Reliability-Based Calibration of the Code for Steel Girder Bridges

by

Patryk Jerzy Wolert

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Approved by

Andrzej S. Nowak, Chair and Professor of Civil Engineering
J. Michael Stallings, Professor of Civil Engineering
James S. Davidson, Professor of Civil Engineering
J. Brian Anderson, Associate Professor of Civil Engineering

Abstract

Accurate evaluation and design of bridge structures can maximize the performance-to-cost ratio, which is one of the most critical aspects in infrastructure maintenance and expansion. The author of this dissertation presents the importance of steel girder bridges and their proportion in the national infrastructure, reviews methods used in calibration of bridge design code, and develops new statistical parameters and material models for structural A709 steel used in bridges. Material models for A992 steel and normal weight concrete were established from available test results. Material models served as inputs for simulation of resistance distribution of steel girders using the Monte-Carlo method.

Resistance analysis was performed for noncomposite, and composite steel girders including rolled I-shaped sections, plate girders, and box girders. For high-performance steel sections, an analytical model was developed that uses nonlinear constitutive material models and accurately captures flexural moment carrying capacity. From the obtained simulations updated statistical parameters were developed for rolled sections. New statistical parameters of resistance were derived for plate girders and steel box girders.

Using calculated resistance models, the author performed reliability analysis and assessed safety levels for steel girder bridges designed in accordance with the current design specification. Finally, a reliability-based calibration of resistance factors was performed, and appropriate recommendations were suggested for implementation in the code.

Acknowledgments

I want to express the deepest appreciation to my advisor, Dr. Andrzej S. Nowak, who has helped and supported me continuously during my Ph.D. program. Without his guidance and persistent help, this dissertation would not have been possible. I want to thank Dr. J. Michael Stallings, one of my doctoral committee members and also the Co-PI of projects I worked on, for his unlimited support during my academic life. I place on record, my sincere gratitude to them for their assistance and guidance and for giving me the opportunity of working with them in a friendly academic environment. I want to thank my doctoral committee members, Dr. James Davidson, and Dr. Brian Anderson for their helpful suggestions and valuable advice on this dissertation. I also would like to acknowledge Dr. Maria Auad for accepting to be outsider reader.

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List of Abbreviations

AM	Analytical Model
ADT	Average Daily Traffic
ADTT	Average Daily Truck Traffic
AASHTO	American Association of State Highway and Transportation Officials
CDF	Cumulative Distribution Function
ENA	Elastic Neutral Axis
FHWA	Federal Highway Administration
FOSM	First Order Second Moment
LRFD	Load and Resistance Factor Design
NBI	National Bridge Inventory
PDF	Probability Density Function
PNA	Plastic Neutral Axis
RPA	Rigid Plastic Analysis
WIM	Weigh-in-motion

Chapter 1: Introduction

1.1 Statement of the problem

Current load and resistance factors used in designing of steel girder bridges were developed in early 1990 based on data and knowledge available at that time. Over time, material parameters improved due to the strict quality control procedures followed by steel manufacturers. Digital databases of the steel test results were created, allowing to plot distributions of steel strength as well as derive their statistical parameters. At the same time, the load effects increased due to the larger volume and weight of vehicular traffic on roads and bridges. The growth of weigh-in-motion systems provided large databases of the traffic records and led to the development of live load models. These changes on both sides, steel resistance and loads, impact safety levels and may require modification of currently used load and resistance factors to keep the reliability levels constant.

1.2 Justification for Research

More advanced reliability procedures currently available, as well as developments in modeling of structures, allow to perform in-depth analysis of structural reliability.

New test data for A709 steel plates were provided by steel mills and served for the derivation of new material and resistance models for bridge steel plate girders. Steel coupons for wide flange sections were tested in 2003 and resulted in a database for reliability analysis. Around the same time, a large database was collected from concrete plants with results of compressive strength test for concrete grades of 3000 ÷ 6000 psi. These data sets allow to update current statistical parameters of resistance and to develop new resistance models. From those, a reliability analysis can be performed to evaluate safety levels behind current design formulas.

1.3 Research Objectives

Research objectives are as follows:

- To analyze available material test data and to develop updated statistical parameters of resistance for steel bridge girders.
- To develop reliability models for steel girder bridges.
- To develop updated load and resistance factors by applying new load and resistance models and performing reliability-based calibration.

1.4 Scope of the Dissertation

This dissertation emphasizes the importance of steel girder bridges and presents their contribution to national infrastructure as well as their age. Additional analysis on the distribution of bridges in each state was performed and provides localized statistical information on structurally deficient and obsolete bridges. The methods used in the last calibration of the bridge design code were reviewed and helped to ensure that the developed calibration procedures are adequate and free of errors.

New material models for structural steel A709 used in bridges were developed. Test results provided by two steel mills for four steel grades contain over 28,000 samples coming from a total of 6,400 heats total. Available data with test results of A992 steel and concrete strengths was processed, and new material model formulation was proposed that better predict values of variables at the bottom tail of their distributions.

Girders analyzed include the following: noncomposite rolled I-shapes, noncomposite I-shaped plate girders, composite rolled I-shapes, composite I-shaped plate girders, and composite box girders. Resistance models were developed for:

1. 250 noncomposite rolled I-shaped sections
2. 64 noncomposite I-shaped plate girder sections
3. 244 composite rolled I-shaped sections
4. 146 composite I-shaped plate girder sections
5. 80 composite box girders

Rolled I-shaped sections and box girders were selected to cover most of the possible design cases. Both composite and noncomposite plate girders were designed for a specific span length and girder spacing. Plate girders were designed in accordance with the AASHTO LRFD Specification [1]. For high-performance steel sections, to capture instant strain hardening after reaching the yield strain, a special analytical model for flexural resistance was developed that accounts for material nonlinearity. It bases on an incrementally established moment-curvature relationship and uses constitutive nonlinear material models for steel and concrete.

Load models were taken from previous studies, including a recent update of live load models that was derived from a substantial WIM database [2]. These live load models allowed for analysis of simple span bridges lengths from 30 to 300 feet.

Finally, reliability analyses of these structures and calibration of the design code were performed. The results suggest an increase of resistance factor for flexure by 5% for selected structural bridge systems that interchangeably corresponds to 5%decrease of the load factors .

Detailed description per chapter is shown below.

Chapter 2: This chapter introduces statistics on bridges extracted from NBI database. It stresses out the importance of steel girder bridges and includes a literature review on the structural reliability, bridge loads and resistance of steel girders.

Chapter 3: The third chapter provides an overview of reliability analysis procedures including formulation of limit state function, methods of reliability index calculation, simulation techniques, and optimal calibration of load and resistance factors.

Chapter 4: This chapter discusses load models used in reliability analysis. It describes currently used loads specified in design code, as well as provides statistical parameters required for probabilistic analysis.

Chapter 5: The fith chapter of this dissertation is the most expanded and comprehensively discusses the resistance of steel girders. Firstly, noncomposite and composite steel sections are selected including rolled I-shapes, plate girders, and box girders. Their geometry and nominal resistances are chosen so that they cover the most common bridge designs. Secondly, code provided flexural and shear resistance estimation procedures are discussed for all the structural types considered. Next, a special analytical model for flexural resistance accounting for material nonlinearity is developed to asses load carrying capacity of high-performance steel sections. To perform resistance simulations, the material databases are analyzed, and material models along with statistical parameters are developed. In section 5.5 resistance simulation techniques are comprehensively described for each of the structural types and applied materials. Section 5.6 presents obtained statistical parameters of material factors for all the girders analyzed. Lastly, remaining resistance factors are presented together with failure criteria considered in the analysis.

Chapter 6: This chapter talks about the reliability analysis performed. Section 6.1 presents obtained resistance distributions, which is followed by distribution of loads. Finally, calculated reliability indices are discussed for each structural type analyzed.

Chapter 7: Chapter seven discusses the approach used in the attempt of resistance factors calibration for the design code. It presents results of undertaken analysis and provides the recommendation on resistance factor for each steel girder type considered.

Chapter 8: Provides summary, conclusions and recommendations.

The references in order of occurrence in the text are listed follow Chapter 8.

Appendices A, B, and C correspond to chapters 4, 5, and 6, respectively.

Chapter 2: Literature review

This chapter is intended as a background discussion on the condition of the US bridges, evaluation of the reliability of bridge girders, their system reliability and modeling as well as various relevant topics.

2.1 Introduction

Current LRFD code design requirements were developed from the work done between 1960 and 2000. Since then, data regarding load and resistance parameters became available in larger quantity and quality. Several publications related to statistics of the materials and loads were released since, allowing for evaluation of current code provisions as well as conducting research on potential improvements. Also, technological development made it easy to implement modeling techniques that were overly complex and difficult in the past.

Bridges are important components of US road infrastructure, which is one of the main drivers of the country's trade-based economy. To get a better understanding of the importance and changing-in-time condition of nation's bridges the National Bridge Inventory (NBI) database was analyzed for years 2012-2017 [3]. The purpose of this data presentation is to introduce the volume and scale of the NBI and to emphasize the importance of steel girder and steel box girder bridges.

The 2017 release of bridge inventory reports over 615,000 bridges nationwide. Table 2-1 shows how the number and area of the nation's bridges were changed since 2012. Bridges noticeably increased - 1.25% in number and 4.10% by area since 2012. The highest increases occurred in 2014 and 2016, with over 2,500 new bridges built in those years.

Table 2-1. NBI Summary from 2012 to 2017 [3]

Year	2012	2013	2014	2015	2016	2017
Number of Bridges	607,380	607,751	610,749	611,845	614,387	615,002
Number of Structurally Deficient Bridges	65,605	62,565	60,445	58,036	55,301	53,895
Number of Functionally Obsolete Bridges	76,319	75,929	76,031	75,857	75,707	75,764
Total Area of Bridges (m^2)	317.6E+6	320.8E+6	323.5E+6	326.3E+6	328.7E+6	331.2E+6
Area of Structurally Deficient (m^2)	24.9E+6	23.5E+6	22.0E+6	20.9E+6	19.6E+6	18.7E+6
Area of Functionally Obsolete (m^2)	51.9E+6	52.1E+6	52.9E+6	53.3E+6	54.2E+6	55.4E+6

The following plots are intended to give an insight on how bridges and their condition disperse in the transportation infrastructure network. Plots reflecting the 2017 are presented for the entire bridge inventory.

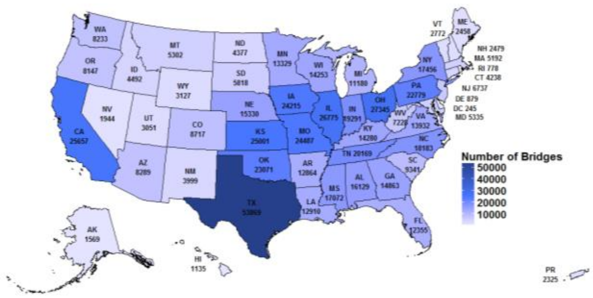


Fig. 2-1: Number of bridges in each state - NBI 2017 database [3].

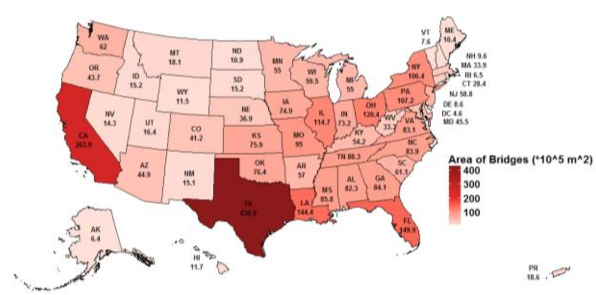


Fig. 2-2: Area of bridges in each state - NBI 2017 database [3].

In addition to the values presented in the figures Fig. 2-1 and Fig. 2-2, the percentage distributions of bridges in each state are shown in Fig. 2-3 and Fig. 2-4.

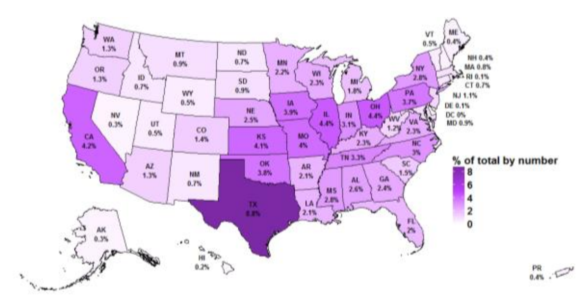


Fig. 2-3: Percentage distribution of bridges in each state, by number - NBI 2017 database [3].

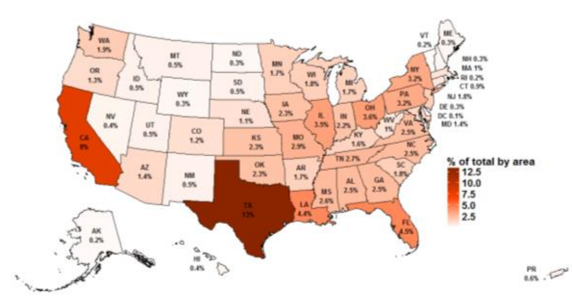


Fig. 2-4: Percentage distribution of bridges in each state, by area - NBI 2017 database [3].

The percentages of nations bridges qualified as structurally deficient and functionally obsolete are presented in Table 2-2 and Table 2-3. Fortunately, the functionally deficient bridges keep a decreasing tendency in number and area (Table 2-2). It is noticeable that the number of structurally deficient bridges decreased over the last six years by 2%.

Table 2-2. Percent of Structurally Deficient Bridges per total NBI [3]

Year	2012	2013	2014	2015	2016	2017
By Number	10.8%	10.3%	9.9%	9.5%	9.0%	8.8%
By Area	7.8%	7.3%	6.8%	6.4%	6.0%	5.6%

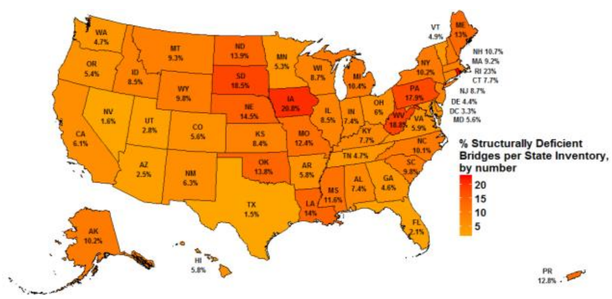


Fig. 2-5: Percentage distribution of Structurally Deficient Bridges in each state, by number - NBI 2017 database [3].

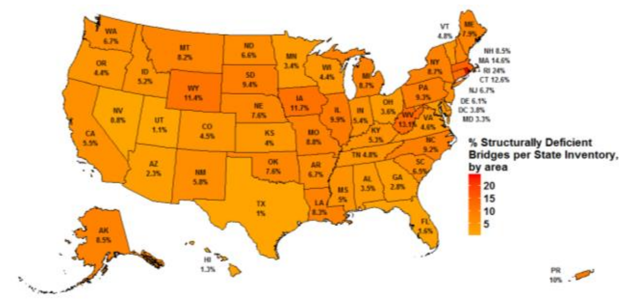


Fig. 2-6: Percentage distribution of Structurally Deficient Bridges in each state, by area - NBI 2017 database [3].

Interestingly, functional obsolescence expressed in percent by area grew by 0.6% over the last six years (Table 2-3). This proves that these bridges remain functional and more bridges become qualified as obsolete due to either imposed policy changes or more accurate bridge inspections.

Table 2-3. Percent of Functionally Obsolete Bridges per total NBI [3]

Year	2012	2013	2014	2015	2016	2017
By Number	12.6%	12.5%	12.4%	12.4%	12.3%	12.3%
By Area	16.3%	16.3%	16.3%	16.3%	16.5%	16.7%

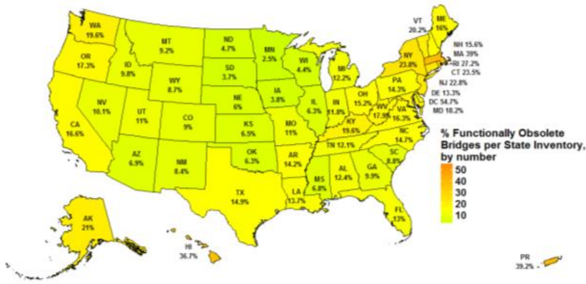


Fig. 2-7: Percentage distribution of Functionally Obsolete Bridges in each state, by number - NBI 2017 database [3].

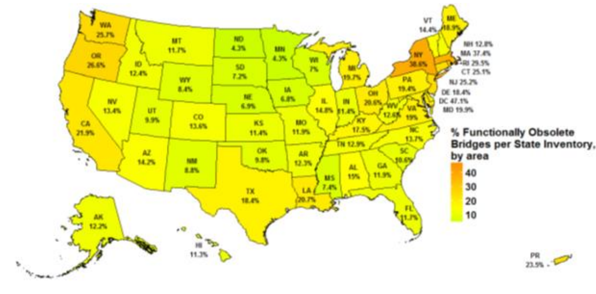


Fig. 2-8: Percentage distribution of Functionally Obsolete Bridges in each state, by area - NBI 2017 database [3].

As far as the age of the bridges was concerned, the age of a structure was not a factor independently impacting its structural condition. There are instances of bridges being structurally deficient mainly to due to the age, but this applied to rather small bridges with lower magnitudes of ADT because other more important structures are prioritized in maintenance funds allocation. To have a better idea of this aspect, the average age of bridge inventory in each state is shown in figures 2-9 through 2-11.

Table 2-4. Average age of NBI [3]

Year	2012	2013	2014	2015	2016	2017
Total Inventory (years)	41.5	41.8	42.2	42.7	43.1	43.5
Structurally Deficient (years)	64.0	64.6	65.3	65.8	66.6	67.0
Functionally Obsolete (years)	52.7	53.2	53.6	54.1	54.7	55.3

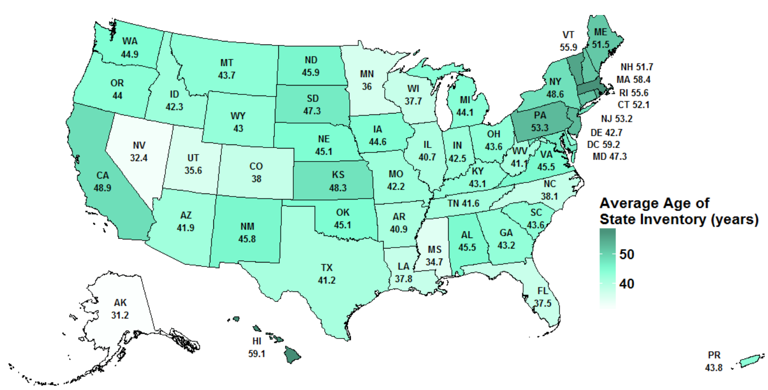


Fig. 2-9: Average age of bridges in each state, by number - NBI 2017 database [3].

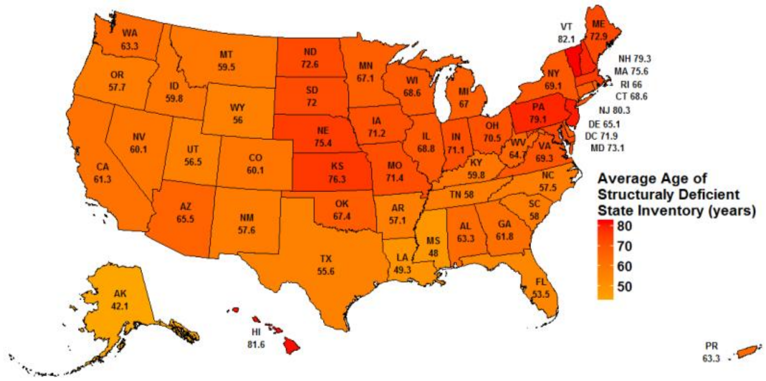


Fig. 2-10: Average age of Structurally Deficient bridges in each state, by number - NBI 2017 database [3].

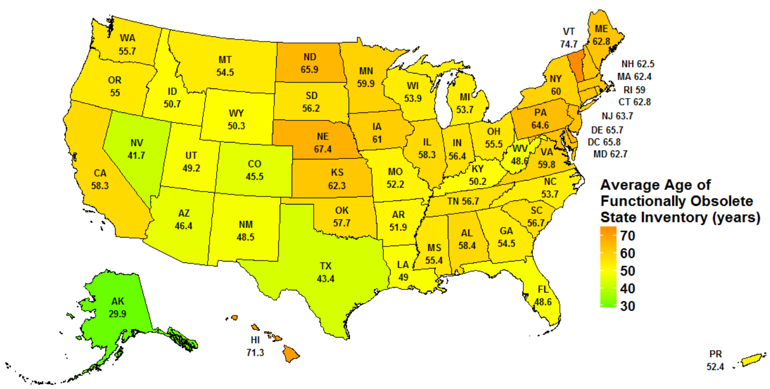


Fig. 2-11: Average age of Functionally Obsolete Bridges in each state, by number - NBI 2017 database [3].

The data presented illustrate a steadily improving condition of the bridge infrastructure and emphasizes the areas of the country, where more efforts are needed to achieve a satisfactory condition in the bridge inventory.

The NBI [3] also contains information on the bridge types (Fig. 2-12), from which a data on the year build of steel girder bridges were extracted and presented in Fig. 2-13. The greatest flourish of steel girder bridges (Fig. 2-13) occurred in the middle of the previous century. Also, relatively uniform number of bridges built in between 1980 and 2010 is noticeable (Fig. 2-13). The number of steel girder bridges built since 2010 (Fig. 2-13), being above 5,000 does not indicate the end of steel girder bridge era. Those numbers prove the importance of steel girder bridges and the need for in-depth research on their performance.

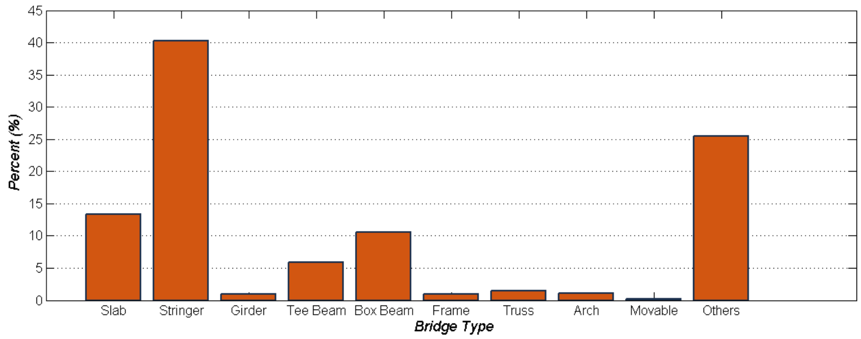


Fig. 2-12: Percentage distribution of bridge types in the United States - NBI 2017 database [3].

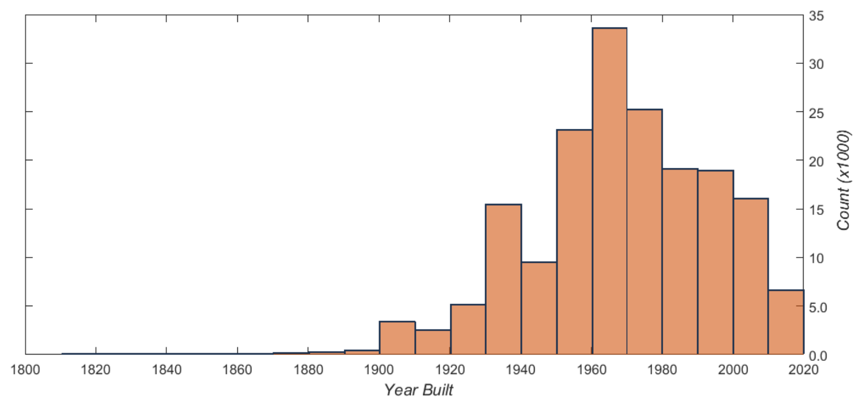


Fig. 2-13: Number of Steel Girder Bridges built in each decade - NBI 2017 database [3].

Nearly a quarter of the NBI [3] (Table 2-5) consists of steel girder bridges in accordance to the nomenclature of FHWA Recording and Coding Guide [4], which does not capture steel box girders. The steel box girders share only 0.1% of the inventory number (total of 1,034 bridges) and 1.1% by area. Table 2-5 and Table 2-6 provide more information on the changes in share of girder and box girder structural types over the last six years.

Table 2-5. Steel Girder Bridges from 2012 to 2017

Year	2012	2013	2014	2015	2016	2017
Number of bridges	153,814	152,569	152,273	151,603	151,262	150,334
Number of Structurally Deficient Bridges	26,297	25,143	24,361	23,513	22,660	21,936
Number of Functionally Obsolete Bridges	28,859	28,536	28,341	28,197	28,068	28,130
Area of Bridges (m2)	116.0E+6	116.2E+6	116.6E+6	116.4E+6	116.9E+6	116.9E+6
Area of Structurally Deficient (m^2)	10.9E+6	10.3E+6	9.5E+6	9.3E+6	9.0E+6	8.6E+6
Area of Functionally Obsolete (m^2)	23.8E+6	23.8E+6	24.2E+6	23.7E+6	23.8E+6	24.3E+6

Table 2-6. Steel Box Girder Bridges from 2012 to 2017

Year	2012	2013	2014	2015	2016	2017
Number of bridges	967	983	1,011	1,008	1,019	1,034
Number of Structurally Deficient Bridges	81	82	95	79	72	77
Number of Functionally Obsolete Bridges	151	162	174	203	205	228
Area of Bridges (m2)	3.4E+6	3.5E+6	3.5E+6	3.7E+6	3.7E+6	3.8E+6
Area of Structurally Deficient (m^2)	399.2E+3	383.2E+3	384.2E+3	406.0E+3	369.6E+3	350.6E+3
Area of Functionally Obsolete (m^2)	593.4E+3	617.4E+3	708.4E+3	706.6E+3	732.2E+3	916.8E+3

The number and area of steel girder and box girder bridges in each state are shown in Fig. 2-14 through Fig. 2-17.

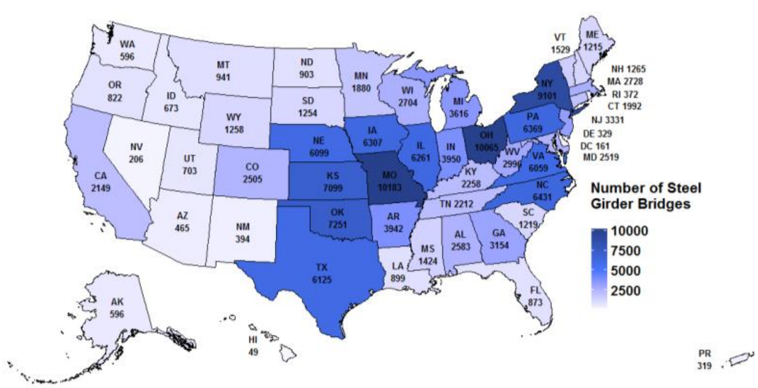


Fig. 2-14: Number of Steel Girder Bridges in each state - NBI 2017 database [3].

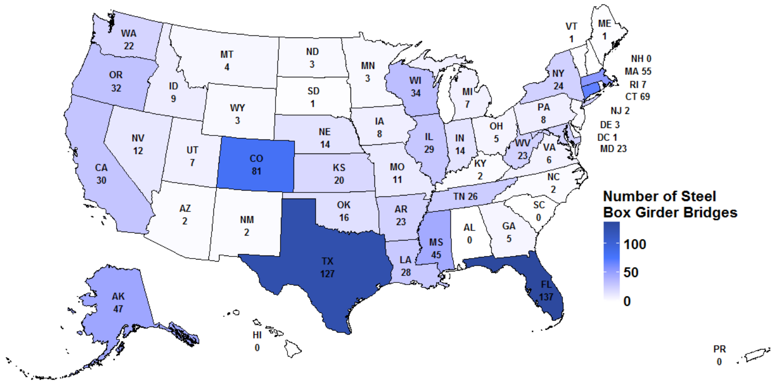


Fig. 2-15: Number of Steel Box Girder Bridges in each state - NBI 2017 database [3].

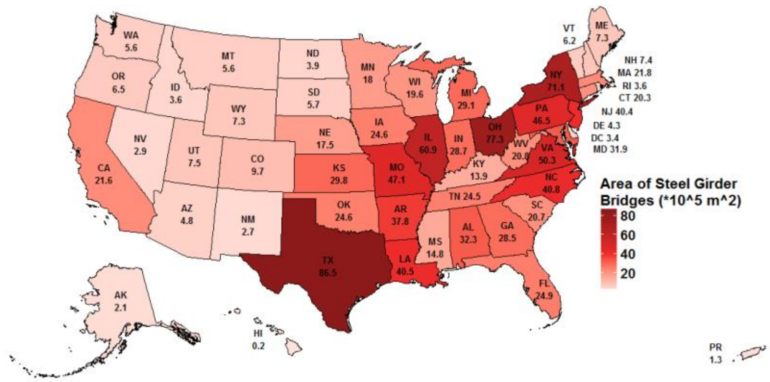


Fig. 2-16: Area of Steel Girder Bridges in each state - NBI 2017 database [3].

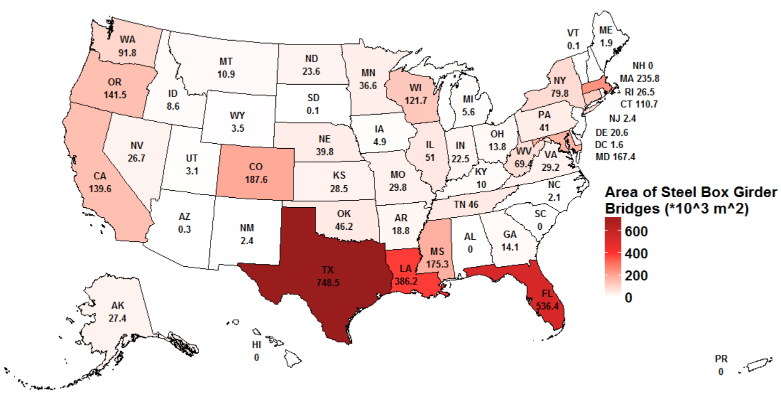


Fig. 2-17: Area of Steel Box Girder Bridges in each state - NBI 2017 database [3].

Plots illustrating portions of state inventory being steel girder and steel box girder type are presented below.

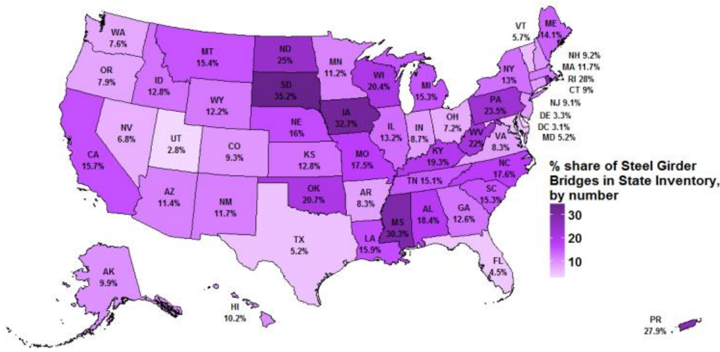


Fig. 2-18: Percentage of Steel Girder Bridges in State Inventory, by number - NBI 2017 database [3].

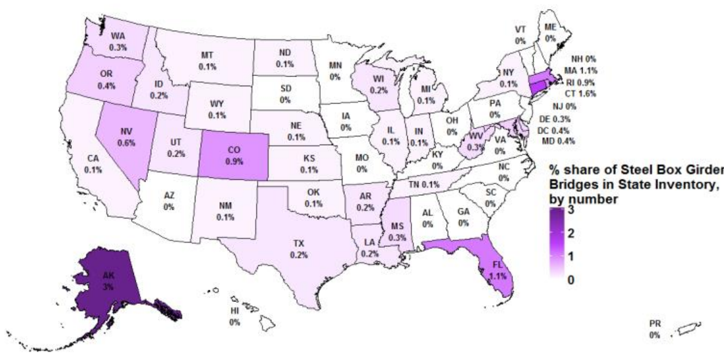


Fig. 2-19: Percentage of Steel Box Girder Bridges in State Inventory, by number - NBI 2017 database [3].

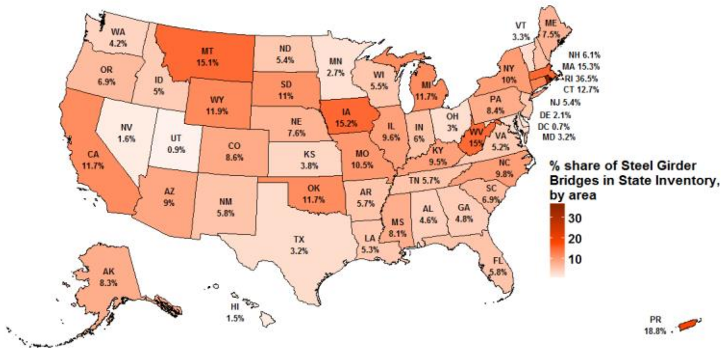


Fig. 2-20: Percentage of Steel Girder Bridges in State Inventory, by area - NBI 2017 database [3].

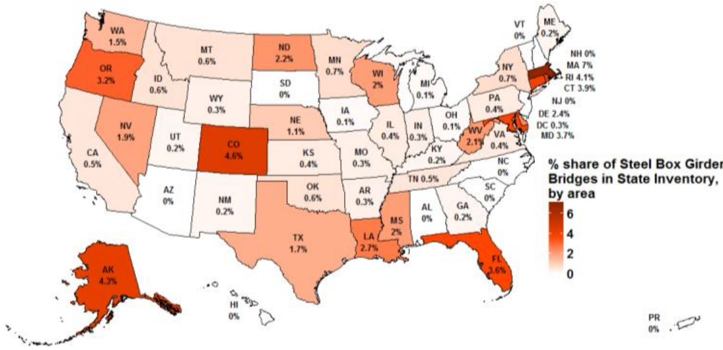


Fig. 2-21: Percentage of Steel Box Girder Bridges in State Inventory, by area - NBI 2017 database [3].

Data on Steel Girder and Steel Box Girder Bridges classified as Structurally Deficient is shown in Table 2-7 and Table 2-8.

Table 2-7. Percent of Structurally Deficient Bridges per Steel Girder Type Inventory.

Year	2012	2013	2014	2015	2016	2017
By Number	17.1%	16.5%	16.0%	15.5%	15.0%	14.6%
By Area	9.4%	8.9%	8.2%	8.0%	7.7%	7.4%

Table 2-8. Percent of Structurally Deficient Bridges per Steel Box Girder Type Inventory.

Year	2012	2013	2014	2015	2016	2017
By Number	8.4%	8.3%	9.4%	7.8%	7.1%	7.4%
By Area	11.7%	11.0%	11.0%	11.0%	9.9%	9.2%

Percentage contribution of structurally deficient structural types considered in state inventory are presented below.

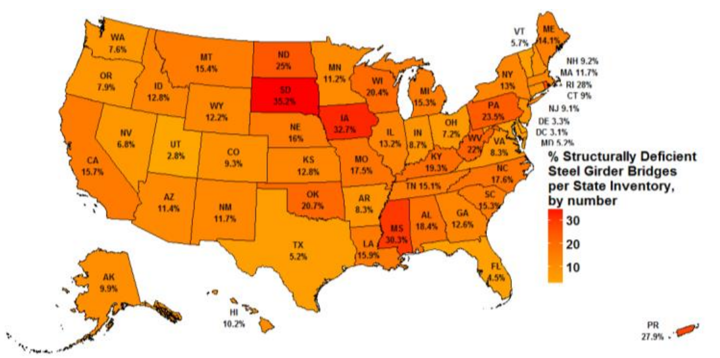


Fig. 2-22: Percentage distribution of Structurally Deficient Steel Girder Bridges in each state, by number - NBI 2017 database [3].

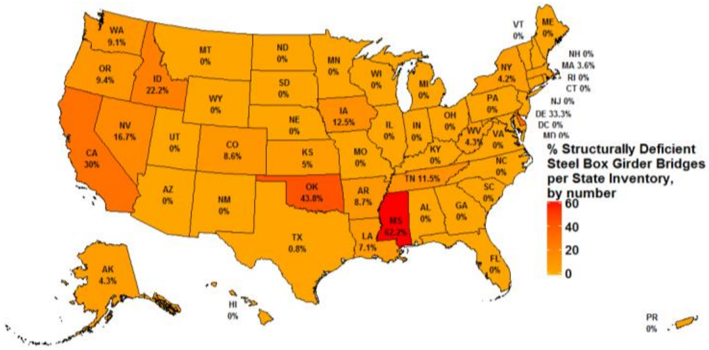


Fig. 2-23: Percentage distribution of Structurally Deficient Steel Box Girder Bridges in each state, by number - NBI 2017 database [3].

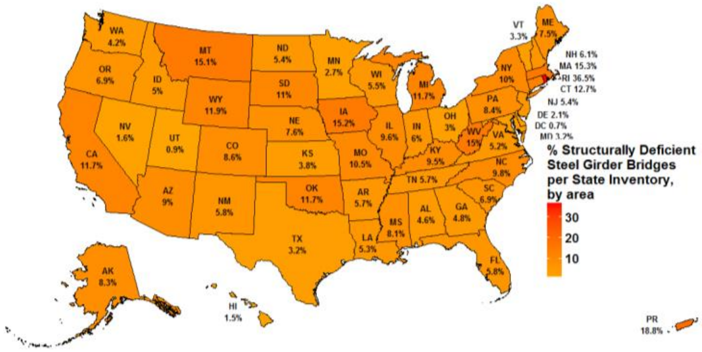


Fig. 2-24: Percentage distribution of Structurally Deficient Steel Girder Bridges in each state, by area - NBI 2017 database [3].

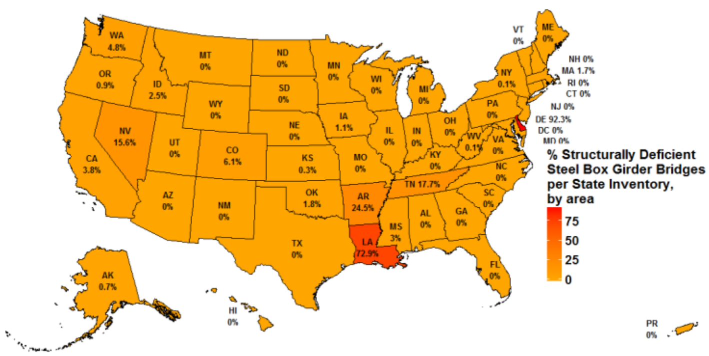


Fig. 2-25: Percentage distribution of Structurally Deficient Steel Box Girder Bridges in each state, by area - NBI 2017 database [3].

Table 2-9 and Table 2-10 present data of Steel Girder and Steel Box Girder Bridges classified as Functionally Obsolete between 2012 and 2017. This is followed by figures with percentages for each state.

Table 2-9. Percent of Functionally Obsolete Bridges per Steel Girder Type Inventory.

Year	2012	2013	2014	2015	2016	2017
By Number	17.1%	16.5%	16.0%	15.5%	15.0%	14.6%
By Area	9.4%	8.9%	8.2%	8.0%	7.7%	7.4%

Table 2-10. Percent of Functionally Obsolete Bridges per Steel Box Girder Type Inventory.

Year	2012	2013	2014	2015	2016	2017
By Number	8.4%	8.3%	9.4%	7.8%	7.1%	7.4%
By Area	11.7%	11.0%	11.0%	11.0%	9.9%	9.2%

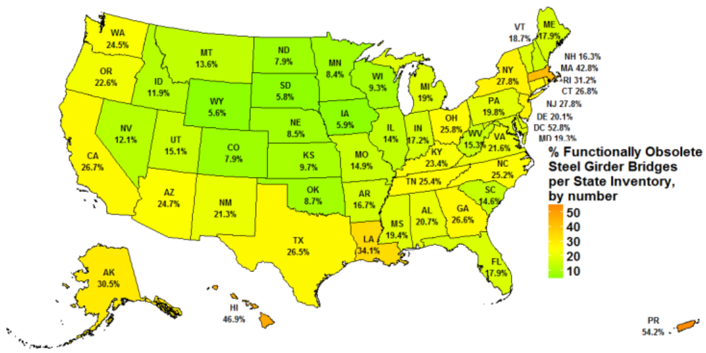


Fig. 2-26: Percentage distribution of Structurally Deficient Steel Girder Bridges in each state, by number - NBI 2017 database [3].

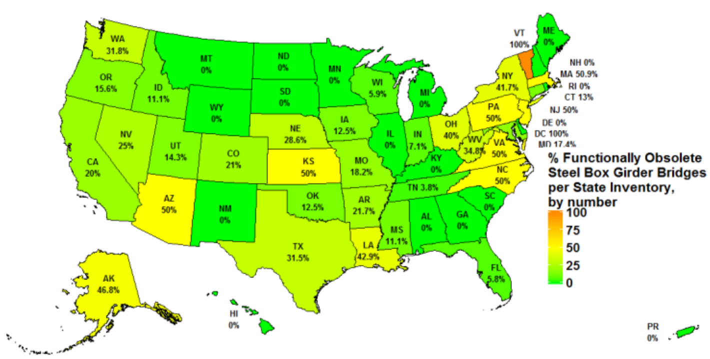


Fig. 2-27: Percentage distribution of Structurally Deficient Steel Box Girder Bridges in each state, by number - NBI 2017 database [3].

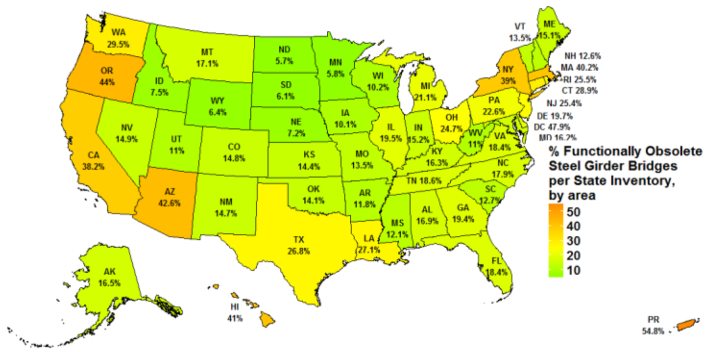


Fig. 2-28: Percentage distribution of Structurally Deficient Steel Girder Bridges in each state, by area - NBI 2017 database [3].

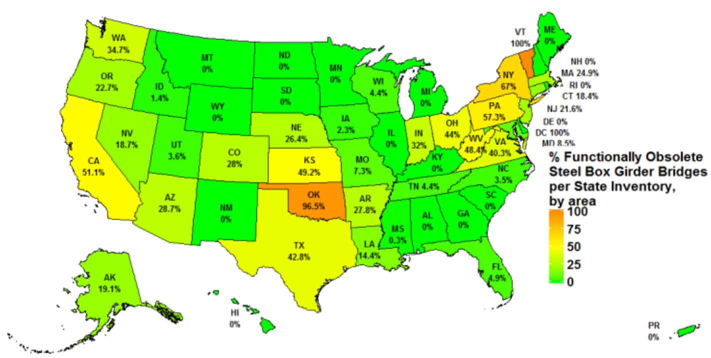


Fig. 2-29: Percentage distribution of Structurally Deficient Steel Box Girder Bridges in each state, by area - NBI 2017 database [3].

2.2 Structural reliability of highway bridges

Structural reliability is a relatively new concept in structural engineering. The word reliability, before World War II was linked mostly to repeatability, where a certain test was reliable if the same results would be obtained repeatedly. In 1920s product improvement through the use of statistical process control was promoted by Dr Shewhart at Bell Labs [5]. Around that time Weibull was working on statistical models for fatigue. The modern use of the word reliability was defined by the U.S. military in the 1940s, characterizing a product that would operate as expected and for a specified period of time. To measure reliability, statistical parameters must be derived from tests and surveys.

The concept of reliability driven by product industries, finally found its application in structural engineering. First publications about the structural safety date back to the 1960s when Freudenthal [6] summarized his work on classical theory of structural reliability. Freudenthal was among the first in the world to develop structural reliability that is the application of probabilistic methods to evaluate structural safety. Since then, because there is insufficient amount of experimental data to determine the tail ends of probability distributions, which are substantial in calculating the probability of failure, and it is easier to formulate design formulae based on the first two moments, attention was given to develop probability-based design codes such as LRFD (Load and Resistance Factor Design).

Throughout the second half of previous century, a number of surveys and tests were carried out. Results are available on statistics of live loads and resistance parameters of steel bars and concrete, which serves for better reliability evaluation of existing structures and new designs. Additional information on the most recent findings applicable for girder bridges is presented in sections that follow.

2.3 Bridge loads

Highway bridges are subjected to different types of loads during their lifetime. These loads include dead load, live load, dynamic load, environmental loads (loads resulting from temperature change, wind, snow, ice, water stream), and special loads such as collision and emergency braking. For long span bridges, critical loads are dead load, temperature induced loads, wind and earthquake loads. For short and medium span bridges governing loads are dead load and live load. Information about the vehicular live load is coming from load surveys and collected Weigh-in-motion (WIM) data play a significant role in the validation of the design live load.

Design load used in engineering practice is expected to generate conservatively larger load effects than the actual loads the bridge experiences. The current AASHTO code [1] uses HL-93 loading for the vehicular live load which is a combination of a design tandem with design lane load or design truck combined with design lane load. The greater force effect from each combination controls and is used in the design of the bridge and its components.

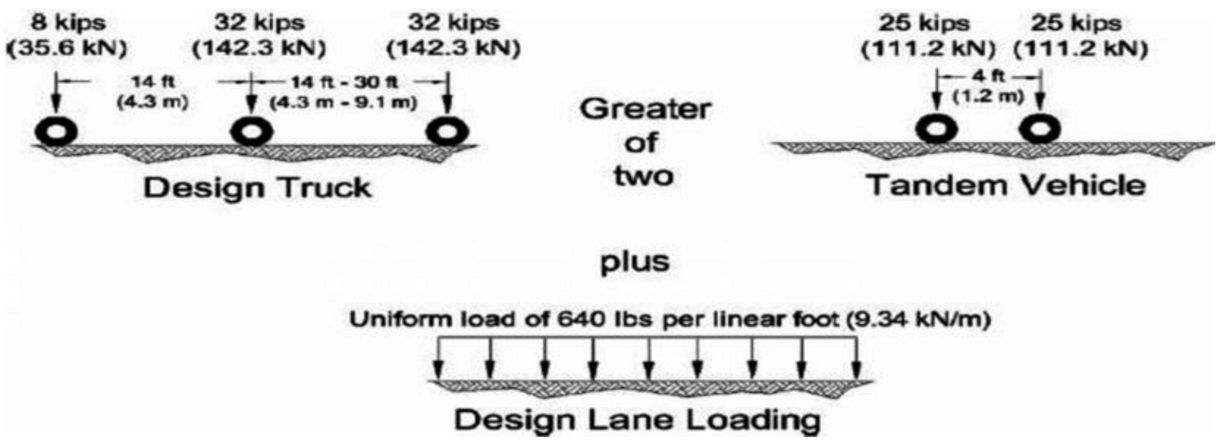


Fig. 2-30: HL-93 Design Loading [1].

Many times, heavy trucks and load configurations generate more significant moments and shear forces than the design load. Such instances must be taken into account by such code provisions that provide a certain margin of safety.

Loads used in the last calibration of the AASHTO code [1] came from a load survey carried out by the Ontario Ministry of Transportation [7] between 1970 and 1990 with fewer than 10,000 vehicles because no other reliable data was available that time. Meanwhile the United States Federal Highway Administration collected a considerable WIM database, and as a result, the Strategic Highway Research Program 2 (SHRP2) R19B report [2] was published. This report includes results obtained from a data set of 34 million vehicles, from 37 locations in 18 states. The results contain WIM moment to HL-93 moment ratios as well as shear ratios for 30, 60, 90, 120, 200 and 300ft span lengths. These values were extrapolated to predict mean maximum future moment, starting from 2 weeks, ending at 100 years. Values of statistical parameters were provided for a range of average daily truck traffic (ADTT) values, from 250 to 10,000. With the research on WIM data being currently done, the SHRP2 [2] report is the most up-to-date source of information on bridge loads and their statistical parameters that can be used for reliability analysis.

2.4 Resistance of steel girder bridges

The resistance of steel girder bridges depends on their structural type and static schemes. The resistance of the bridge can be expressed as a resistance of the whole structure, a multispan system of girders with deck, a one span system, or a simple girder with the certain tributary width deck. One of the critical factors in steel bridge capacity is the strength of steel. Steel, as a material has a few properties which can be designed: strength, toughness, ductility, weldability, and durability that can be utilized as desired. From the bridge performance point of view, all these properties are essential and must be foreseen in the design process. As of the nature of the research presented in this dissertation, the main focus regarding the material parameters is on the strength and ductility of the steel.

The steel industry started booming with the development of the Bessemer converter in 1857. A number of steel grades were introduced, and manufacturing techniques were unified which allowed for the production of a nearly uniform strength of steel. One of the main parameters describing steel is its nominal yield and ultimate strength. The nominal value, which also can be named as guaranteed strength, is used in the design of steel bridges and structures. The nominal value is conservatively chosen and is smaller than the mean strength for a specific steel grade. As a matter of fact, steel strength tends to deviate from the mean due to differentiation in the manufacturing processes and resulting in certain statistical parameters and distribution types. Similarly, the strength of concrete used in a structure can be described by nominal, mean and deviation value.

An extensive study on the resistance of bridge components was performed by Ellingwood and Galambos [8] and published in 1980. This publication contains results of tests made by authors and results obtained by other researchers that are summarized in a way to serve for reliability analyses. Of the most valuable information; still used in the research and available in this publication, are material property statistics, modeling statistics, and resistance statistics for steel elements. Since 1980, quite extensive research has been done on material parameters, as well as resistance parameters of various bridge systems. In 1990s Tabash & Nowak [9], [10] developed the resistance parameters for bridges. In his dissertation Fernand [11] developed a model for a deck on steel girders based on resistance parameters of steel developed by Nowak [10] and Tabash [9]. These same statistical parameters were later published in the National Cooperative Highway Research Program report 368 [12] in 1999. The same resistance parameters for steel girders were used in more recent work on resistance of bridge systems by Nowak [13], Czarnecki [14] as well as in attempts for code calibration due to findings of increased live load [15]. This was purely due to costs associated with research on statistical parameters for structural steel and the economic impact on the steel industry resulting from new findings. Although, manufacturing practices improved over the last three decades the statistical parameters for resistance of steel were not yet comprehensively studied. Certain ASTM codes regulate the requirements for steel products. With regard to testing of steel components for bridges, the AASHTO Standard Specification for

Transpiration Materials and Methods of Sampling and Testing [16] fully adopted the ASTM code for Mechanical Testing of Steel Products (AASHTO T 244-06, ASTM A 370-05).

Chapter 3: Reliability analysis procedures

This chapter describes reliability analysis procedures used to determine the reliability indices.

3.1 Limit state function

Considering loads and resistance as a random variable it is necessary to formulate limit state function, which distinguishes failure from safe performance of the structural system considered. For a bridge an undesired performance is the loss of ability to carry traffic. The undesired performance can include collapse of the bridge structure or excessive deflection causing discomfort for pedestrians and drivers. Limit states can be divided into two categories:

Ultimate Limit States (ULS) are mostly related to the loss of load carrying capacity. When an ULS is exceeded, a catastrophic failure of the structure occurs, such as collapse or loss of operability. ULSs can be the formation of a plastic hinge, crushing of concrete, buckling or loss of stability. These are the limit states considered in a reliability-based design code.

Serviceability Limit States (SLS) are related to gradual degradation and comfort of the user. These limit states are usually not associated with an immediate structural collapse. SLSs can be an excessive cracking on a bridge deck leading to potholes and spalling of concrete.

The acceptability criteria are often based on engineering judgment (arbitrary decision). For example, consider a beam that fails if the moment due to the loads exceeds the moment carrying capacity. Then the corresponding limit state function can be written as follows:

$$g = g(x_1, x_2, x_3, \dots, x_n) = R - Q \tag{3.1}$$

where R represents the resistance (moment carrying capacity), Q represents the load effect (total moment applied) and x_i represent the random variables of load and resistance such as dead load, live load, length, depth, etc. The limit state function represents the boundary beyond which the structure no longer functions. The probability of failure, P_f, is equal to the probability that the undesired performance will occur. Mathematically, this can be expressed in terms of the limit state function as:

$$P_f = P(R - Q < 0) = P(g < 0) \tag{3.2}$$

If both R and Q are continuous random variables, then each has a probability density function (PDF) such as shown in Fig. 3-1.

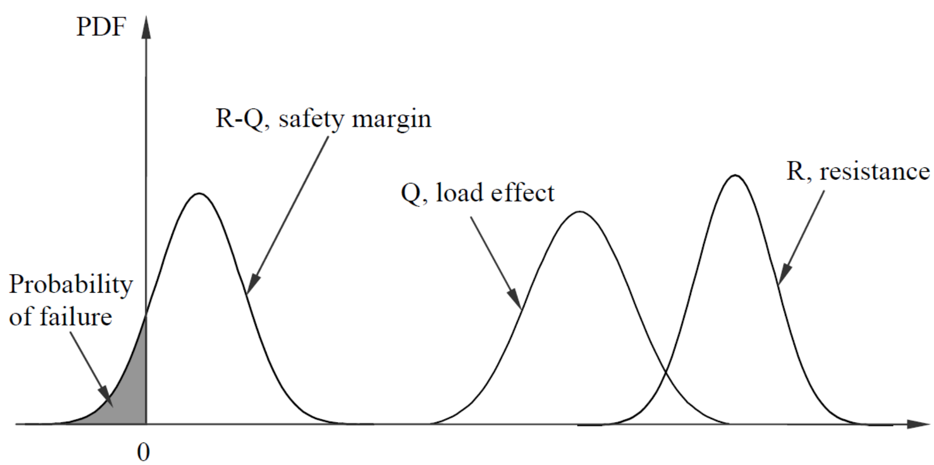


Fig. 3-1: Probability Density Function of load, resistance, and safety margin [17].

Furthermore, R-Q is also a random variable with its own PDF. This is shown in the figure above. The probability of failure corresponds to the shaded area in Fig. 3-1. Specifically, the probability of failure is:

$$P_f = \int_{-\infty}^{+\infty} F_R(x_i) f_Q(x_i) dx_i \tag{3.3}$$

where, $F_R(x)$ is the CDF of resistance R and $f_Q(x)$ is the PDF of the load Q.

Because there are often multiple random variables that determine R and Q, the evaluation of equation (3.3) cannot be calculated as this would require complex and time-consuming numerical techniques. Moreover, there is often insufficient data to fully define the basic variables needed for this numerical procedure in order to obtain acceptable accuracy. Therefore, it is convenient to measure structural safety in terms of a reliability index.

3.2 Reliability index

The reliability index represents the shortest distance from the origin of standard space (reduced variable space) to the limit state line $g(Z_R, Z_Q)=0$, in the reduced variables space, as shown in Fig. 3-2, where Z_R is the reduced random variable for resistance and Z_Q is the reduced variable for load. The reduced form of a random variable, X, is given by:

$$Z_X = \frac{X - \mu_X}{\sigma_X} \tag{3.4}$$

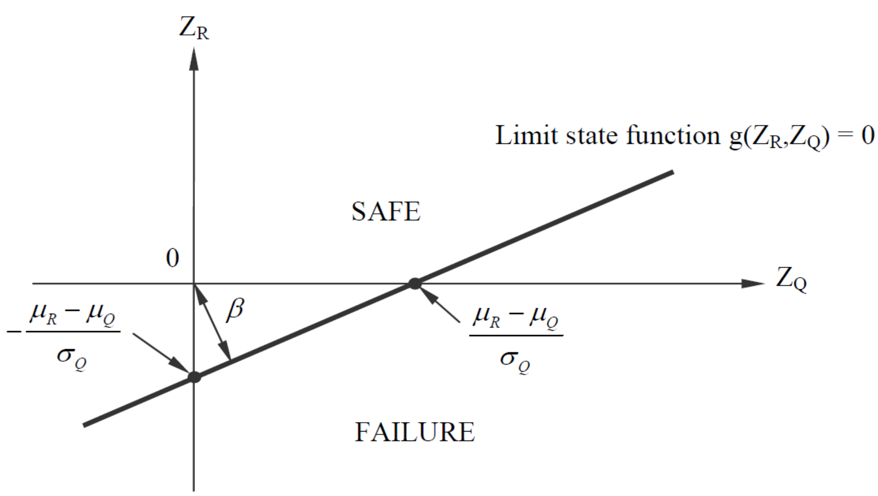


Fig. 3-2: Reliability index as shortest distance to origin [17].

There are various procedures available for calculation of β. These procedures vary regarding accuracy and required input data.

The reliability index, β, is related to the probability of failure, P_f, by:

$$\beta = -\Phi^{-1}(P_f) \tag{3.5}$$

where Φ^{-1} is the inverse standard normal distribution function. A comparison of the reliability index to probability of failure according the equation (3.5) is given in Table 3-1. The value reliability index of 3.5 represents the target reliability index for bridges of the AASHTO LRFD Code. However, this value is used for calibration only, and as it will be shown in this study, the actual components can have significantly different values of β.

Table 3-1. Reliability index and corresponding reliability and probability of failure.

Reliability Index, β	Reliability	Probability of Failure	
0.0	0.500	5.00E-01	50%
0.5	0.691	3.09E-01	31%
1.0	0.8413	1.59E-01	16%
1.5	0.93319	6.68E-02	7%
2.0	0.977250	2.28E-02	2%
2.5	0.9937903	6.21E-03	0.6%
3.0	0.99865010	1.35E-03	0.1%
3.5	0.999767371	2.33E-04	0.02%
4.0	0.9999683288	3.17E-05	0.003%
4.5	0.99999660233	3.40E-06	0.0003%
5.0	0.999999713348	2.87E-07	0.00003%
5.5	0.9999999810104	1.90E-08	0.000002%
6.0	0.99999999901341	9.87E-10	0.0000001%
6.5	0.999999999959840	4.02E-11	0.000000004%
7.0	0.9999999999987200	1.28E-12	0.0000000001%

3.2.1 First Order Second Moment Methods

The First Order Second Moment (FOSM) method is one the simplest procedures for calculating the reliability indices. First order implies that this method considers only linear limit state functions or linear approximation of them, while second moment refers to the fact that the first two moments of a random variable, the mean value and the standard deviation, are considered. The third and fourth moments are skewness and kurtosis, respectively, but these parameters are often unavailable and are rarely used. If both R and Q are independent normal random variables, then the reliability index, β, as originally defined in 1969 by Cornell [18] is expressed as:

$$\beta = \frac{\mu_R - \mu_Q}{\sqrt{\sigma_R^2 + \sigma_Q^2}} \tag{3.6}$$

Where μ_R and μ_Q are the means of R and Q, respectively, and σ_R, σ_Q are the standard deviations of R and Q, respectively. If both R and Q are lognormal variables, then β can be derived from following equation:

$$\beta = \frac{\frac{\mu_R}{\mu_Q}\sqrt{\frac{V_Q^2 + 1}{V_R^2 + 1}}}{\sqrt{\sigma_R^2 + \sigma_Q^2}} \tag{3.7}$$

When:

$$\sigma_{\ln(X)}^2 = \ln(V_X^2 + 1) \tag{3.8}$$

$$\mu_{\ln(X)} = \ln(\mu_R) - 0.5\sigma_{\ln(X)}^2 \tag{3.9}$$

Where V_R and V_Q are the coefficients of variation of R and Q respectively. If V_R and V_Q are less or equal to 0.20, the value of β can be approximated by the following expression:

$$\beta = \frac{\ln\left(\frac{\mu_R}{\mu_Q}\right)}{\sqrt{V_R^2 + V_Q^2}} \tag{3.10}$$

Using the following expressions:

$$\sigma_{\ln(X)}^2 \approx V_X^2 \tag{3.11}$$

$$\mu_{\ln(X)} \approx \ln(\mu_X) \tag{3.12}$$

Where μ_R and μ_Q are the means of R and Q, respectively, and V_R, V_Q are the coefficients of variation of R and Q, respectively.

When the limit state function is a linear combination of n normal and uncorrelated random variables X_1, X_2, …., X_n, of the form:

$$g = g(X_1, X_2, \dots, X_n) = a_0 + a_1X_1 + a_2X_2 + \cdots + a_nX_n = a_0 + \sum_{i=1}^{n} a_iX_i \tag{3.13}$$

Where a_i are deterministic constants, the reliability index can be calculated using the formula below:

$$\beta = \frac{a_0 + \sum_{i=1}^{n} a_i \mu_{X_i}}{\sqrt{\sum_{i=1}^{n} (a_i \sigma_{X_i})^2}} \tag{3.14}$$

where μ_{Xi} and σ_{Xi} are the means and standard deviations respectively of the normal random variables X_i.

Similarly, when the given limit state function is a product of parameters with X_1, $X_2, \ldots, X_n$ which are uncorrelated lognormal random variables, then the reliability index can be calculated [19] as:

$$\beta = \frac{\sum_{i=1}^{n} \ln(\bar{X}_i)}{\sqrt{\sum_{i=1}^{n} (V_{X_i})^2}} \tag{3.15}$$

Where V_{X1}, $V_{X2, \ldots,}$ V_{Xn} are coefficients of variation.

The First Order Second Moment method can also be used to compute the reliability index for nonlinear limit state functions. In such case, the limit state function is linearized using a Taylor series expansion about the mean values of the random variables [20]:

$$g(X_1, X_2, \ldots, X_n) \approx g(\mu_{X_1}, \mu_{X_2}, \ldots, \mu_{X_n}) + \sum_{i=1}^{n} (X_i - \mu_{X_i}) \frac{\partial g}{\partial X_i}\bigg|_{evaluated\ at\ mean\ values} \tag{3.16}$$

Reliability index can then be computed as:

$$\beta = \frac{g(\mu_{X_1}, \mu_{X_2}, \ldots, \mu_{X_n})}{\sqrt{\sum_{i=1}^{n} (\alpha_i \sigma_{X_i})^2}} \quad where\ \alpha_i = \frac{\partial g}{\partial X_i}\bigg|_{evaluated\ at\ mean\ values} \tag{3.17}$$

The reliability index calculated by this method is called the First Order Second Moment (FOSM) mean value reliability index, as the Taylor series expansion is carried out about the mean values of the random variables.

Because the FOSM mean value method is based on the approximation of nonnormal CDF's of the state variables by normal variables, the method presents advantages as well as disadvantages. The main advantage of the method is its simplicity; only the first two moments of each random variable are needed and the calculations are trivial. Moreover, knowledge of the distribution of the random variable is not needed.

However, this can be considered as a disadvantage. If the knowledge of the distribution of the random variable is not needed, it means that this method does not account for it. Indeed, if the random variables are other than normally distributed, the method is not as accurate. This is particularly true if the upper tail of the load distribution and the lower tail of the resistance distribution cannot be correctly approximated by normal distributions. Another problem is that the reliability index depends on the formulation of the limit state function. This is referred in the literature as the invariance problem of the mean value FOSM method.

3.2.2 Hasofer-Lind reliability index

To overcome the invariance problem of the FOSM method, Hasofer and Lind [21] proposed a modified reliability index formulation, the Advanced First Order Second Moment reliability moment (AFSOM). In this method, the limit state function is evaluated at a point known as the "design point" instead of the mean values. The design point is located on failure surface, $g=0$, and since this point is a priori unknown, an iteration technique must be used to solve for the reliability index. As it was done in the FOSM method, the Hasofer-Lind method consists by first transforming each of the random variables into standard normal space, using equation (3.5). As before, the Hasofer-Lind reliability index is defined as the shortest distance from the origin of the reduced variable space to the limit state function or failure surface $g=0$ as presented in Fig. 3-3.

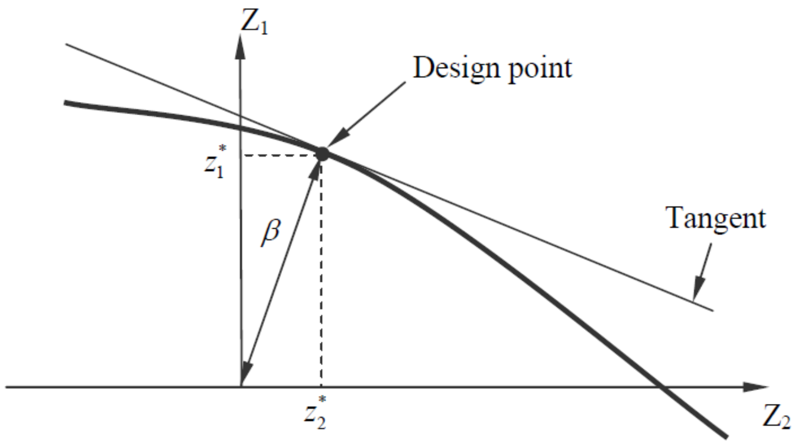


Fig. 3-3: Hasofer-Lind reliability index [17].

Therefore, in the case of a linear limit state, equation (3.14) can be used. However, for a nonlinear limit state function, the iterative method mentioned earlier must be used.

The iterative method requires a simultaneous solution of 2n+1 equations with 2n+1 unknowns, where n is equal to the number of random variables. The process is repeated until values of β and α_i converge:

$$\alpha_i = \frac{\left.\frac{\partial g}{\partial Z_i}\right|_{evaluated\ at\ design\ point}}{\sqrt{\sum_{k=1}^{n}\left(\left.\frac{\partial g}{\partial Z_k}\right|_{evaluated\ at\ design\ point}\right)^2}}$$

$$\frac{\partial g}{\partial Z_i} = \frac{\partial g}{\partial X_i}\frac{\partial X_i}{\partial Z_i} = \frac{\partial g}{\partial X_i}\sigma_{X_i} \qquad (3.18)$$

$$\sum_{i=1}^{n}(\alpha_i)^2 = 1$$

$$z_i^* = \beta\alpha_i$$

$$g(z_1^*, z_2^*, \dots, z_n^*) = 0$$

Although it considers the nonlinearity of the limit state function, the Hasofer-Lind method, as for the FOSM method, does not take into account the distribution type of the random variables, and therefore is not accurate when used with distributions other than normal.

3.2.3 Rackwitz-Fiessler procedure

Rackwitz and Fiessler [22] developed an iterative procedure to calculate reliability indices that this time can take into account the distribution of the random variables for both linear and nonlinear limit states. Each nonnormal random variable is converted at the design point into “equivalent normal” distribution. This is achieved by equaling the CDF and the PDF of the actual function to the normal CDF and normal PDF at the value of the variable x^* on the failure boundary ($g = 0$) as described in equations (3.19) and (3.20).

$$F_X(x^*) = \Phi\left(\frac{x^* - \mu_X^e}{\sigma_X^e}\right) \tag{3.19}$$

$$f_X(x^*) = \frac{1}{\sigma_X^e}\phi\left(\frac{x^* - \mu_X^e}{\sigma_X^e}\right) \tag{3.20}$$

Where Φ is the CDF for the standard normal distribution and ϕ is the PDF for the standard normal distribution. The initial design point $\{x_i*\}$ is obtained by assuming values for $n-1$ of the random variables X_i, the mean values often being a reasonable choice, then, the remaining random variable is calculated using the limit state function $g=0$. By doing so, it is ensured that the design point is on the failure boundary. Then the process works the following way:

1. From equation (3.19) and (3.20) we can obtain the expression for the equivalent normal mean and equivalent normal standard deviation for each random variable.

$$\mu_X^e = x^* - \sigma_X^e\left[\Phi^{-1}\left(F_X(x^*)\right)\right] \tag{3.21}$$

$$\sigma_X^e = \frac{1}{f_X(x^*)}\phi\left(\frac{x^* - \mu_X^e}{\sigma_X^e}\right) = \frac{1}{f_X(x^*)}\phi\left[\Phi^{-1}\left(F_X(x^*)\right)\right] \tag{3.22}$$

2. As in the previous method, the reduced variates are determined using equation (3.23).

$$z_i^* = \frac{x_i^* - \mu_{X_i}^e}{\sigma_{X_i}^e} \tag{3.23}$$

3. Next, the partial derivative of the limit state function g is evaluated for each random variable X_i, and presented in a vector form as follow:

$$\{G\} = \begin{Bmatrix} G_1 \\ G_2 \\ \vdots \\ G_n \end{Bmatrix} \quad where \quad G_i = -\frac{\partial g}{\partial Z_i}\bigg|_{evaluated\ at\ design\ point} \tag{3.24}$$

4. Then β is calculated with following formula:

$$\beta = \frac{\{G\}^T\{z^*\}}{\sqrt{\{G\}^T\{G\}}} \quad where \quad \{z^*\} = \begin{Bmatrix} z_1^* \\ z_2^* \\ \vdots \\ z_n^* \end{Bmatrix} \tag{3.25}$$

5. The sensitivity factors are calculated in a column vector as follows:

$$\{\alpha\} = \frac{\{G\}}{\sqrt{\{G\}^T\{G\}}} \tag{3.26}$$

6. A new design point is determined in the original coordinates for n-1 values using:

$$x_i^* = \mu_{X_i}^e + \alpha_i \beta \sigma_{X_i}^e \tag{3.27}$$

7. The value of remaining random variable is calculated using the limit state function *g=0*.

8. Steps 1-7 are repeated until reliability index converges.

Typically, the Rackwitz-Fiessler procedure converges very quickly, and in most cases, after only a few iterations.

3.3 Simulation techniques

In certain cases, the methods for the computation of reliability explained above can become very complicated. This happens especially when the limit state function is very complex or cannot be expressed in a closed form, as, for example in this study, the orthotropic plate equations governing the behavior of a bridge deck slab. In these situations, simulation methods are used.

3.3.1 Monte Carlo simulation

The Monte Carlo technique is based on the generating of values for given distribution functions. For example, the load effect Q, and the resistance R, are functions of random variables, $R=f(x_1, x_2, \ldots, x_n)$ and $Q=f(y_1, y_2, \ldots, y_n)$. By generating a large number of specific values for the random variables x_i and y_i, R and Q can then be evaluated, and their statistical parameters (mean and standard deviation) can be computed. With these statistical parameters, the reliability index can now be calculated using one of the methods described earlier, regardless of how complex the original limit state function is, as now it can be reduced to $g=R–Q$. Moreover, the distribution of the random parameters affecting the load and the resistance (x_i and y_i) is included in the simulation process so that the generated values reflect the actual distributions of the random variables. For each random variable, the generation of values by the Monte Carlo simulation is done the following way.

The first step is to generate random numbers, u_i, that are uniformly distributed between *0* and *1* (there is an equal chance for any number within that range to be generated)

Then for each random variable, X, the generated value is calculated using the equation:

$$x_i = F_x^{-1}(\mu_i) \tag{3.28}$$

where F_x^{-1} is the CDF of the random variable. For a standard normal variable, equation (3.28) becomes:

$$x_i = \Phi^{-1}(\mu_i) \tag{3.29}$$

where Φ^{-1} is the inverse of the standard normal cumulative distribution function. For any normally distributed random variable,

$$x_i = \mu_X + \Phi^{-1}(\mu_i)\sigma_X \tag{3.30}$$

Where μ_x and σ_x are the mean and standard deviation of the random variable being generated.

For a lognormal random variable,

$$x_i = \exp[\mu_{lnX} + \Phi^{-1}(\mu_i)\sigma_{lnX}] \tag{3.31}$$

where

$$\sigma^2_{\ln(X)} = \ln(V_X^2 + 1) \approx CoV_X^2 \qquad (for\ V_X\ < 0.20) \tag{3.32}$$

$$\mu_{\ln(X)} = \ln(\mu_R) - 0.5\sigma^2_{\ln(X)} \approx \ln(\mu_X)\ \ (for\ V_X\ < 0.20) \tag{3.33}$$

Finally, the limit state function can be evaluated directly for each generated set of variables, and after repeating the process many times, the probability of failure can be obtained. For example, if the limit state function is *g=R–Q*, the probability of failure can be estimated by:

$$P_f = \frac{\mathrm{n}}{\mathrm{N}} \tag{3.34}$$

where *n* is the number of times that $g \leq 0$ and *N* is the total number of simulations. As the number of simulations increases, the obtained probability of failure is closer to the real value of the probability of failure. In order to estimate how many simulations are needed to achieve the acceptable accuracy, Soong and Grigoriu [23] showed that the estimated probability of failure itself can be treated as a random variable with its own mean, standard deviation and coefficient of variation as shown below:

$$\sigma^2_{P_f} = \frac{P_f(1 - P_f)}{N} \tag{3.35}$$

$$V_{P_f} = \sqrt{\frac{1 - P_f}{N \times P_f}} \tag{3.36}$$

These relationships provide a way to determine how many simulations are required to estimate a probability and limit the uncertainty in the estimate. It is clear that the smaller the expected probability of failure, the larger the number of required simulations.

3.3.2 Rosenblueth's 2k+1 Point Estimate method

To reduce the number of required simulations, several simulation techniques have been developed: The Latin Hypercube method, described by Iman and Conover [24] is one of them. In this method, the range of possible values of each random variable is divided into strata, and a value from each stratum is randomly selected as a representative value. The representative values for each random variable are then combined so that each representative value is considered once and only once in the simulation process. However, in order to further reduce the number of required simulations, point estimation methods can be used.

The point estimate method is very similar to the Monte Carlo simulation, but instead of generating many random values to be used for the simulation, the function of random variables is evaluated at only a few pre-determined key points. The results obtained at these key points are then used to estimate the mean and variance (or coefficient of variation) of the function. These key point values have been derived to give a good accuracy. The 2k+1 method developed by Rosenblueth [25] has been widely used and proved to be accurate; however, the CDF of the function cannot be obtained by this method. Let's consider a limit state function Y described by

$$Y = f(x_1, x_2, \dots, x_i, \dots, x_k) \tag{3.37}$$

where f is some deterministic function, but not necessarily known in closed form, and x_i are random input variables. The procedure for Rosenblueth's 2k+1 point estimate method is as follows:

1. Determine the mean value, μ_{Xi}, and standard deviation σ_{Xi} for each of the k input random variables.
2. Define y_0 as the value obtained from equation (3.37) when all input variables are equal to their mean values.

$$y_0 = f\left(\mu_{x_1}, \mu_{x_2}, \dots, \mu_{x_i}, \dots, \mu_{x_k}\right) \tag{3.38}$$

3. For each random variable x_i, evaluate the function at two values shifted from the mean value μ_{x_i} by $\pm\sigma_{x_i}$while all other variables are assumed to be equal to their mean values. The function Y will be then evaluated at $2k$ additional points. These values of the function will be referred to as y_i^+ and y_i^-. The subscript denotes the variable which is shifted, and the superscript indicates the direction of the shift. In mathematical notation,

$$y_i^+ = f\left(\mu_{x_1}, \mu_{x_2}, \dots, \mu_{x_i} + \sigma_{x_i}, \dots, \mu_{x_k}\right) \tag{3.39}$$

$$y_i^- = f\left(\mu_{x_1}, \mu_{x_2}, \dots, \mu_{x_i} - \sigma_{x_i}, \dots, \mu_{x_k}\right) \tag{3.40}$$

4. For each random variable, calculate the following two quantities based on y_i^+ and y_i^-.

$$\overline{y_i} = \frac{y_i^+ + y_i^-}{2} \tag{3.41}$$

$$V_{y_i} = \frac{y_i^+ - y_i^-}{y_i^+ + y_i^-} \tag{3.42}$$

5. Calculate the estimated mean and coefficient of variation of Y as follows:

$$\bar{Y} = y_0 \prod_{i=1}^{k} \left(\frac{\overline{y_i}}{y_0}\right) \tag{3.43}$$

$$V_Y = \sqrt{\left\{\prod_{i=1}^{k} \left(1 + C_Y{}^2\right)\right\} - 1} \tag{3.44}$$

The two main advantages of this method are that first, there is no need to know the distribution of the input random variables, only two first moments are needed. Second, the number of simulations is relatively small compared to the Latin hypercube sampling or Monte Carlo simulation; for K random input variables, only 2k+1 simulations are needed.

3.4 Load and resistance factors

Load and Resistance factors can be derived from resulting reliability indices, β. Reliability analysis can be used to determine the coordinates of the design point—that is, the corresponding value of the factored load for each load component and the value of the factored resistance. For the limit state function in Eq. (3.1), the design point is a point in n-dimensional space that satisfies the equation, and if failure is to occur, it is the most likely a combination of all the variables. For example, if the limit state function is given by equation (3.1) and R and Q are normal random variables, then the coordinates of the design point are determined by equations (3.45) and (3.46).

$$R^* = \mu_R - \frac{\beta\sigma_R^2}{\sqrt{\sigma_R^2 + \sigma_Q^2}} \tag{3.45}$$

$$Q^* = \mu_Q - \frac{\beta\sigma_Q^2}{\sqrt{\sigma_Q^2 + \sigma_Q^2}} \tag{3.46}$$

Where R^* and Q^* are the coordinate of the design point of resistance, R, and load, Q, respectively. With the design points calculated optimum load and resistance factors can be determined. Equation (3.47) and (3.48) describe optimum load and resistance factors.

$$\gamma_X = \frac{\lambda_X X^*}{\mu_X} \tag{3.47}$$

$$\phi = \frac{\lambda_R R^*}{\mu_R} \tag{3.48}$$

Chapter 4: Load models

Reliability analysis requires knowledge of load components and their statistics for every bridge analyzed. Typically, nominal load, Q, is determined from a load combination, as presented in equation (4.1), where load components, Q_i, are multiplied by individually assigned load factors, γ_i.

$$Q = \sum \gamma_i Q_i, \tag{4.1}$$

In this dissertation, AASHTO's [1] design formula for strength I limit state is considered, and presented below:

$$Q = 1.25DC + 1.50DW + 1.75(1 + IM)LL \tag{4.2}$$

where: DC = dead load of structural components and nonstructural attachments, DW= dead load of wearing surfaces and utilities, IM= vehicular dynamic load allowance, LL= vehicular live load.

This chapter presents nominal values of dead and live load components, and their statistical parameters that will further be used for reliability analysis.

4.1 Dead load

Dead load that acts on the bridge superstructure depends on the volumes and densities of the components including main girder, deck, traffic barriers, and other miscellaneous items. The actual dimensions of the structural systems considered are presented in Chapter 5. Table 4-1 shows dead load components considered.

Table 4-1. Dead Load Components.

Component	Density (kip/ft^3)	Surface Load (kip/ft^2)	Uniform Load (kip/ft)
Wearing surface	0.140	-	-
Reinforced concrete	0.150	-	-
Parapet	-	-	0.530
Deck forms	-	0.015	-
Miscellaneous	-	-	0.020 per girder
Steel girder	0.491	-	-

Based on the values presented in Table 4-1, nominal values of dead load are calculated and considered in the reliability analysis.

From the nominal value of the dead load its actual distribution can be derived. Statistical parameters for dead loads are taken from National Bureau of Standards (NBS) Special Publication 577 [8] and SHRP 2 report [2] and shown in Table 4-2.

Table 4-2. Statistical Parameters of Dead Load.

Dead Load Component	Bias factor, λ	Coefficient of variation, V
Factory made members	1.03	0.08
Cast-in-place	1.05	0.10
Wearing surface	3 in (mean thickness)	0.25
Miscellaneous	1.03~1.05	0.08~0.10

Distribution of the dead load is assumed to be normal as per NBS Special Publication 577 [8].

4.2 Design live load

In accordance to AASHTO LRFD 2014 [1], design live load per lane, denominated as HL93, is greater of both products 1) design truck and lane load, 2) tandem loading and lane load. For a selected design span length(s) a moving load must be simulated, and the envelope of moments and shears has to be obtained. To account for dynamic load effect on the bridge, that is caused by impact of the approaching vehicle, its weight or surface roughness, the code provides dynamic load allowance, *IM*. For deck joints IM=0.75 for all the limit states, while for other components IM=0.15 for fatigue and limit state and IM=0.33 for all other limit states. Since fatigue limit state is not covered in this dissertation, the dynamic load allowance of 0.33 is considered for nominal live load.

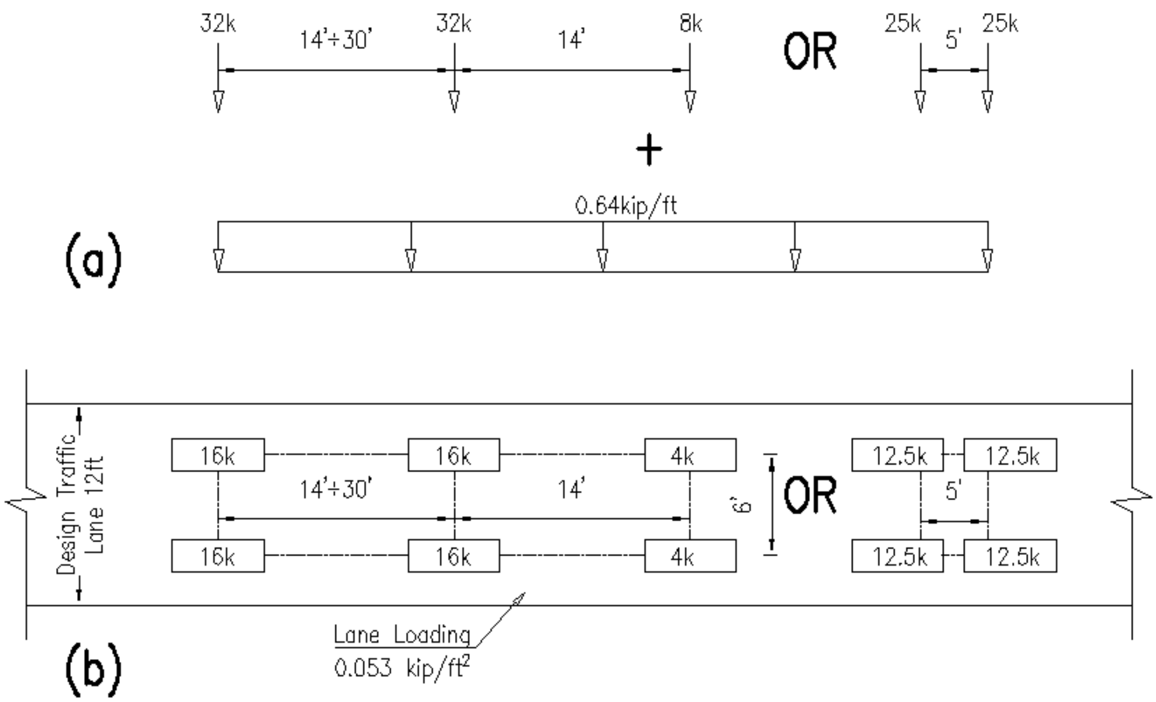


Fig. 4-1: HL93 Loading as per AASHTO LRFD Specification [1]: (a) Linear loading per lane, (b) Surface loading per lane.

The Table 4-3 shows resulting moments and shear forces due to HL93 loading cases for selected simple span lengths. Maximum controlling values of live load moments and shear forces are presented in Table 4-4.

Table 4-3. HL93 Live Load Moments and Shear Forces.

Moment w/o dynamic allowance (k-ft)		Moment w/ dynamic allowance (k-ft)		Shear w/o dynamic allowance (kip)		Shear w/ dynamic allowance (kip)	
(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)
354	399	447	506	59.2	56.3	75.6	71.7
1094	989	1361	1220	80.0	67.5	100.1	83.5
1992	1724	2436	2078	93.3	77.7	114.6	93.8
3035	2602	3657	3081	104.8	87.6	126.7	103.8
6522	5650	7618	6459	132.6	113.5	155.3	129.8
12321	10900	14011	12121	165.8	145.7	188.8	162.1

(a) Design truck and lane load
(b) Tandem and lane load

Table 4-4. Maximum HL93 Live Load Moments and Shear Forces.

Span Length (ft)	Moment w/o dynamic allowance (k-ft)	Moment w/ dynamic allowance (k-ft)	Shear w/o dynamic allowance (kip)	Sear w/ dynamic allowance (kip)
	max	max	max	max
30	399	506	59.2	75.6
60	1094	1361	80.0	100.1
90	1992	2436	93.3	114.6
120	3035	3657	104.8	126.7
200	6522	7618	132.6	155.3
300	12321	14011	165.8	188.8

To establish a percentage of the live load acting on a certain girder supporting the deck, a girder distribution factor must be evaluated. The girder distribution factor expresses how much of a lane live load is transferred to a single girder in the structural system. The AASHTO LRFD Specification [1] provides formulas for girder distribution factor, that are treated as accurate, even though the actual percentage of transferred moment and shears per girder is conservatively overestimated.

The distribution factor of live load moment in interior beams for concrete deck on steel I-shaped beams is described by equations (4.3) and (4.4), for one and two or more lanes loaded, respectively.

$$0.06 + \left(\frac{S}{14}\right)^{0.4} \left(\frac{S}{L}\right)^{0.3} \left(\frac{K_g}{12Lt_s{}^3}\right)^{0.1} \tag{4.3}$$

$$0.075 + \left(\frac{S}{9.5}\right)^{0.6} \left(\frac{S}{L}\right)^{0.2} \left(\frac{K_g}{12Lt_s{}^3}\right)^{0.1} \tag{4.4}$$

Equations above are applicable for beams with spacing $S \in< 3.5, 16.0 > ft$, deck thickness $t_s \in < 4.5, 12.0 > in$, span length $L \in< 20, 240 > ft$, longitudinal stiffness parameter $K_g \in< 10^4; 7 \times 10^6 > in^4$, and for number of girders N_b more than 3. For number of girders of three, the code requires taking lesser value obtained from the equations above or lever rule.

The distribution factor of live load shear force in interior beams for concrete deck on steel I-shaped beams the is given as in equations (4.5) and (4.6), for one and two or more lanes loaded, respectively.

$$0.36 + \frac{S}{25} \tag{4.5}$$

$$0.2 + \frac{S}{12} - \left(\frac{S}{35}\right)^2 \tag{4.6}$$

Equations above are applicable for beams with spacing $S \in < 3.5, 16.0 > ft$, deck thickness $t_s \in < 4.5, 12.0 > in$, span length $L \in < 20, 240 > ft$, and for number of girders N_b more than 3. For number of girders of three, the code requires to use a lever rule.

The AASHTO LRFD Specification [1] provides formula the distribution factor of live load for concrete deck supported on steel box girders as shown in equation (4.7). This formula applies for moments and shears, in interior and exterior beams, regardless of number of lanes loaded.

$$0.05 + 0.85\frac{N_L}{N_b} + \frac{0.425}{N_L} \tag{4.7}$$

Equation above is applicable for beams with number of lanes to number of beams as follows, $0.5 \leq \frac{N_L}{N_b} \leq 1.5$. For a case outside of the range of applicability, the code [1] requires using lever rule.

4.3 WIM live load models

Load models developed in SHRP Report 2 [2] were derived from NCHRP Project 12-76 (NCHRP Report 683) [26] and the FHWA WIM database. The data that the authors processed included over 34 million vehicles. The results of their analysis, in the form of statistical parameters for moment and reaction ratios (WIM-to-HL93 Loading), are used herein. Statistical parameters relate to the maximum expected static bending moment and the static reaction for single span bridges and include bias factor, λ, which is equal to the mean-to-nominal ratio, and coefficient of variation, V, equal to the ratio of standard deviation and the mean. The authors derived the statistical parameters for live load for different span lengths, from 30 feet to 300 feet, ADTTs from 250 to 10,000, and various expectancy time periods. All the values are shown in Table 4-5 through Table 4-14, and are normally distributed [2].

For reliability analysis, the variability of the impact factor has to be taken into account. In the last calibration of the code the results of research on the impact factor published in NCHRP Report 368 [12] were used. Also, the SHRP 2 Report [2], refers to overarching rules from NCHRP Report 368 [12], where the recommended dynamic load is 10% of the live load with COV=80%. In this study, the impact factor of 10% was used with a conservative value of the coefficient of variation for live load w/dynamic allowance of 18%, as per NCHRP Report 368 [12].

Table 4-5. Statistical Parameters of Live Load Moments for ADTT 250 [2]

Span	30 ft		60 ft		90 ft		120 ft		200 ft		300 ft	
	λ	COV	λ	COV	λ	COV	λ	COV	λ	COV	λ	COV
1 Day	0.92	0.28	0.82	0.23	0.80	0.17	0.79	0.15	0.71	0.18	0.61	0.18
2 Weeks	1.06	0.21	1.05	0.16	1.01	0.18	1.02	0.16	0.93	0.16	0.84	0.16
1 Month	1.12	0.21	1.09	0.19	1.08	0.18	1.08	0.17	1.01	0.19	0.90	0.16
2 Months	1.14	0.18	1.15	0.17	1.14	0.18	1.14	0.17	1.05	0.15	0.95	0.15
6 Months	1.19	0.17	1.23	0.19	1.20	0.15	1.19	0.14	1.12	0.15	1.04	0.15
1 Year	1.23	0.15	1.27	0.19	1.24	0.16	1.22	0.12	1.15	0.15	1.08	0.15
5 Years	1.31	0.15	1.35	0.16	1.31	0.11	1.31	0.10	1.25	0.15	1.18	0.15
50 Years	1.37	0.11	1.39	0.13	1.39	0.07	1.37	0.10	1.32	0.16	1.25	0.15
75 Years	1.38	0.10	1.40	0.12	1.41	0.07	1.39	0.10	1.34	0.16	1.27	0.15
100 Years	1.39	0.09	1.43	0.12	1.42	0.07	1.41	0.10	1.35	0.16	1.29	0.15

Table 4-6. Statistical Parameters of Live Load Moments for ADTT 1000 [2]

Span	30 ft		60 ft		90 ft		120 ft		200 ft		300 ft	
	λ	COV	λ	COV	λ	COV	λ	COV	λ	COV	λ	COV
1 Day	0.99	0.28	0.89	0.20	0.90	0.17	0.89	0.17	0.81	0.19	0.71	0.19
2 Weeks	1.14	0.21	1.13	0.16	1.13	0.18	1.14	0.16	1.06	0.16	0.97	0.16
1 Month	1.18	0.16	1.19	0.16	1.19	0.17	1.19	0.16	1.11	0.14	1.01	0.14
2 Months	1.23	0.16	1.26	0.18	1.26	0.17	1.23	0.13	1.16	0.14	1.07	0.14
6 Months	1.27	0.14	1.31	0.16	1.30	0.12	1.27	0.11	1.22	0.15	1.15	0.15
1 Year	1.33	0.16	1.34	0.16	1.32	0.10	1.31	0.10	1.25	0.16	1.18	0.16
5 Years	1.37	0.15	1.37	0.13	1.36	0.08	1.35	0.10	1.30	0.15	1.24	0.15
50 Years	1.38	0.07	1.42	0.12	1.41	0.08	1.41	0.11	1.35	0.14	1.28	0.14
75 Years	1.40	0.07	1.42	0.11	1.42	0.07	1.41	0.10	1.36	0.13	1.29	0.13
100 Years	1.40	0.07	1.44	0.11	1.43	0.07	1.43	0.10	1.37	0.13	1.30	0.13

Table 4-7. Statistical Parameters of Live Load Moments for ADTT 2500 [2]

Span	30 ft		60 ft		90 ft		120 ft		200 ft		300 ft	
	λ	COV	λ	COV	λ	COV	λ	COV	λ	COV	λ	COV
1 Day	1.03	0.19	0.97	0.18	0.97	0.17	0.98	0.17	0.90	0.19	0.80	0.19
2 Weeks	1.20	0.19	1.20	0.17	1.20	0.17	1.20	0.15	1.12	0.14	1.02	0.14
1 Month	1.23	0.16	1.25	0.17	1.26	0.17	1.22	0.12	1.16	0.15	1.09	0.15
2 Months	1.28	0.15	1.31	0.17	1.29	0.11	1.27	0.09	1.21	0.15	1.12	0.15
6 Months	1.31	0.15	1.34	0.17	1.32	0.10	1.31	0.10	1.25	0.16	1.18	0.16
1 Year	1.34	0.14	1.35	0.14	1.36	0.09	1.34	0.09	1.28	0.15	1.21	0.15
5 Years	1.36	0.12	1.39	0.12	1.39	0.08	1.38	0.10	1.33	0.16	1.26	0.16
50 Years	1.40	0.08	1.42	0.11	1.43	0.07	1.43	0.11	1.37	0.15	1.29	0.15
75 Years	1.40	0.07	1.43	0.10	1.43	0.07	1.44	0.10	1.37	0.14	1.29	0.14
100 Years	1.40	0.07	1.44	0.10	1.44	0.07	1.44	0.10	1.39	0.14	1.32	0.14

Table 4-8. Statistical Parameters of Live Load Moments for ADTT 5000 [2]

Span	30 ft		60 ft		90 ft		120 ft		200 ft		300 ft	
	λ	COV	λ	COV	λ	COV	λ	COV	λ	COV	λ	COV
1 Day	1.08	0.18	1.02	0.17	1.03	0.17	1.03	0.17	0.95	0.17	0.84	0.17
2 Weeks	1.24	0.17	1.26	0.17	1.24	0.16	1.24	0.13	1.16	0.14	1.06	0.14
1 Month	1.28	0.15	1.32	0.18	1.30	0.11	1.26	0.09	1.20	0.14	1.13	0.14
2 Months	1.31	0.15	1.34	0.17	1.32	0.10	1.31	0.10	1.23	0.14	1.16	0.14
6 Months	1.34	0.14	1.35	0.14	1.34	0.08	1.32	0.09	1.28	0.15	1.23	0.15
1 Year	1.35	0.12	1.38	0.14	1.38	0.09	1.36	0.09	1.31	0.15	1.25	0.15
5 Years	1.39	0.13	1.40	0.12	1.40	0.08	1.41	0.11	1.34	0.15	1.28	0.15
50 Years	1.41	0.11	1.44	0.10	1.44	0.09	1.46	0.12	1.39	0.15	1.30	0.15
75 Years	1.42	0.11	1.45	0.10	1.45	0.08	1.46	0.11	1.40	0.15	1.31	0.15
100 Years	1.42	0.11	1.45	0.10	1.47	0.08	1.47	0.11	1.40	0.15	1.33	0.15

Table 4-9. Statistical Parameters of Live Load Moments for ADTT 10000 [2]

Span	30 ft		60 ft		90 ft		120 ft		200 ft		300 ft	
	λ	COV	λ	COV	λ	COV	λ	COV	λ	COV	λ	COV
1 Day	1.17	0.22	1.09	0.16	1.11	0.18	1.13	0.20	1.02	0.17	0.91	0.17
2 Weeks	1.29	0.18	1.31	0.17	1.29	0.11	1.27	0.09	1.22	0.16	1.16	0.16
1 Month	1.32	0.16	1.34	0.16	1.32	0.10	1.29	0.09	1.25	0.16	1.20	0.16
2 Months	1.35	0.16	1.35	0.14	1.35	0.09	1.32	0.09	1.28	0.15	1.23	0.15
6 Months	1.35	0.13	1.37	0.13	1.37	0.09	1.34	0.08	1.30	0.15	1.25	0.15
1 Year	1.37	0.11	1.39	0.13	1.39	0.08	1.38	0.10	1.32	0.15	1.27	0.15
5 Years	1.39	0.08	1.41	0.11	1.42	0.08	1.42	0.11	1.37	0.15	1.30	0.15
50 Years	1.40	0.06	1.45	0.11	1.45	0.08	1.46	0.11	1.40	0.15	1.31	0.15
75 Years	1.41	0.06	1.46	0.10	1.47	0.08	1.47	0.11	1.40	0.14	1.32	0.14
100 Years	1.42	0.06	1.47	0.10	1.49	0.08	1.48	0.11	1.42	0.14	1.33	0.14

Table 4-10. Statistical Parameters of Live Load Reactions for ADTT 250 [2]

Span	30 ft		60 ft		90 ft		120 ft		200 ft		300 ft	
	λ	COV	λ	COV	λ	COV	λ	COV	λ	COV	λ	COV
1 Day	1.02	0.13	0.88	0.12	0.88	0.12	0.86	0.13	0.73	0.13	0.57	0.13
2 Weeks	1.22	0.13	1.08	0.12	1.11	0.12	1.08	0.13	0.97	0.14	0.82	0.14
1 Month	1.28	0.13	1.14	0.13	1.17	0.12	1.15	0.12	1.06	0.14	0.93	0.14
2 Months	1.32	0.13	1.19	0.12	1.22	0.12	1.20	0.12	1.12	0.14	0.98	0.14
6 Months	1.37	0.12	1.27	0.12	1.32	0.13	1.30	0.12	1.18	0.14	1.08	0.14
1 Year	1.41	0.12	1.31	0.13	1.37	0.13	1.35	0.13	1.22	0.14	1.12	0.14
5 Years	1.49	0.12	1.38	0.13	1.46	0.13	1.44	0.13	1.35	0.14	1.24	0.14
50 Years	1.54	0.12	1.49	0.14	1.52	0.13	1.52	0.13	1.45	0.15	1.36	0.15
75 Years	1.55	0.12	1.50	0.14	1.55	0.13	1.55	0.13	1.46	0.15	1.37	0.15
100 Years	1.56	0.12	1.50	0.14	1.55	0.13	1.55	0.13	1.47	0.15	1.38	0.15

Table 4-11. Statistical Parameters of Live Load Reactions for ADTT 1000 [2]

Span	30 ft		60 ft		90 ft		120 ft		200 ft		300 ft	
	λ	COV	λ	COV	λ	COV	λ	COV	λ	COV	λ	COV
1 Day	1.14	0.14	0.95	0.13	0.94	0.11	0.91	0.10	0.84	0.13	0.74	0.13
2 Weeks	1.31	0.13	1.17	0.12	1.19	0.11	1.19	0.11	1.09	0.13	0.97	0.13
1 Month	1.35	0.12	1.23	0.13	1.26	0.11	1.25	0.11	1.17	0.13	1.06	0.13
2 Months	1.38	0.11	1.26	0.11	1.31	0.12	1.31	0.12	1.22	0.14	1.11	0.14
6 Months	1.42	0.11	1.29	0.11	1.38	0.13	1.37	0.12	1.28	0.14	1.18	0.14
1 Year	1.45	0.11	1.32	0.11	1.40	0.12	1.40	0.12	1.32	0.14	1.21	0.14
5 Years	1.50	0.11	1.40	0.11	1.49	0.12	1.50	0.13	1.38	0.14	1.28	0.14
50 Years	1.56	0.11	1.46	0.11	1.56	0.13	1.57	0.14	1.47	0.15	1.35	0.15
75 Years	1.57	0.11	1.47	0.11	1.57	0.13	1.58	0.14	1.48	0.15	1.36	0.15
100 Years	1.57	0.11	1.48	0.11	1.57	0.13	1.59	0.14	1.49	0.15	1.36	0.15

Table 4-12. Statistical Parameters of Live Load Reactions for ADTT 2500 [2]

Span	30 ft		60 ft		90 ft		120 ft		200 ft		300 ft	
	λ	COV	λ	COV	λ	COV	λ	COV	λ	COV	λ	COV
1 Day	1.18	0.12	1.02	0.10	1.07	0.12	1.04	0.11	0.93	0.13	0.79	0.13
2 Weeks	1.35	0.12	1.23	0.11	1.29	0.12	1.29	0.12	1.19	0.13	1.06	0.13
1 Month	1.38	0.12	1.26	0.11	1.35	0.12	1.34	0.12	1.23	0.14	1.12	0.14
2 Months	1.41	0.12	1.29	0.11	1.40	0.13	1.38	0.12	1.29	0.14	1.17	0.14
6 Months	1.47	0.12	1.34	0.11	1.44	0.13	1.44	0.13	1.33	0.15	1.22	0.15
1 Year	1.49	0.13	1.36	0.11	1.47	0.13	1.48	0.13	1.38	0.15	1.25	0.15
5 Years	1.55	0.13	1.44	0.12	1.55	0.13	1.54	0.13	1.43	0.15	1.31	0.15
50 Years	1.59	0.13	1.53	0.13	1.58	0.13	1.59	0.14	1.50	0.16	1.38	0.16
75 Years	1.60	0.13	1.54	0.13	1.59	0.13	1.60	0.14	1.51	0.16	1.39	0.16
100 Years	1.60	0.13	1.54	0.13	1.59	0.13	1.61	0.14	1.51	0.16	1.40	0.16

Table 4-13. Statistical Parameters of Live Load Reactions for ADTT 5000 [2]

Span	30 ft		60 ft		90 ft		120 ft		200 ft		300 ft	
	λ	COV	λ	COV	λ	COV	λ	COV	λ	COV	λ	COV
1 Day	1.25	0.12	1.09	0.11	1.14	0.13	1.12	0.13	1.02	0.14	0.90	0.14
2 Weeks	1.42	0.13	1.30	0.12	1.36	0.13	1.36	0.13	1.26	0.15	1.13	0.15
1 Month	1.46	0.13	1.34	0.12	1.39	0.13	1.40	0.13	1.30	0.15	1.18	0.15
2 Months	1.48	0.13	1.36	0.12	1.43	0.13	1.44	0.13	1.33	0.15	1.21	0.15
6 Months	1.51	0.13	1.39	0.12	1.47	0.13	1.48	0.13	1.39	0.15	1.27	0.15
1 Year	1.54	0.13	1.41	0.12	1.50	0.13	1.51	0.13	1.41	0.15	1.29	0.15
5 Years	1.58	0.13	1.48	0.12	1.54	0.12	1.56	0.13	1.46	0.15	1.34	0.15
50 Years	1.62	0.13	1.53	0.12	1.59	0.12	1.61	0.13	1.52	0.15	1.40	0.15
75 Years	1.63	0.12	1.54	0.12	1.60	0.12	1.62	0.13	1.53	0.15	1.41	0.15
100 Years	1.63	0.12	1.55	0.12	1.61	0.12	1.62	0.13	1.53	0.15	1.42	0.15

Table 4-14. Statistical Parameters of Live Load Reactions for ADTT 10000 [2]

Span		30 ft		60 ft		90 ft		120 ft		200 ft		300 ft	
		λ	COV	λ	COV	λ	COV	λ	COV	λ	COV	λ	COV
1	Day	1.31	0.13	1.20	0.13	1.23	0.13	1.21	0.13	1.11	0.14	0.98	0.14
2	Weeks	1.45	0.13	1.35	0.13	1.40	0.13	1.41	0.13	1.31	0.15	1.19	0.15
1	Month	1.48	0.13	1.39	0.13	1.43	0.13	1.45	0.13	1.36	0.15	1.24	0.15
2	Months	1.50	0.13	1.42	0.13	1.46	0.12	1.48	0.13	1.39	0.15	1.27	0.15
6	Months	1.52	0.13	1.45	0.13	1.48	0.12	1.52	0.13	1.41	0.15	1.31	0.15
1	Year	1.55	0.13	1.46	0.13	1.51	0.12	1.54	0.13	1.44	0.15	1.33	0.15
5	Years	1.60	0.13	1.50	0.13	1.55	0.12	1.59	0.13	1.49	0.15	1.37	0.15
50	Years	1.64	0.13	1.56	0.13	1.62	0.13	1.62	0.13	1.54	0.15	1.43	0.15
75	Years	1.65	0.13	1.57	0.13	1.63	0.12	1.63	0.13	1.55	0.15	1.44	0.15
100	Years	1.66	0.13	1.57	0.13	1.63	0.12	1.64	0.13	1.55	0.15	1.45	0.15

Chapter 5: Resistance

Resistance of a structural element or system can be influenced by many aspects that can be allocated in one of the three groups: material property, analysis, and fabrication variations. It has been established that the actual resistance is a product of three factors, associated with the categories listed, and the nominal resistance. In mathematical formulation the resistance is expressed as follows:

$$R = MPF \cdot R_N \tag{5.1}$$

where:

M = material factor (-)

P = performance (analysis) factor (-)

F = fabrication factor (-)

R_N = nominal value of resistance (kip-ft / kip)

5.1 Cross-section selection and proportion limits

Five types of structural bridge systems are investigated in this dissertation. This section introduces different girder shapes that meet all the limitations of proportions. Structural types considered are:

I. Noncomposite rolled I-shaped girders,

II. Noncomposite I-shaped plate girders,

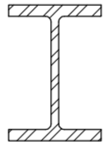
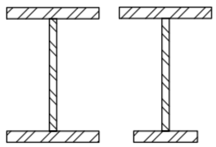
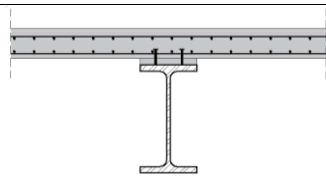
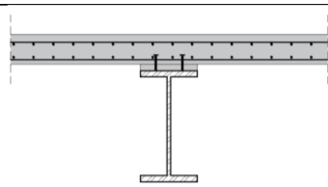
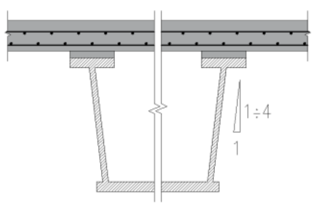
III. Composite rolled I-shaped girders,

IV. Composite I-shaped plate girders,

V. Composite steel box girders.

More details on each type are available in Table 5-1.

Table 5-1. Summary of analyzed structural types and dimensions.

Structural Type	Cross-Section	Steel Shape	F_y (ksi)	Haunch (in)	Deck Thickness (in)	Deck's effective width (ft)
I. Noncomposite rolled I-shaped girders		See Table 5-2	50	-	-	-
II. Noncomposite I-shaped plate girders		See Table 5-3	50, 70*	-	-	-
III. Composite rolled I-shaped girders		See Table 5-4 and Table 5-5	50	2	9	4, 6, 8, 10, 12
IV. Composite I-shaped plate girders		See Table 5-6	50, 70*	2	9	6, 8, 10, 12, 14, 16
V. Composite steel box girders.		See Table 5-7	50, 70*	0	9	13.80, 15.60, 16.80, 17.40, 18.45, 18.60, 19.50, 19.80, 20.40, 20.63, 21.45, 21.60, 22.50, 23.40, 23.63, 24.45, 25.50, 26.63

*Yield strength of 70ksi is analyzed for shear resistance only.

For structural types III through V, deck's reinforcement was taken as orthotropic #4 dia. rebars at 8in spacing with 3.0-inch top cover and 1.5-inch bottom cover.

5.1.1 Noncomposite rolled I-shaped girders

The rolled I-shaped sections selected for analysis are the most economical, with highest moment of inertia per unit weight. Table 5-2 present steel rolled W-shapes considered in this study. All the shapes have compact webs and flanges, in accordance with slenderness limits described in Table 5-8. Sections below presented are analyzed for structural type I, as specified in Table 5-1.

Table 5-2. Structural Type I, Noncomposite I-Shaped Rolled Sections.

#	Shape	#	Shape	#	Shape	#	Shape	#	Shape
1	W44X335	26	W40X167	51	W33X318	76	W30X99	101	W24X207
2	W44X290	27	W40X149	52	W33X291	77	W30X90	102	W24X192
3	W44X262	28	W36X652	53	W33X263	78	W27X539	103	W24X176
4	W44X230	29	W36X529	54	W33X241	79	W27X368	104	W24X162
5	W40X593	30	W36X487	55	W33X221	80	W27X336	105	W24X146
6	W40X503	31	W36X441	56	W33X201	81	W27X307	106	W24X131
7	W40X431	32	W36X395	57	W33X169	82	W27X281	107	W24X117
8	W40X397	33	W36X361	58	W33X152	83	W27X258	108	W24X104
9	W40X372	34	W36X330	59	W33X141	84	W27X235	109	W24X103
10	W40X362	35	W36X302	60	W33X130	85	W27X217	110	W24X94
11	W40X324	36	W36X282	61	W33X118	86	W27X194	111	W24X84
12	W40X297	37	W36X262	62	W30X391	87	W27X178	112	W24X76
13	W40X277	38	W36X247	63	W30X357	88	W27X161	113	W24X68
14	W40X249	39	W36X231	64	W30X326	89	W27X146	114	W24X62
15	W40X215	40	W36X256	65	W30X292	90	W27X129	115	W24X55
16	W40X199	41	W36X232	66	W30X261	91	W27X114	116	W21X201
17	W40X392	42	W36X210	67	W30X235	92	W27X102	117	W21X182
18	W40X331	43	W36X194	68	W30X211	93	W27X94	118	W21X166
19	W40X327	44	W36X182	69	W30X191	94	W27X84	119	W21X147
20	W40X294	45	W36X170	70	W30X173	95	W24X370	120	W21X132
21	W40X278	46	W36X160	71	W30X148	96	W24X335	121	W21X122
22	W40X264	47	W36X150	72	W30X132	97	W24X306	122	W21X111
23	W40X235	48	W36X135	73	W30X124	98	W24X279	123	W21X101
24	W40X211	49	W33X387	74	W30X116	99	W24X250	124	W21X93
25	W40X183	50	W33X354	75	W30X108	100	W24X229	125	W21X83
#	**Shape**	**#**	**Shape**	**#**	**Shape**	**#**	**Shape**	**#**	**Shape**
126	W21X73	151	W18X60	176	W14X370	201	W14X30	226	W12X35
127	W21X68	152	W18X55	177	W14X342	202	W14X26	227	W12X30
128	W21X62	153	W18X50	178	W14X311	203	W14X22	228	W12X26
129	W21X55	154	W18X46	179	W14X283	204	W12X336	229	W12X22
130	W21X48*	155	W18X40	180	W14X257	205	W12X305	230	W12X19
131	W21X57	156	W18X35	181	W14X233	206	W12X279	231	W12X16
132	W21X50	157	W16X100	182	W14X211	207	W12X252	232	W12X14
133	W21X44	158	W16X89	183	W14X193	208	W12X230	233	W10X112

134	W18X311	159	W16X77	184	W14X176	209	W12X210	234	W10X100
135	W18X283	160	W16X67	185	W14X159	210	W12X190	235	W10X88
136	W18X258	161	W16X57	186	W14X145	211	W12X170	236	W10X77
137	W18X234	162	W16X50	187	W14X132	212	W12X152	237	W10X68
#	**Shape**	**#**	**Shape**	**#**	**Shape**	**#**	**Shape**	**#**	**Shape**
138	W18X211	163	W16X45	188	W14X120	213	W12X136	238	W10X60
139	W18X192	164	W16X40	189	W14X109	214	W12X120	239	W10X54
140	W18X175	165	W16X36	190	W14X99*	215	W12X106	240	W10X49
141	W18X158	166	W16X31	191	W14X90*	216	W12X96	241	W10X45
142	W18X143	167	W16X26	192	W14X82	217	W12X87	242	W10X39
143	W18X130	168	W14X730	193	W14X74	218	W12X79	243	W10X33
144	W18X119	169	W14X665	194	W14X68	219	W12X72	244	W10X30
145	W18X106	170	W14X605	195	W14X61	220	W12X65*	245	W10X26
146	W18X97	171	W14X550	196	W14X53	221	W12X58	246	W10X22
147	W18X86	172	W14X500	197	W14X48	222	W12X53	247	W10X19
148	W18X76	173	W14X455	198	W14X43	223	W12X50	248	W10X17
149	W18X71	174	W14X426	199	W14X38	224	W12X45	249	W10X15
150	W18X65	175	W14X398	200	W14X34	225	W12X40	250	W10X12*

* Section flange is noncompact.

More details on analyzed sections can be found in Appendix B.1.

5.1.2 Noncomposite I-shaped plate girders

Selection of noncomposite plate girder sections was done through an individual design of a compact section. Compactness criteria are presented in Table 5-8. Total of 64 plate girders made of grade 50 of A709 steel were designed and cover span lengths from 60 ft to 210 ft with increments of 10 ft and spacings of 6, 8, 10, and 12 feet.

Plates for webs and flanges are selected as recommended by practice manuals, with absolute minimum thickness of 3/16 in and 1/16 in. increments up to 1 in. of thickness. For plate thickness greater than 1 in. increment of ¼ in. is respected.

Table 5-3. Structural Type II, Noncomposite I-Shaped Plate Girders.

IDs	S (ft)	L (ft)	b_{fc} (in)	t_{fc} (in)	t_w (in)	D (in)	b_{ft} (in)	t_{ft} (in)
1-16	6	60-210	7 - 20	0.88 – 1.75	0.75 – 1.00	36 - 80	7 - 21	0.88 – 1.75
17-32	8	60-210	7.5 - 21	0.88 – 2.25	0.75 – 1.00	40 - 80	8 - 22	1.00 – 2.25
33-48	10	60-210	7.75 - 24	1.00 – 2.50	0.75 – 1.00	44 - 80	8 - 25	1.00 – 2.50
49-64	12	60-210	9.25 - 26	1.00 – 2.75	0.75 – 1.00	46 - 80	9.25 - 27	1.00 – 2.75

Basing on the web thickness, t_w, the web height, D, is chosen accordingly to achieve the greatest height-to-thickness, D/t_w, ratio possible, and remain compact. Web heights from 36 to 80 inches with increments of 2 inches are used in the design. For web thickness, the minimum value of 0.5 in. is respected, as thinner plate is subjected to excessive distortion from welding. Flange widths are chosen in increments of 2 and 3 inches. For certain cases, this rule is excepted for one or both flanges to match section’s capacity with the required value coming from the loads. This exception eliminates bias due to manufacturing and designing practices and allows for accurate determination of resistance and its statistical parameters.

More details on analyzed sections can be found in Appendix B.1.

5.1.3 Composite rolled I-shaped girders

Rolled I-shaped sections were selected through an analysis, so that the concrete deck paired with a steel section would create the most economical composite section, with the highest ratio of moment capacity per weight. In the considered set of composite girders, steel sections with maximum weight per linear foot of 256 lbs were paired with concrete decks of various width and uniform thickness of 9 inches. Girder spacings and concrete strengths were selected to maximize flexural load carrying capacity by keeping the plastic neutral axis is concrete slab. Geometry of analyzed sections is presented in Table 5-4 and Table 5-5.

Table 5-4. Structural Type III, Composite I-Shaped Rolled Sections. Part 1.

ID	Shape	S (ft)	t_{deck} (in)	t_h (in)	F_y (ksi)	f'_c (psi)	ID	Shape	S (ft)	t_{deck} (in)	t_h (in)	F_y (ksi)	f'_c (psi)
1	W44X230	12	9	2	50	6000	**61**	W21X147	12	9	2	50	6000
2	W40X215	12	9	2	50	6000	**62**	W21X132	12	9	2	50	6000
3	W40X199	12	9	2	50	6000	**63**	W21X122	12	9	2	50	6000
4	W40X235	12	9	2	50	6000	**64**	W21X111	12	9	2	50	6000
5	W40X211	12	9	2	50	6000	**65**	W21X101	12	9	2	50	6000
6	W40X183	12	9	2	50	6000	**66**	W21X93	10	9	2	50	4000
7	W40X167	12	9	2	50	6000	**67**	W21X83	10	9	2	50	4000
8	W40X149	12	9	2	50	6000	**68**	W21X73	10	9	2	50	4000
9	W36X247	12	9	2	50	6000	**69**	W21X68	10	9	2	50	4000
10	W36X231	12	9	2	50	6000	**70**	W21X62	10	9	2	50	4000
11	W36X256	12	9	2	50	6000	**71**	W21X55	10	9	2	50	4000
12	W36X232	12	9	2	50	6000	**72**	W21X48	10	9	2	50	4000
13	W36X210	12	9	2	50	6000	**73**	W21X57	10	9	2	50	4000
14	W36X194	12	9	2	50	6000	**74**	W21X50	10	9	2	50	4000
15	W36X182	12	9	2	50	6000	**75**	W21X44	10	9	2	50	4000
16	W36X170	12	9	2	50	6000	**76**	W18X175	12	9	2	50	6000
17	W36X160	12	9	2	50	6000	**77**	W18X158	12	9	2	50	6000
18	W36X150	12	9	2	50	6000	**78**	W18X143	12	9	2	50	6000
19	W36X135	12	9	2	50	6000	**79**	W18X130	12	9	2	50	6000
20	W33X201	12	9	2	50	6000	**80**	W18X119	12	9	2	50	6000
21	W33X169	12	9	2	50	6000	**81**	W18X106	12	9	2	50	6000
22	W33X152	12	9	2	50	6000	**82**	W18X97	10	9	2	50	4000
23	W33X141	12	9	2	50	6000	**83**	W18X86	10	9	2	50	4000
24	W33X130	12	9	2	50	6000	**84**	W18X76	10	9	2	50	4000
25	W33X118	12	9	2	50	6000	**85**	W18X71	10	9	2	50	4000
26	W30X211	12	9	2	50	6000	**86**	W18X65	10	9	2	50	4000
27	W30X191	12	9	2	50	6000	**87**	W18X60	10	9	2	50	4000
28	W30X173	12	9	2	50	6000	**88**	W18X55	10	9	2	50	4000
29	W30X148	12	9	2	50	6000	**89**	W18X50	10	9	2	50	4000
30	W30X132	12	9	2	50	6000	**90**	W18X46	10	9	2	50	4000
31	W30X124	12	9	2	50	6000	**91**	W18X40	10	9	2	50	4000
32	W30X116	12	9	2	50	6000	**92**	W18X35	10	9	2	50	4000
33	W30X108	12	9	2	50	6000	**93**	W16X100	12	9	2	50	6000
34	W30X99	12	9	2	50	6000	**94**	W16X89	10	9	2	50	4000
35	W30X90	12	9	2	50	6000	**95**	W16X77	10	9	2	50	4000
36	W27X194	12	9	2	50	6000	**96**	W16X67	10	9	2	50	4000
37	W27X178	12	9	2	50	6000	**97**	W16X57	10	9	2	50	4000

38	W27X161	12	9	2	50	6000	**98**	W16X50	10	9	2	50	4000
39	W27X146	12	9	2	50	6000	**99**	W16X45	10	9	2	50	4000
40	W27X129	12	9	2	50	6000	**100**	W16X40	10	9	2	50	4000
41	W27X114	12	9	2	50	6000	**101**	W16X36	10	9	2	50	4000
42	W27X102	12	9	2	50	6000	**102**	W16X31	10	9	2	50	4000
43	W27X94	12	9	2	50	6000	**103**	W16X26	10	9	2	50	4000
44	W27X84	12	9	2	50	6000	**104**	W14X109	12	9	2	50	6000
45	W24X176	12	9	2	50	6000	**105**	W14X99	12	9	2	50	6000
46	W24X162	12	9	2	50	6000	**106**	W14X90	12	9	2	50	6000
47	W24X146	12	9	2	50	6000	**107**	W14X82	12	9	2	50	6000
48	W24X131	12	9	2	50	6000	**108**	W14X74	12	9	2	50	6000
49	W24X117	12	9	2	50	6000	**109**	W14X68	12	9	2	50	6000
50	W24X104	12	9	2	50	6000	**110**	W14X61	12	9	2	50	6000
51	W24X103	12	9	2	50	6000	**111**	W14X53	12	9	2	50	6000
52	W24X94	10	9	2	50	4000	**112**	W14X48	12	9	2	50	6000
53	W24X84	10	9	2	50	4000	**113**	W14X43	10	9	2	50	4000
54	W24X76	10	9	2	50	4000	**114**	W14X38	10	9	2	50	4000
55	W24X68	10	9	2	50	4000	**115**	W14X34	10	9	2	50	4000
56	W24X62	10	9	2	50	4000	**116**	W14X30	10	9	2	50	4000
57	W24X55	10	9	2	50	4000	**117**	W14X26	10	9	2	50	4000
58	W21X201	12	9	2	50	6000	**118**	W14X22	10	9	2	50	4000
59	W21X182	12	9	2	50	6000	**119**	W18X211	12	9	2	50	6000
60	W21X166	12	9	2	50	6000	**120**	W18X192	12	9	2	50	6000

In addition to the sections listed in table above, for the structural type III – composite rolled I-shaped girders, the most economical composite sections are simulated for spacing, *S*, varying from 4 to 12 ft, and varying compressive strength of concrete, f'_c. Details of these sections are presented in the table below.

Table 5-5. Structural Type III, Composite I-Shaped Rolled Sections. Part 2.

IDs	Shape	S (ft)	t_{deck} (in)	t_h (in)	F_y (ksi)	f'$_c$ (psi)
121-130	W44x230	6, 8, 10, 12	9	2	50	3000, 3500, 4000, 4500, 5000, 6000
131-140	W40x149	6, 8, 10, 12	9	2	50	3000, 3500, 4000, 4500, 5000, 6000
141-150	W36x135	6, 8, 10, 12	9	2	50	3000, 3500, 4000, 4500, 5000, 6000
151-160	W33x118	6, 8, 10, 12	9	2	50	3000, 3500, 4000, 4500, 5000, 6000
161-170	W30x99	6, 8, 10, 12	9	2	50	3000, 3500, 4000, 4500, 5000, 6000
171-180	W27x84	6, 8, 10, 12	9	2	50	3000, 3500, 4000, 4500, 5000, 6000
181-190	W24x55	6, 8, 10, 12	9	2	50	3000, 3500, 4000, 4500, 5000, 6000

191-200	W21x44	6, 8, 10, 12	9	2	50	3000, 3500, 4000, 4500, 5000, 6000
201-211	W18x35	4, 6, 8, 10, 12	9	2	50	3000, 3500, 4000, 4500, 5000, 6000
212-222	W16x26	4, 6, 8, 10, 12	9	2	50	3000, 3500, 4000, 4500, 5000, 6000
223-233	W14x22	4, 6, 8, 10, 12	9	2	50	3000, 3500, 4000, 4500, 5000, 6000
234-244	W12x14	4, 6, 8, 10, 12	9	2	50	3000, 3500, 4000, 4500, 5000, 6000

More details on analyzed sections can be found in Appendix B.1.

5.1.4 Composite I-shaped plate girders

Plate girder sections are selected in such a way to cover all the possible shapes that may be used in the practice. Therefore, a series of designs of simple span bridges was performed so that the section had load carrying capacity equal to the demand coming from loads. Proportioning requirements, in accordance to AASHTO LRFD Specification [1] were satisfied. Lead proportioning provisions of are presented below.

Webs of an I-section flexural member shall be proportioned such that:

$$D/t_w \leq 150 \tag{5.2}$$

$$D/t_w \leq 300 \tag{5.3}$$

Equation (5.2) applies for webs without longitudinal stiffeners, and equation (5.3) for webs with longitudinal stiffeners. The equations above allow for easier web proportioning in the preliminary design and their satisfaction allows web bend-buckling to be disregarded in the design of composite section in positive flexure as it does not control. The limit in equation (5.2) is valid for sections with minimum yield strengths up to and including 100 ksi. In this study, only webs without longitudinal stiffeners are evaluated as per equation (5.2).

The compression and tension flanges shall be proportioned such that:

$$b_f/2t_f \leq 12 \tag{5.4}$$

$$b_f \geq D/6 \tag{5.5}$$

$$t_f \geq 1.1t_w \tag{5.6}$$

$$0.1 \leq I_{yc}/I_{yt} \leq 10 \tag{5.7}$$

where:

I_{yc} = moment of inertia of the compression flange of the steel section about the vertical axis in the plane of the web (in.^{4})

I_{yt} = moment of inertia of the tension flange of the steel section about the vertical axis in the plane of the web (in.^{4})

Sections in straight bridges qualify as compact sections when following requirements are met:

- the specified minimum yield strengths of the flanges and web do not exceed 70ksi,
- web satisfies the limitations described by equations (5.2) and (5.3) for webs without and with longitudinal stiffeners, respectfully,
- the section satisfies the web slenderness limit given by equation (5.8).

The web slenderness limit is given by:

$$2D_{cp}/t_w \leq 3.76\sqrt{E/F_{yc}} \tag{5.8}$$

Designed sections meet all the requirements presented above and are compact. Web heights range from 30 in. to 120 in. with increments of 2 in. Plates for webs and flanges are selected as recommended by practice manuals, with 1/16 in. increments up to 1 in. of thickness with minimum thickness of 3/16 in. For plate thickness greater than 1 in. increment of ¼ in. is respected. Basing on the web thickness, t_w, the web height, D, is chosen accordingly to achieve the greatest height-to-thickness, D/t_w, ratio possible, capped as specified by equation (5.2). For web thickness, the minimum value of 0.5 in. is respected, as thinner plate is subjected to excessive distortion from welding. Flange widths are chosen in increments of 2 and 3 inches. For certain cases, this rule is excepted for one or both flanges to match section's capacity with the required value coming from the loads. This exception eliminates bias due to manufacturing and designing practices and allows for accurate determination of resistance and its statistical parameters.

Table 5-6. Structural Type IV, Composite I-Shaped Plate Girders.

#	S (ft)	L (ft)	t_{deck} (in)	t_h (in)	b_{fc} (in)	t_{fc} (in)	t_w (in)	D (in)	b_{ft} (in)	t_{ft} (in)	F_y (ksi)	f'_c (psi)
1-3	*Empty placeholders*											
4-30	6	70-330	9	2	6 - 38	0.625 – 2.75	0.5 – 1.0	30 - 120	7 - 37	0.625 – 2.25	50	4000
31-55	8	60-300	9	2	6 - 30	0.625 – 2.75	0.5 – 1.0	28 -120	7 -30	0.625 – 2.75	50	4000
56-76	10	100-300	9	2	11 - 35	0.625 – 2.75	0.5 – 1.0	54 - 120	13 - 36	0.625 – 2.75	50	4000
77-101	12	60-300	9	2	7 - 39	0.625 – 2.75	0.5 – 1.0	40 - 120	8 - 40	0.625 – 2.75	50	4000
102-124	14	80-300	9	2	9 - 40	0.625 – 3.0	0.5 – 1.0	52 - 120	10 - 46	0.625 – 3.0	50	4000
125-149	16	60-300	9	2	7 - 43	0.625 – 3.0	0.5 – 1.0	40 - 120	8 - 50	0.625 – 3.0	50	4000

5.1.5 Composite box girders

Selection of the box girder cross-sections is partially inspired by a work done by C.P. Heins entitled ‘Steel Box Girder Bridges – Design Guides & Methods’ [27] that was published in 1983 and bases on allowable stress design. The sections analyzed by Heins are suitable up to 240 feet span length. A handful of additional sections is analyzed to fulfill the set specified by Heins.

According to provisions of AASHTO LRFD Specification [1], webs of a box-section flexural member can be inclined or vertical. The inclination of the web plates to a plane normal to the compression flange should not exceed 1 to 4. For the case of inclined webs, the distance along the web shall be used for checking all design requirements. Webs attached to top flanges of tub sections shall be attached at mid-width of the flanges. Webs shall be proportioned as specified in subsection 5.1.4 with equations (5.2) and (5.3) for webs with without and with longitudinal stiffeners. In this dissertation, only inclined webs without longitudinal stiffeners are evaluated.

The same provisions as for Composite I-shaped plate girders (subsection 5.1.4) apply for the compression flanges proportioning – equations (5.4) through (5.6).

The AASHTO Specification [1], also imposes special restrictions related to the use of live load distribution factor included in it. The bearing lines shall not be skewed and the distance between boxes must meet the following geometric limitations. The distance center-to-center of flanges of adjacent boxes, *a*, taken at the midspan, shall neither be greater than 120 percent nor less than 80 percent of the distance center-to-center of the flanges of each adjacent box, *w*, as illustrated in Fig. 5-1. The distance center-to-center of flanges of each individual box shall be the same. The cantilever overhang of the concrete deck, including curb and parapet, shall not be greater than either 60 percent of the average distance between the centers of the top steel flanges of adjacent box sections, *a*, or 6.0 ft.

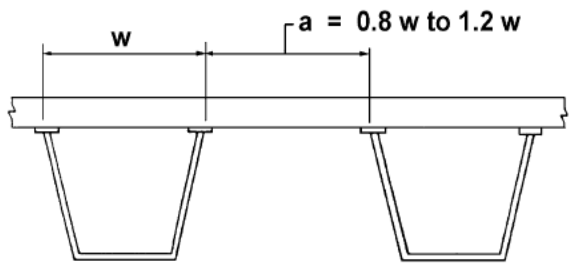


Fig. 5-1: Center-to-center Flange Distance [1].

Sections in straight bridges qualify as compact sections when following requirements are met:

- the specified minimum yield strengths of the flanges and web do not exceed 70ksi,
- webs meet the limitations described by equations (5.2) and (5.3) for webs without and with longitudinal stiffeners, respectfully,
- special geometric restrictions, mentioned above, are met,
- the box flange is fully effective in resisting flexure,
- the section satisfies the web slenderness limit given by equation (5.8).

Box flanges in multiple and single box sections are considered fully effective in resisting flexure if the width of the flange does not exceed one-fifth of the effective span. For single spans, the effective span shall be taken as span length, while for continuous spans, it shall be taken equal to the distance between points of permanent load contraflexure. If the flange width exceeds one-fifth of the effective span, only a width equal to one-fifth of the effective span shall be considered effective in resisting flexure.

Following the proportioning guidelines presented herein, and practical plate dimensioning as described in subsection 5.1.4 eighty compact steel box girders were generated. Table 5-7 shows the box girder sections generated and analyzed.

Table 5-7. Structural Type V, Composite Box Girders.

#	w (ft)	a/w (0.8-1.2)	x, Inclination 1/x	h (in)	S (ft)	t_{deck} (in)	t_h (in)	b_{fc} (in)	t_{fc} (in)	t_w (in)	D (in)	b_{ft} (in)	t_{ft} (in)	F_y (ksi)	f'_c (psi)
1-9	7.67, 9.33, 11.00	0.80	4	24	13.8, 16.8, 19.8	9	0	7.0	0.375	0.1875	24.75	80, 100, 120	0.375 – 0.75	50	4000, 5000, 6000
10-24	8.67, 10.30, 12.00	0.80	4	48	15.60, 18.60, 21.60	9	0	9.0	0.5	0.375	49.50	80, 100, 120	0.375 – 1.25	50	4000, 5000, 6000
25-39	9.67, 11.30, 13.00	0.80	4	72	17.40, 20.40, 23.40	9	0	13.0	0.625	0.5	74.25	80, 100, 120	0.375 – 1.25	50	4000, 5000, 6000
40-54	10.30, 11.90, 13.60	0.80	4	86	18.45, 21.45 24.45	9	0	16.0	0.75	0.625	88.75	80, 100, 120	0.375 – 1.25	50	4000, 5000, 6000
55-69	10.80, 12.50, 14.20	0.80	4	100	19.50, 22.50, 25.50	9	0	19.0	0.875	0.75	103.00	80, 100, 120	0.375 – 1.25	50	4000, 5000, 6000
70-80	11.50, 13.10, 14.80	0.80	4	115	20.63, 23.63, 26.63	9	0	21.0	1	0.875	118.50	80, 100, 120	0.50 – 1.25	50	5000, 6000

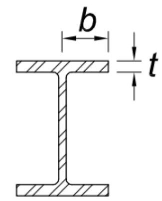
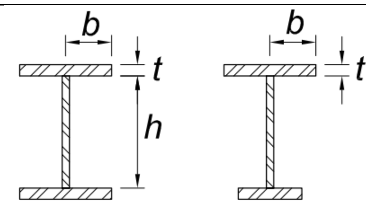
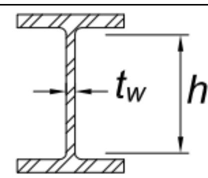
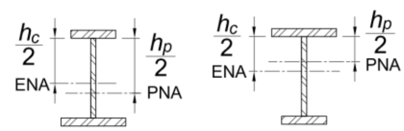
5.2 Resistance models

The resistance models for steel girders, presented in this section are quoted from specific design codes and base on well researched and understood methods. These methods include plastic and buckling analysis, that together with derived specific application limitations allow designer to determine the controlling resistance. This section will discuss only those resistance models that apply to the strength I limit state. To determine nominal resistance of a single steel bridge girder, calculations must be performed on nominal values of material strength and dimensions.

5.2.1 Flexural resistance of noncomposite I-shaped girders

In this subsection, flexural resistance calculations per AISC 360-16 Specification [28] are presented for both, rolled and welded plate I-shaped girders. To determine flexural strength of a section, the first step is to allocate the flange and web slenderness into one of three groups of slenderness: compact, noncompact, slender. Table 5-8 presents limiting slenderness ratio values for considered shapes subject to flexure.

Table 5-8. Slenderness Ratio for Elements Subject to Flexure

	Description of Element	Slenderness ratio (Width-to-Thickness Ratio)	Limiting Slenderness Ratio λp (compact/ noncompact)	Limiting Slenderness Ratio λr (noncompact/ slender)	Example
Unstiffened Elements	Flanges of rolled I-shaped sections, channels, and tees	b/t	$0.38\sqrt{E/F_y}$	$1.0\sqrt{E/F_y}$	
Unstiffened Elements	Flanges of doubly and singly symmetric I-shaped built-up sections	b/t	$0.38\sqrt{E/F_y}$	$0.95\sqrt{k_cE/F_L}$ [a],[b]	
Stiffened Elements	Webs of doubly symmetric I-shaped sections and channels	h/t_w	$3.76\sqrt{E/F_y}$	$5.70\sqrt{E/F_y}$	
Stiffened Elements	Webs of singly symmetric I-shaped sections	h_c/t_w	$\dfrac{\frac{h_c}{h_p}\sqrt{E/F_y}}{\left(0.54\frac{M_p}{M_y}-0.09\right)^2} \le \lambda_r$ [c]	$5.70\sqrt{E/F_y}$	

[a] $k_c = 4/\sqrt{h/t_w}$, shall not be taken less than 0.35 nor greater than 0.76 for calculation purposes.
[b] $F_L = 0.7F_y$ for slender web I-shaped memberts and major-axis bending of compact and noncompact web built-up I-shaped members with $S_{xt}/S_{xc} \ge 0.7$;
$F_L = F_yS_{xt}/S_{xc} \ge 0.5F_y$ for major-axis bending of compact and noncompact web built-up I-shaped members with $S_{xt}/S_{xc} < 0.7$, where S_{xc}, S_{xt}=elastic section modulus referred to compression and tension flanges, respectively (in.^{3})
[c] M_y is the moment at yielding of the extreme fiber. $M_p = F_yZ_x$, plastic bending moment, kip-in, where Z_x =plastic section modulus taken about x-axis (in.^{3})

where:

b = for flanges of I-shaped members, the width, *b*, is one-half the full-flange width, b_f (in.)

t = thickness of flange (in.)

h = for rolled I-shaped members, the clear distance between flanges less the fillet at each flange (in.)

= for built-up welded sections, the clear distance between flanges (in.)

t_w = thickness of web (in.)

h_c = twice the distance from the center of gravity to the inside face of the compression flange (in.)

h_p = twice the distance from the plastic neutral axis to the inside face of the compression flange (in.)

ENA = elastic neutral axis (-)

PNA = plastic neutral axis (-)

Secondly, depending on the slenderness of both, web and flange, the flexural resistance can be calculated using the following expressions:

$$M_n = M_p = F_y Z_x \tag{5.9}$$

$$M_n = M_p - \left(M_p - 0.7F_y S_x\right)\left(\frac{\lambda - \lambda_{pf}}{\lambda_{rf} - \lambda_{pf}}\right) \tag{5.10}$$

$$M_n = \frac{0.9Ek_c S_x}{\lambda^2} \tag{5.11}$$

where:

F_y = Yield strength of steel (ksi)

Z_x = plastic section modulus (in.^{3})

S_x = elastic section modulus (in.^{3})

λ = Width-to-thickness ratio for the element considered (-)

λ_{pf} = Limiting width-to-thickness parameter for compact flange (-)

λ_{rf} = Limiting width-to-thickness parameter for noncompact flange (-)

E = Modulus of elasticity of steel = 29’000 ksi

k_c = Coefficient for slender unstiffened elements (Table 5-8) (-)

The flowchart below (Fig. 5-2) shows the determination process of the flexural resistance due to yielding. Lateral-Torsional Buckling is assumed not to apply, due to appropriate bracing provided. Sections with noncompact and slender webs are not captured in the flowchart.

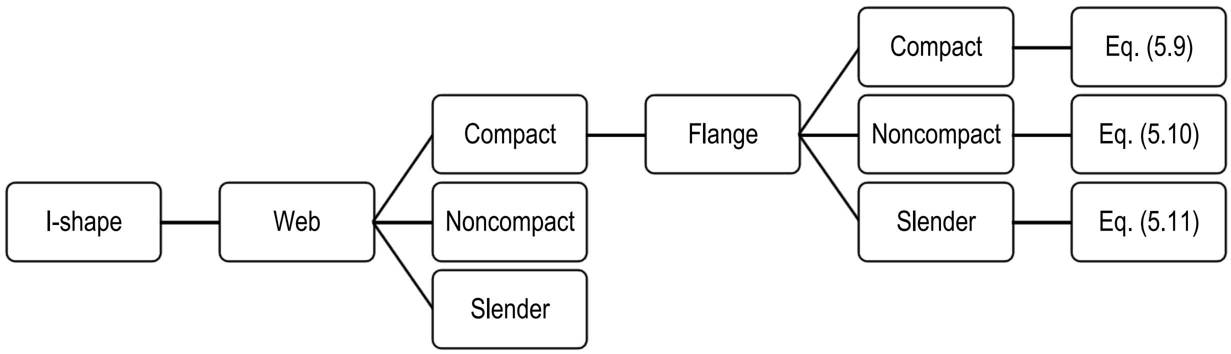


Fig. 5-2: Flexural Resistance Determination Flowchart for I-shaped girders.

5.2.2 Shear resistance of noncomposite I-shaped girders

Similarly, as the subsection above, this subsection refers to rolled and welded plate I-shaped girders with calculations per AISC 360-16 Specification [28]. The shear strength of webs without tension field action is considered and given by following equation:

$$V_n = 0.6F_yA_wC_{v1} \tag{5.12}$$

where:

F_y = specified minimum yield stress of the type of the steel being used (ksi)

A_w = area of web, the overall depth times the web thickness, dt_w (in.^{2})

C_{v1} = web shear strength coefficient (-)

Depending on h/t_w ratio an appropriate web shear strength coefficient, C_{v1}, is chosen or calculated, in accordance with procedure shown below (Fig. 5-3).

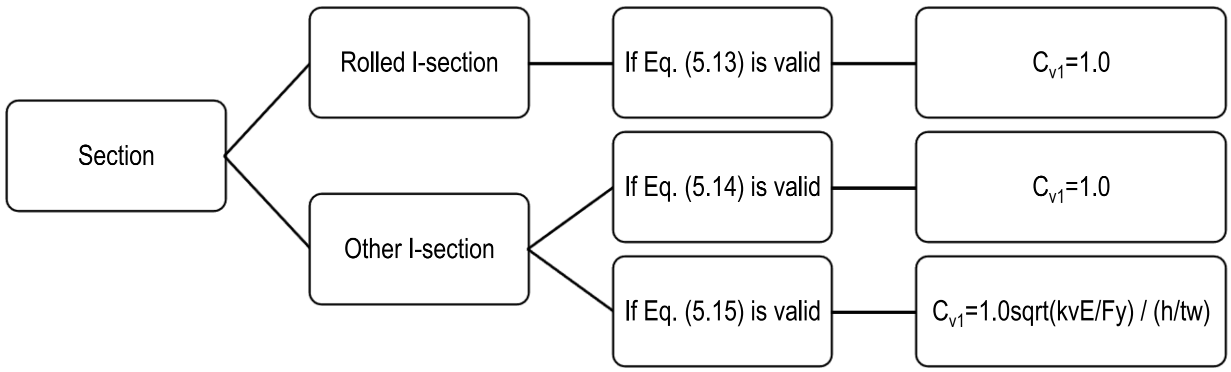


Fig. 5-3: Web shear strength coefficient determination flowchart for I-shaped girders.

With web slenderness given by:

$$h/t_w \leq 2.24\sqrt{E/F_y} \tag{5.13}$$

$$h/t_w \leq 1.10\sqrt{k_v E/F_y} \tag{5.14}$$

$$h/t_w > 1.10\sqrt{k_v E/F_y} \tag{5.15}$$

where:

h = for rolled I-shaped members, the clear distance between flanges less the fillet at each flange (in.)

= for built-up welded sections, the clear distance between flanges, (in.)

t_w = thickness of web (in.)

k_v = web plate shear buckling coefficient; for webs without transverse stiffeners = 5.34 (-)

5.2.3 Flexural resistance of composite I-shaped girders

The nominal flexural resistance of composite systems, including I-shaped rolled sections and plate girders, is determined in accordance to AASHTO LRFD Specification [1]. A typical I-shaped section considered is shown in the Fig. 5-4. In this analysis, deck reinforcement is considered as orthotropic reinforcement with both, bottom and top mesh of #4 rebars at 8” spacing (#4@8”).

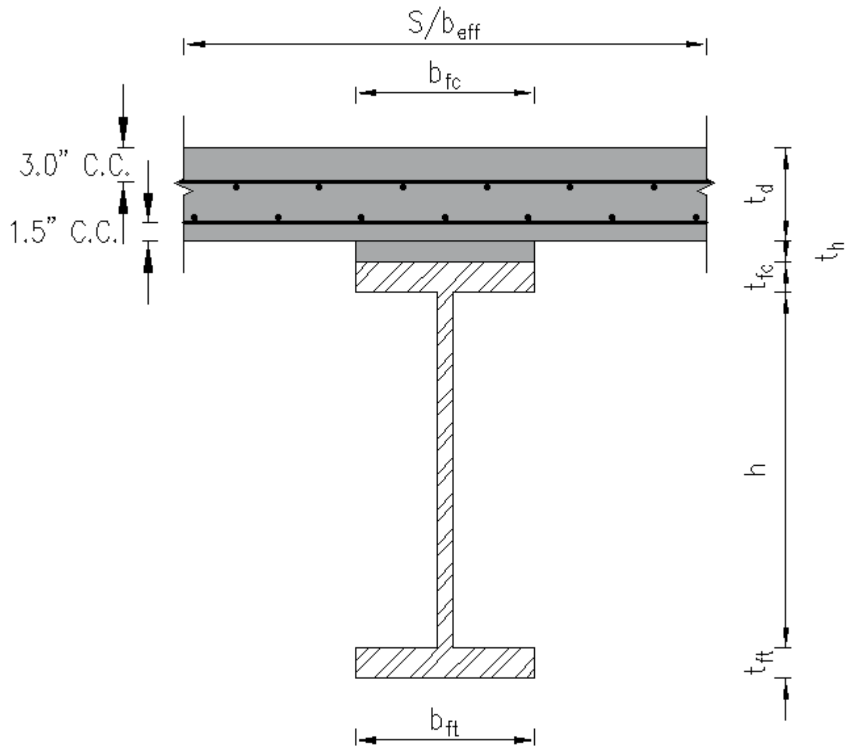


Fig. 5-4: Considered I-shaped composite section.

A flowchart (Fig. 5-5) illustrates the requirements to qualify a composite section in positive flexure as compact.

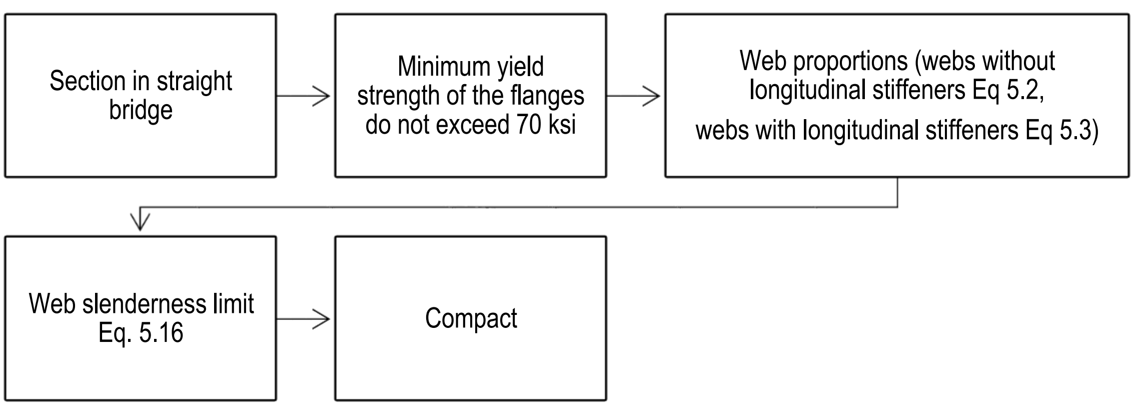


Fig. 5-5: Requirements for compact composite sections in positive flexure.

$$2D_{cp}/t_w \leq 3.76\sqrt{E/F_{yc}} \tag{5.16}$$

where:

D_{cp} = depth of the web in compression at the plastic moment (in.)

The noncompact sections are composite sections in kinked (chorded) continuous or horizontally curved steel girder bridges.

Both compact and noncompact composite sections shall satisfy ductility requirement:

$$D_p \leq 0.42D_t \tag{5.17}$$

where:

D_p = distance from the top of the concrete deck to the neutral axis of the composite section at the plastic moment (in.)

D_t = total depth of the composite section (in.)

The ductility requirement shown above is intended to protect the concrete deck from premature crushing. The ratio of D_p/D_t is equal to 0.42 to ensure significant yielding of the bottom flange when the crushing strain is reached at the top of the deck.

For the considered section (Fig. 5-4) the plastic neutral axis (PNA) may be in the web, top (compression) flange or concrete deck (Fig. 5-7). To determine the location of the PNA a comparison of maximum forces at yielding must be performed (Fig. 5-6).

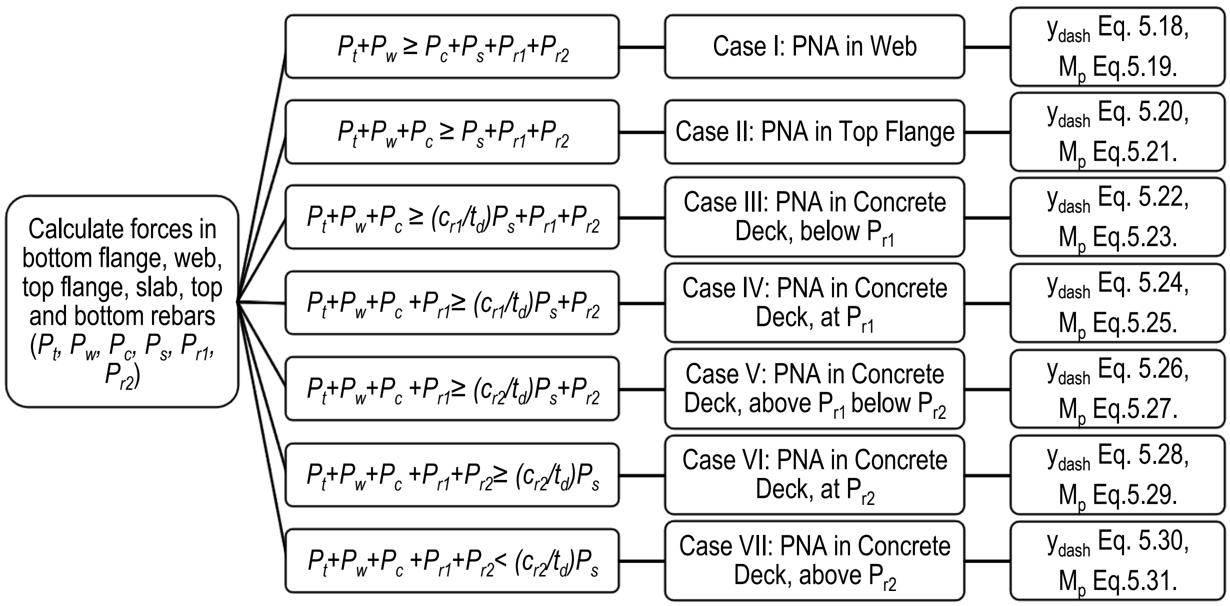


Fig. 5-6: PNA location determination process.

Depending on the magnitude of forces P_t, P_w, P_c, and P_s equation describing location of PNA as well as plastic moment, M_p, varies. Fig. 5-7 explains application of equations for y_{dash} and M_p.

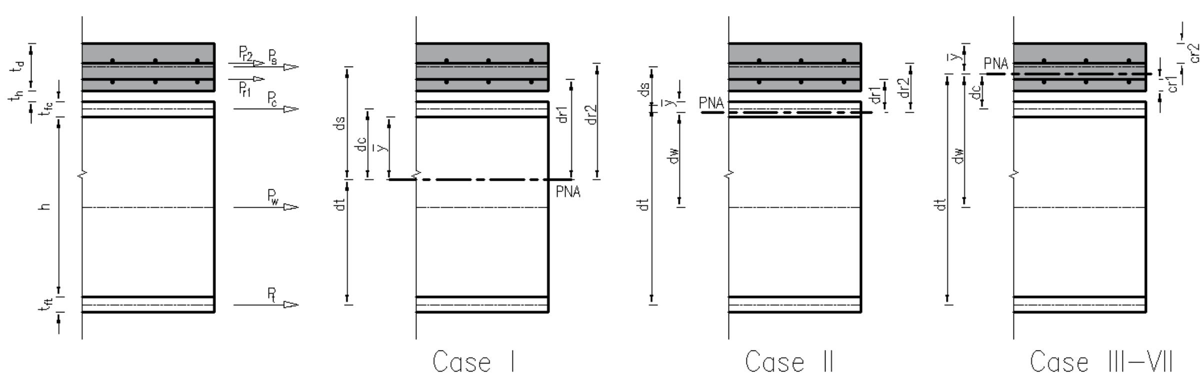


Fig. 5-7: Location of the PNA and forces acting on a section.

$$\bar{y} = \frac{h}{2}\left(\frac{P_t - P_c - P_s - P_{r1} - P_{r2}}{P_w} + 1\right) \tag{5.18}$$

$$M_p = P_t d_t + \frac{P_w}{2h}[\bar{y}^2 + (h - \bar{y})^2] + P_c d_c + P_{r1} d_{r1} + P_s d_s + P_{r2} d_{r2} \tag{5.19}$$

$$\bar{y} = \frac{t_{fc}}{2}\left(\frac{P_w + P_t - P_s - P_{r1} - P_{r2}}{P_c} + 1\right) \tag{5.20}$$

$$M_p = P_t d_t + P_w d_w + \frac{P_c}{2t_{fc}}\left[\bar{y}^2 + \left(t_{fc} - \bar{y}\right)^2\right] + P_{r1} d_{r1} + P_s d_s + P_{r2} d_{r2} \tag{5.21}$$

$$\bar{y} = t_d\left(\frac{P_c + P_w + P_t - P_{r1} - P_{r2}}{P_s}\right) \tag{5.22}$$

$$M_p = P_t d_t + P_w d_w + P_s d_s + \frac{\bar{y}^2 P_s}{2t_d} + P_{r1} d_{r1} + P_{r2} d_{r2} \tag{5.23}$$

$$\bar{y} = c_{r1} \tag{5.24}$$

$$M_p = P_t d_t + P_w d_w + P_s d_s + \frac{\bar{y}^2 P_s}{2t_d} + P_{r2} d_{r2} \tag{5.25}$$

$$\bar{y} = t_d\left(\frac{P_{r1} + P_c + P_w + P_t - P_{r2}}{P_s}\right) \tag{5.26}$$

$$M_p = P_t d_t + P_w d_w + P_s d_s + P_{r1} d_{r1} + \frac{\bar{y}^2 P_s}{2t_d} + P_{r2} d_{r2} \tag{5.27}$$

$$\bar{y} = c_{r2} \tag{5.28}$$

$$M_p = P_t d_t + P_w d_w + P_s d_s + P_{r1} d_{r1} + \frac{\bar{y}^2 P_s}{2t_d} \tag{5.29}$$

$$\bar{y} = t_d\left(\frac{P_{r1} + P_{r2} + P_c + P_w + P_t}{P_s}\right) \tag{5.30}$$

$$M_p = P_t d_t + P_w d_w + P_s d_s + P_{r1} d_{r1} + \frac{\bar{y}^2 P_s}{2t_d} + P_{r2} d_{r2} \tag{5.31}$$

where:

d_c = distance from PNA to centerline of top (compression flange) (in.)

d_t = distance from PNA to centerline of bottom (tension flange) (in.)

d_w = distance from PNA to centerline of web (in.)

d_s = distance from PNA to centerline of the deck (in.)

d_{r1} = distance from PNA to centerline of bottom reinforcement (in.)

d_{r2} = distance from PNA to centerline of top reinforcement (in.)

f_c' = concrete compressive strength (ksi)

$\bar{y}$ = distance from PNA to either top of the deck, top of the compression flange or bottom of the compression flange (in.)

M_p = plastic moment of the composite section (kip-in.)

The nominal flexural resistance of the section shall be taken as:

$$M_n = M_p, \text{ if } D_p \leq 0.1D_t \tag{5.32}$$

$$M_n = M_p\left(1.07 - 0.7\frac{D_p}{D_t}\right) \text{ otherwise} \tag{5.33}$$

Where equation (5.33) implements an additional margin of safety, which increases approximately as a linear function of D_p/D_t is intended to protect the concrete deck from premature crushing, thereby ensuring adequate ductility of the composite section. This additional margin of safety is neglected in resistance simulations because it artificially reduces flexural capacity and affects lower tail of resistance distribution. There is an additional limitation for continuous span girders, where the nominal flexural resistance shall satisfy:

$$M_n \leq 1.3R_hM_y \tag{5.34}$$

where:

M_y = yield moment (kip-in)

R_h = hybrid factor

5.2.4 Shear resistance of composite I-shaped girders

The AASHTO LRFD Specification [1] specifies the shear resistance for unstiffened and stiffened webs. In this study, just unstiffened webs are considered.

The nominal shear resistance of unstiffened webs shall be takes as:

$$V_n = V_{cr} = CV_p \tag{5.35}$$

in which:

$$V_p = 0.58F_{yw}Dt_w \tag{5.36}$$

where:

C = ratio of the shear-buckling resistance to the shear yield strength determined by Eqs. (5.39), (5.40) or (5.41) as applicable, with the shear-buckling coefficient, k, taken equal to 5.0 (-)

D = clear distance between flanges (in.)

V_{cr} = shear-buckling resistance (kip)

V_n = nominal shear resistance (kip)

V_p = plastic shear force (kip)

The nominal shear resistance of an interior web panel of a stiffened web with the section along the entire panel proportioned such that:

$$\frac{2Dt_w}{b_{fc}t_{fc} + b_{ft}t_{ft}} \leq 2.5 \tag{5.37}$$

shall be takes as:

$$V_n = V_p\left[C + \frac{0.87(1-C)}{\sqrt{1+\left(\frac{d_0}{D}\right)^2}}\right] \tag{5.38}$$

where:

d_0 = transverse stiffener spacing (in.)

V_p = plastic shear force, determined by equation (5.36) (kip)

C = ratio of the shear-buckling resistance to the shear yield strength determined by Eqs. (5.39), (5.40) or (5.41) as applicable, with the shear-buckling coefficient, k, calculated by eq. (5.42)

The ratio, C, shall be determined as specified below:

$$\text{If } D/t_w \leq 1.12\sqrt{Ek/F_{yw}}, \text{ then: } C = 1.0 \tag{5.39}$$

$$\text{If } 1.12\sqrt{Ek/F_{yw}} \leq D/t_w \leq 1.40\sqrt{Ek/F_{yw}}, \text{ then: } C = \frac{1.12}{D/t_w}\sqrt{Ek/F_{yw}} \tag{5.40}$$

$$\text{If } D/t_w \geq 1.40\sqrt{Ek/F_{yw}}, \text{ then: } C = \frac{1.57}{\left(\frac{D}{t_w}\right)^2}\left(\frac{Ek}{F_{yw}}\right) \tag{5.41}$$

In which:

$$k = 5 + \frac{5}{\left(\frac{d_0}{D}\right)^2} \tag{5.42}$$

5.2.5 Flexural resistance of composite box girders

According to AASHTO LRFD Specification [1], the nominal flexural resistance of the composite steel box sections shall be calculated as specified in subsection 5.2.3.

5.2.6 Shear resistance of composite box girders

Shear resistance of a single web of the box section shall be calculated as specified in section 5.2.4 except for provisions specified herein. For the case of inclined web, each web shall be designed for a shear, V_{ui}, due to factored loads taken as:

$$V_{ui} = V_u / \cos\theta \tag{5.43}$$

where:

V_u = vertical shear due to the factored loads on one inclined web (kip)

θ = the angle of inclination of the web plate to the vertical (degrees)

For all single box sections, horizontally curved sections, and multiple box sections in bridges not satisfying the special geometric requirements of subsection 5.1.5, or with box flanges that are not fully effective, V_u shall be taken as the sum of the flexural and St. Venant torsional shears.

For box flanges, b_{fc} or b_{ft}, as applicable, shall be taken as one-half of the effective flange width between webs in checking eq. (5.37), where the effective flange width shall be taken as specified in subsection 5.1.5, but not to exceed $18t_f$ where t_f is the thickness of the box flange.

5.3 Resistance model for composite sections with material nonlinearity

To capture flexural resistance of High-Performance Steel (HPS) bridge composite sections an analytical model was developed. Due to significant differences in plastic properties between HPS and conventional mild steel, the traditional flexural resistance models presented in section 5.2 are not applicable for the HPS composite sections. It appears that resistance models basing on plastic analysis overestimate the development of plasticity in HPS when used in composite section. This section exhibits the difference between the HPS and mild steel and describes the development of the analytical resistance model for composite bridge sections. The developed resistance model is an improved version of the model published by Ban and Bradford [29]. Unfortunately, the Ban and Bradford analytical model is unable to properly account for strain hardening in HPS and does not account for presence of reinforcing bars in concrete slab. Developed model presented herein is validated with test results, compared with theoretical solutions, and used to determine distribution and statistical parameters of HPS composite sections.

5.3.1 Geometry of cross-section and assumptions

A model for composite I-shaped steel beams and steel box girders with a reinforced concrete deck is developed. The model is capable of simulating the moment-curvature relationship for traditional I-shaped girder, plate girders with flanges of different dimensions and steel box girders with vertical and sloped webs. Geometry of considered cross-sections is shown in Fig. 5-8. Two types of concrete deck construction, with and without concrete haunch are considered. The cross section is subjected to positive moment. The developed model is based on following assumptions:

1. The strains along the depth of the composite section are distributed linearly, and they are consistent by having the same curvature, Φ
2. All the materials, steel, concrete and rebars are treated as homogeneous based on their axial stress-strain relationships.
3. For rebar steel and concrete the strain hardening in tension is ignored, while for HPS section it is taken into account.
4. The slip between the steel section and concrete slab is quantified as a slip strain, ε_i, defined as difference between the steel strain, ε_{si}, and the concrete strain, ε_{ci}, at the interface surface.
5. Stresses within both, compression and tension flange, are constant through the plate thickness, and they are determined by using strains at midthickness (ε_{fc} and ε_{ft} respectively).
6. Resistance of haunch concrete in compression is ignored.
7. Because of very slight effect of plate buckling due to restrain from shear studs [30] neither plate buckling nor shear lag effects occur [31].

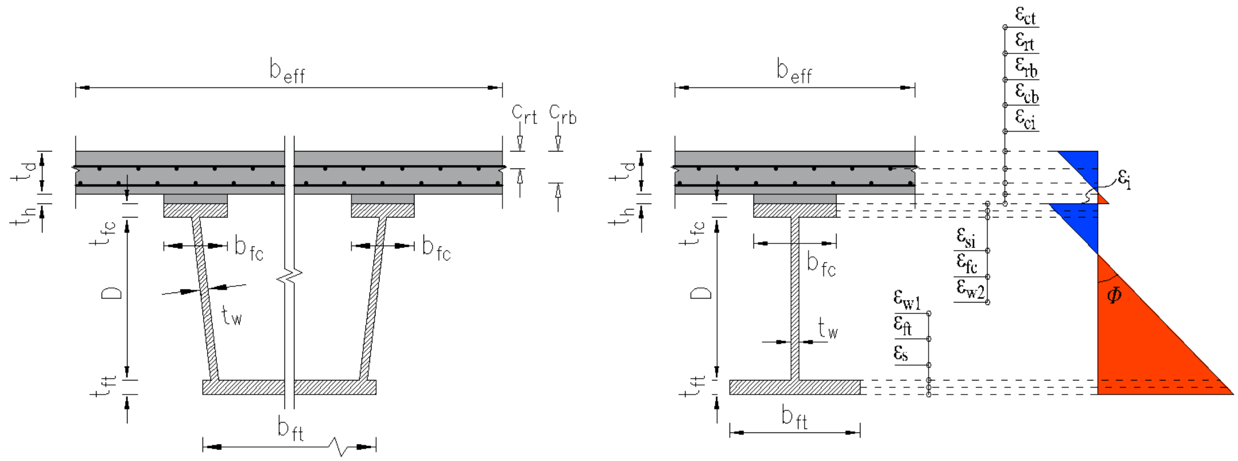


Fig. 5-8: Cross-sectional dimensions and strain distribution.

5.3.2 Constitutive models for steel and concrete

The constitutive material model for steel is described using linear stress-strain relationships of different slope angles within certain regions (Fig. 5-9a). Within elastic region, for $\varepsilon < \varepsilon_y$, the slope of the stress-strain linear relationship is defined by Young's modulus of elasticity, E_s. At the yield plateau, for strain greater than yield strain and less than strain hardening strain, $\varepsilon_y < \varepsilon < \varepsilon_{sh}$, the stress is constant and equal to yield strength, F_y. In case of HPS the yield plateau does not exist therefore $\varepsilon_{sh} = \varepsilon_y$. Within strain hardening region, the stress increases from its yield, F_y, to ultimate value, F_u, between strain hardening, ε_{sh}, and ultimate strain, ε_u. By mathematical formulation the stress function is given by:

$$\sigma_s(\varepsilon) = \begin{cases} \varepsilon E_s & for\ \varepsilon < \varepsilon_y \\ F_y & for\ \varepsilon_y \leq \varepsilon < \varepsilon_{sh} \\ F_y + \left(\dfrac{F_u - F_y}{\varepsilon_u - \varepsilon_{sh}}\right)(\varepsilon - \varepsilon_{sh}) & for\ \varepsilon_{sh} \leq \varepsilon < \varepsilon_u \end{cases} \qquad (5.44)$$

The concrete material model in compression is described with nonlinear stress-strain curve provided in Eurocode 2 [32] as shown in Fig. 5-9b. According to Eurocode 2 [32] the stress-strain relationship is given by:

$$\sigma_c(\varepsilon_c) = \left[\frac{k\left(\frac{\varepsilon_c}{\varepsilon_{c0}}\right) - \left(\frac{\varepsilon_c}{\varepsilon_{c0}}\right)^2}{1 + (k-2)\left(\frac{\varepsilon_c}{\varepsilon_{c0}}\right)}\right] f'_c \tag{5.45}$$

where

$$\varepsilon_{c0} = \min\left(0.7{f'_c}^{0.31}, 2.8\right)/1000 \quad (f'_c \; input \; in \; MPa) \tag{5.46}$$

$$k = 1.05E_c|\varepsilon_{c0}|/f'_c \quad (E_c \; and \; f'_c \; input \; in \; MPa) \tag{5.47}$$

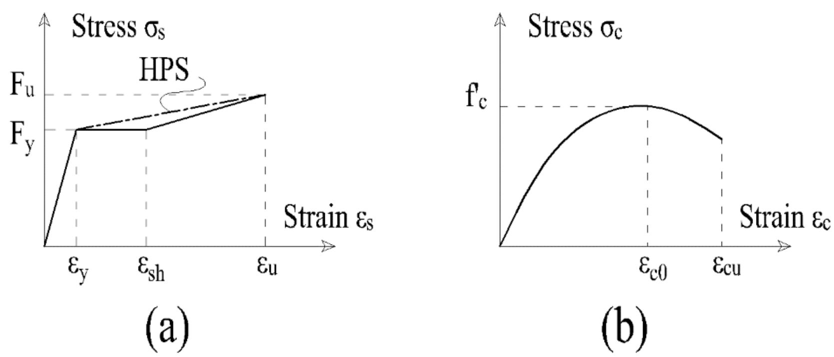


Fig. 5-9: Stress-strain relationship for (a) steel, (b) concrete.

and where

$$E_c = 22000\left(\frac{f'_c}{10}\right)^{0.31} \text{(MPa)}, (f'_c \; input \; in \; MPa) \tag{5.48}$$

The ultimate strain of concrete, ε_{cu}, is also determined from Eurocode formula [32] with the upper limit as specified in ACI 318 [33]:

$$\varepsilon_{cu} = \min\left[2.8 + 27\left(\frac{98 - f'_c}{100}\right)^4, 3.0\right]/1000 \tag{5.49}$$

with the remaining strength of concrete beyond ε_{cu} neglected. Concrete in tension is assumed to be cracked with no tensile strength.

5.3.3 Strain distribution of cross section along depth

Basing on the distribution along section's depth (Fig. 5-8) strain at any location along can be evaluated using strain of the bottom fibers of the tension flange and the geometry. Strains shown in Fig. 5-8 can be evaluated using following formulas:

$$\varepsilon_{ft} = \varepsilon_s - \left(\frac{t_{ft}}{2}\right)\phi \tag{5.50}$$

$$\varepsilon_{w1} = \varepsilon_s - t_{ft}\phi \tag{5.51}$$

$$\varepsilon_{w2} = \varepsilon_s - (t_{ft} + D)\phi \tag{5.52}$$

$$\varepsilon_{fc} = \varepsilon_s - \left(t_{ft} + D + \frac{t_{fc}}{2}\right)\phi \tag{5.53}$$

$$\varepsilon_{si} = \varepsilon_s - \left(t_{ft} + D + t_{fc}\right)\phi \tag{5.54}$$

$$\varepsilon_{ci} = \varepsilon_s - \left(t_{ft} + D + t_{fc}\right)\phi + \varepsilon_i \tag{5.55}$$

$$\varepsilon_{cb} = \varepsilon_s - \left(t_{ft} + D + t_{fc} + t_h\right)\phi + \varepsilon_i \tag{5.56}$$

$$\varepsilon_{rb} = \varepsilon_s - \left(t_{ft} + D + t_{fc} + t_h + t_d - c_{rb}\right)\phi + \varepsilon_i \tag{5.57}$$

$$\varepsilon_{rt} = \varepsilon_s - \left(t_{ft} + D + t_{fc} + t_h + t_d - c_{rt}\right)\phi + \varepsilon_i \tag{5.58}$$

$$\varepsilon_{ct} = \varepsilon_s - \left(t_{ft} + D + t_{fc} + t_h + t_d\right)\phi + \varepsilon_i \tag{5.59}$$

It is assumed that the slip strain, ε_{si}, at the steel-concrete interface is a function of the degree of shear connection, β_{shear}. For composite beams with full interaction $\beta_{shear} \geq 1$ and slip strain $\varepsilon_i=0$. In the case of zero interaction ($\beta_{shear}=0$), the neutral axes of both the steel and concrete components are at the midheight of each of these components. Based on this concept, Rotter and Ansourian [34] used a linear function for Φ to express ε_i. To quantify the nonlinear effects of β_{shear} on the flexural strength when using more accurate plastic theory [35] the slip strain, ε_i, is assumed to be a parabolic function of degree of shear connection β_{shear} as shown by following equation:

$$\varepsilon_i = (1 - \beta_{shear})^2 \left[\frac{t_{ft} + D + t_{fc}}{2} + \frac{t_d + t_h}{2}\right]\phi \tag{5.60}$$

5.3.4 Force equilibrium

Based on strain distribution (Fig. 5-8) the axial force within each component of the section can be obtained (Fig. 5-10).

For flanges the axial forces are calculated using midthickness strain value as follows:

$$P_t = \sigma_s(\varepsilon_{ft}) \cdot t_{ft} b_{ft} \tag{5.61}$$

$$P_c = \sigma_s(\varepsilon_{fc}) \cdot t_{fc} b_{fc} \tag{5.62}$$

where for steel box girder section the width of compression flange, b_{fc}, shall be taken as a sum of widths for both flanges.

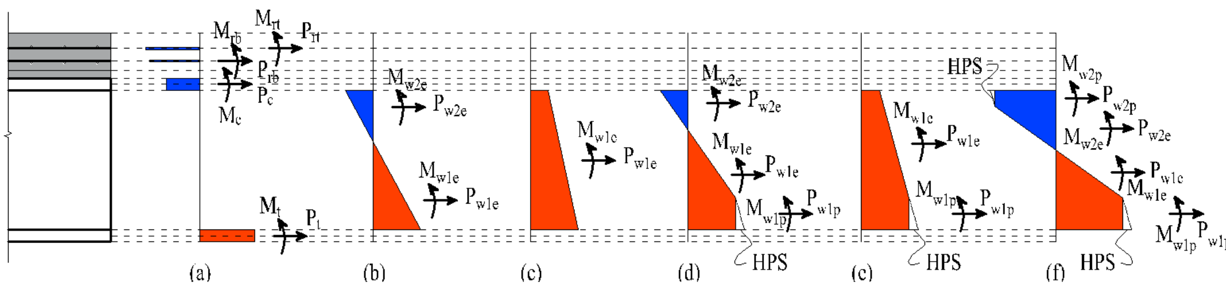


Fig. 5-10: Scenarios of stress distribution for steel section: (a) flanges and reinforcement, (b) web with $\varepsilon_{w1} < \varepsilon_y$ and $-\varepsilon_y < \varepsilon_{w2} \leq 0$, (c) web with $\varepsilon_{w1} < \varepsilon_y$ and $0 \leq \varepsilon_{w2} < \varepsilon_{w1}$, (d) web with $\varepsilon_{w1} \geq \varepsilon_y$ and $-\varepsilon_y < \varepsilon_{w2} \leq 0$, (e) web with $\varepsilon_{w1} \geq \varepsilon_y$ and $0 \leq \varepsilon_{w2} < \varepsilon_y$, (f) web with $\varepsilon_{w1} \geq \varepsilon_y$ and $-\varepsilon_y > \varepsilon_{w2}$.

The axial force in the web portion of the steel section depends on the strains at its bottom and top location. The axial tension force(s) in web, for stress distribution as shown in Fig. 5-10b can be calculated using:

$$P_{w1e} = \sigma_s\left(\frac{\varepsilon_{w1}}{2}\right) \cdot \frac{t_w \varepsilon_{w1}}{\phi}, \tag{5.63}$$

for stress distribution as shown in Fig. 5-10c using:

$$P_{w1e} = \sigma_s\left(\frac{\varepsilon_{w1} + \varepsilon_{w2}}{2}\right) \cdot \frac{t_w(\varepsilon_{w1} - \varepsilon_{w2})}{\phi}, \tag{5.64}$$

for stress distribution as shown in Fig. 5-10d and Fig. 5-10f using:

$$P_{w1e} = \sigma_s\left(\frac{\varepsilon_y}{2}\right)\cdot\frac{t_w\varepsilon_y}{\phi}, \tag{5.65}$$

$$P_{w1p} = \sigma_s\left(\frac{\varepsilon_{w1}+\varepsilon_y}{2}\right)\cdot\frac{t_w\left(\varepsilon_{w1}-\varepsilon_y\right)}{\phi}, \tag{5.66}$$

for stress distribution as shown in Fig. 5-10e using:

$$P_{w1e} = \sigma_s\left(\frac{\varepsilon_{w2}+\varepsilon_y}{2}\right)\cdot\frac{t_w\left(\varepsilon_y-\varepsilon_{w2}\right)}{\phi}, \tag{5.67}$$

$$P_{w1p} = \sigma_s\left(\frac{\varepsilon_{w1}+\varepsilon_y}{2}\right)\cdot\frac{t_w\left(\varepsilon_{w1}-\varepsilon_y\right)}{\phi}. \tag{5.68}$$

The compressive force(s) in the web, for stress distribution as shown in Fig. 5-10b and Fig. 5-10d can be calculated using:

$$P_{w2e} = -\sigma_s\left(\frac{|\varepsilon_{w2}|}{2}\right)\cdot\frac{t_w|\varepsilon_{w2}|}{\phi}, \tag{5.69}$$

for stress distribution as shown in Fig. 5-10f using:

$$P_{w2e} = -\sigma_s\left(\frac{\varepsilon_y}{2}\right)\cdot\frac{t_w\varepsilon_y}{\phi}, \tag{5.70}$$

$$P_{w2p} = -\sigma_s\left(\frac{|\varepsilon_{w2}|+\varepsilon_y}{2}\right)\cdot\frac{t_w\left(|\varepsilon_{w2}|-\varepsilon_y\right)}{\phi}, \tag{5.71}$$

and for stress distribution as shown in Fig. 5-10c and Fig. 5-10e it is written as:

$$P_{w2e/p} = 0. \tag{5.72}$$

For steel box girder section, the thickness of the web, t_w, shall be taken as a sum of thicknesses for both webs of the section.

For the top and bottom reinforcement the axial force is written by

$$P_{rb/rt} = \sigma_s\left(\varepsilon_{rb/rt}\right)\cdot A_{sb/st}. \tag{5.73}$$

The compressive force in concrete deck is calculated from stress distribution through the thickness of the concrete slab (Fig. 5-11). It is assumed that tensile stress and the stress within the haunch do not contribute to the resistance of the section and are equal zero.

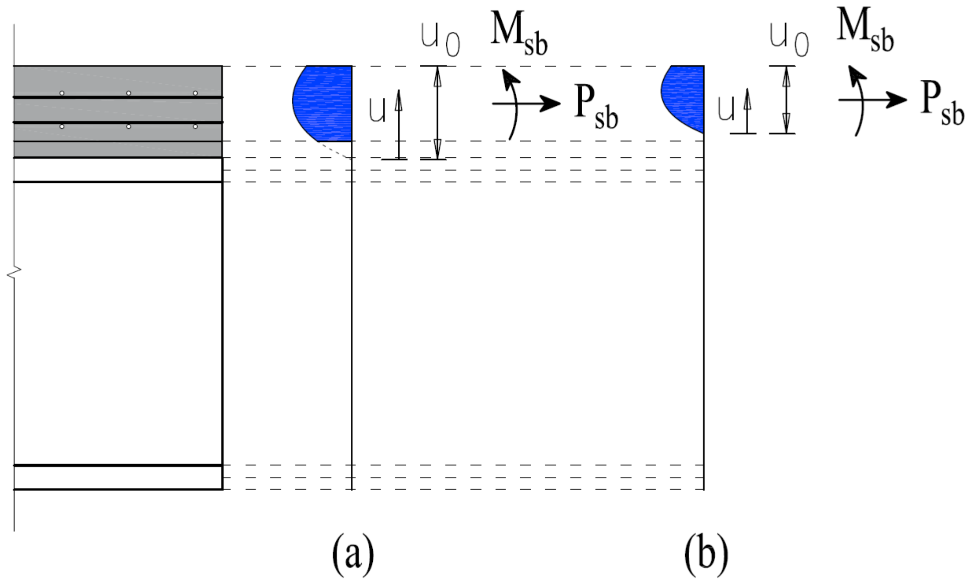


Fig. 5-11: Scenarios of stress distribution for concrete slab: (a) $\varepsilon_{cb} < 0$, (b) $\varepsilon_{cb} \geq 0$.

To calculate the axial force within the concrete slab, P_{sb}, using parabolic stress distribution as shown in Fig. 5-11, a local axis <u>u</u> is defined along the slab height, originating at the height of zero concrete stress. This way, the axial compressive force in the concrete, P_{sb}, can be calculated using following equation:

$$P_{sb} = \int_{u_1}^{u_2} -\sigma_c(u) \cdot b_{eff} du \tag{5.74}$$

By plugging the equation for concrete strength equation (5.45) into formula presented above the compressive force in concrete becomes:

$$P_{sb} = -b_{eff} f'_c \cdot \int_{u_1}^{u_2} \frac{k \left[\frac{\varepsilon_c(u)}{\varepsilon_{c0}}\right] - \left[\frac{\varepsilon_c(u)}{\varepsilon_{c0}}\right]^2}{1 + (k-2)\left[\frac{\varepsilon_c(u)}{\varepsilon_{c0}}\right]} du \tag{5.75}$$

where the magnitude of the concrete strain, $\varepsilon_u(u)$, action along the local axis u is

$$\varepsilon_c(u) = \phi u \tag{5.76}$$

And the endpoints of the interval (u_1,u_2) are calculated from

$$u_1 = \begin{cases} u_0 - t_d & if\ \varepsilon_{cb} < 0 \\ 0 & if\ \varepsilon_{cb} \geq 0 \end{cases} \tag{5.77}$$

$$u_2 = \begin{cases} \varepsilon_{cu}/\phi & if\ |\varepsilon_{ct}| \geq \varepsilon_{cu} \\ u_0 & if\ |\varepsilon_{ct}| < \varepsilon_{cu} \end{cases} \tag{5.78}$$

Where u0 = distance between height corresponding to a zero concrete stress and the extreme fiber of the concrete in compression, and may be written as

$$u_0 = -\varepsilon_{ct}/\phi \tag{5.79}$$

The equation of horizontal equilibrium can therefore be obtained and written as

$$P_t + P_{w1e} + P_{w1p} + P_{w2e} + P_{w2p} + P_c + P_{sb} + P_{rb} + P_{rt} = 0 \tag{5.80}$$

5.3.5 Moment-curvature relationship

Since both, the strain distribution and axial forces within each individual component are evaluated using strain of the bottom fibers of the tension flange, ε_s, and curvature, Φ, it is possible to derive Moment-Curvature (MC) relationship for the analyzed cross-section. For a given strain, ε_s, the curvature, Φ, can be evaluated by solving nonlinear equation of force equilibrium (5.80). Next, with known strain, ε_s, and curvature, Φ, strains at specific locations along the sections depth (Fig. 5-8) described by formulas (5.50) through (5.59) are calculated, and moments can be calculated. The moments of the axial forces within the two steel flanges are calculated using following:

$$M_t = \sigma_s(\varepsilon_{ft}) \cdot t_{ft} b_{ft} \left(t_d + t_h + t_{fc} + D + \frac{t_{ft}}{2} \right) \tag{5.81}$$

$$M_c = \sigma_s(\varepsilon_{fc}) \cdot t_{fc} b_{fc} \left(t_d + t_h + \frac{t_{fc}}{2} \right) \tag{5.82}$$

where for steel box girder section the width of compression flange, b_{fc}, shall be taken as a sum of widths for both flanges.

The moment(s) in the web due to tensile force(s), for stress distribution as shown in Fig. 5-10b can be calculated using:

$$M_{w1e} = \sigma_s\left(\frac{\varepsilon_{w1}}{2}\right)\cdot\frac{t_w\varepsilon_{w1}}{\phi}\cdot\left(t_d + t_h + t_{fc} + D - \frac{\varepsilon_{w1}}{3\phi}\right), \tag{5.83}$$

for stress distribution as shown in Fig. 5-10c using:

$$\begin{aligned} M_{w1e} = {} & \sigma_s\left(\frac{\varepsilon_{w1}}{2}\right)\cdot\frac{t_w\varepsilon_{w1}}{\phi}\cdot\left(t_d + t_h + t_{fc} + D - \frac{\varepsilon_{w1}}{3\phi}\right) - \sigma_s\left(\frac{\varepsilon_{w2}}{2}\right)\cdot\frac{t_w\varepsilon_{w2}}{\phi} \\ & \cdot\left(t_d + t_h + t_{fc} - \frac{\varepsilon_{w2}}{3\phi}\right), \end{aligned} \tag{5.84}$$

for stress distribution as shown in Fig. 5-10d and Fig. 5-10f using:

$$M_{w1e} = \sigma_s\left(\frac{\varepsilon_y}{2}\right)\cdot\frac{t_w\varepsilon_y}{\phi}\cdot\left(t_d + t_h + t_{fc} + D - \frac{\varepsilon_{w1} - \varepsilon_y}{\phi} - \frac{\varepsilon_y}{3\phi}\right), \tag{5.85}$$

$$M_{w1p} = \sigma_s\left(\frac{\varepsilon_{w1} + \varepsilon_y}{2}\right)\cdot\frac{t_w\left(\varepsilon_{w1} - \varepsilon_y\right)}{\phi}\cdot\left(t_d + t_h + t_{fc} + D - \frac{\varepsilon_{w1} - \varepsilon_y}{2\phi}\right), \tag{5.86}$$

for stress distribution as shown in Fig. 5-10e using:

$$\begin{aligned} M_{w1e} = {} & \sigma_s\left(\frac{\varepsilon_y}{2}\right)\cdot\frac{t_w\varepsilon_y}{\phi}\cdot\left(t_d + t_h + t_{fc} + D - \frac{\varepsilon_{w1} - \varepsilon_y}{\phi} - \frac{\varepsilon_y}{3\phi}\right) - \sigma_s\left(\frac{\varepsilon_{w2}}{2}\right)\cdot\frac{t_w\varepsilon_{w2}}{\phi} \\ & \cdot\left(t_d + t_h + t_{fc} - \frac{\varepsilon_{w2}}{3\phi}\right), \end{aligned} \tag{5.87}$$

$$M_{w1p} = \begin{cases} \sigma_s\left(\frac{\varepsilon_{w1} + \varepsilon_y}{2}\right)\cdot\frac{t_w\left(\varepsilon_{w1} - \varepsilon_y\right)}{\phi}\cdot\left(t_d + t_h + t_{fc} + D - \frac{\varepsilon_{w1} - \varepsilon_y}{2\phi}\right) \; for\ mild\ steel \\ \int_{\varepsilon_{w1}}^{\varepsilon_y} \sigma_s(\varepsilon)\cdot t_w\frac{\varepsilon}{\phi}\cdot\left(t_d + t_h + t_{fc} + D - \frac{\varepsilon_{w1} - \varepsilon}{\phi}\right)d\varepsilon \; for\ HPS. \end{cases} \tag{5.88}$$

Equation for plastic moment in the web, M_{w1p}, using graphical integration is challenging to derive because the rate of strain hardening in HPS, defined by yield and ultimate strains and stresses, varies depending on input values. Instead, for HPS the plastic moment in the web, M_{w1p}, is given as an integral (5.88).

The moment(s) in web due to compressive force(s), for stress distribution as shown in Fig. 5-10b and Fig. 5-10d can be calculated using:

$$M_{w2e} = -\sigma_s\left(\frac{|\varepsilon_{w2}|}{2}\right)\cdot\frac{t_w|\varepsilon_{w2}|}{\phi}\cdot\left(t_d + t_h + t_{fc} + \frac{|\varepsilon_{w2}|}{3\phi}\right), \tag{5.89}$$

for stress distribution as shown in Fig. 5-10f using:

$$M_{w2e} = -\sigma_s\left(\frac{\varepsilon_y}{2}\right)\cdot\frac{t_w\varepsilon_y}{\phi}\cdot\left(t_d + t_h + t_{fc} + \frac{|\varepsilon_{w2}| - \varepsilon_y}{\phi} + \frac{\varepsilon_y}{3\phi}\right), \tag{5.90}$$

$$M_{w2p} = -\sigma_s\left(\frac{|\varepsilon_{w2}| + \varepsilon_y}{2}\right)\cdot\frac{t_w(|\varepsilon_{w2}| - \varepsilon_y)}{\phi}\cdot\left(t_d + t_h + t_{fc} + \frac{|\varepsilon_{w2}| - \varepsilon_y}{2\phi}\right), \tag{5.91}$$

and for stress distribution as shown in Fig. 5-10c and Fig. 5-10e it is written as:

$$M_{w2e/p} = 0. \tag{5.92}$$

For steel box girder section, the thickness of the web, t_w, shall be taken as a sum of thicknesses for both webs of the section.

For the top and bottom reinforcement the moment is written by

$$M_{rb/rt} = \sigma_s(\varepsilon_{rb/rt})\cdot A_{sb/st}c_{rb/rt}. \tag{5.93}$$

The moment in the concrete deck is calculated from stress distribution through the thickness of the concrete slab (Fig. 5-11) using following formula:

$$M_{sb} = \int_{u_1}^{u_2} -\sigma_c(u)\cdot b_{eff}(u_0 - u)du \tag{5.94}$$

Consequently, the internal moment resistance (M) of the cross-section is obtained from

$$M = M_t + M_{w1e} + M_{w1p} + M_{w2e} + M_{w2p} + M_c + M_{sb} + M_{rb} + M_{rt} \tag{5.95}$$

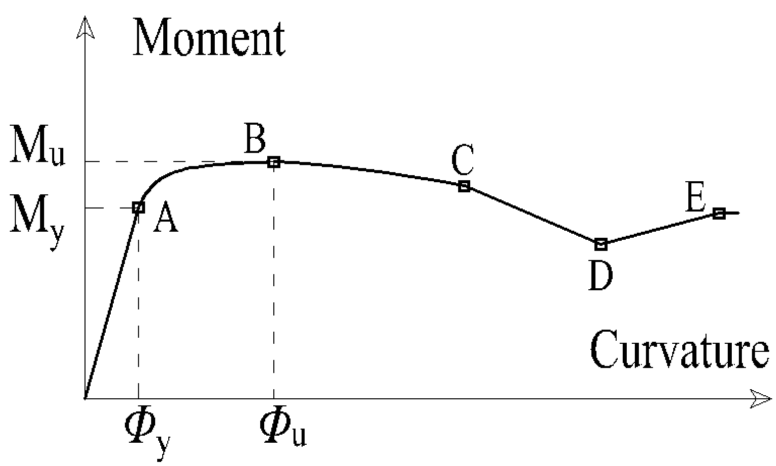


Fig. 5-12: Typical Moment-Curvature curve for composite section with mild steel girder.

A typical M-C curve is shown in Fig. 5-12 in which point A denotes the beginning of steel yielding within the steel section, point B represents the peak moment carrying capacity, and point C corresponds to concrete crushing. As the curvature progresses, the entire concrete slab fails throughout its depth due to crushing at point D. There is usually a small increasing branch in the moment-curvature relationship resulting from strain hardening in steel, until the stress within the entire steel section reaches ultimate stress, F_u shown as point E in Fig. 5-12.

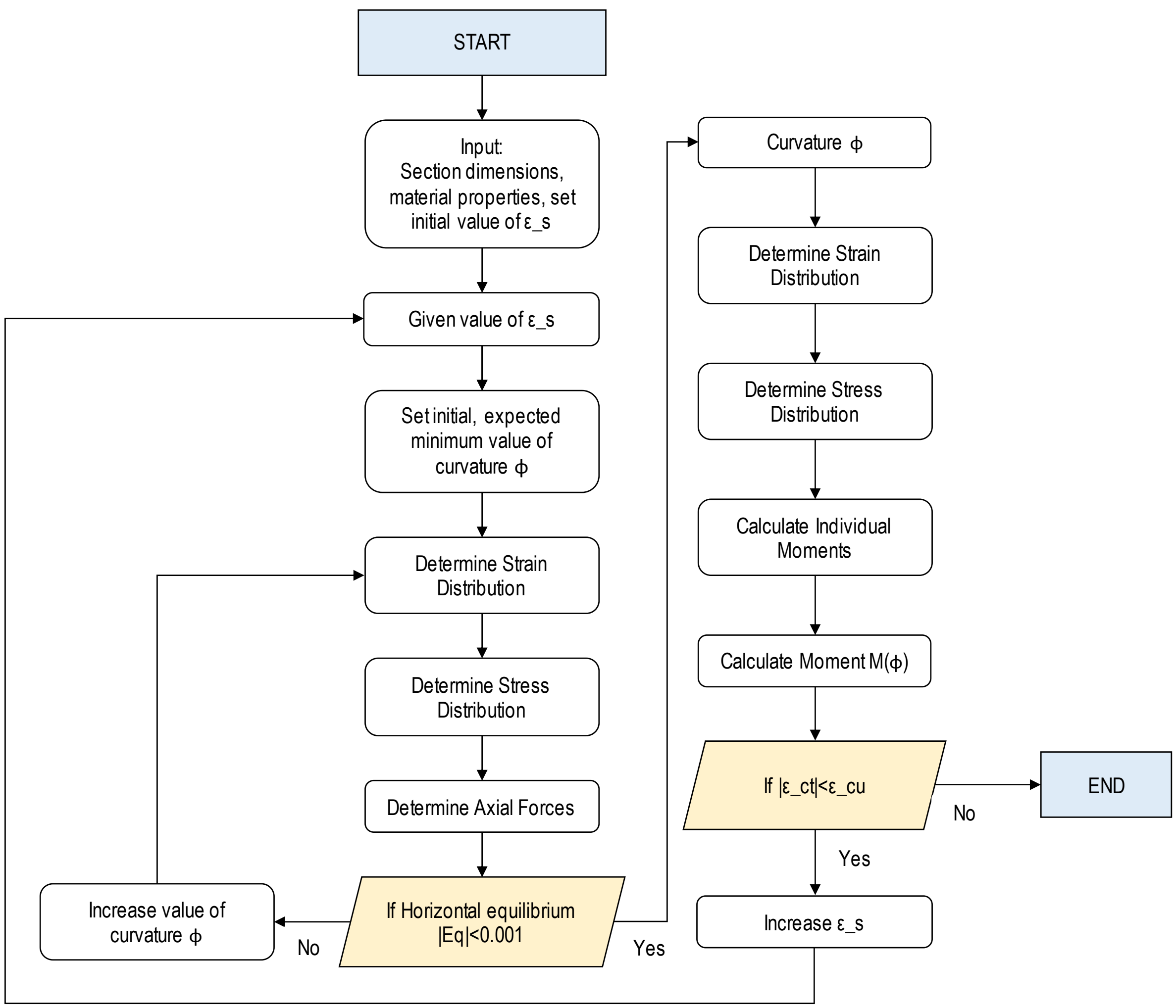


Fig. 5-13: Programming flowchart for analytical nonlinear resistance model.

Fig. 5-13 shows approach used in analytical modeling and the iterative process of developing M-C curve for a analyzed composite section. The author developed a MATLAB program that solves nonlinear equation of horizontal force equilibrium and evaluates moment-curvature relationship up to concrete crushing (point C in Fig. 5-12). The program uses author's optimization algorithms developed by the author that improve accuracy of the results at minimum computational time. The program returns moment-curvature relationship and reports value of maximum moment capacity of a section analyzed.

5.3.6 Model validation and comparison with theoretical results

Validation of the developed analytical model is done through result comparison of independently tested composite beams by Zhao and Yuan [36] and Capman and Balakrishnan [37] with results obtained from analysis. Information on the tested beams partially comes from Ban and Bradford [30]. The dimensions of the cross-sections tested are shown in Table 5-9, while their material parameters are shown in Table 5-10.

Table 5-9. Dimensions of laboratory tested composite beams.

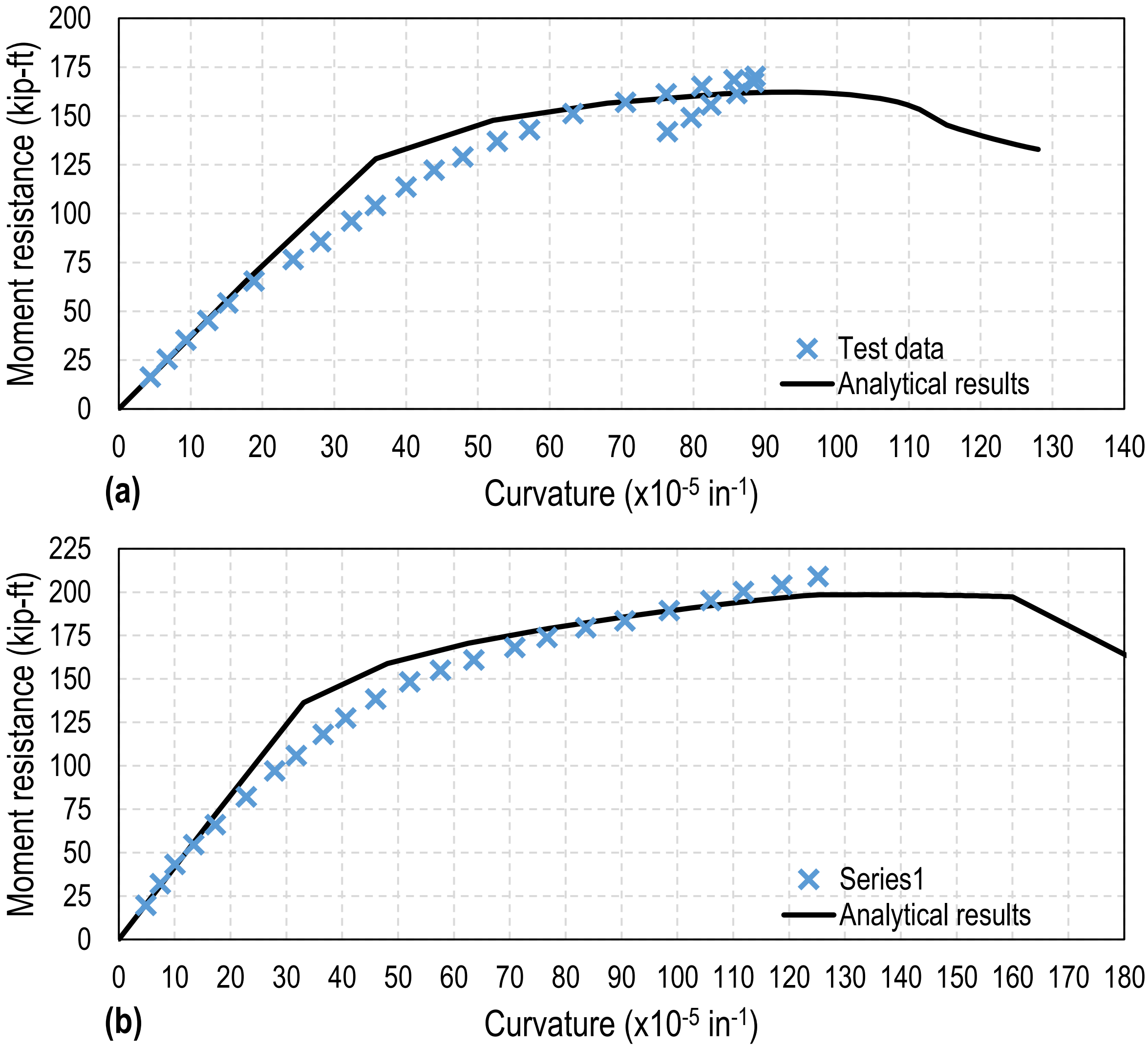
Reference	Specimen	L (in)	b_{eff} (in)	t_d (in)	t_h (in)	b_f (in)	t_f (in)	D (in)	t_w (in)	Reinforcement ratio (%)
Zhao and Yuan [36]	SCB2	157.5	23.62	3.94	0	5.12	0.39	5.12	0.39	1.04
	SCB3	157.5	23.62	3.94	0	5.12	0.39	5.12	0.39	1.04
	SCB6	157.5	23.62	3.94	0	5.12	0.39	7.09	0.39	1.04
Chapman and Balakrishnan [37]	A5	216.0	48.0	6.0	0	6.0	0.72	10.57	0.40	0.21
	A6	216.0	48.0	6.0	0	6.0	0.72	10.57	0.40	0.21

The comparison of moment-curvature relationships is illustrated in Fig. 5-14. For the specimens SCB2, SCB3, and SCB6, shown in Fig. 5-14a,b,c respectively, the model overestimates the moment resistance in pre-yielding regions. Such difference could result from assumed value of Young's modulus of elasticity for steel. Zha and Yuan did not report this parameter in their publication [36]. Further, within the region of growing yielding, between points A and B as per

Table 5-10. Material properties and interface behavior obtained from tests.

Reference	Specimen	E_s (ksi)	F_y (ksi)	F_u (ksi)	ε_{st}	ε_{st}	f'_c (psi)	β_{shear}	F_{yr} (ksi)
Zhao and Yuan [36]	SCB2	29000	65.3	69.8	0.02[c]	0.14[c]	5105	1.0	49.0
	SCB3	29000	65.3	69.8	0.02[c]	0.14[c]	10860	1.0	49.0
	SCB6	29000	65.3	69.8	0.02[c]	0.14[c]	11140	1.0	49.0
Chapman and Balakrishnan [37]	A5	29515[a] 28427[b]	33.6[a] 42.1[b]	64.3[a] 64.3[b]	$1.0\varepsilon_y$[a] $1.0\varepsilon_y$[b]	0.25[c]	5900	0.41	40.0[d]
	A6	29515[a] 30617[b]	34.3[a] 38.2[b]	60.4[a] 66.5[b]	$1.7\varepsilon_y$[a] $1.5\varepsilon_y$[b]	0.25[c]	5930	0.30	40.0[d]

[a]Material properties for steel flanges.
[b]Material properties for steel web.
[c]Nominal values referring to Ban and Bradford [38].
[d]Nominal values referring to Munter and Lume [39].



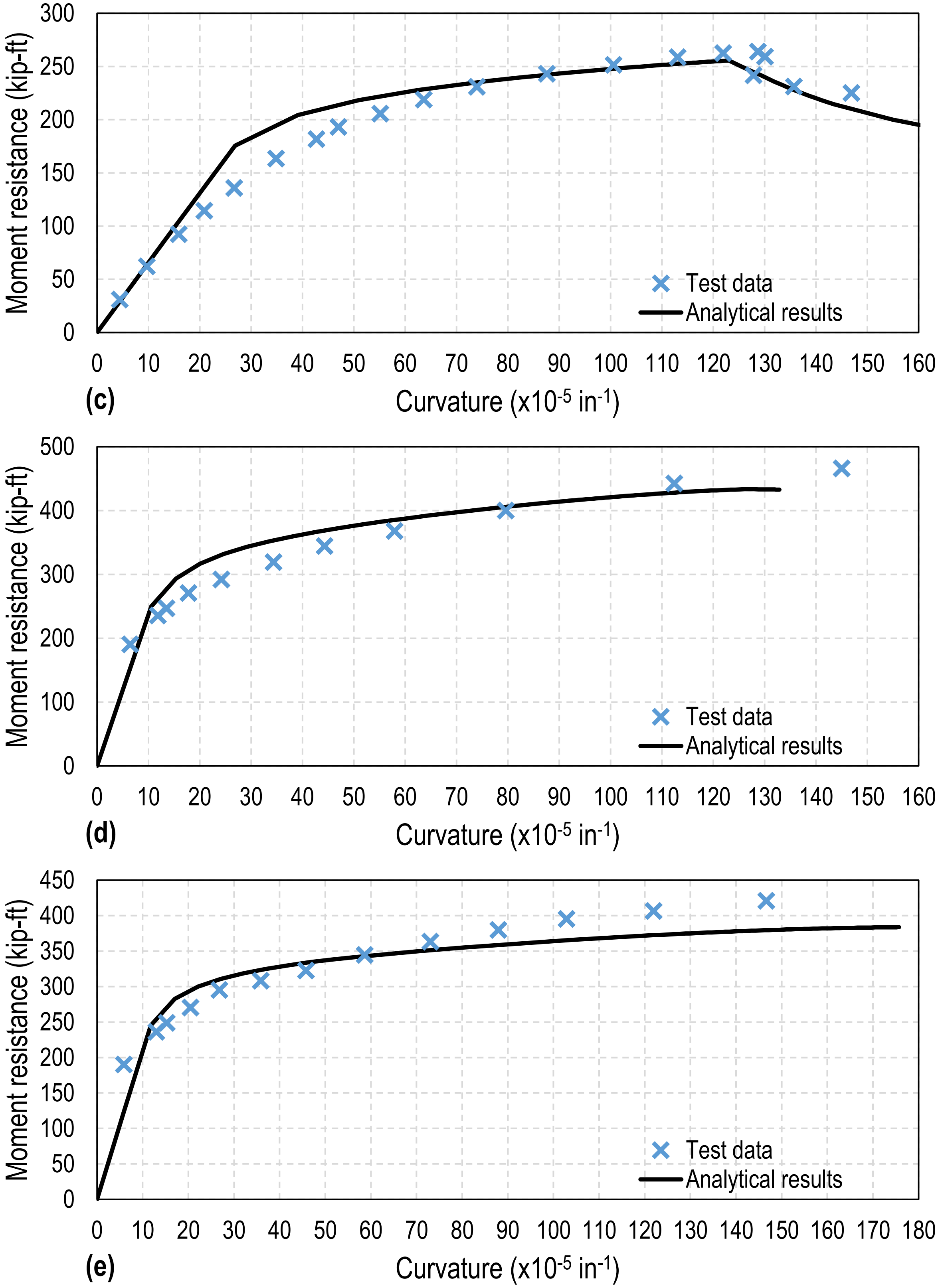


Fig. 5-14: Comparison of moment-curvature response for test data and simulated analytical results: (a) SCB2, (b) SCB3, (c) SCB6, (d) A5, (e) A6.

Fig. 5-12, the analytical results converge with test data exhibiting very good fit. Test data for specimen SCB2 (Fig. 5-14a) wrap up after reaching maximum value of moment resistance. This could indicate unloading case or simple error during the measurements and is not considered as a shape with which analytical results should match. For specimens A5 and A6 (Fig. 5-14de) the analytical results fit the test data very good and very closely follow the trend of the relationship.

The analytical model results were compared with the theoretical to investigate any discrepancy between results obtained with two methods. Comparison was made for selected girders and illustrated in Fig. 5-15 and shown in Table 5-11. The model very closely replicates theoretical values with minor exceptions (max 1.9% more) which results from nonlinear concrete material model application.

Table 5-11. Comparison of moment capacity due to theoretical and analytical approach.

ID	Moment due to method (kip-ft)		Difference ratio	ID	Moment due to method (kip-ft)		Difference ratio
	Theoretical	Analytical			Theoretical	Analytical	
8	5,218	5,255	1.01	91	26,418	26,587	1.01
17	16,555	16,605	1.00	101	89,301	88,932	1.00
37	7,434	7,534	1.01	103	7,259	7,369	1.02
45	19,208	19,270	1.00	106	11,848	12,051	1.02
55	71,823	71,958	1.00	114	30,013	30,274	1.01
58	8,975	9,074	1.01	124	103,803	103,751	1.00
66	22,910	22,990	1.00	128	8,149	8,307	1.02
76	82,002	82,041	1.00	131	13,324	13,558	1.02
80	6,369	6,423	1.01	139	47,029	47,412	1.01
83	10,434	10,601	1.02	149	111,488	111,102	1.00

To illustrate the difference between flexural strength for HPS and mild steel series of composite beams were analyzed for both steel types. The difference in flexural strengths is represented as a ratio of plastic moments for HPS and mild steel and shown in Fig. 5-16. It is clearly visible that for sections reaching high plastic strains the difference in moment capacity between HPS HPSand mild steel oscillates around 3.5%, which is a noticeable increase.

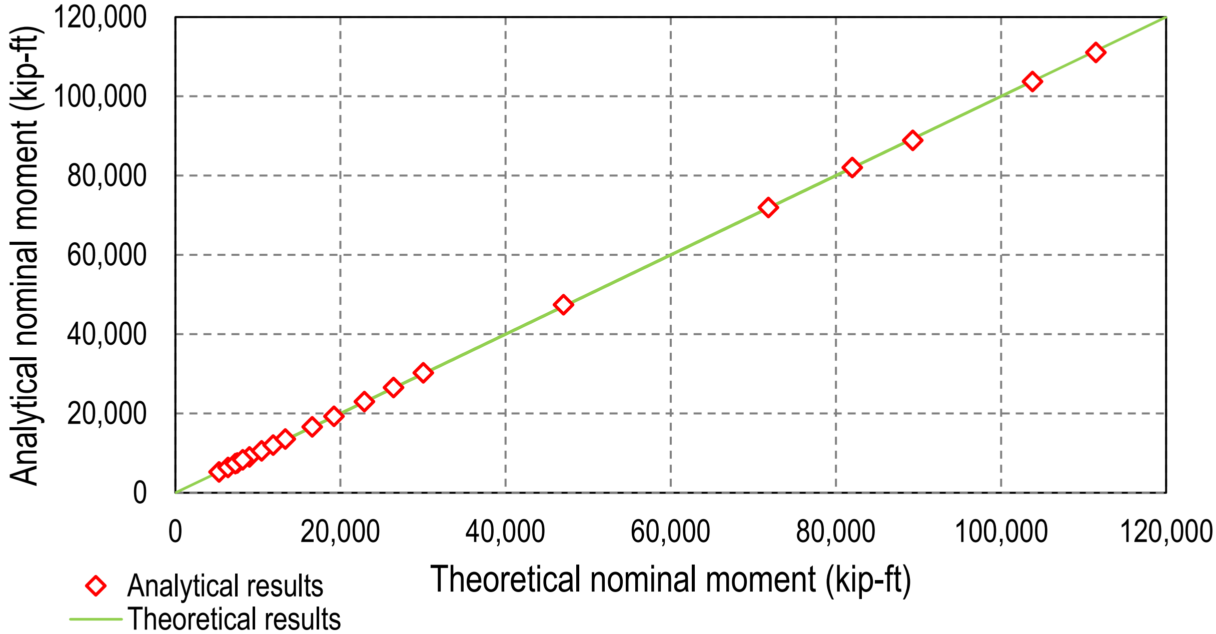


Fig. 5-15: Analytical vs Theoretical nominal moment capacity.

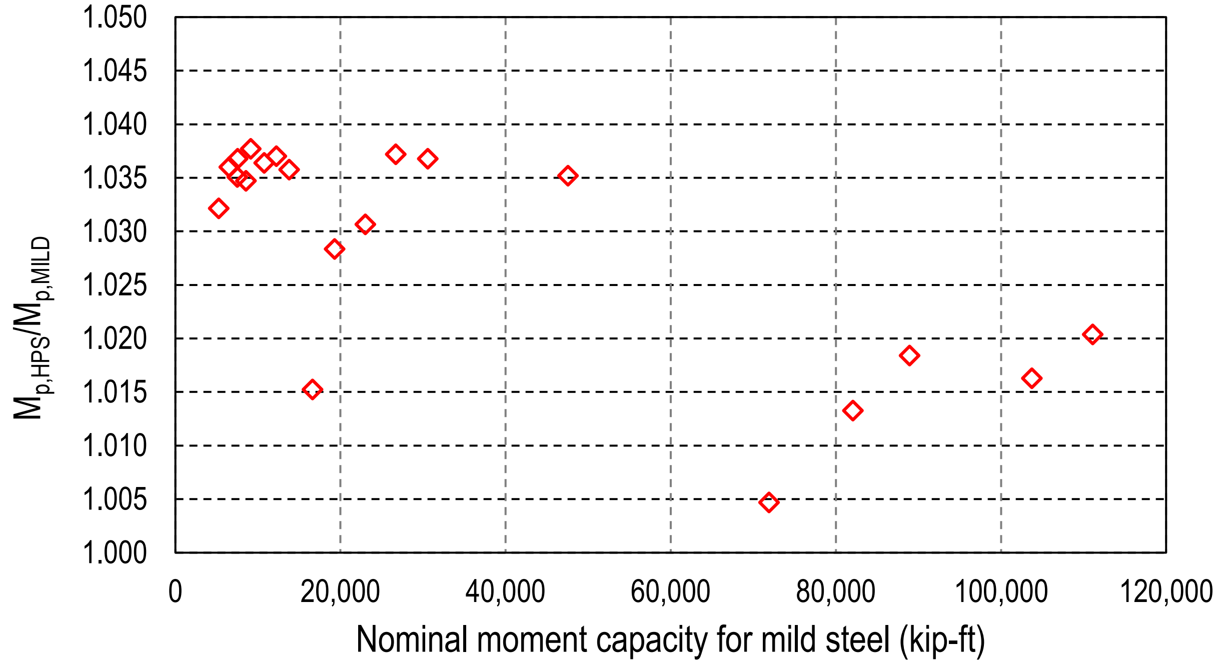


Fig. 5-16: Plastic moment ratios for HPS and mild steel.

5.4 Statistical parameters of materials

To determine the material factor of resistance of steel bridge girders, the statistical parameters of the materials are required. In this study, available data was analyzed, and resistance parameters are derived for A709 and A992 steels as well as for normal weight concretes. Resistance parameters for reinforcing bars are taken from previous studies.

5.4.1 A709 Steel

Results of tensile strength tests for A709 steel plates of different grades were provided by two steel producers. The objective of this study was to quantify statistical parameters for the mechanical properties of A709 steel and to investigate the necessity of updating the resistance factor(s) for steel structures in the AASHTO LRFD Specification [1]. The database comes from tests carried out between December 2011 and mid-August 2017. Datasets provided by source A contain yield strength, tensile strength, and elongation, while source B does not report elongation. Due to the objective of this research, analysis of yield strength only was performed. Table 5-12 shows information about the datasets considered.

Table 5-12. A709 Steel Plate Test Data Information.

Steel Grade	Dataset #	Source	Number of samples	Number of heats	Production date
Grade 50	1	A	18468	2636	01/2012 – 08/2017
	2	B	1824	1393	02/2013 – 07/2017
Grade 50W	3	A	515	237	01/2012 – 08/2017
	4	B	3235	1425	01/2013 – 07/2017
HPS 50W	5	A	228	37	10/2012 – 08/2017
	6	B	155	130	01/2015 – 12/2016
HPS 70W	7	A	2641	351	12/2011 – 07/2017
HPS 70W F1F2F3 HT	8	B	317	82	01/2015 – 01/2017
HPS 70W T1T2T3 HT	9	B	662	148	01/2015 – 07/2017

The database contains test results for various thicknesses of steel plates with increments of 1/16 in. up to the thickness of 1 inch, and ¼ in. increments for plates greater than 1 inch. To investigate dependence of test results on plate thickness, the datasets shown in Table 5-12 were divided into subsets based on their rounded thickness referred as rounded gauge. Table 5-13 shows plate thickness assignment to certain rounded gauge value.

Table 5-13. Thickness vs. Rounded Gauge.

Thickness, t (in)	Rounded Gauge
0.25 ≤ t < 0.75	0.5
0.75 ≤ t < 1.25	1.0
1.25 ≤ t < 1.75	1.5
1.75 ≤ t < 2.25	2.0
2.25 ≤ t < 2.75	2.5
2.75 ≤ t < 3.25	3.0
3.25 ≤ t < 3.75	3.5
3.75 ≤ t < 4.25	4.0

Since the number of provided data points for a certain steel grade and rounded gauge varies significantly between producers, and not to favor any of the producers, these datasets are analyzed separately. It is important to mention that merging data for a certain steel grade and rounded gauge from both producers would result in distorted overall distribution of strength, not necessarily reflecting the actual distributions of the same product from different producers. This is especially true for significantly different in size datasets with differing distributions. Since for each steel grade the difference in number of records from each producer is substantial, with relative ratio of number of records from source A to B or vice-versa more than 1.5, it is reasonable to treat all the datasets separately and derive a conservative distribution of the considered steel grade best representing available product. To do so, a following procedure was introduced:

Step 1: Plot the data for certain steel grade and rounded gauge for producer A on the probability paper.

Step 2: Fit a k-th order polynomial to the data plotted as $F_y=f(z)$. Measure fitness by R^2 value.

Step 3: Repeat steps 1 and 2 for data from producer B, C, D, etc. foe each rounded gauge of each steel grade.

Step 4: Plot fitted polynomial distributions, where

$$F_y(z) = p_k z^k + p_{k-1} z^{k-1} + \cdots + p_2 z^2 + p_1 z + p_0 \tag{5.96}$$

in domain of $z \in < -7,7 >$, for each producer.

Step 5: Determine minimum value of F_y at each z within the domain.

Step 6: Fit a n-th order polynomial into the obtained distribution of minimum values at each z. Fitted final polynomial is the conservative representation of the distribution of considered rounded gauge of selected steel grade.

Step 7: Repeat the procedure for remaining rounded gauges of a considered steel grade.

A visual example of the described procedure is shown in Fig. 5-17. Figures, Fig. 5-18 through Fig. 5-28 present Cumulative Distribution Functions (CDFs) of yield strength, F_y, data per each rounded gauge for each steel grade considered with the fitted polynomials best representing their distributions. Figures Fig. 5-29 through Fig. 5-35 present final fits of polynomials representing the distribution of certain steel grade per rounded gauge.

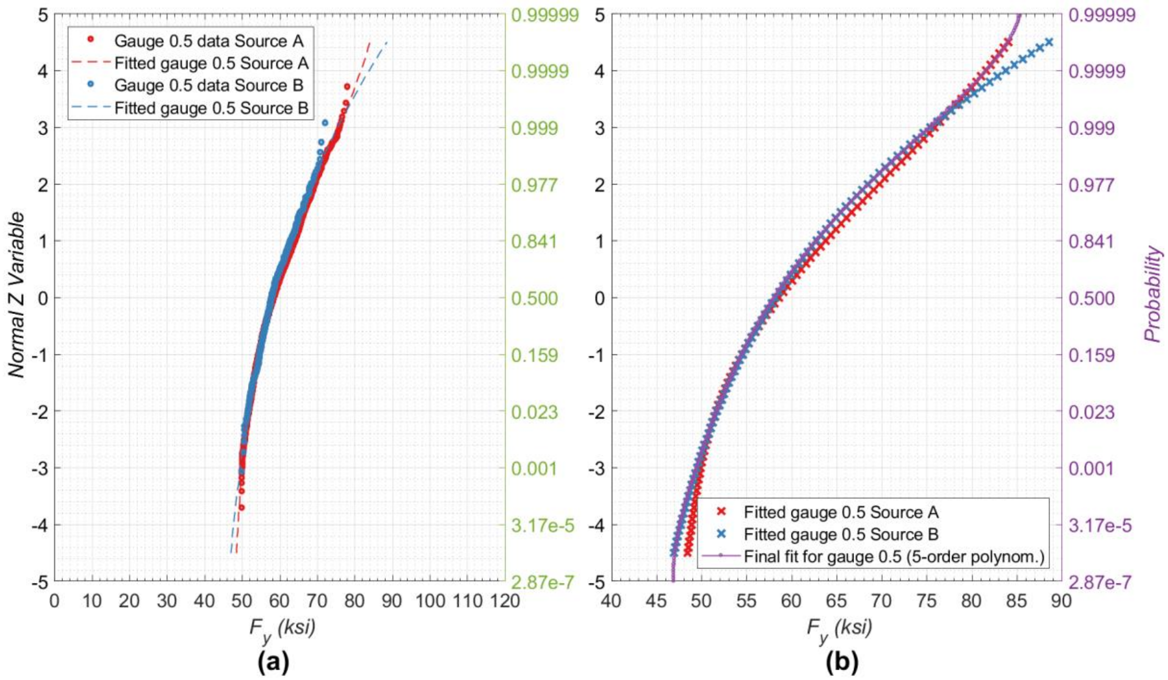


Fig. 5-17: Example of the distribution determination procedure for Rounded Gauge 0.5 inch for Grade 50steel. (a) CDF of the data and fitted polynomials for steel from sources A and B, (b) Plot of fitted polynomials for both sources and final fit for considered gauge.

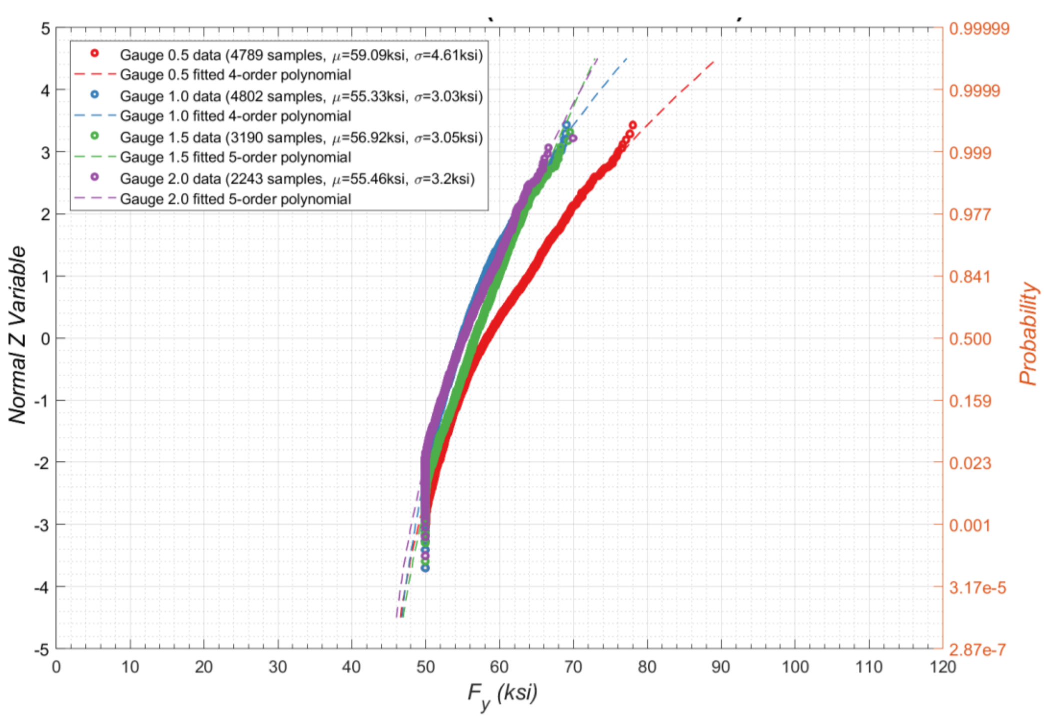


Fig. 5-18: CDFs for Grade 50 steel from source A. Gauges 0.5 - 2.0 inch.

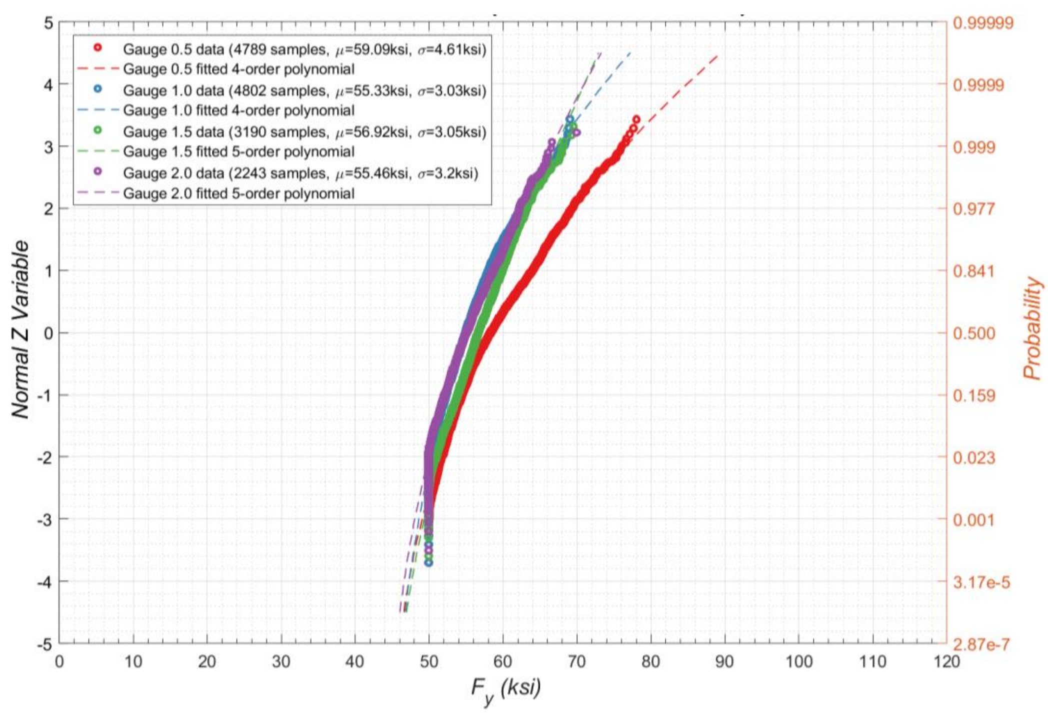


Fig. 5-19: CDFs for Grade 50 steel from source A. Gauges 2.5 - 4.0 inch.

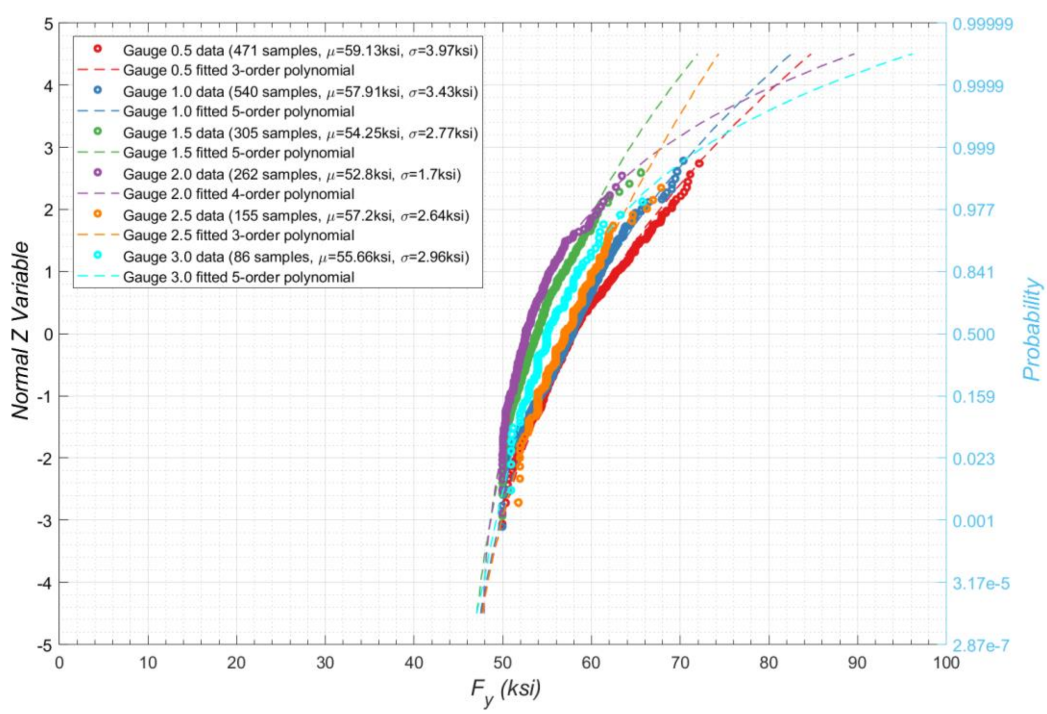


Fig. 5-20: CDFs for Grade 50 steel from source B. All gauges.

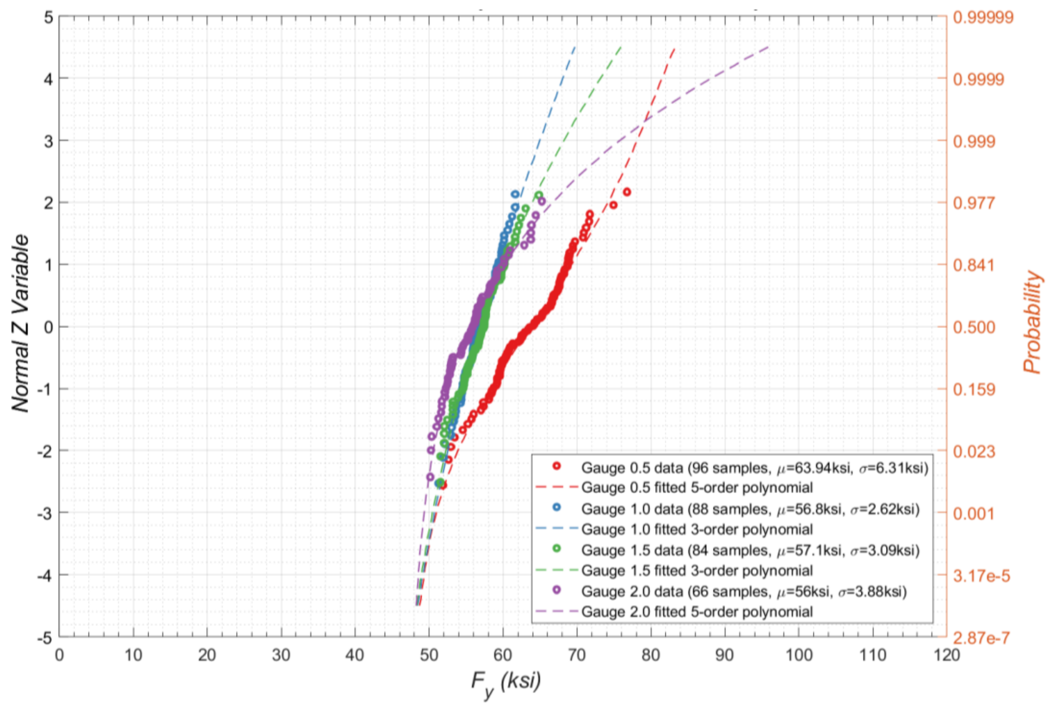


Fig. 5-21: CDFs for Grade 50W steel from source A. Gauges 0.5 - 2.0 inch.

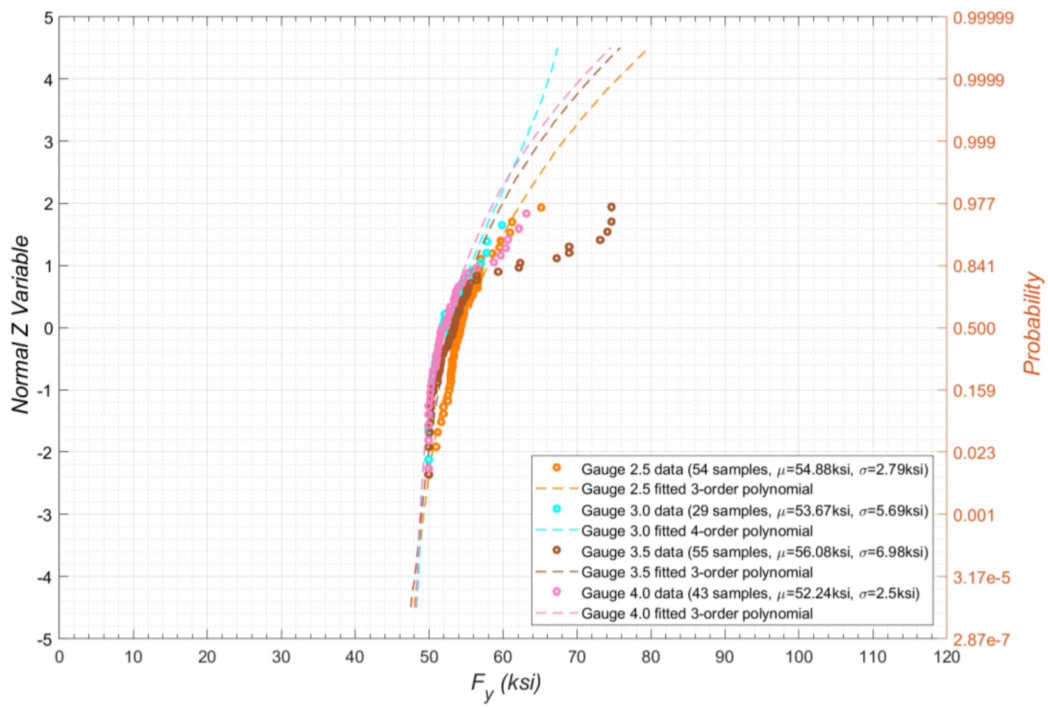


Fig. 5-22: CDFs for Grade 50W steel from source A. Gauges 2.5 - 4.0 inch.

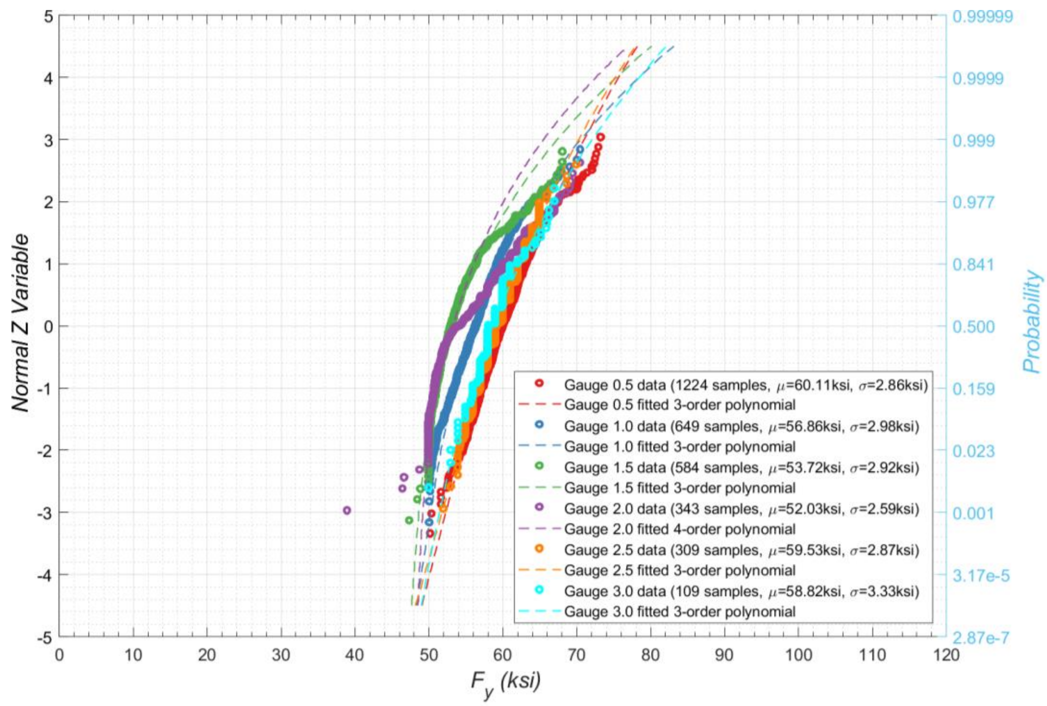


Fig. 5-23: CDFs for Grade 50W steel from source B. All gauges.

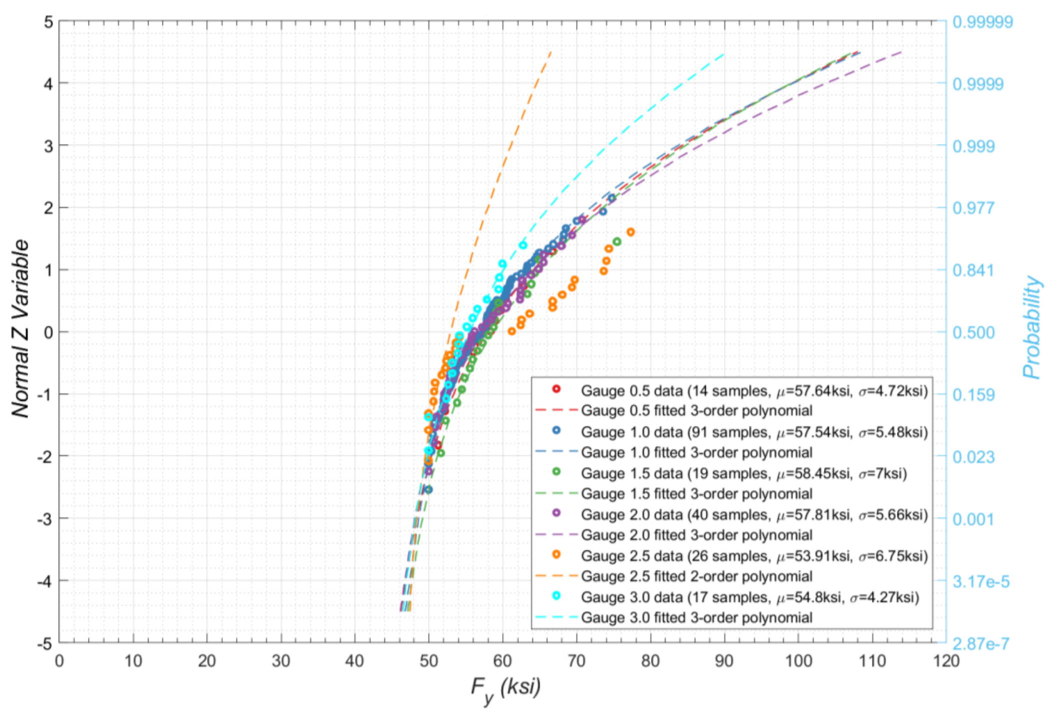


Fig. 5-24: CDFs for Grade HPS-50W steel from source A. All gauges.

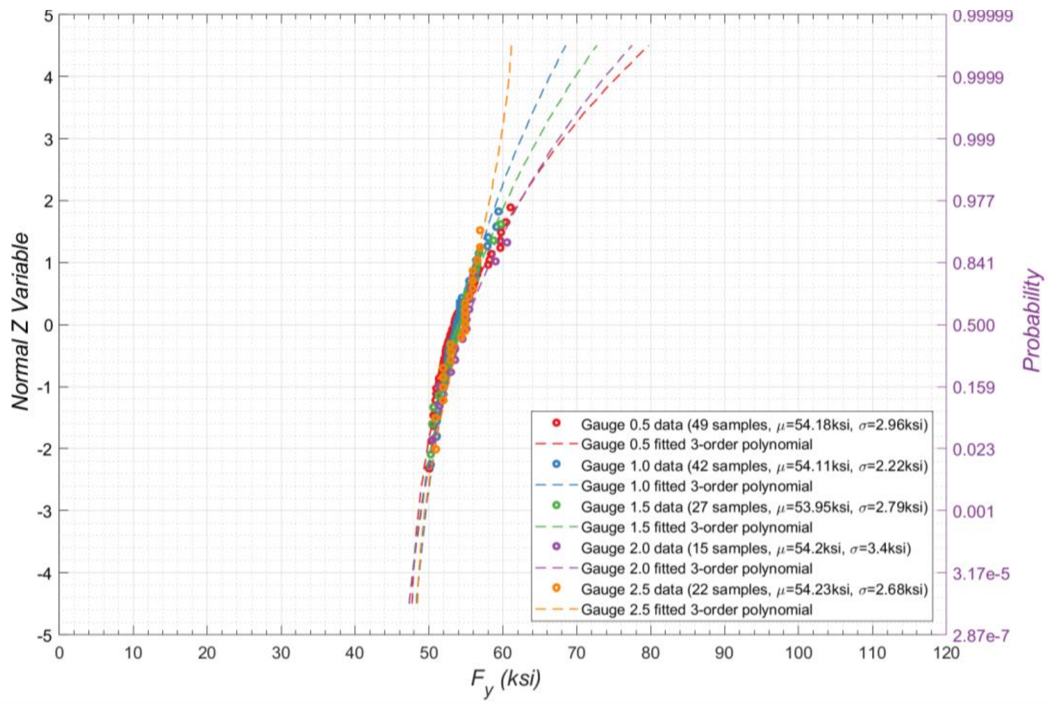


Fig. 5-25: CDFs for Grade HPS-50W steel from source B. All gauges.

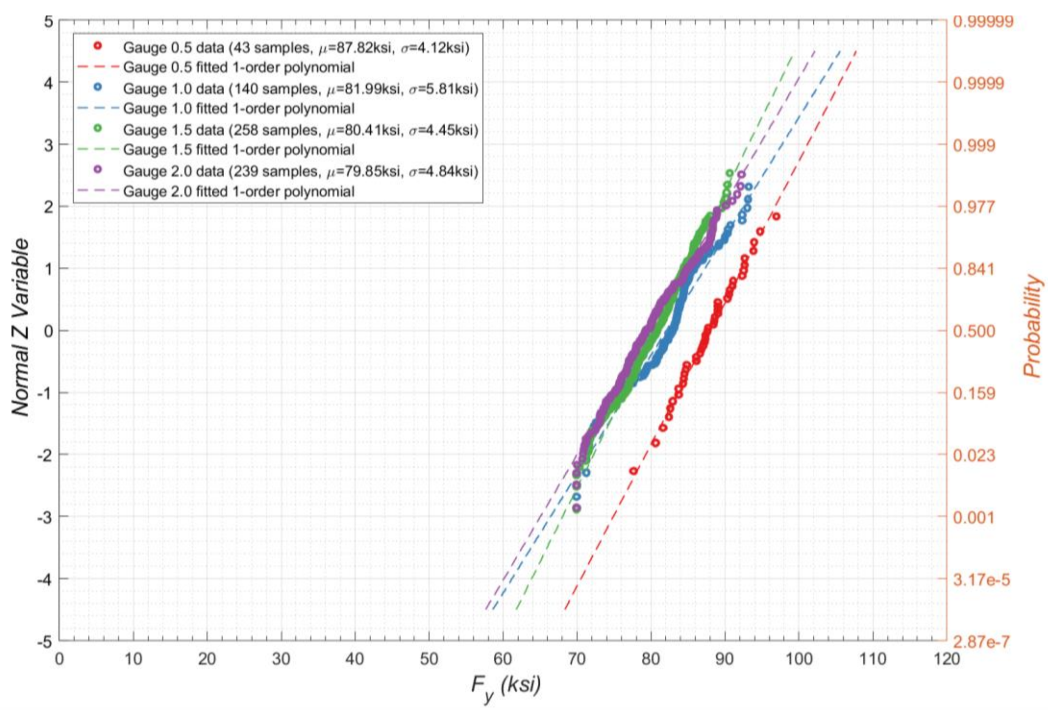


Fig. 5-26: CDFs for Grade HPS-70W steel from source A. Gauges 0.5 - 2.0 inch.

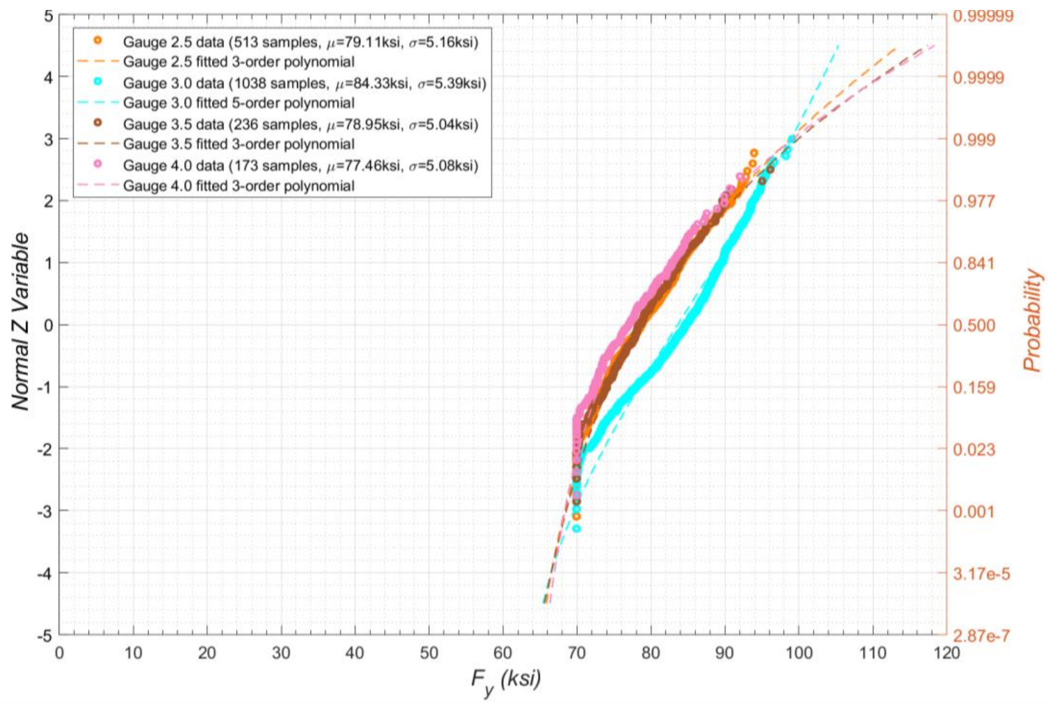


Fig. 5-27: CDFs for Grade HPS-70W steel from source A. Gauges 2.5 - 4.0 inch.

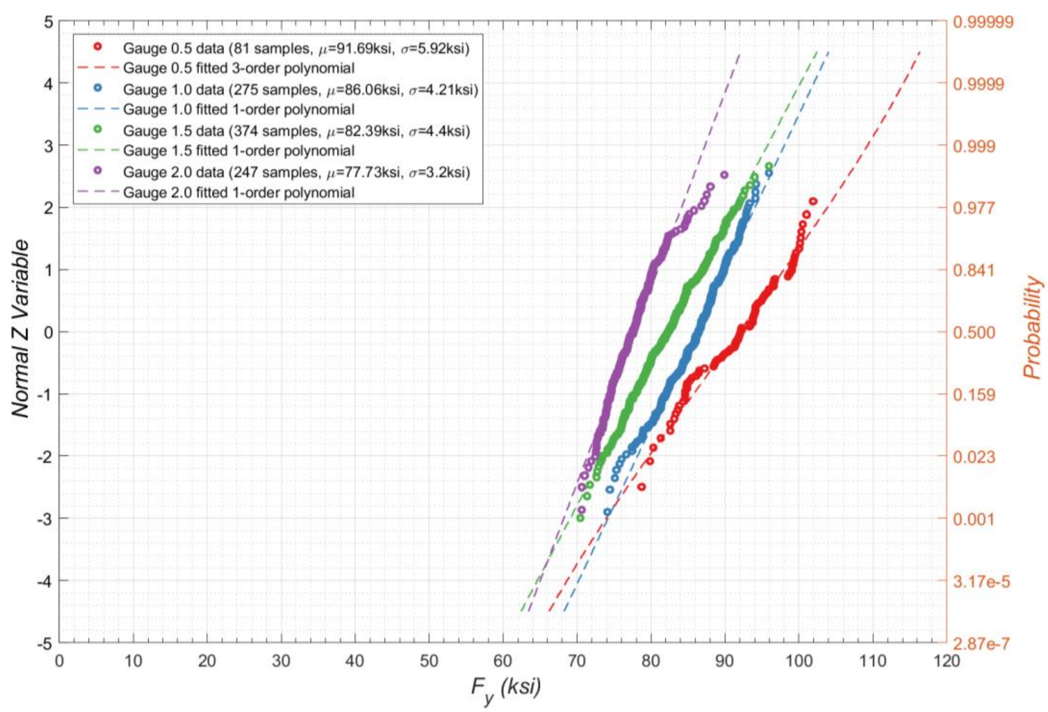


Fig. 5-28: CDFs for Grade HPS-70W steel from source B. All gauges.

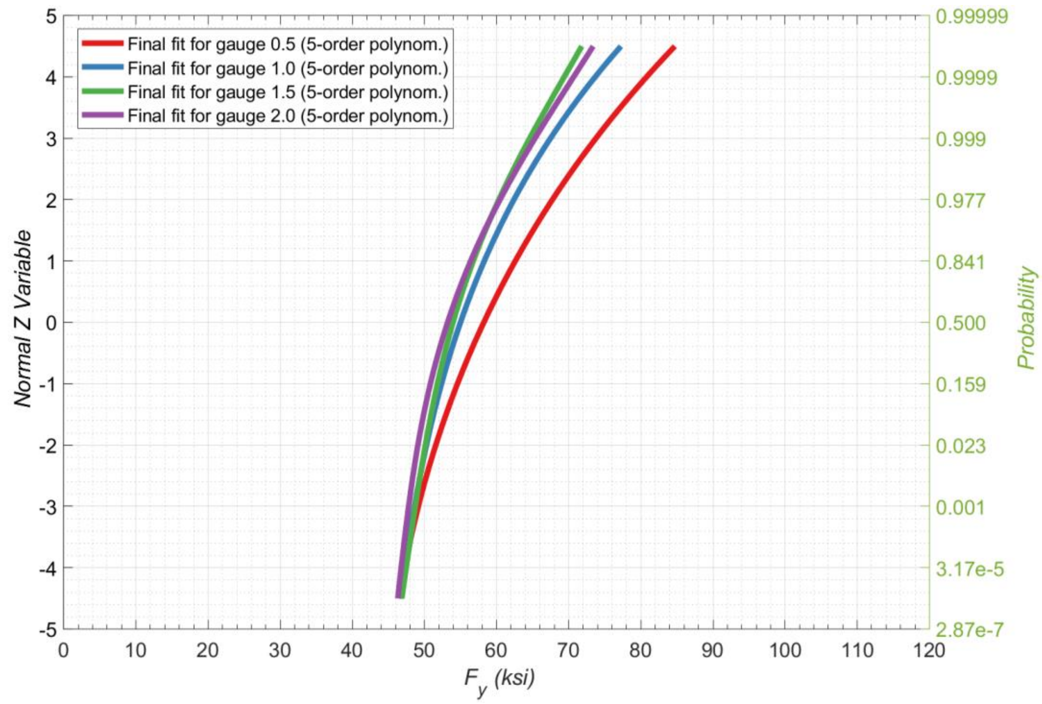


Fig. 5-29: Final CDFs for Grade 50 steel. Gauges 0.5 - 2.0 inch.

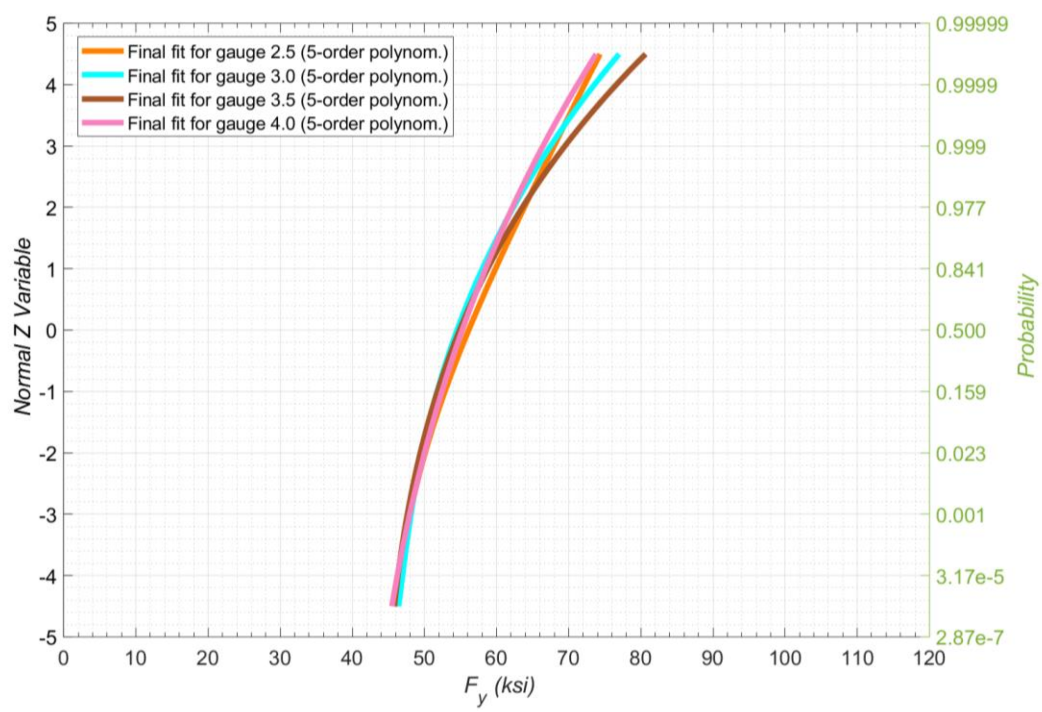


Fig. 5-30: Final CDFs for Grade 50 steel. Gauges 2.5 - 4.0 inch.

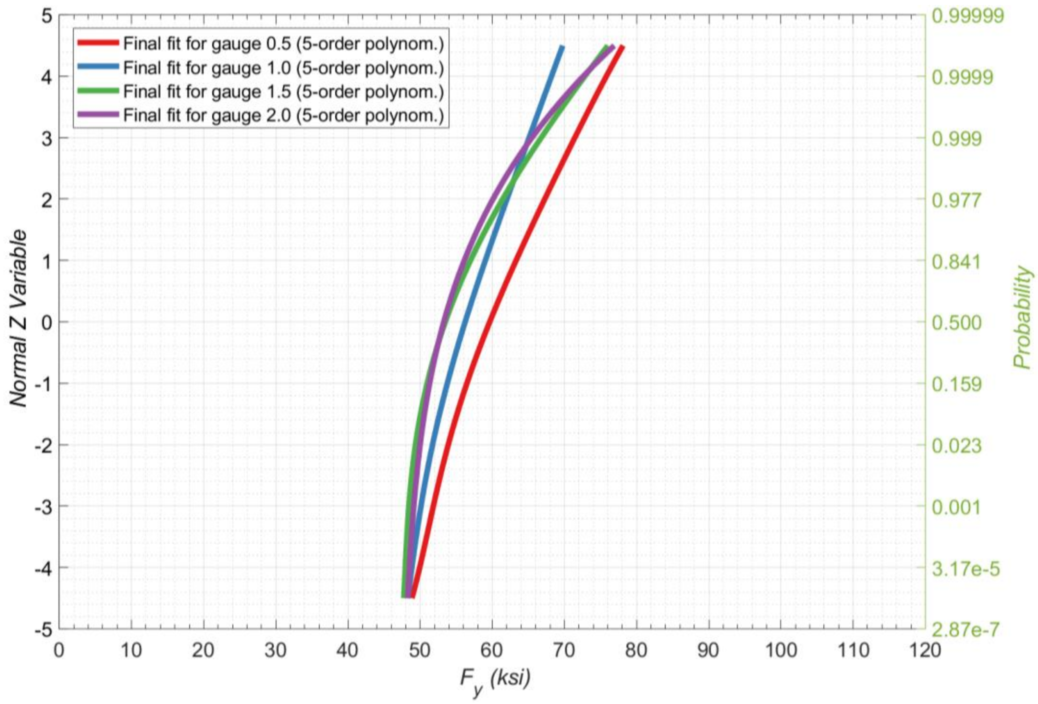


Fig. 5-31: Final CDFs for Grade 50W steel. Gauges 0.5 - 2.0 inch.

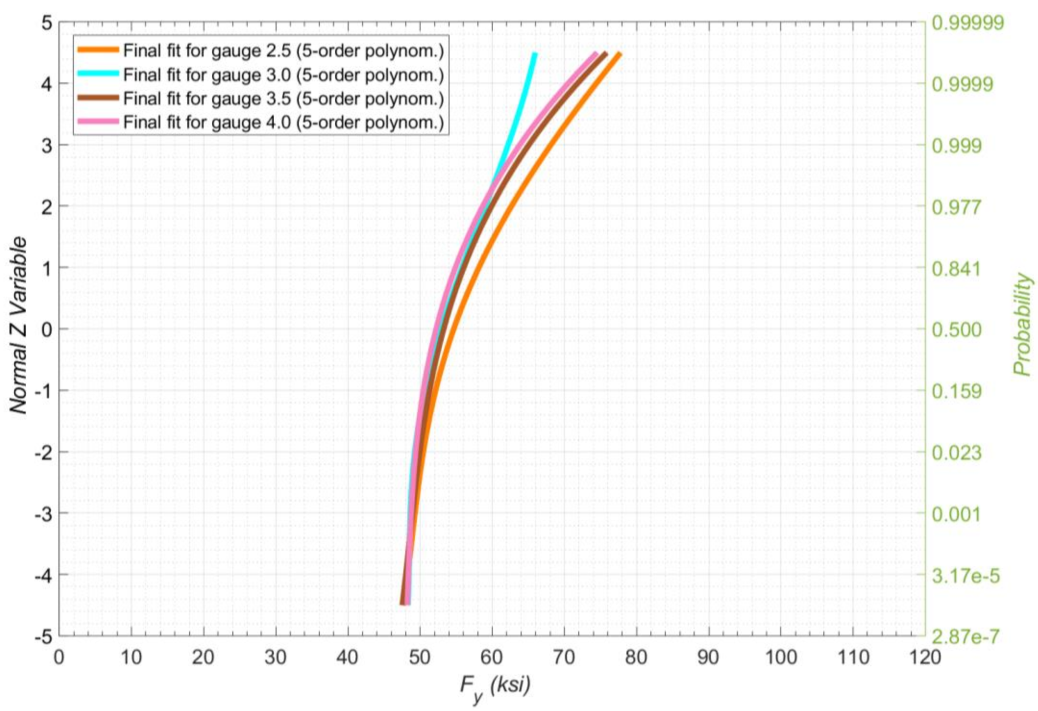


Fig. 5-32: Final CDFs for Grade 50W steel. Gauges 2.5 - 4.0 inch.

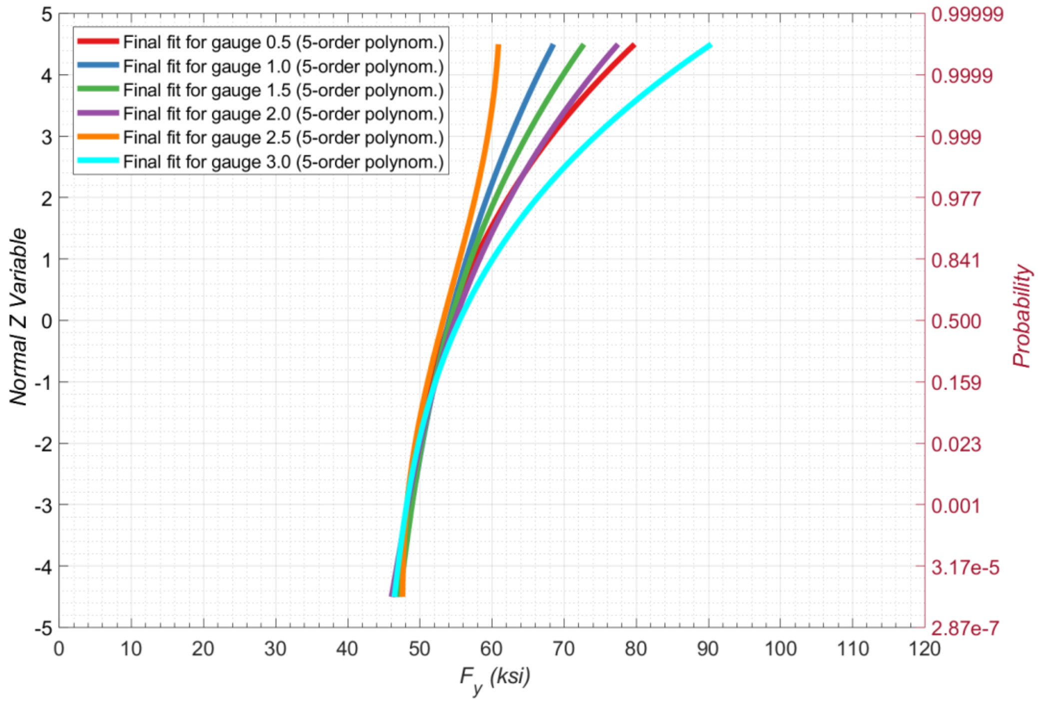


Fig. 5-33: Final CDFs for Grade HPS-50W steel. All gauges.

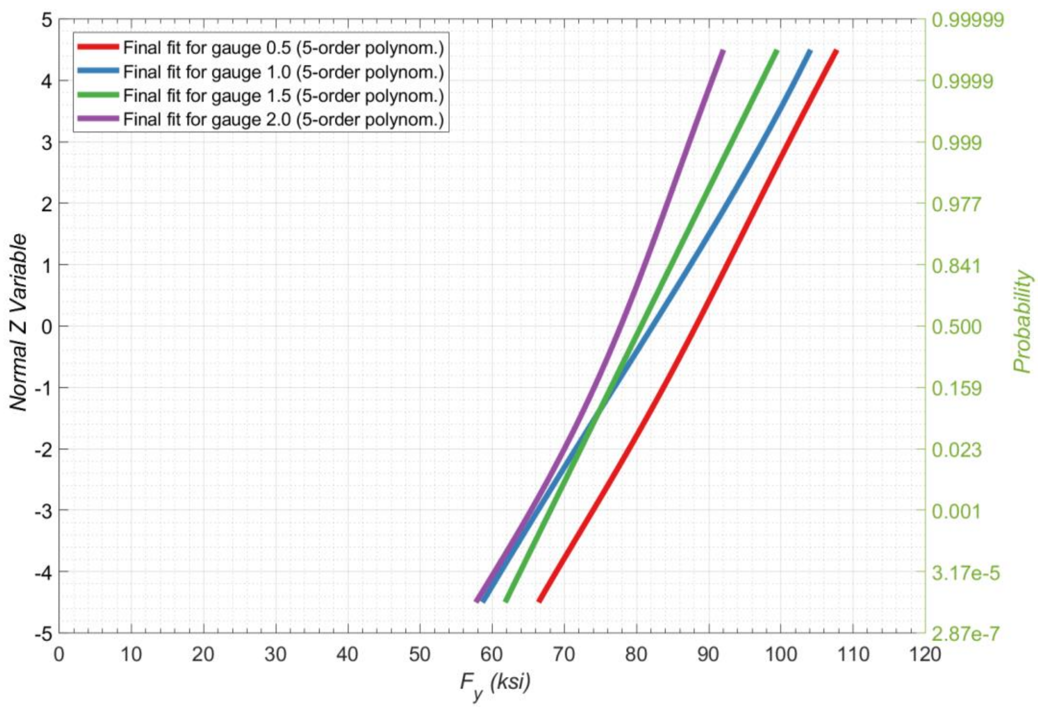


Fig. 5-34: Final CDFs for Grade HPS-70W steel. Gauges 0.5 - 2.0 inch.

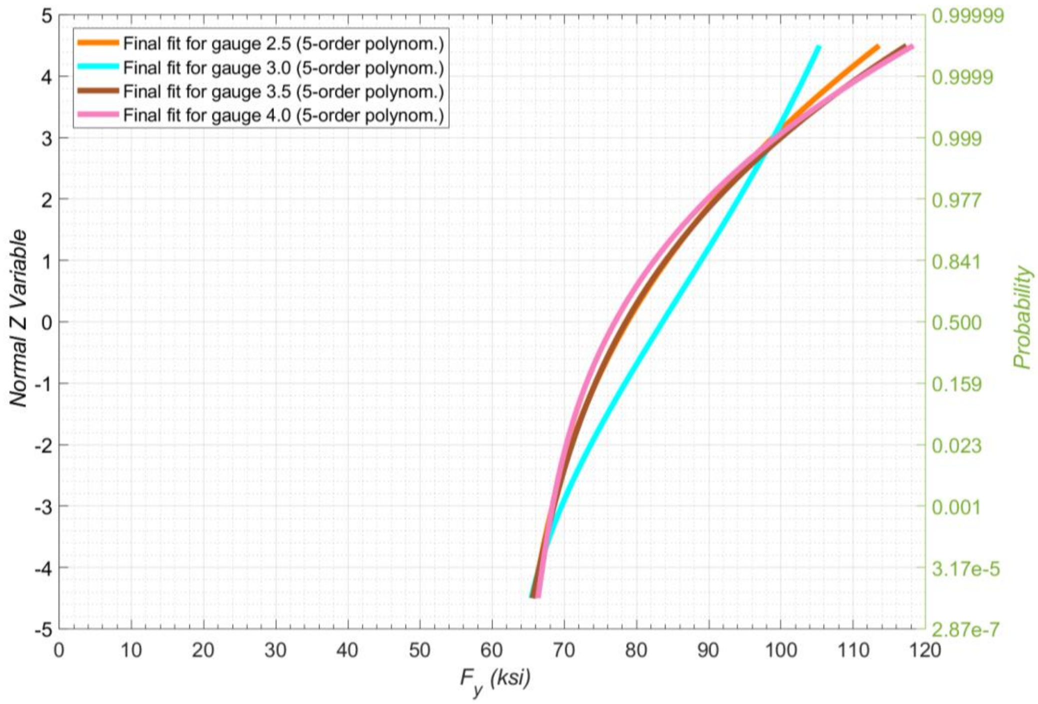


Fig. 5-35: Final CDFs for Grade HPS-70W steel. Gauges 2.5 - 4.0 inch.

Table 5-14 present the coefficients of the fitted 5-th order polynomial representing the final distributions of considered steel grades per rounded gauge and their statistical parameters.

Table 5-14. Coefficients of polynomials fitted into distributions of yield strength for A709 steel data and statistical parameters, per grade per rounded gauge.

Steel Grade	Rounded Gauge	p_5	p_4	p_3	p_2	p_1	p_0	Bias factor, λ	Coefficient of variation, V
Grade 50	0.5	9.44E-06	5.83E-04	1.21E-02	3.53E-01	3.99	58.2	1.165	0.070
	1.0	-1.28E-17	5.26E-04	2.21E-02	3.35E-01	2.94	55.0	1.100	0.055
	1.5	-4.68E-04	-3.11E-03	2.51E-02	3.28E-01	2.46	54.0	1.080	0.045
	2.0	-4.07E-04	-4.00E-03	2.00E-02	4.09E-01	2.77	53.2	1.065	0.050
	2.5	3.60E-04	-5.72E-04	-2.62E-02	2.11E-01	3.54	56.1	1.125	0.065
	3.0	2.46E-04	-8.33E-04	8.49E-03	3.72E-01	3.13	54.5	1.090	0.055
	3.5	5.44E-06	4.87E-04	2.04E-02	4.04E-01	3.46	54.9	1.095	0.065
	4.0	5.13E-07	8.26E-05	6.20E-03	2.17E-01	3.02	55.2	1.105	0.055
Grade 50W	0.5	8.46E-04	-2.76E-03	-2.61E-02	2.46E-01	3.43	59.6	1.195	0.055
	1.0	3.51E-04	-1.32E-03	-2.02E-02	1.64E-01	2.65	56.2	1.125	0.045
	1.5	2.21E-05	-3.91E-03	7.02E-03	4.93E-01	2.99	53.5	1.070	0.055
	2.0	-3.36E-05	1.14E-03	4.12E-02	4.37E-01	2.36	53.3	1.065	0.045

	2.5	1.93E-05	-4.62E-03	1.75E-02	4.92E-01	2.98	54.7	1.095	0.055
	3.0	6.47E-04	-6.27E-03	-4.57E-02	3.35E-01	2.62	52.9	1.060	0.050
	3.5	-9.12E-19	-5.14E-17	4.06E-02	4.16E-01	2.33	53.3	1.065	0.045
	4.0	-7.64E-18	-3.10E-17	3.65E-02	4.52E-01	2.18	52.2	1.045	0.045
HPS 50W	0.5	-7.45E-06	-8.76E-04	3.61E-02	4.54E-01	2.99	54.2	1.085	0.055
	1.0	1.49E-04	-6.82E-04	7.72E-03	1.90E-01	2.20	54.1	1.080	0.040
	1.5	7.23E-05	-5.57E-04	1.53E-02	2.93E-01	2.50	54.2	1.085	0.045
	2.0	1.57E-04	-6.63E-04	1.91E-02	3.55E-01	3.04	54.8	1.095	0.055
	2.5	4.70E-04	-1.14E-03	-4.81E-02	7.34E-02	2.26	53.2	1.065	0.040
	3.0	-3.42E-18	-3.55E-17	4.68E-02	6.40E-01	3.93	55.5	1.110	0.070
HPS 70W	0.5	-3.62E-04	1.80E-03	1.70E-02	-9.31E-02	4.40	88.2	1.260	0.050
	1.0	1.43E-04	-4.33E-04	-1.58E-02	-3.31E-02	5.32	82.2	1.175	0.065
	1.5	-7.72E-18	5.39E-17	6.10E-16	-1.69E-15	4.19	80.6	1.150	0.050
	2.0	-2.86E-04	1.53E-03	2.21E-02	-1.76E-01	3.48	77.8	1.110	0.045
	2.5	-1.27E-17	6.08E-17	1.97E-02	5.44E-01	4.91	78.7	1.125	0.065
	3.0	3.51E-04	1.18E-03	-5.02E-02	6.36E-02	5.31	83.6	1.195	0.065
	3.5	-1.28E-17	6.62E-17	4.58E-02	6.40E-01	4.83	78.5	1.120	0.060
	4.0	-9.58E-18	-3.86E-17	5.56E-02	7.58E-01	4.66	77.0	1.100	0.060

5.4.2 A992 Steel

The statistical parameters for rolled I-shapes are derived from the results of a fairly recent study by Bartlett and others [40] published in 2001, where a total of 207 flange and web A992 steel coupon specimens were tested. Specimens were tested at the University of Western Ontario (UWO) and the University of Minnesota (UM), and although UWO tested half-thick coupons there was no discrepancy observed between test results from UM. Test specimens were obtained from different rolled I-shaped beams provided by three producers. The tested yield strength results available in the research report by Bartlett, Dexter et al. [41] were extracted and used as inputs in this work.

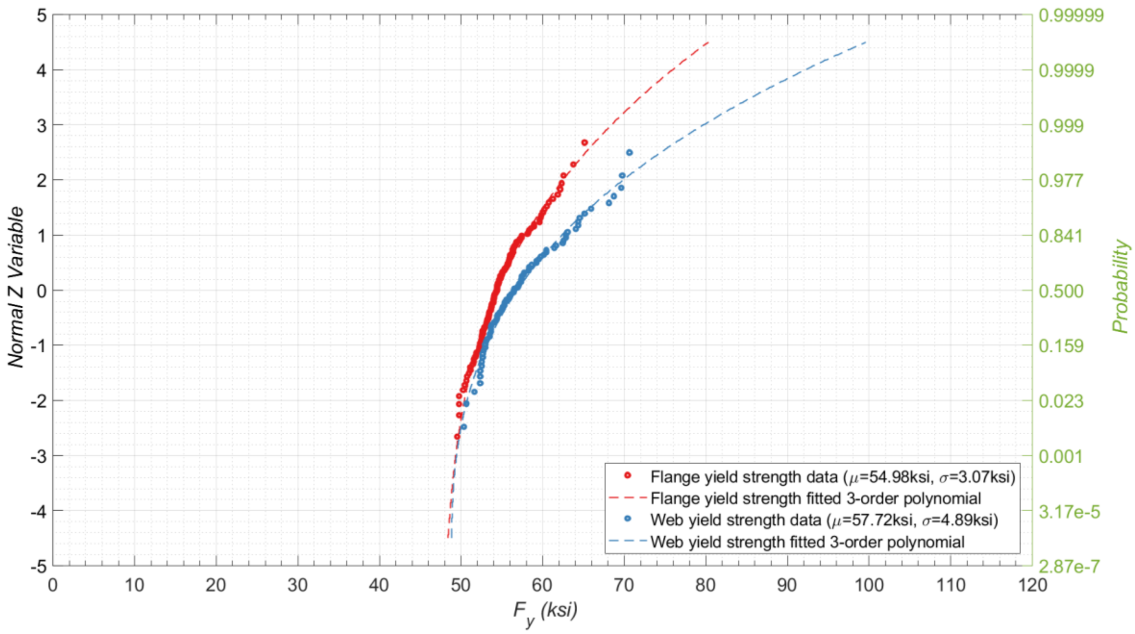


Fig. 5-36: CDFs for data and fitted polynomials of Grade 50, A992 steel yield strength.

Since the reported data contained of a few results for a certain W-shape for each producer, it formed a perfect set that merged would give the actual distribution of the yield strength despite the origin of the sample. Therefore, in this study the extracted data was first plotted on probability paper, then k-th order polynomial best fitting into the data by means of R^2 value was fitted and further used in the probability analysis (Fig. 5-36). The coefficients of a 3rd order polynomial fitted into data of web and flange yield strength of a rolled I-shape are presented in Table 5-15.

Table 5-15. Coefficients of yield strength distribution polynomial and statistical parameters for A992 steel.

Steel Grade	Element	p_3	p_2	p_1	p_0	Bias factor, λ	Coefficient of variation, V
A992-50	Flange	3.23E-02	4.87E-01	2.89E+00	5.45E+01	1.100	0.055
	Web	5.27E-02	8.56E-01	4.57E+00	5.69E+01	1.150	0.085

The authors reported bias factor, λ, of 1.1 and coefficient of variation, V, of 0.056 for flange yield strength [41] which is consistent with the results for plotted data in Fig. 5-36. The flange-to-web strength ratio had a mean of 0.953 and V of 0.064 according to the report, and this is also consistent with the outcomes shown in the figure above. What is of a great importance is the lower tail of the distribution which still reaches values lower than the nominal but not in a normal nor lognormal fashion. This extrapolated shape of the tail will impact the location of the design point and further results of reliability analysis.

5.4.3 Concrete

It was assumed that the concrete deck of the bridge is made of normal weight concrete (NWC). The statistical parameters for NWC are reported in recent work by Rakoczy and Nowak [42] and presented in Table 5-16.

Table 5-16. Statistical parameters for Normal Weight Concrete

f'_c (psi)	Bias factor, λ	Coefficient of variation, V
3000	1.33	0.145
3500	1.24	0.115
4000	1.21	0.155
4500	1.19	0.160
5000	1.22	0.125
6000	1.22	0.075

It turns out that for a high number of simulations, for very low probabilities of occurrence and corresponding normal z variables (see section 3.3.1) generated the assumed normal distribution of concrete strength is not appropriate as it results in impossibly low values concrete strength. For the data presented in Table 5-16, and concrete nominal compressive strength of 4000psi, very low values of strength are generated at z values of -3 and lower which corresponds to probability of occurrence of 0.14% and lower. Concrete strength at this region of distribution is less than half the mean strength and is a consequence of linear extrapolation of the lower tail.

To avoid generating extremely low concrete strength at z values of -4 or lower, the actual data base used to derive the parameters presented in Table 5-16 was analyzed. In a similar fashion as for steels polynomials best fitting the data distribution were fitted and used in further analysis Fig. 5-37. Coefficients of fitted polynomials are presented in Table 5-17.

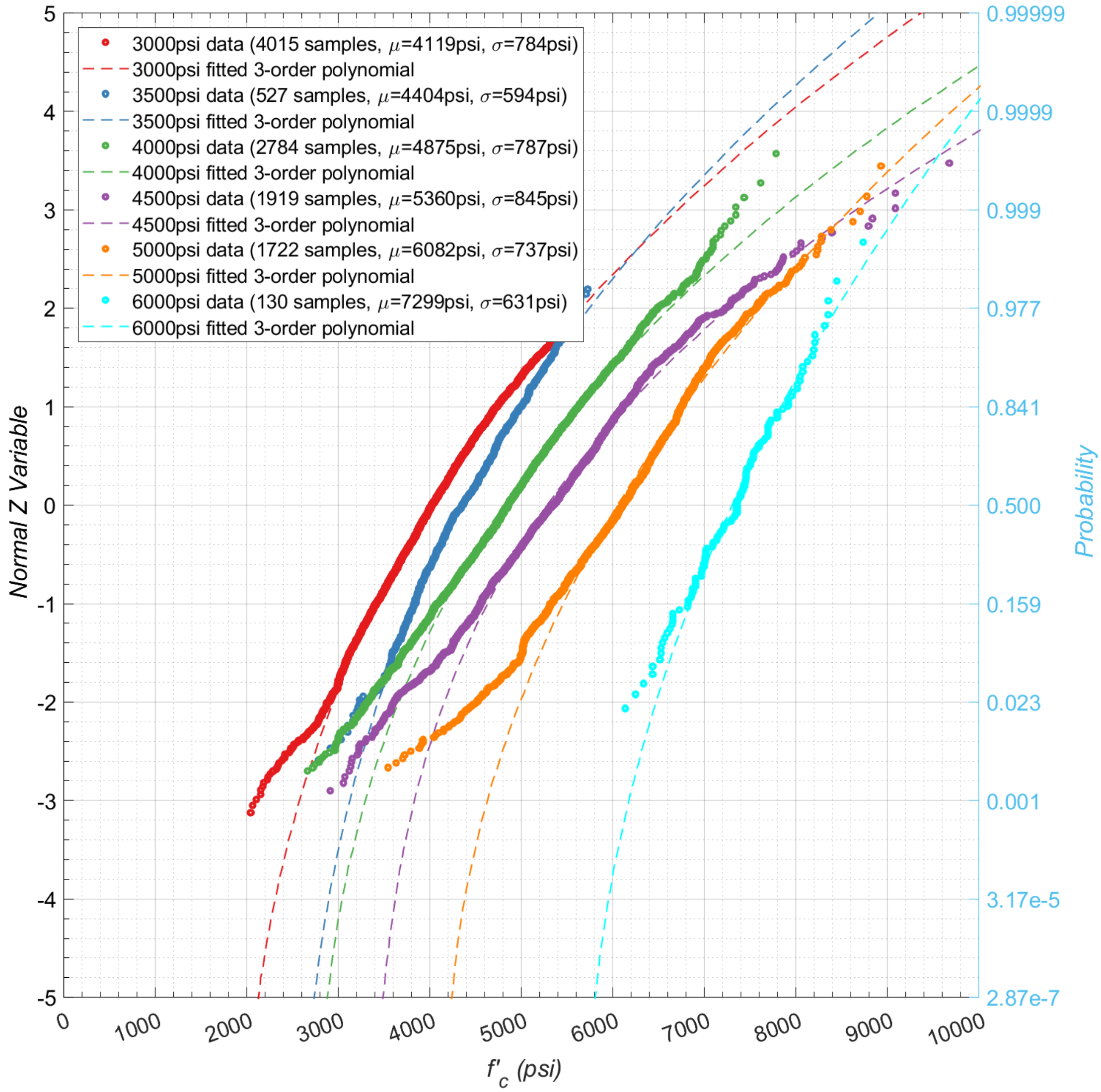


Fig. 5-37: CDFs for data and fitted polynomials of Normal Weight Concrete compressive strength.

Table 5-17. Coefficients of polynomials fitted into distribution of Normal Weight Concretes and statistical parameters.

Nominal Concrete Strength (psi)	p_3	p_2	p_1	p_0	Bias factor, λ	Coefficient of variation, V
3000	2.22E+00	6.88E+01	668	4024	1.340	0.165
3500	1.96E+00	5.89E+01	568	4352	1.245	0.130
4000	3.05E+00	8.40E+01	728	4806	1.200	0.150
4500	5.59E+00	1.07E+02	754	5281	1.175	0.145
5000	7.22E-01	6.19E+01	653	6050	1.210	0.110
6000	6.13E-02	3.94E+01	494	7302	1.215	0.070

5.4.4 Steel rebars

Due to the role of steel rebar in concrete deck, which is to improve the flexural resistance of the deck in the transverse direction, the longitudinally oriented reinforcement does not contribute significantly in the overall section's flexural resistance. Nevertheless, inclusion of the rebar in strength calculations results in a few percent increase of resistance. For this reason, the actual distribution of rebar yield strength does not impact the resistance of the final section noticeably and can was taken as normal with resistance parameters used for ACI 318 calibration [43] and shown in Table 5-18.

Table 5-18. Statistical parameters for reinforcing steel, Grade 60 [43].

Bar size	Bias factor, λ	Coefficient of variation, V
#3	1.200	0.040
#4	1.145	0.065
#5	1.125	0.040
#6	1.150	0.050
#7	1.165	0.050
#8	1.145	0.050
#9	1.150	0.050
#10	1.140	0.040
#11	1.145	0.035

5.5 Resistance simulation

This section is intended to clearly explain the approach and simulation procedures used in resistance distribution and material factor determination. Resistance of all the sections (as described in section 5.1) was simulated for the strength limit state. The service limit state, fatigue and fracture limit state, as well as constructability requirements are not investigated in this study. Resistance simulations are performed on the controlling limit state only. Resistance models described in section 5.2 control for sections that are compact. From the obtained results, resistance parameters are calculated and presented in section 5.6. Resistance distributions are used for reliability analysis and presented in section 6.1.

5.5.1 Flexure of noncomposite girders

Simulation of flexural resistance for noncomposite girders was performed by means of Monte-Carlo simulation (see subsection 3.3.1). The resistance of each girder was simulated using resistance model presented in sections 5.2.1. All selected W-shapes and designed plate girder sections are compact, therefore controlling limit state is yielding. For a few W-sections in the analyzed set (see Table 5-2) the flange is noncompact, which leads to compression flange local buckling limit state, as it was assumed that appropriate bracing would be provided and therefore lateral-torsional buckling does not apply.

For each girder analyzed one million (n=1,000,000) simulations of resistance are performed, treating certain input values as variables. Resistance of a noncomposite section is a function of three variables: yield strength of compression flange, web and tension flange, which is presented by equation:

$$R_M = R_M(f_{yc}, f_{yw}, f_{yt}) \tag{5.97}$$

For rolled I sections it was assumed that variables are correlated which is justified by the nature of the rolling process of a section. Strength of each plate in a plate girder was assumed to be uncorrelated. Noncomposite plate girders were analyzed only for grades A709-50 and A709-50W.

5.5.2 Flexure of composite girders

Simulation of flexural resistance for composite girders, including rolled I-shaped girders, plate girders, and box girders, was performed by means of Monte-Carlo simulations. Flexural resistance of composite sections was expressed as plastic moment in accordance with resistance models described earlier. Resistance of a composite section is a function of six variables: yield strength of compression flange, yield strength of web, yield strength of tension flange, compressive strength of concrete, yield strength of top and bottom reinforcement. The resistance function is described by following equation:

$$R_M = R_M(f_{yc}, f_{yw}, f_{yt}, f_c', f_{yrb}, f_{yrt}) \tag{5.98}$$

Similarly as for noncomposite sections, flanges and web of rolled W-shapes were assumed to be fully correlated, while for plate and box girders the yield strength of each plate was uncorrelated. Remaining variables of resistance function, which are concrete strength and yield strength of both layers of steel rebars, are simulated as uncorrelated.

The whole range of composite sections was analyzed using resistance models described in section 5.2 for A992, A709-50 and A709-50W steels with one million (n=1,000,000) Monte-Carlo simulations.

Due to the nature of HPS for which the strain hardening occurs without yield plateau, utilization of developed nonlinear resistance model (described in section 5.3) was necessary for A709-HPS50W steel grade. Due to high computational time when using nonlinear analytical resistance model, only 9 selected sections are simulated for HPS with lesser number of Monte-Carlo simulations. Selected for this analysis were girders covering spans of 120, 200, and 300 feet with various girder spacings. Plate girders with following ID numbers are simulated using HPS50W steel grade: 37, 58, 66, 83, 91, 101, 114, 124, 149 (see subsection 5.1.4). Selection of these sections was based on their spacing and design span length. Computational time study led to conclusion that ten thousand (n=10,000) Monte-Carlo simulations is optimum providing enough data points to develop meaningful distribution of resistance. Ten thousand simulations are also widely accepted as the industry standard. Strain hardening was conservatively underestimated with assumption of ultimate strength, F_u, being 1.4 times the yield strength, F_y, and ultimate strain of fixed value of 0.14.

5.5.3 Shear of girders

The shear resistance was simulated with one million (n=1,000,000) Monte-Carlo simulations. Resistance equations used in these simulations are presented in sections 5.2.2, 5.2.4, and 5.2.6 for noncomposite I-shaped, composite I-shaped, and box girders respectively. Only compact webs were considered herein. For rolled I-shaped steel shapes, shear resistance was simulated for all the sections considered. For A709 steel plate webs, plates with slenderness ratio of 50% and 75% of the compact slenderness limit were simulated for thicknesses from 0.5 to 2 inches and for all the steel grades.

5.6 Material Factor

Material factors for flexural and shear resistance specified by equation (5.1), were derived for all girder sections presented in section 5.1. Bias factor, λ, and coefficient of variation, V, were determined through simulations described in section 5.5. The resulting values of statistical parameters are shown and discussed in the following subsections. Full reports on statistical parameters of analyzed sections are attached in Appendix B.2.

5.6.1 Flexure of noncomposite rolled I-shaped girders

Material factors for noncomposite rolled I-shaped girders were determined through Monte-Carlo simulations, see subsection 5.5.1. Cross-sections analyzed are reported in Table 5-2. Fig. 5-38 shows resulting bias factors and coefficients of variation plotted against nominal moment carrying capacity of the section. Mean bias factor is λ=1.11 and mean coefficient of variation is V=0.055. There is a consistency visible of the resulting values that is due to uniform yield strength of A992 distribution. The small variation of ±1% for bias factor and ±0.5% is due to the differentiated distribution of the yield strength of web and flanges, which impacts the distribution of simulated plastic moments and in result the bias factor and coefficient of variation.

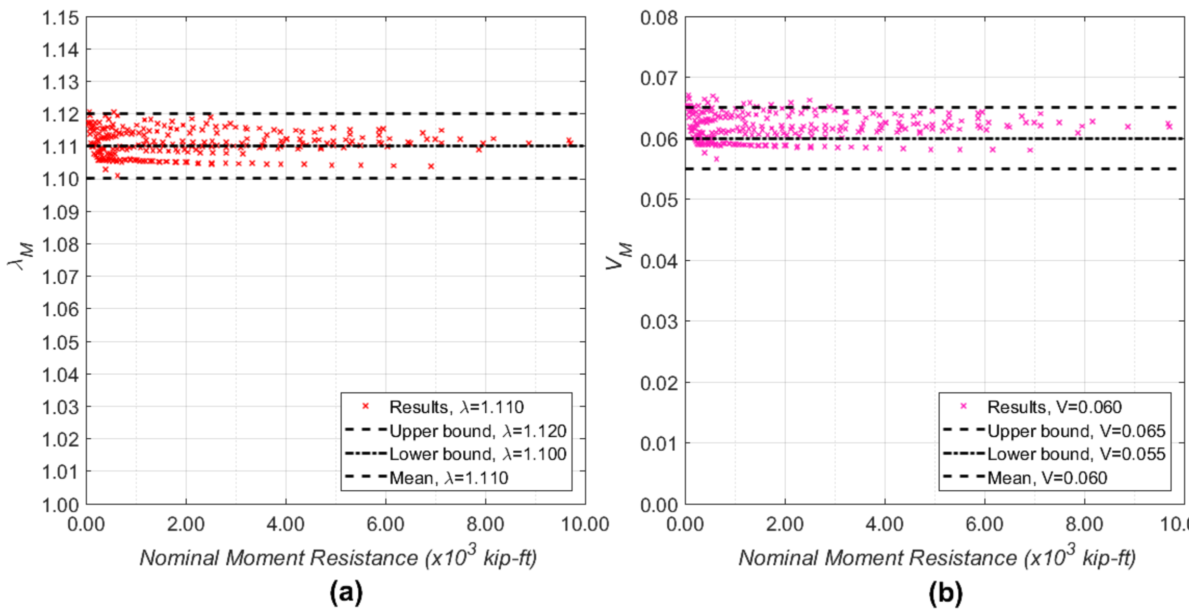


Fig. 5-38: Statistical parameters of moment resistance for noncomposite W-shapes – a) Bias factor, λ_M, b) Coefficient of variation, V_M.

When comparing obtained results to statistical parameters of resistance reported in NCHRP Report 368 [12] and reported by Bartlett et al. [40], the difference may not be considerable. The true benefit of this simulation is the obtained resistance distribution that will be used in reliability analysis.

5.6.2 Flexure of noncomposite I-shaped plate girders

Due to strength distributions for each A709 steel grade and per rounded gauge, the material factor for noncomposite I-shaped plate girders exhibits larger variation than for W-shapes. Fig. 5-39 and Fig. 5-40 present statistical parameters of moment resistance for two steel grades plotted against nominal capacity of a section. Since the plate girders were designed for a specific span length and spacing, the results are presented for each girder spacing in Fig. 5-41.

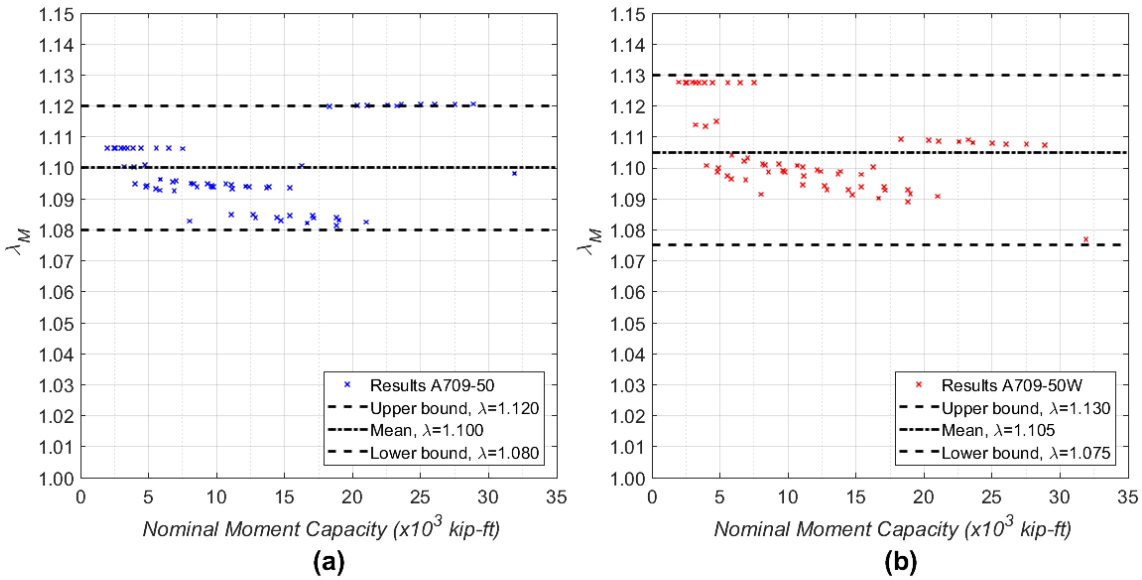


Fig. 5-39: Bias factor, λ_M, of plastic moment resistance for noncomposite plate girders – a) A709-50 steel, b) A709-50W steel.

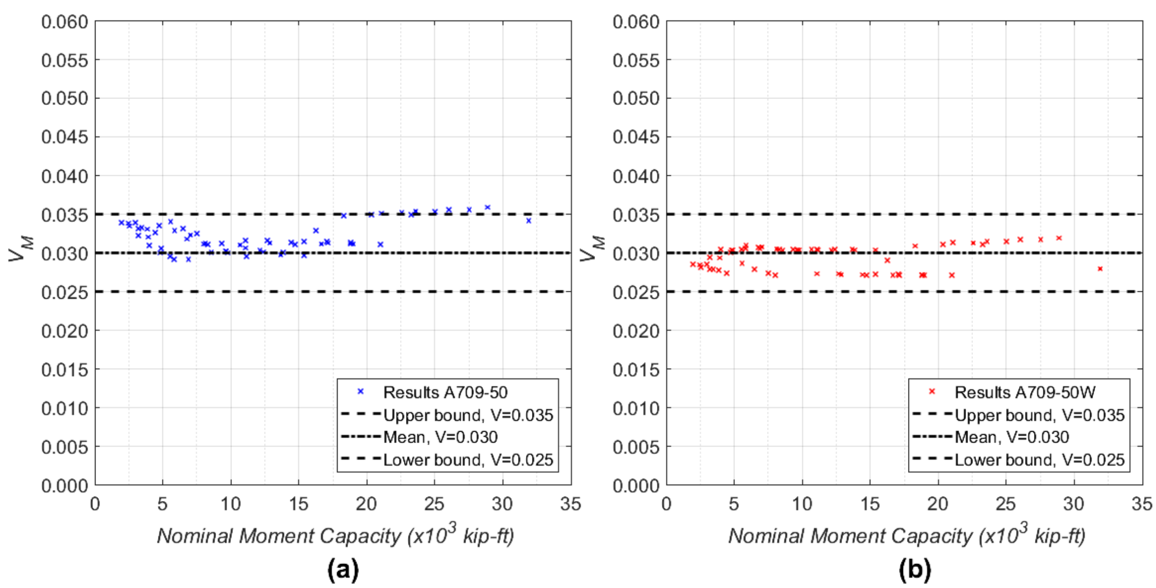


Fig. 5-40: Coefficient of variation, V_M, of plastic moment resistance for noncomposite plate girders – a) A709-50 steel, b) A709-50W steel.

Mean bias factor and mean coefficient of variation for A709-50 steel sections is 1.1 and 0.03 respectively. For A709-50W steel sections, the mean bias factor and mean coefficient of variation is 1.105 and 0.03 respectively. Conservatively, statistical parameters for noncomposite plate girders could be taken as minimum λ and maximum V. In such approach recommended bias factor is 1.08 for A709-50 steel and 1.09 for A709-50W (1.09 is chosen since there is just one outlier dragging the minimum value down to 1.075 in Fig. 5-40b). Recommended coefficient of variation, for both steels is 0.035. Variation visible in Fig. 5-41 is a consequence of used combinations of certain plate thicknesses flanges and web, their yield strength distributions, and resulting stresses.

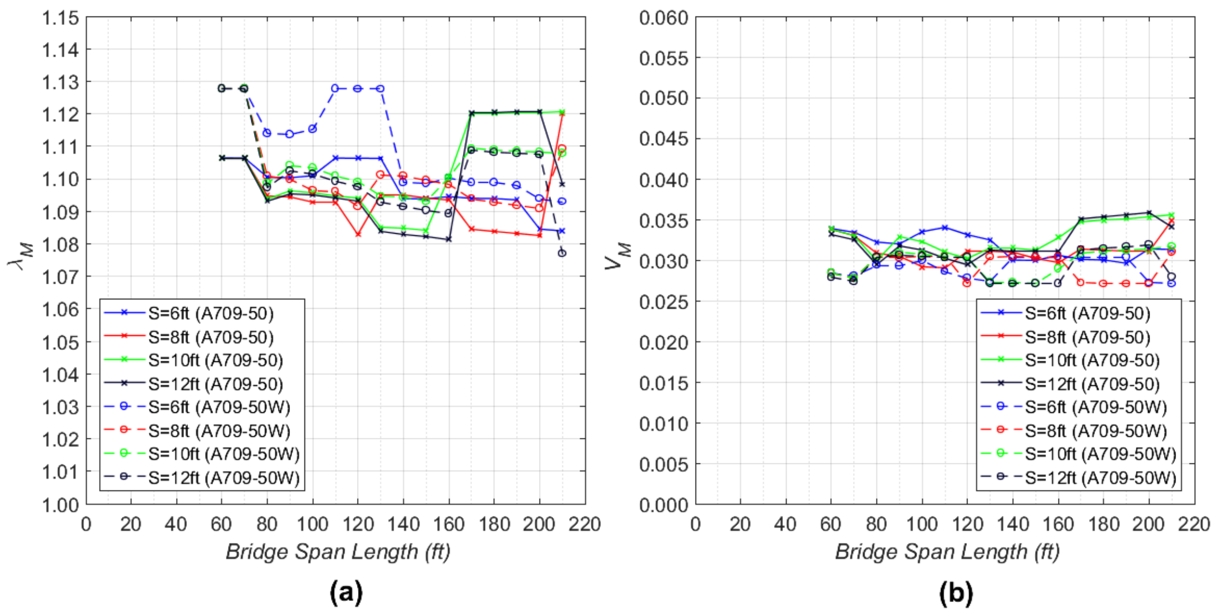


Fig. 5-41: Statistical parameters of moment resistance for noncomposite noncomposite plate girders per girder spacing, S, and design span length, L,– a) Bias factor, λ_M, b) Coefficient of variation, V_M.

5.6.3 Flexure of composite rolled I-shaped girders

Material factors of the composite rolled I-shaped girder shapes were determined through Monte-Carlo simulations, see subsection 5.5.1. Cross-sections analyzed are reported in Table 5-4 and Table 5-5. Results of bias factor and coefficient of variation are plotted (Fig. 5-42) against section's nominal moment carrying capacity.

Bias factor presented in Fig. 5-42a is noticeably larger than previously derived value of 1.07 [12] for composite I-shaped steel girders. This is a proof for improvement in manufacturing practices and overall better performance of W-sections than it was previously derived. The spread of both bias factor and coefficient of variation for composite W-shapes is very small and mean values of λ=1.13 and V=0.06 can be concluded.

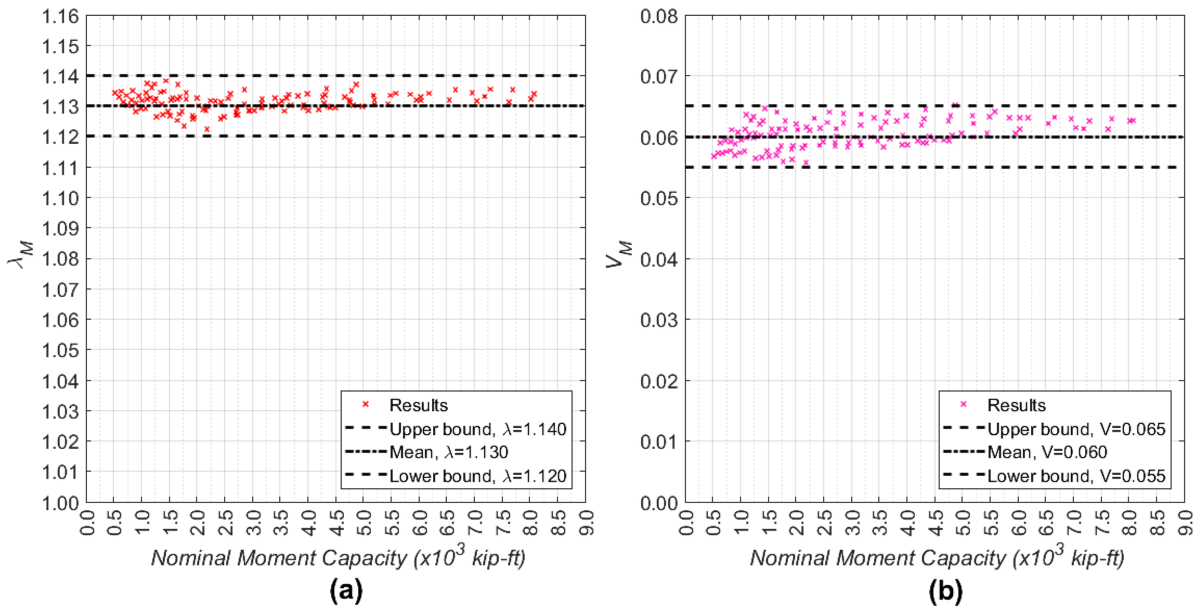


Fig. 5-42: Statistical parameters of moment resistance for composite rolled I-shapes – a) Bias factor, λ_M, b) Coefficient of variation, V_M.

5.6.4 Flexure of composite I-shaped plate girders

Figures shown below (Fig. 5-43 and Fig. 5-44) present statistical parameters of moment resistance for the pool of composite plate girders (see section 5.1.4) made of A709 grade 50 and 50W steel. In the Fig. 5-43 one can observe similar trends between the two steel grades, with slightly smaller maximum bias factor, λ_M, for grade 50 steel. This difference can be explained by means of individual yield strength distribution of certain plate thicknesses for each grade (see subsection 5.4.1). What is also important to mention, is larger bias factor, λ_M, for girders with lesser capacity up to 10,000 kip-ft. These sections have web depths, *D*, up to 70 inches, for which high mean capacity comes from the location of PNA in the slab for nominal strengths and used 0.5-inch-thick webs. Deeper sections, because of the geometry and developed plastic forces, tend to

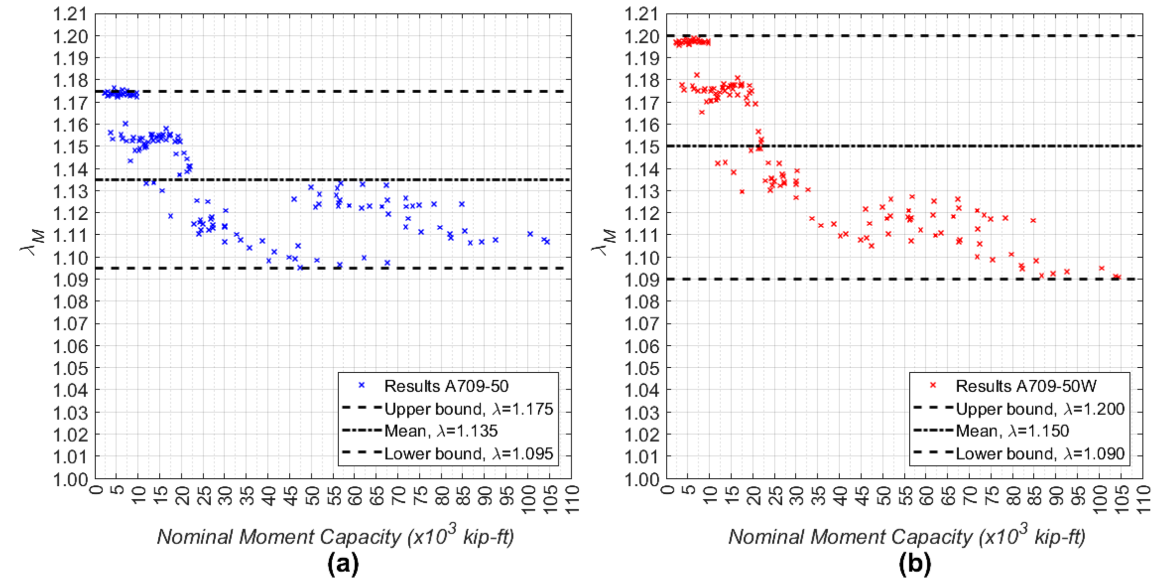


Fig. 5-43: Bias factor, λ_M, of moment resistance for composite plate girders - a) A709-50 steel, b) A709-50W steel.

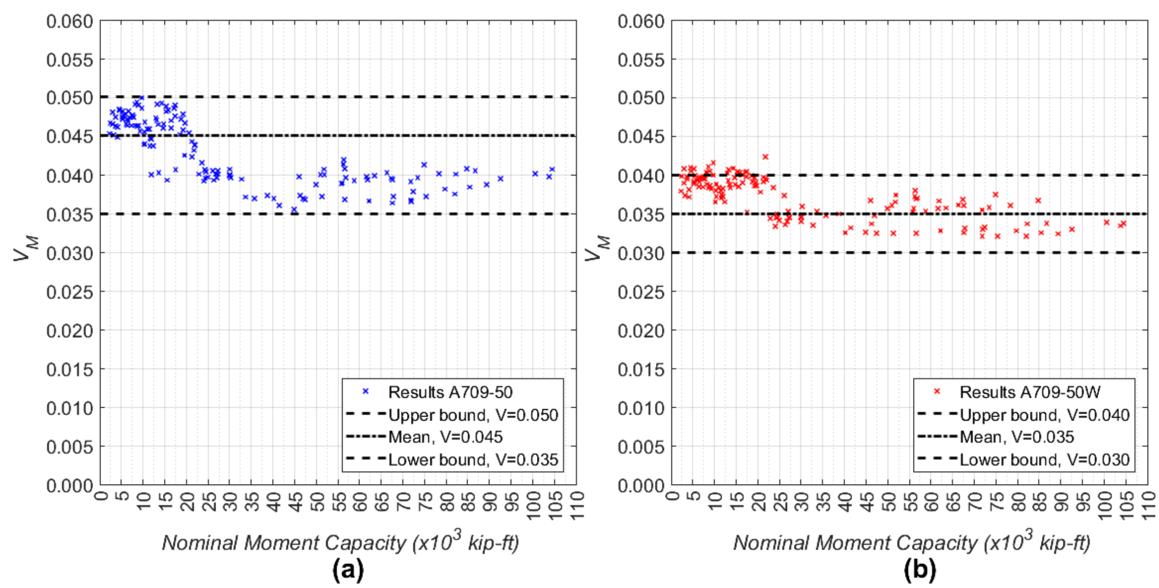


Fig. 5-44: Coefficient of variation, V_M, of moment resistance for composite plate girders - a) A709-50 steel, b) A709-50W steel.

have the PNA in top flange and web, and therefore their mean-to-nominal resistance factor, λ_M, is smaller. This corresponds to inability to develop high ductility, and results in minimum value of bias factor of 1.095 and 1.09 for A709-50 and A709-50W respectfully. At instances of nominal flexural capacity from 50,000 to 75,000 kip-ft, both bias factor and coefficient of variation have different values for nearly the same capacity. This can be explained by different thicknesses of a flange or a web of two girders designed for the same span lengths and different girder spacing. Coefficient of variation for A709-50W sections exhibit better consistency, expressed as a smaller spread because of closer distributions of A709-50W yield strength per gauge (Fig. 5-31 and Fig. 5-32) as oppose to A709-50 (Fig. 5-29 and Fig. 5-30).

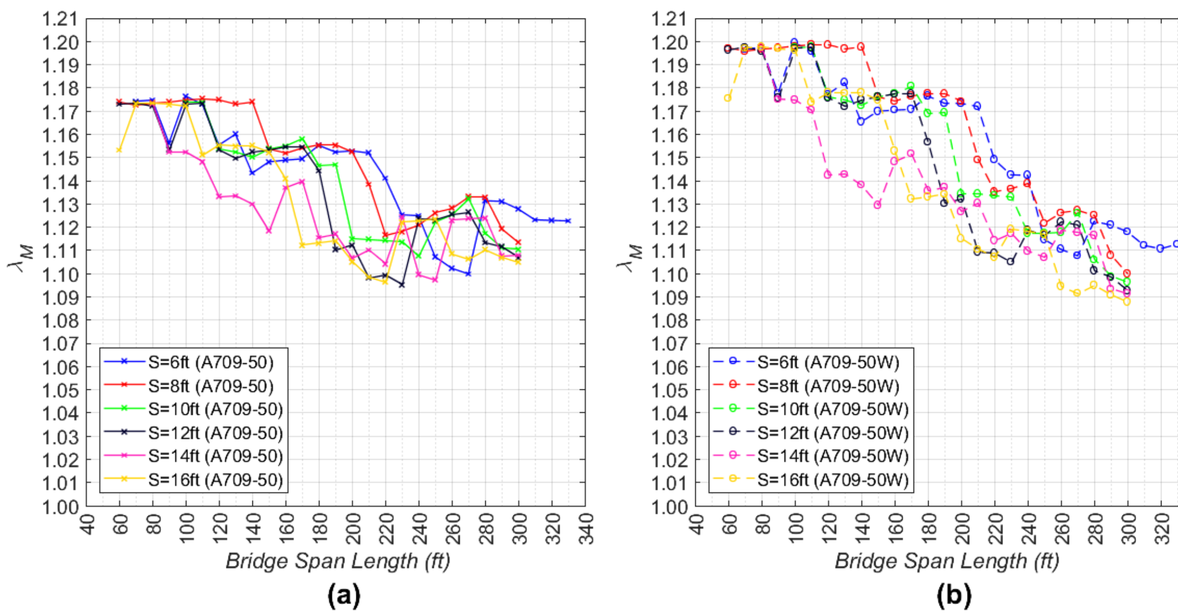


Fig. 5-45: Bias factor, λ_M, of moment resistance for composite plate girders per girder spacing, S, and design span length, L - a) A709-50 steel, b) A709-50W steel.

Fig. 5-45 presents relationship of the bias factor per design span length of the section, for both grades considered. With increasing capacity due to span length and girder spacing the bias factor tends to decrease in a steady fashion for both steel grades (Fig. 5-45). Coefficient of variation also tends to decrease in value with increasing span length but at a different rate, as it is shown in Fig. 5-46.

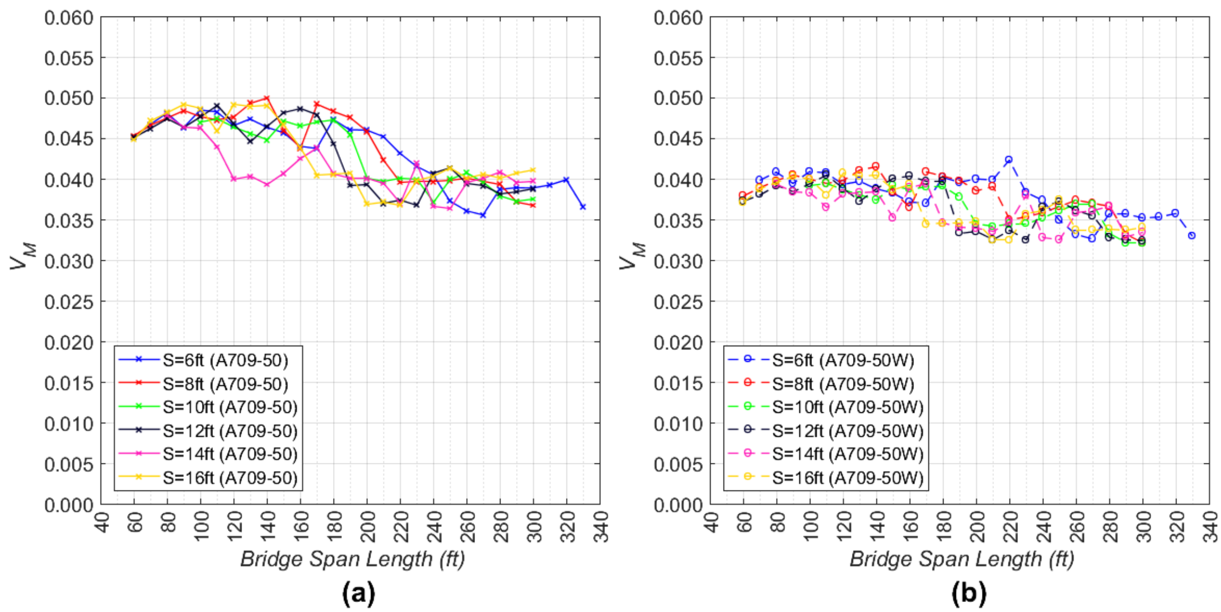


Fig. 5-46: Coefficient of variation, V_M, of moment resistance for composite plate girders per girder spacing, S, and design span length, L - a) A709-50 steel, b) A709-50W steel.

For HPS50W, just nine sections were modelled. Sections were simulated using analytical approach, as described in section 5.3, and traditionally using rigid plastic analysis, as earlier presented in section 5.2. Because of this, three sets of statistical parameters are calculated. In first, the mean resistance, standard deviation, and nominal resistance are all obtained from analytical model. In second, all parameters are calculated using rigid plastic analysis. In third parameters are derived from resistance distribution obtained from analytical model and compared with nominal resistance calculated traditionally. This allows to illustrate the actual advantage of HPS, when traditional modelling approach is used that does not account for strain hardening in steel after first yielding. It is also noticeable, that for the pool of composite plate girders made of A709-HPS50W analyzed the bias factor and coefficient of variation are very consistent for each method investigated.

Table 5-19. Statistical parameters of resistance for selected composite I-shaped plate girders made of A709-HPS50W steel.

Girder ID	37	58	66	83	91	101	114	124	149
λ_{AM}	1.105	1.100	1.095	1.100	1.090	1.115	1.085	1.120	1.115
λ_{RPA}	1.115	1.110	1.110	1.115	1.105	1.120	1.105	1.120	1.120
$\lambda_{AM/RPA}$	1.175	1.185	1.145	1.195	1.155	1.135	1.170	1.140	1.140
V_{AM}	0.040	0.040	0.030	0.040	0.030	0.045	0.030	0.050	0.050
V_{RPA}	0.040	0.040	0.035	0.040	0.035	0.045	0.030	0.050	0.050
$V_{AM/RPA}$	0.040	0.040	0.030	0.040	0.030	0.045	0.030	0.050	0.050

5.6.5 Flexure of composite steel box girders

Resulting material factors for considered steel box girder sections are shown below in Fig. 5-47 and Fig. 5-48. The spread of bias factor for A709-50 sections is 0.08 with mean at 1.14. For the A709-50W steel the spread is 0.105 with mean at 1.155.

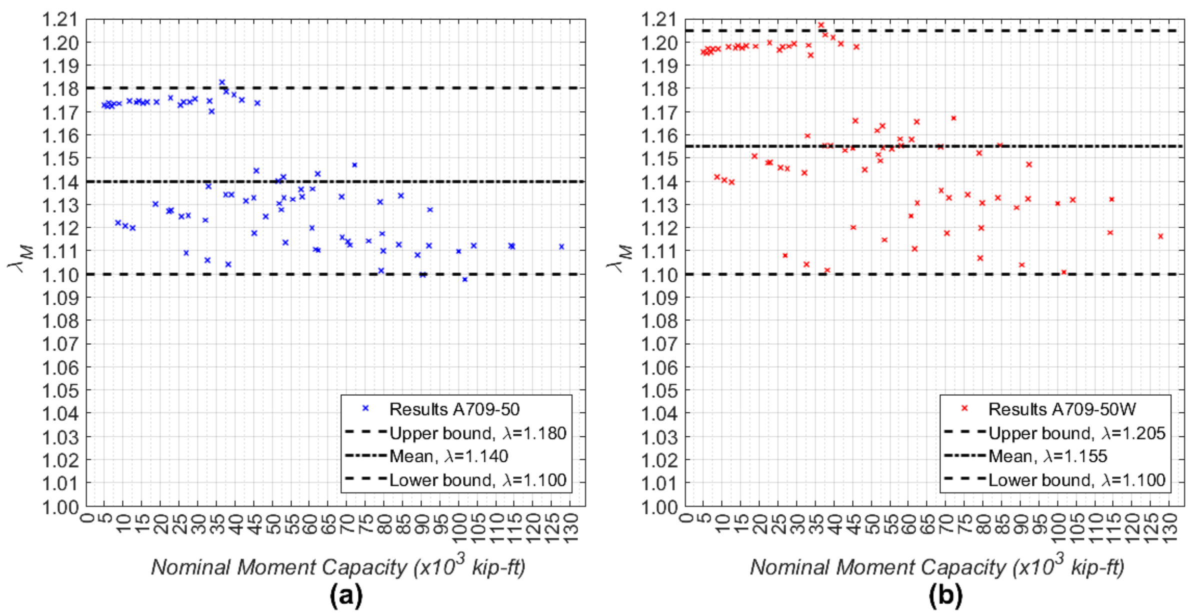


Fig. 5-47: Bias factor, λ_M, of moment resistance for composite box girders – a) A709-50 steel, b) A709-50W steel.

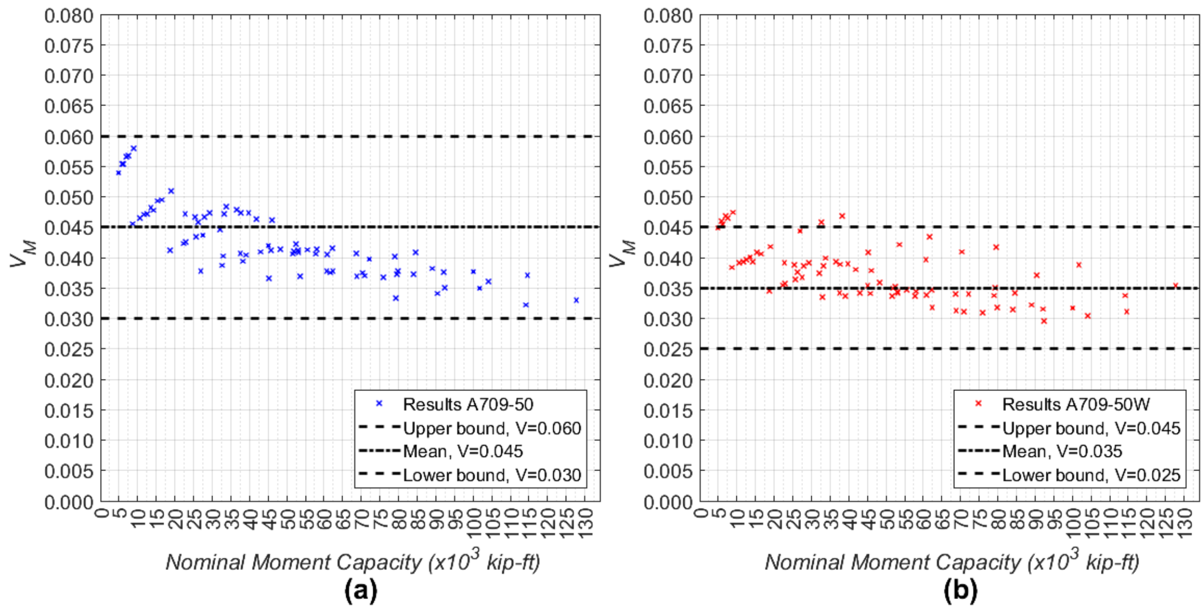


Fig. 5-48: Coefficient of variation, V_M, of plastic moment resistance for composite box girders – a) A709-50 steel, b) A709-50W steel.

Higher values of the bias factor are for sections with thinner plates. Coefficient of variation exhibits smaller spread from a mean value and has similar trend for both steel grades. Recommended is using the mean values of V=0.045 for A709-50 and V=0.035 for A709-50W.

5.6.6 Shear of rolled I-shaped girders

Regardless of composite action, for rolled I-shaped sections made of A992 steel, statistical parameters of material factor are equal to λ_V=1.155 with V_V=0.085. Fig. 5-49 shows that these statistical parameters are constant, regardless of section's nominal shear capacity. This is due to a single distribution of yield strength of the web, presented in Fig. 5-36.

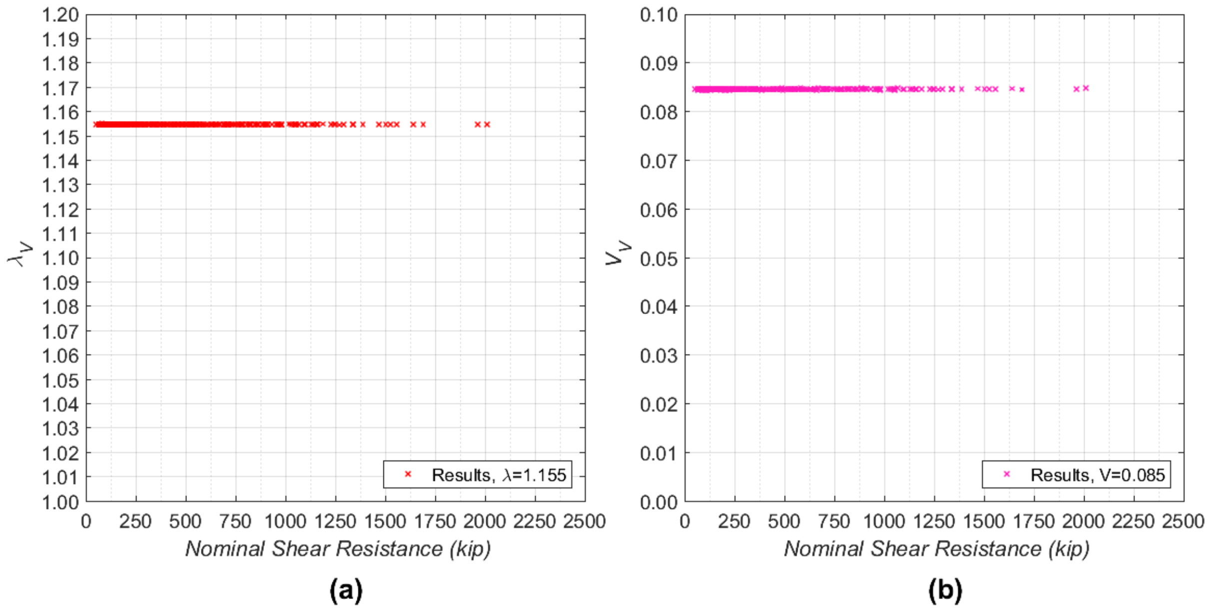


Fig. 5-49: Statistical parameters of shear resistance for W-shapes – a) Bias factor, λ_V, b) Coefficient of variation, V_V.

5.6.7 Shear of I-shaped plate girders and box girders

Shear resistance model for plate girders and box girders, regardless of composite action, is the same (see subsections 5.2.4 and 5.2.6). Presented values were obtained for compact webs, for thicknesses from 0.5 to 2.0 inches, for all four steel grades. Bias factor is plotted against considered web thickness in Fig. 5-50 and Fig. 5-51. Coefficient variation is shown in Fig. 5-52 and Fig. 5-53.

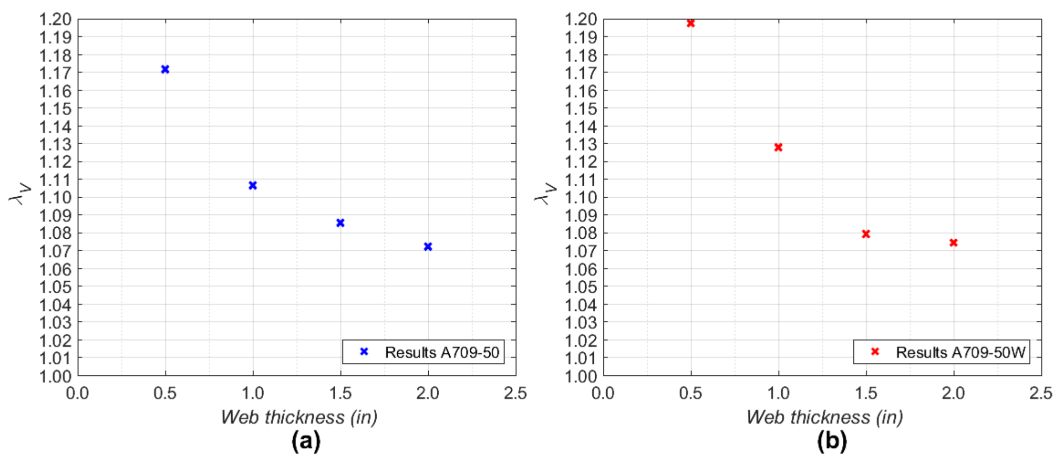


Fig. 5-50: Shear resistance bias factor, λ_V, for compact webs – a) A709-50, b) A709-50W.

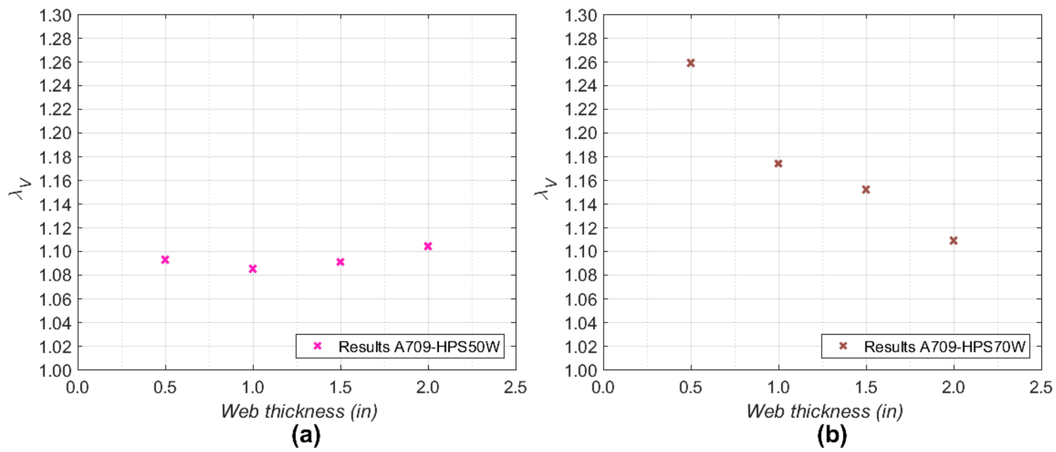


Fig. 5-51: Shear resistance bias factor, λ_V, for compact webs – a) A709-HPS50W, b) A709-HPS70W.

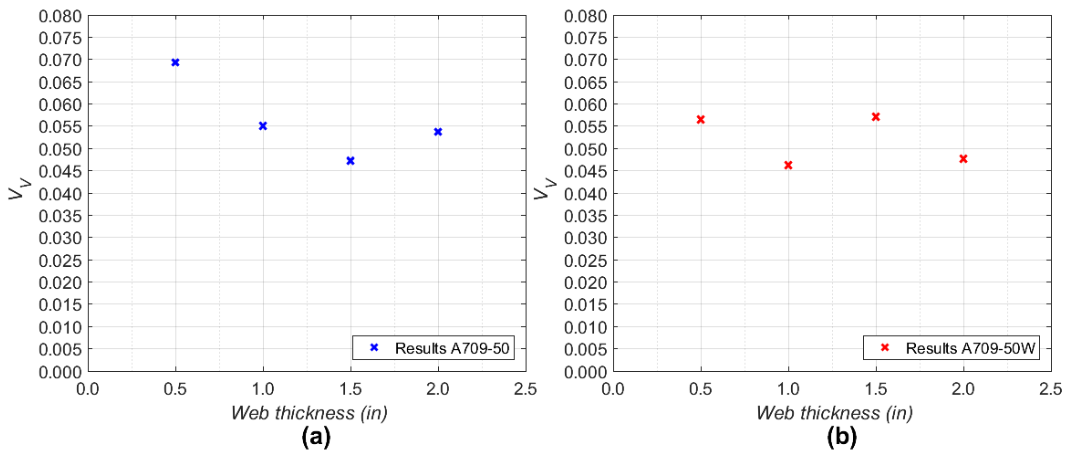


Fig. 5-52: Shear resistance coefficient of variation, V_V, for compact webs – a) A709-50, b) A709-50W.

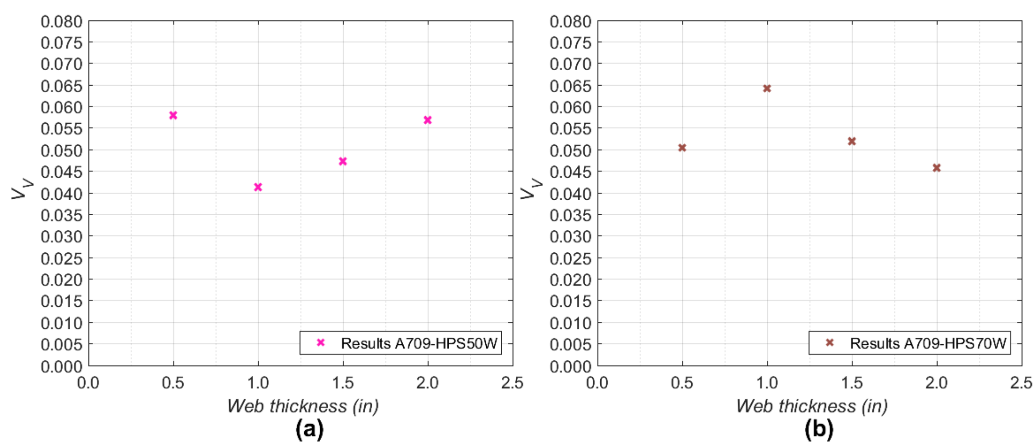


Fig. 5-53: Shear resistance coefficient of variation, V_V, for compact webs – a) A709-HPS50W, b) A709-HPS70W.

Values presented in figures above correspond directly do yield strength distributions of the considered thickness of the steel grade considered. For ease of presentation, resulting statistical parameters are shown in Table 5-20.

Table 5-20. Statistical parameters of shear resistance for A709 plates.

Steel grade	A709-50				A709-50W				A709-HPS50W				A709-HPS70W			
Plate thickness	0.5	1.0	1.5	2.0	0.5	1.0	1.5	2.0	0.5	1.0	1.5	2.0	0.5	1.0	1.5	2.0
λ_V	1.170	1.100	1.085	1.070	1.200	1.125	1.080	1.080	1.090	1.085	1.090	1.100	1.260	1.170	1.150	1.110
V_V	0.070	0.055	0.050	0.050	0.055	0.045	0.060	0.050	0.060	0.040	0.050	0.055	0.050	0.065	0.050	0.045

5.7 Fabrication and professional factors

The statistical parameters of professional factor capture the variation between resulting values of the specific analysis chosen and the actual performance of the element considered. This parameter is not easy to establish and is even more complex for equations of resistance of steel bolt connections.

The fabrication factor and its statistical parameters could be verified either from a series of measurements performed by steel manufacturer or by analysis of acceptable tolerances defined in ASTM code. In this dissertation these values are taken as established in previous work [17] and presented in Table 5-21.

Table 5-21. Statistical Parameters of Component Resistance.

Type of structure	F		P	
	λ	V	λ	V
Noncomposite steel girders				
Moment (compact)	1.00	0.05	1.02	0.06
Moment (non-compact)	1.00	0.05	1.03	0.06
Shear	1.00	0.05	1.02	0.07
Composite steel Girders				
Moment	1.00	0.05	1.05	0.06
Shear	1.00	0.05	1.02	0.07

5.8 Failure criteria

When performing reliability analysis failure criteria have to be introduced to distinguish the satisfactory performance from the unsatisfactory. For bridge systems and bridge elements these criteria refer to limit states that are evaluated during the design. In this dissertation two failure criteria are investigated, full plasticization of a noncomposite steel section and concrete deck crushing for composite sections. Both resistance models described in sections 5.2 and 5.3, are associated with the ultimate limit state of concrete crushing. For shear resistance, failure is defined as exceedance of the shear capacity defined in section 5.2.

Chapter 6: Reliability analysis for steel bridge girders

This chapter is intended to present resistance distributions and the results of reliability analysis for all the structural types of bridge girders considered. Resistance distributions as well as load distributions are crucial in evaluation of design point and calculating reliability indices accurately (refer to section 3.2.3).

6.1 Distribution of resistance

6.1.1 Flexural resistance of noncomposite rolled I-shaped girders

Distribution of resistance can be plotted from results of simulations for all 250 analyzed W-shapes (see section 5.1). To illustrate distributions for all the sections analyzed resistance ratios are plotted in Fig. 6-1. Resistance ratio is moment resistance of a section divided by its nominal value, R/R_N. For all sections analyzed a clear uniformity is observed in the lower tail of CDFs. This is due to uniform material model of A992 steel for all the sections. Minimum resistance ratio values range from 0.96 to 0.97 with mean of 0.967, which proves consistency of simulated sections. There is a clear uniformity of the plots (Fig. 6-1) for z values less than -1. Although the upper tail of resistance distributions does not impact the reliability, it is worth mentioning that diversification visible in Fig. 6-1 comes from difference in shape dimensions and resulting plastic forces.

Since the bottom tail of distribution determines location of the design point and associated reliability index, the reliability analysis for W-shapes can be performed on any individual distribution and will return the same value of reliability index.

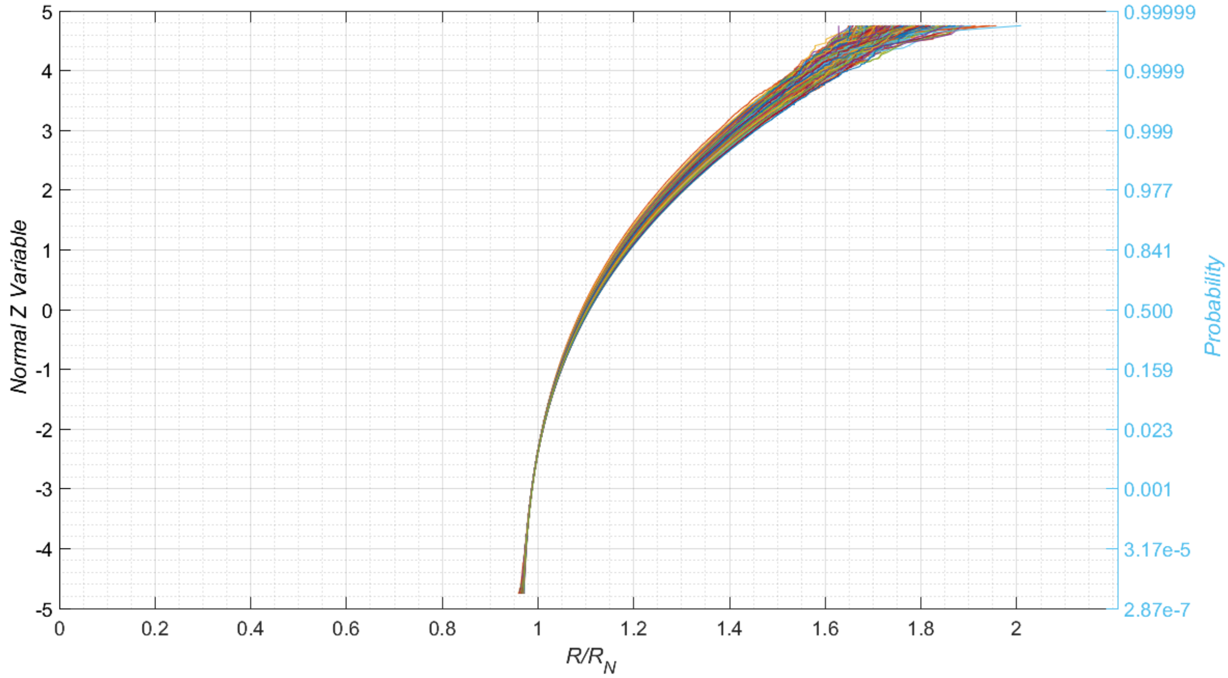


Fig. 6-1: CDFs of flexural R/R_N for all noncomposite I-rolled girders analyzed.

6.1.2 Flexural resistance of noncomposite I-shaped plate girders

Similarly as for noncomposite W-shapes, CDFs of resistance ratios are plotted for all the noncomposite plate girder sections analyzed made of grade 50 and 50W steel (Fig. 6-2). Lower tail of R/R_N ratio distributions is not as consistent for all the shapes as it is for noncomposite W-shapes. With minimum values of R/R_N ranging from 0.960 to 0.985 and mean of 0.974 for A709-50 steel and ranging from 0.978 to 1.014 and mean of 0.992 for A709-50W steel the difference is not of a great significance despite diverse material models per rounded thickness. What is also clearly visible is larger spread of bottom tails of resistance ratio distributions for sections made of grade 50W steel.

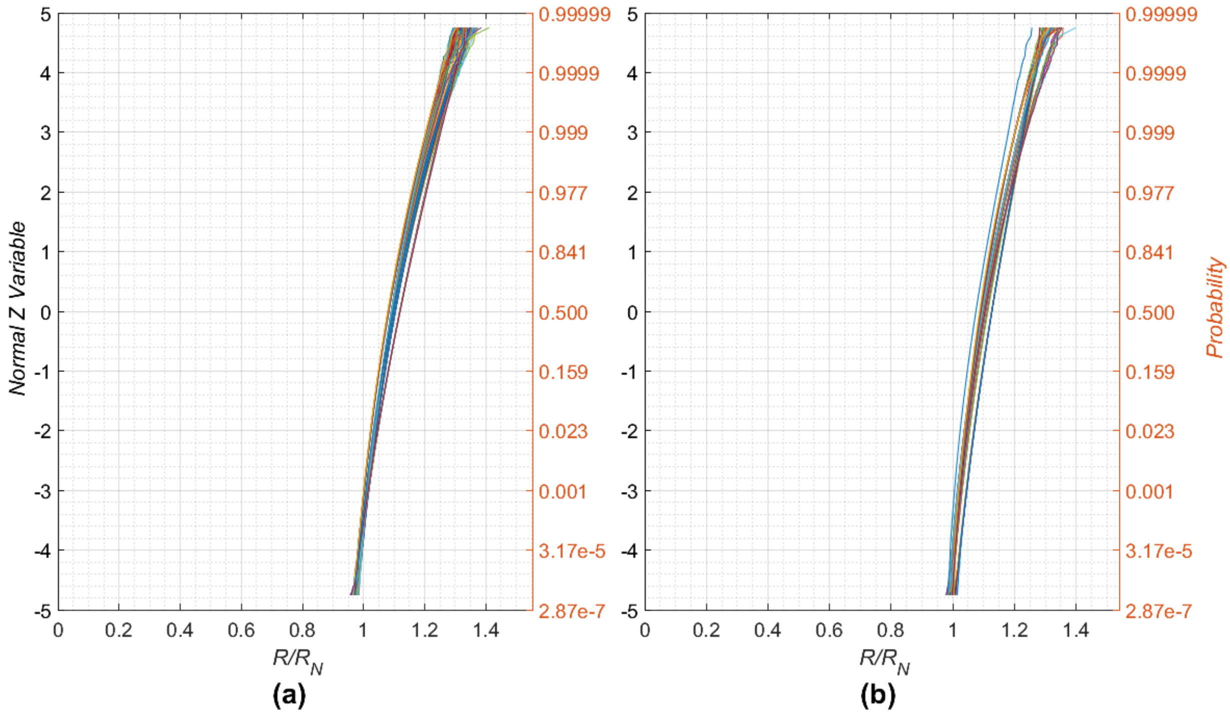


Fig. 6-2: CDFs of R/R_N for all noncomposite I-shaped plate girders analyzed: (a) A709-50, (b) A709-50W.

6.1.3 Flexural resistance of composite rolled I-shaped girders

Resistance ratio, R/R_N, distributions shown in Fig. 6-3 are for composite girders made of W-shapes and exhibit wider variation at the bottom tails. Minimum values of R/R_N ratios range from 0.930 to 0.994 with mean of 0.973, which suggests using a distribution of the lowest value for conservative final reliability analysis. This spread of distributions in the lower tail areas corresponding to z values of -2 and lower, is a consequence of analyzed combinations of section dimensions and diverse yield strength used simulations that results in a shift of location of PNA. Such low resistance ratios occur for a particular simulation with higher tension flange stress and lower compressive strength of concrete. Fig. 6-4 to Fig. 6-7 show the impact of various girder spacing for a selected steel section as well as the impact of different concrete strengths. Visible differences in R/R_N ratios are negligible and it is assumed that the distribution remains consistent.

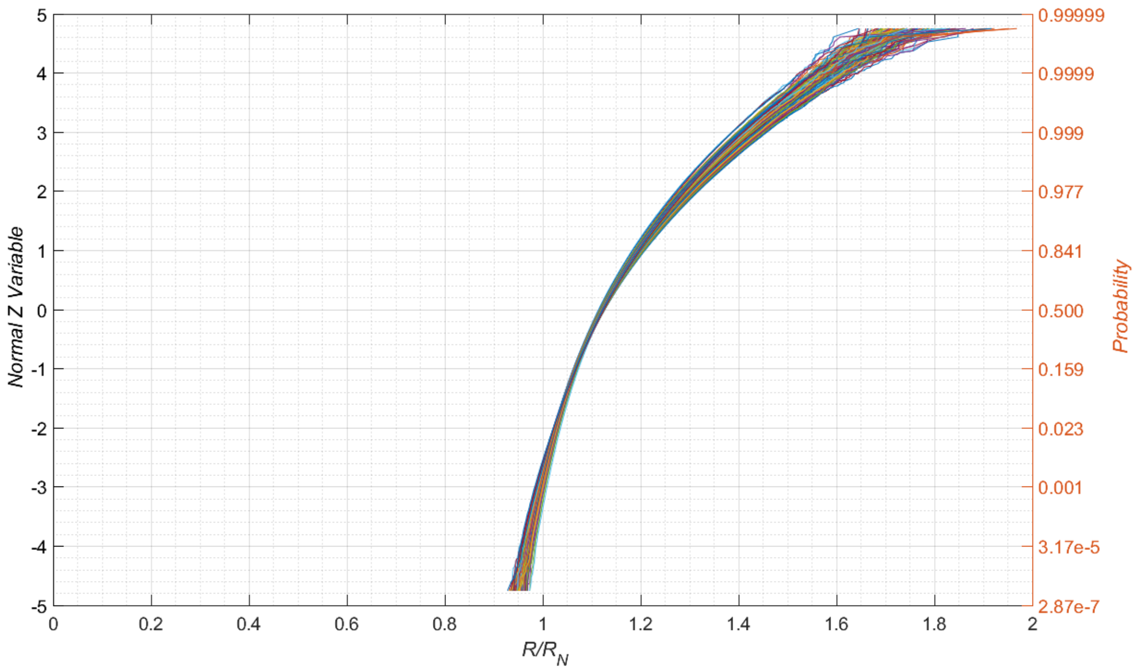


Fig. 6-3: CDFs of R/R_N for composite rolled I-shaped girders with f'c=4000psi.

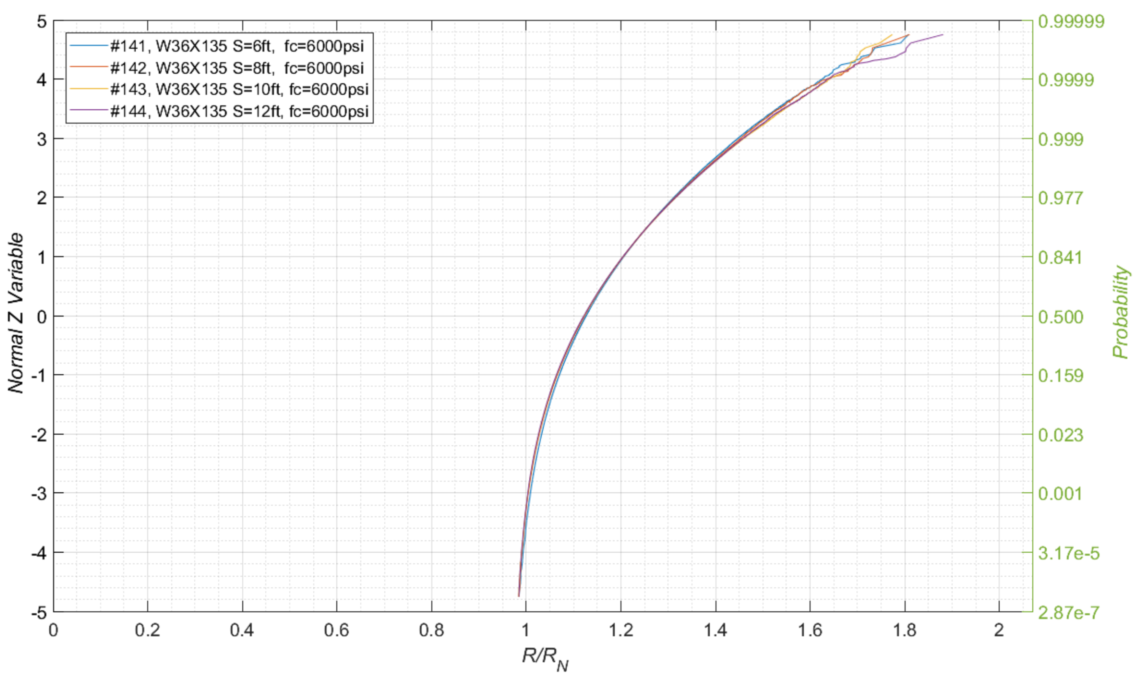


Fig. 6-4: CDFs of R/R_N for composite rolled I-shaped W36x135 with f'c=6000psi.

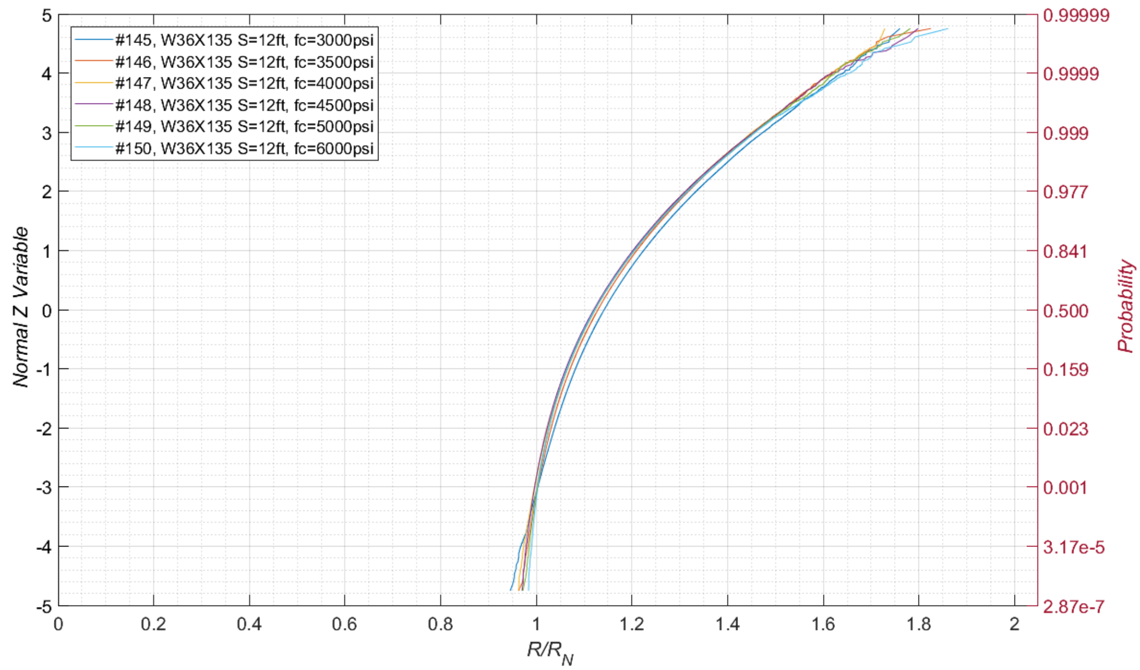


Fig. 6-5: CDFs of R/R$_N$ for composite rolled I-shaped W36x135 with S=12ft.

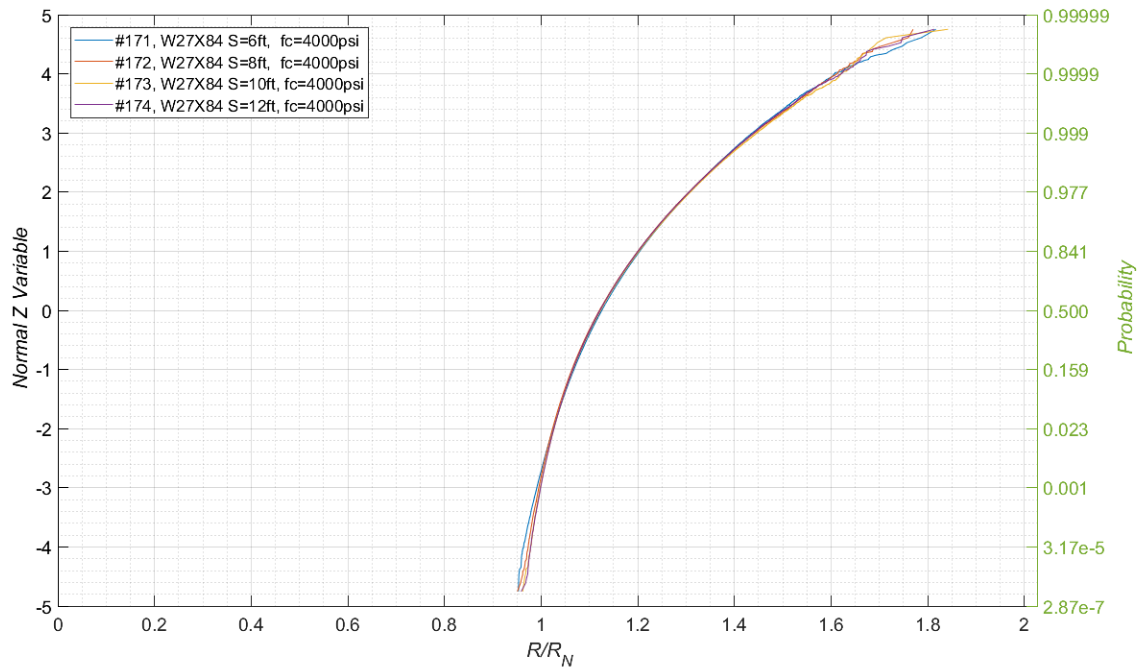


Fig. 6-6: CDFs of R/R$_N$ for composite rolled I-shaped W27x84 with f'c=4000psi.

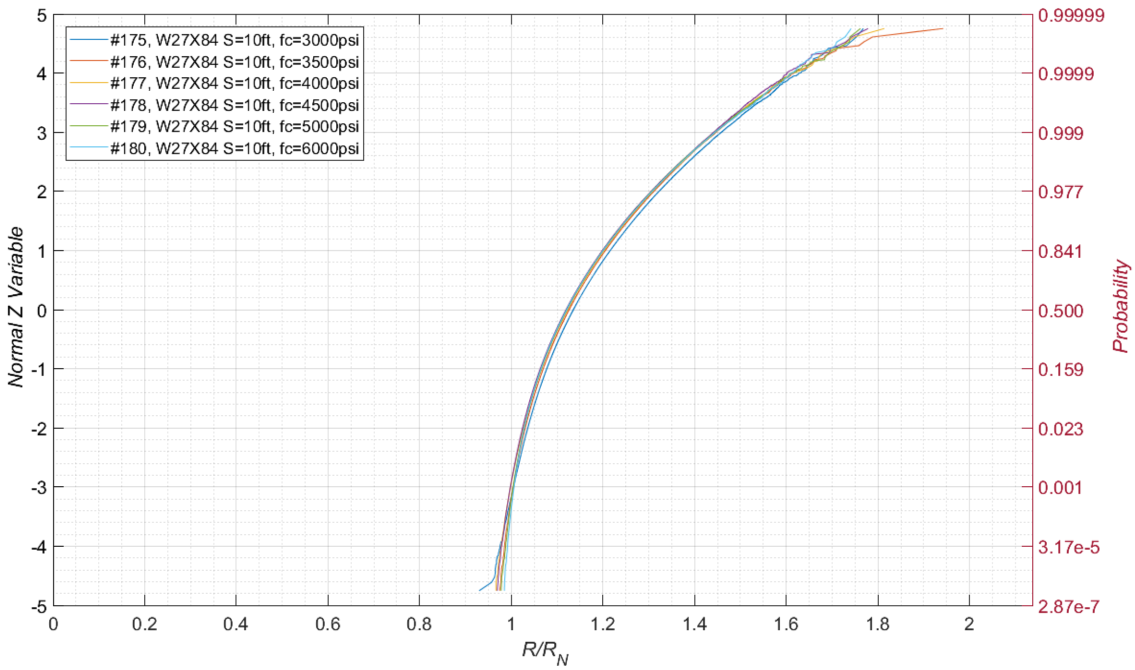


Fig. 6-7: CDFs of R/R_N for composite rolled I-shaped W27x84 with S=10ft.

6.1.4 Flexural resistance of composite I-shaped plate girders

Similarly, as for composite W-shapes, CDFs of resistance ratios are plotted for all the composite plate girder sections analyzed made of grade 50 and 50W steel (Fig. 6-8). The spread of the lower tail distributions of R/R_N ratio is not as high as for composite W-shape sections. With minimum values of R/R_N ranging from 0.934 to 0.988 and mean of 0.995 for A709-50 steel sections, and from 0.962 to 1.032 and mean of 0.994 for A709-50W steel the spread of resistance ratio is not significant. The variation of these values comes from diverse material models per rounded thickness for both steels. Because of visible intersections of the distributions shown in Fig. 6-8, all the composite plate girders must be considered in the reliability analysis.

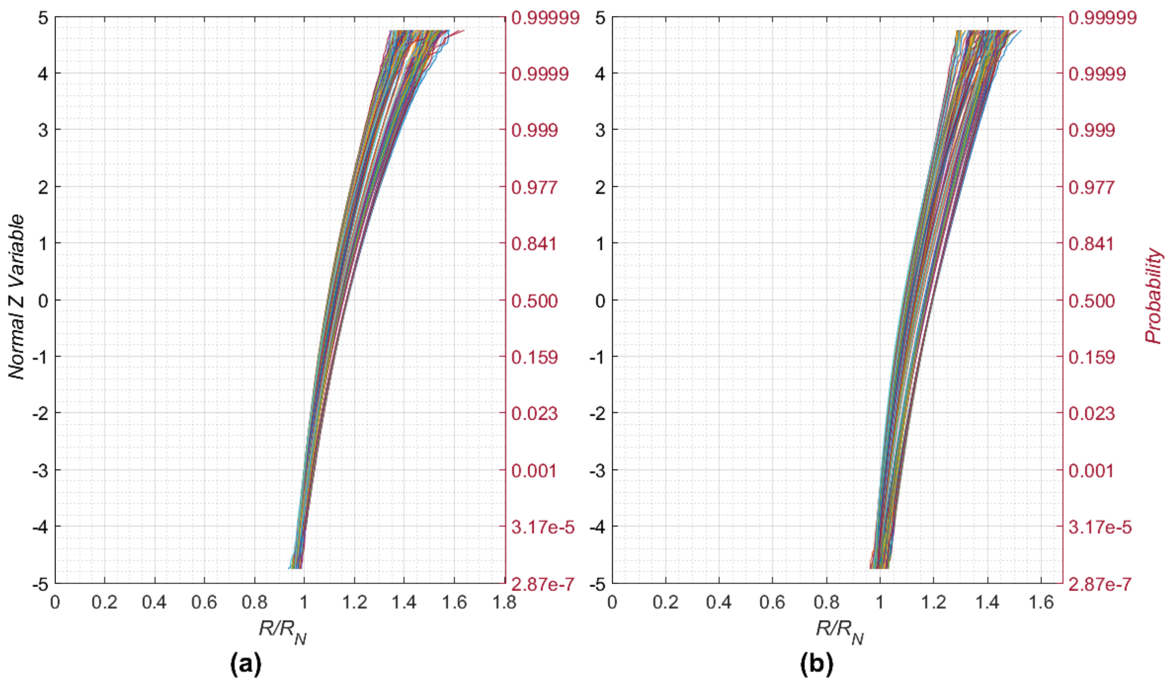


Fig. 6-8: CDFs of R/R_N for all composite I-shaped plate girders analyzed: (a) A709-50, (b) A709-50W.

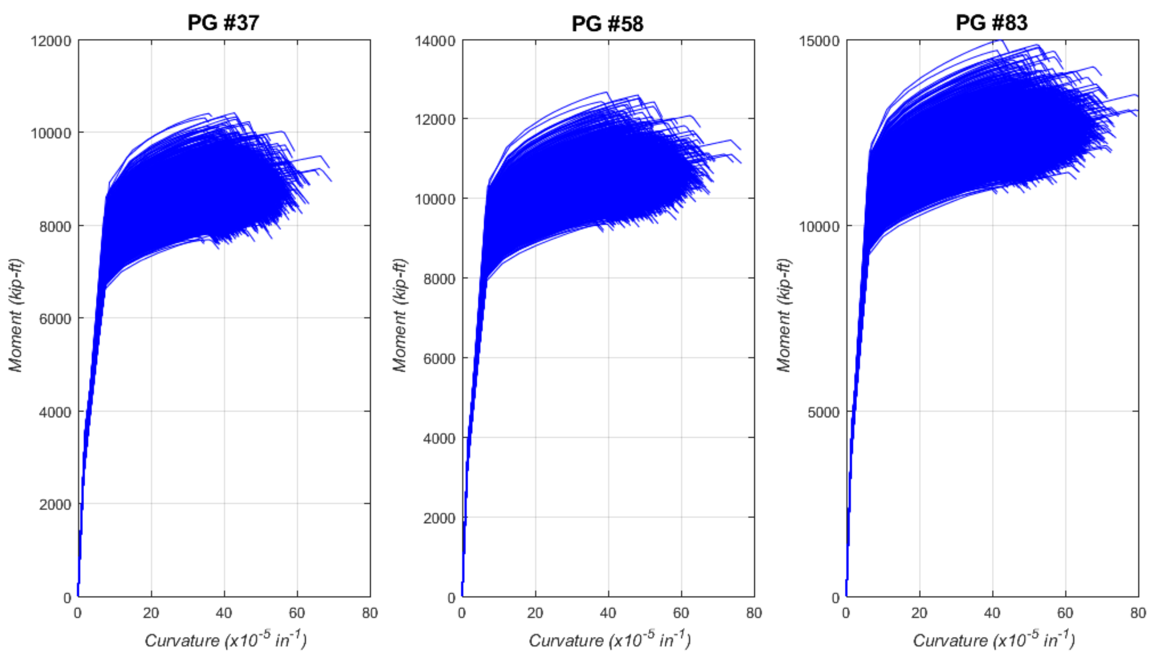


Fig. 6-9: Moment-Curvature plots for selected composite I-shaped plate girder made of A709-HPS50W and L=120ft.

Analysis of flexural resistance for A709-HPS50W steel was performed on 10,000 simulations (see subsection 5.5.2). Fig. 6-9 presents Moment-Curvature plots for all 10,000 simulations for three A709-HPS50W plate girders spanning over 120 feet. These three girders have webs of 60, 66, 72 inches of depth that are very ductile. First yield occurs at curvatures of 5-8 $x10^{-5}$ in^{-1} and fail at curvatures over 35 $x10^{-5}$ in^{-1}. Following Fig. 6-10 through Fig. 6-12 present comparison of CDFs for all three girders made of grades 50, 50W, and HPS50W steel with HPS50W simulated with traditional rigid plastic analysis and analytical nonlinear model. The differences are highlighted in Table 6-1. Because of the high ductility of these three girders, the ratio of mean resistances obtained through analytical model and rigid plastic analysis is more than 1.06. This is a significant gain of the mean resistance of the section considered. What is also observed is with larger girder spacing this ratio increases. This is because the PNA is being shifted up with increasing concrete deck width. Comparing all three distributions in Fig. 6-10 through Fig. 6-12, girder made of HPS50W has the lowest capacity throughout the whole CDF, when the immediate strain hardening of HPS is taken into account (AM curve) the resistance of HPS50W exceeds resistance of other grades.

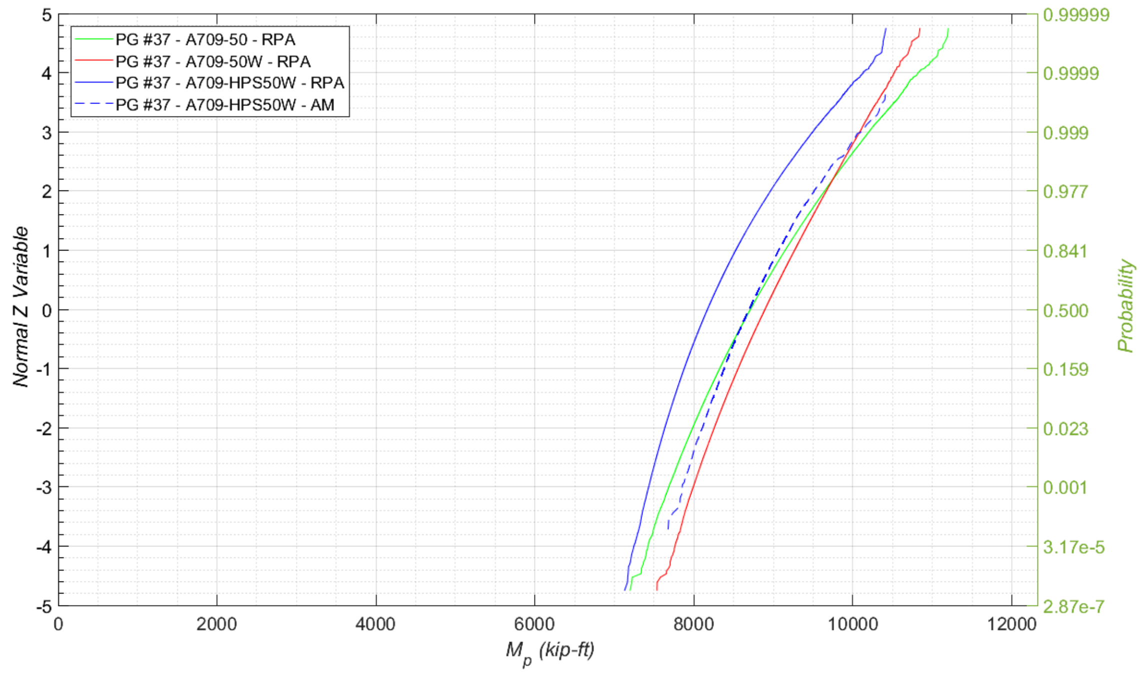


Fig. 6-10: Comparison of flexural resistance CDFs for composite I-shaped plate girder #37 with S=8ft, L=120ft.

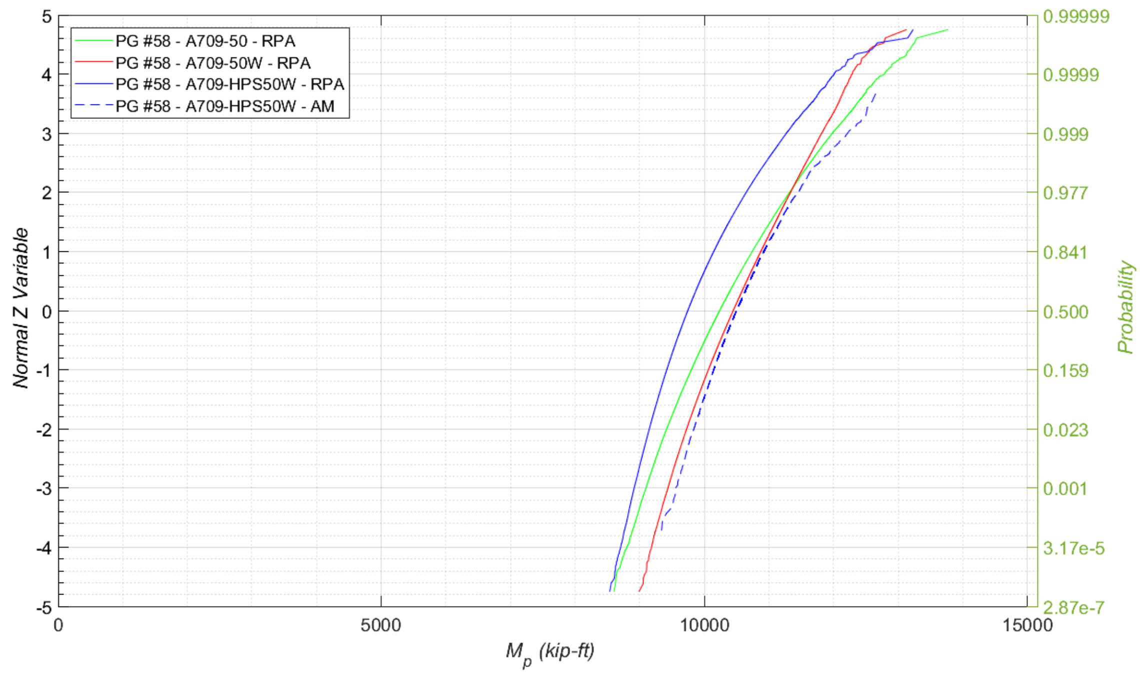


Fig. 6-11: Comparison of flexural resistance CDFs for composite I-shaped plate girder #58 with S=10ft, L=120ft.

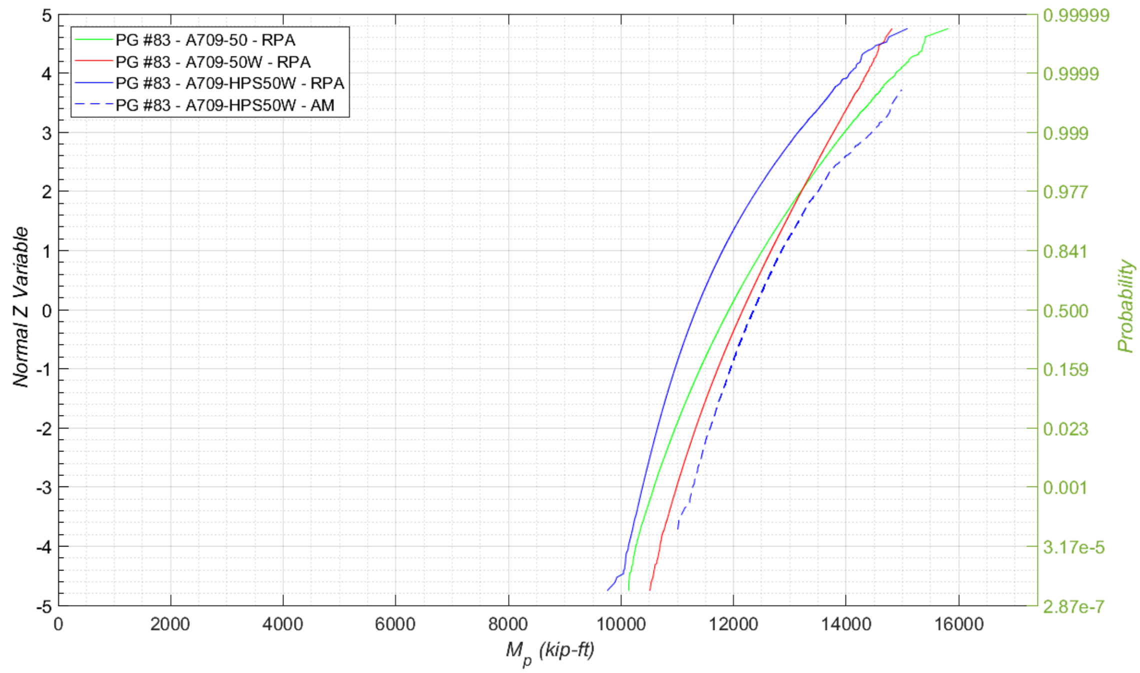


Fig. 6-12: Comparison of flexural resistance CDFs for composite I-shaped plate girder #83 with S=12ft, L=120ft.

In Fig. 6-13 Moment-Curvature plots for 10,000 simulations performed for three A709-HPS50W plate girders spanning over 200 feet are shown. These three girders have web depths of 96, 100, 108 inches and therefore are less ductile than girders design to cover 120 feet span length. First yield occurs at curvatures of 2.5-3.5 $x10^{-5}$ in^{-1} and fail at curvatures between 20-48 $x10^{-5}$ in^{-1}. Following figures (Fig. 6-14 - Fig. 6-16) show CDFs for all three girders made of grades 50, 50W, and HPS50W steel, with HPS50W simulated with traditional rigid plastic analysis and analytical nonlinear model. The differences are highlighted in Table 6-1. Because of average ductility of these three girders, the ratio of mean resistances obtained through analytical model and rigid plastic analysis is between 1.05 and 1.08. This is considered as substantial gain of the mean resistance of the sections considered. Similarly as for the three HPS50W girders designed for span length of 120 feet, the girders designed for span length of 200 feet analyzed with AM perform better than other steel grades.

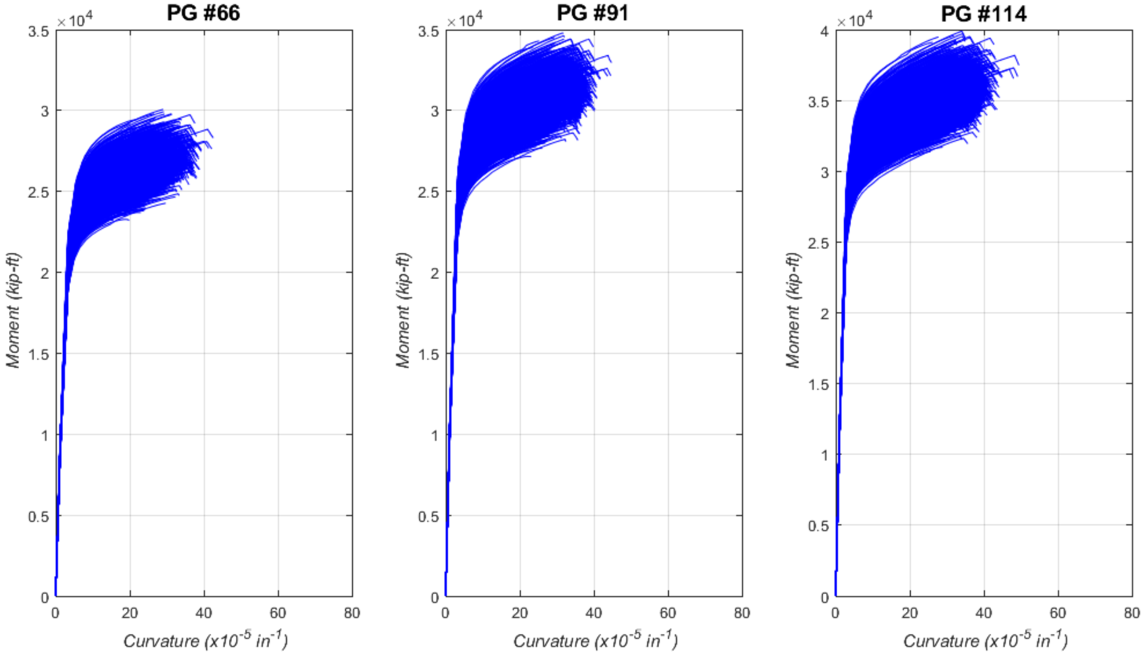


Fig. 6-13: Moment-Curvature plots for selected composite I-shaped plate girder made of A709-HPS50W and L=200ft.

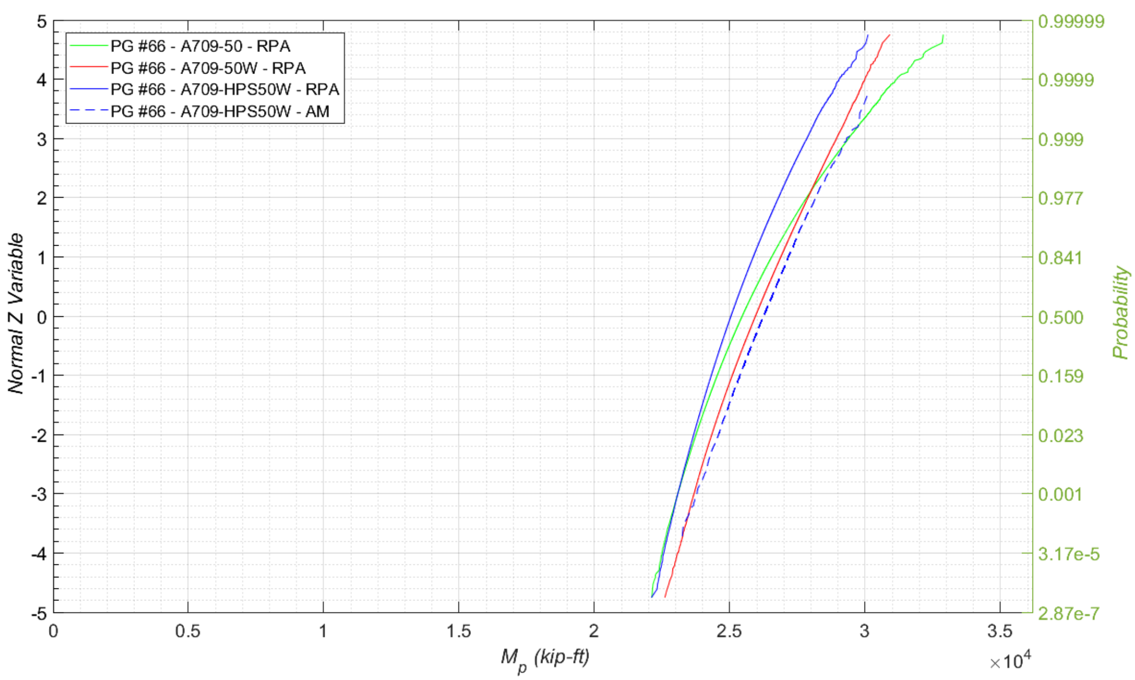


Fig. 6-14: Comparison of flexural resistance CDFs for composite I-shaped plate girder #66 with S=10ft, L=200ft.

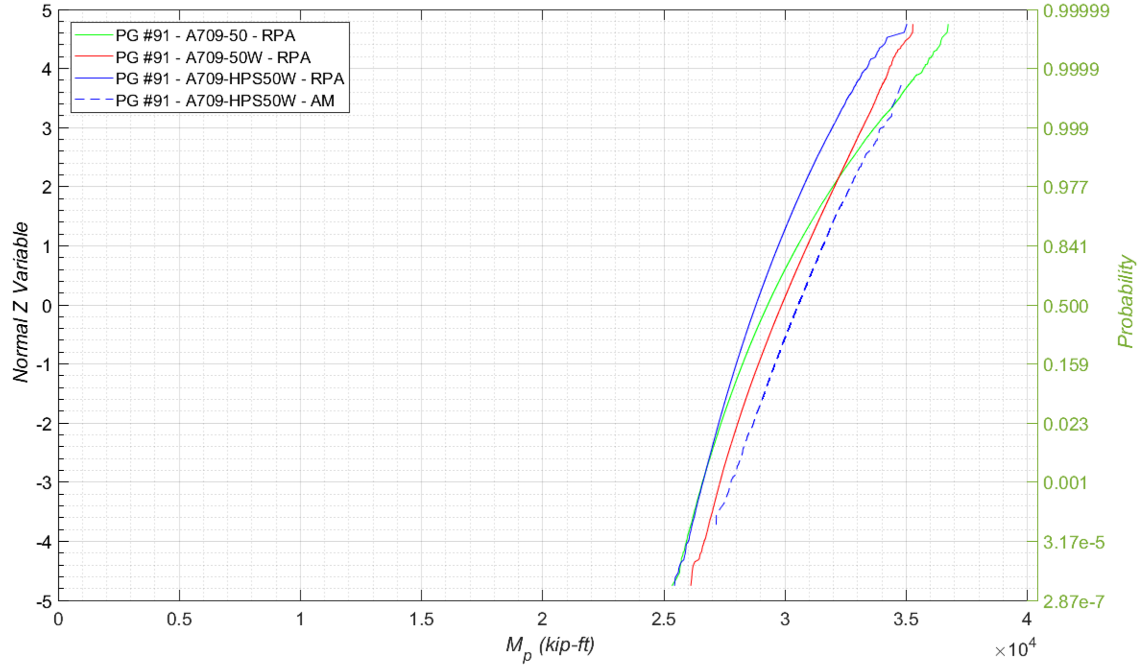


Fig. 6-15: Comparison of flexural resistance CDFs for composite I-shaped plate girder #91 with S=12ft, L=200ft.

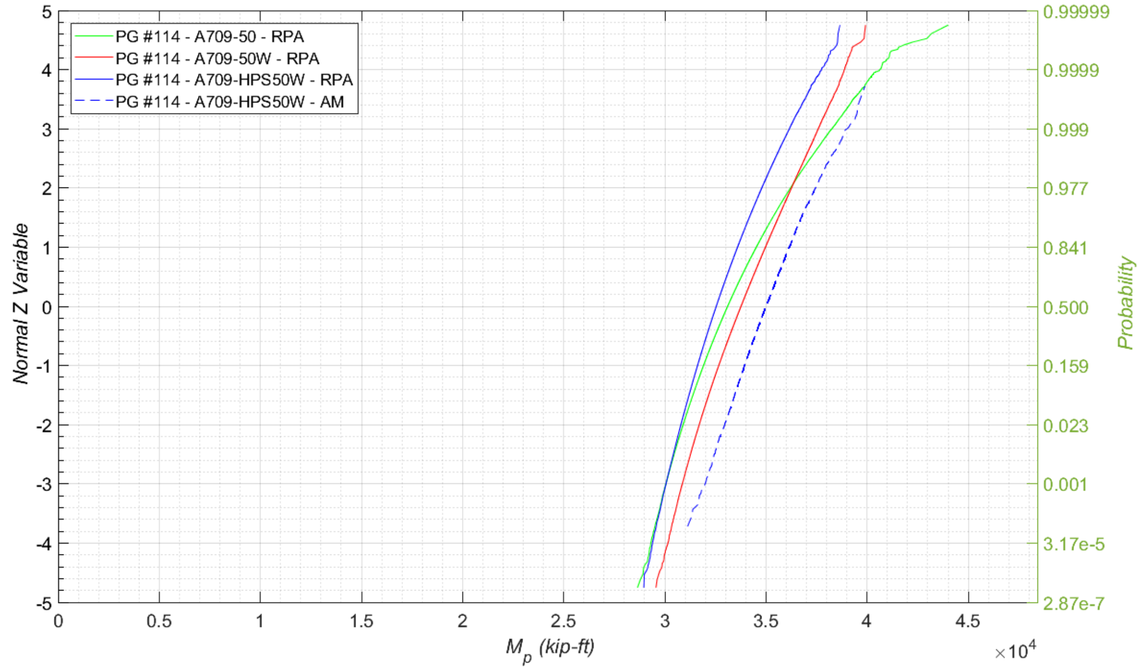


Fig. 6-16: Comparison of flexural resistance CDFs for composite I-shaped plate girder #114 with S=14ft, L=200ft.

Moment-Curvature plots for the composite plate girders designed for the longest span length of 300 feet are presented in Fig. 6-17. It is clearly visible that these sections are least ductile, with first yield point at curvature values between 3.0-3.5 x10^{-5} in^{-1}, and concrete crushing at curvatures between 8-22 x10^{-5} in^{-1}. Because of such small ductility the ratio of mean resistances obtained through AM and RPA is the least of about 1.02 (Table 6-1). Interestingly, resistance of HPS50W sections analyzed with both AM and RPA, is greater than for other steel grades considered. This is due to thicker flanges that have different yield strength distribution than thinner flanges used in girders spanning over 120 and 200 feet.

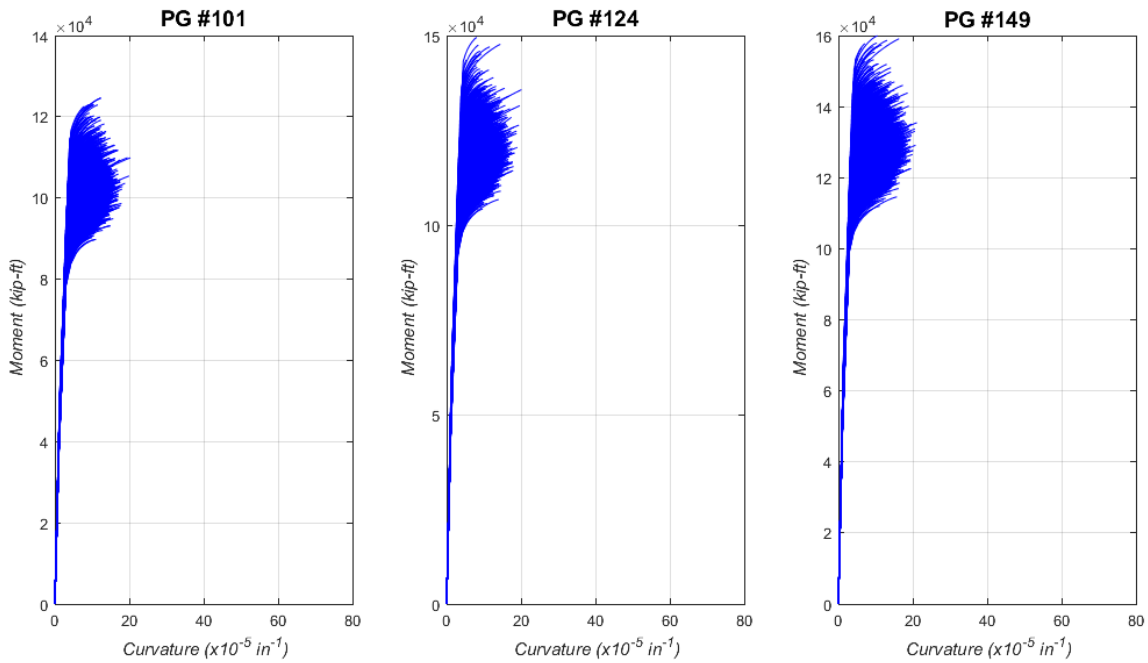


Fig. 6-17: Moment-Curvature plots for selected composite I-shaped plate girder made of A709-HPS50W and L=300ft.

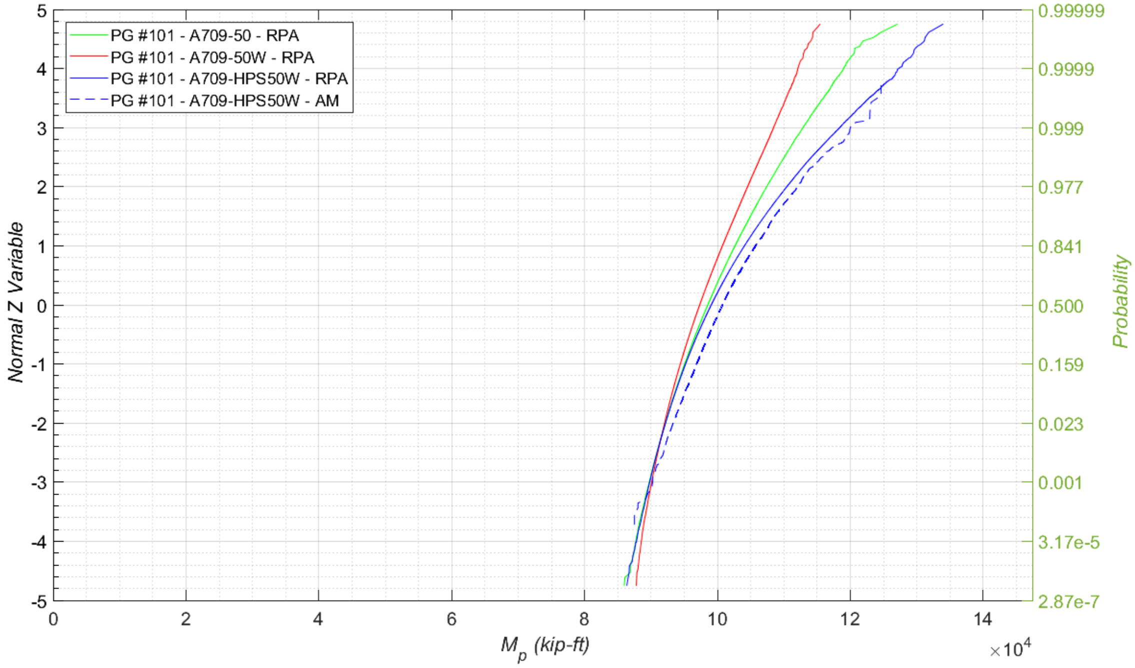


Fig. 6-18: Comparison of flexural resistance CDFs for composite I-shaped plate girder #101 with S=12ft, L=300ft.

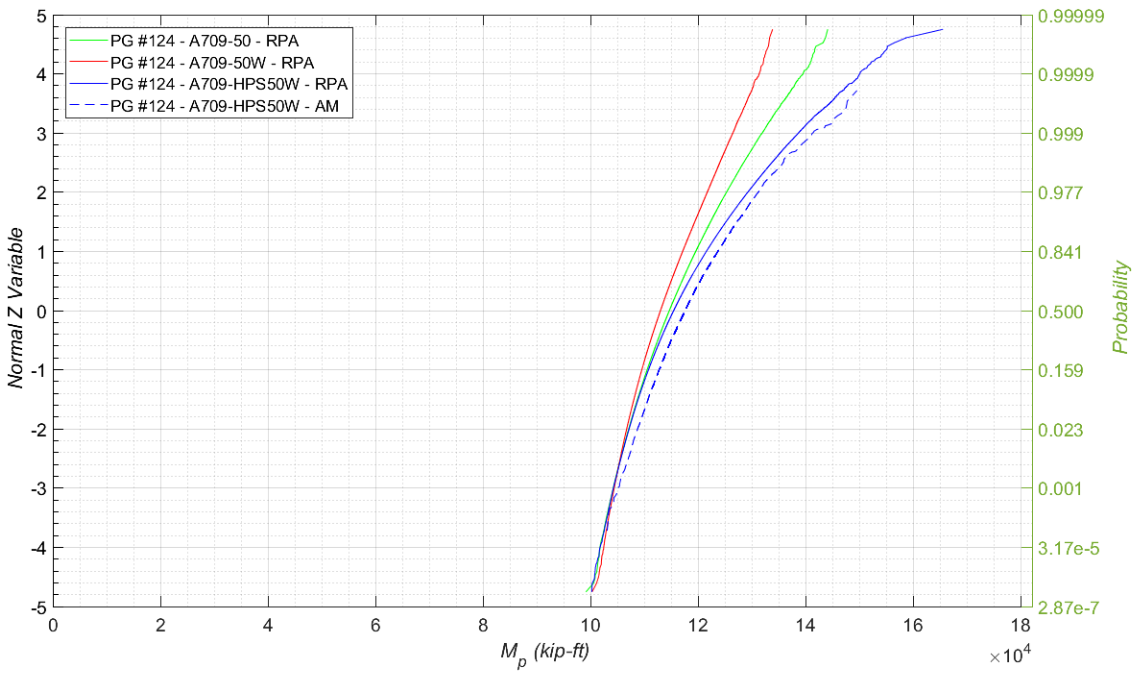


Fig. 6-19: Comparison of flexural resistance CDFs for composite I-shaped plate girder #124 with S=14ft, L=300ft.

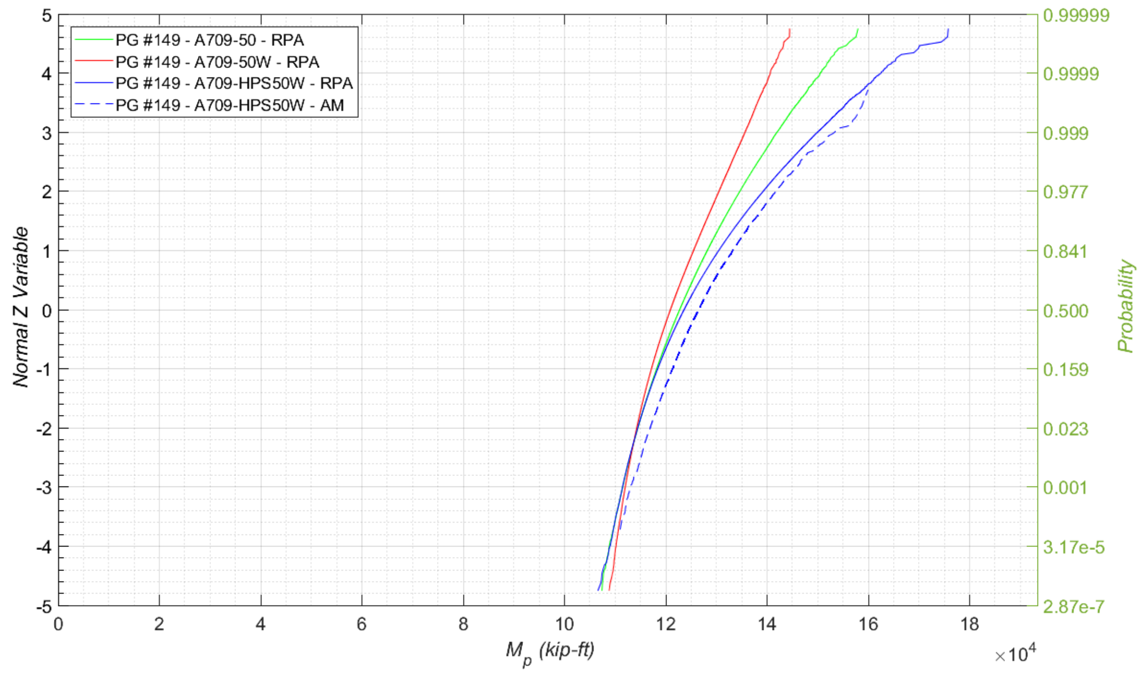


Fig. 6-20: Comparison of flexural resistance CDFs for composite I-shaped plate girder #149 with S=16ft, L=300ft.

Table 6-1. Comparison of mean flexural resistance for A709-HPS50W steel obtained with AM and RPA.

ID	37	58	83	66	91	114	101	124	149
L (ft)	120	120	120	200	200	200	300	300	300
S (ft)	8	10	12	10	12	14	12	14	16
μ_{M_AM}/μ_{M_RPA}	1.064	1.078	1.090	1.048	1.060	1.076	1.017	1.018	1.023
μ_{M_AM} (kip-ft)	8,693	10,500	12,358	26,244	30,542	34,996	100,746	117,529	126,459
μ_{M_RPA} (kip-ft)	8,169	9,744	11,334	25,042	28,801	32,539	99,064	115,426	123,601

6.1.5 Flexural resistance of composite box girders

The box girders considered, presented in subsection 5.1.5, were simulated using n=1,000,000 Monte-Carlo simulations using rigid plastic resistance model described in section 5.2.5 as made of A709-50 and A709-50W. Fig. 6-21 shows distribution of resistance ratios R/R_N for each simulated composite box girder. There is a definite consistency in the lower tails with minimum values of R/R_N ranging from 0.948 to 0.991 and mean of 0.973 for A709-50 sections, and R/R_N ranging from 0.973 to 1.035 with mean of 1.005 for A709-50W sections. Because of visible intersections and different inclinations of the distributions (Fig. 6-21), all the composite box girders must be considered in the reliability analysis.

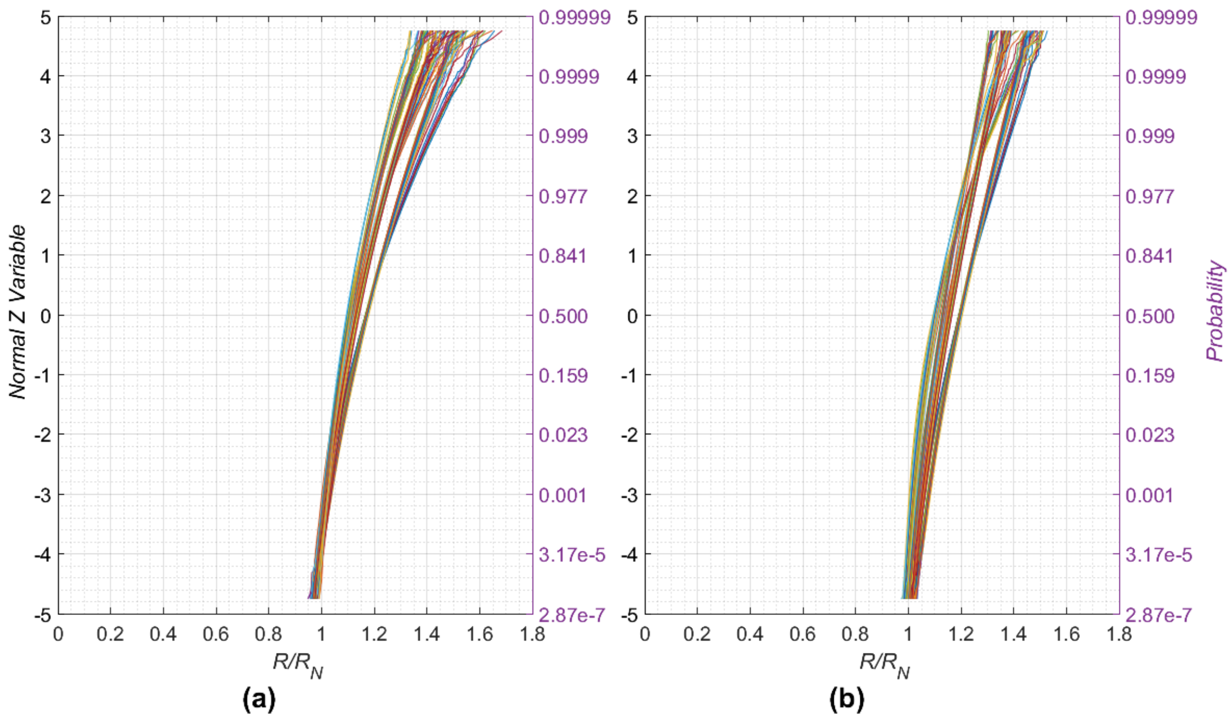


Fig. 6-21: CDFs of R/R_N for composite box girders.

6.1.6 Shear of rolled I-shaped girders

Perfect consistency of shear resistance to nominal resistance is due to homogeneous material model for A992 steel. The differences in the upper distribution tails are of no interest in reliability analysis and come from various slenderness limits that are a function of yield strength of steel, F_y (see equations 5.39 ÷ 5.41) for each simulation. The shape of the resistance distribution curve is the same as A992 web material model.

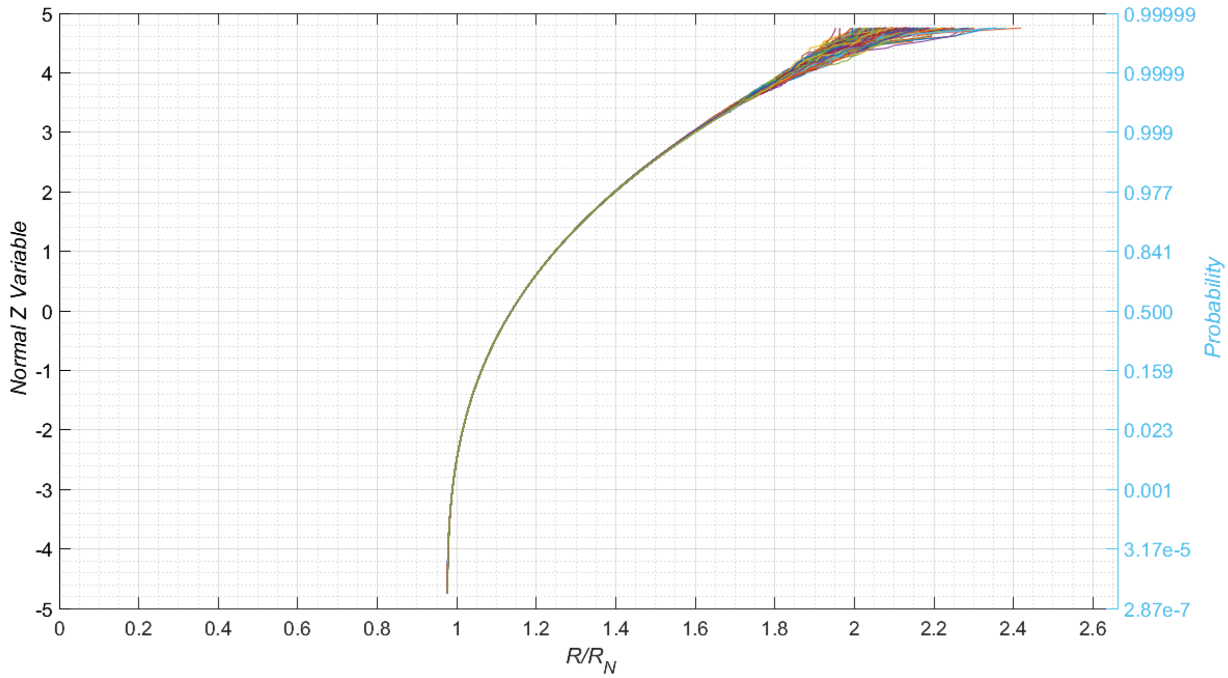


Fig. 6-22: CDFs of shear R/R_N for all noncomposite I-rolled girders analyzed.

6.1.7 Shear of plate and box girders

Shear resistance distributions have the same shape as material model curves for each thickness of each steel grade (Fig. 6-23 and Fig. 6-24). There is some distortion of the upper tales of R/R_N distribution which is due to exceedance of compact slenderness limit and reduction of shear resistance by shear strength coefficient C_v.

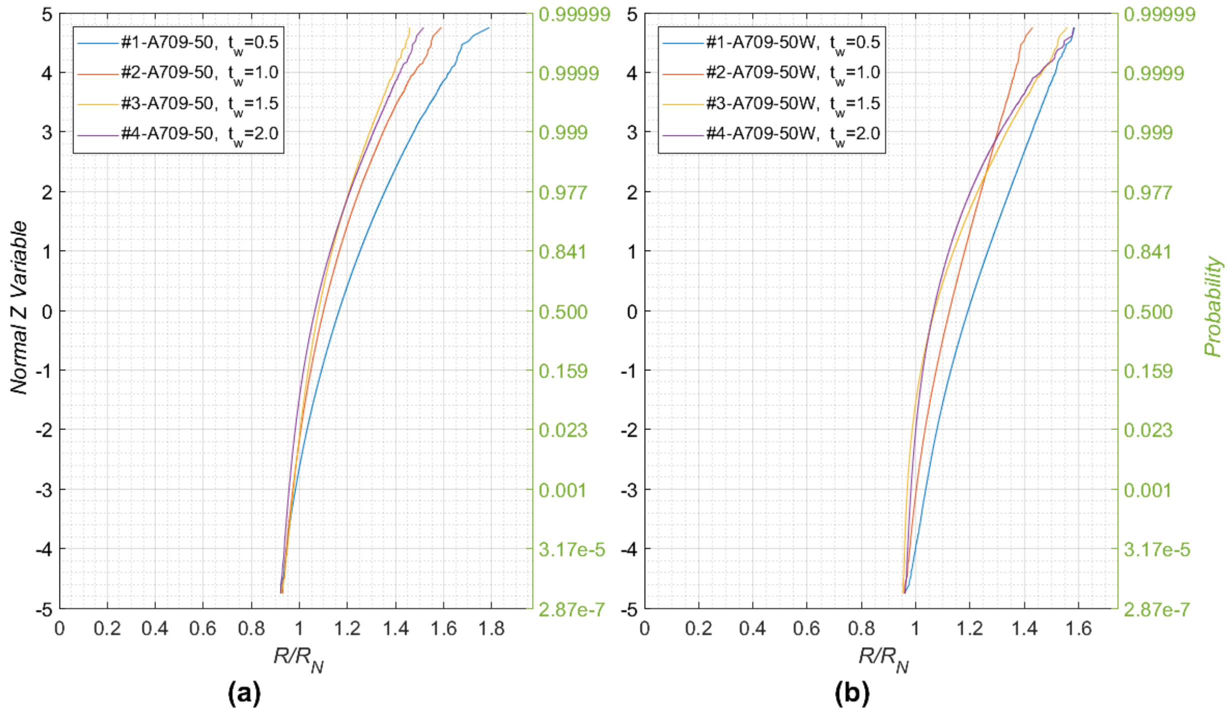


Fig. 6-23: CDFs of shear R/R_N for web plates made of: (a) A709-50, (b) A709-50W.

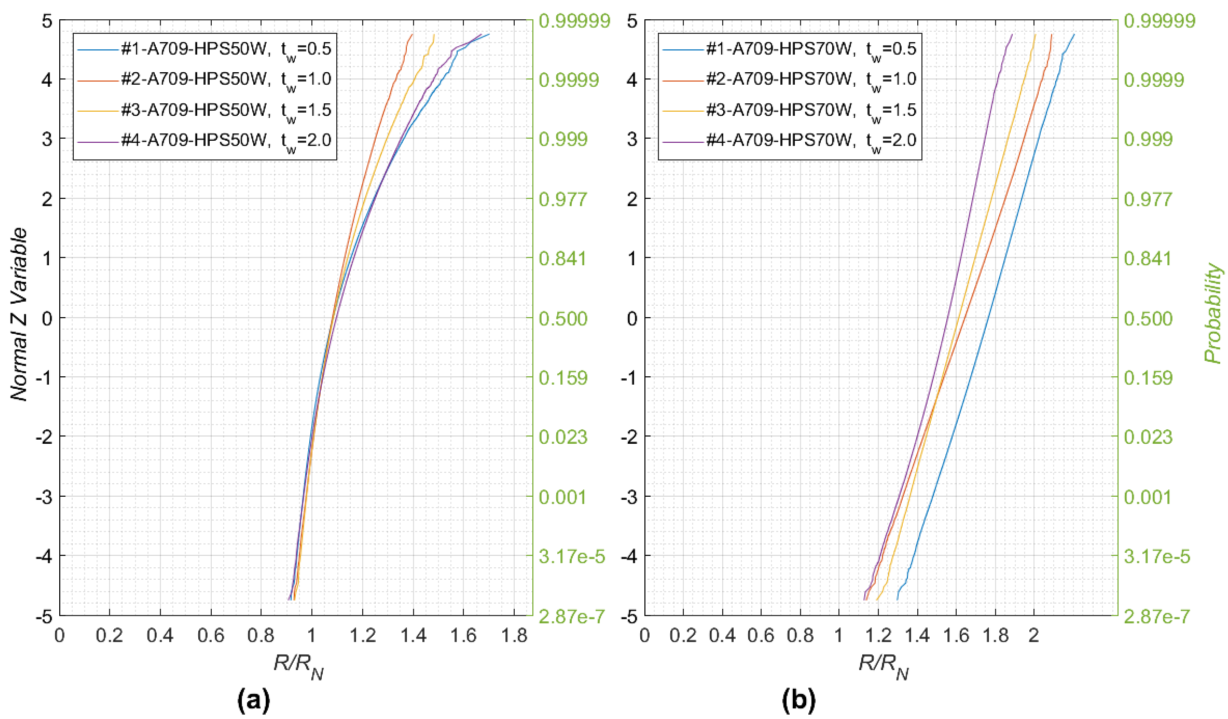


Fig. 6-24: CDFs of shear R/R_N for web plates made of: (a) A709-HPS50W, (b) A709-HPS70W.

6.2 Distribution of load

Distribution of load is normal, as each load component has normal distribution (see chapter 4). For normally distributed load, three elements must be known: nominal value, bias factor and coefficient of variation. Statistical parameters of load components were earlier presented in chapter 4. Nominal values of considered loads, which are dead load DC, wearing surface DW, and vehicular live load LL, must be determined from the nominal resistance, R. For just one equation with three unknowns, two additional equations must be described to allow for solving each unknown. To simplify the solution and to eliminate two unknowns, dead-to-total load ratio, D/(D+L), is introduced.

Traditionally, a whole spectrum of D/(D+L) ratios ranging from 0 to 1, had been considered in reliability analysis providing reliability indices, β, corresponding to D/(D+L) ratio. Such approach, after excluding D/(D+L)=0 that physically does not exist, is correct for reliability analysis of elements that exhibit wide spectrum of live load that is difficult to capture, i.e. in buildings. Additionally, since dead load consists of two components, ratio of DW/DC needs to be known. The ratio of DW/(DC+DW) was investigated for all the girders analyzed, and it was found that it ranges from 0.005 to 0.02. Since it is very low and impactless, it is assumed as a fixed value of 0.01 for all the girders of all structural types analyzed.

Since the plate girders were designed for specific dead and live loads the nominal values of load components are known, and their distributions can be evaluated. For other girder types analyzed, the nominal values of load components are unknown. Nevertheless, the nominal load components can be established using the design formula given by equation (4.2), and possible D/(D+L) ratios. This evaluation provides nominal values of load components that match the considered capacity. In mathematical notation, determination of nominal values of load components for load combination (4.2), is as follows:

$$\phi R_N = 1.25\left(\frac{D}{D+L}\right)Q\left(1-\frac{DW}{D}\right)+1.5\left(\frac{D}{D+L}\right)Q\left(\frac{DW}{D}\right)+1.75\cdot 1.33\cdot\left(1-\frac{D}{D+L}\right)Q \qquad (6.1)$$

From transformation of the above equation, nominal value of load Q can be obtained, and further individual nominal load components DC, DW and LL.

For comprehensive reliability analysis, the whole range of possible D/(D+L) ratios must be covered. Basing on the loads described in chapter 4, an investigation of all possible D/(D+L) ratios for bending moments and shear forces was performed for all the girder types. Findings of this investigation are shown in Table 6-2 and Table 6-3. Provided D/(D+L) intervals were rounded up and down to the nearest 0.05. As it can be noticed, the intervals of D/(D+L) ratios are mostly the same regardless of load effect, moment or shear force, with just a few instances of small differences.

Table 6-2. Minimum and maximum D/(D+L) ratios for each structural type due to acting bending moments.

Structural Type	Deck's effective width (ft)	Steel girder weight (lb/ft)	D/(D+L) ratio per bridge span length					
			30 ft	60 ft	90 ft	120 ft	200 ft	300 ft
I. Noncomposite rolled I-shaped girders	4÷12	12÷593	0.25÷0.40	0.35÷0.55	0.45÷0.60	0.50÷0.65	0.60÷0.75	-
II. Noncomposite I-shaped plate girders	6÷12	100÷800	-	0.40÷0.55	0.50÷0.65	0.55÷0.70	0.65÷0.75	-
III. Composite rolled I-shaped girders	6÷12	14÷256	0.25÷0.35	0.40÷0.50	0.50÷0.55	0.55÷0.60	0.65÷0.70	0.45÷0.55
IV. Composite I-shaped plate girders	6÷16	60÷1400	-	0.40÷0.65	0.50÷0.70	0.55÷0.75	0.65÷0.80	0.50÷0.70
V. Composite steel box girders.	13.8÷26.7	150÷1400	-	0.45÷0.50	0.50÷0.65	0.55÷0.70	0.60÷0.75	0.65÷0.80

Table 6-3. Minimum and maximum D/(D+L) ratios for each structural type due to acting shear forces.

Structural Type	Deck's effective width (ft)	Steel girder weight (lb/ft)	D/(D+L) ratio per bridge span length					
			30 ft	60 ft	90 ft	120 ft	200 ft	300 ft
I. Noncomposite rolled I-shaped girders	4÷12	12÷593	0.25÷0.40	0.35÷0.55	0.45÷0.60	0.50÷0.70	0.60÷0.75	-
II. Noncomposite I-shaped plate girders	6÷12	100÷800	-	0.40÷0.55	0.50÷0.65	0.55÷0.70	0.65÷0.80	-
III. Composite rolled I-shaped girders	6÷12	14÷256	0.25÷0.35	0.40÷0.50	0.45÷0.55	0.55÷0.60	0.60÷0.70	0.45÷0.55
IV. Composite I-shaped plate girders	6÷16	60÷1400	-	0.40÷0.65	0.50÷0.70	0.55÷0.75	0.65÷0.85	0.45÷0.70
V. Composite steel box girders.	13÷27	150÷1400	-	0.40÷0.60	0.50÷0.65	0.50÷0.70	0.60÷0.75	0.65÷0.80

For both, noncomposite and composite plate girders all possible D/(D+L) ratios are analyzed since these sections were designed for specific span lengths and girder spacings. The reliability analysis for structural types I, III, and V is performed for minimum and maximum D/(D+L) ratio per span length as shown in tables above.

6.3 Reliability analysis

To perform the reliability analysis, the author developed a MATLAB script that plots distributions of both resistance and load, finds location of design point utilizing iterative Rackwitz-Fisseler procedure (see section 3.2.3) and calculates resulting reliability index, β. The script reads the resistance curve for a specified girder, it establishes the load distribution based on a nominal value of resistance (as described in section 6.2) and using iterative Rackwitz-Fisseler procedure obtains the location of design point and reliability index. The Rackwitz-Fisseler procedure is executed in following steps:

1. Guess the initial value of design point and find equation of tangents to F_R and F_Q at the design point
2. Read equivalent mean values and standard deviations from the tangents to F_R and F_Q
3. Calculate reliability index using equivalent mean values and standard deviations using equation (3.6)
4. Calculate new design point, R^*, using equation (3.45)

Reliability analysis is performed for all the girders analyzed for various ADTTs, D/(D+L) ratios, and bridge span lengths.

6.3.1 Flexure of noncomposite rolled I-shaped girders

Example plots for randomly selected rolled I-shapes are shown in Fig. 6-25 through Fig. 6-27.

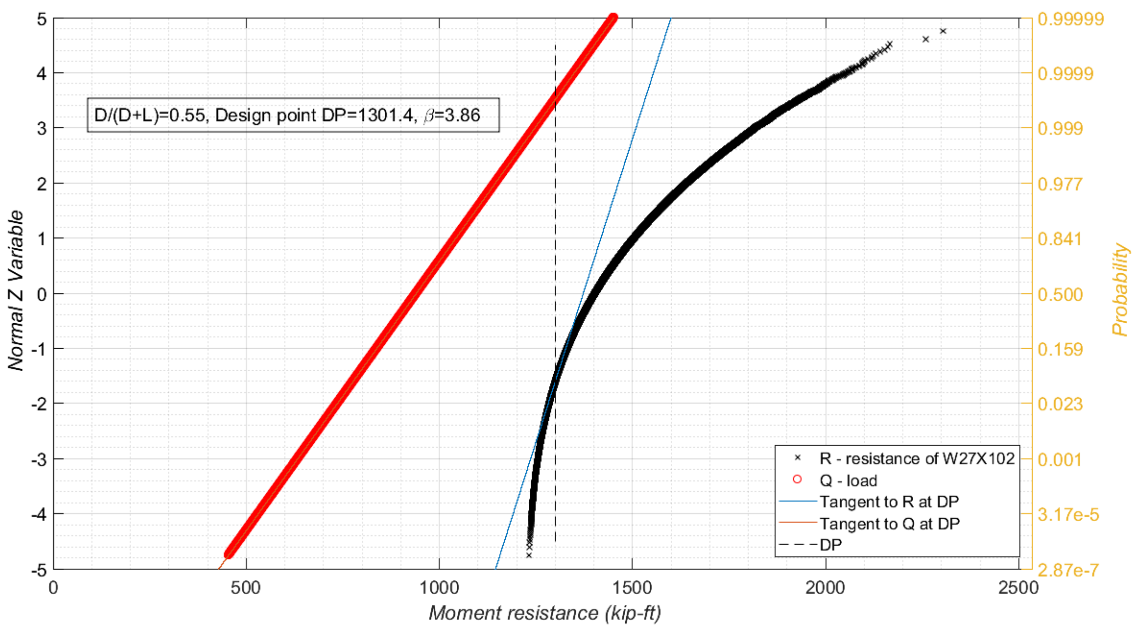


Fig. 6-25: CDFs of flexural resistance and loads for W27x102 and load resulting from L=60ft, D/(D+L)=0.55, and ADTT=2,500.

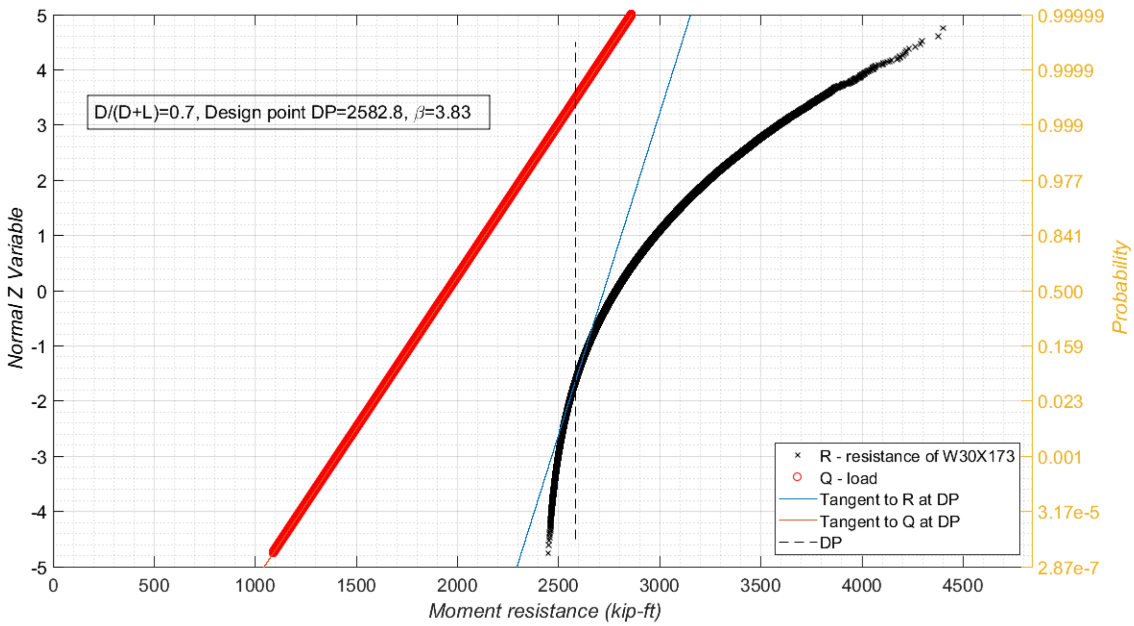


Fig. 6-26: CDFs of flexural resistance and loads for W30x173 and load resulting from L=120ft, D/(D+L)=0.70, and ADTT=5,000.

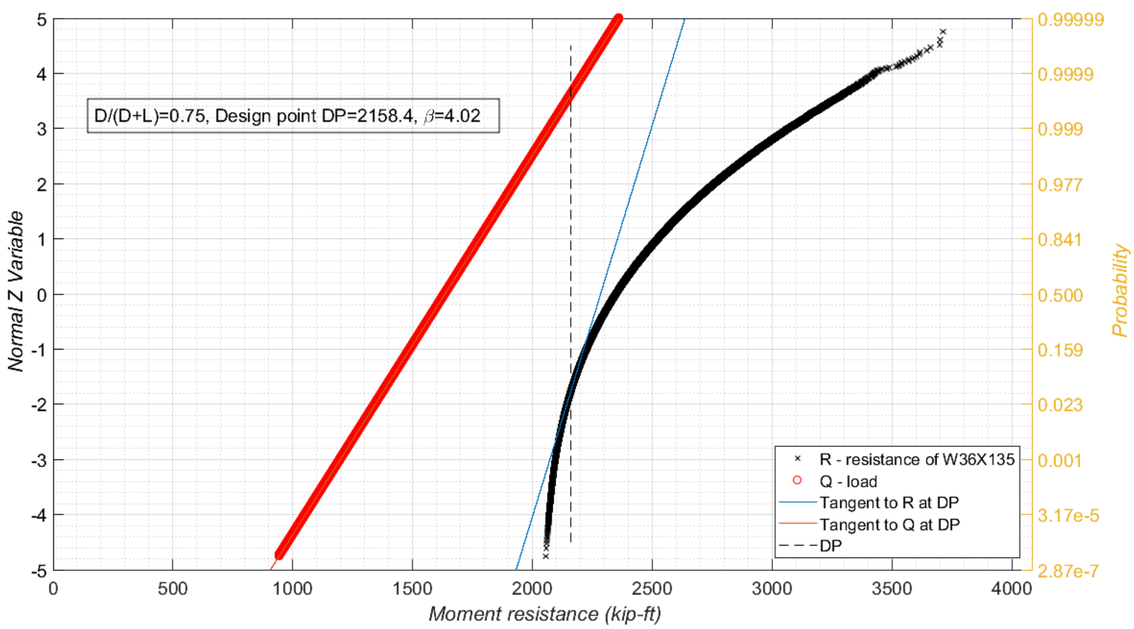


Fig. 6-27: CDFs of flexural resistance and loads for W36x135 and load resulting from L=200ft, D/(D+L)=0.75, and ADTT=10,000.

Reliability analysis was performed for all the noncomposite W-shapes considered, for span lengths of {30, 60, 90, 120, 200} feet and maximum ADTT values of {250, 1000, 2500, 5000, 10000} to occur in 75 years (see subsection 4.3). Among all 250 sections analyzed a minimum, an average, and the mean values of obtained reliability indices are presented herein. The full report, with all the resulting values of reliability indices can be found in Appendix C.1.1.

Due to the approach used in reliability analysis, that utilized D/(D+L) ratio, the results need to be presented for absolute minimum, average, and maximum D/(D+L) ratios and reliability indices. Figures below present obtained reliability indices, for a specific D/(D+L) ratio, for each span length, L, and average daily truck traffic, ADTT, considered. Fig. 6-28 presents absolute minimum reliability index values among all the sections analyzed, for the lowest D/(D+L) ratio that corresponds to the girder spacing of 4 feet and the lightest section in the analyzed set, as shown in Table 6-2. This plot is an over-conservative representation of the lower bounds of the actual reliability index that noncomposite I-shaped girders can experience. Overconservativeness comes from unrealistic usage of the lightest girder W10x12, at spacing of 4 feet for span lengths over 60 feet. For span lengths of 60, 90, and 120 feet it is more appropriate to consider average values of D/(D+L) ratios. These are shown in Fig. 6-29, that presents average reliability indices β. The upper bounds of the reliability index are presented in Fig. 6-30 that shows maximum β for the highest values of D/(D+L). Values shown in Fig. 6-30 relate to the heaviest section at the maximum considered spacing of 12 feet. Data presented in Fig. 6-28, Fig. 6-29, and Fig. 6-30 is reported in Table 6-4.

As shown in Fig. 6-28, noncomposite rolled I-shaped sections perform satisfactorily for 30 feet span length, with minimum $\beta=3.48$ for ADTT=5’000. Slightly higher values, up to $\beta=3.72$ are visible for other ADTTs. Reliability of noncomposite rolled I-shapes for span lengths 60, 90 and

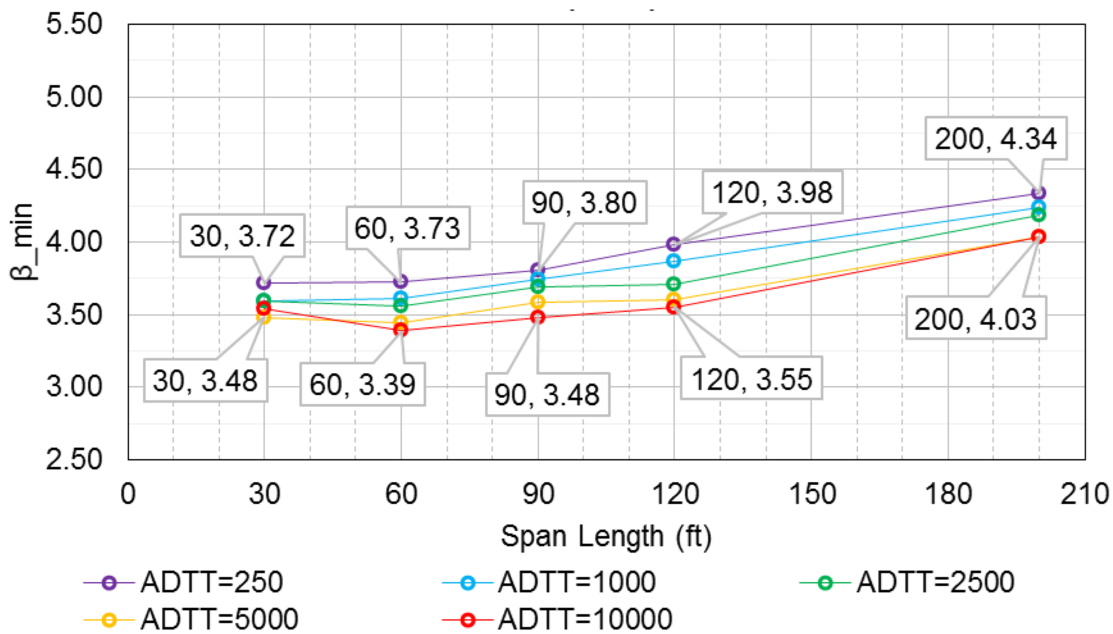


Fig. 6-28: Minimum reliability index, β_{min}, for noncomposite rolled I-shaped sections, Φ=1.00, minimum D/(D+L).

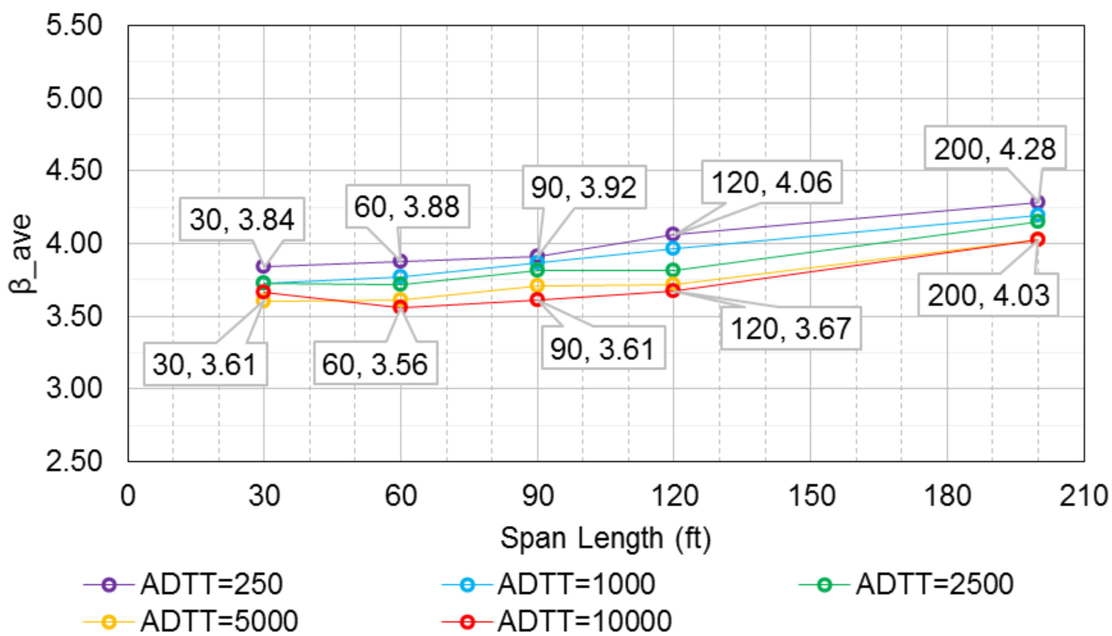


Fig. 6-29: Average reliability index, β_{ave}, for noncomposite rolled I-shaped sections, Φ=1.00, average D/(D+L).

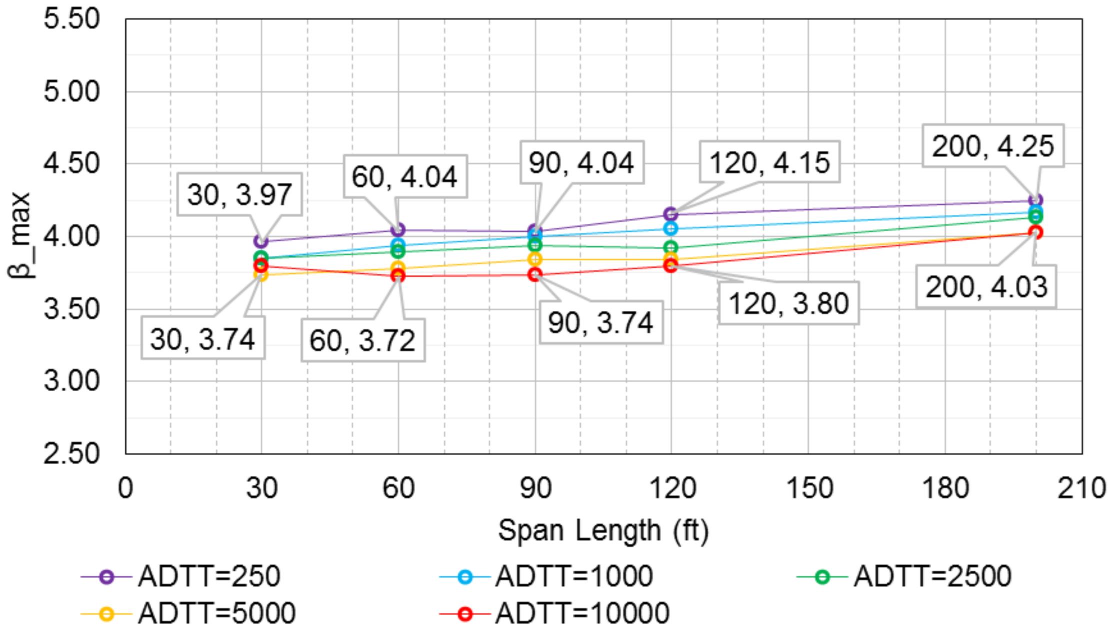


Fig. 6-30: Maximum reliability index, β_{max}, for noncomposite rolled I-shaped sections, Φ=1.00, maximum D/(D+L).

120 is above the target of 3.5 as shown in Fig. 6-29. For span lengths of 60 and 90 feet, and ADTT up to 2500 the reliability indices exceed 3.75, that could be an indicator for adjustments of design formulas. Span length of 120 feet (Fig. 6-29) clearly outperforms for all the ADTTs. Safety of girders with 200 feet span lengths is the highest among all the analyzed lengths, which is due to smaller bias factor of live load for this length (see Table 4-5 through Table 4-9) and lower values of D/(D+L) ratios considered (Table 6-2).

Table 6-4. Obtained Reliability Indices for noncomposite rolled I-shaped girders per L, ADTT, and D/(D+L).

	Min. D/(D+L)					Ave. D/(D+L)					Max. D/(D+L)				
ADTT \ L (ft)	30	60	90	120	200	30	60	90	120	200	30	60	90	120	200
250	3.72	3.73	3.80	3.98	4.34	3.84	3.88	3.92	4.06	4.28	3.97	4.04	4.04	4.15	4.25
1000	3.60	3.61	3.75	3.87	4.24	3.72	3.77	3.86	3.96	4.20	3.85	3.94	4.00	4.05	4.17
2500	3.60	3.55	3.69	3.71	4.18	3.72	3.72	3.81	3.81	4.15	3.85	3.90	3.94	3.92	4.13
5000	3.48	3.44	3.58	3.60	4.03	3.61	3.61	3.71	3.72	4.03	3.74	3.78	3.84	3.84	4.03
10000	3.54	3.39	3.48	3.55	4.03	3.66	3.56	3.61	3.67	4.03	3.79	3.72	3.74	3.80	4.03

6.3.2 Flexure of noncomposite I-shaped plate girders

Reliability indices are presented herein for A709-50 and A709-50W steel noncomposite plate girders that were designed for a specific span length. Fig. 6-31 to Fig. 6-34, and Fig. 6-40 to Fig. 6-43 present calculated reliability indices for a particular girder spacing per ADTT for A709-50 and A709-50W steel sections, respectively. Fig. 6-35 to Fig. 6-39 and Fig. 6-44 to Fig. 6-48 present reliability indices for a particular ADTT per girder spacing for both steel grades. Full report, with all the resulting values of reliability indices can be found in Appendix C.1.2. The resulting reliability index, for the most severe ADTT of 10,000 has values higher than 3.75 for A709-50 sections regardless of inter-girder spacing.

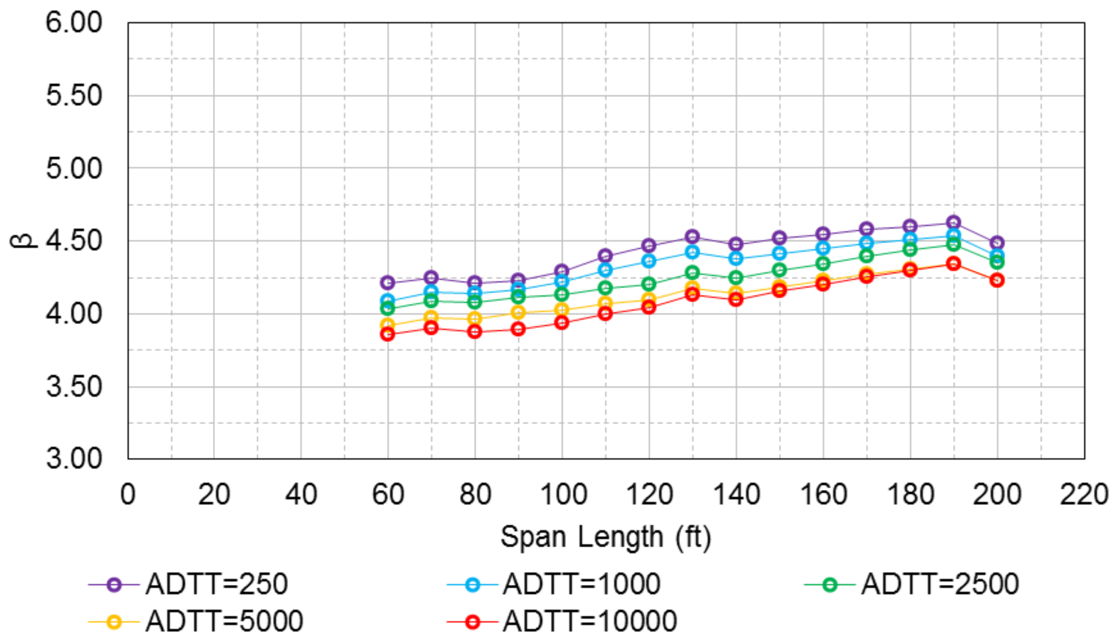


Fig. 6-31: Reliability index, β, for A709-50 noncomposite plate girders with S=6ft, Φ=1.00.

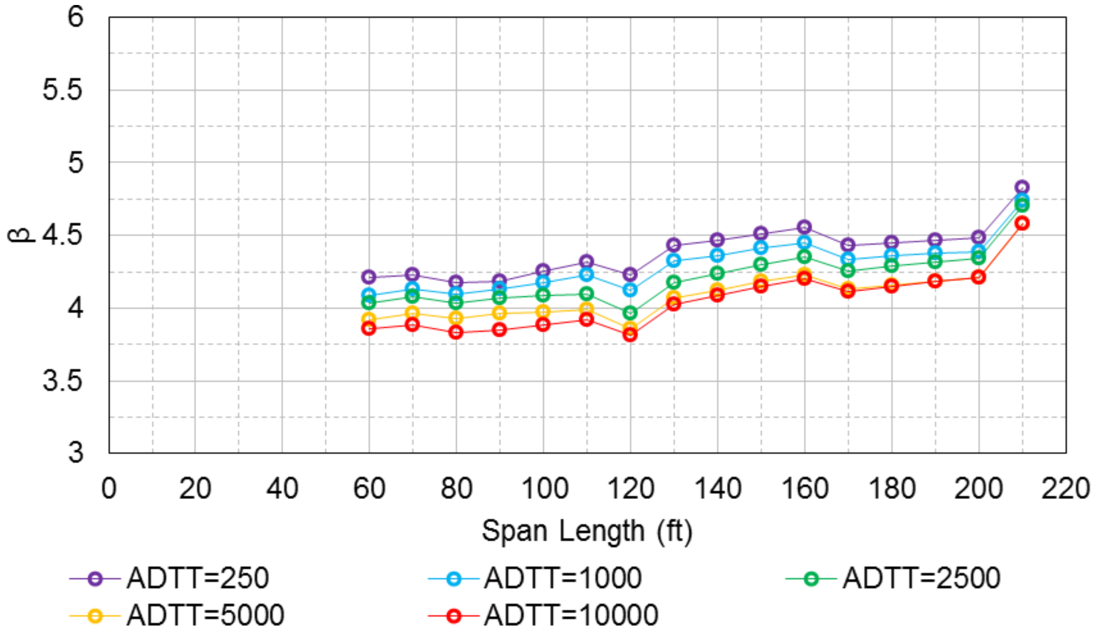


Fig. 6-32: Reliability index, β, for A709-50 noncomposite plate girders with S=8ft, Φ=1.00.

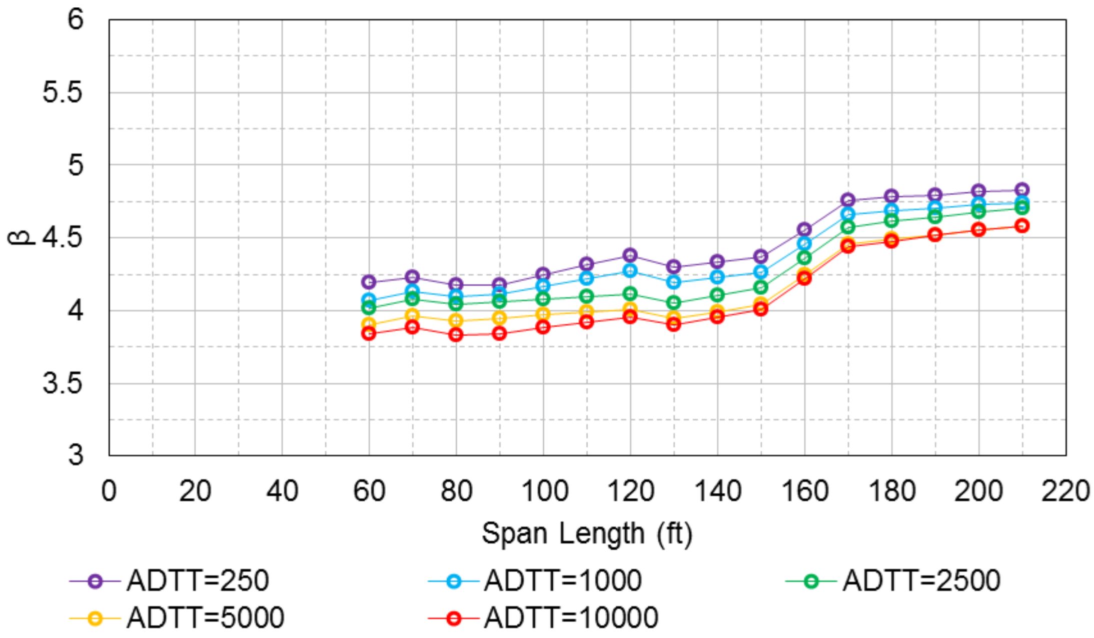


Fig. 6-33: Reliability index, β, for A709-50 noncomposite plate girders with S=10ft, Φ=1.00.

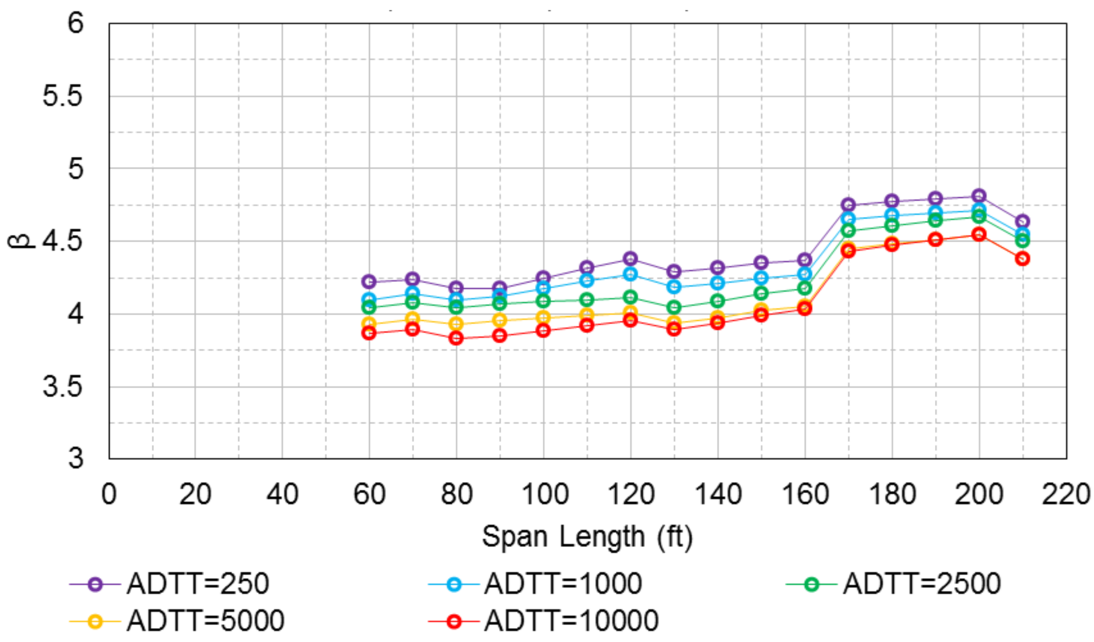


Fig. 6-34: Reliability index, β, for A709-50 noncomposite plate girders with S=12ft, Φ=1.00.

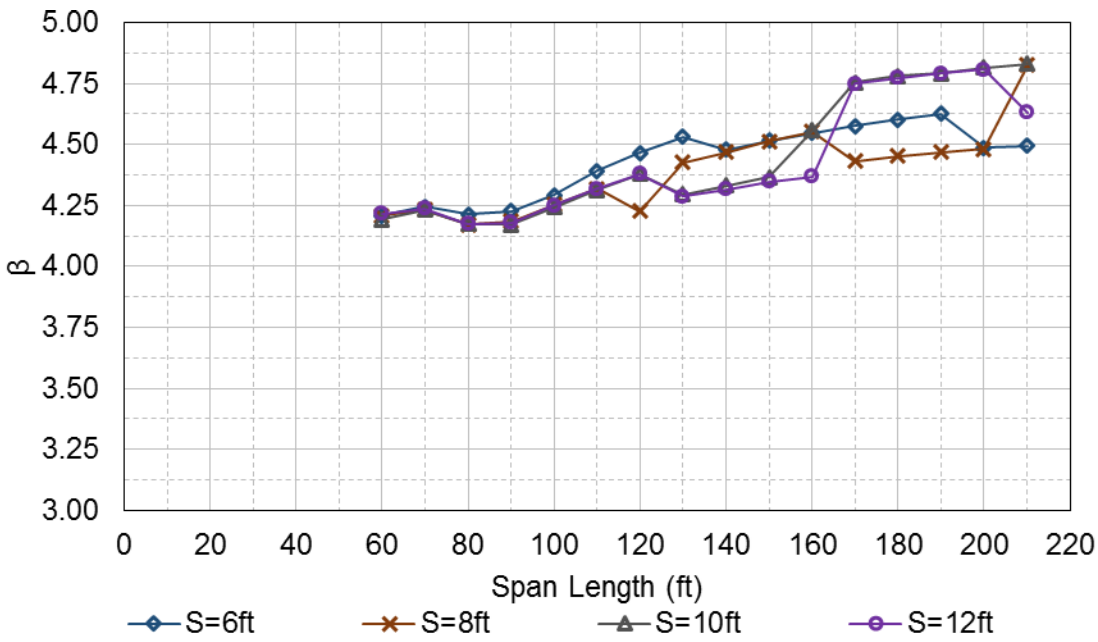


Fig. 6-35: Reliability index, β, for A709-50 noncomposite plate girders with ADTT=250, Φ=1.00.

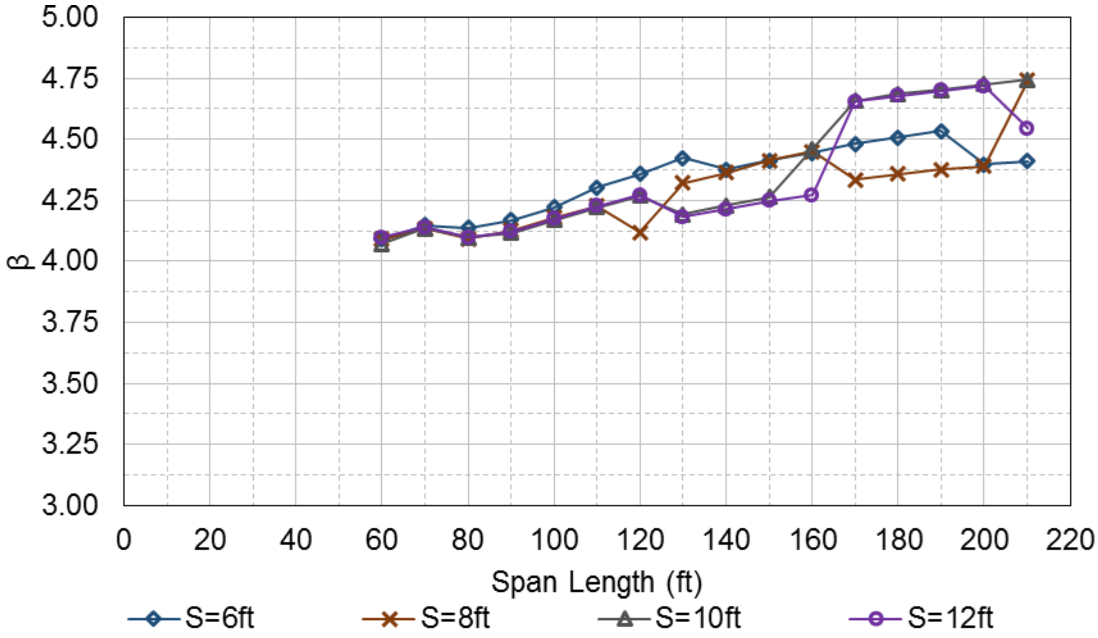


Fig. 6-36: Reliability index, β, for A709-50 noncomposite plate girders with ADTT=1,000, Φ=1.00.

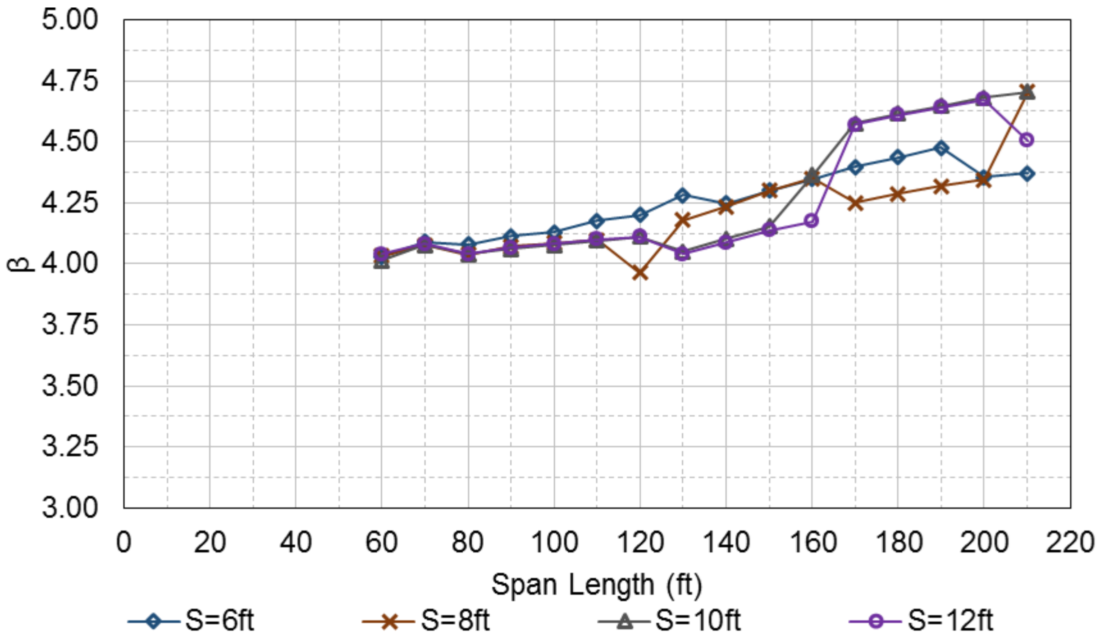


Fig. 6-37: Reliability index, β, for A709-50 noncomposite plate girders with ADTT=2,500, Φ=1.00.

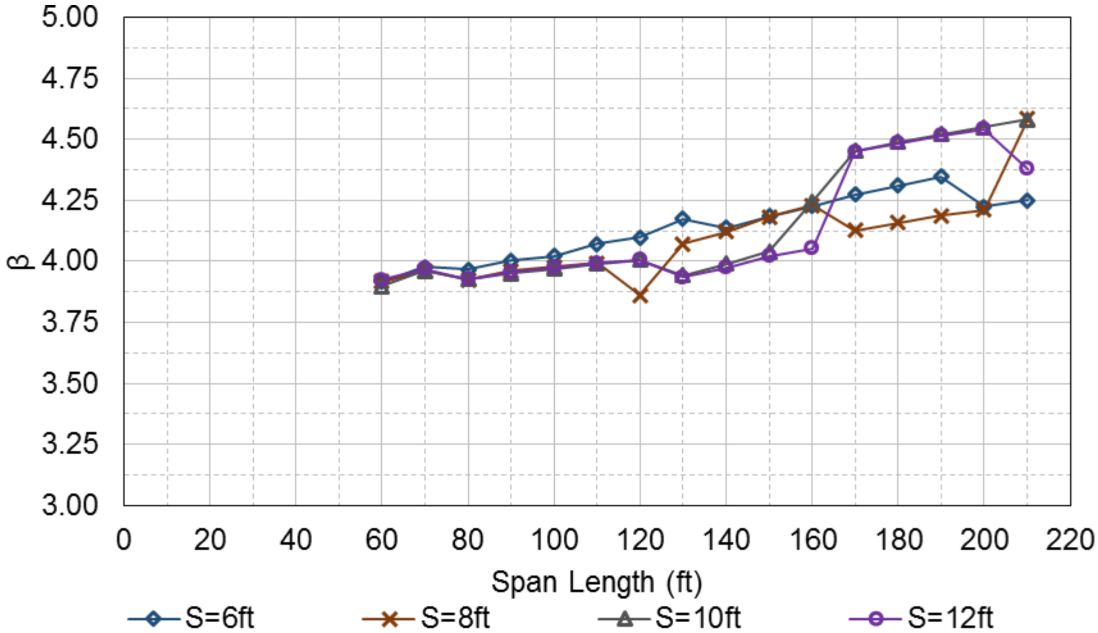


Fig. 6-38: Reliability index, β, for A709-50 noncomposite plate girders with ADTT=5,000, Φ=1.00.

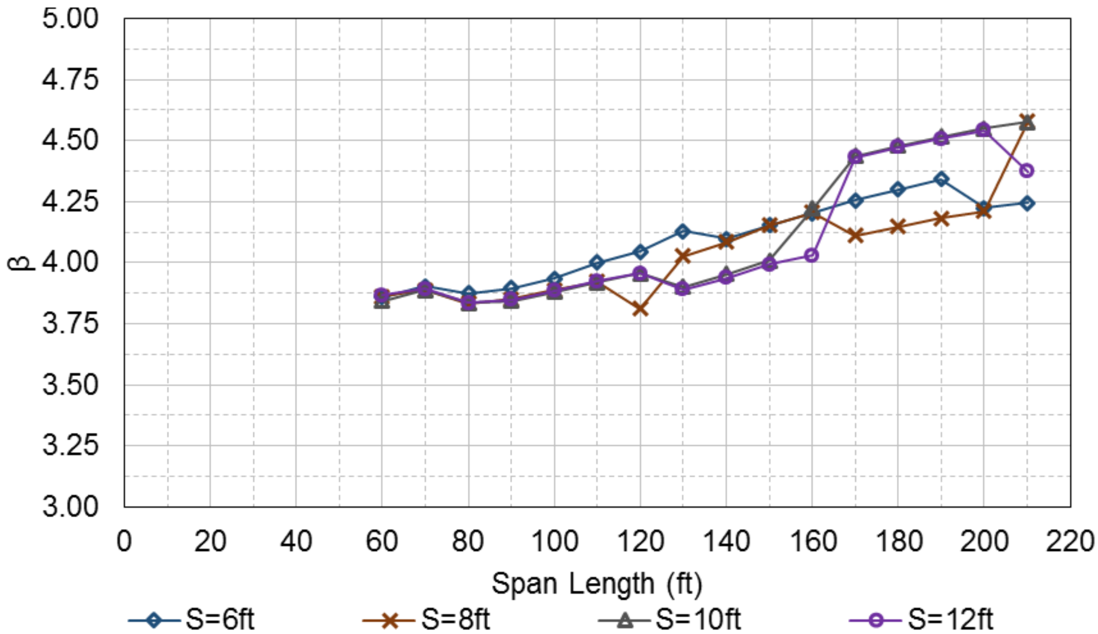


Fig. 6-39: Reliability index, β, for A709-50 noncomposite plate girders with ADTT=10,000, Φ=1.00.

Noncomposite plate girders made of A709-50W steel show very different values of reliability indices for a specific design span length than A709-50 sections. Minimum value is about 3.8, with clearly the weakest point of 80 feet span length, for which the tension flange of designed section has thickness of 1.25 inch. Yield strength distribution of 1.5 rounded gauge of A709-50W steel (Fig. 5-31) is more inclined at the bottom tail and therefore shapes resistance distribution of the section designed for 80 feet span length, so that the reliability index has lesser value than for section considered for 70 feet span length.

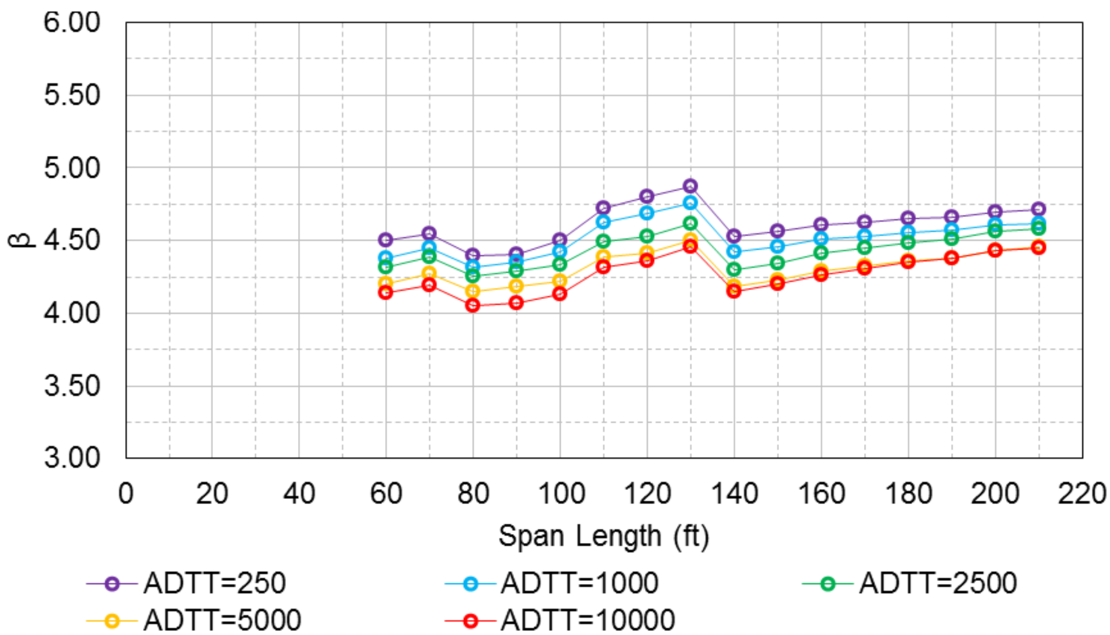


Fig. 6-40: Reliability index, β, for A709-50W noncomposite plate girders with S=6ft, Φ=1.00.

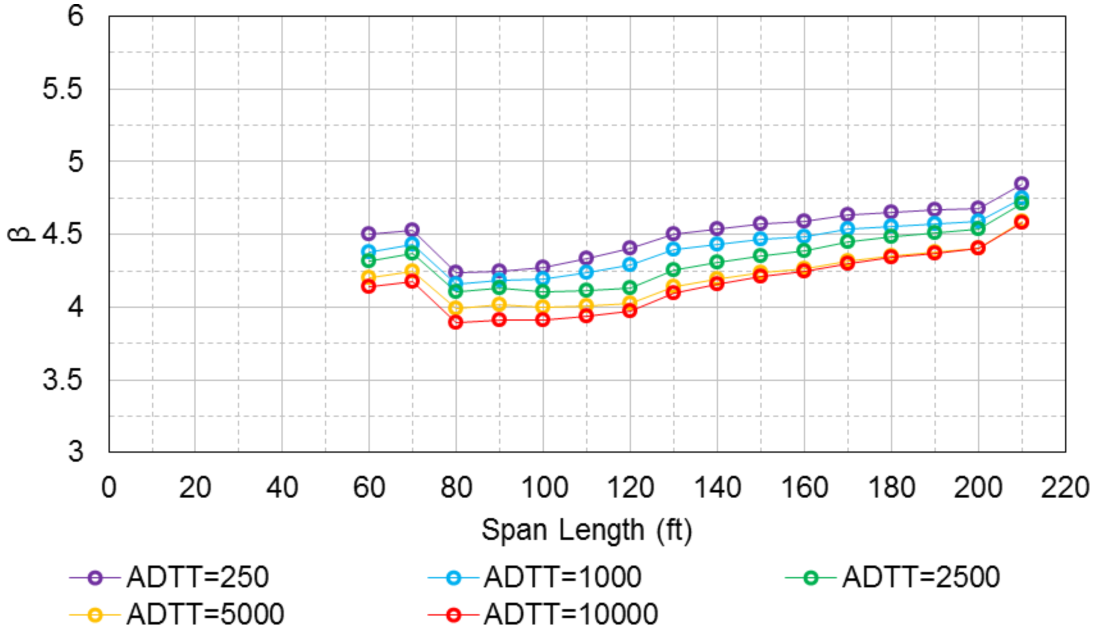


Fig. 6-41: Reliability index, β, for A709-50W noncomposite plate girders with S=8ft, Φ=1.00.

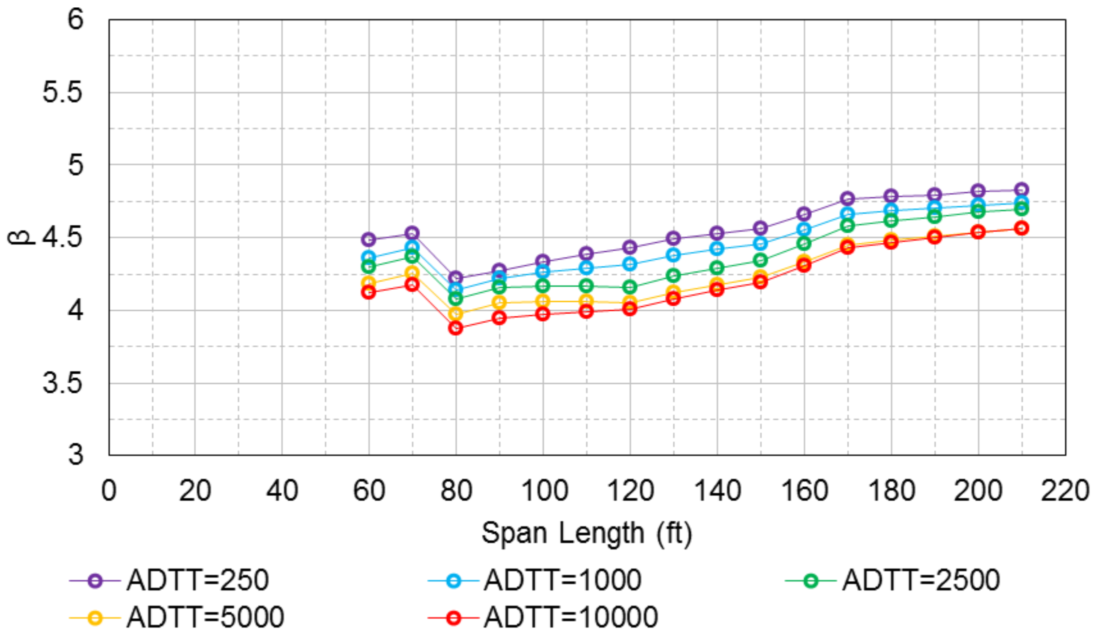


Fig. 6-42: Reliability index, β, for A709-50W noncomposite plate girders with S=10ft, Φ=1.00.

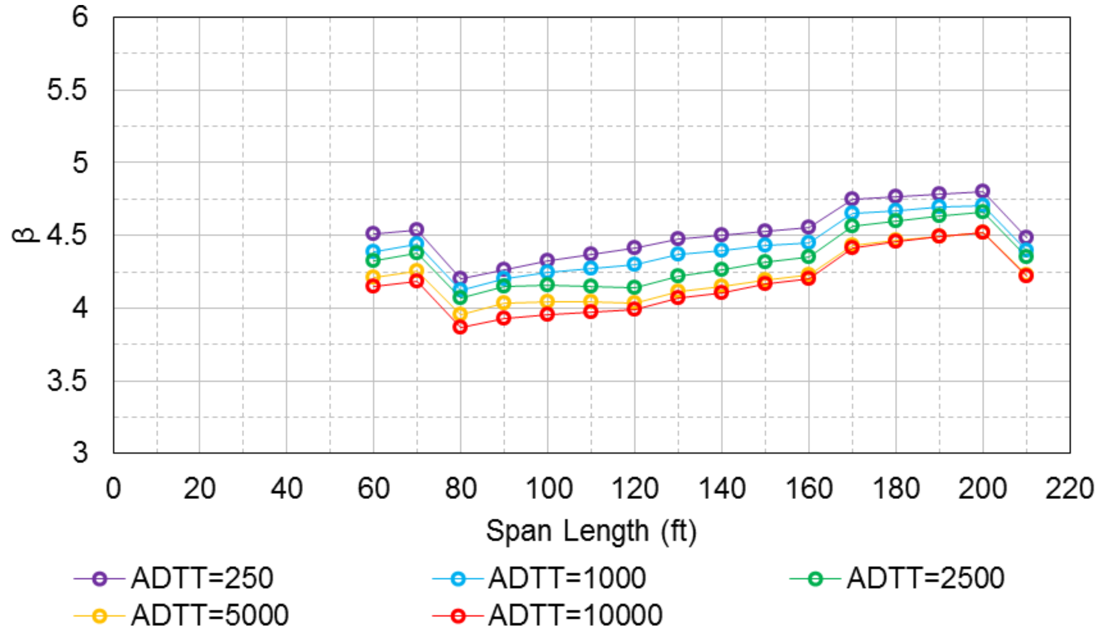


Fig. 6-43: Reliability index, β, for A709-50W noncomposite plate girders with S=12ft, Φ=1.00.

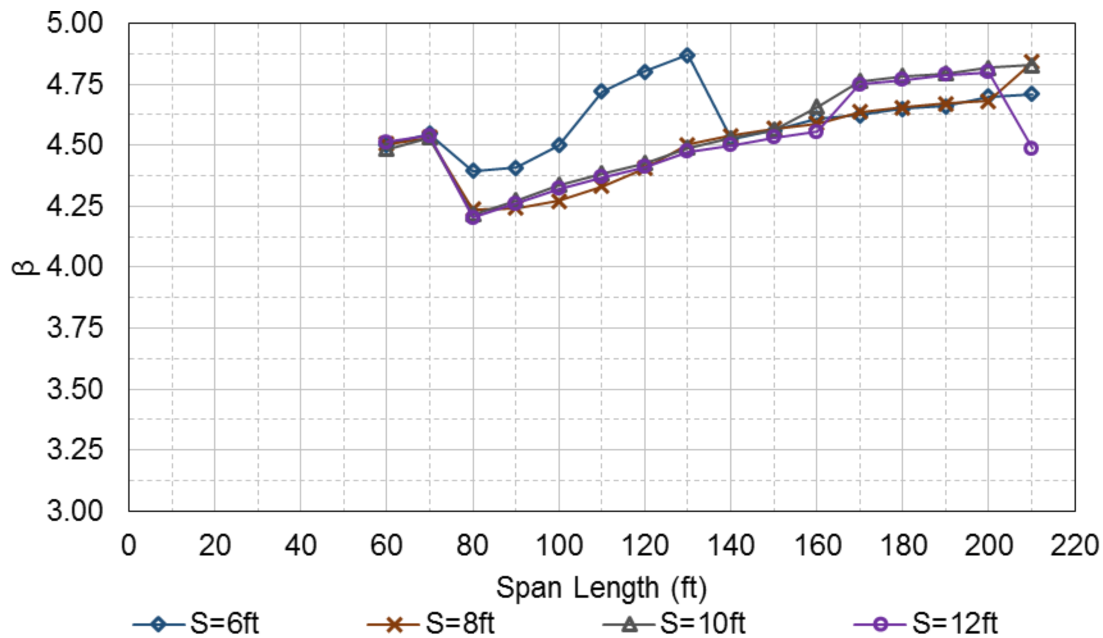


Fig. 6-44: Reliability index, β, for A709-50W noncomposite plate girders with ADTT=250, Φ=1.00.

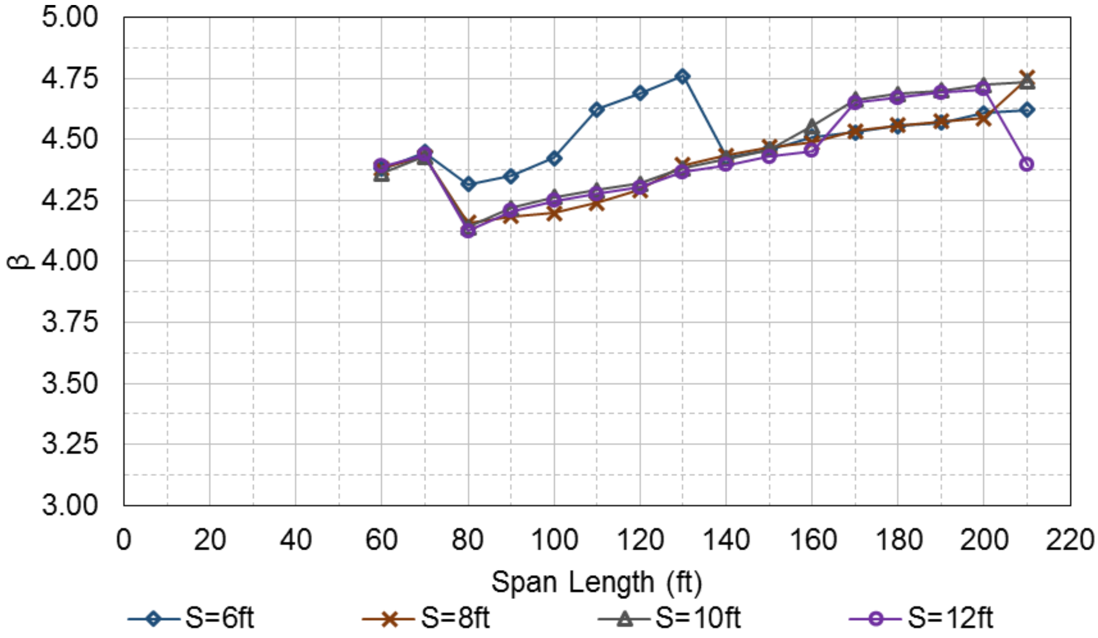


Fig. 6-45: Reliability index, β, for A709-50W noncomposite plate girders with ADTT=1,000, Φ=1.00.

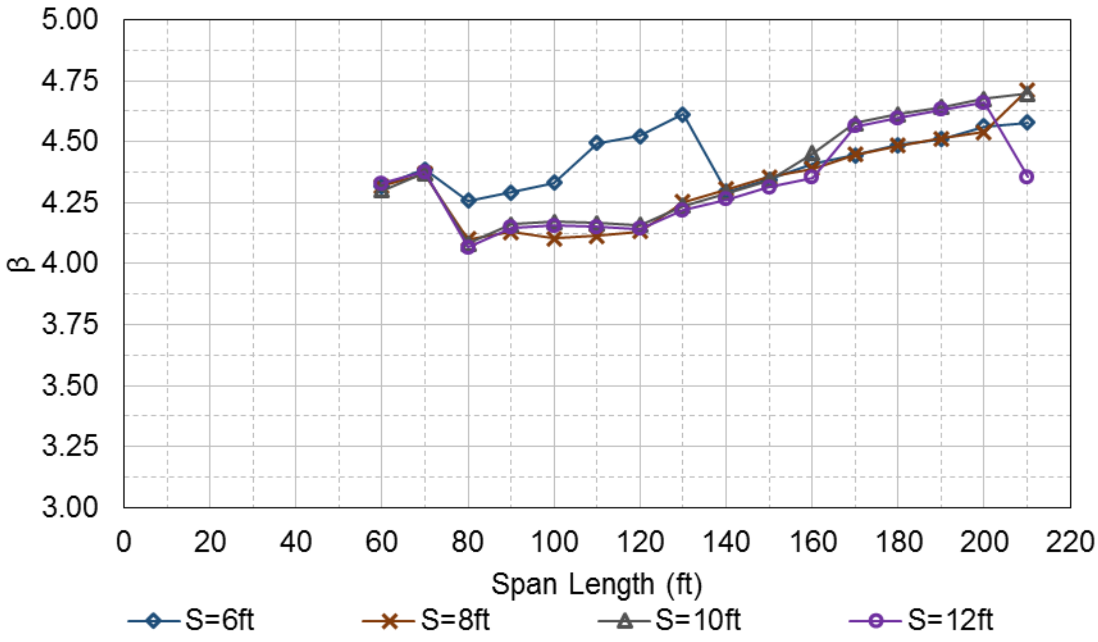


Fig. 6-46: Reliability index, β, for A709-50W noncomposite plate girders with ADTT=2,500, Φ=1.00.

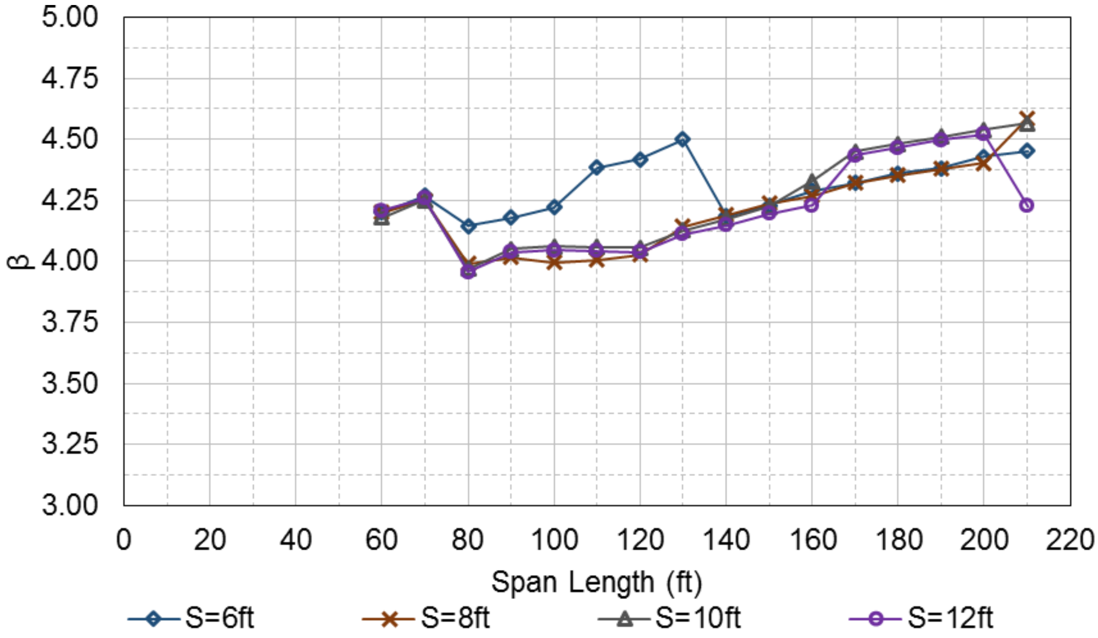


Fig. 6-47: Reliability index, β, for A709-50W noncomposite plate girders with ADTT=5,000, Φ=1.00.

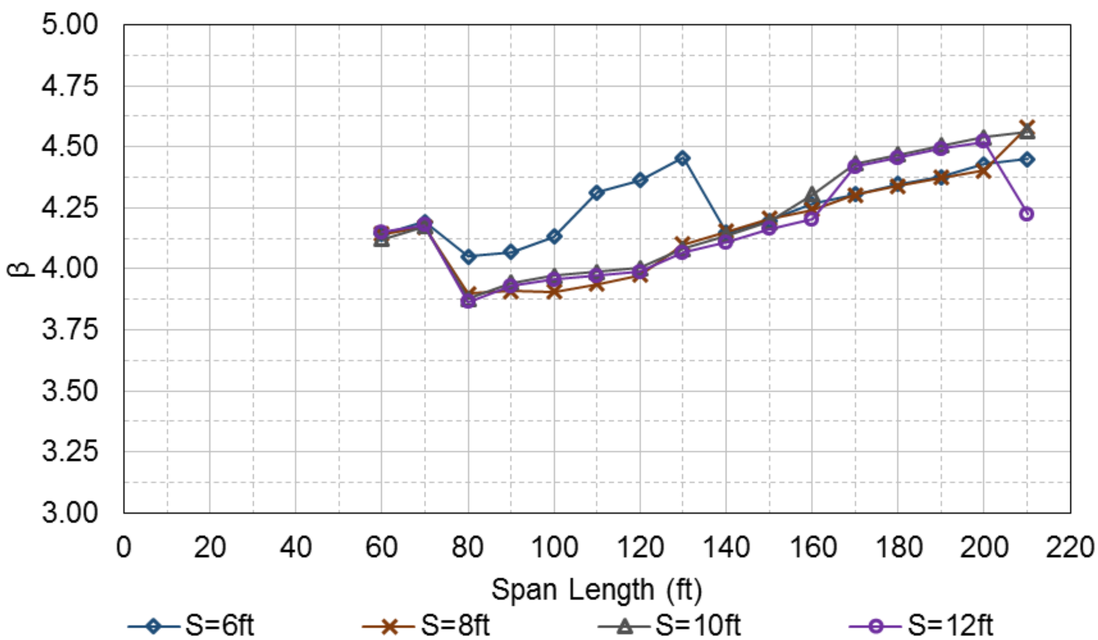


Fig. 6-48: Reliability index, β, for A709-50W noncomposite plate girders with ADTT=10,000, Φ=1.00.

Two example plots of the reliability analysis are shown below. The full report of load that noncomposite plate girders were designed for, with D/(D+L) ratios is attached in Appendix C.2.1.

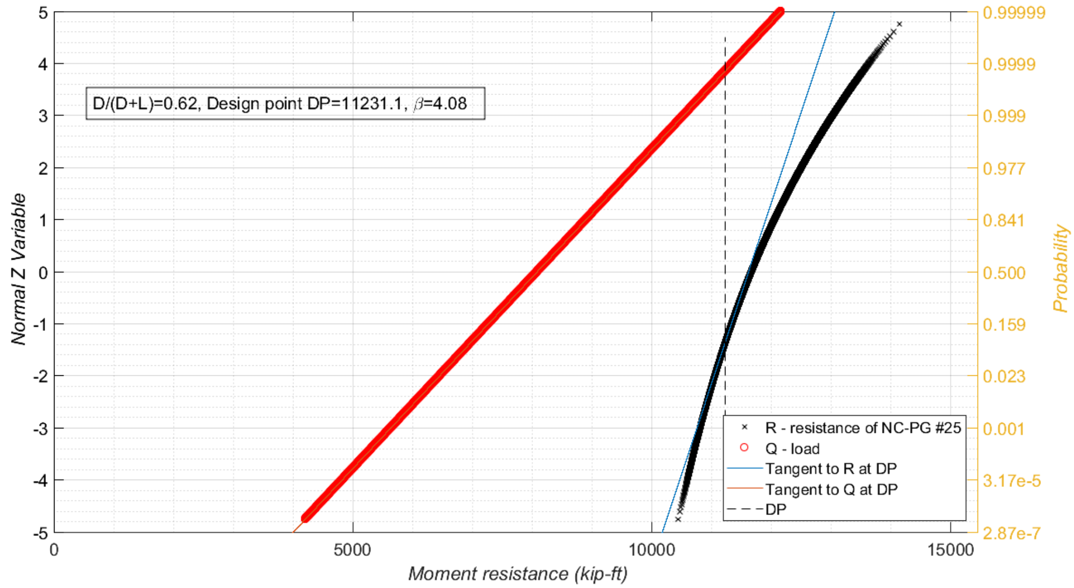


Fig. 6-49: CDFs of flexural resistance and loads for A709-50 NC-PG #25 designed for L=140 ft, and S=8ft with ADTT=10,000.

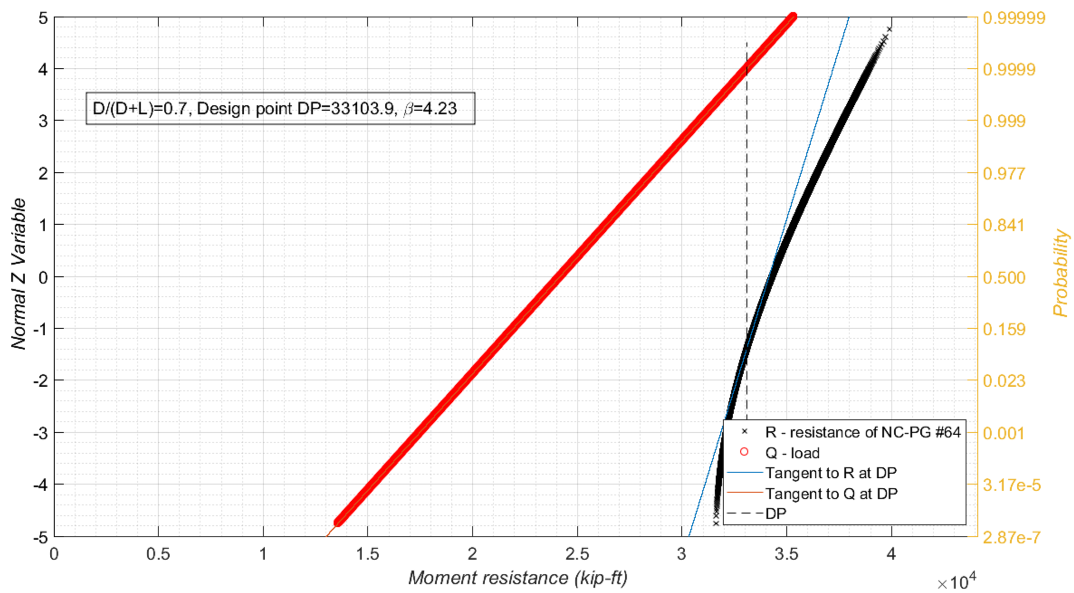


Fig. 6-50: CDFs of flexural resistance and loads for A709-50W NC-PG #64 designed for L=210 ft, and S=12ft with ADTT=5,000.

6.3.3 Flexure of composite rolled I-shaped girders

Reliability analysis was performed for all the composite W-shapes considered, for span lengths of {30, 60, 90, 120, 200, 300} feet and maximum ADTT values of {250, 1000, 2500, 5000, 10000} to occur in 75 years (see subsection 4.3) with D/(D+L) ratios are specified in Table 6-2. A minimum, an average, and the mean values of obtained reliability indices are presented in Fig. 6-51 ÷ Fig. 6-53, for the 120 sections with 4000psi concrete deck. The same reasoning for presentation and analysis of minimum, average and maximum reliability indices as explained in subsection 6.3.1 applies for composite W-shapes. The full report, with all the resulting values of reliability indices can be found in Appendix C.1.3. It is concluded that the composite rolled I-shaped steel sections perform satisfactorily, and calibration may be needed for these sections to lower the reliability indices down to the target of 3.5.

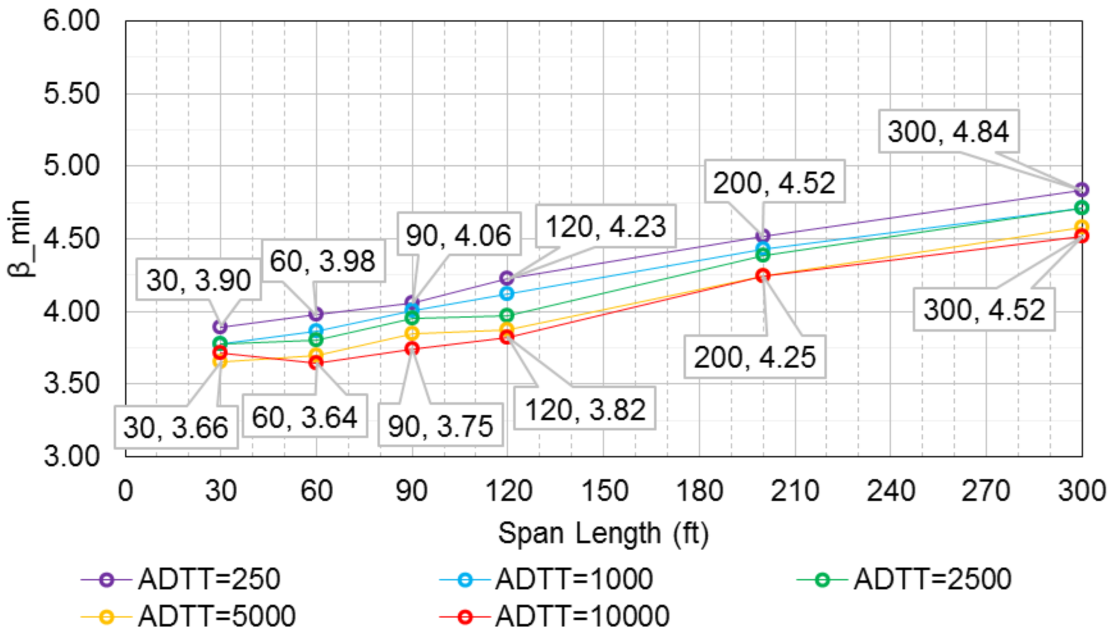


Fig. 6-51: Minimum reliability index, β_{min}, for composite rolled I-shaped sections, Φ=1.00, minimum D/(D+L).

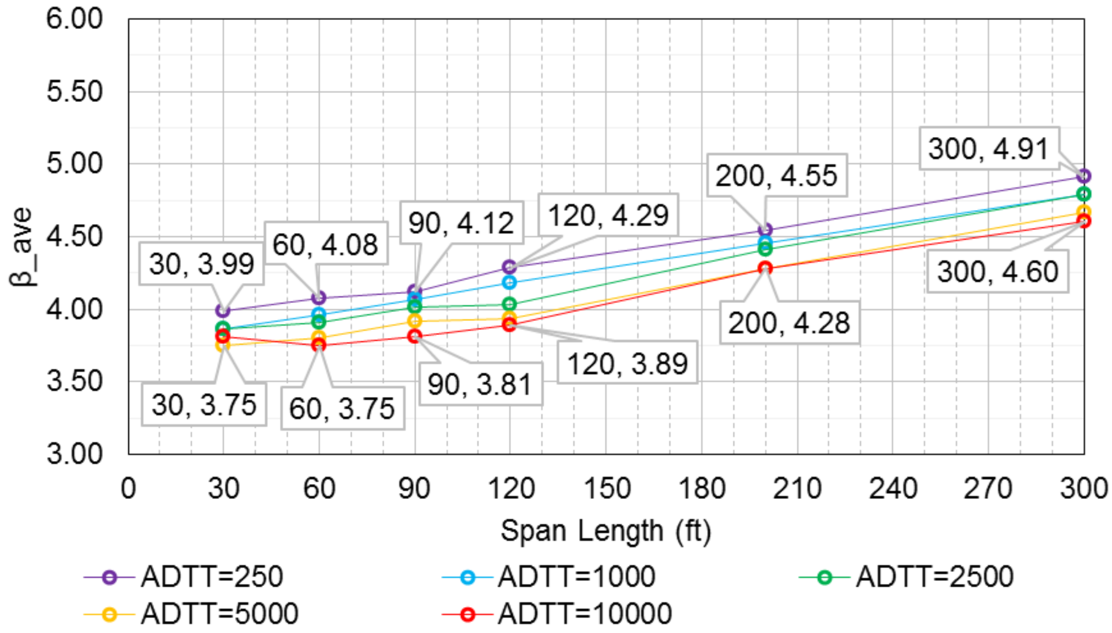


Fig. 6-52: Average reliability index, β_{ave}, for composite rolled I-shaped sections, Φ=1.00, average D/(D+L).

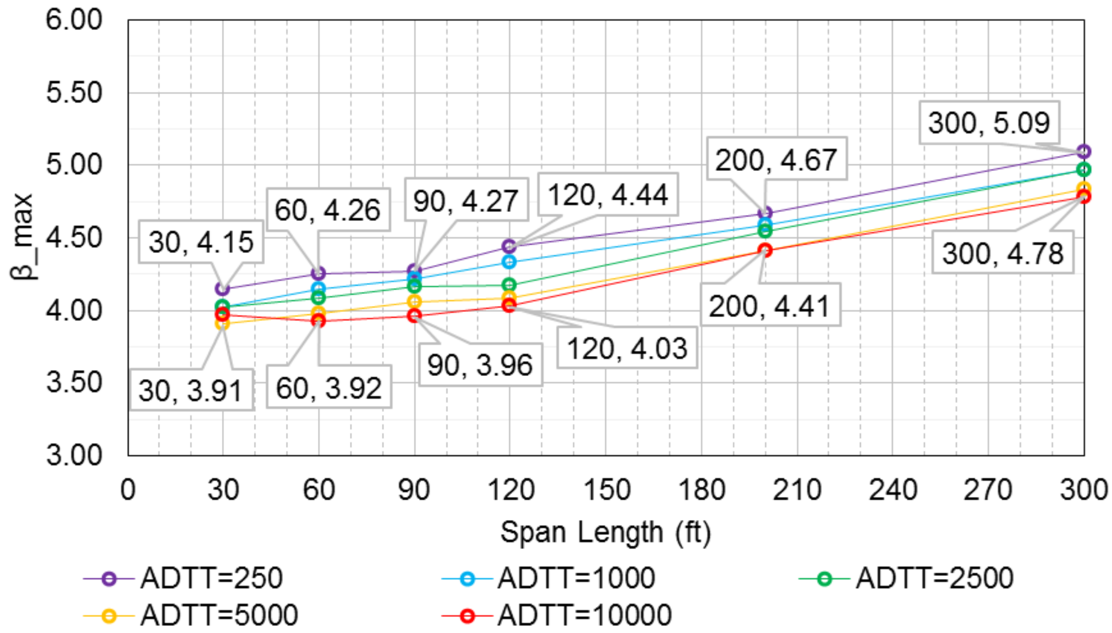


Fig. 6-53: Maximum reliability index, β_{max}, for composite rolled I-shaped sections, Φ=1.00, maximum D/(D+L).

Values shown in Fig. 6-51 ÷ Fig. 6-53 are tabularized in Table 6-5.

Table 6-5. Obtained Reliability Indices for composite rolled I-shaped girders per L, ADTT, and D/(D+L).

ADTT \ L (ft)	Min. D/(D+L)						Ave. D/(D+L)						Max. D/(D+L)					
	30	60	90	120	200	300	30	60	90	120	200	300	30	60	90	120	200	300
250	3.90	3.98	4.06	4.23	4.52	4.84	3.99	4.08	4.12	4.29	4.55	4.91	4.15	4.26	4.27	4.44	4.67	5.09
1000	3.77	3.86	4.01	4.12	4.43	4.71	3.87	3.96	4.07	4.18	4.46	4.79	4.02	4.14	4.22	4.33	4.59	4.97
2500	3.77	3.81	3.95	3.97	4.38	4.71	3.87	3.91	4.02	4.03	4.41	4.79	4.02	4.09	4.16	4.18	4.54	4.97
5000	3.66	3.70	3.85	3.87	4.25	4.58	3.75	3.80	3.92	3.94	4.28	4.66	3.91	3.98	4.06	4.08	4.41	4.84
10000	3.71	3.64	3.75	3.82	4.25	4.52	3.81	3.75	3.81	3.89	4.28	4.60	3.97	3.92	3.96	4.03	4.41	4.78

6.3.4 Flexure of composite I-shaped plate girders

Reliability analysis of composite I-shaped plate girders was performed for all the designed sections using steels A709-50 and A709-50W. Nine A709-HPS50W sections were analyzed basing on nominal flexural resistance obtained from AM and RPA. All the analysis presented herein were performed for ADTT values of {250, 1000, 2500, 5000, 10000}. The full report, with all the resulting values of reliability indices can be found in Appendix C.1.4. Design loads and D/(D+L) ratios for each girder is attached in Appendix C.2.2.Fig. 6-54 through Fig. 6-64 show calculated reliability indices for A709-50 sections. Reliability indices for A709-50W sections are presented in Fig. 6-65 through Fig. 6-75. Composite plate girders made of both steels, A709-50 and A709-50W, report very high values of reliability indices, with minimum of about 4.25. This is an indication that calibration of design formula is needed for these structural types.

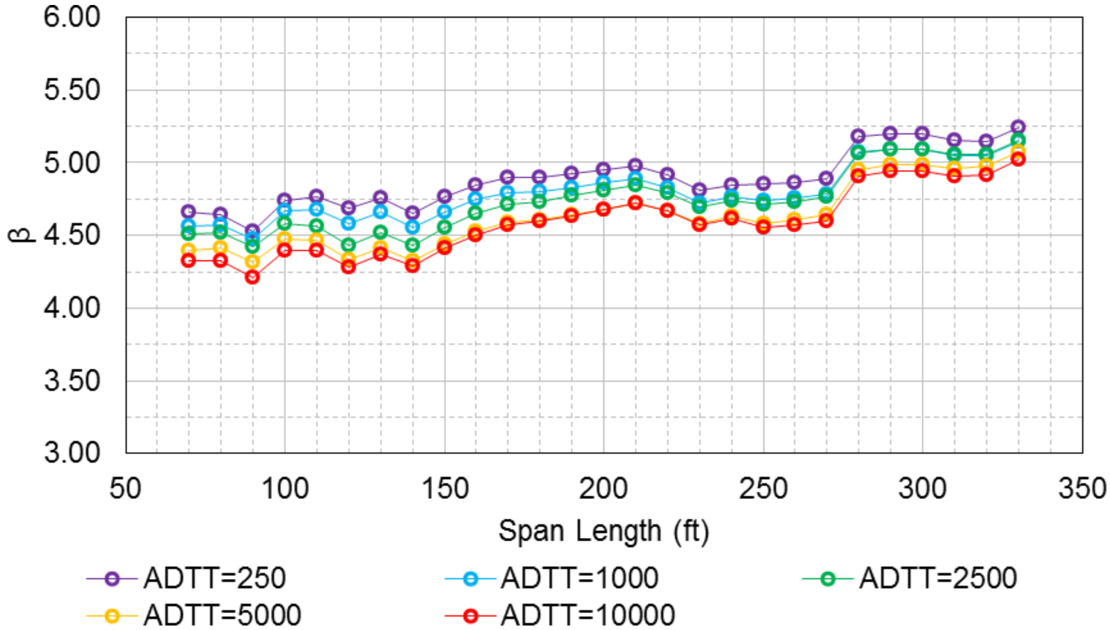


Fig. 6-54: Reliability index, β, for A709-50 composite plate girders with S=6ft, Φ=1.00.

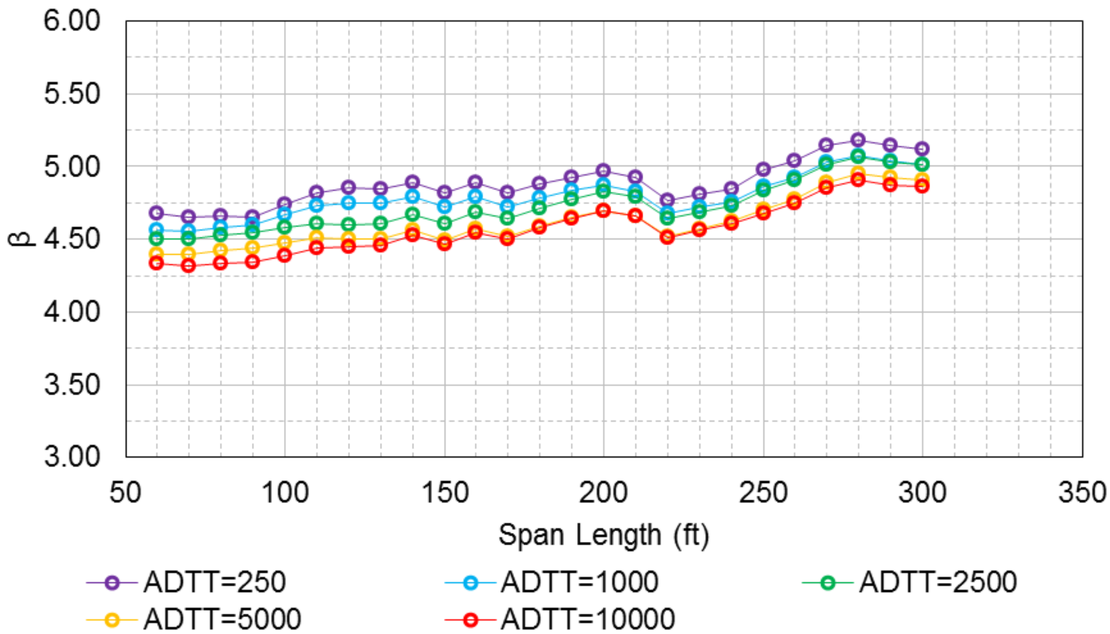


Fig. 6-55: Reliability index, β, for A709-50 composite plate girders with S=8ft, Φ=1.00.

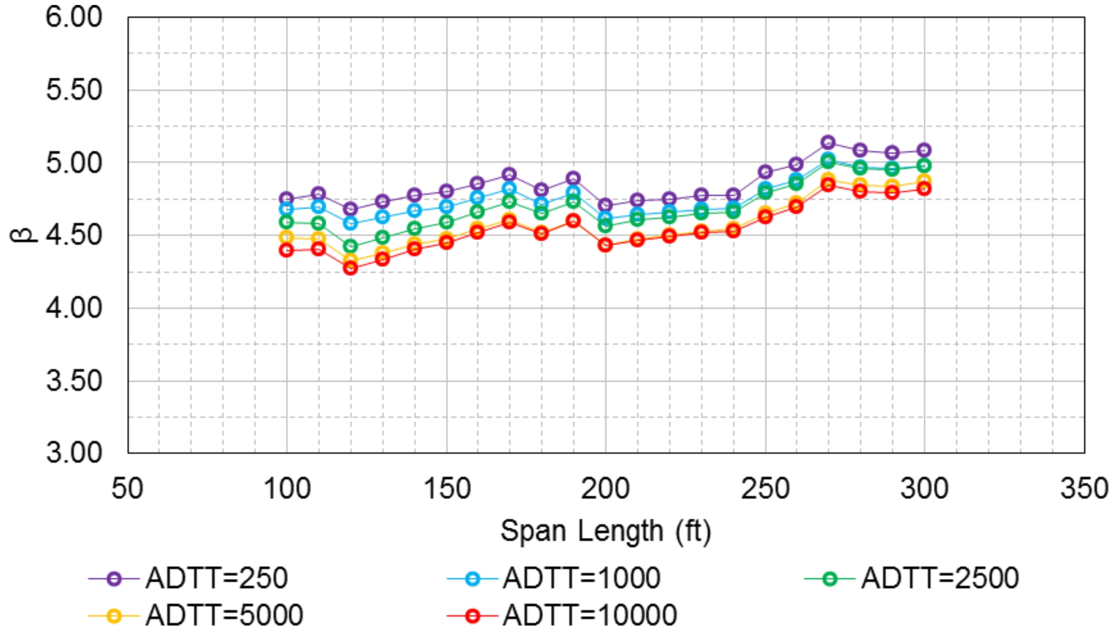


Fig. 6-56: Reliability index, β, for A709-50 composite plate girders with S=10ft, Φ=1.00.

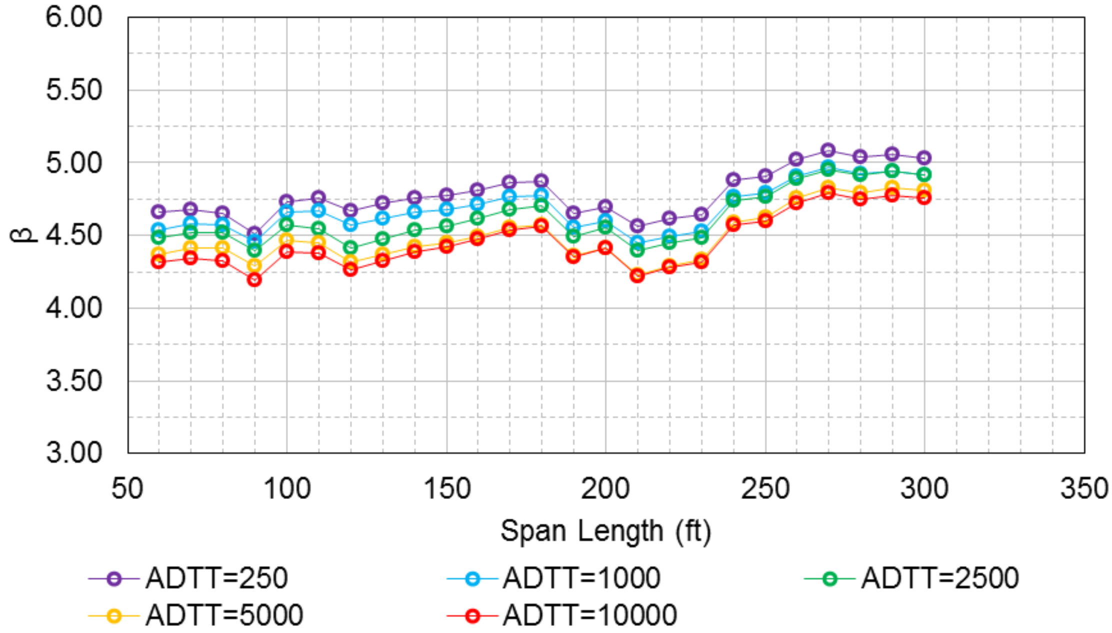


Fig. 6-57: Reliability index, β, for A709-50 composite plate girders with S=12ft, Φ=1.00.

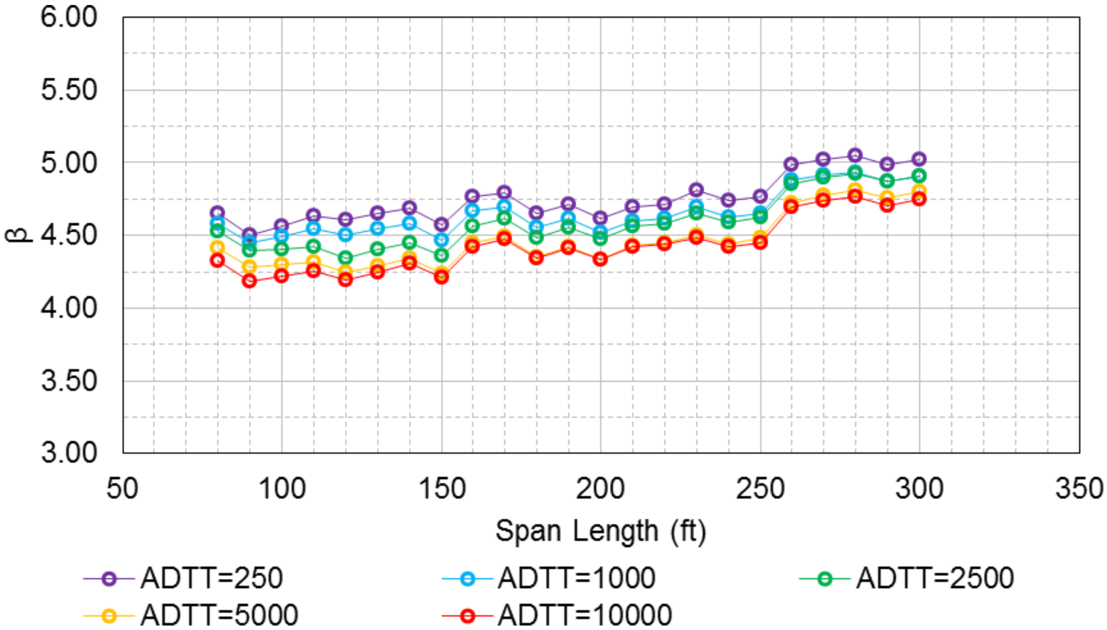


Fig. 6-58: Reliability index, β, for A709-50 composite plate girders with S=14ft, Φ=1.00.

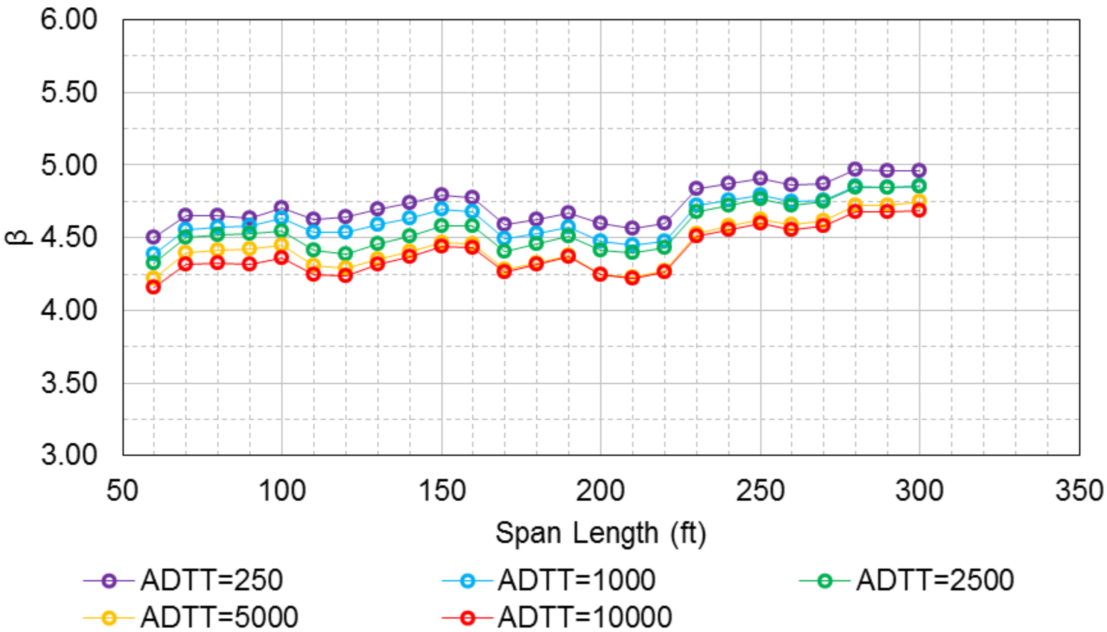


Fig. 6-59: Reliability index, β, for A709-50 composite plate girders with S=16ft, Φ=1.00.

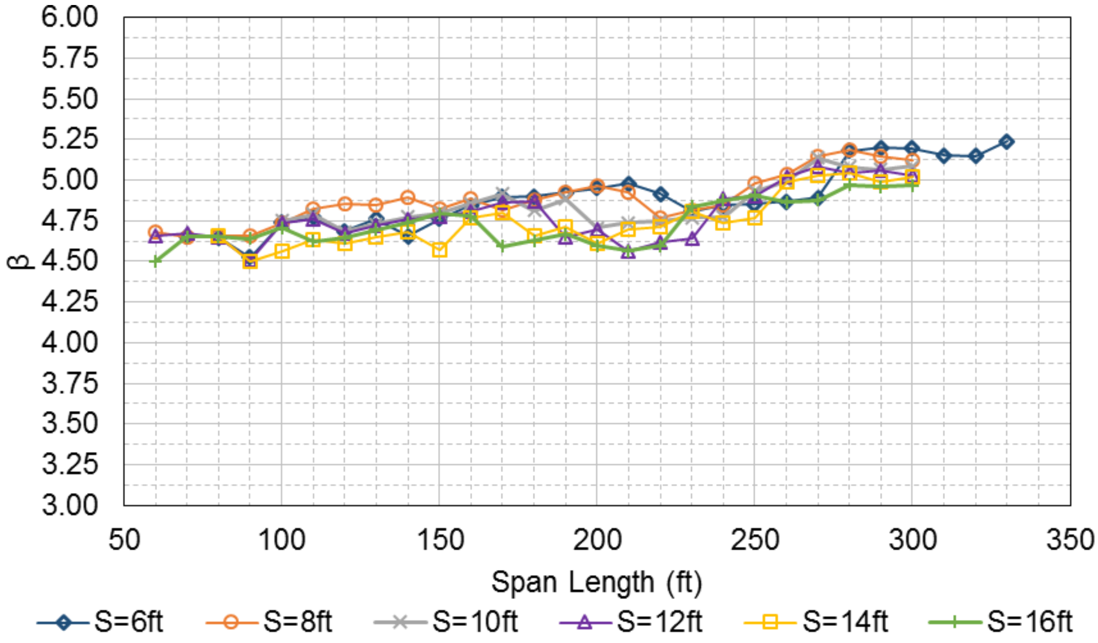


Fig. 6-60: Reliability index, β, for A709-50 composite plate girders with ADTT=250, Φ=1.00.

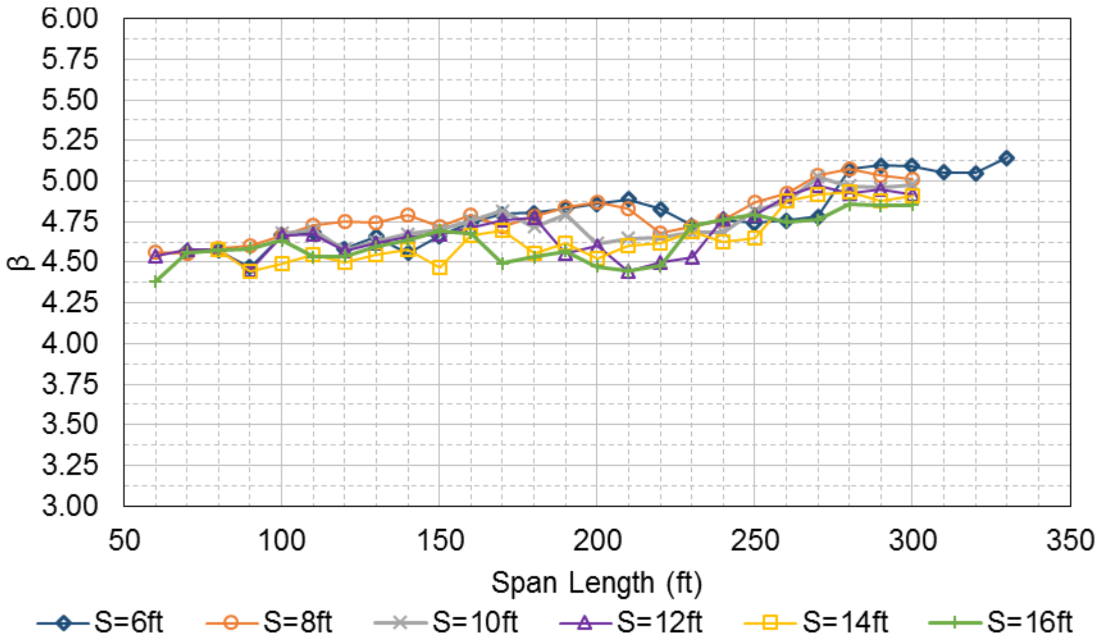


Fig. 6-61: Reliability index, β, for A709-50 composite plate girders with ADTT=1,000, Φ=1.00.

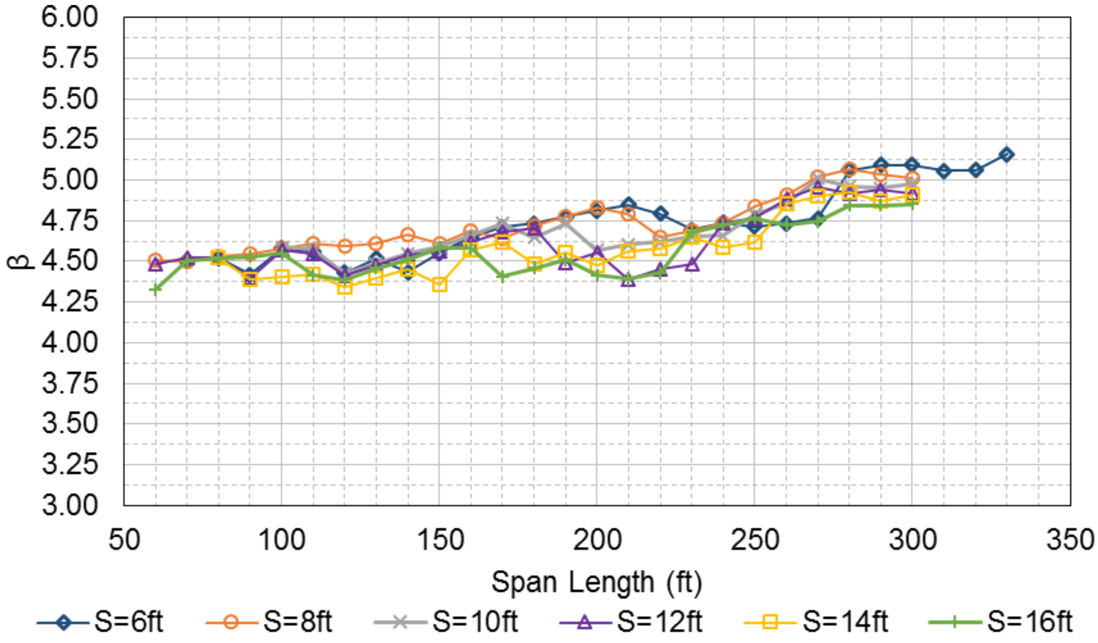


Fig. 6-62: Reliability index, β, for A709-50 composite plate girders with ADTT=2,500, Φ=1.00.

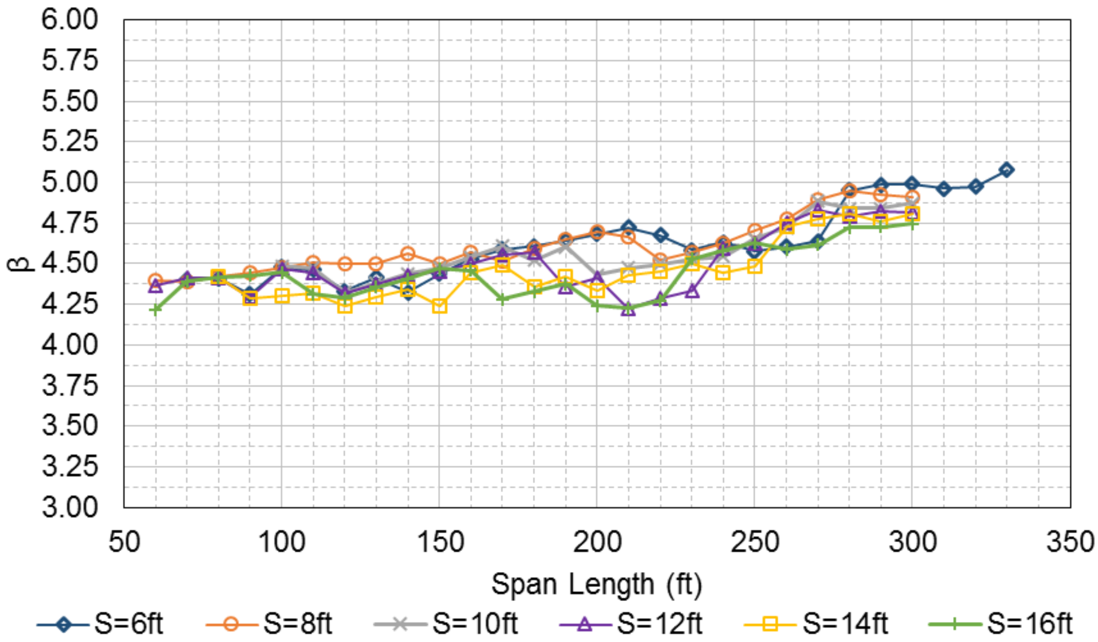


Fig. 6-63: Reliability index, β, for A709-50 composite plate girders with ADTT=5,000, Φ=1.00.

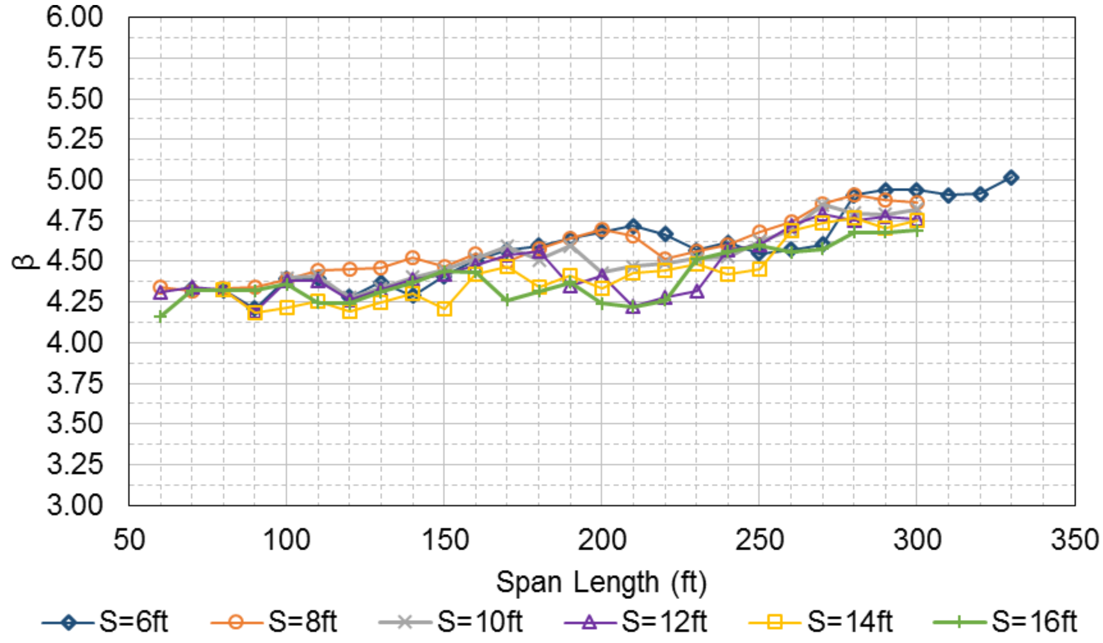


Fig. 6-64: Reliability index, β, for A709-50 composite plate girders with ADTT=10,000, Φ=1.00.

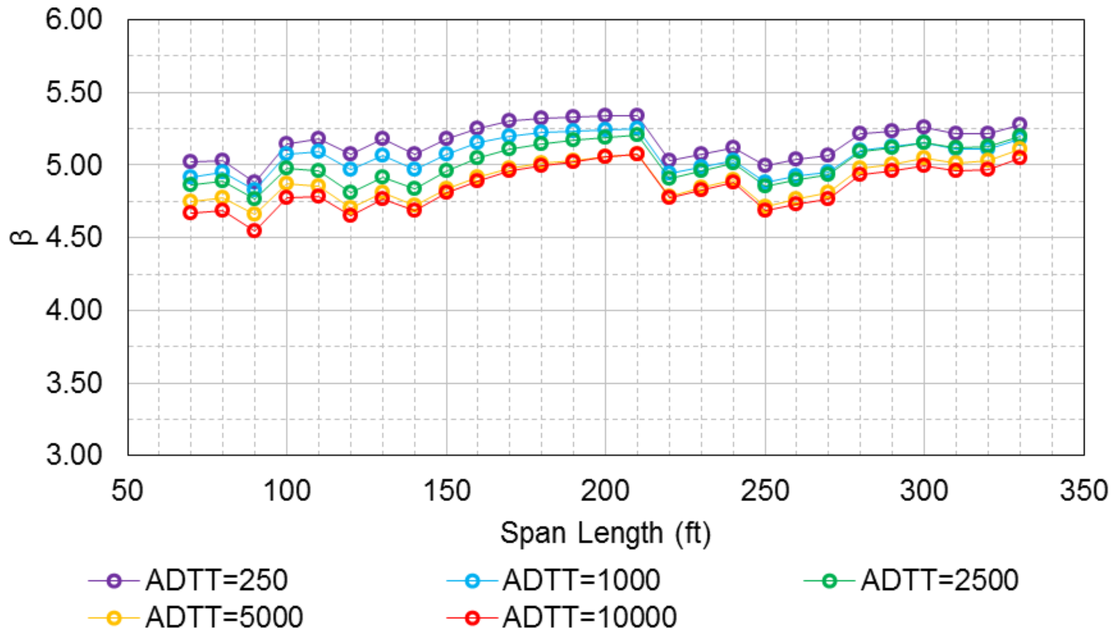


Fig. 6-65: Reliability index, β, for A709-50W composite plate girders with S=6ft, Φ=1.00.

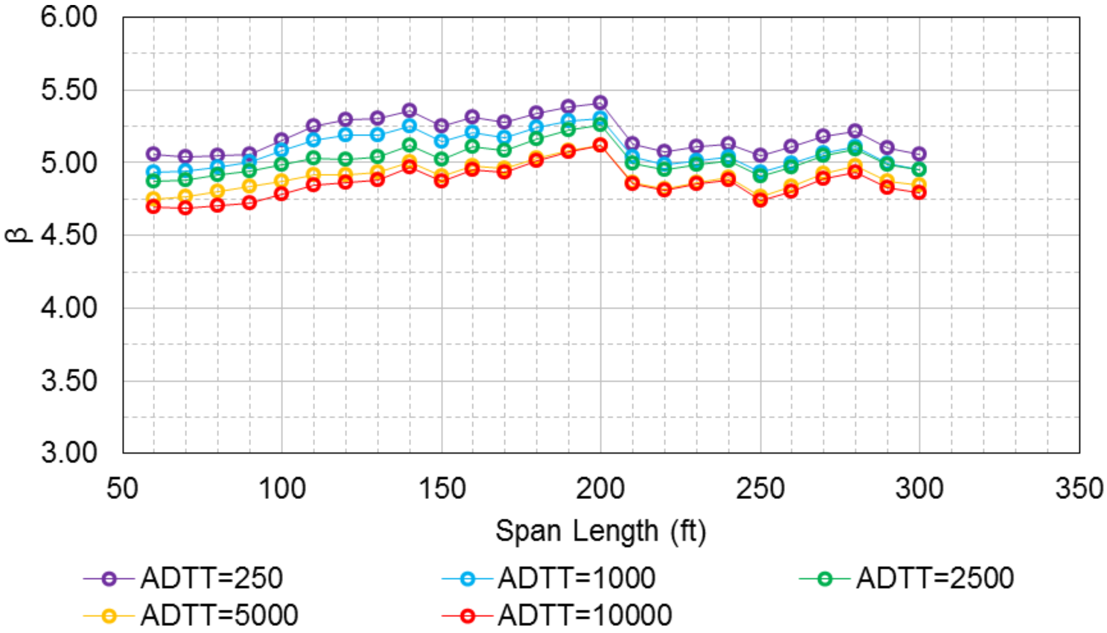


Fig. 6-66: Reliability index, β, for A709-50W composite plate girders with S=8ft, Φ=1.00.

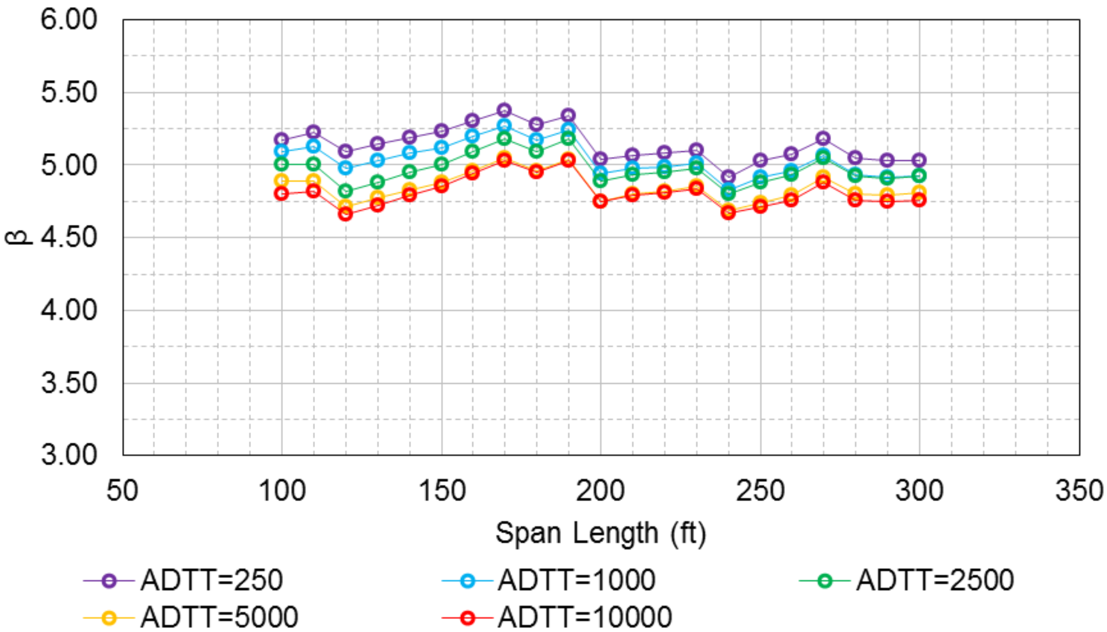


Fig. 6-67: Reliability index, β, for A709-50W composite plate girders with S=10ft, Φ=1.00.

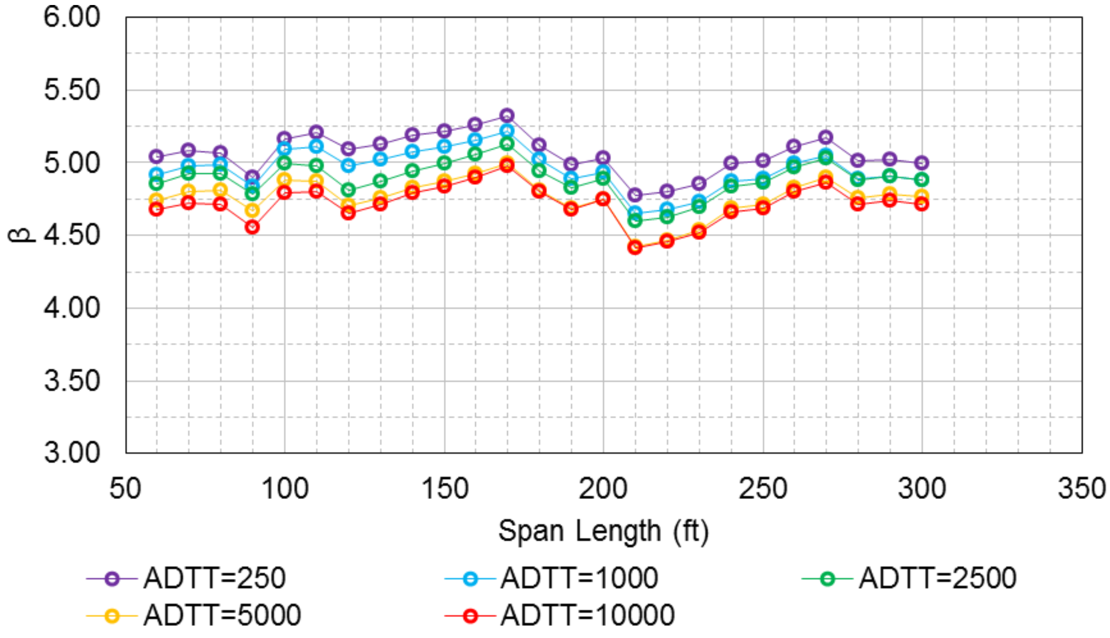


Fig. 6-68: Reliability index, β, for A709-50W composite plate girders with S=12ft, Φ=1.00.

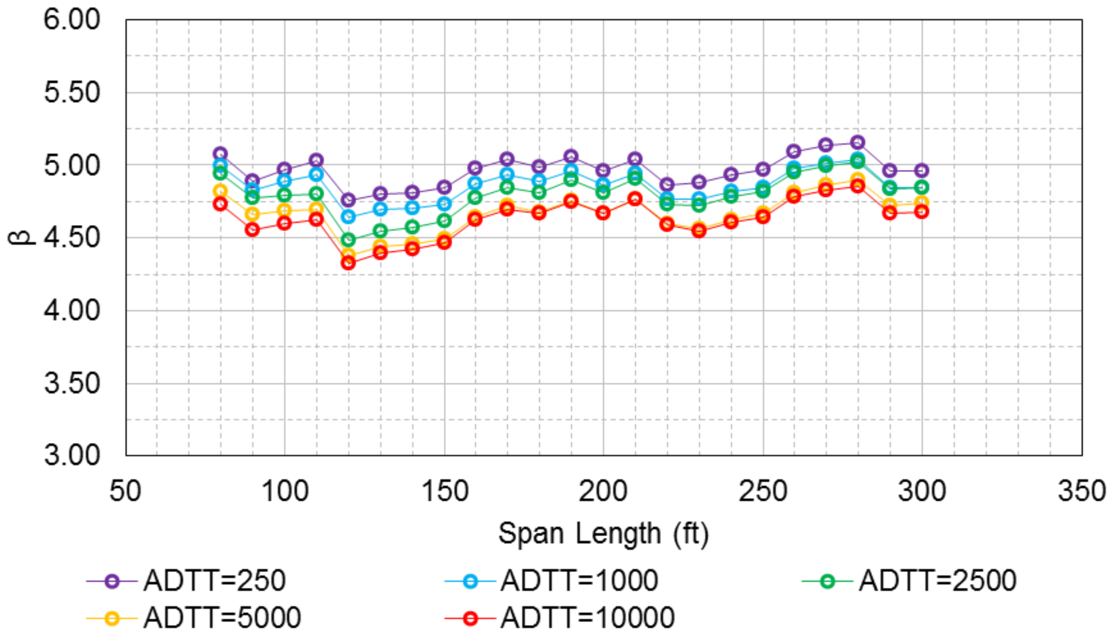


Fig. 6-69: Reliability index, β, for A709-50W composite plate girders with S=14ft, Φ=1.00.

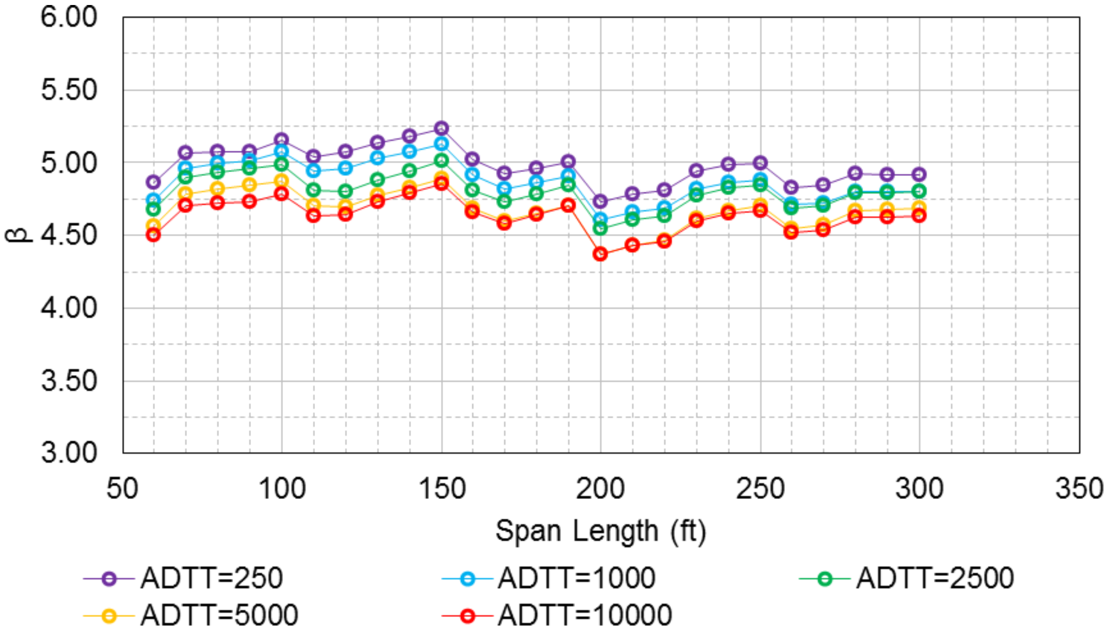


Fig. 6-70: Reliability index, β, for A709-50W composite plate girders with S=16ft, Φ=1.00.

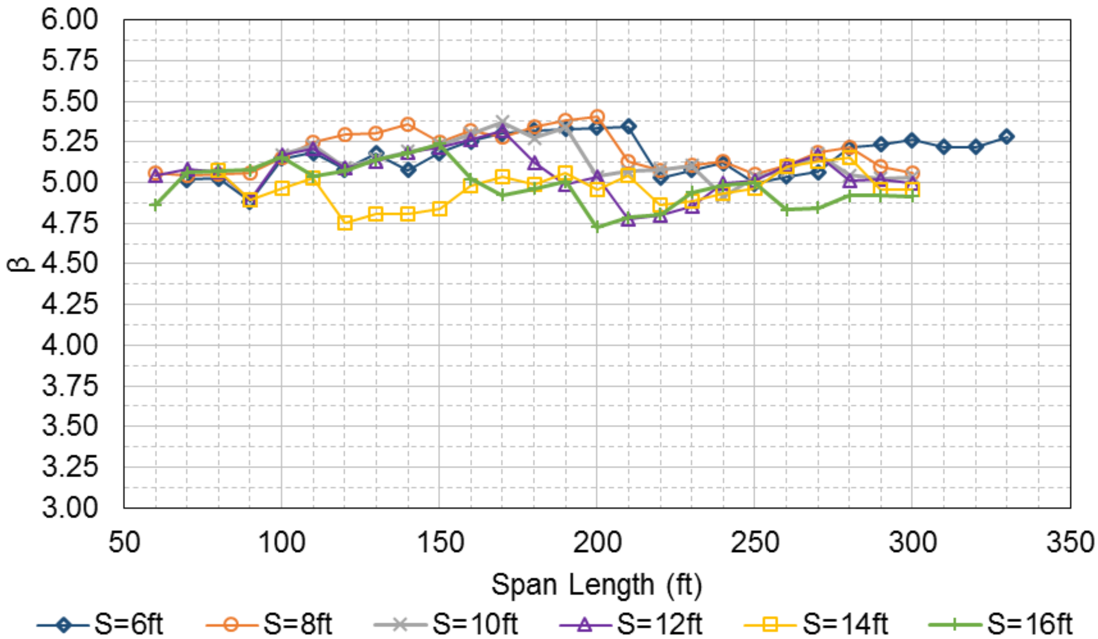


Fig. 6-71: Reliability index, β, for A709-50W composite plate girders with ADTT=250, Φ=1.00.

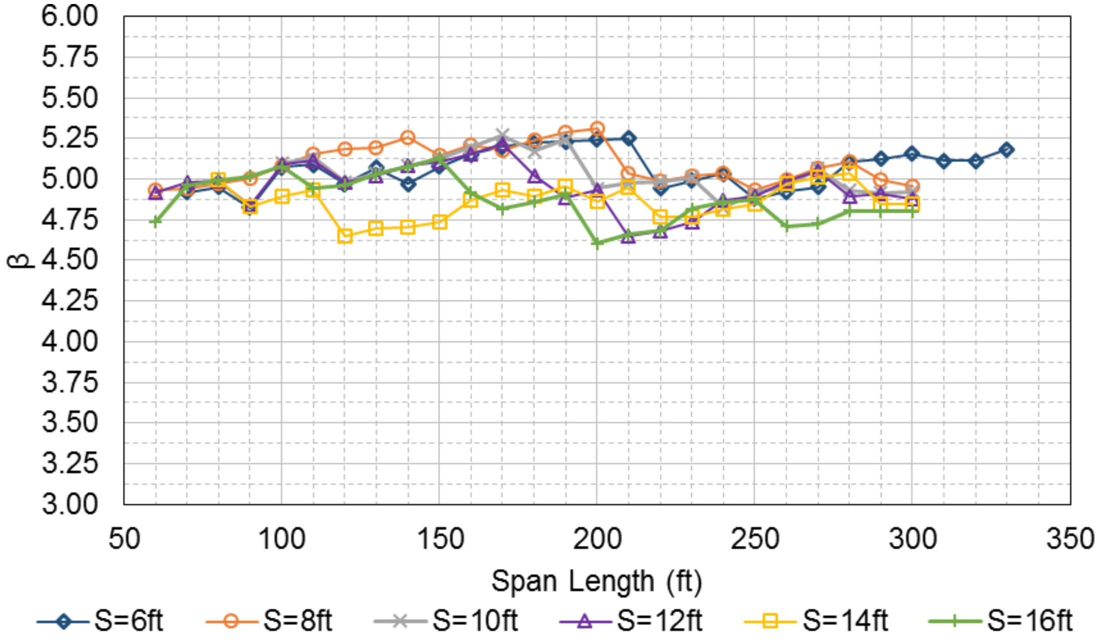


Fig. 6-72: Reliability index, β, for A709-50W composite plate girders with ADTT=1,000, Φ=1.00.

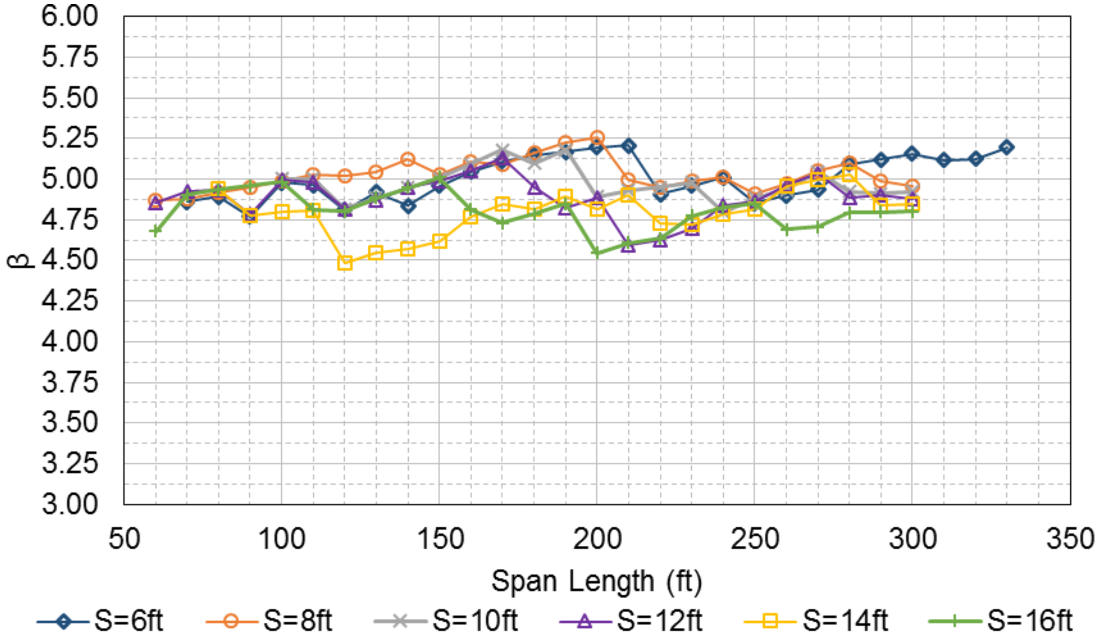


Fig. 6-73: Reliability index, β, for A709-50W composite plate girders with ADTT=2,500, Φ=1.00.

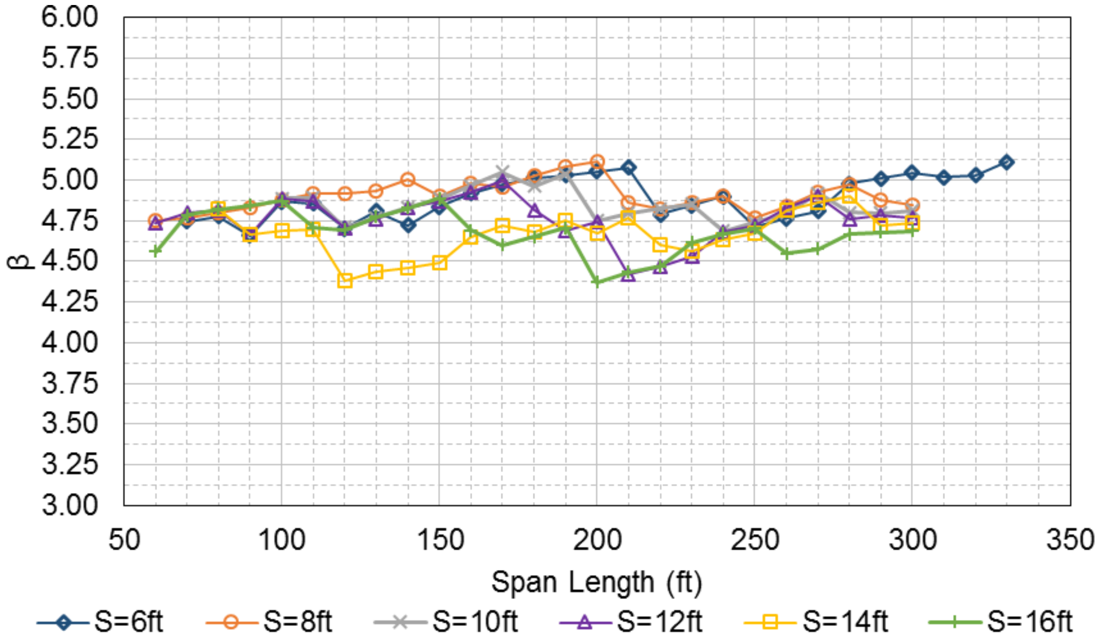


Fig. 6-74: Reliability index, β, for A709-50W composite plate girders with ADTT=5,000, Φ=1.00.

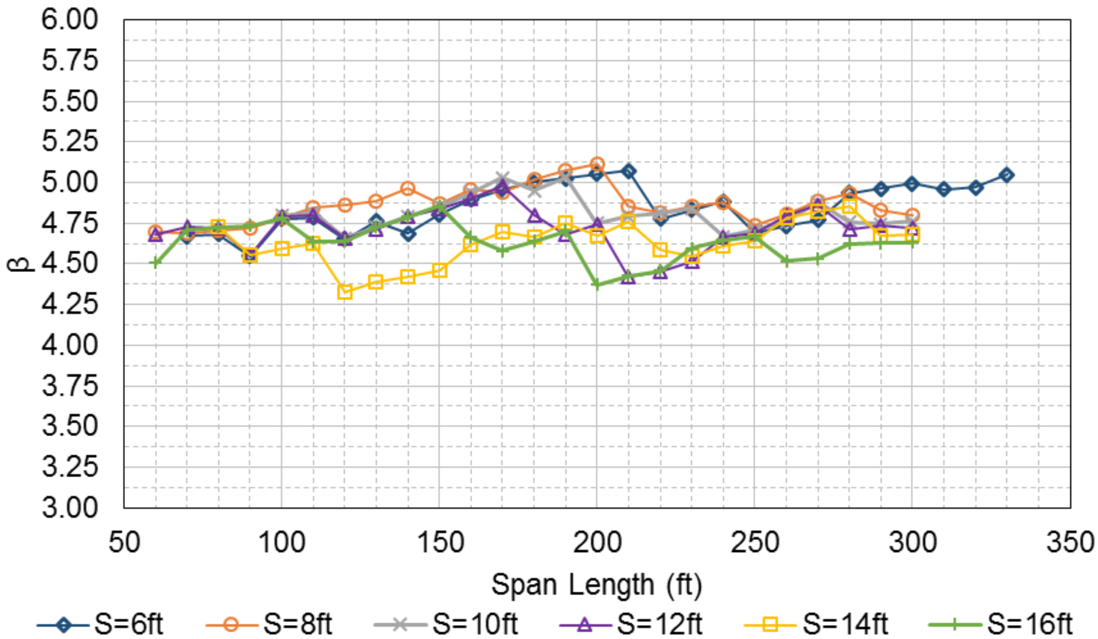


Fig. 6-75: Reliability index, β, for A709-50W composite plate girders with ADTT=10,000, Φ=1.00.

For the nine HPS 50W composite plate girder sections analyzed, the reliability index is presented in Fig. 6-76 and Fig. 6-77. Reliability indices shown in Fig. 6-76 are derived from nominal resistance obtained from AM, that accounts for strain hardening of HPS and results in higher capacity in comparison to RPA resistance model. Fig. 6-77 presents more actual reliability indices for HPS50W composite plate girder sections, where nominal resistance used in derivation of load components is obtained from theoretical resistance model. Analysis of a composite steel section that considers strain hardening of HPS is not a common practice among designers, therefore it reasonable to use nominal flexural resistance obtained from rigid plastic analysis and consider the higher reliability of HPS50W sections (Fig. 6-77).

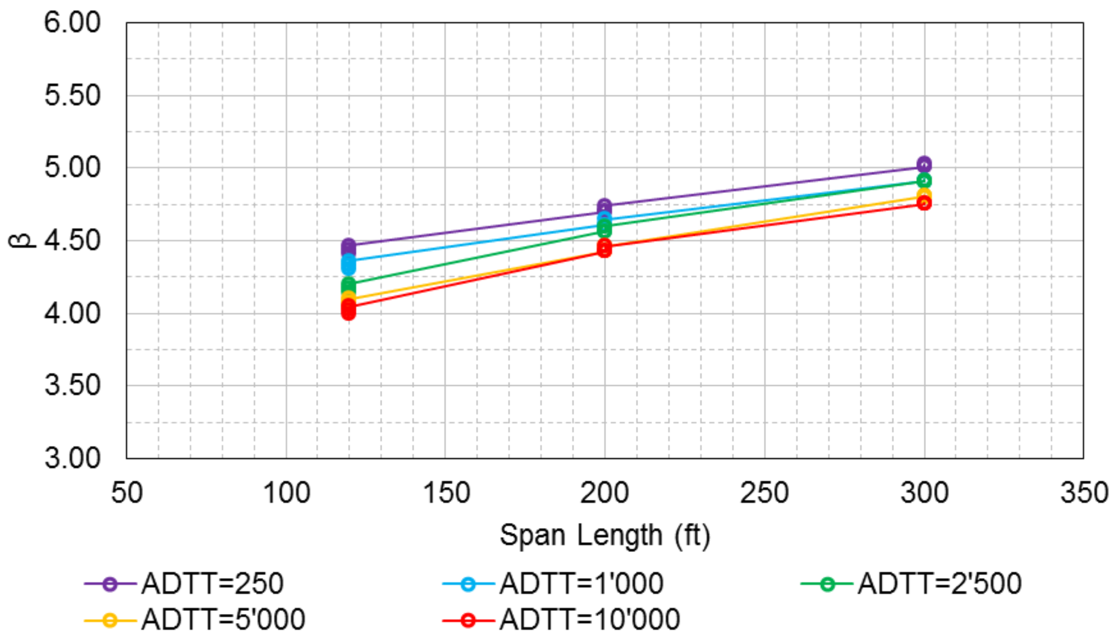


Fig. 6-76: Reliability index, β, for A709-HPS50W composite plate girders per ADTT, Φ=1.00. Nominal resistance obtained from analytical model.

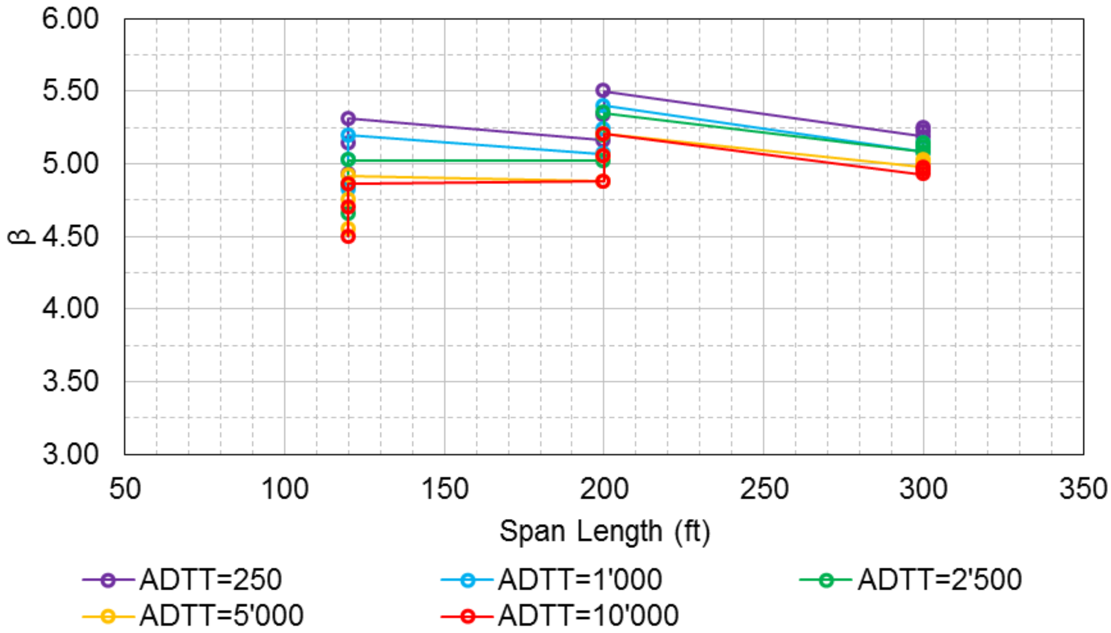


Fig. 6-77: Reliability index, β, for A709-HPS50W composite plate girders per ADTT, Φ=1.00. Nominal resistance obtained from theoretical model.

6.3.5 Flexure of composite box girders

Reliability indices are presented for A709-50 and A709-50W steel composite box girders. Fig. 6-78 to Fig. 6-83 present calculated reliability indices per ADTT for minimum, average, and maximum D/(D+L) ratio as per Table 6-2, for both steel grades. The same reasoning for presentation and analysis of minimum, average and maximum reliability indices as explained in subsection 6.3.1 applies for composite box girders. The reliability indices were calculated for span lengths of {60, 90, 120, 200, 300} feet and maximum ADTT values of {250, 1000, 2500, 5000, 10000} to occur in 75 years (see subsection 4.3). The full report, with all the resulting values of reliability indices can be found in Appendix C.1.5. It is concluded that the composite box girders exceed the expected reliability, with absolute minimum reliability indices of 3.77 and 3.67 for A709-50 and A709-50W steels respectively. The obtained values clearly suggest that calibration may be required to lower the reliability indices down to the target value of 3.5 for these sections.

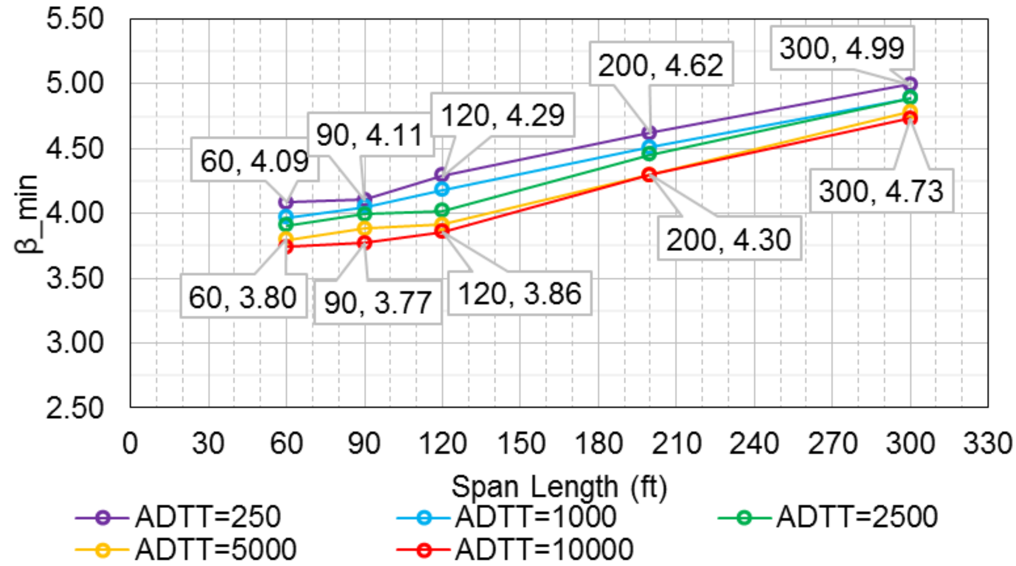


Fig. 6-78: Minimum reliability index, β_{min}, for composite box girders made of A709-50 steel, Φ=1.00, minimum D/(D+L).

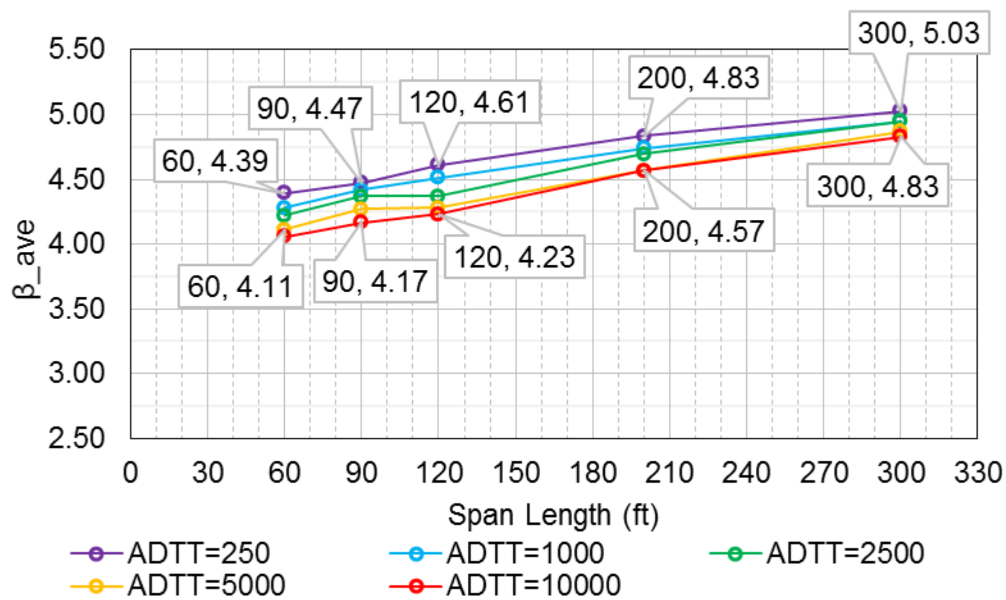


Fig. 6-79: Average reliability index, β_{ave}, for composite box girders made of A709-50 steel, Φ=1.00, average D/(D+L).

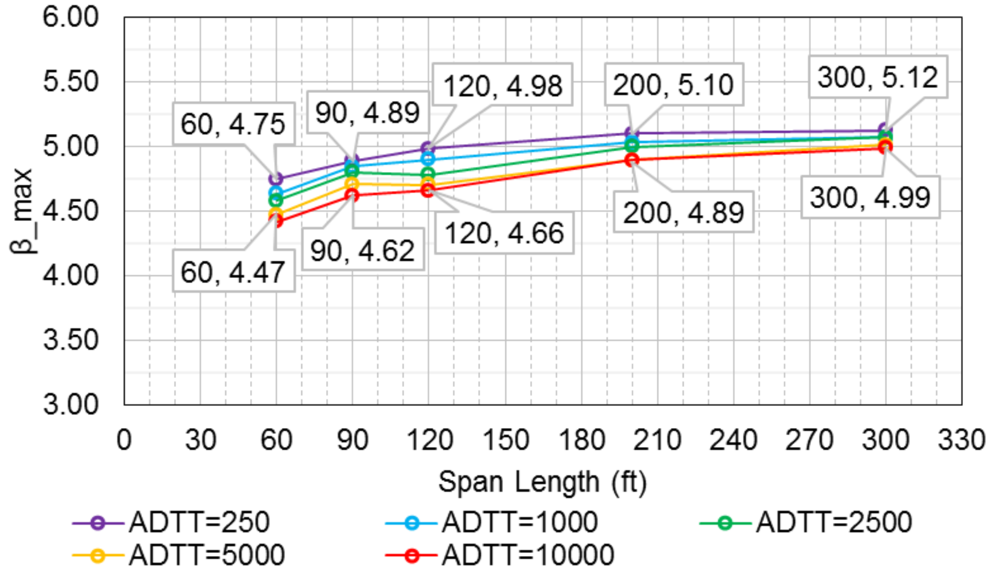


Fig. 6-80: Maximum reliability index, β_{max}, for composite box girders made of A709-50 steel, Φ=1.00, maximum D/(D+L).

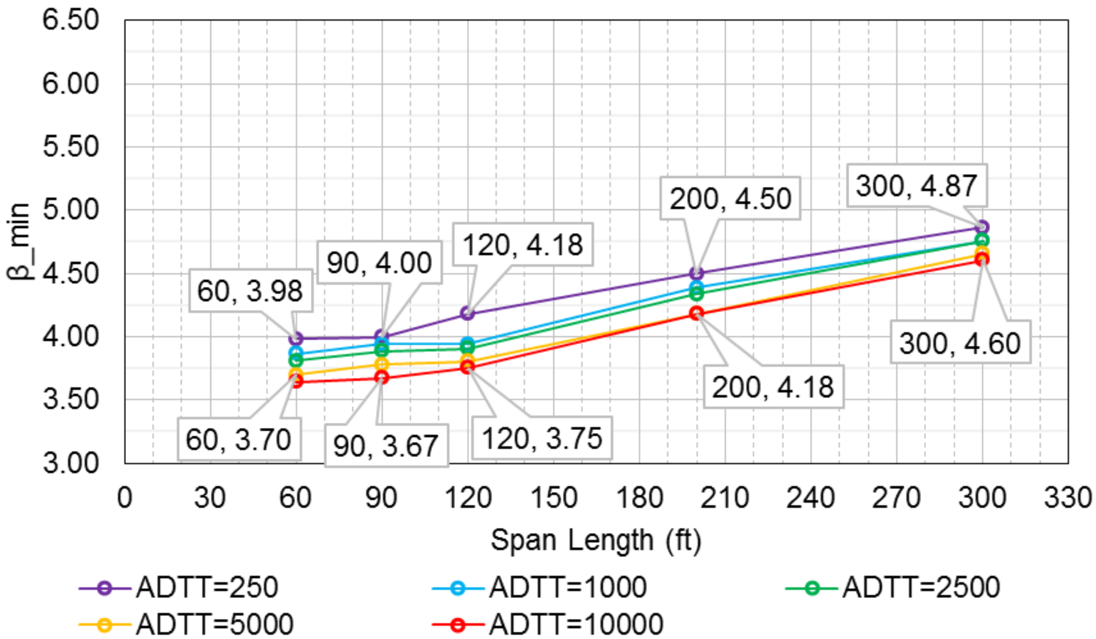


Fig. 6-81: Minimum reliability index, β_{min}, for composite box girders made of A709-50W steel, Φ=1.00, minimum D/(D+L).

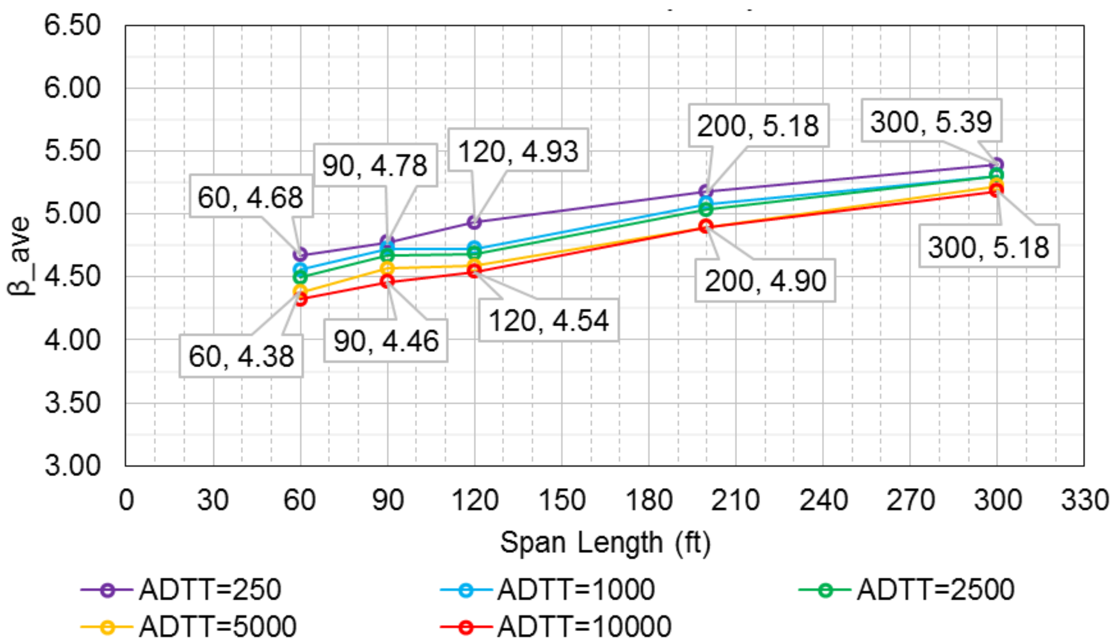


Fig. 6-82: Average reliability index, β_{ave}, for composite box girders made of A709-50W steel, Φ=1.00, average D/(D+L).

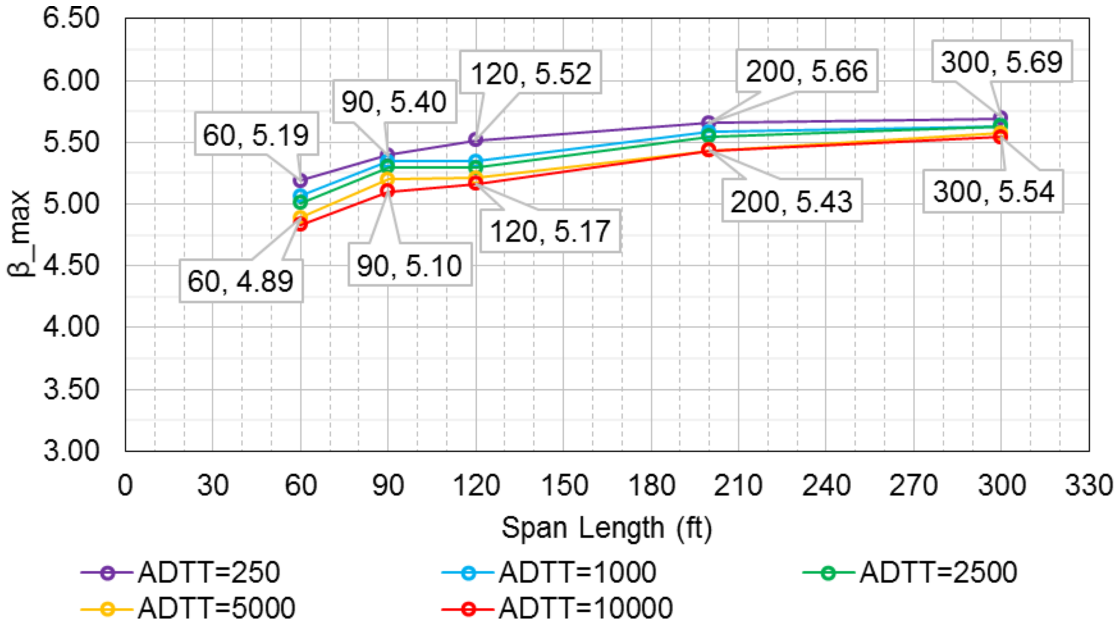


Fig. 6-83: Maximum reliability index, β_{max}, for composite box girders made of A709-50W steel, Φ=1.00, maximum D/(D+L).

Data shown in Fig. 6-78 ÷ Fig. 6-83 is tabulated below (Table 6-6 and Table 6-7).

Table 6-6. Obtained Reliability Indices for A709-50 composite box girders per L, ADTT, and D/(D+L).

	Min. D/(D+L)					Ave. D/(D+L)					Max. D/(D+L)				
ADTT \ L (ft)	60	90	120	200	300	60	90	120	200	300	60	90	120	200	300
250	4.09	4.11	4.29	4.62	4.99	4.39	4.47	4.61	4.83	5.03	4.75	4.89	4.98	5.10	5.12
1000	3.97	4.05	4.18	4.51	4.89	4.28	4.42	4.51	4.74	4.95	4.64	4.85	4.90	5.03	5.07
2500	3.91	3.99	4.02	4.46	4.89	4.22	4.37	4.37	4.70	4.95	4.58	4.80	4.78	5.00	5.07
5000	3.80	3.88	3.91	4.30	4.78	4.11	4.27	4.28	4.57	4.87	4.47	4.71	4.70	4.89	5.01
10000	3.74	3.77	3.86	4.30	4.73	4.06	4.17	4.23	4.57	4.83	4.42	4.62	4.66	4.89	4.99

Table 6-7. Obtained Reliability Indices for A709-50W composite box girders per L, ADTT, and D/(D+L).

	Min. D/(D+L)					Ave. D/(D+L)					Max. D/(D+L)				
ADTT \ L (ft)	60	90	120	200	300	60	90	120	200	300	60	90	120	200	300
250	3.98	4.00	4.18	4.50	4.87	4.68	4.78	4.93	5.18	5.39	5.19	5.40	5.52	5.66	5.69
1000	3.87	3.94	3.94	4.39	4.76	4.56	4.72	4.72	5.08	5.31	5.07	5.35	5.35	5.58	5.63
2500	3.81	3.89	3.91	4.34	4.76	4.50	4.67	4.68	5.04	5.31	5.01	5.30	5.29	5.54	5.63
5000	3.70	3.78	3.80	4.18	4.66	4.38	4.57	4.59	4.90	5.22	4.89	5.20	5.21	5.43	5.57
10000	3.64	3.67	3.75	4.18	4.60	4.32	4.46	4.54	4.90	5.18	4.83	5.10	5.17	5.43	5.54

6.3.6 Shear of rolled I-shaped girders

Due to uniformity in resistance distribution , the results of reliability analysis are exactly the same for each rolled I-shaped section considered. Three plots of reliability indices are presented, for minimum, average, and maximum value of D/(D+L) (Fig. 6-84 ÷ Fig. 6-86) for a specific span lengths analyzed as per Table 6-3. All the values shown in figures below are tabulated in Table 6-8. Calculated reliability indices for shear resistance of rolled I-shaped steel sections are clearly under the expected target of 3.5. Because obtained values for span lengths up to 120 feet are below target β, a calibration of shear design formula is necessary.

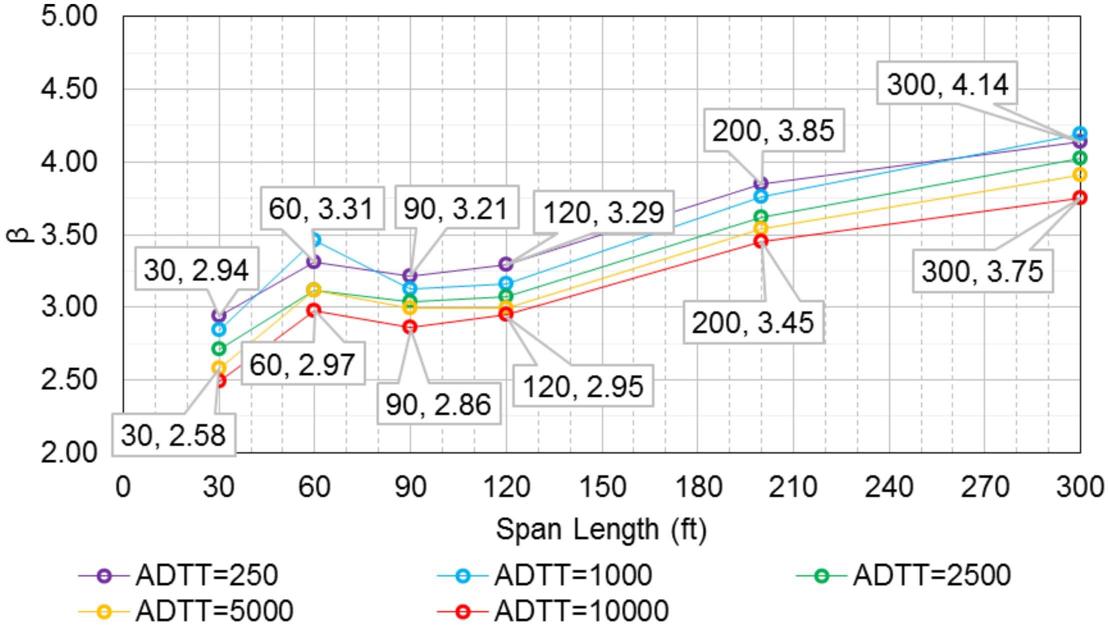


Fig. 6-84: Reliability index, β, due to shear for rolled I-shaped sections, Φ=1.00, minimum D/(D+L).

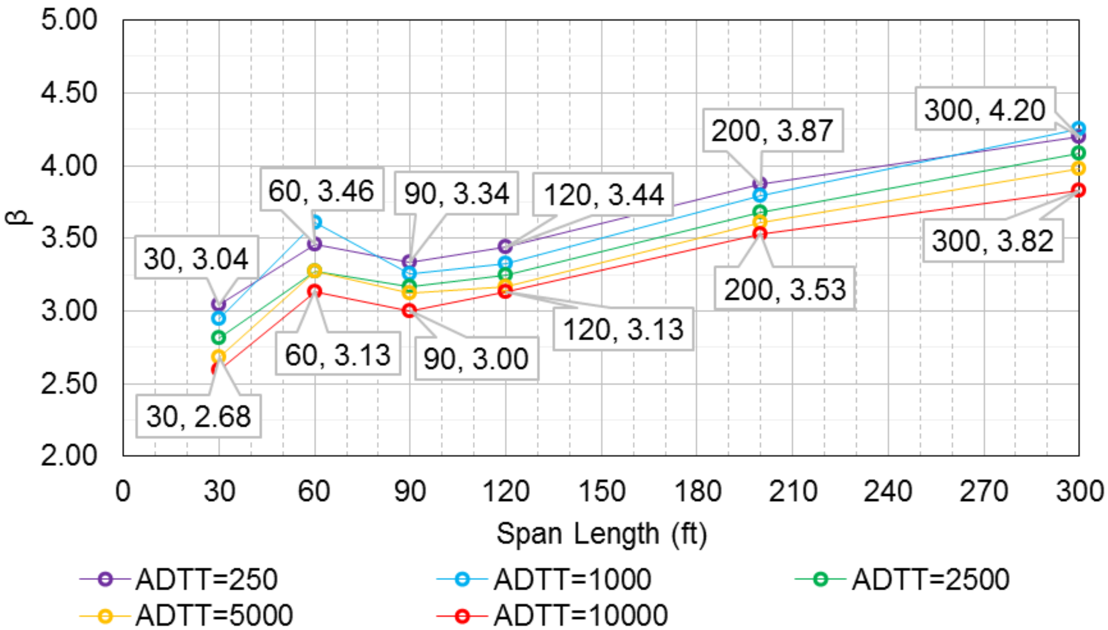


Fig. 6-85: Reliability index, β, due to shear for rolled I-shaped sections, Φ=1.00, average D/(D+L).

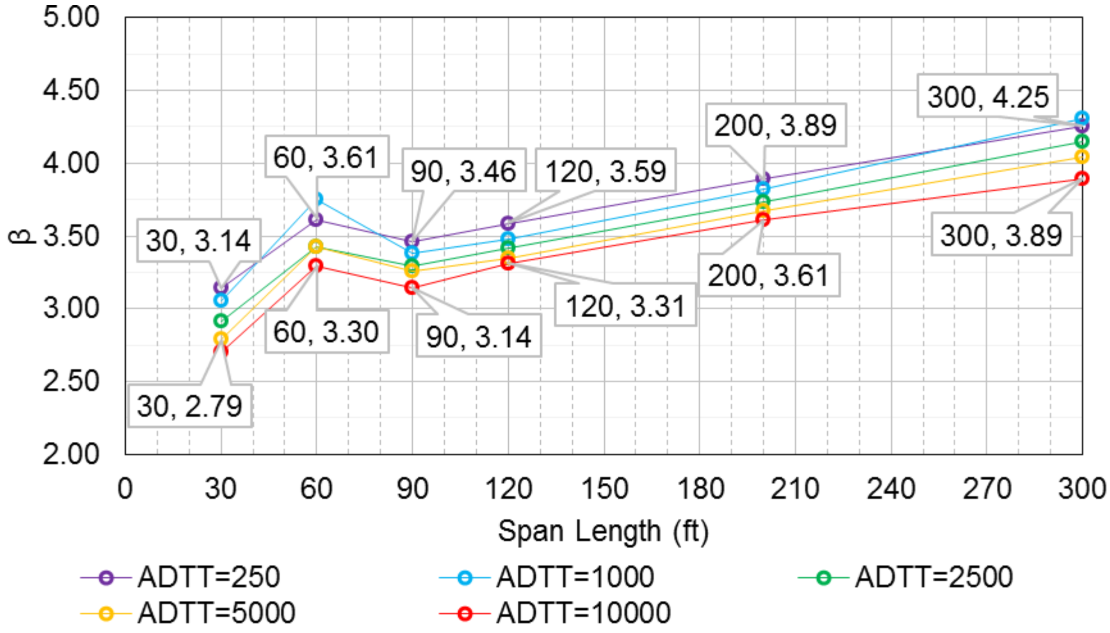


Fig. 6-86: Reliability index, β, due to shear for rolled I-shaped sections, Φ=1.00, maximum D/(D+L).

Table 6-8. Reliability Indices for shear resistance of rolled I-shaped girders per L, ADTT, and D/(D+L).

	Min. D/(D+L)						Ave. D/(D+L)						Max. D/(D+L)					
ADTT \ L (ft)	30	60	90	120	200	300	30	60	90	120	200	300	30	60	90	120	200	300
250	2.94	3.31	3.21	3.29	3.85	4.14	3.04	3.46	3.34	3.44	3.87	4.20	3.14	3.61	3.46	3.59	3.89	4.25
1000	2.84	3.46	3.12	3.16	3.76	4.19	2.95	3.61	3.25	3.32	3.79	4.25	3.05	3.75	3.38	3.48	3.83	4.31
2500	2.71	3.11	3.03	3.07	3.62	4.02	2.81	3.27	3.17	3.24	3.68	4.09	2.92	3.43	3.30	3.41	3.73	4.15
5000	2.58	3.11	2.99	2.99	3.54	3.91	2.68	3.27	3.12	3.17	3.60	3.98	2.79	3.43	3.26	3.34	3.67	4.05
10000	2.49	2.97	2.86	2.95	3.45	3.75	2.60	3.13	3.00	3.13	3.53	3.82	2.70	3.30	3.14	3.31	3.61	3.89

6.3.7 Shear of plate and box girders

The results of reliability analysis for A709 steel grades are presented in tabulated form for ADTT from 250 to 10,000 (Table 6-9 ÷ Table 6-12). Calculated reliability indices are marked in red and orange for values lower than 3.0 and 3.5 respectively. Tables 6-9 and 6-10 show results for grade 50 and 50W steels for minimum and maximum D/(D+L) ratios. Simillarly, tables 6-11 and 6-12 showing reliability indices for grades 50W and 70W for minimum and maximum D/(D+L) ratios. This represent a spectrum of possible values. Diversified D/(D+L) ratios analyzed (Table 6-3) and statistical parameters of live load result in varied distribution of the results. To understand the resulting reliability indices for A709 shear plates, each steel grade is discussed separately.

Most of the results for grade 50 and 50W (Table 6-9 and Table 6-10) are lower than the target of 3.5 and require calibration to perform in satisfactory manner.

Table 6-9. Reliability Indices for shear resistance of A709-50 and 709-50W steel for minimum D/(D+L).

A709-50						A709-50W					
ADTT=250						ADTT=250					
t (in) \ L (ft)	60	90	120	200	300	t (in) \ L (ft)	60	90	120	200	300
0.5	3.59	3.51	3.58	4.04	4.32	0.5	4.00	3.94	4.05	4.56	4.81
1.0	3.28	3.19	3.28	3.75	4.04	1.0	3.55	3.48	3.57	4.08	4.35
1.5	3.20	3.11	3.19	3.68	3.98	1.5	3.03	2.93	3.00	3.47	3.79
2.0	3.00	2.90	2.97	3.44	3.76	2.0	3.10	3.01	3.09	3.59	3.90
ADTT=1,000						ADTT=1,000					
t (in) \ L (ft)	60	90	120	200	300	t (in) \ L (ft)	60	90	120	200	300
0.5	3.74	3.43	3.47	3.96	4.37	0.5	4.16	3.86	3.92	4.48	4.87
1.0	3.43	3.10	3.15	3.66	4.10	1.0	3.71	3.39	3.44	3.98	4.41
1.5	3.35	3.01	3.05	3.58	4.04	1.5	3.18	2.84	2.87	3.38	3.85
2.0	3.16	2.81	2.84	3.35	3.81	2.0	3.26	2.92	2.96	3.49	3.96
ADTT=2,500						ADTT=2,500					
t (in) \ L (ft)	60	90	120	200	300	t (in) \ L (ft)	60	90	120	200	300
0.5	3.40	3.34	3.39	3.82	4.21	0.5	3.79	3.76	3.83	4.33	4.70
1.0	3.09	3.02	3.06	3.52	3.93	1.0	3.35	3.29	3.35	3.84	4.23
1.5	3.00	2.92	2.97	3.45	3.86	1.5	2.84	2.75	2.79	3.25	3.68
2.0	2.81	2.72	2.76	3.22	3.64	2.0	2.90	2.82	2.87	3.35	3.78
ADTT=5,000						ADTT=5,000					
t (in) \ L (ft)	60	90	120	200	300	t (in) \ L (ft)	60	90	120	200	300
0.5	3.40	3.30	3.31	3.75	4.10	0.5	3.79	3.71	3.74	4.25	4.58
1.0	3.09	2.97	2.97	3.44	3.82	1.0	3.35	3.25	3.26	3.75	4.12
1.5	3.00	2.88	2.88	3.36	3.75	1.5	2.84	2.71	2.71	3.16	3.57
2.0	2.81	2.68	2.68	3.13	3.53	2.0	2.90	2.78	2.78	3.26	3.66
ADTT=10,000						ADTT=10,000					
t (in) \ L (ft)	60	90	120	200	300	t (in) \ L (ft)	60	90	120	200	300
0.5	3.26	3.17	3.27	3.67	3.95	0.5	3.65	3.58	3.70	4.16	4.41
1.0	2.94	2.84	2.93	3.35	3.66	1.0	3.20	3.11	3.22	3.67	3.95
1.5	2.85	2.74	2.84	3.27	3.58	1.5	2.70	2.58	2.67	3.08	3.40
2.0	2.67	2.55	2.64	3.04	3.37	2.0	2.76	2.64	2.74	3.17	3.49

Table 6-10. Reliability Indices for shear resistance of A709-50 and 709-50W steel for maximum D/(D+L).

A709-50					
ADTT=250					
t (in) \ L (ft)	60	90	120	200	300
0.5	3.92	3.79	3.81	3.84	4.20
1.0	3.62	3.47	3.49	3.53	3.92
1.5	3.55	3.40	3.42	3.46	3.86
2.0	3.31	3.15	3.16	3.19	3.58
ADTT=1,000					
t (in) \ L (ft)	60	90	120	200	300
0.5	4.03	3.72	3.72	3.80	4.23
1.0	3.75	3.40	3.40	3.49	3.94
1.5	3.68	3.32	3.32	3.42	3.88
2.0	3.43	3.08	3.07	3.16	3.61
ADTT=2,500					
t (in) \ L (ft)	60	90	120	200	300
0.5	3.77	3.65	3.66	3.75	4.14
1.0	3.46	3.33	3.34	3.44	3.86
1.5	3.38	3.25	3.26	3.36	3.80
2.0	3.14	3.01	3.01	3.10	3.53
ADTT=5,000					
t (in) \ L (ft)	60	90	120	200	300
0.5	3.77	3.62	3.60	3.73	4.10
1.0	3.46	3.30	3.28	3.40	3.81
1.5	3.38	3.21	3.20	3.33	3.75
2.0	3.14	2.97	2.95	3.07	3.48
ADTT=10,000					
t (in) \ L (ft)	60	90	120	200	300
0.5	3.67	3.53	3.59	3.69	4.03
1.0	3.34	3.20	3.25	3.37	3.74
1.5	3.26	3.11	3.17	3.29	3.67
2.0	3.03	2.87	2.92	3.03	3.40

A709-50W					
ADTT=250					
t (in) \ L (ft)	60	90	120	200	300
0.5	4.46	4.33	4.37	4.42	4.81
1.0	3.96	3.81	3.84	3.89	4.29
1.5	3.34	3.19	3.20	3.23	3.63
2.0	3.46	3.30	3.32	3.36	3.77
ADTT=1,000					
t (in) \ L (ft)	60	90	120	200	300
0.5	4.59	4.25	4.27	4.39	4.85
1.0	4.09	3.74	3.75	3.85	4.32
1.5	3.47	3.11	3.11	3.20	3.65
2.0	3.59	3.22	3.22	3.32	3.80
ADTT=2,500					
t (in) \ L (ft)	60	90	120	200	300
0.5	4.29	4.18	4.20	4.34	4.76
1.0	3.79	3.67	3.69	3.80	4.23
1.5	3.18	3.04	3.05	3.14	3.58
2.0	3.29	3.15	3.16	3.26	3.72
ADTT=5,000					
t (in) \ L (ft)	60	90	120	200	300
0.5	4.29	4.14	4.15	4.30	4.71
1.0	3.79	3.63	3.62	3.76	4.18
1.5	3.18	3.01	2.99	3.10	3.52
2.0	3.29	3.11	3.10	3.23	3.66
ADTT=10,000					
t (in) \ L (ft)	60	90	120	200	300
0.5	4.17	4.04	4.12	4.26	4.64
1.0	3.67	3.53	3.59	3.72	4.10
1.5	3.06	2.91	2.96	3.07	3.44
2.0	3.16	3.01	3.06	3.19	3.58

The plates of grades HPS50W and HPS70W perform better in shear than grades 50 and 50W (Table 6-11 and Table 6-12). Yet, most of the reliability index values are below 3.5 which indicates a need for calibration.

Table 6-11. Reliability Indices for shear resistance of A709-HPS50W and 709-HPS70W steel for minimum D/(D+L).

A709-HPS50W						A709-HPS70W					
ADTT=250						ADTT=250					
t (in) \ L (ft)	60	90	120	200	300	t (in) \ L (ft)	60	90	120	200	300
0.5	3.15	3.05	3.13	3.60	3.90	0.5	4.40	4.35	4.44	4.86	5.09
1.0	3.24	3.15	3.24	3.73	4.03	1.0	3.51	3.42	3.48	3.84	4.12
1.5	3.24	3.15	3.23	3.72	4.02	1.5	3.60	3.53	3.60	4.02	4.30
2.0	3.24	3.15	3.23	3.69	3.99	2.0	3.32	3.23	3.29	3.68	3.97
ADTT=1,000						ADTT=1,000					
t (in) \ L (ft)	60	90	120	200	300	t (in) \ L (ft)	60	90	120	200	300
0.5	3.30	2.97	3.00	3.51	3.96	0.5	4.54	4.27	4.32	4.79	5.14
1.0	3.40	3.06	3.11	3.64	4.09	1.0	3.64	3.35	3.38	3.77	4.16
1.5	3.39	3.06	3.10	3.63	4.08	1.5	3.75	3.44	3.48	3.94	4.35
2.0	3.39	3.06	3.10	3.60	4.05	2.0	3.46	3.15	3.18	3.61	4.02
ADTT=2,500						ADTT=2,500					
t (in) \ L (ft)	60	90	120	200	300	t (in) \ L (ft)	60	90	120	200	300
0.5	2.95	2.88	2.92	3.38	3.80	0.5	4.21	4.18	4.24	4.68	4.99
1.0	3.04	2.97	3.02	3.50	3.91	1.0	3.34	3.27	3.31	3.67	4.03
1.5	3.04	2.96	3.01	3.49	3.91	1.5	3.42	3.36	3.40	3.83	4.20
2.0	3.04	2.97	3.01	3.47	3.88	2.0	3.14	3.07	3.10	3.50	3.88
ADTT=5,000						ADTT=5,000					
t (in) \ L (ft)	60	90	120	200	300	t (in) \ L (ft)	60	90	120	200	300
0.5	2.95	2.83	2.83	3.29	3.68	0.5	4.21	4.14	4.17	4.59	4.90
1.0	3.04	2.92	2.93	3.41	3.80	1.0	3.34	3.24	3.24	3.60	3.94
1.5	3.04	2.92	2.92	3.40	3.79	1.5	3.42	3.32	3.32	3.75	4.10
2.0	3.04	2.93	2.93	3.39	3.77	2.0	3.14	3.03	3.03	3.42	3.79
ADTT=10,000						ADTT=10,000					
t (in) \ L (ft)	60	90	120	200	300	t (in) \ L (ft)	60	90	120	200	300
0.5	2.81	2.70	2.79	3.21	3.52	0.5	4.08	4.02	4.12	4.52	4.76
1.0	2.89	2.79	2.89	3.32	3.64	1.0	3.22	3.13	3.20	3.53	3.81
1.5	2.89	2.79	2.88	3.32	3.63	1.5	3.28	3.19	3.29	3.67	3.95
2.0	2.90	2.80	2.89	3.30	3.61	2.0	3.01	2.91	2.99	3.35	3.65

Table 6-12. Reliability Indices for shear resistance of A709-HPS50W and 709-HPS70W steel for maximum D/(D+L).

A709-HPS50W						A709-HPS70W					
ADTT=250						ADTT=250					
t (in) \ L (ft)	60	90	120	200	300	t (in) \ L (ft)	60	90	120	200	300
0.5	3.47	3.32	3.34	3.37	3.76	0.5	4.77	4.65	4.66	4.70	5.00
1.0	3.60	3.45	3.48	3.52	3.92	1.0	3.73	3.60	3.60	3.62	3.90
1.5	3.60	3.44	3.46	3.51	3.90	1.5	3.91	3.78	3.79	3.82	4.15
2.0	3.57	3.42	3.43	3.47	3.85	2.0	3.56	3.43	3.43	3.45	3.76
ADTT=1,000						ADTT=1,000					
t (in) \ L (ft)	60	90	120	200	300	t (in) \ L (ft)	60	90	120	200	300
0.5	3.59	3.24	3.25	3.33	3.79	0.5	4.87	4.58	4.60	4.67	5.02
1.0	3.73	3.38	3.38	3.48	3.94	1.0	3.82	3.55	3.53	3.59	3.92
1.5	3.72	3.37	3.37	3.47	3.93	1.5	4.02	3.71	3.71	3.79	4.17
2.0	3.69	3.35	3.34	3.44	3.88	2.0	3.66	3.37	3.36	3.42	3.78
ADTT=2,500						ADTT=2,500					
t (in) \ L (ft)	60	90	120	200	300	t (in) \ L (ft)	60	90	120	200	300
0.5	3.31	3.18	3.18	3.28	3.71	0.5	4.63	4.52	4.54	4.63	4.96
1.0	3.44	3.31	3.32	3.42	3.86	1.0	3.61	3.49	3.49	3.55	3.87
1.5	3.43	3.30	3.31	3.41	3.85	1.5	3.77	3.65	3.66	3.74	4.10
2.0	3.41	3.28	3.28	3.38	3.80	2.0	3.43	3.31	3.31	3.38	3.72
ADTT=5,000						ADTT=5,000					
t (in) \ L (ft)	60	90	120	200	300	t (in) \ L (ft)	60	90	120	200	300
0.5	3.31	3.14	3.12	3.25	3.66	0.5	4.63	4.50	4.49	4.60	4.92
1.0	3.44	3.27	3.26	3.39	3.81	1.0	3.61	3.47	3.44	3.52	3.83
1.5	3.43	3.26	3.25	3.37	3.80	1.5	3.77	3.62	3.60	3.71	4.06
2.0	3.41	3.24	3.23	3.35	3.75	2.0	3.43	3.28	3.26	3.35	3.68
ADTT=10,000						ADTT=10,000					
t (in) \ L (ft)	60	90	120	200	300	t (in) \ L (ft)	60	90	120	200	300
0.5	3.20	3.05	3.10	3.22	3.58	0.5	4.52	4.41	4.47	4.57	4.87
1.0	3.32	3.17	3.22	3.35	3.73	1.0	3.51	3.39	3.42	3.50	3.77
1.5	3.31	3.16	3.22	3.34	3.72	1.5	3.66	3.53	3.58	3.68	3.99
2.0	3.29	3.14	3.20	3.31	3.67	2.0	3.33	3.20	3.23	3.32	3.62

Chapter 7: Resistance factors for steel bridges

For optimum evaluation of the load and resistance factors the distributions of both, load and resistance, must be known. Interference in load factors is not recommended without comprehensive analysis of loads. Distributions of loads and their statistical parameters used in this dissertation were taken from previous studies and therefore the load factors are not investigated herein.

To provide a uniform safety level for the steel girders analyzed, expressed as reliability index β of 3.5, the resistance factor can be modified accordingly. Following the adopted by design code [1] values of resistance factor, modifications in increments of 0.05 are acceptable. Due to the nature of the reliability index calculations, which are based on the lower tail of the resistance distribution, determination of the appropriate resistance factors is done through a series of reliability index calculations with various resistance factors. The full reports of calculated reliability indices for different resistance factors are attached in Appendix C.1.

The reliability analysis performed for all the considered structural types (see section 6.3), revealed satisfactory performance and exceeded the desired safety levels, therefore an investigation of a higher resistance factor is presented in this chapter. The following sections present reliability indices calculated using resistance factor Φ=1.05 for all the structural types, in the same fashion as in section 6.3. The reliability analysis with increased resistance factor was not attempted for A709 steel plates due to shear. Results presented for the current design formula (see subsection 6.3.7) indicate that investigation of larger resistance factor is not reasonable.

7.1 Flexure of noncomposite rolled I-shaped girders

Reliability indices were calculated for resistance factor Φ=1.05 for noncomposite rolled I-shaped girders with minimum, average, and maximum D/(D+L) ratios (Fig. 7-1 ÷ Fig. 7-3). The best representation of calculated safety levels is shown in Fig. 7-2 for average D/(D+L) ratios. The reliability index values shown in Fig. 7-2 are lesser than the desired value of 3.5 for all the ADTTs and for the most common span length between 30 to 90 feet. This leads to the conclusion that resistance factor of 1.05 is not an appropriate value, and if the calibration of these safety levels is to be made, it should be performed on the load side or resistance factors with increments of 0.01 shall be permitted.

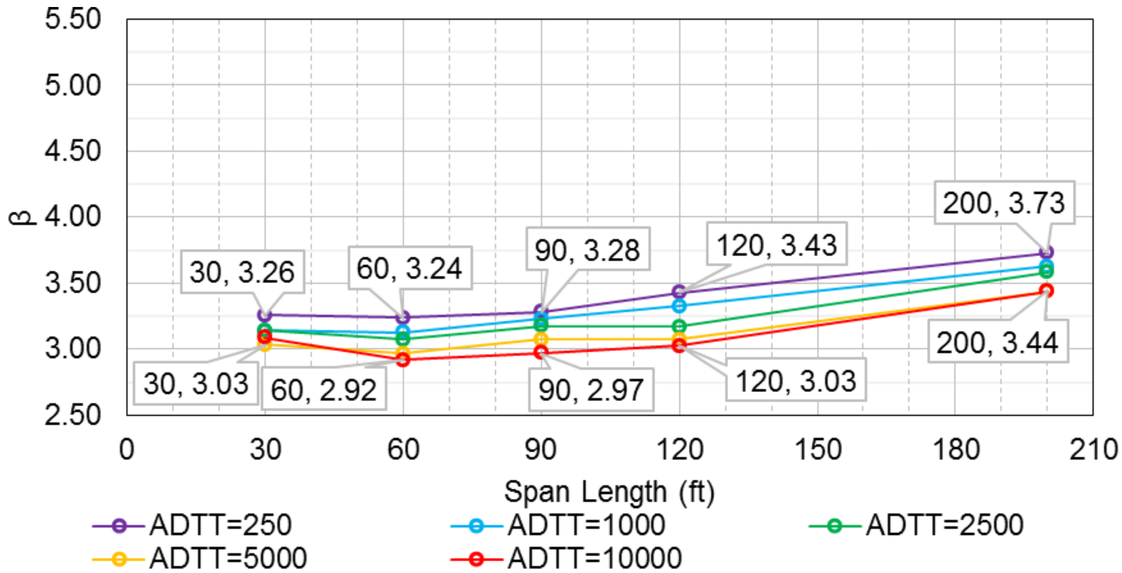


Fig. 7-1: Minimum reliability index, β_{min}, for noncomposite rolled I-shaped sections, Φ=1.05, minimum D/(D+L).

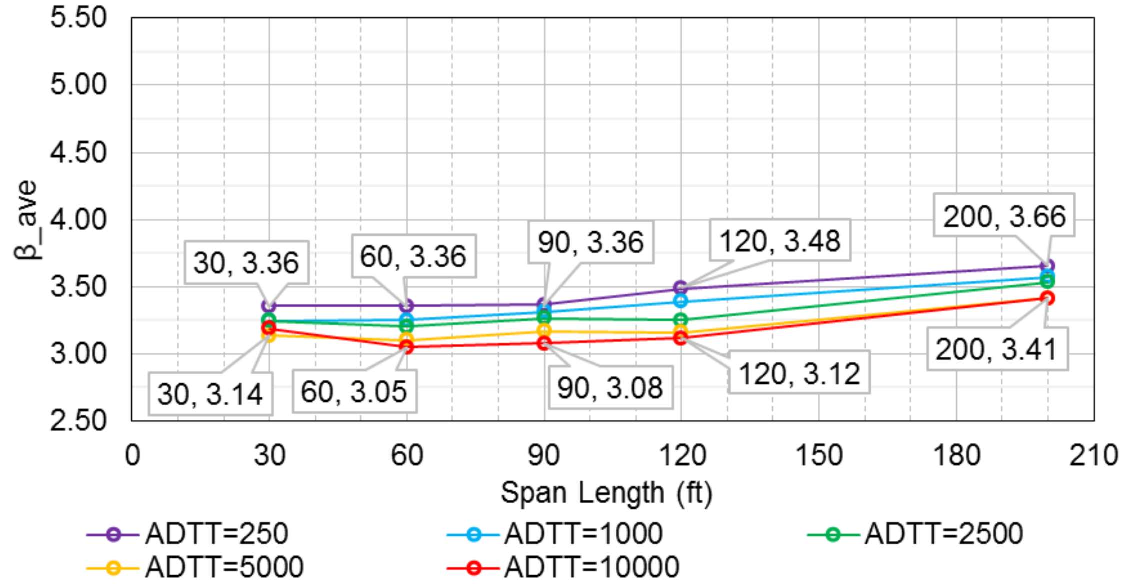


Fig. 7-2: Average reliability index, β_{ave}, for noncomposite rolled I-shaped sections, Φ=1.05, average D/(D+L).

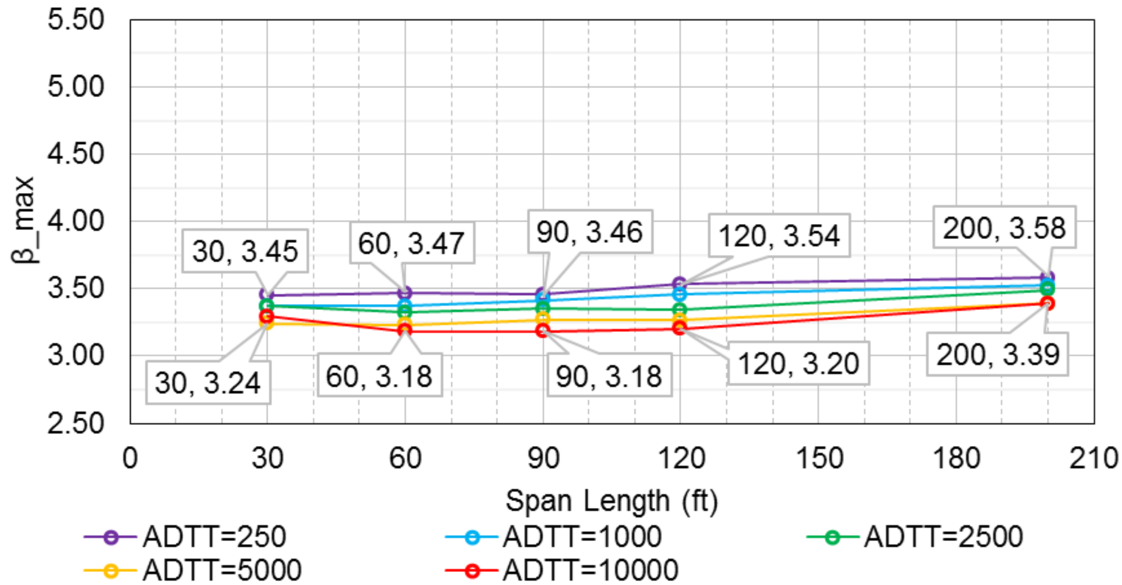


Fig. 7-3: Maximum reliability index, β_{max}, for noncomposite rolled I-shaped sections, Φ=1.05, maximum D/(D+L).

7.2 Flexure of noncomposite I-shaped plate girders

The results of the reliability analysis utilizing resistance factor of 1.05 for all the noncomposite I-shaped plate girders made of A709-50 and A709-50W steel are shown in Fig. 7-4 through Fig. 7-11. Results for all the girder spacings, *S*, and steel grades considered lineup closely to the target reliability index of 3.5. The minimum values are about 3.25 for large values of ADTT of 5,000 and 10,000 and span lengths up to 120 feet. Overall performance of noncomposite plate girders for considered steel grades is satisfactory for resistance factor of 1.05. Therefore, it is recommended to use resistance factor *Φ*=1.05 for noncomposite plate girders with the current load factors.

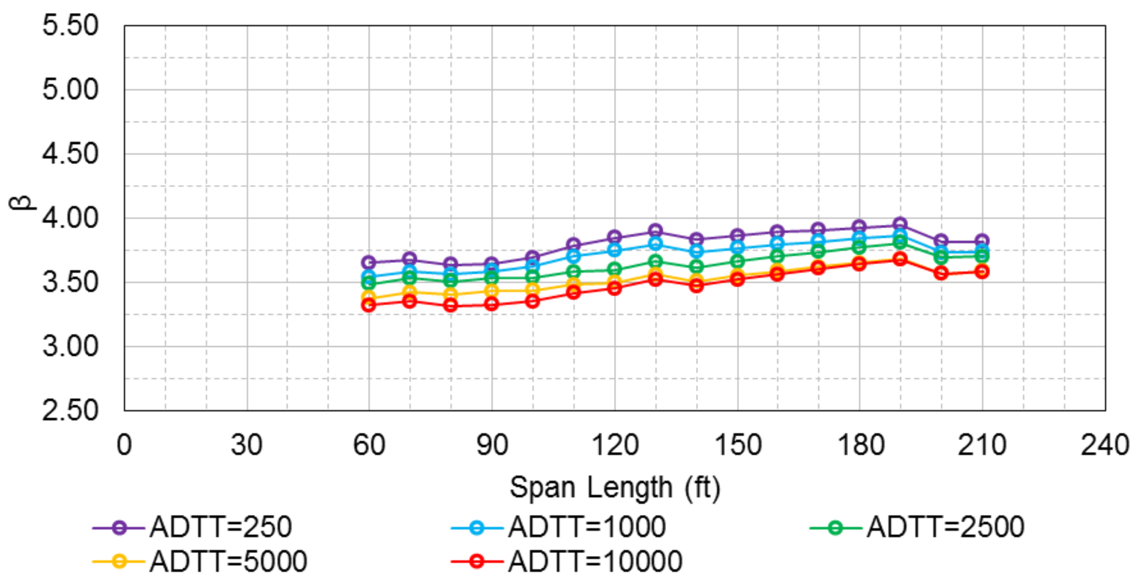


Fig. 7-4: Reliability index, β, for A709-50 noncomposite plate girders with S=6ft and Φ=1.05.

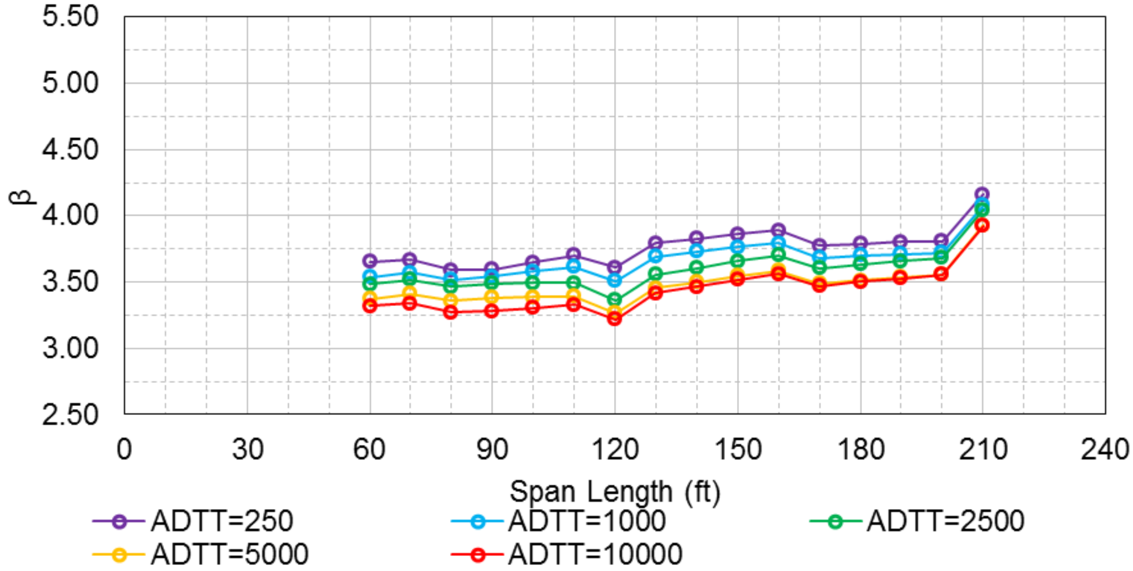


Fig. 7-5: Reliability index, β, for A709-50 noncomposite plate girders with S=8ft and Φ=1.05.

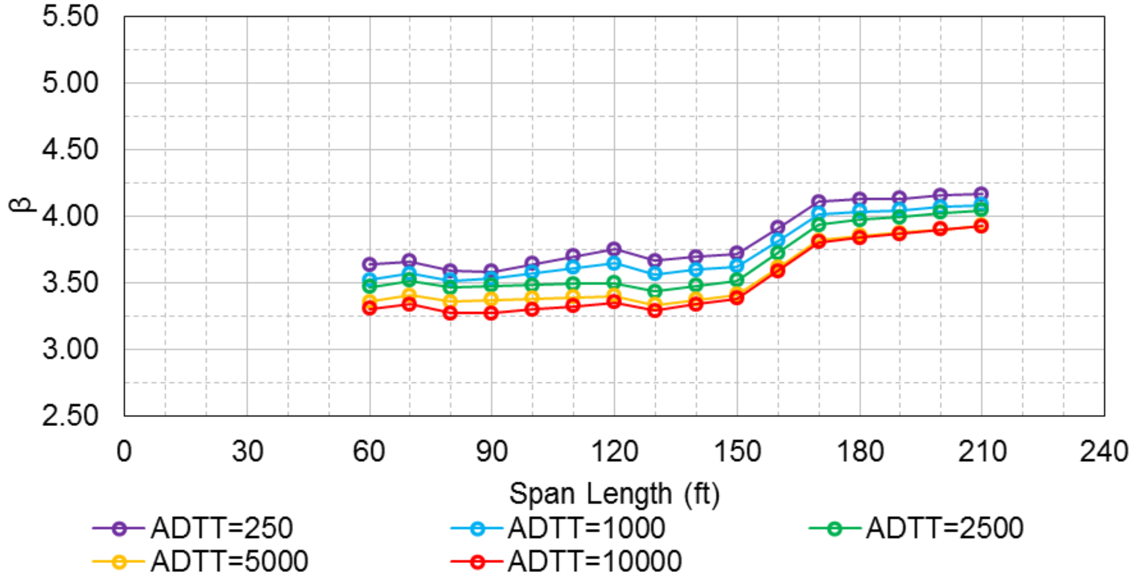


Fig. 7-6: Reliability index, β, for A709-50 noncomposite plate girders with S=10ft and Φ=1.05.

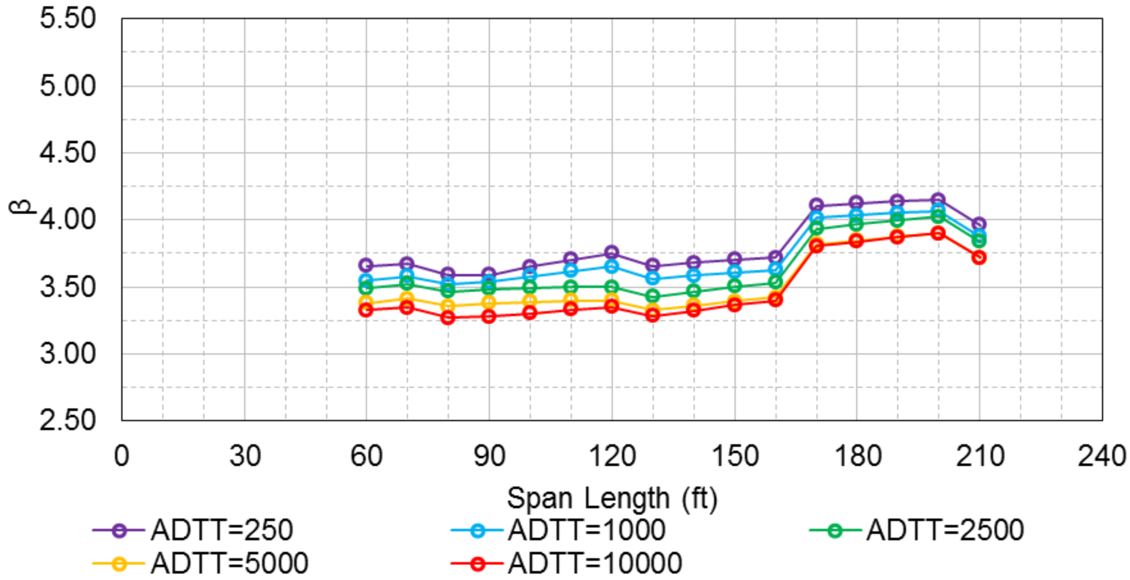


Fig. 7-7: Reliability index, β, for A709-50 noncomposite plate girders with S=12ft and Φ=1.05.

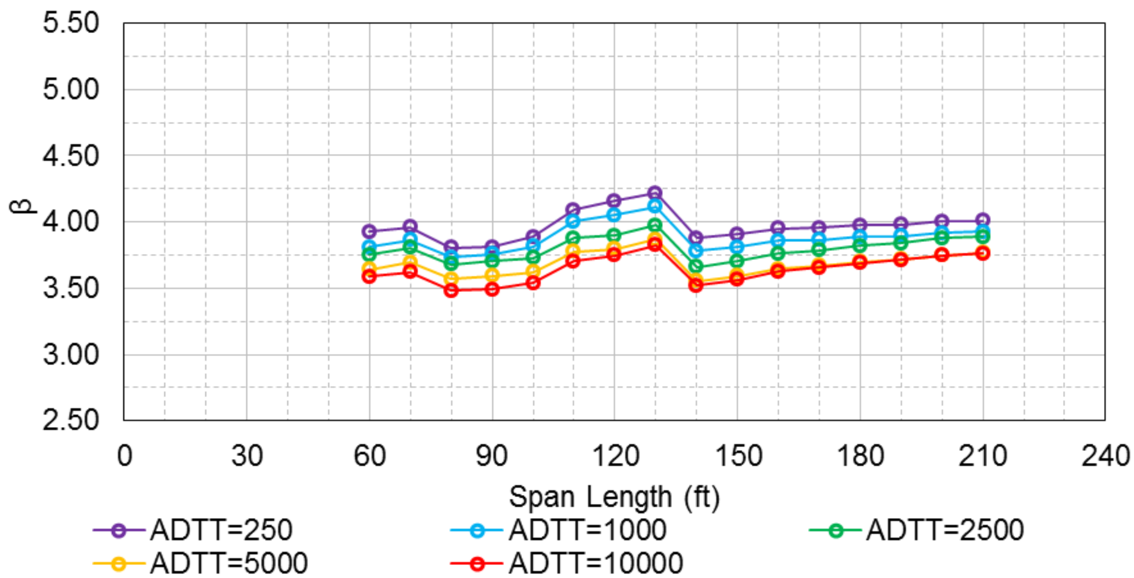


Fig. 7-8: Reliability index, β, for A709-50W noncomposite plate girders with S=6ft and Φ=1.05.

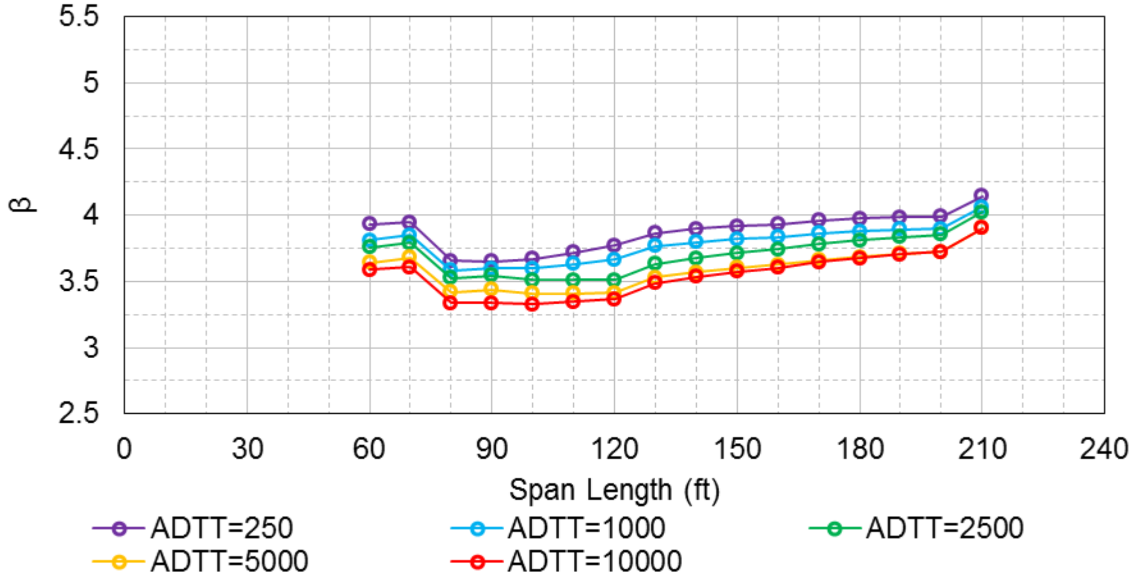


Fig. 7-9: Reliability index, β, for A709-50W noncomposite plate girders with S=8ft and Φ=1.05.

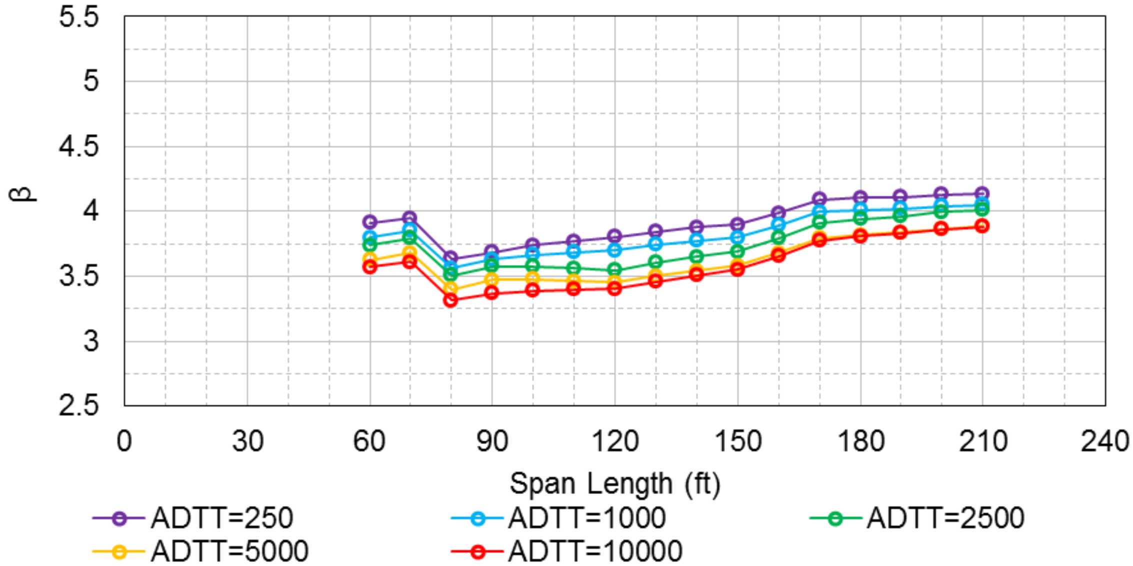


Fig. 7-10: Reliability index, β, for A709-50W noncomposite plate girders with S=10ft and Φ=1.05.

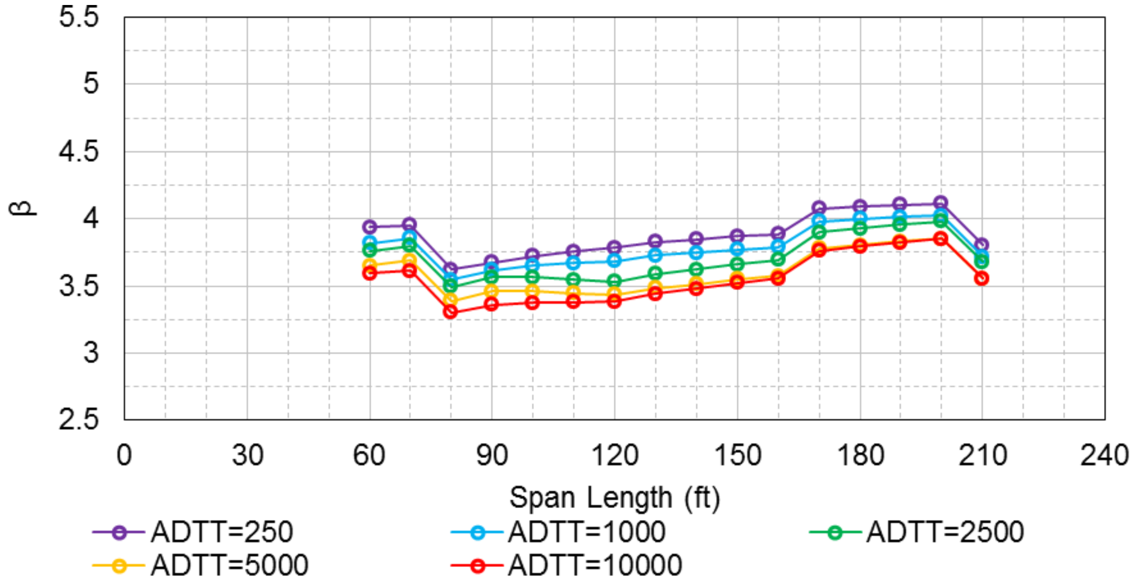


Fig. 7-11: Reliability index, β, for A709-50W noncomposite plate girders with S=12ft and Φ=1.05.

7.3 Flexure of composite rolled I-shaped girders

Reliability indices were calculated for resistance factor Φ=1.05 for composite rolled I-shaped girders with minimum, average, and maximum D/(D+L) ratios (Fig. 7-12 ÷ Fig. 7-14). The best representation of calculated safety levels is shown in Fig. 7-13 for average D/(D+L) ratios. The reliability index values shown in Fig. 7-13 are located very close to the target value of 3.5 for all the ADTTs and for the most common span length between 30 to 120 feet. For larger span lengths the reliability indices exceed 3.5. This leads to conclusion that resistance factor of 1.05 is an appropriate value to be incorporated in the design code.

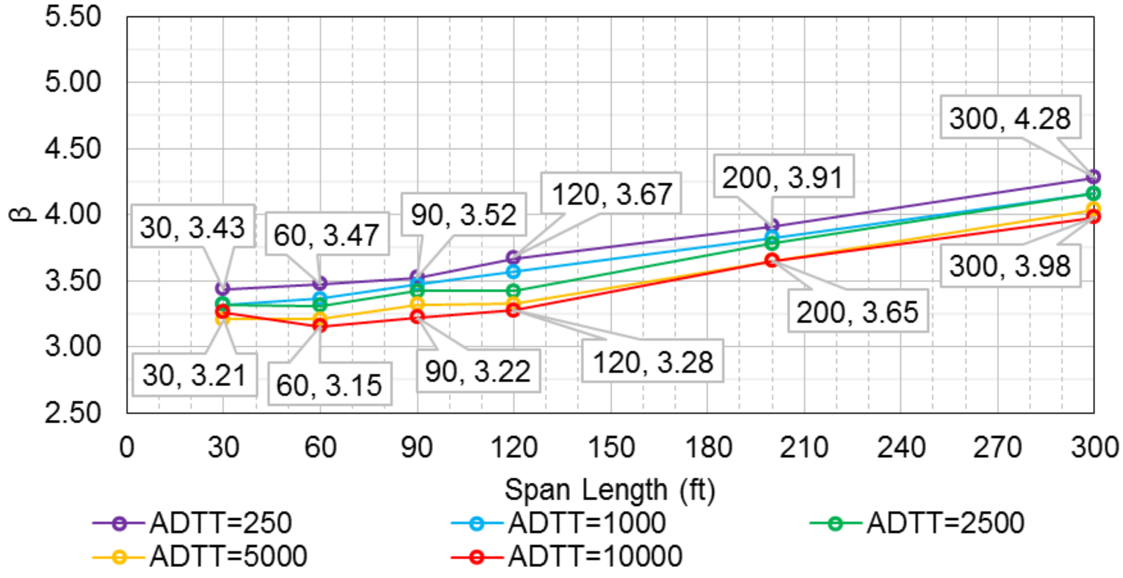


Fig. 7-12: Minimum reliability index, β_{min}, for composite rolled I-shaped sections, Φ=1.05, minimum D/(D+L).

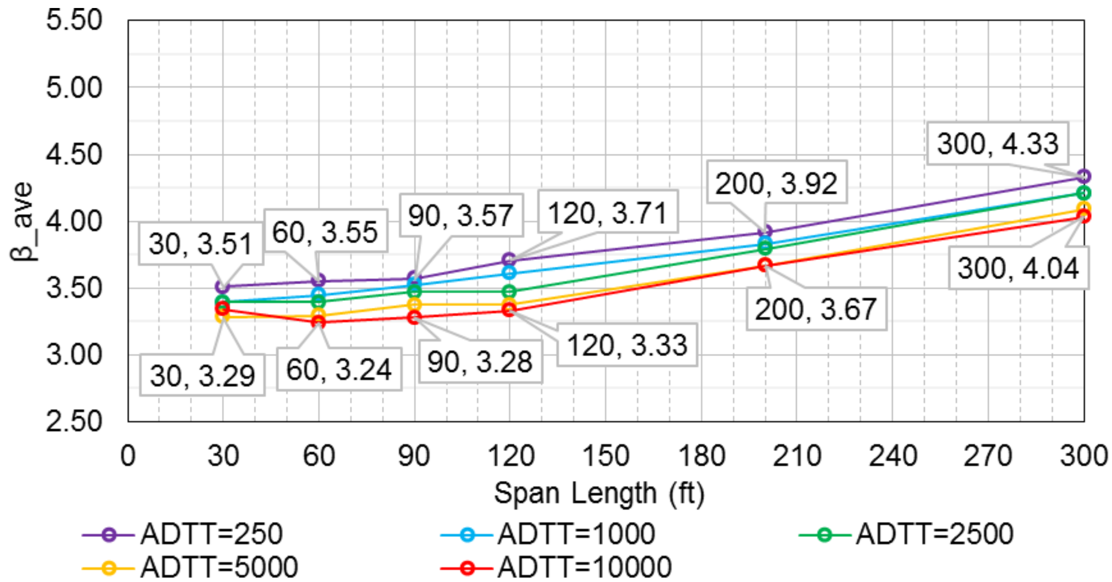


Fig. 7-13: Average reliability index, β_{ave}, for composite rolled I-shaped sections, Φ=1.05, average D/(D+L).

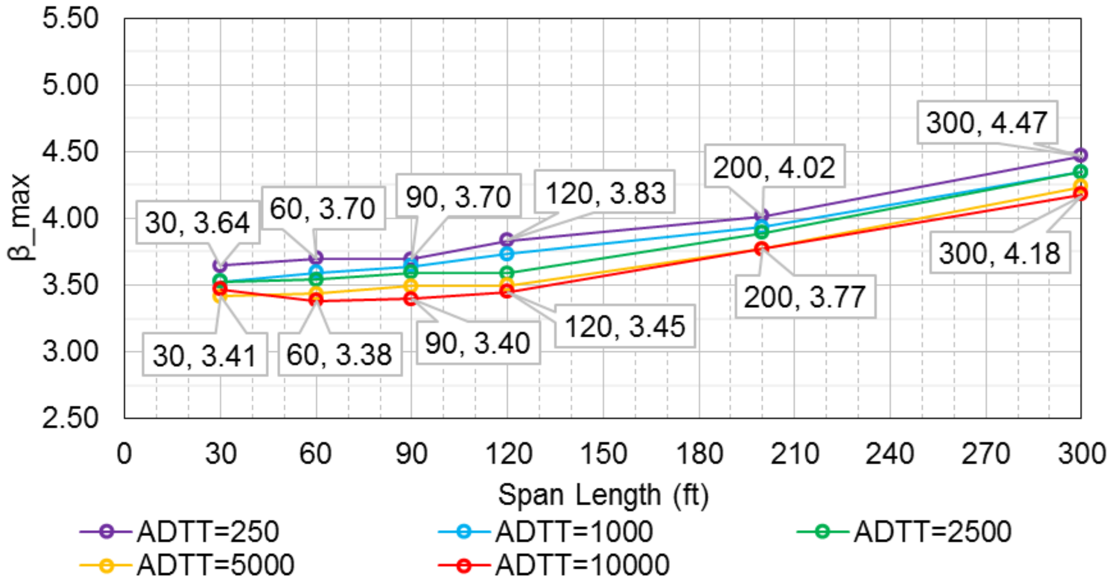


Fig. 7-14: Maximum reliability index, β_{max}, for composite rolled I-shaped sections, Φ=1.05, maximum D/(D+L).

7.4 Flexure of composite I-shaped plate girders

Reliability indices obtained with resistance factor Φ=1.05 for composite I-shaped plate girders made of A709-50 and A709-50W steels are shown in Fig. 7-15 through Fig. 7-26. All the calculated reliability indices far exceed the target value of 3.5 even for the largest ADTT of 10,000. This is not only justifying the application of resistance factor of 1.05 in the design provisions but proves that composite plate girders have a potential for even higher resistance factor. Higher values of the resistance factor for composite plate girders is not considered in this dissertation.

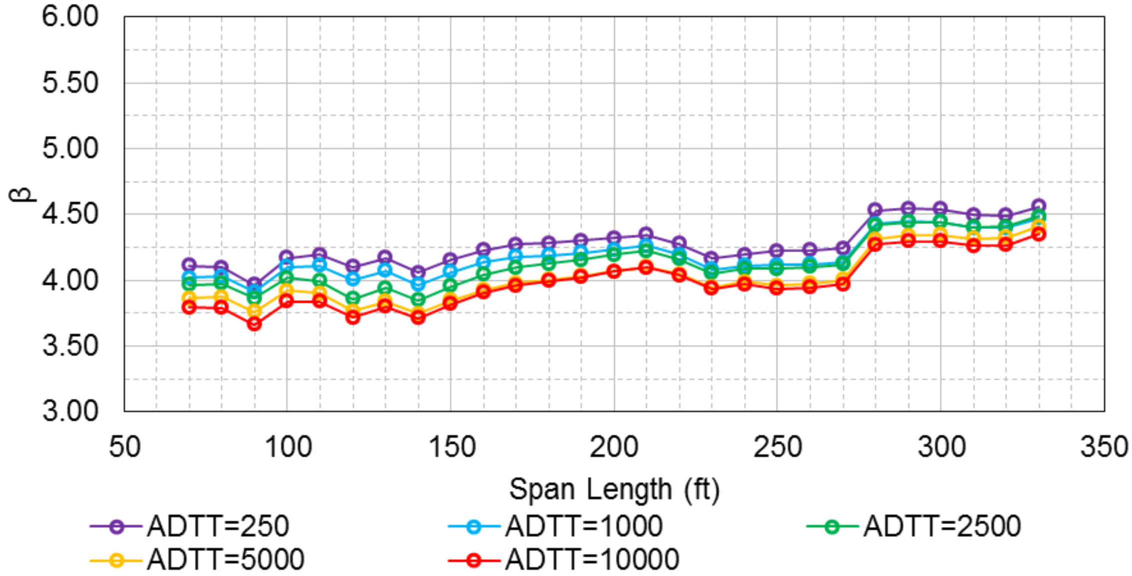


Fig. 7-15: Reliability index, β, for A709-50 composite plate girders with S=6ft and Φ=1.05.

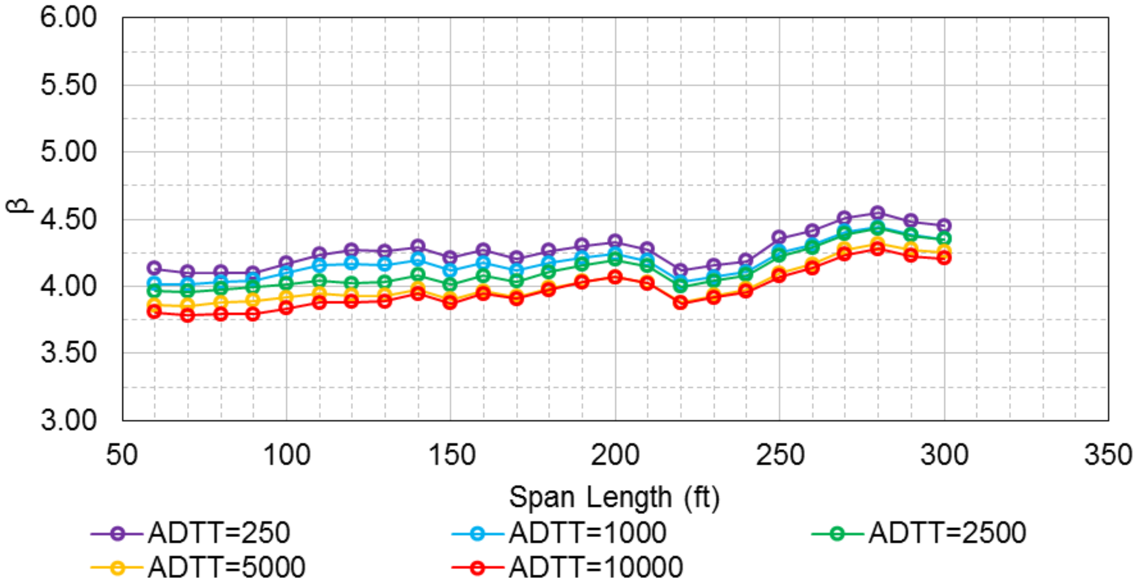


Fig. 7-16: Reliability index, β, for A709-50 composite plate girders with S=8ft and Φ=1.05.

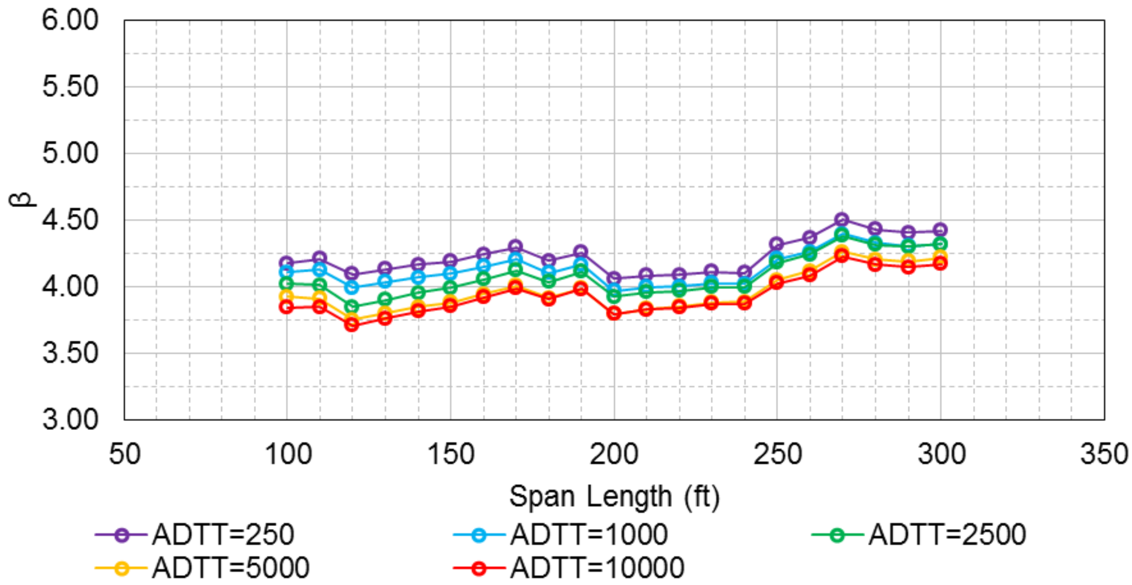


Fig. 7-17: Reliability index, β, for A709-50 composite plate girders with S=10ft and Φ=1.05.

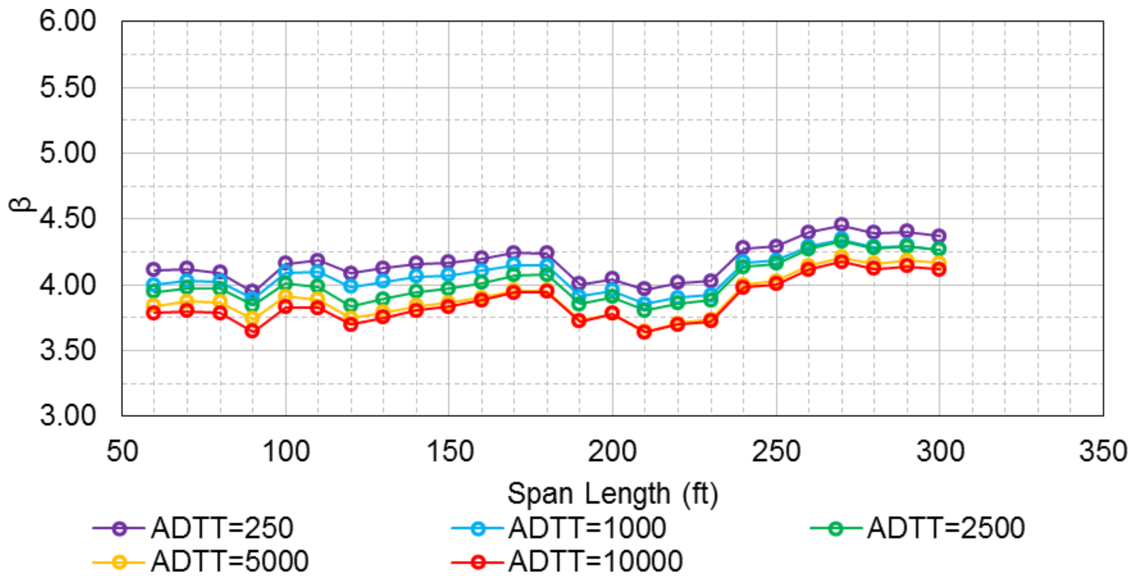


Fig. 7-18: Reliability index, β, for A709-50 composite plate girders with S=12ft and Φ=1.05.

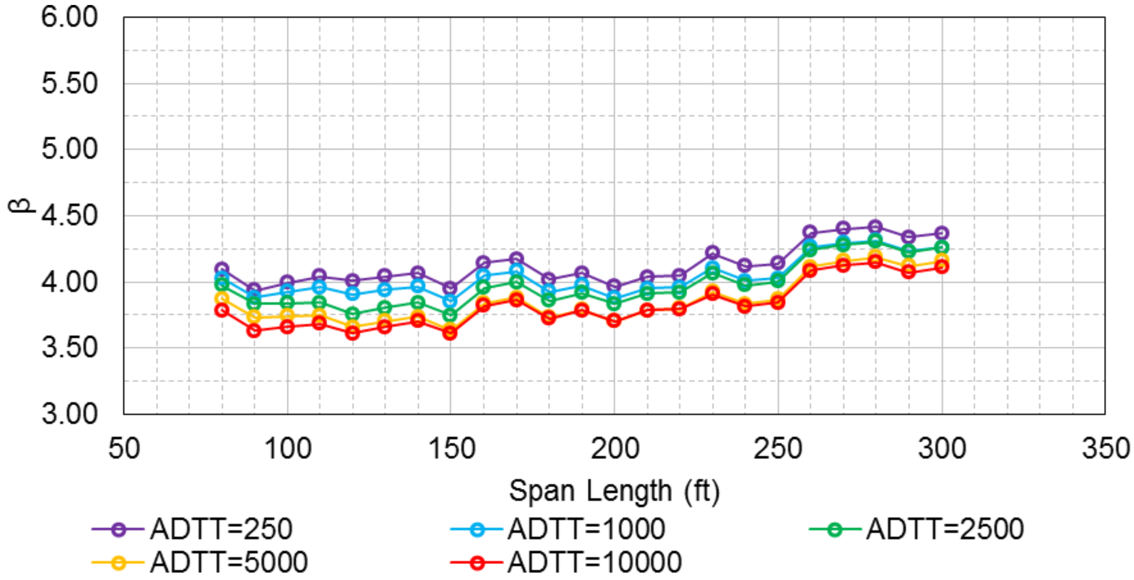


Fig. 7-19: Reliability index, β, for A709-50 composite plate girders with S=14ft and Φ=1.05.

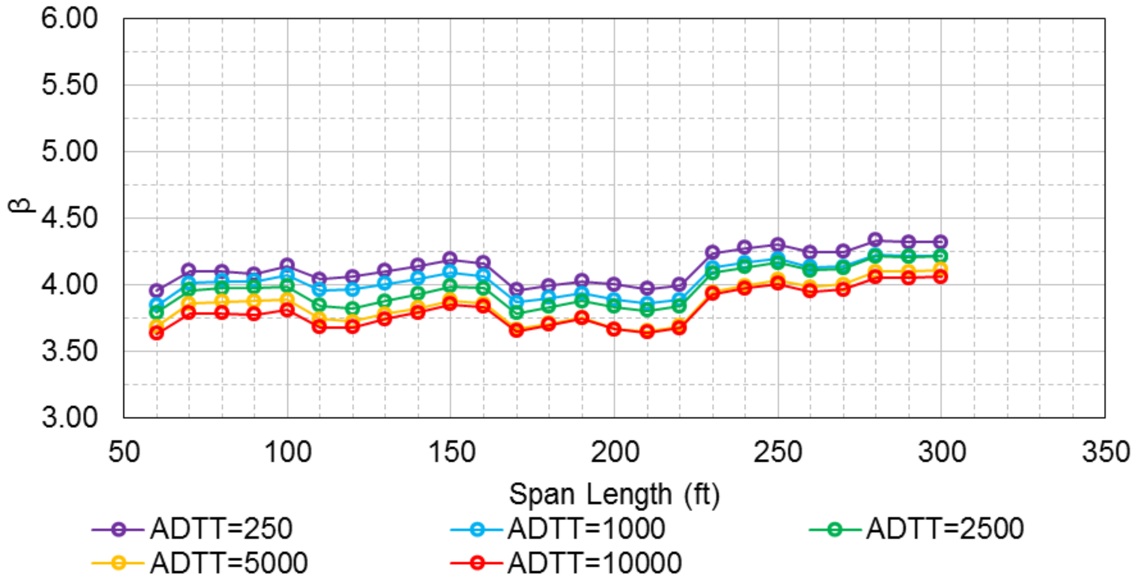


Fig. 7-20: Reliability index, β, for A709-50 composite plate girders with S=16ft and Φ=1.05.

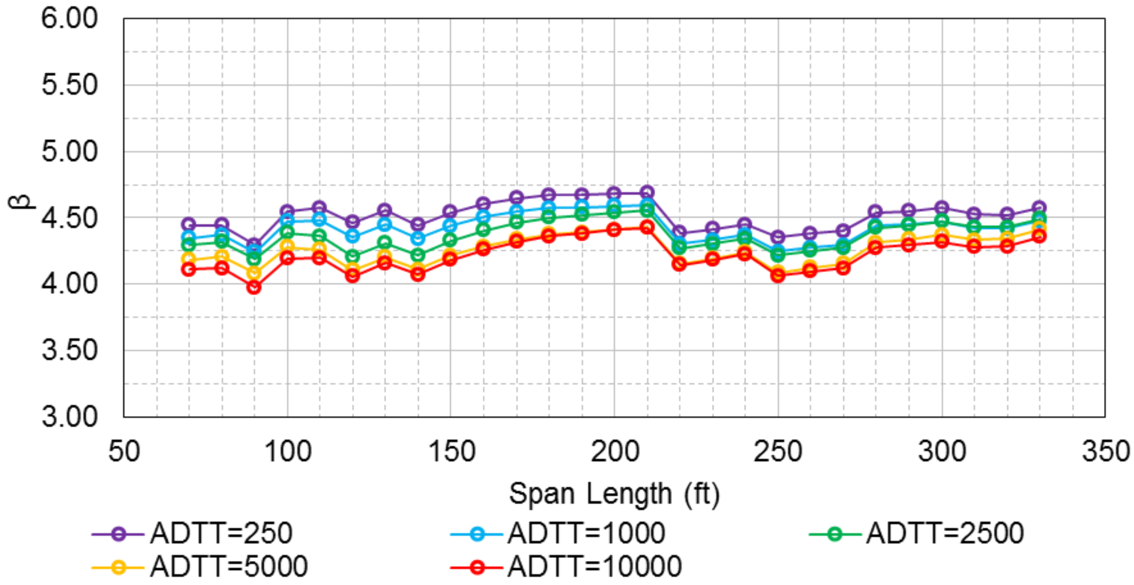


Fig. 7-21: Reliability index, β, for A709-50W composite plate girders with S=6ft and Φ=1.05.

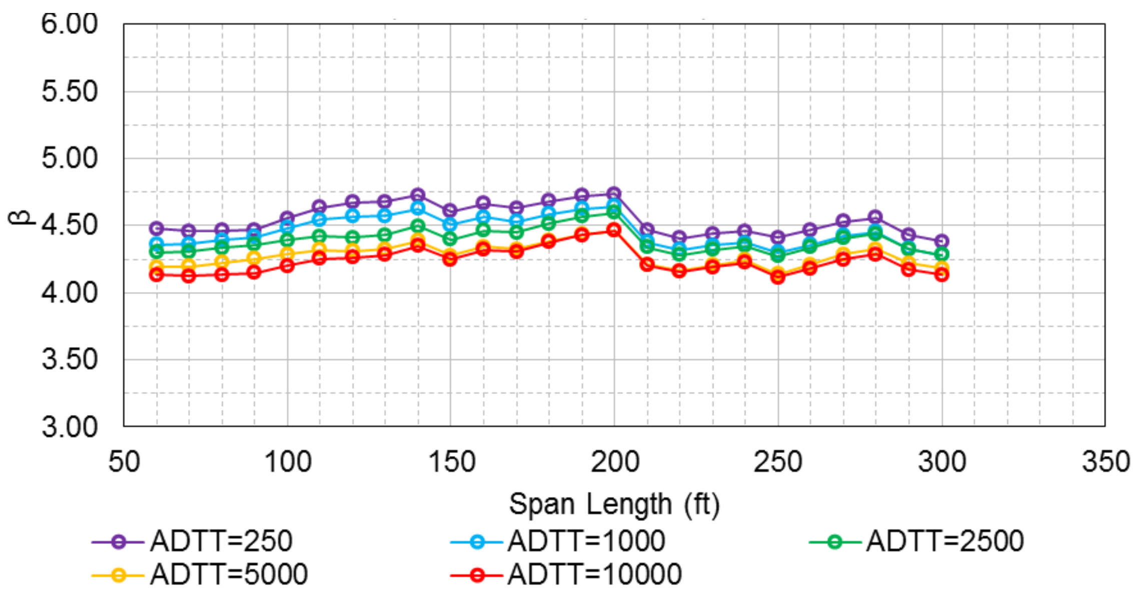


Fig. 7-22: Reliability index, β, for A709-50W composite plate girders with S=8ft and Φ=1.05.

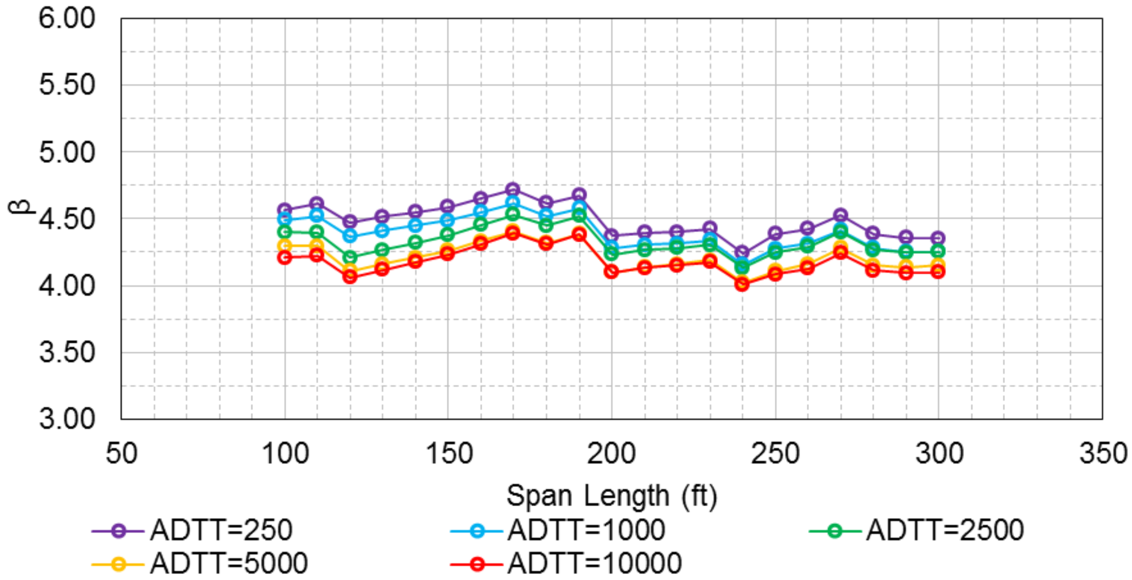


Fig. 7-23: Reliability index, β, for A709-50W composite plate girders with S=10ft and Φ=1.05.

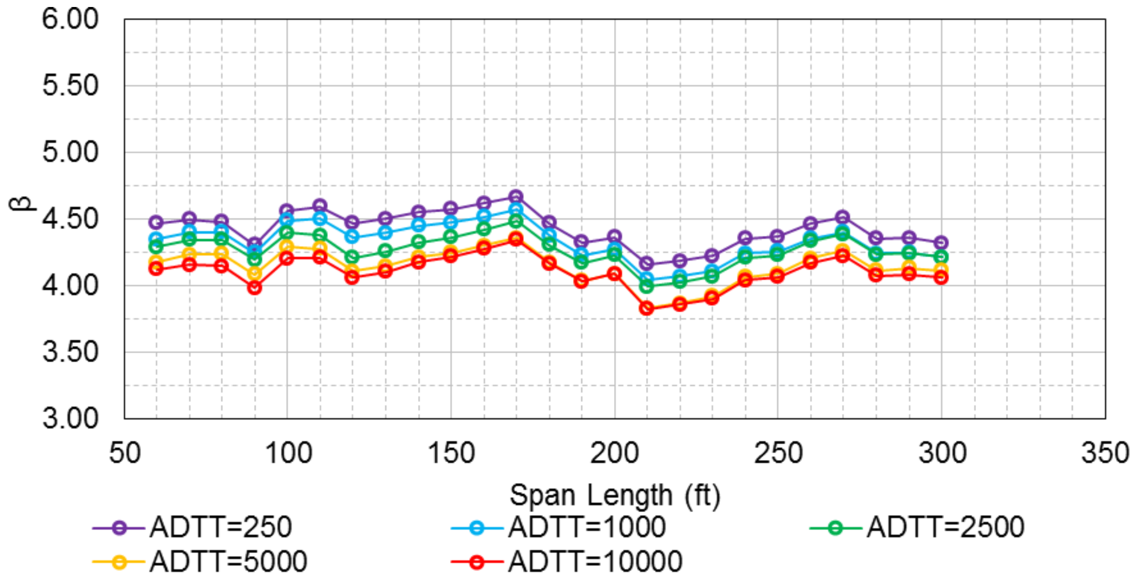


Fig. 7-24: Reliability index, β, for A709-50W composite plate girders with S=12ft and Φ=1.05.

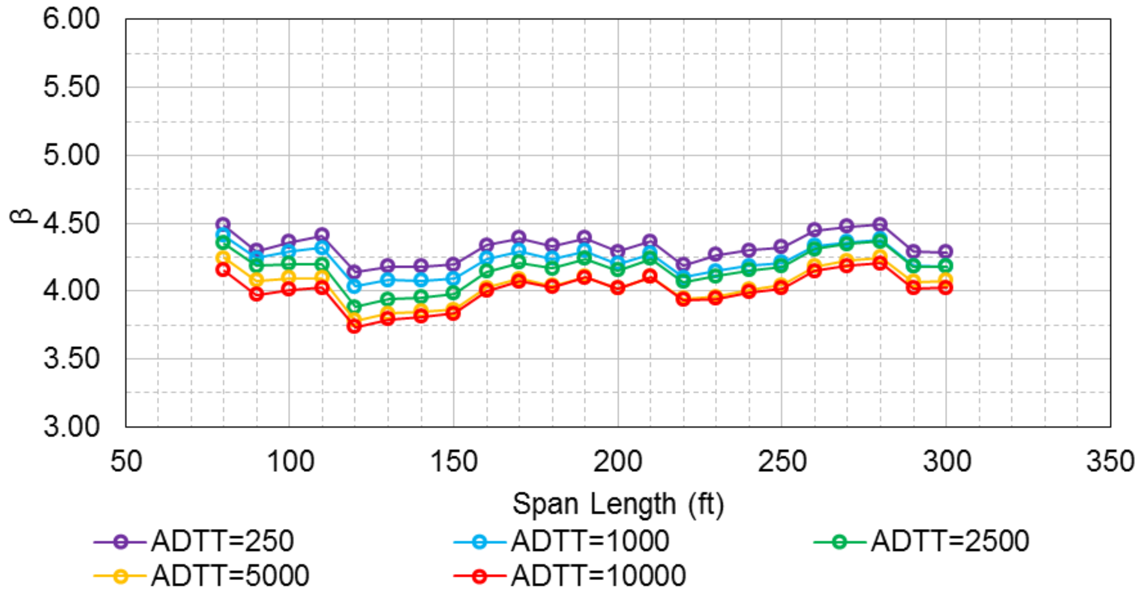


Fig. 7-25: Reliability index, β, for A709-50W composite plate girders with S=14ft and Φ=1.05.

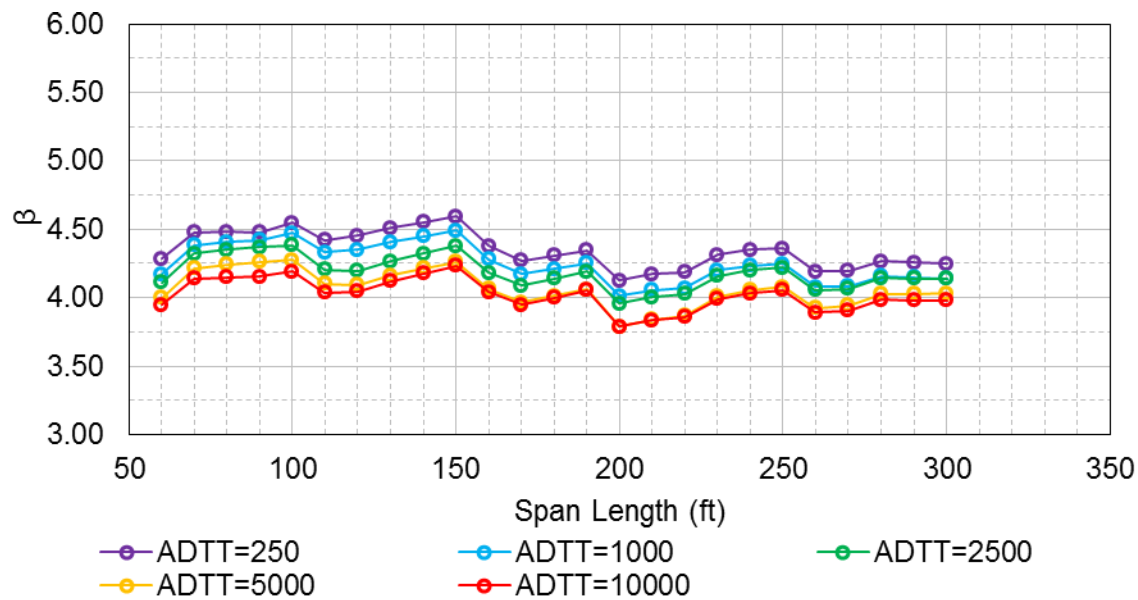


Fig. 7-26: Reliability index, β, for A709-50W composite plate girders with S=16ft and Φ=1.05.

For the nine HPS 50W composite plate girder sections analyzed, the reliability index calculated with Φ=1.05 is presented in Fig. 7-27 and Fig. 7-28. Reliability indices shown in Fig. 7-27 are derived from nominal resistance obtained from AM, that accounts for strain hardening of

HPS and results in higher capacity in comparison to RPA resistance model. Fig. 7-28 presents more actual reliability indices for HPS50W composite plate girder sections, where nominal resistance used in derivation of load components is obtained from theoretical resistance model. For both approaches, the safety levels exceed the expectations and indicate that resistance factor of 1.05 should be recommended. The distribution of β for composite plate girders for other grades analyzed (Fig. 7-15 ÷ Fig. 7-26) has relatively constant trend, and therefore it can be assumed it is the same for HPS50W composite plate girder. Basing on this assumption, resistance factor of 1.05 is concluded for composite plate girders made of A709-HPS50W steel without consideration of other span lengths and spacings.

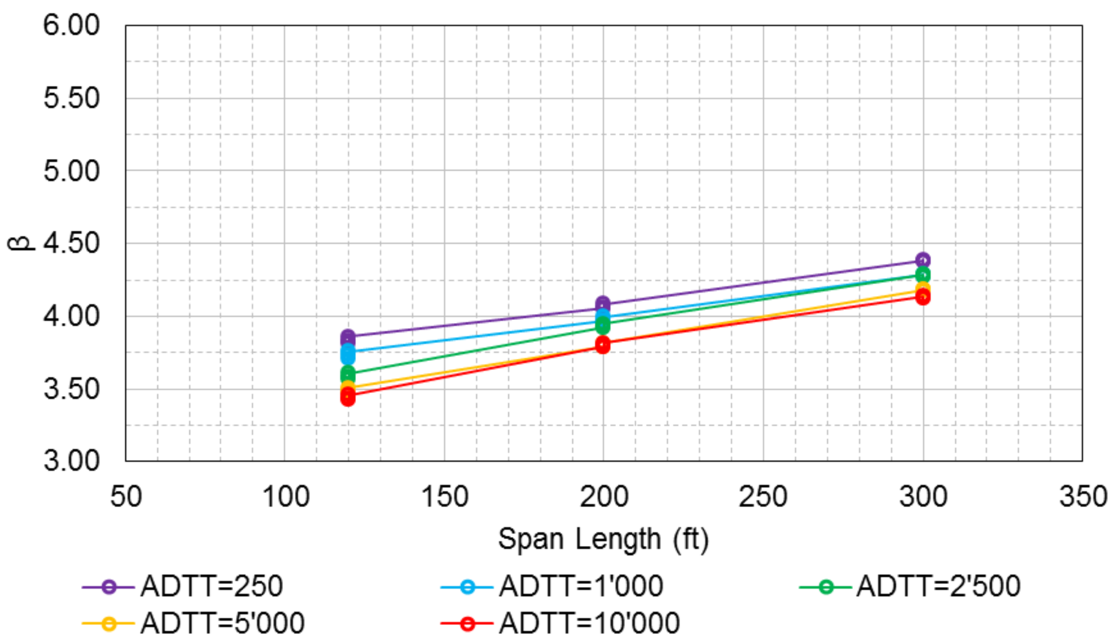


Fig. 7-27: Reliability index, β, for A709-HPS50W composite plate, Φ=1.05, nominal resistance obtained from analytical model.

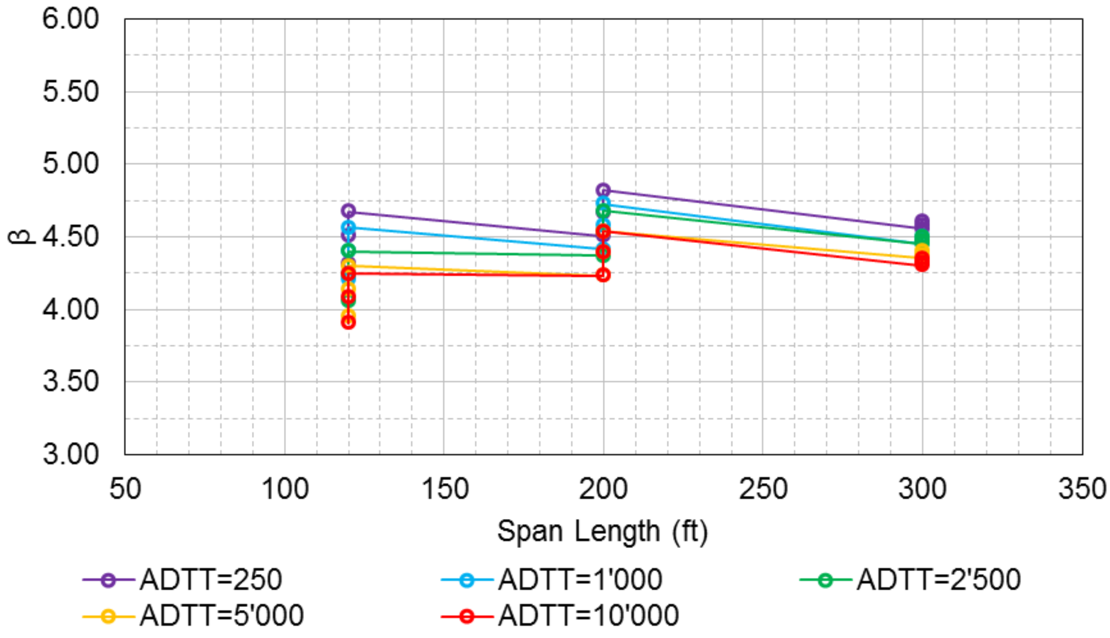


Fig. 7-28: Reliability index, β, for A709-HPS50W composite plate , Φ=1.05, nominal resistance obtained from theoretical model.

7.5 Flexure of composite box girders

Fig. 7-29 through Fig. 7-34 show reliability indices for composite box girders with minimum, average, and maximum D/(D+L) ratios for steel grades 50 and 50W, using a resistance factor Φ=1.05. The best representation of calculated safety levels is presented for average D/(D+L) ratios in Fig. 7-30 and Fig. 7-33, for A709-50 and A709-50W, respectively. Comparison of the presented values with target β=3.5 leads to conclusion that composite box girders are suitable for utilization of increased resistance factor.

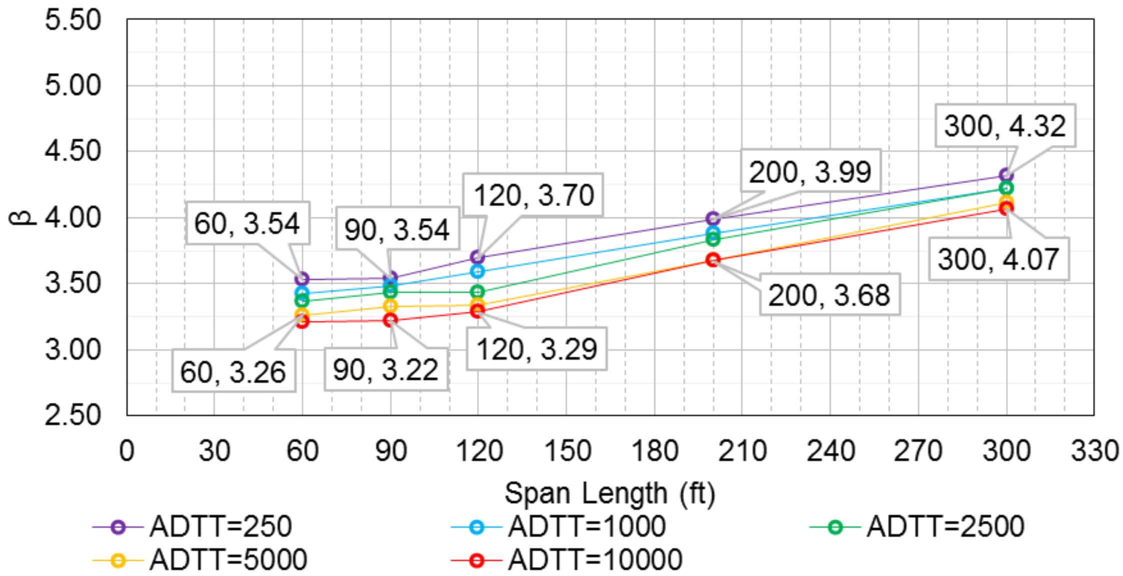


Fig. 7-29: Minimum reliability index, β_{min}, for composite box girders made of A709-50 steel, Φ=1.05, minimum D/(D+L).

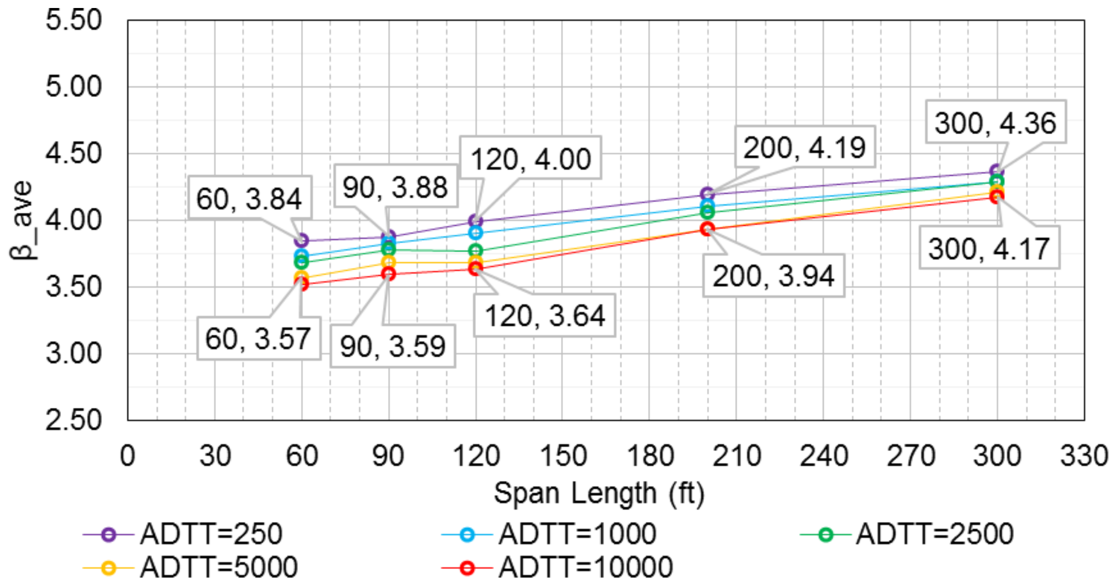


Fig. 7-30: Average reliability index, β_{ave}, for composite box girders made of A709-50 steel, Φ=1.05, average D/(D+L).

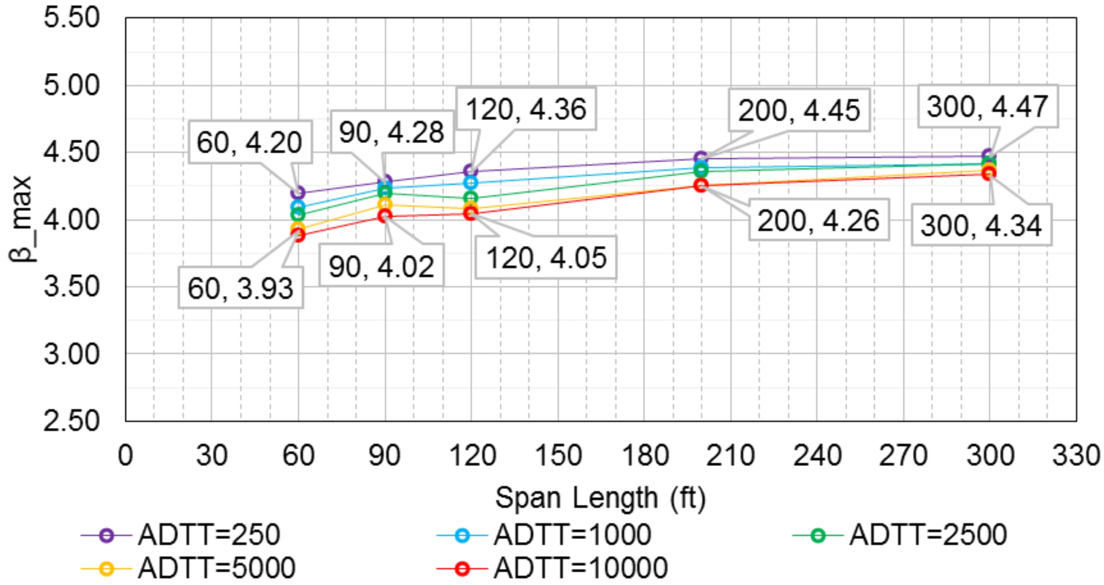


Fig. 7-31: Maximum reliability index, β_{ave}, for composite box girders made of A709-50 steel, Φ=1.05, maximum D/(D+L).

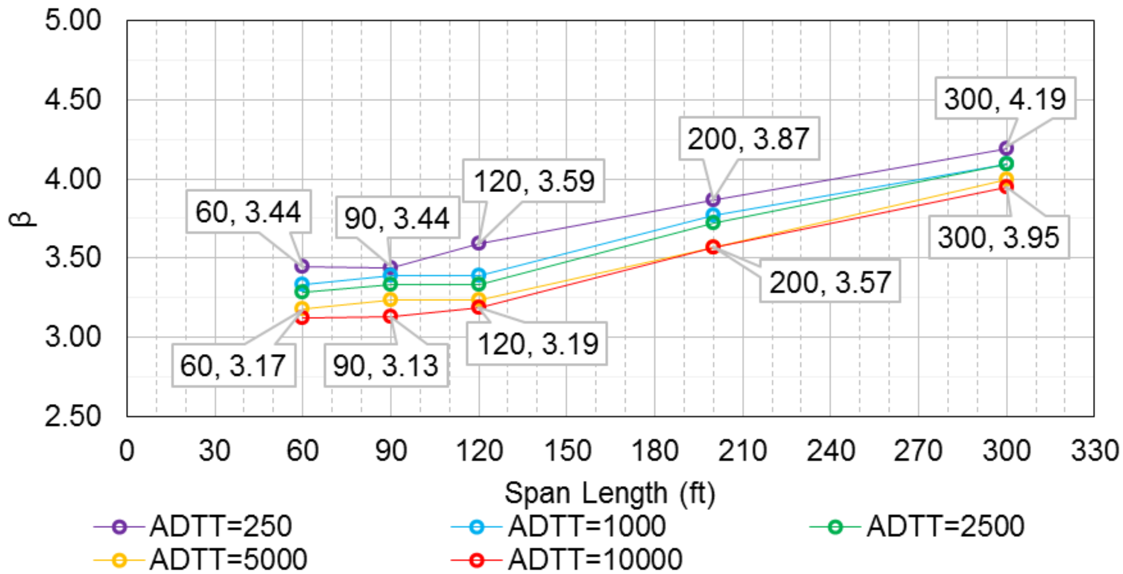


Fig. 7-32: Minimum reliability index, β_{min}, for composite box girders made of A709-50W steel, Φ=1.05, minimum D/(D+L).

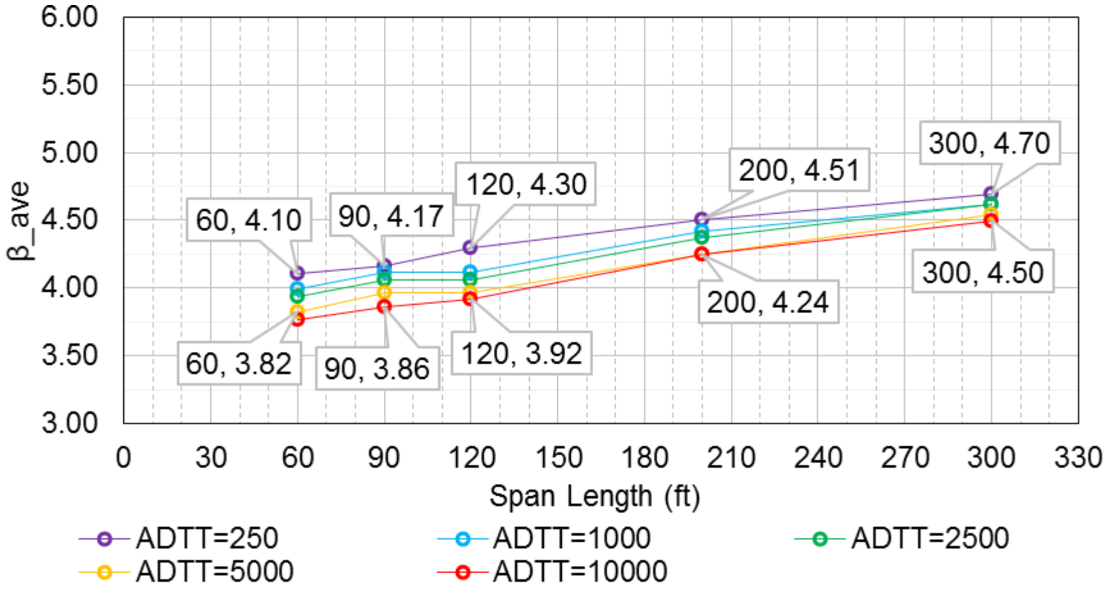


Fig. 7-33: Average reliability index, β_{ave}, for composite box girders made of A709-50W steel, Φ=1.05, average D/(D+L).

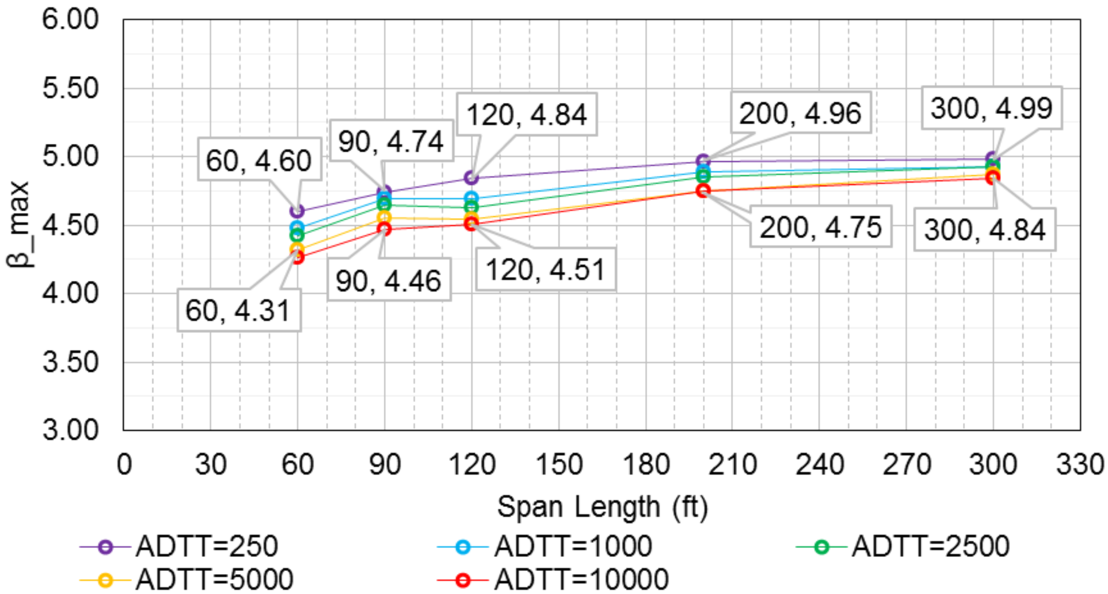


Fig. 7-34: Maximum reliability index, β_{ave}, for composite box girders made of A709-50W steel, Φ=1.05, maximum D/(D+L).

7.6 Shear of rolled I-shaped girders

Safety levels expressed in terms of reliability index calculated with resistance factor of 0.95 for shear of rolled I-shaped girders are presented in Fig. 7-35, Fig. 7-36, and Fig. 7-37. The results match the target beta for span lengths from 60 feet through 300 feet and justify the decrease of resistance factor for shear.

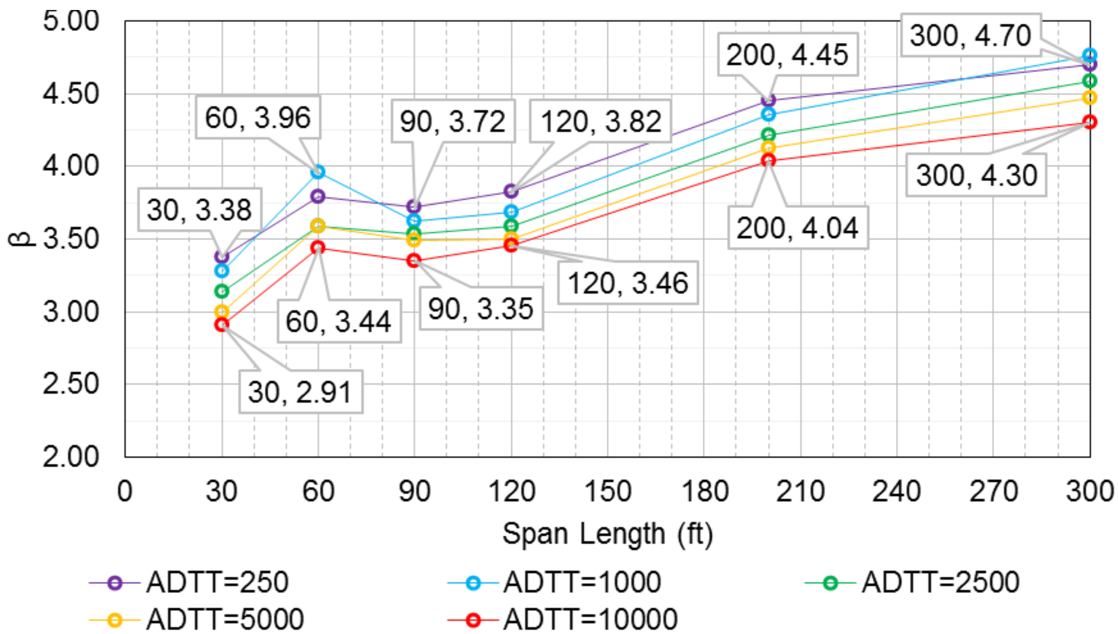


Fig. 7-35: Reliability index, β, due to shear for rolled I-shaped sections, Φ=0.95, minimum D/(D+L).

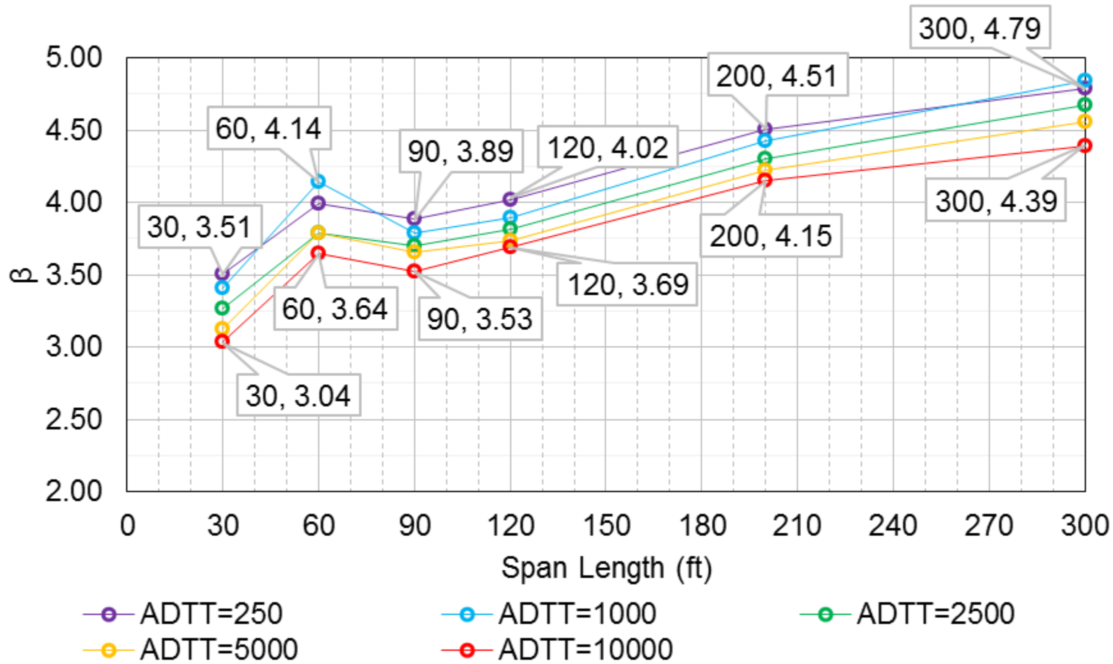


Fig. 7-36: Reliability index, β, due to shear for rolled I-shaped sections, Φ=0.95, average D/(D+L).

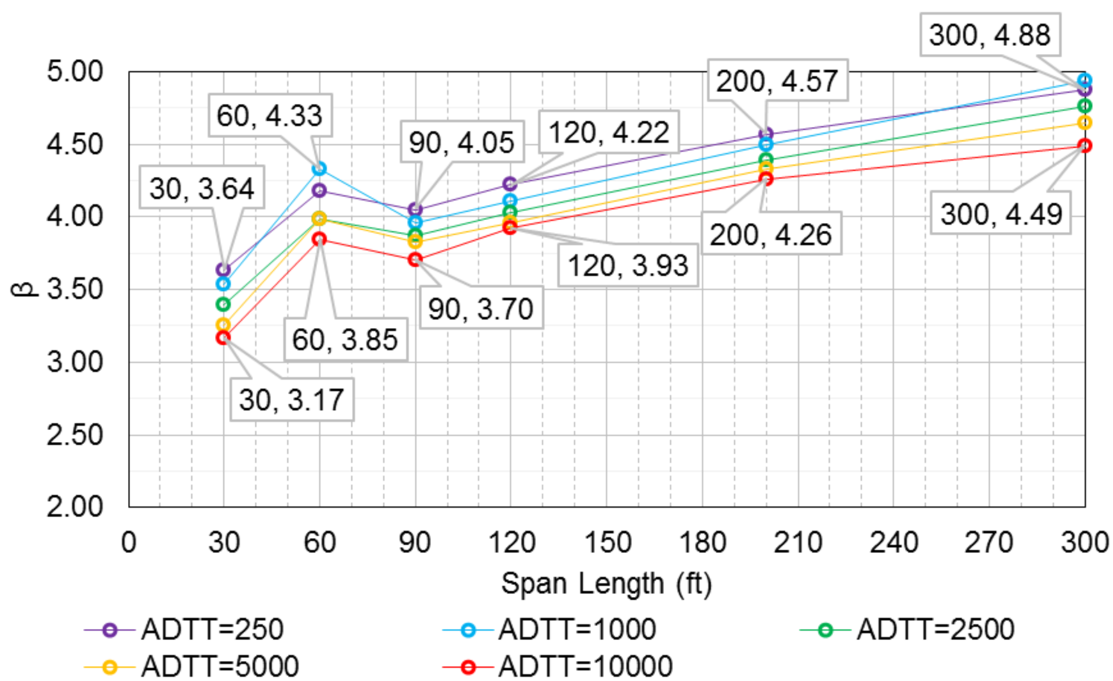


Fig. 7-37: Reliability index, β, due to shear for rolled I-shaped sections, Φ=0.95, maximum D/(D+L).

Chapter 8: Summary and conclusions

8.1 Summary

The study deals with the development of probabilistic shear and flexural resistance models for short and medium span steel girder bridges. Resistance models were developed for 250 noncomposite rolled I-shaped girders, 64 noncomposite I-shaped plate girders, 244 composite rolled I-shaped girders, 146 composite I-shaped plate girders, and 80 composite box girders. Importance of these kinds of bridges was emphasized through analysis of the NBI database.

Material data for A992 steel used for rolled sections and for normal weight concrete was extracted from a recent study [41] and described as polynomial functions in probability space. Yield strength data for grades 50, 50W, HPS50W, and HPS70W of A709 steel plates were provided by two steel manufacturers. The A709 data was processed and material models for each grade and rounded thickness were described in form of polynomial functions in probability space.

Flexural and shear resistance models were taken from AISC [28] and AASHTO LRFD [1] specifications. To capture strain hardening phenomena in HPS an analytical model utilizing constitutive material models was developed. Distribution of resistance of each girder was determined using 1,000,000 Monte Carlo simulations for theoretical resistance models. For the analytical model 10,000 Monte Carlo simulations provided resistance distributions for composite I-shaped plate girders made of A709-HPS50W steel. From all the simulated distributions, the statistical parameters of resistance were obtained for all the structural types considered.

Next, reliability analysis was performed using the advanced, iterative Rackwitz-Fissler procedure utilizing nonnormal resistance distributions. Load models for this analysis were taken from recent SHRP 2 report [2] which were more severe than those used in the original code calibration. Reliability analysis provided insights on safety margins of each structural girder type analyzed. Despite increased live loads, reliabilities of considered girders allowed for calibration through increase of some of the resistance factors.

8.2 Conclusions

The most important findings of this research and the study implications are listed below.

1. Developed material models for A992, A709 steels as well as for normal weight concretes, that predict bottom tail distributions, allow to obtain most accurate resistance distributions.
2. The shape of the upper tail of material and resistance distributions does not affect reliability as it was calculated at the design point located in the bottom tail of the distribution.
3. A normal distribution of concrete strength shall not be used for a large number of simulations, as it yields unrealistically low values for normal z variables. This especially affects distribution of flexural resistance of composite sections.
4. Utilization of the analytical model developed in this study for HPS results in 3-4% increase of nominal moment capacity.
5. Due to nonnormal material distributions and geometrical differences of analyzed girders, the resulting statistical parameters of resistance (bias factor, λ, and coefficient of variation, V) exhibit variations. The more diverse material distributions are, the higher spread of the statistical parameters is observed.
6. Calculated statistical parameters for of resistance are presented in Table 8-1, Table 8-2, and Table 8-3.
7. The reliability analysis was performed with an advanced iterative Rackwitz-Fisseler procedure, that established design points and equivalent normal values of mean and standard deviation for each distribution. This procedure provides the most accurate values

of reliability index. The results of reliability indices, for all the structural types considered, proved their adequacy and need for calibration due to over exceedance of desired safety levels.

8. Additional analysis was performed to investigate reliability indices for a modified resistance factor. It was concluded that an increase of the flexural resistance factor to value of 1.05 is recommended for noncomposite plate girders, composite rolled I-shaped girders, composite plate girders, and composite box girders.

Table 8-1. Statistical parameters of the flexural resistance

Structural type	Steel	F		P		M		Resistance	
		λ	V	λ	V	λ_{ave}	V_{ave}	λ	V
Noncomposite rolled I-shaped girders	A992	1.00	0.05	1.02	0.06	1.110	0.060	1.130	0.100
Noncomposite I-shaped plate girders	A709-50	1.00	0.05	1.02	0.06	1.100	0.030	1.120	0.085
	A709-50W	1.00	0.05	1.02	0.06	1.105	0.030	1.125	0.085
	A709-HPS50W	1.00	0.05	1.02	0.06	-	-	-	-
	A709-HPS70W	1.00	0.05	1.02	0.06	-	-	-	-
Composite rolled I-shaped girders	A992	1.00	0.05	1.05	0.06	1.130	0.060	1.185	0.100
Composite I-shaped plate girders	A709-50	1.00	0.05	1.05	0.06	1.135	0.045	1.190	0.090
	A709-50W	1.00	0.05	1.05	0.06	1.150	0.035	1.210	0.085
	A709-HPS50W	1.00	0.05	1.05	0.06	-	-	-	-
	A709-HPS70W	1.00	0.05	1.05	0.06	-	-	-	-
Composite box girders	A709-50	1.00	0.05	1.05	0.06	1.140	0.045	1.195	0.090
	A709-50W	1.00	0.05	1.05	0.06	1.155	0.035	1.215	0.085
	A709-HPS50W	1.00	0.05	1.05	0.06	-	-	-	-
	A709-HPS70W	1.00	0.05	1.05	0.06	-	-	-	-

Table 8-2. Statistical parameters of the material factor of flexural resistance

Structural type	Steel	Bias factor λ_M max	Bias factor λ_M min	Bias factor λ_M ave.	Coefficient of variation V_M max	Coefficient of variation V_M min	Coefficient of variation V_M ave.
Noncomposite rolled I-shaped girders	A992	1.120	1.100	1.110	0.065	0.055	0.060
Noncomposite I-shaped plate girders	A709-50	1.120	1.080	1.100	0.035	0.025	0.030
	A709-50W	1.130	1.090	1.105	0.035	0.025	0.030
	A709-HPS50W	-	-	-	-	-	-
	A709-HPS70W	-	-	-	-	-	-
Composite rolled I-shaped girders	A992	1.140	1.120	1.130	0.065	0.055	0.060
Composite I-shaped plate girders	A709-50	1.175	1.095	1.135	0.050	0.035	0.045
	A709-50W	1.200	1.090	1.150	0.040	0.030	0.035
	A709-HPS50W	-	-	-	-	-	-
	A709-HPS70W	-	-	-	-	-	-
Composite box girders	A709-50	1.180	1.100	1.140	0.060	0.030	0.045
	A709-50W	1.205	1.100	1.155	0.045	0.025	0.035
	A709-HPS50W	-	-	-	-	-	-
	A709-HPS70W	-	-	-	-	-	-

Table 8-3. Statistical parameters of the shear resistance

Structural type	Steel	Thickness (in)	F λ	F V	P λ	P V	M λ	M V	Resistance λ	Resistance V
Rolled I-shaped girders	A992	all	1.00	0.05	1.02	0.07	1.155	0.085	1.180	0.120
Plate girders and box girders	A709-50	0.5	1.00	0.05	1.02	0.07	1.170	0.070	1.195	0.110
		1.0	1.00	0.05	1.02	0.07	1.100	0.055	1.120	0.100
		1.5	1.00	0.05	1.02	0.07	1.085	0.050	1.105	0.100
		2.0	1.00	0.05	1.02	0.07	1.070	0.050	1.090	0.100
	A709-50W	0.5	1.00	0.05	1.02	0.07	1.200	0.055	1.225	0.100
		1.0	1.00	0.05	1.02	0.07	1.125	0.045	1.150	0.095
		1.5	1.00	0.05	1.02	0.07	1.080	0.060	1.100	0.105
		2.0	1.00	0.05	1.02	0.07	1.080	0.050	1.100	0.100
	A709-HPS50W	0.5	1.00	0.05	1.02	0.07	1.090	0.060	1.110	0.105
		1.0	1.00	0.05	1.02	0.07	1.085	0.040	1.105	0.095
		1.5	1.00	0.05	1.02	0.07	1.090	0.050	1.110	0.100
		2.0	1.00	0.05	1.02	0.07	1.100	0.055	1.120	0.100
	A709-HPS70W	0.5	1.00	0.05	1.02	0.07	1.260	0.050	1.285	0.100
		1.0	1.00	0.05	1.02	0.07	1.170	0.065	1.195	0.110
		1.5	1.00	0.05	1.02	0.07	1.150	0.050	1.175	0.100
		2.0	1.00	0.05	1.02	0.07	1.110	0.045	1.130	0.095

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Appendix A

Appendix A fully corresponds to Chapter 4: Load models. Attached is a table of HL93 loads for span lengths 30 feet to 600 feet.

Table A- 1. HL93 Loads for span length 30-600 ft.

S (ft)	M Lane (kip/ft)	M Vehicle (kip/ft)	V Lane (kip)	V Vehicle (kip)	S (ft)	M Lane (kip/ft)	M Vehicle (kip/ft)	V Lane (kip)	V Vehicle (kip)
30	72	327	9.6	49.6	**320**	8,192	5,481	102.4	69.9
35	98	389	11.2	52.8	**325**	8,450	5,571	104.0	69.9
40	128	451	12.8	55.2	**330**	8,712	5,661	105.6	70.0
45	162	539	14.4	57.1	**335**	8,978	5,751	107.2	70.0
50	200	628	16.0	58.6	**340**	9,248	5,841	108.8	70.0
55	242	717	17.6	59.8	**345**	9,522	5,931	110.4	70.1
60	288	806	19.2	60.8	**350**	9,800	6,021	112.0	70.1
65	338	896	20.8	61.7	**355**	10,082	6,111	113.6	70.1
70	392	985	22.4	62.4	**360**	10,368	6,201	115.2	70.1
75	450	1,075	24.0	63.0	**365**	10,658	6,291	116.8	70.2
80	512	1,165	25.6	63.6	**370**	10,952	6,381	118.4	70.2
85	578	1,255	27.2	64.1	**375**	11,250	6,471	120.0	70.2
90	648	1,344	28.8	64.5	**380**	11,552	6,561	121.6	70.2
95	722	1,434	30.4	64.9	**385**	11,858	6,651	123.2	70.3
100	800	1,524	32.0	65.3	**390**	12,168	6,741	124.8	70.3
105	882	1,614	33.6	65.6	**395**	12,482	6,831	126.4	70.3
110	968	1,703	35.2	65.9	**400**	12,800	6,921	128.0	70.3
115	1,058	1,793	36.8	66.2	**405**	13,122	7,011	129.6	70.3
120	1,152	1,883	38.4	66.4	**410**	13,448	7,101	131.2	70.4
125	1,250	1,973	40.0	66.6	**415**	13,778	7,191	132.8	70.4
130	1,352	2,063	41.6	66.8	**420**	14,112	7,281	134.4	70.4
135	1,458	2,153	43.2	67.0	**425**	14,450	7,371	136.0	70.4
140	1,568	2,243	44.8	67.2	**430**	14,792	7,461	137.6	70.4
145	1,682	2,333	46.4	67.4	**435**	15,138	7,551	139.2	70.5
150	1,800	2,423	48.0	67.5	**440**	15,488	7,641	140.8	70.5
155	1,922	2,513	49.6	67.7	**445**	15,842	7,731	142.4	70.5
160	2,048	2,602	51.2	67.8	**450**	16,200	7,821	144.0	70.5
165	2,178	2,692	52.8	67.9	**455**	16,562	7,911	145.6	70.5
170	2,312	2,782	54.4	68.0	**460**	16,928	8,001	147.2	70.5
175	2,450	2,872	56.0	68.2	**465**	17,298	8,091	148.8	70.6

180	2,592	2,962	57.6	68.3	**470**	17,672	8,181	150.4	70.6
185	2,738	3,052	59.2	68.4	**475**	18,050	8,271	152.0	70.6
190	2,888	3,142	60.8	68.5	**480**	18,432	8,361	153.6	70.6
195	3,042	3,232	62.4	68.6	**485**	18,818	8,451	155.2	70.6
200	3,200	3,322	64.0	68.6	**490**	19,208	8,541	156.8	70.6
205	3,362	3,412	65.6	68.7	**495**	19,602	8,631	158.4	70.6
210	3,528	3,502	67.2	68.8	**500**	20,000	8,721	160.0	70.7
215	3,698	3,592	68.8	68.9	**505**	20,402	8,811	161.6	70.7
220	3,872	3,682	70.4	68.9	**510**	20,808	8,901	163.2	70.7
225	4,050	3,772	72.0	69.0	**515**	21,218	8,991	164.8	70.7
230	4,232	3,862	73.6	69.1	**520**	21,632	9,081	166.4	70.7
235	4,418	3,952	75.2	69.1	**525**	22,050	9,171	168.0	70.7
240	4,608	4,042	76.8	69.2	**530**	22,472	9,261	169.6	70.7
245	4,802	4,132	78.4	69.3	**535**	22,898	9,351	171.2	70.7
250	5,000	4,222	80.0	69.3	**540**	23,328	9,441	172.8	70.8
255	5,202	4,312	81.6	69.4	**545**	23,762	9,531	174.4	70.8
260	5,408	4,401	83.2	69.4	**550**	24,200	9,621	176.0	70.8
265	5,618	4,491	84.8	69.5	**555**	24,642	9,711	177.6	70.8
270	5,832	4,581	86.4	69.5	**560**	25,088	9,801	179.2	70.8
275	6,050	4,671	88.0	69.6	**565**	25,538	9,891	180.8	70.8
280	6,272	4,761	89.6	69.6	**570**	25,992	9,981	182.4	70.8
285	6,498	4,851	91.2	69.6	**575**	26,450	10,071	184.0	70.8
290	6,728	4,941	92.8	69.7	**580**	26,912	10,161	185.6	70.8
295	6,962	5,031	94.4	69.7	**585**	27,378	10,251	187.2	70.9
300	7,200	5,121	96.0	69.8	**590**	27,848	10,341	188.8	70.9
305	7,442	5,211	97.6	69.8	**595**	28,322	10,431	190.4	70.9
310	7,688	5,301	99.2	69.8	**600**	28,800	10,521	192.0	70.9
315	7,938	5,391	100.8	69.9					

Appendix B

Appendix B fully corresponds to Chapter 5: Resistance.

B.1 Analyzed Sections and Nominal Resistance

Tables in this section present all steel sections analyzed and their values of nominal flexural and shear strengths.

B.1.1 Noncomposite rolled I-shaped steel sections

Table B- 1. Nominal Flexural and Shear Resistance for Noncomposite Rolled I-Shaped Steel Sections

#	Shape	F_y (ksi)	**M_n (kip-ft)**	**V_n (kip)**	b/t	λp (compact / noncompact)	λp (noncompact / slender)	Flange Slenderness	h/t	λp (compact / noncompact)	λp (noncompact / slender)	Web Slenderness
1	W44X335	50	**6,750**	**1,360**	4.5	9.2	24.1	compact	39	90.6	137.3	compact
2	W44X290	50	**5,875**	**1,131**	5.0	9.2	24.1	compact	47	90.6	137.3	compact
3	W44X262	50	**5,292**	**1,020**	5.6	9.2	24.1	compact	52	90.6	137.3	compact
4	W44X230	50	**4,583**	**914**	6.5	9.2	24.1	compact	57	90.6	137.3	compact
5	W40X593	50	**11,500**	**2,309**	2.6	9.2	24.1	compact	20	90.6	137.3	compact
6	W40X503	50	**9,667**	**1,945**	3.0	9.2	24.1	compact	24	90.6	137.3	compact
7	W40X431	50	**8,167**	**1,660**	3.4	9.2	24.1	compact	27	90.6	137.3	compact
8	W40X397	50	**7,500**	**1,501**	3.7	9.2	24.1	compact	30	90.6	137.3	compact
9	W40X372	50	**7,000**	**1,413**	3.9	9.2	24.1	compact	31	90.6	137.3	compact
10	W40X362	50	**6,833**	**1,364**	4.0	9.2	24.1	compact	33	90.6	137.3	compact
11	W40X324	50	**6,083**	**1,206**	4.4	9.2	24.1	compact	37	90.6	137.3	compact
12	W40X297	50	**5,542**	**1,110**	4.8	9.2	24.1	compact	39	90.6	137.3	compact
13	W40X277	50	**5,208**	**989**	5.0	9.2	24.1	compact	44	90.6	137.3	compact
14	W40X249	50	**4,667**	**887**	5.6	9.2	24.1	compact	49	90.6	137.3	compact
15	W40X215	50	**4,017**	**761**	6.5	9.2	24.1	compact	56	90.6	137.3	compact
16	W40X199	50	**3,621**	**755**	7.4	9.2	24.1	compact	56	90.6	137.3	compact
17	W40X392	50	**7,125**	**1,772**	2.5	9.2	24.1	compact	26	90.6	137.3	compact
18	W40X331	50	**5,958**	**1,493**	2.9	9.2	24.1	compact	30	90.6	137.3	compact
19	W40X327	50	**5,875**	**1,444**	2.8	9.2	24.1	compact	31	90.6	137.3	compact

20	W40X294	50	5,292	1,285	3.1	9.2	24.1	compact	34	90.6	137.3	compact
21	W40X278	50	4,958	1,242	3.3	9.2	24.1	compact	36	90.6	137.3	compact
22	W40X264	50	4,708	1,152	3.4	9.2	24.1	compact	38	90.6	137.3	compact
23	W40X235	50	4,208	989	3.8	9.2	24.1	compact	44	90.6	137.3	compact
24	W40X211	50	3,775	887	4.2	9.2	24.1	compact	49	90.6	137.3	compact
25	W40X183	50	3,225	761	4.9	9.2	24.1	compact	56	90.6	137.3	compact
26	W40X167	50	2,888	753	5.7	9.2	24.1	compact	56	90.6	137.3	compact
27	W40X149	50	2,492	722	7.1	9.2	24.1	compact	58	90.6	137.3	compact
28	W36X652	50	12,125	2,429	2.5	9.2	24.1	compact	17	90.6	137.3	compact
29	W36X529	50	9,708	1,922	3.0	9.2	24.1	compact	21	90.6	137.3	compact
30	W36X487	50	8,875	1,769	3.2	9.2	24.1	compact	23	90.6	137.3	compact
31	W36X441	50	7,958	1,587	3.5	9.2	24.1	compact	25	90.6	137.3	compact
32	W36X395	50	7,125	1,405	3.8	9.2	24.1	compact	28	90.6	137.3	compact
33	W36X361	50	6,458	1,277	4.2	9.2	24.1	compact	30	90.6	137.3	compact
34	W36X330	50	5,875	1,154	4.5	9.2	24.1	compact	33	90.6	137.3	compact
35	W36X302	50	5,333	1,057	5.0	9.2	24.1	compact	36	90.6	137.3	compact
36	W36X282	50	4,958	985	5.3	9.2	24.1	compact	38	90.6	137.3	compact
37	W36X262	50	4,583	930	5.8	9.2	24.1	compact	41	90.6	137.3	compact
38	W36X247	50	4,292	881	6.1	9.2	24.1	compact	43	90.6	137.3	compact
39	W36X231	50	4,013	832	6.5	9.2	24.1	compact	45	90.6	137.3	compact
40	W36X256	50	4,333	1,077	3.5	9.2	24.1	compact	35	90.6	137.3	compact
41	W36X232	50	3,900	968	3.9	9.2	24.1	compact	39	90.6	137.3	compact
42	W36X210	50	3,471	914	4.5	9.2	24.1	compact	41	90.6	137.3	compact
43	W36X194	50	3,196	838	4.8	9.2	24.1	compact	44	90.6	137.3	compact
44	W36X182	50	2,992	790	5.1	9.2	24.1	compact	47	90.6	137.3	compact
45	W36X170	50	2,783	738	5.5	9.2	24.1	compact	50	90.6	137.3	compact
46	W36X160	50	2,600	702	5.9	9.2	24.1	compact	52	90.6	137.3	compact
47	W36X150	50	2,421	673	6.4	9.2	24.1	compact	54	90.6	137.3	compact
48	W36X135	50	2,121	641	7.6	9.2	24.1	compact	57	90.6	137.3	compact
49	W33X387	50	6,500	1,361	3.6	9.2	24.1	compact	25	90.6	137.3	compact
50	W33X354	50	5,917	1,239	3.9	9.2	24.1	compact	27	90.6	137.3	compact
51	W33X318	50	5,292	1,098	4.2	9.2	24.1	compact	30	90.6	137.3	compact
52	W33X291	50	4,833	1,002	4.6	9.2	24.1	compact	33	90.6	137.3	compact
53	W33X263	50	4,333	900	5.0	9.2	24.1	compact	36	90.6	137.3	compact
54	W33X241	50	3,917	852	5.7	9.2	24.1	compact	38	90.6	137.3	compact
55	W33X221	50	3,571	788	6.2	9.2	24.1	compact	40	90.6	137.3	compact
56	W33X201	50	3,221	723	6.8	9.2	24.1	compact	44	90.6	137.3	compact
57	W33X169	50	2,621	679	4.7	9.2	24.1	compact	47	90.6	137.3	compact
58	W33X152	50	2,329	638	5.5	9.2	24.1	compact	49	90.6	137.3	compact

59	W33X141	50	**2,142**	**604**	6.0	9.2	24.1	compact	52	90.6	137.3	compact
60	W33X130	50	**1,946**	**576**	6.7	9.2	24.1	compact	54	90.6	137.3	compact
61	W33X118	50	**1,729**	**543**	7.8	9.2	24.1	compact	57	90.6	137.3	compact
62	W30X391	50	**6,042**	**1,355**	3.2	9.2	24.1	compact	21	90.6	137.3	compact
63	W30X357	50	**5,500**	**1,220**	3.5	9.2	24.1	compact	23	90.6	137.3	compact
64	W30X326	50	**4,958**	**1,108**	3.8	9.2	24.1	compact	25	90.6	137.3	compact
65	W30X292	50	**4,417**	**979**	4.1	9.2	24.1	compact	28	90.6	137.3	compact
66	W30X261	50	**3,929**	**882**	4.6	9.2	24.1	compact	30	90.6	137.3	compact
67	W30X235	50	**3,529**	**779**	5.0	9.2	24.1	compact	34	90.6	137.3	compact
68	W30X211	50	**3,129**	**718**	5.7	9.2	24.1	compact	36	90.6	137.3	compact
69	W30X191	50	**2,813**	**654**	6.3	9.2	24.1	compact	40	90.6	137.3	compact
70	W30X173	50	**2,529**	**597**	7.0	9.2	24.1	compact	43	90.6	137.3	compact
71	W30X148	50	**2,083**	**599**	4.4	9.2	24.1	compact	44	90.6	137.3	compact
72	W30X132	50	**1,821**	**559**	5.3	9.2	24.1	compact	46	90.6	137.3	compact
73	W30X124	50	**1,700**	**530**	5.6	9.2	24.1	compact	48	90.6	137.3	compact
74	W30X116	50	**1,575**	**509**	6.2	9.2	24.1	compact	50	90.6	137.3	compact
75	W30X108	50	**1,442**	**487**	6.9	9.2	24.1	compact	52	90.6	137.3	compact
76	W30X99	50	**1,300**	**463**	7.8	9.2	24.1	compact	55	90.6	137.3	compact
77	W30X90	50	**1,179**	**416**	8.5	9.2	24.1	compact	60	90.6	137.3	compact
78	W27X539	50	**7,875**	**1,921**	2.2	9.2	24.1	compact	13	90.6	137.3	compact
79	W27X368	50	**5,167**	**1,259**	3.0	9.2	24.1	compact	18	90.6	137.3	compact
80	W27X336	50	**4,708**	**1,134**	3.2	9.2	24.1	compact	20	90.6	137.3	compact
81	W27X307	50	**4,292**	**1,030**	3.4	9.2	24.1	compact	22	90.6	137.3	compact
82	W27X281	50	**3,900**	**932**	3.7	9.2	24.1	compact	24	90.6	137.3	compact
83	W27X258	50	**3,550**	**853**	4.0	9.2	24.1	compact	26	90.6	137.3	compact
84	W27X235	50	**3,217**	**784**	4.4	9.2	24.1	compact	28	90.6	137.3	compact
85	W27X217	50	**2,963**	**707**	4.7	9.2	24.1	compact	31	90.6	137.3	compact
86	W27X194	50	**2,629**	**632**	5.2	9.2	24.1	compact	34	90.6	137.3	compact
87	W27X178	50	**2,375**	**605**	5.9	9.2	24.1	compact	35	90.6	137.3	compact
88	W27X161	50	**2,146**	**546**	6.5	9.2	24.1	compact	39	90.6	137.3	compact
89	W27X146	50	**1,933**	**497**	7.2	9.2	24.1	compact	42	90.6	137.3	compact
90	W27X129	50	**1,646**	**505**	4.5	9.2	24.1	compact	42	90.6	137.3	compact
91	W27X114	50	**1,429**	**467**	5.4	9.2	24.1	compact	45	90.6	137.3	compact
92	W27X102	50	**1,271**	**419**	6.0	9.2	24.1	compact	49	90.6	137.3	compact
93	W27X94	50	**1,158**	**395**	6.7	9.2	24.1	compact	52	90.6	137.3	compact
94	W27X84	50	**1,017**	**368**	7.8	9.2	24.1	compact	55	90.6	137.3	compact
95	W24X370	50	**4,708**	**1,277**	2.5	9.2	24.1	compact	15	90.6	137.3	compact
96	W24X335	50	**4,250**	**1,139**	2.7	9.2	24.1	compact	16	90.6	137.3	compact
97	W24X306	50	**3,842**	**1,024**	2.9	9.2	24.1	compact	18	90.6	137.3	compact

98	W24X279	50	**3,479**	**929**	3.2	9.2	24.1	compact	19	90.6	137.3	compact
99	W24X250	50	**3,100**	**821**	3.5	9.2	24.1	compact	22	90.6	137.3	compact
100	W24X229	50	**2,813**	**749**	3.8	9.2	24.1	compact	23	90.6	137.3	compact
101	W24X207	50	**2,525**	**671**	4.1	9.2	24.1	compact	26	90.6	137.3	compact
102	W24X192	50	**2,329**	**620**	4.5	9.2	24.1	compact	28	90.6	137.3	compact
103	W24X176	50	**2,129**	**567**	4.8	9.2	24.1	compact	30	90.6	137.3	compact
104	W24X162	50	**1,950**	**529**	5.3	9.2	24.1	compact	32	90.6	137.3	compact
105	W24X146	50	**1,742**	**482**	5.9	9.2	24.1	compact	35	90.6	137.3	compact
106	W24X131	50	**1,542**	**445**	6.7	9.2	24.1	compact	37	90.6	137.3	compact
107	W24X117	50	**1,363**	**401**	7.5	9.2	24.1	compact	41	90.6	137.3	compact
108	W24X104	50	**1,204**	**362**	8.5	9.2	24.1	compact	45	90.6	137.3	compact
109	W24X103	50	**1,167**	**404**	4.6	9.2	24.1	compact	41	90.6	137.3	compact
110	W24X94	50	**1,058**	**375**	5.2	9.2	24.1	compact	44	90.6	137.3	compact
111	W24X84	50	**933**	**340**	5.9	9.2	24.1	compact	48	90.6	137.3	compact
112	W24X76	50	**833**	**315**	6.6	9.2	24.1	compact	51	90.6	137.3	compact
113	W24X68	50	**738**	**295**	7.7	9.2	24.1	compact	54	90.6	137.3	compact
114	W24X62	50	**638**	**306**	6.0	9.2	24.1	compact	52	90.6	137.3	compact
115	W24X55	50	**558**	**280**	6.9	9.2	24.1	compact	57	90.6	137.3	compact
116	W21X201	50	**2,208**	**628**	3.9	9.2	24.1	compact	22	90.6	137.3	compact
117	W21X182	50	**1,983**	**565**	4.2	9.2	24.1	compact	24	90.6	137.3	compact
118	W21X166	50	**1,800**	**506**	4.6	9.2	24.1	compact	26	90.6	137.3	compact
119	W21X147	50	**1,554**	**477**	5.4	9.2	24.1	compact	28	90.6	137.3	compact
120	W21X132	50	**1,388**	**425**	6.0	9.2	24.1	compact	30	90.6	137.3	compact
121	W21X122	50	**1,279**	**391**	6.5	9.2	24.1	compact	33	90.6	137.3	compact
122	W21X111	50	**1,163**	**355**	7.0	9.2	24.1	compact	36	90.6	137.3	compact
123	W21X101	50	**1,054**	**321**	7.7	9.2	24.1	compact	40	90.6	137.3	compact
124	W21X93	50	**921**	**376**	4.5	9.2	24.1	compact	34	90.6	137.3	compact
125	W21X83	50	**817**	**331**	5.0	9.2	24.1	compact	38	90.6	137.3	compact
126	W21X73	50	**717**	**289**	5.6	9.2	24.1	compact	43	90.6	137.3	compact
127	W21X68	50	**667**	**272**	6.0	9.2	24.1	compact	46	90.6	137.3	compact
128	W21X62	50	**600**	**252**	6.7	9.2	24.1	compact	49	90.6	137.3	compact
129	W21X55	50	**525**	**234**	7.9	9.2	24.1	compact	53	90.6	137.3	compact
130	W21X48*	50	**442**	**216**	9.5	9.2	24.1	noncompact	56	90.6	137.3	compact
131	W21X57	50	**538**	**256**	5.0	9.2	24.1	compact	49	90.6	137.3	compact
132	W21X50	50	**458**	**237**	6.1	9.2	24.1	compact	52	90.6	137.3	compact
133	W21X44	50	**398**	**217**	7.2	9.2	24.1	compact	57	90.6	137.3	compact
134	W18X311	50	**3,142**	**1,017**	2.2	9.2	24.1	compact	11	90.6	137.3	compact
135	W18X283	50	**2,817**	**920**	2.4	9.2	24.1	compact	12	90.6	137.3	compact
136	W18X258	50	**2,546**	**826**	2.6	9.2	24.1	compact	13	90.6	137.3	compact

137	W18X234	50	**2,288**	**734**	2.8	9.2	24.1	compact	15	90.6	137.3	compact
138	W18X211	50	**2,042**	**658**	3.0	9.2	24.1	compact	16	90.6	137.3	compact
139	W18X192	50	**1,842**	**588**	3.3	9.2	24.1	compact	18	90.6	137.3	compact
140	W18X175	50	**1,658**	**534**	3.6	9.2	24.1	compact	19	90.6	137.3	compact
141	W18X158	50	**1,483**	**479**	3.9	9.2	24.1	compact	21	90.6	137.3	compact
142	W18X143	50	**1,342**	**427**	4.2	9.2	24.1	compact	23	90.6	137.3	compact
143	W18X130	50	**1,208**	**388**	4.7	9.2	24.1	compact	25	90.6	137.3	compact
144	W18X119	50	**1,092**	**373**	5.3	9.2	24.1	compact	26	90.6	137.3	compact
145	W18X106	50	**958**	**331**	6.0	9.2	24.1	compact	29	90.6	137.3	compact
146	W18X97	50	**879**	**299**	6.4	9.2	24.1	compact	32	90.6	137.3	compact
147	W18X86	50	**775**	**265**	7.2	9.2	24.1	compact	35	90.6	137.3	compact
148	W18X76	50	**679**	**232**	8.1	9.2	24.1	compact	40	90.6	137.3	compact
149	W18X71	50	**608**	**275**	4.7	9.2	24.1	compact	34	90.6	137.3	compact
150	W18X65	50	**554**	**248**	5.1	9.2	24.1	compact	38	90.6	137.3	compact
151	W18X60	50	**513**	**227**	5.4	9.2	24.1	compact	41	90.6	137.3	compact
152	W18X55	50	**467**	**212**	6.0	9.2	24.1	compact	43	90.6	137.3	compact
153	W18X50	50	**421**	**192**	6.6	9.2	24.1	compact	47	90.6	137.3	compact
154	W18X46	50	**378**	**195**	5.0	9.2	24.1	compact	47	90.6	137.3	compact
155	W18X40	50	**327**	**169**	5.7	9.2	24.1	compact	53	90.6	137.3	compact
156	W18X35	50	**277**	**159**	7.1	9.2	24.1	compact	56	90.6	137.3	compact
157	W16X100	50	**825**	**298**	5.3	9.2	24.1	compact	26	90.6	137.3	compact
158	W16X89	50	**729**	**265**	5.9	9.2	24.1	compact	29	90.6	137.3	compact
159	W16X77	50	**625**	**225**	6.8	9.2	24.1	compact	33	90.6	137.3	compact
160	W16X67	50	**542**	**193**	7.7	9.2	24.1	compact	38	90.6	137.3	compact
161	W16X57	50	**438**	**212**	5.0	9.2	24.1	compact	35	90.6	137.3	compact
162	W16X50	50	**383**	**186**	5.6	9.2	24.1	compact	40	90.6	137.3	compact
163	W16X45	50	**343**	**167**	6.2	9.2	24.1	compact	43	90.6	137.3	compact
164	W16X40	50	**304**	**146**	6.9	9.2	24.1	compact	49	90.6	137.3	compact
165	W16X36	50	**267**	**141**	8.1	9.2	24.1	compact	51	90.6	137.3	compact
166	W16X31	50	**225**	**131**	6.3	9.2	24.1	compact	55	90.6	137.3	compact
167	W16X26	50	**184**	**118**	8.0	9.2	24.1	compact	60	90.6	137.3	compact
168	W14X730	50	**6,917**	**2,063**	1.8	9.2	24.1	compact	4	90.6	137.3	compact
169	W14X665	50	**6,167**	**1,834**	2.0	9.2	24.1	compact	4	90.6	137.3	compact
170	W14X605	50	**5,500**	**1,630**	2.1	9.2	24.1	compact	5	90.6	137.3	compact
171	W14X550	50	**4,917**	**1,442**	2.3	9.2	24.1	compact	5	90.6	137.3	compact
172	W14X500	50	**4,375**	**1,288**	2.4	9.2	24.1	compact	6	90.6	137.3	compact
173	W14X455	50	**3,900**	**1,151**	2.6	9.2	24.1	compact	6	90.6	137.3	compact
174	W14X426	50	**3,621**	**1,055**	2.7	9.2	24.1	compact	7	90.6	137.3	compact
175	W14X398	50	**3,338**	**972**	2.9	9.2	24.1	compact	7	90.6	137.3	compact

176	W14X370	50	**3,067**	**891**	3.1	9.2	24.1	compact	8	90.6	137.3	compact
177	W14X342	50	**2,800**	**809**	3.3	9.2	24.1	compact	8	90.6	137.3	compact
178	W14X311	50	**2,513**	**723**	3.6	9.2	24.1	compact	9	90.6	137.3	compact
179	W14X283	50	**2,258**	**646**	3.9	9.2	24.1	compact	10	90.6	137.3	compact
180	W14X257	50	**2,029**	**581**	4.2	9.2	24.1	compact	11	90.6	137.3	compact
181	W14X233	50	**1,817**	**514**	4.6	9.2	24.1	compact	12	90.6	137.3	compact
182	W14X211	50	**1,625**	**462**	5.1	9.2	24.1	compact	13	90.6	137.3	compact
183	W14X193	50	**1,479**	**414**	5.5	9.2	24.1	compact	14	90.6	137.3	compact
184	W14X176	50	**1,333**	**378**	6.0	9.2	24.1	compact	15	90.6	137.3	compact
185	W14X159	50	**1,196**	**335**	6.6	9.2	24.1	compact	17	90.6	137.3	compact
186	W14X145	50	**1,083**	**302**	7.1	9.2	24.1	compact	19	90.6	137.3	compact
187	W14X132	50	**975**	**284**	7.1	9.2	24.1	compact	20	90.6	137.3	compact
188	W14X120	50	**883**	**257**	7.8	9.2	24.1	compact	21	90.6	137.3	compact
189	W14X109	50	**800**	**225**	8.5	9.2	24.1	compact	24	90.6	137.3	compact
190	W14X99*	50	**717**	**207**	9.4	9.2	24.1	noncompact	26	90.6	137.3	compact
191	W14X90*	50	**637**	**185**	10.2	9.2	24.1	noncompact	29	90.6	137.3	compact
192	W14X82	50	**579**	**219**	5.9	9.2	24.1	compact	25	90.6	137.3	compact
193	W14X74	50	**525**	**192**	6.4	9.2	24.1	compact	28	90.6	137.3	compact
194	W14X68	50	**479**	**174**	6.9	9.2	24.1	compact	30	90.6	137.3	compact
195	W14X61	50	**425**	**156**	7.8	9.2	24.1	compact	34	90.6	137.3	compact
196	W14X53	50	**363**	**154**	6.1	9.2	24.1	compact	34	90.6	137.3	compact
197	W14X48	50	**327**	**141**	6.7	9.2	24.1	compact	37	90.6	137.3	compact
198	W14X43	50	**290**	**125**	7.5	9.2	24.1	compact	41	90.6	137.3	compact
199	W14X38	50	**256**	**131**	6.6	9.2	24.1	compact	42	90.6	137.3	compact
200	W14X34	50	**228**	**120**	7.4	9.2	24.1	compact	46	90.6	137.3	compact
201	W14X30	50	**197**	**112**	8.7	9.2	24.1	compact	48	90.6	137.3	compact
202	W14X26	50	**168**	**106**	6.0	9.2	24.1	compact	51	90.6	137.3	compact
203	W14X22	50	**138**	**95**	7.5	9.2	24.1	compact	57	90.6	137.3	compact
204	W12X336	50	**2,513**	**897**	2.3	9.2	24.1	compact	6	90.6	137.3	compact
205	W12X305	50	**2,238**	**797**	2.4	9.2	24.1	compact	7	90.6	137.3	compact
206	W12X279	50	**2,004**	**730**	2.7	9.2	24.1	compact	7	90.6	137.3	compact
207	W12X252	50	**1,783**	**647**	2.9	9.2	24.1	compact	8	90.6	137.3	compact
208	W12X230	50	**1,608**	**584**	3.1	9.2	24.1	compact	8	90.6	137.3	compact
209	W12X210	50	**1,450**	**520**	3.4	9.2	24.1	compact	9	90.6	137.3	compact
210	W12X190	50	**1,296**	**458**	3.6	9.2	24.1	compact	10	90.6	137.3	compact
211	W12X170	50	**1,146**	**403**	4.0	9.2	24.1	compact	11	90.6	137.3	compact
212	W12X152	50	**1,013**	**358**	4.5	9.2	24.1	compact	13	90.6	137.3	compact
213	W12X136	50	**892**	**318**	5.0	9.2	24.1	compact	14	90.6	137.3	compact
214	W12X120	50	**775**	**279**	5.5	9.2	24.1	compact	15	90.6	137.3	compact

215	W12X106	50	**683**	**236**	6.2	9.2	24.1	compact	18	90.6	137.3	compact
216	W12X96	50	**613**	**210**	6.8	9.2	24.1	compact	20	90.6	137.3	compact
217	W12X87	50	**550**	**193**	7.5	9.2	24.1	compact	21	90.6	137.3	compact
218	W12X79	50	**496**	**175**	8.2	9.2	24.1	compact	23	90.6	137.3	compact
219	W12X72	50	**450**	**159**	9.0	9.2	24.1	compact	25	90.6	137.3	compact
220	W12X65*	50	**396**	**142**	9.9	9.2	24.1	noncompact	28	90.6	137.3	compact
221	W12X58	50	**360**	**132**	7.8	9.2	24.1	compact	30	90.6	137.3	compact
222	W12X53	50	**325**	**125**	8.7	9.2	24.1	compact	32	90.6	137.3	compact
223	W12X50	50	**300**	**135**	6.3	9.2	24.1	compact	30	90.6	137.3	compact
224	W12X45	50	**268**	**122**	7.0	9.2	24.1	compact	33	90.6	137.3	compact
225	W12X40	50	**238**	**105**	7.8	9.2	24.1	compact	37	90.6	137.3	compact
226	W12X35	50	**213**	**113**	6.3	9.2	24.1	compact	38	90.6	137.3	compact
227	W12X30	50	**180**	**96**	7.4	9.2	24.1	compact	44	90.6	137.3	compact
228	W12X26	50	**155**	**84**	8.5	9.2	24.1	compact	50	90.6	137.3	compact
229	W12X22	50	**122**	**96**	4.7	9.2	24.1	compact	44	90.6	137.3	compact
230	W12X19	50	**103**	**86**	5.7	9.2	24.1	compact	49	90.6	137.3	compact
231	W12X16	50	**84**	**79**	7.5	9.2	24.1	compact	52	90.6	137.3	compact
232	W12X14	50	**73**	**71**	8.8	9.2	24.1	compact	57	90.6	137.3	compact
233	W10X112	50	**613**	**258**	4.2	9.2	24.1	compact	12	90.6	137.3	compact
234	W10X100	50	**542**	**226**	4.6	9.2	24.1	compact	13	90.6	137.3	compact
235	W10X88	50	**471**	**196**	5.2	9.2	24.1	compact	15	90.6	137.3	compact
236	W10X77	50	**407**	**169**	5.9	9.2	24.1	compact	17	90.6	137.3	compact
237	W10X68	50	**355**	**147**	6.6	9.2	24.1	compact	19	90.6	137.3	compact
238	W10X60	50	**311**	**129**	7.4	9.2	24.1	compact	21	90.6	137.3	compact
239	W10X54	50	**278**	**112**	8.1	9.2	24.1	compact	24	90.6	137.3	compact
240	W10X49	50	**252**	**102**	8.9	9.2	24.1	compact	26	90.6	137.3	compact
241	W10X45	50	**229**	**106**	6.5	9.2	24.1	compact	25	90.6	137.3	compact
242	W10X39	50	**195**	**94**	7.5	9.2	24.1	compact	28	90.6	137.3	compact
243	W10X33	50	**162**	**85**	9.1	9.2	24.1	compact	31	90.6	137.3	compact
244	W10X30	50	**153**	**95**	5.7	9.2	24.1	compact	32	90.6	137.3	compact
245	W10X26	50	**130**	**80**	6.6	9.2	24.1	compact	36	90.6	137.3	compact
246	W10X22	50	**108**	**73**	8.0	9.2	24.1	compact	40	90.6	137.3	compact
247	W10X19	50	**90**	**77**	5.1	9.2	24.1	compact	38	90.6	137.3	compact
248	W10X17	50	**78**	**73**	6.1	9.2	24.1	compact	39	90.6	137.3	compact
249	W10X15	50	**67**	**69**	7.4	9.2	24.1	compact	41	90.6	137.3	compact
250	W10X12*	50	**52**	**56**	9.4	9.2	24.1	noncompact	50	90.6	137.3	compact

B.1.2 Noncomposite I-shaped plate girders

Table B- 2. Nominal Flexural and Shear Resistance for Noncomposite I-Shaped Plate Girders

#	S (ft)	L (ft)	t_{deck} (in)	t_{fws} (in)	b_{fc} (in)	t_{fc} (in)	t_w (in)	D (in)	b_{ft} (in)	t_{ft} (in)	F_y (ksi)	V_n (kip)	M_p (kip-ft)	M_u/M_p
1	6	60	9	2	7.00	0.88	0.75	36	7.55	0.88	50	783	1,990	100.0%
2	6	70	9	2	7.50	1.00	0.75	40	8.00	1.00	50	870	2,574	99.9%
3	6	80	9	2	8.00	1.00	0.75	44	8.21	1.25	50	957	3,223	100.0%
4	6	90	9	2	9.00	1.00	0.75	48	9.57	1.25	50	984	3,934	100.0%
5	6	100	9	2	9.25	1.00	0.88	52	9.25	1.25	50	1,320	4,762	99.4%
6	6	110	9	2	11.00	1.00	0.88	56	11.90	1.00	50	1,339	5,577	100.0%
7	6	120	9	2	13.75	1.00	0.88	58	14.15	1.00	50	1,339	6,495	100.0%
8	6	130	9	2	16.50	1.00	0.88	60	16.65	1.00	50	1,339	7,494	100.0%
9	6	140	9	2	15.25	1.25	0.88	62	15.55	1.25	50	1,339	8,577	100.0%
10	6	150	9	2	16.25	1.25	0.88	66	16.75	1.25	50	1,340	9,749	99.9%
11	6	160	9	2	15.50	1.25	1.00	68	16.10	1.50	50	1,749	11,085	100.0%
12	6	170	9	2	16.00	1.50	1.00	70	16.75	1.50	50	1,749	12,420	100.0%
13	6	180	9	2	17.00	1.50	1.00	74	17.55	1.50	50	1,749	13,855	100.0%
14	6	190	9	2	19.00	1.50	1.00	76	19.76	1.50	50	1,737	15,403	100.0%
15	6	200	9	2	18.25	1.75	1.00	78	18.60	1.75	50	1,693	17,051	100.0%
16	6	210	9	2	20.00	1.75	1.00	80	20.76	1.75	50	1,650	18,813	100.0%
17	8	60	9	2	7.51	0.88	0.75	40	8.00	1.00	50	870	2,490	100.0%
18	8	70	9	2	9.00	1.00	0.75	44	9.05	1.00	50	957	3,205	100.0%
19	8	80	9	2	8.50	1.25	0.75	48	8.75	1.25	50	984	4,012	99.9%
20	8	90	9	2	10.00	1.25	0.75	52	10.00	1.25	50	984	4,886	99.9%
21	8	100	9	2	11.00	1.50	0.75	52	11.26	1.50	50	984	5,834	100.0%
22	8	110	9	2	12.00	1.50	0.75	56	12.70	1.50	50	984	6,887	99.9%
23	8	120	9	2	12.25	1.75	0.75	58	12.50	1.75	50	960	8,019	99.9%
24	8	130	9	2	12.25	1.50	1.00	64	12.52	1.50	50	1,749	9,337	100.0%
25	8	140	9	2	13.50	1.50	1.00	68	13.50	1.50	50	1,749	10,681	99.9%
26	8	150	9	2	15.00	1.50	1.00	70	16.50	1.50	50	1,749	12,137	99.9%
27	8	160	9	2	18.00	1.50	1.00	72	18.00	1.50	50	1,749	13,669	99.9%
28	8	170	9	2	17.25	1.75	1.00	74	17.75	1.75	50	1,749	15,369	99.7%
29	8	180	9	2	19.25	1.75	1.00	76	20.00	1.75	50	1,737	17,141	99.7%
30	8	190	9	2	21.50	1.75	1.00	78	22.00	1.75	50	1,693	18,985	100.0%
31	8	200	9	2	20.50	2.00	1.00	80	21.50	2.00	50	1,650	21,013	100.0%
32	8	210	9	2	21.00	2.25	1.00	80	22.00	2.25	50	1,650	23,240	99.8%
33	10	60	9	2	7.75	1.00	0.75	44	8.00	1.00	50	957	2,989	99.6%
34	10	70	9	2	10.00	1.00	0.75	48	10.00	1.00	50	984	3,842	99.8%

35	10	80	9	2	10.50	1.25	0.75	50	10.75	1.25	50	984	4,789	99.8%
36	10	90	9	2	9.75	1.25	1.00	54	10.00	1.25	50	1,566	5,879	99.8%
37	10	100	9	2	11.00	1.25	1.00	58	11.85	1.25	50	1,682	7,029	100.0%
38	10	110	9	2	13.00	1.25	1.00	60	13.00	1.50	50	1,740	8,311	99.7%
39	10	120	9	2	14.25	1.50	1.00	62	14.25	1.50	50	1,749	9,660	99.7%
40	10	130	9	2	14.00	1.75	1.00	64	14.52	1.75	50	1,749	11,102	100.0%
41	10	140	9	2	15.25	1.75	1.00	68	15.75	1.75	50	1,749	12,699	99.9%
42	10	150	9	2	16.50	1.75	1.00	70	16.75	2.00	50	1,749	14,423	99.9%
43	10	160	9	2	17.50	2.00	1.00	70	17.50	2.25	50	1,749	16,261	99.9%
44	10	170	9	2	18.50	2.25	1.00	72	18.50	2.25	50	1,749	18,278	99.6%
45	10	180	9	2	20.50	2.25	1.00	74	20.50	2.25	50	1,749	20,358	99.7%
46	10	190	9	2	22.50	2.25	1.00	76	22.60	2.25	50	1,737	22,559	100.0%
47	10	200	9	2	23.00	2.25	1.00	78	24.10	2.50	50	1,693	25,019	100.0%
48	10	210	9	2	24.00	2.50	1.00	80	24.55	2.50	50	1,650	27,526	100.0%
49	12	60	9	2	9.25	1.00	0.75	46	9.25	1.00	50	984	3,465	99.7%
50	12	70	9	2	11.50	1.00	0.75	50	12.00	1.00	50	984	4,450	100.0%
51	12	80	9	2	12.25	1.25	0.75	52	12.50	1.25	50	984	5,544	100.0%
52	12	90	9	2	11.50	1.25	1.00	56	12.25	1.25	50	1,624	6,807	99.9%
53	12	100	9	2	13.25	1.25	1.00	60	14.27	1.25	50	1,740	8,138	100.0%
54	12	110	9	2	15.50	1.25	1.00	62	15.50	1.50	50	1,749	9,617	99.8%
55	12	120	9	2	16.50	1.50	1.00	64	17.10	1.50	50	1,749	11,143	100.0%
56	12	130	9	2	16.50	1.75	1.00	66	17.25	1.75	50	1,749	12,872	99.8%
57	12	140	9	2	16.75	2.00	1.00	68	17.25	2.00	50	1,749	14,732	99.6%
58	12	150	9	2	19.25	2.00	1.00	70	19.25	2.00	50	1,749	16,654	99.9%
59	12	160	9	2	21.50	2.00	1.00	72	22.00	2.00	50	1,749	18,811	99.7%
60	12	170	9	2	21.00	2.25	1.00	74	22.00	2.25	50	1,749	21,068	99.8%
61	12	180	9	2	21.00	2.50	1.00	76	22.00	2.50	50	1,737	23,591	99.5%
62	12	190	9	2	23.00	2.50	1.00	78	24.02	2.50	50	1,693	26,045	100.0%
63	12	200	9	2	25.25	2.50	1.00	80	26.50	2.50	50	1,650	28,893	99.8%
64	12	210	9	2	26.25	2.75	1.00	80	27.00	2.75	50	1,650	31,907	99.7%

B.1.3 Composite rolled I-shaped steel sections

Table B- 3. Nominal Flexural and Shear Resistance for Composite Rolled I-Shaped Steel Sections

#	Shape	S (ft)	t_{deck} (in)	t_h (in)	F_y (ksi)	f'_c (ksi)	h/tw<150	bft/2/tft<12	bft>d/6	tft>1.1tw	Weight (lb/ft)	(kip-ft)/lb	D_p (in)	D_p/D_t	M_p (kip-ft)	V_n (kip)
1	W44X230	12	9	2	50	4	OK	OK	OK	OK	230	35	6.75	0.13	8,078	833
2	W40X215	12	9	2	50	4	OK	OK	OK	OK	215	32	6.36	0.13	7,052	689
3	W40X199	12	9	2	50	4	OK	OK	OK	OK	199	33	5.88	0.12	6,552	689
4	W40X235	12	9	2	50	4	OK	OK	OK	OK	235	32	6.75	0.13	7,695	880
5	W40X211	12	9	2	50	4	OK	OK	OK	OK	211	32	6.22	0.12	6,968	795
6	W40X183	12	9	2	50	4	OK	OK	OK	OK	183	33	5.32	0.11	6,042	690
7	W40X167	12	9	2	50	4	OK	OK	OK	OK	167	33	4.91	0.10	5,589	689
8	W40X149	10	9	2	50	4	OK	OK	OK	OK	149	33	5.22	0.11	4,881	668
9	W36X247	12	9	2	50	4	OK	OK	OK	OK	247	30	6.75	0.14	7,630	789
10	W36X231	12	9	2	50	4	OK	OK	OK	OK	231	30	6.75	0.14	7,193	749
11	W36X256	12	9	2	50	4	OK	OK	OK	OK	256	30	6.75	0.14	8,026	945
12	W36X232	12	9	2	50	4	OK	OK	OK	OK	232	31	6.75	0.14	7,290	857
13	W36X210	12	9	2	50	4	OK	OK	OK	OK	210	31	6.27	0.13	6,667	818
14	W36X194	12	9	2	50	4	OK	OK	OK	OK	194	31	5.77	0.12	6,186	754
15	W36X182	12	9	2	50	4	OK	OK	OK	OK	182	32	5.43	0.11	5,849	714
16	W36X170	12	9	2	50	4	OK	OK	OK	OK	170	32	5.06	0.11	5,490	670
17	W36X160	12	9	2	50	4	OK	OK	OK	OK	160	32	4.75	0.10	5,183	640
18	W36X150	10	9	2	50	4	OK	OK	OK	OK	150	32	5.37	0.11	4,792	617
19	W36X135	10	9	2	50	4	OK	OK	OK	OK	135	32	4.83	0.10	4,342	592
20	W33X201	12	9	2	50	4	OK	OK	OK	OK	201	29	5.98	0.13	6,039	651
21	W33X169	12	9	2	50	4	OK	OK	OK	OK	169	31	5.01	0.11	5,201	609
22	W33X152	12	9	2	50	4	OK	OK	OK	OK	152	31	4.55	0.10	4,752	578
23	W33X141	10	9	2	50	4	OK	OK	OK	OK	141	30	5.03	0.11	4,307	551
24	W33X130	10	9	2	50	4	OK	OK	OK	OK	130	31	4.64	0.11	4,000	528
25	W33X118	10	9	2	50	4	OK	OK	OK	OK	118	31	4.20	0.10	3,656	501
26	W30X211	12	9	2	50	4	OK	OK	OK	OK	211	27	6.31	0.15	5,956	635
27	W30X191	12	9	2	50	4	OK	OK	OK	OK	191	28	5.70	0.14	5,448	583
28	W30X173	12	9	2	50	4	OK	OK	OK	OK	173	28	5.17	0.12	4,983	537
29	W30X148	10	9	2	50	4	OK	OK	OK	OK	148	28	5.29	0.13	4,265	534
30	W30X132	10	9	2	50	4	OK	OK	OK	OK	132	29	4.71	0.11	3,825	505
31	W30X124	10	9	2	50	4	OK	OK	OK	OK	124	29	4.43	0.11	3,620	481
32	W30X116	10	9	2	50	4	OK	OK	OK	OK	116	29	4.15	0.10	3,408	464
33	W30X108	10	9	2	50	4	OK	OK	OK	OK	108	29	3.84	0.09	3,178	447

34	W30X99	8	9	2	50	4	OK	OK	OK	OK	99	29	4.41	0.11	**2,860**	**428**
35	W30X90	8	9	2	50	4	OK	OK	OK	OK	90	29	3.98	0.10	**2,604**	**385**
36	W27X194	12	9	2	50	4	OK	OK	OK	OK	194	26	5.78	0.15	**5,205**	**553**
37	W27X178	12	9	2	50	4	OK	OK	OK	OK	178	26	5.31	0.14	**4,816**	**534**
38	W27X161	12	9	2	50	4	OK	OK	OK	OK	161	27	4.80	0.12	**4,406**	**487**
39	W27X146	10	9	2	50	4	OK	OK	OK	OK	146	26	5.23	0.14	**3,929**	**447**
40	W27X129	10	9	2	50	4	OK	OK	OK	OK	129	27	4.59	0.12	**3,536**	**449**
41	W27X114	10	9	2	50	4	OK	OK	OK	OK	114	28	4.08	0.11	**3,173**	**421**
42	W27X102	10	9	2	50	4	OK	OK	OK	OK	102	28	3.75	0.10	**2,860**	**380**
43	W27X94	8	9	2	50	4	OK	OK	OK	OK	94	27	4.19	0.11	**2,575**	**361**
44	W27X84	8	9	2	50	4	OK	OK	OK	OK	84	28	3.75	0.10	**2,332**	**339**
45	W24X176	12	9	2	50	4	OK	OK	OK	OK	176	25	5.26	0.15	**4,497**	**490**
46	W24X162	12	9	2	50	4	OK	OK	OK	OK	162	25	4.86	0.14	**4,195**	**461**
47	W24X146	10	9	2	50	4	OK	OK	OK	OK	146	24	5.24	0.15	**3,694**	**425**
48	W24X131	10	9	2	50	4	OK	OK	OK	OK	131	25	4.71	0.13	**3,363**	**396**
49	W24X117	10	9	2	50	4	OK	OK	OK	OK	117	26	4.19	0.12	**3,033**	**360**
50	W24X104	10	9	2	50	4	OK	OK	OK	OK	104	26	3.75	0.11	**2,739**	**328**
51	W24X103	10	9	2	50	4	OK	OK	OK	OK	103	26	3.75	0.11	**2,727**	**360**
52	W24X94	8	9	2	50	4	OK	OK	OK	OK	94	26	4.21	0.12	**2,437**	**337**
53	W24X84	8	9	2	50	4	OK	OK	OK	OK	84	26	3.75	0.11	**2,199**	**307**
54	W24X76	8	9	2	50	4	OK	OK	OK	OK	76	26	3.75	0.11	**2,001**	**288**
55	W24X68	8	9	2	50	4	OK	OK	OK	OK	68	26	3.75	0.11	**1,809**	**271**
56	W24X62	8	9	2	50	4	OK	OK	OK	OK	62	27	3.69	0.11	**1,661**	**281**
57	W24X55	6	9	2	50	4	OK	OK	OK	OK	55	26	3.75	0.11	**1,443**	**259**
58	W21X201	12	9	2	50	4	OK	OK	OK	OK	201	22	6.03	0.18	**4,764**	**521**
59	W21X182	12	9	2	50	4	OK	OK	OK	OK	182	23	5.45	0.16	**4,358**	**475**
60	W21X166	12	9	2	50	4	OK	OK	OK	OK	166	23	4.96	0.15	**4,011**	**430**
61	W21X147	10	9	2	50	4	OK	OK	OK	OK	147	23	5.27	0.16	**3,478**	**413**
62	W21X132	10	9	2	50	4	OK	OK	OK	OK	132	23	4.73	0.14	**3,159**	**372**
63	W21X122	10	9	2	50	4	OK	OK	OK	OK	122	24	4.37	0.13	**2,951**	**344**
64	W21X111	10	9	2	50	4	OK	OK	OK	OK	111	24	3.97	0.12	**2,708**	**315**
65	W21X101	10	9	2	50	4	OK	OK	OK	OK	101	24	3.75	0.12	**2,499**	**287**
66	W21X93	8	9	2	50	4	OK	OK	OK	OK	93	24	4.15	0.13	**2,256**	**332**
67	W21X83	8	9	2	50	4	OK	OK	OK	OK	83	24	3.75	0.12	**2,034**	**295**
68	W21X73	8	9	2	50	4	OK	OK	OK	OK	73	25	3.75	0.12	**1,810**	**260**
69	W21X68	8	9	2	50	4	OK	OK	OK	OK	68	25	3.75	0.12	**1,699**	**246**
70	W21X62	8	9	2	50	4	OK	OK	OK	OK	62	25	3.70	0.12	**1,564**	**229**
71	W21X55	6	9	2	50	4	OK	OK	OK	OK	55	24	3.75	0.12	**1,349**	**215**
72	W21X48	6	9	2	50	4	OK	OK	OK	OK	48	24	3.75	0.12	**1,190**	**200**

73	W21X57	6	9	2	50	4	OK	OK	OK	OK	57	24	3.75	0.12	**1,400**	**233**
74	W21X50	6	9	2	50	4	OK	OK	OK	OK	50	24	3.75	0.12	**1,238**	**217**
75	W21X44	6	9	2	50	4	OK	OK	OK	OK	44	25	3.57	0.11	**1,110**	**201**
76	W18X175	12	9	2	50	4	OK	OK	OK	OK	175	21	5.23	0.17	**3,924**	**434**
77	W18X158	12	9	2	50	4	OK	OK	OK	OK	158	22	4.71	0.15	**3,577**	**395**
78	W18X143	10	9	2	50	4	OK	OK	OK	OK	143	21	5.13	0.17	**3,177**	**357**
79	W18X130	10	9	2	50	4	OK	OK	OK	OK	130	22	4.68	0.15	**2,932**	**328**
80	W18X119	10	9	2	50	4	OK	OK	OK	OK	119	22	4.29	0.14	**2,708**	**321**
81	W18X106	10	9	2	50	4	OK	OK	OK	OK	106	22	3.80	0.13	**2,427**	**288**
82	W18X97	8	9	2	50	4	OK	OK	OK	OK	97	22	4.34	0.15	**2,164**	**262**
83	W18X86	8	9	2	50	4	OK	OK	OK	OK	86	22	3.86	0.13	**1,953**	**235**
84	W18X76	8	9	2	50	4	OK	OK	OK	OK	76	22	3.75	0.13	**1,736**	**208**
85	W18X71	8	9	2	50	4	OK	OK	OK	OK	71	23	3.75	0.13	**1,655**	**242**
86	W18X65	8	9	2	50	4	OK	OK	OK	OK	65	23	3.75	0.13	**1,531**	**221**
87	W18X60	6	9	2	50	4	OK	OK	OK	OK	60	22	3.75	0.13	**1,364**	**202**
88	W18X55	6	9	2	50	4	OK	OK	OK	OK	55	23	3.75	0.13	**1,263**	**190**
89	W18X50	6	9	2	50	4	OK	OK	OK	OK	50	23	3.75	0.13	**1,157**	**174**
90	W18X46	6	9	2	50	4	OK	OK	OK	OK	46	23	3.70	0.13	**1,084**	**176**
91	W18X40	6	9	2	50	4	OK	OK	OK	OK	40	24	3.34	0.12	**956**	**154**
92	W18X35	6	9	2	50	4	OK	OK	OK	OK	35	24	3.04	0.11	**849**	**147**
93	W16X100	8	9	2	50	4	OK	OK	OK	OK	100	20	4.49	0.16	**2,125**	**255**
94	W16X89	8	9	2	50	4	OK	OK	OK	OK	89	21	4.00	0.14	**1,924**	**229**
95	W16X77	8	9	2	50	4	OK	OK	OK	OK	77	21	3.75	0.14	**1,681**	**198**
96	W16X67	8	9	2	50	4	OK	OK	OK	OK	67	22	3.75	0.14	**1,479**	**171**
97	W16X57	6	9	2	50	4	OK	OK	OK	OK	57	21	3.75	0.14	**1,243**	**187**
98	W16X50	6	9	2	50	4	OK	OK	OK	OK	50	22	3.75	0.14	**1,111**	**166**
99	W16X45	6	9	2	50	4	OK	OK	OK	OK	45	22	3.64	0.13	**1,009**	**150**
100	W16X40	6	9	2	50	4	OK	OK	OK	OK	40	22	3.34	0.12	**911**	**133**
101	W16X36	6	9	2	50	4	OK	OK	OK	OK	36	23	3.10	0.12	**830**	**129**
102	W16X31	6	9	2	50	4	OK	OK	OK	OK	31	24	2.80	0.10	**733**	**120**
103	W16X26	6	9	2	50	4	OK	OK	OK	OK	26	24	2.50	0.09	**632**	**109**
104	W14X109	10	9	2	50	4	OK	OK	OK	OK	109	19	3.89	0.15	**2,185**	**192**
105	W14X99	8	9	2	50	4	OK	OK	OK	OK	99	19	4.43	0.18	**1,934**	**178**
106	W14X90	8	9	2	50	4	OK	OK	OK	OK	90	19	4.00	0.16	**1,773**	**161**
107	W14X82	8	9	2	50	4	OK	OK	OK	OK	82	19	3.75	0.15	**1,651**	**186**
108	W14X74	8	9	2	50	4	OK	OK	OK	OK	74	20	3.75	0.15	**1,517**	**165**
109	W14X68	8	9	2	50	4	OK	OK	OK	OK	68	20	3.75	0.15	**1,394**	**151**
110	W14X61	8	9	2	50	4	OK	OK	OK	OK	61	20	3.64	0.15	**1,272**	**137**
111	W14X53	6	9	2	50	4	OK	OK	OK	OK	53	20	3.75	0.15	**1,078**	**135**

112	W14X48	6	9	2	50	4	OK	OK	OK	OK	48	20	3.75	0.15	**989**	**124**
113	W14X43	6	9	2	50	4	OK	OK	OK	OK	43	20	3.48	0.14	**897**	**112**
114	W14X38	6	9	2	50	4	OK	OK	OK	OK	38	21	3.21	0.13	**827**	**117**
115	W14X34	6	9	2	50	4	OK	OK	OK	OK	34	22	2.98	0.12	**753**	**108**
116	W14X30	6	9	2	50	4	OK	OK	OK	OK	30	22	2.74	0.11	**675**	**102**
117	W14X26	6	9	2	50	4	OK	OK	OK	OK	26	23	2.51	0.10	**604**	**97**
118	W14X22	6	9	2	50	4	OK	OK	OK	OK	22	24	2.26	0.09	**523**	**87**
119	W18X211	12	9	2	50	4	OK	OK	OK	OK	211	21	6.35	0.20	**4,669**	**519**
120	W18X192	12	9	2	50	4	OK	OK	OK	OK	192	21	5.77	0.18	**4,291**	**470**
121	W44X230	**6**	9	2	50	6	OK	OK	OK	OK	230	32	8.52	0.16	**7,755**	**833**
122	W44X230	**8**	9	2	50	6	OK	OK	OK	OK	230	35	6.75	0.13	**8,096**	**833**
123	W44X230	**10**	9	2	50	6	OK	OK	OK	OK	230	36	5.50	0.10	**8,318**	**833**
124	W44X230	**12**	9	2	50	6	OK	OK	OK	OK	230	37	4.58	0.08	**8,480**	**833**
125	W44X230	12	9	2	50	**3**	OK	OK	OK	OK	230	33	7.94	0.15	**7,735**	**833**
126	W44X230	12	9	2	50	**3.5**	OK	OK	OK	OK	230	34	6.81	0.13	**7,957**	**833**
127	W44X230	12	9	2	50	**4**	OK	OK	OK	OK	230	35	6.75	0.13	**8,078**	**833**
128	W44X230	12	9	2	50	**4.5**	OK	OK	OK	OK	230	35	6.11	0.11	**8,209**	**833**
129	W44X230	12	9	2	50	**5**	OK	OK	OK	OK	230	36	5.50	0.10	**8,317**	**833**
130	W44X230	12	9	2	50	**6**	OK	OK	OK	OK	230	37	4.58	0.08	**8,480**	**833**
131	W40X149	**6**	9	2	50	6	OK	OK	OK	OK	149	32	5.80	0.12	**4,818**	**668**
132	W40X149	**8**	9	2	50	6	OK	OK	OK	OK	149	33	4.35	0.09	**4,980**	**668**
133	W40X149	**10**	9	2	50	6	OK	OK	OK	OK	149	34	3.75	0.08	**5,084**	**668**
134	W40X149	**12**	9	2	50	6	OK	OK	OK	OK	149	35	3.51	0.07	**5,163**	**668**
135	W40X149	12	9	2	50	**3**	OK	OK	OK	OK	149	32	5.80	0.12	**4,808**	**668**
136	W40X149	12	9	2	50	**3.5**	OK	OK	OK	OK	149	33	4.97	0.10	**4,913**	**668**
137	W40X149	12	9	2	50	**4**	OK	OK	OK	OK	149	33	4.35	0.09	**4,991**	**668**
138	W40X149	12	9	2	50	**4.5**	OK	OK	OK	OK	149	34	3.87	0.08	**5,052**	**668**
139	W40X149	12	9	2	50	**5**	OK	OK	OK	OK	149	34	3.75	0.08	**5,093**	**668**
140	W40X149	12	9	2	50	**6**	OK	OK	OK	OK	149	35	3.51	0.07	**5,163**	**668**
141	W36X135	**6**	9	2	50	6	OK	OK	OK	OK	135	31	5.36	0.12	**4,283**	**592**
142	W36X135	**8**	9	2	50	6	OK	OK	OK	OK	135	33	4.02	0.09	**4,426**	**592**
143	W36X135	**10**	9	2	50	6	OK	OK	OK	OK	135	33	3.75	0.08	**4,515**	**592**
144	W36X135	**12**	9	2	50	6	OK	OK	OK	OK	135	34	3.29	0.07	**4,589**	**592**
145	W36X135	12	9	2	50	**3**	OK	OK	OK	OK	135	31	5.36	0.12	**4,281**	**592**
146	W36X135	12	9	2	50	**3.5**	OK	OK	OK	OK	135	32	4.60	0.10	**4,372**	**592**
147	W36X135	12	9	2	50	**4**	OK	OK	OK	OK	135	33	4.02	0.09	**4,441**	**592**
148	W36X135	12	9	2	50	**4.5**	OK	OK	OK	OK	135	33	3.75	0.08	**4,488**	**592**
149	W36X135	12	9	2	50	**5**	OK	OK	OK	OK	135	34	3.75	0.08	**4,524**	**592**
150	W36X135	12	9	2	50	**6**	OK	OK	OK	OK	135	34	3.29	0.07	**4,589**	**592**

151	W33X118	**6**	9	2	50	6	OK	OK	OK	OK	118	30	4.67	0.11	**3,601**	**501**
152	W33X118	**8**	9	2	50	6	OK	OK	OK	OK	118	31	3.75	0.09	**3,712**	**501**
153	W33X118	**10**	9	2	50	6	OK	OK	OK	OK	118	32	3.42	0.08	**3,790**	**501**
154	W33X118	**12**	9	2	50	6	OK	OK	OK	OK	118	33	2.94	0.07	**3,854**	**501**
155	W33X118	12	9	2	50	**3**	OK	OK	OK	OK	118	30	4.67	0.11	**3,611**	**501**
156	W33X118	12	9	2	50	**3.5**	OK	OK	OK	OK	118	31	4.00	0.09	**3,684**	**501**
157	W33X118	12	9	2	50	**4**	OK	OK	OK	OK	118	32	3.75	0.09	**3,730**	**501**
158	W33X118	12	9	2	50	**4.5**	OK	OK	OK	OK	118	32	3.75	0.09	**3,766**	**501**
159	W33X118	12	9	2	50	**5**	OK	OK	OK	OK	118	32	3.53	0.08	**3,801**	**501**
160	W33X118	12	9	2	50	**6**	OK	OK	OK	OK	118	33	2.94	0.07	**3,854**	**501**
161	W30X99	**6**	9	2	50	6	OK	OK	OK	OK	99	29	3.92	0.10	**2,894**	**428**
162	W30X99	**8**	9	2	50	6	OK	OK	OK	OK	99	30	3.57	0.09	**2,978**	**428**
163	W30X99	**10**	9	2	50	6	OK	OK	OK	OK	99	31	2.97	0.07	**3,044**	**428**
164	W30X99	**12**	9	2	50	6	OK	OK	OK	OK	99	31	2.57	0.06	**3,097**	**428**
165	W30X99	10	9	2	50	**3**	OK	OK	OK	OK	99	28	4.71	0.12	**2,838**	**428**
166	W30X99	10	9	2	50	**3.5**	OK	OK	OK	OK	99	29	4.04	0.10	**2,900**	**428**
167	W30X99	10	9	2	50	**4**	OK	OK	OK	OK	99	30	3.75	0.09	**2,940**	**428**
168	W30X99	10	9	2	50	**4.5**	OK	OK	OK	OK	99	30	3.75	0.09	**2,970**	**428**
169	W30X99	10	9	2	50	**5**	OK	OK	OK	OK	99	30	3.56	0.09	**2,999**	**428**
170	W30X99	10	9	2	50	**6**	OK	OK	OK	OK	99	31	2.97	0.07	**3,044**	**428**
171	W27X84	**6**	9	2	50	4	OK	OK	OK	OK	84	26	5.00	0.13	**2,235**	**339**
172	W27X84	**8**	9	2	50	4	OK	OK	OK	OK	84	28	3.75	0.10	**2,332**	**339**
173	W27X84	**10**	9	2	50	4	OK	OK	OK	OK	84	28	3.75	0.10	**2,389**	**339**
174	W27X84	**12**	9	2	50	4	OK	OK	OK	OK	84	29	3.42	0.09	**2,443**	**339**
175	W27X84	10	9	2	50	**3**	OK	OK	OK	OK	84	28	4.00	0.11	**2,320**	**339**
176	W27X84	10	9	2	50	**3.5**	OK	OK	OK	OK	84	28	3.75	0.10	**2,359**	**339**
177	W27X84	10	9	2	50	**4**	OK	OK	OK	OK	84	28	3.75	0.10	**2,389**	**339**
178	W27X84	10	9	2	50	**4.5**	OK	OK	OK	OK	84	29	3.49	0.09	**2,417**	**339**
179	W27X84	10	9	2	50	**5**	OK	OK	OK	OK	84	29	3.14	0.08	**2,440**	**339**
180	W27X84	10	9	2	50	**6**	OK	OK	OK	OK	84	29	2.62	0.07	**2,475**	**339**
181	W24X55	**6**	9	2	50	4	OK	OK	OK	OK	55	26	3.75	0.11	**1,443**	**259**
182	W24X55	**8**	9	2	50	4	OK	OK	OK	OK	55	27	3.39	0.10	**1,498**	**259**
183	W24X55	**10**	9	2	50	4	OK	OK	OK	OK	55	28	2.89	0.08	**1,544**	**259**
184	W24X55	**12**	9	2	50	4	OK	OK	OK	OK	55	29	2.55	0.07	**1,584**	**259**
185	W24X55	8	9	2	50	**3**	OK	OK	OK	OK	55	26	3.75	0.11	**1,452**	**259**
186	W24X55	8	9	2	50	**3.5**	OK	OK	OK	OK	55	27	3.75	0.11	**1,476**	**259**
187	W24X55	8	9	2	50	**4**	OK	OK	OK	OK	55	27	3.39	0.10	**1,498**	**259**
188	W24X55	8	9	2	50	**4.5**	OK	OK	OK	OK	55	28	3.01	0.09	**1,515**	**259**
189	W24X55	8	9	2	50	**5**	OK	OK	OK	OK	55	28	2.71	0.08	**1,529**	**259**

190	W24X55	8	9	2	50	**6**	OK	OK	OK	OK	55	28	2.26	0.07	**1,550**	**259**
191	W21X44	**6**	9	2	50	4	OK	OK	OK	OK	44	25	3.57	0.11	**1,110**	**201**
192	W21X44	**8**	9	2	50	4	OK	OK	OK	OK	44	26	2.90	0.09	**1,157**	**201**
193	W21X44	**10**	9	2	50	4	OK	OK	OK	OK	44	27	2.49	0.08	**1,196**	**201**
194	W21X44	**12**	9	2	50	4	OK	OK	OK	OK	44	28	2.22	0.07	**1,232**	**201**
195	W21X44	8	9	2	50	**3**	OK	OK	OK	OK	44	25	3.75	0.12	**1,119**	**201**
196	W21X44	8	9	2	50	**3.5**	OK	OK	OK	OK	44	26	3.31	0.10	**1,141**	**201**
197	W21X44	8	9	2	50	**4**	OK	OK	OK	OK	44	26	2.90	0.09	**1,157**	**201**
198	W21X44	8	9	2	50	**4.5**	OK	OK	OK	OK	44	27	2.57	0.08	**1,169**	**201**
199	W21X44	8	9	2	50	**5**	OK	OK	OK	OK	44	27	2.32	0.07	**1,180**	**201**
200	W21X44	8	9	2	50	**6**	OK	OK	OK	OK	44	27	1.93	0.06	**1,195**	**201**
201	W18X35	**4**	9	2	50	4	OK	OK	OK	OK	35	22	3.75	0.13	**797**	**147**
202	W18X35	**6**	9	2	50	4	OK	OK	OK	OK	35	24	3.04	0.11	**849**	**147**
203	W18X35	**8**	9	2	50	4	OK	OK	OK	OK	35	25	2.49	0.09	**889**	**147**
204	W18X35	**10**	9	2	50	4	OK	OK	OK	OK	35	26	2.17	0.08	**925**	**147**
205	W18X35	**12**	9	2	50	4	OK	OK	OK	OK	35	27	1.95	0.07	**958**	**147**
206	W18X35	6	9	2	50	**3**	OK	OK	OK	OK	35	23	3.75	0.13	**818**	**147**
207	W18X35	6	9	2	50	**3.5**	OK	OK	OK	OK	35	24	3.47	0.12	**835**	**147**
208	W18X35	6	9	2	50	**4**	OK	OK	OK	OK	35	24	3.04	0.11	**849**	**147**
209	W18X35	6	9	2	50	**4.5**	OK	OK	OK	OK	35	25	2.70	0.09	**859**	**147**
210	W18X35	6	9	2	50	**5**	OK	OK	OK	OK	35	25	2.43	0.08	**868**	**147**
211	W18X35	6	9	2	50	**6**	OK	OK	OK	OK	35	25	2.02	0.07	**880**	**147**
212	W16X26	**4**	9	2	50	4	OK	OK	OK	OK	26	22	3.32	0.12	**590**	**109**
213	W16X26	**6**	9	2	50	4	OK	OK	OK	OK	26	24	2.50	0.09	**632**	**109**
214	W16X26	**8**	9	2	50	4	OK	OK	OK	OK	26	26	2.09	0.08	**667**	**109**
215	W16X26	**10**	9	2	50	4	OK	OK	OK	OK	26	27	1.85	0.07	**700**	**109**
216	W16X26	**12**	9	2	50	4	OK	OK	OK	OK	26	28	1.69	0.06	**731**	**109**
217	W16X26	6	9	2	50	**3**	OK	OK	OK	OK	26	23	3.34	0.13	**611**	**109**
218	W16X26	6	9	2	50	**3.5**	OK	OK	OK	OK	26	24	2.86	0.11	**623**	**109**
219	W16X26	6	9	2	50	**4**	OK	OK	OK	OK	26	24	2.50	0.09	**632**	**109**
220	W16X26	6	9	2	50	**4.5**	OK	OK	OK	OK	26	25	2.23	0.08	**639**	**109**
221	W16X26	6	9	2	50	**5**	OK	OK	OK	OK	26	25	2.00	0.08	**645**	**109**
222	W16X26	6	9	2	50	**6**	OK	OK	OK	OK	26	25	1.67	0.06	**653**	**109**
223	W14X22	**4**	9	2	50	4	OK	OK	OK	OK	22	22	2.96	0.12	**485**	**87**
224	W14X22	**6**	9	2	50	4	OK	OK	OK	OK	22	24	2.26	0.09	**523**	**87**
225	W14X22	**8**	9	2	50	4	OK	OK	OK	OK	22	25	1.91	0.08	**556**	**87**
226	W14X22	**10**	9	2	50	4	OK	OK	OK	OK	22	27	1.70	0.07	**588**	**87**
227	W14X22	**12**	9	2	50	4	OK	OK	OK	OK	22	28	1.56	0.06	**618**	**87**
228	W14X22	6	9	2	50	**3**	OK	OK	OK	OK	22	23	3.01	0.12	**506**	**87**

229	W14X22	6	9	2	50	**3.5**	OK	OK	OK	OK	22	23	2.58	0.10	**516**	**87**
230	W14X22	6	9	2	50	**4**	OK	OK	OK	OK	22	24	2.26	0.09	**523**	**87**
231	W14X22	6	9	2	50	**4.5**	OK	OK	OK	OK	22	24	2.01	0.08	**529**	**87**
232	W14X22	6	9	2	50	**5**	OK	OK	OK	OK	22	24	1.81	0.07	**533**	**87**
233	W14X22	6	9	2	50	**6**	OK	OK	OK	OK	22	25	1.51	0.06	**540**	**87**
234	W12X14	**4**	9	2	50	4	OK	OK	OK	OK	14	23	2.26	0.10	**325**	**66**
235	W12X14	**6**	9	2	50	4	OK	OK	OK	OK	14	26	1.80	0.08	**358**	**66**
236	W12X14	**8**	9	2	50	4	OK	OK	OK	OK	14	28	1.56	0.07	**389**	**66**
237	W12X14	**10**	9	2	50	4	OK	OK	OK	OK	14	30	1.42	0.06	**418**	**66**
238	W12X14	**12**	9	2	50	4	OK	OK	OK	OK	14	32	1.33	0.06	**448**	**66**
239	W12X14	6	9	2	50	**3**	OK	OK	OK	OK	14	25	2.39	0.10	**347**	**66**
240	W12X14	6	9	2	50	**3.5**	OK	OK	OK	OK	14	25	2.05	0.09	**353**	**66**
241	W12X14	6	9	2	50	**4**	OK	OK	OK	OK	14	26	1.80	0.08	**358**	**66**
242	W12X14	6	9	2	50	**4.5**	OK	OK	OK	OK	14	26	1.60	0.07	**362**	**66**
243	W12X14	6	9	2	50	**5**	OK	OK	OK	OK	14	26	1.44	0.06	**365**	**66**
244	W12X14	6	9	2	50	**6**	OK	OK	OK	OK	14	26	1.20	0.05	**369**	**66**

B.1.4. Composite I-shaped plate girders

Table B- 4. Dimensions and proportions of composite I-shaped plate girder sections.

#	S (ft)	L (ft)	t_{deck} (in)	t_h (in)	b_{fc} (in)	t_{fc} (in)	t_w (in)	D (in)	b_{ft} (in)	t_{ft} (in)	D/tw	h/tw<150	bfc/2/tfc<12	bfc>d/6	tfc>1.1tw	bft/2/tft<12	bft>d/6	tft>1.1tw	Iyc/Iyt	Iyc/Iyt
1	*Empty placeholder*																			
2	*Empty placeholder*																			
3	*Empty placeholder*																			
4	6	70	9	2	6.0	0.625	0.5	30	7.3	0.625	60	OK	OK	OK	OK	OK	OK	OK	OK	0.56
5	6	80	9	2	6.5	0.625	0.5	36	7.4	0.625	72	OK	OK	OK	OK	OK	OK	OK	OK	0.68
6	6	90	9	2	7.0	0.625	0.5	40	7.9	0.75	80	OK	OK	OK	OK	OK	OK	OK	OK	0.58
7	6	100	9	2	8.0	0.625	0.5	46	9.4	0.625	92	OK	OK	OK	OK	OK	OK	OK	OK	0.62
8	6	110	9	2	9.5	0.625	0.5	50	10.8	0.625	100	OK	OK	OK	OK	OK	OK	OK	OK	0.67
9	6	120	9	2	10.0	0.625	0.5	54	10.7	0.75	108	OK	OK	OK	OK	OK	OK	OK	OK	0.67
10	6	130	9	2	10.5	0.625	0.5	60	10.7	0.75	120	OK	OK	OK	OK	OK	OK	OK	OK	0.79
11	6	140	9	2	11.0	0.75	0.5	64	12.4	0.75	128	OK	OK	OK	OK	OK	OK	OK	OK	0.69
12	6	150	9	2	12.0	0.75	0.5	68	12.0	0.875	136	OK	OK	OK	OK	OK	OK	OK	OK	0.85
13	6	160	9	2	13.0	0.75	0.5	70	15.0	0.875	140	OK	OK	OK	OK	OK	OK	OK	OK	0.56
14	6	170	9	2	13.0	0.75	0.5	74	14.2	1	148	OK	OK	OK	OK	OK	OK	OK	OK	0.57
15	6	180	9	2	14.0	0.75	0.625	78	14.6	0.75	125	OK	OK	OK	OK	OK	OK	OK	OK	0.88
16	6	190	9	2	15.0	0.75	0.625	82	15.0	0.875	131	OK	OK	OK	OK	OK	OK	OK	OK	0.86
17	6	200	9	2	15.0	0.75	0.625	88	15.9	0.875	141	OK	OK	OK	OK	OK	OK	OK	OK	0.72
18	6	210	9	2	16.0	0.75	0.625	92	16.6	1	147	OK	OK	OK	OK	OK	OK	OK	OK	0.67
19	6	220	9	2	16.0	0.75	0.625	92	17.5	1.5	147	OK	OK	OK	OK	OK	OK	OK	OK	0.38
20	6	230	9	2	18.0	0.875	0.75	102	18.7	0.875	136	OK	OK	OK	OK	OK	OK	OK	OK	0.89
21	6	240	9	2	19.0	1	0.75	104	20.5	1	139	OK	OK	OK	OK	OK	OK	OK	OK	0.80
22	6	250	9	2	24.0	1.5	0.75	112	24.1	1.75	149	OK	OK	OK	OK	OK	OK	OK	OK	0.85
23	6	260	9	2	25.5	1.75	0.75	112	26.6	1.75	149	OK	OK	OK	OK	OK	OK	OK	OK	0.88
24	6	270	9	2	26.0	2	0.75	112	26.9	2	149	OK	OK	OK	OK	OK	OK	OK	OK	0.90
25	6	280	9	2	26.0	2.25	0.75	112	26.0	2.5	149	OK	OK	OK	OK	OK	OK	OK	OK	0.90
26	6	290	9	2	29.7	2.25	0.75	112	30.0	2.5	149	OK	OK	OK	OK	OK	OK	OK	OK	0.88
27	6	300	9	2	31.4	2.5	0.75	112	30.0	2.5	149	OK	OK	OK	OK	OK	OK	OK	OK	1.15
28	6	310	9	2	32.5	2.75	0.75	112	32.0	2.5	149	OK	OK	OK	OK	OK	OK	OK	OK	1.15
29	6	320	9	2	36.1	2.75	0.75	112	36.0	2.5	149	OK	OK	OK	OK	OK	OK	OK	OK	1.11
30	6	330	9	2	38.0	2.75	1	120	37.0	2.25	120	OK	OK	OK	OK	OK	OK	OK	OK	1.32
31	8	60	9	2	6.0	0.625	0.5	28	7.2	0.625	56	OK	OK	OK	OK	OK	OK	OK	OK	0.58
32	8	70	9	2	6.0	0.625	0.5	34	8.0	0.625	68	OK	OK	OK	OK	OK	OK	OK	OK	0.43
33	8	80	9	2	7.0	0.625	0.5	40	8.5	0.625	80	OK	OK	OK	OK	OK	OK	OK	OK	0.57

34	8	90	9	2	8.0	0.625	0.5	46	8.9	0.625	92	OK	OK	OK	OK	OK	OK	OK	OK	0.73
35	8	100	9	2	10.0	0.625	0.5	50	11.1	0.625	100	OK	OK	OK	OK	OK	OK	OK	OK	0.73
36	8	110	9	2	10.0	0.625	0.5	54	13.6	0.625	108	OK	OK	OK	OK	OK	OK	OK	OK	0.40
37	8	120	9	2	12.0	0.625	0.5	60	13.9	0.625	120	OK	OK	OK	OK	OK	OK	OK	OK	0.65
38	8	130	9	2	12.0	0.625	0.5	68	12.3	0.625	136	OK	OK	OK	OK	OK	OK	OK	OK	0.94
39	8	140	9	2	12.6	0.625	0.5	74	12.6	0.625	148	OK	OK	OK	OK	OK	OK	OK	OK	1.00
40	8	150	9	2	13.0	0.625	0.5	74	15.7	0.75	148	OK	OK	OK	OK	OK	OK	OK	OK	0.47
41	8	160	9	2	13.0	0.625	0.5	74	16.0	1	148	OK	OK	OK	OK	OK	OK	OK	OK	0.34
42	8	170	9	2	14.0	0.75	0.625	82	14.0	0.75	131	OK	OK	OK	OK	OK	OK	OK	OK	1.00
43	8	180	9	2	15.0	0.75	0.625	86	15.8	0.75	138	OK	OK	OK	OK	OK	OK	OK	OK	0.86
44	8	190	9	2	16.0	0.75	0.625	90	17.6	0.75	144	OK	OK	OK	OK	OK	OK	OK	OK	0.75
45	8	200	9	2	16.0	0.75	0.625	92	16.2	1	147	OK	OK	OK	OK	OK	OK	OK	OK	0.73
46	8	210	9	2	16.0	0.75	0.625	92	17.4	1.25	147	OK	OK	OK	OK	OK	OK	OK	OK	0.46
47	8	220	9	2	18.0	0.875	0.75	100	18.9	0.875	133	OK	OK	OK	OK	OK	OK	OK	OK	0.86
48	8	230	9	2	19.0	0.875	0.75	106	20.0	0.875	141	OK	OK	OK	OK	OK	OK	OK	OK	0.85
49	8	240	9	2	19.0	0.875	0.75	110	21.7	1	147	OK	OK	OK	OK	OK	OK	OK	OK	0.59
50	8	250	9	2	22.0	2	0.75	110	24.8	2.25	147	OK	OK	OK	OK	OK	OK	OK	OK	0.62
51	8	260	9	2	21.0	2	0.875	120	23.1	2.25	137	OK	OK	OK	OK	OK	OK	OK	OK	0.67
52	8	270	9	2	22.0	2.25	0.875	120	24.8	2.5	137	OK	OK	OK	OK	OK	OK	OK	OK	0.63
53	8	280	9	2	26.0	2.25	0.875	120	28.9	2.5	137	OK	OK	OK	OK	OK	OK	OK	OK	0.66
54	8	290	9	2	28.0	2.5	1	120	28.2	2.75	120	OK	OK	OK	OK	OK	OK	OK	OK	0.89
55	8	300	9	2	30.0	2.75	1	120	30.3	2.75	120	OK	OK	OK	OK	OK	OK	OK	OK	0.97
56	10	100	9	2	11.0	0.625	0.5	54	13.3	0.625	108	OK	OK	OK	OK	OK	OK	OK	OK	0.56
57	10	110	9	2	11.0	0.625	0.5	60	14.3	0.625	120	OK	OK	OK	OK	OK	OK	OK	OK	0.46
58	10	120	9	2	12.0	0.625	0.5	66	12.6	0.75	132	OK	OK	OK	OK	OK	OK	OK	OK	0.72
59	10	130	9	2	12.0	0.625	0.5	70	15.1	0.75	140	OK	OK	OK	OK	OK	OK	OK	OK	0.42
60	10	140	9	2	13.0	0.625	0.5	74	15.0	0.875	148	OK	OK	OK	OK	OK	OK	OK	OK	0.46
61	10	150	9	2	13.0	0.75	0.625	74	17.1	0.75	118	OK	OK	OK	OK	OK	OK	OK	OK	0.44
62	10	160	9	2	13.5	0.75	0.625	78	16.6	0.875	125	OK	OK	OK	OK	OK	OK	OK	OK	0.46
63	10	170	9	2	14.5	0.75	0.625	84	16.8	0.875	134	OK	OK	OK	OK	OK	OK	OK	OK	0.55
64	10	180	9	2	16.0	0.75	0.625	90	17.5	0.875	144	OK	OK	OK	OK	OK	OK	OK	OK	0.66
65	10	190	9	2	16.0	0.75	0.625	92	18.8	1	147	OK	OK	OK	OK	OK	OK	OK	OK	0.47
66	10	200	9	2	17.0	0.875	0.75	96	17.1	0.875	128	OK	OK	OK	OK	OK	OK	OK	OK	0.98
67	10	210	9	2	17.0	0.875	0.75	100	19.0	0.875	133	OK	OK	OK	OK	OK	OK	OK	OK	0.72
68	10	220	9	2	18.0	0.875	0.75	106	18.7	0.875	141	OK	OK	OK	OK	OK	OK	OK	OK	0.90
69	10	230	9	2	19.0	0.875	0.75	112	19.4	0.875	149	OK	OK	OK	OK	OK	OK	OK	OK	0.93
70	10	240	9	2	20.0	0.875	0.75	112	20.0	1.25	149	OK	OK	OK	OK	OK	OK	OK	OK	0.70
71	10	250	9	2	26.0	2	0.75	112	26.9	2.25	149	OK	OK	OK	OK	OK	OK	OK	OK	0.80
72	10	260	9	2	26.0	2.25	0.75	112	28.9	2.5	149	OK	OK	OK	OK	OK	OK	OK	OK	0.65

73	10	270	9	2	26.0	2.25	1	120	29.4	2.5	120	OK	OK	OK	OK	OK	OK	OK	OK	0.62
74	10	280	9	2	28.0	2.5	1	120	30.0	2.75	120	OK	OK	OK	OK	OK	OK	OK	OK	0.74
75	10	290	9	2	31.0	2.75	1	120	31.3	2.75	120	OK	OK	OK	OK	OK	OK	OK	OK	0.97
76	10	300	9	2	35.0	2.75	1	120	36.1	2.75	120	OK	OK	OK	OK	OK	OK	OK	OK	0.91
77	12	60	9	2	7.0	0.625	0.375	40	8.1	0.625	107	OK	OK	OK	OK	OK	OK	OK	OK	0.65
78	12	70	9	2	8.3	0.625	0.375	48	8.9	0.625	128	OK	OK	OK	OK	OK	OK	OK	OK	0.82
79	12	80	9	2	9.0	0.625	0.5	48	10.3	0.625	96	OK	OK	OK	OK	OK	OK	OK	OK	0.66
80	12	90	9	2	9.5	0.625	0.5	54	9.9	0.75	108	OK	OK	OK	OK	OK	OK	OK	OK	0.75
81	12	100	9	2	11.0	0.625	0.5	60	13.2	0.625	120	OK	OK	OK	OK	OK	OK	OK	OK	0.58
82	12	110	9	2	12.0	0.625	0.5	68	12.6	0.625	136	OK	OK	OK	OK	OK	OK	OK	OK	0.86
83	12	120	9	2	12.5	0.625	0.5	72	13.3	0.75	144	OK	OK	OK	OK	OK	OK	OK	OK	0.70
84	12	130	9	2	13.0	0.625	0.5	74	15.2	0.875	148	OK	OK	OK	OK	OK	OK	OK	OK	0.44
85	12	140	9	2	13.0	0.75	0.625	74	15.3	0.875	118	OK	OK	OK	OK	OK	OK	OK	OK	0.53
86	12	150	9	2	14.0	0.75	0.625	82	14.0	0.875	131	OK	OK	OK	OK	OK	OK	OK	OK	0.85
87	12	160	9	2	15.0	0.75	0.625	88	17.0	0.75	141	OK	OK	OK	OK	OK	OK	OK	OK	0.69
88	12	170	9	2	16.0	0.75	0.625	92	16.9	0.875	147	OK	OK	OK	OK	OK	OK	OK	OK	0.73
89	12	180	9	2	16.0	0.75	0.625	92	16.0	1.25	147	OK	OK	OK	OK	OK	OK	OK	OK	0.60
90	12	190	9	2	17.0	1	0.75	94	18.4	1	125	OK	OK	OK	OK	OK	OK	OK	OK	0.78
91	12	200	9	2	18.0	1	0.75	100	18.6	1	133	OK	OK	OK	OK	OK	OK	OK	OK	0.91
92	12	210	9	2	20.0	1	0.75	112	21.4	1.75	149	OK	OK	OK	OK	OK	OK	OK	OK	0.47
93	12	220	9	2	20.0	1	0.75	112	25.6	2	149	OK	OK	OK	OK	OK	OK	OK	OK	0.24
94	12	230	9	2	22.0	1.75	0.75	112	25.9	2	149	OK	OK	OK	OK	OK	OK	OK	OK	0.54
95	12	240	9	2	26.0	2	0.75	112	26.9	2.25	149	OK	OK	OK	OK	OK	OK	OK	OK	0.80
96	12	250	9	2	28.0	2	0.75	112	31.1	2.25	149	OK	OK	OK	OK	OK	OK	OK	OK	0.65
97	12	260	9	2	28.0	2	1	120	31.1	2.25	120	OK	OK	OK	OK	OK	OK	OK	OK	0.65
98	12	270	9	2	31.0	2.25	1	120	30.8	2.5	120	OK	OK	OK	OK	OK	OK	OK	OK	0.91
99	12	280	9	2	31.0	2.5	1	120	34.0	2.75	120	OK	OK	OK	OK	OK	OK	OK	OK	0.69
100	12	290	9	2	36.3	2.5	1	120	38.0	2.75	120	OK	OK	OK	OK	OK	OK	OK	OK	0.79
101	12	300	9	2	39.2	2.75	1	120	40.0	2.75	120	OK	OK	OK	OK	OK	OK	OK	OK	0.94
102	14	80	9	2	9.0	0.625	0.5	52	10.9	0.625	104	OK	OK	OK	OK	OK	OK	OK	OK	0.57
103	14	90	9	2	10.0	0.625	0.5	58	10.7	0.75	116	OK	OK	OK	OK	OK	OK	OK	OK	0.69
104	14	100	9	2	11.0	0.625	0.5	64	12.2	0.75	128	OK	OK	OK	OK	OK	OK	OK	OK	0.61
105	14	110	9	2	12.0	0.625	0.5	66	12.8	1	132	OK	OK	OK	OK	OK	OK	OK	OK	0.51
106	14	120	9	2	12.0	0.625	0.5	66	14.5	1.25	132	OK	OK	OK	OK	OK	OK	OK	OK	0.28
107	14	130	9	2	13.0	0.625	0.5	72	15.4	1.25	144	OK	OK	OK	OK	OK	OK	OK	OK	0.30
108	14	140	9	2	13.0	0.625	0.5	74	15.6	1.5	148	OK	OK	OK	OK	OK	OK	OK	OK	0.24
109	14	150	9	2	13.0	0.625	0.5	74	16.8	1.75	148	OK	OK	OK	OK	OK	OK	OK	OK	0.17
110	14	160	9	2	15.0	0.75	0.625	84	17.4	1.25	134	OK	OK	OK	OK	OK	OK	OK	OK	0.39
111	14	170	9	2	16.0	0.75	0.625	92	16.6	1.25	147	OK	OK	OK	OK	OK	OK	OK	OK	0.54

112	14	180	9	2	17.0	0.875	0.75	98	17.5	0.875	131	OK	OK	OK	OK	OK	OK	OK	OK	0.92
113	14	190	9	2	17.5	0.875	0.75	102	17.6	1	136	OK	OK	OK	OK	OK	OK	OK	OK	0.86
114	14	200	9	2	18.5	0.875	0.75	108	18.5	1	144	OK	OK	OK	OK	OK	OK	OK	OK	0.88
115	14	210	9	2	20.0	1	0.75	112	20.7	1	149	OK	OK	OK	OK	OK	OK	OK	OK	0.90
116	14	220	9	2	20.0	1	0.75	112	21.6	1.25	149	OK	OK	OK	OK	OK	OK	OK	OK	0.63
117	14	230	9	2	24.0	1.25	0.75	110	29.3	2.5	147	OK	OK	OK	OK	OK	OK	OK	OK	0.27
118	14	240	9	2	28.0	1.5	1	120	28.6	2	120	OK	OK	OK	OK	OK	OK	OK	OK	0.70
119	14	250	9	2	30.0	1.75	1	120	33.7	2	120	OK	OK	OK	OK	OK	OK	OK	OK	0.61
120	14	260	9	2	31.5	2	1	120	35.0	2.25	120	OK	OK	OK	OK	OK	OK	OK	OK	0.65
121	14	270	9	2	34.4	2.25	1	120	35.0	2.5	120	OK	OK	OK	OK	OK	OK	OK	OK	0.85
122	14	280	9	2	39.9	2.25	1	120	40.0	2.5	120	OK	OK	OK	OK	OK	OK	OK	OK	0.89
123	14	290	9	2	40.3	2.5	1	120	42.0	2.75	120	OK	OK	OK	OK	OK	OK	OK	OK	0.80
124	14	300	9	2	37.0	3	1	120	46.0	3	120	OK	OK	OK	OK	OK	OK	OK	OK	0.52
125	16	60	9	2	7.0	0.625	0.5	40	8.0	0.75	80	OK	OK	OK	OK	OK	OK	OK	OK	0.56
126	16	70	9	2	9.0	0.625	0.5	48	10.4	0.625	96	OK	OK	OK	OK	OK	OK	OK	OK	0.66
127	16	80	9	2	10.0	0.625	0.5	56	11.0	0.625	112	OK	OK	OK	OK	OK	OK	OK	OK	0.75
128	16	90	9	2	11.0	0.625	0.5	64	11.5	0.625	128	OK	OK	OK	OK	OK	OK	OK	OK	0.88
129	16	100	9	2	12.5	0.625	0.5	70	13.8	0.625	140	OK	OK	OK	OK	OK	OK	OK	OK	0.75
130	16	110	9	2	13.0	0.625	0.5	74	15.0	0.75	148	OK	OK	OK	OK	OK	OK	OK	OK	0.54
131	16	120	9	2	13.0	0.75	0.625	76	13.3	0.75	122	OK	OK	OK	OK	OK	OK	OK	OK	0.93
132	16	130	9	2	15.0	0.75	0.625	82	15.0	0.75	131	OK	OK	OK	OK	OK	OK	OK	OK	1.00
133	16	140	9	2	15.0	0.75	0.625	88	16.1	0.75	141	OK	OK	OK	OK	OK	OK	OK	OK	0.81
134	16	150	9	2	16.0	0.875	0.625	90	16.1	1	144	OK	OK	OK	OK	OK	OK	OK	OK	0.86
135	16	160	9	2	16.0	0.875	0.625	92	16.3	1.25	147	OK	OK	OK	OK	OK	OK	OK	OK	0.66
136	16	170	9	2	17.0	0.875	0.75	98	17.4	0.88	131	OK	OK	OK	OK	OK	OK	OK	OK	0.94
137	16	180	9	2	18.0	0.875	0.75	104	18.2	0.88	139	OK	OK	OK	OK	OK	OK	OK	OK	0.96
138	16	190	9	2	19.0	0.875	0.75	110	19.1	0.88	147	OK	OK	OK	OK	OK	OK	OK	OK	0.98
139	16	200	9	2	21.0	1	0.875	120	22.2	1.5	137	OK	OK	OK	OK	OK	OK	OK	OK	0.57
140	16	210	9	2	21.0	1	0.875	120	23.8	1.75	137	OK	OK	OK	OK	OK	OK	OK	OK	0.39
141	16	220	9	2	21.0	1	0.875	120	26.2	2	137	OK	OK	OK	OK	OK	OK	OK	OK	0.26
142	16	230	9	2	21.0	1.5	0.875	120	27.3	2.25	137	OK	OK	OK	OK	OK	OK	OK	OK	0.30
143	16	240	9	2	22.0	2	0.875	120	28.0	2.5	137	OK	OK	OK	OK	OK	OK	OK	OK	0.39
144	16	250	9	2	24.0	2	0.875	120	35.0	2.5	137	OK	OK	OK	OK	OK	OK	OK	OK	0.26
145	16	260	9	2	26.0	2.25	0.875	120	37.1	2.75	137	OK	OK	OK	OK	OK	OK	OK	OK	0.28
146	16	270	9	2	33.2	2.25	0.875	120	40.0	2.75	137	OK	OK	OK	OK	OK	OK	OK	OK	0.47
147	16	280	9	2	39.2	2.25	1	120	48.0	2.75	120	OK	OK	OK	OK	OK	OK	OK	OK	0.45
148	16	290	9	2	42.9	2.5	1	120	50.0	2.75	120	OK	OK	OK	OK	OK	OK	OK	OK	0.57
149	16	300	9	2	41.2	3	1	120	50.0	3	120	OK	OK	OK	OK	OK	OK	OK	OK	0.56

Table B- 5. Nominal Flexural and Shear Resistance for composite I-shaped plate girder sections.

#	S (ft)	L (ft)	F_y (ksi)	f'_c (ksi)	Weight (lb/ft)	(kip-ft)/lb	D_p/D_t	$D_p < 0.42D_t$	M_p (kip-ft)	M_n (kip-ft)	M_u (kip-ft)	Mu/Mn	V_n (kip)
1	*Empty placeholder*												
2	*Empty placeholder*												
3	*Empty placeholder*												
4	6	70	50	4	81	30	0.11	OK	2414	**2,392**	2,391	100%	**435**
5	6	80	50	4	93	32	0.11	OK	3030	**3,003**	3,001	100%	**437**
6	6	90	50	4	105	35	0.12	OK	3716	**3,669**	3,667	100%	**413**
7	6	100	50	4	117	37	0.12	OK	4449	**4,400**	4,398	100%	**359**
8	6	110	50	4	131	40	0.11	OK	5218	**5,187**	5,185	100%	**330**
9	6	120	50	4	143	42	0.11	OK	6094	**6,040**	6,037	100%	**306**
10	6	130	50	4	155	45	0.11	OK	7023	**6,961**	6,958	100%	**275**
11	6	140	50	4	172	46	0.14	OK	8215	**7,961**	7,957	100%	**258**
12	6	150	50	4	186	49	0.14	OK	9273	**9,021**	9,016	100%	**243**
13	6	160	50	4	201	51	0.14	OK	10422	**10,149**	10,144	100%	**236**
14	6	170	50	4	212	54	0.13	OK	11591	**11,330**	11,324	100%	**223**
15	6	180	50	4	244	52	0.13	OK	12980	**12,673**	12,667	100%	**413**
16	6	190	50	4	262	54	0.16	OK	14708	**14,081**	14,074	100%	**393**
17	6	200	50	4	278	56	0.19	OK	16555	**15,542**	15,534	100%	**366**
18	6	210	50	4	299	57	0.21	OK	18600	**17,117**	17,108	100%	**350**
19	6	220	50	4	332	57	0.29	OK	21745	**18,916**	18,907	100%	**350**
20	6	230	50	4	377	55	0.27	OK	23650	**20,864**	20,853	100%	**546**
21	6	240	50	4	408	56	0.28	OK	26064	**22,823**	22,812	100%	**536**
22	6	250	50	4	563	58	0.32	OK	38779	**32,872**	32,855	100%	**497**
23	6	260	50	4	608	59	0.30	OK	41401	**35,704**	35,687	100%	**497**
24	6	270	50	4	659	59	0.30	OK	44956	**38,766**	38,747	100%	**497**
25	6	280	50	4	720	59	0.32	OK	49892	**42,158**	42,137	100%	**497**
26	6	290	50	4	784	58	0.33	OK	54457	**45,691**	45,668	100%	**497**
27	6	300	50	4	824	60	0.27	OK	55816	**49,147**	49,122	100%	**497**
28	6	310	50	4	879	60	0.24	OK	58797	**52,964**	52,938	100%	**497**
29	6	320	50	4	948	60	0.24	OK	63559	**57,211**	57,183	100%	**497**
30	6	330	50	4	1068	59	0.28	OK	71878	**62,578**	62,547	100%	**1,100**
31	8	60	50	4	77	30	0.09	OK	2302	**2,302**	2,301	100%	**406**
32	8	70	50	4	89	33	0.09	OK	2981	**2,981**	2,979	100%	**437**
33	8	80	50	4	103	36	0.09	OK	3723	**3,723**	3,721	100%	**413**
34	8	90	50	4	116	39	0.09	OK	4573	**4,573**	4,570	100%	**359**
35	8	100	50	4	133	41	0.09	OK	5476	**5,476**	5,473	100%	**330**

36	8	110	50	4	145	45	0.10	OK	6449	**6,449**	6,446	100%	**306**
37	8	120	50	4	160	46	0.09	OK	7434	**7,434**	7,431	100%	**275**
38	8	130	50	4	171	50	0.08	OK	8570	**8,570**	8,566	100%	**243**
39	8	140	50	4	183	53	0.08	OK	9763	**9,763**	9,758	100%	**223**
40	8	150	50	4	198	56	0.09	OK	11018	**11,018**	11,012	100%	**223**
41	8	160	50	4	212	58	0.10	OK	12350	**12,350**	12,344	100%	**223**
42	8	170	50	4	251	56	0.12	OK	14302	**14,110**	14,103	100%	**393**
43	8	180	50	4	267	59	0.12	OK	15835	**15,661**	15,653	100%	**375**
44	8	190	50	4	283	61	0.11	OK	17468	**17,317**	17,308	100%	**358**
45	8	200	50	4	297	64	0.11	OK	19208	**19,057**	19,048	100%	**350**
46	8	210	50	4	317	66	0.13	OK	21379	**20,926**	20,916	100%	**350**
47	8	220	50	4	372	62	0.17	OK	24397	**23,201**	23,190	100%	**557**
48	8	230	50	4	394	64	0.19	OK	26999	**25,352**	25,339	100%	**526**
49	8	240	50	4	419	66	0.22	OK	30171	**27,645**	27,632	100%	**506**
50	8	250	50	4	633	65	0.26	OK	46002	**40,837**	40,817	100%	**506**
51	8	260	50	4	690	64	0.31	OK	51904	**44,372**	44,350	100%	**737**
52	8	270	50	4	751	64	0.32	OK	56855	**48,134**	48,110	100%	**737**
53	8	280	50	4	818	64	0.32	OK	61870	**52,175**	52,149	100%	**737**
54	8	290	50	4	928	61	0.33	OK	67879	**57,007**	56,979	100%	**1,100**
55	8	300	50	4	992	62	0.31	OK	71823	**61,488**	61,457	100%	**1,100**
56	10	100	50	4	147	45	0.08	OK	6552	**6,552**	6,549	100%	**306**
57	10	110	50	4	159	49	0.08	OK	7717	**7,717**	7,714	100%	**275**
58	10	120	50	4	173	52	0.08	OK	8975	**8,975**	8,971	100%	**250**
59	10	130	50	4	187	55	0.08	OK	10318	**10,318**	10,313	100%	**236**
60	10	140	50	4	202	58	0.08	OK	11675	**11,675**	11,669	100%	**223**
61	10	150	50	4	239	55	0.09	OK	13193	**13,193**	13,186	100%	**436**
62	10	160	50	4	255	58	0.09	OK	14803	**14,803**	14,796	100%	**413**
63	10	170	50	4	271	61	0.09	OK	16523	**16,523**	16,514	100%	**384**
64	10	180	50	4	290	64	0.11	OK	18719	**18,614**	18,605	100%	**358**
65	10	190	50	4	306	67	0.11	OK	20671	**20,567**	20,556	100%	**350**
66	10	200	50	4	354	64	0.11	OK	22910	**22,801**	22,790	100%	**580**
67	10	210	50	4	369	68	0.10	OK	25055	**24,981**	24,969	100%	**557**
68	10	220	50	4	387	70	0.10	OK	27295	**27,295**	27,281	100%	**526**
69	10	230	50	4	408	73	0.11	OK	30048	**29,766**	29,752	100%	**497**
70	10	240	50	4	439	74	0.15	OK	33675	**32,474**	32,457	100%	**497**
71	10	250	50	4	682	71	0.16	OK	50995	**48,763**	48,738	100%	**497**
72	10	260	50	4	746	71	0.19	OK	56548	**52,916**	52,889	100%	**497**
73	10	270	50	4	875	66	0.30	OK	67296	**58,036**	58,007	100%	**1,100**
74	10	280	50	4	946	66	0.29	OK	72335	**62,809**	62,777	100%	**1,100**

75	10	290	50	4	1011	67	0.25	OK	75422	**67,696**	67,663	100%	**1,100**
76	10	300	50	4	1095	67	0.25	OK	82002	**73,125**	73,089	100%	**1,100**
77	12	60	50	4	85	38	0.07	OK	3234	**3,234**	3,233	100%	**174**
78	12	70	50	4	100	42	0.06	OK	4193	**4,193**	4,191	100%	**145**
79	12	80	50	4	125	42	0.06	OK	5222	**5,222**	5,219	100%	**344**
80	12	90	50	4	140	45	0.06	OK	6369	**6,369**	6,365	100%	**306**
81	12	100	50	4	157	49	0.06	OK	7623	**7,623**	7,619	100%	**275**
82	12	110	50	4	171	52	0.06	OK	8977	**8,977**	8,973	100%	**243**
83	12	120	50	4	187	56	0.07	OK	10434	**10,434**	10,429	100%	**229**
84	12	130	50	4	203	59	0.07	OK	11987	**11,987**	11,981	100%	**223**
85	12	140	50	4	241	56	0.08	OK	13572	**13,572**	13,565	100%	**436**
86	12	150	50	4	257	60	0.07	OK	15371	**15,371**	15,364	100%	**393**
87	12	160	50	4	274	63	0.07	OK	17247	**17,247**	17,238	100%	**366**
88	12	170	50	4	292	66	0.07	OK	19232	**19,232**	19,222	100%	**350**
89	12	180	50	4	311	69	0.08	OK	21314	**21,314**	21,304	100%	**350**
90	12	190	50	4	368	65	0.11	OK	24070	**23,981**	23,969	100%	**593**
91	12	200	50	4	387	68	0.10	OK	26418	**26,401**	26,388	100%	**557**
92	12	210	50	4	491	81	0.12	OK	40198	**39,687**	39,667	100%	**497**
93	12	220	50	4	539	80	0.19	OK	46317	**43,355**	43,334	100%	**497**
94	12	230	50	4	605	78	0.10	OK	47420	**47,369**	47,345	100%	**497**
95	12	240	50	4	682	76	0.10	OK	51744	**51,691**	51,665	100%	**497**
96	12	250	50	4	729	77	0.11	OK	56268	**55,980**	55,952	100%	**497**
97	12	260	50	4	854	72	0.23	OK	67561	**61,286**	61,255	100%	**1,100**
98	12	270	50	4	926	72	0.21	OK	71846	**66,355**	66,322	100%	**1,100**
99	12	280	50	4	1010	71	0.24	OK	79677	**71,785**	71,750	100%	**1,100**
100	12	290	50	4	1094	71	0.23	OK	85537	**77,546**	77,507	100%	**1,100**
101	12	300	50	4	1172	71	0.19	OK	89301	**83,493**	83,451	100%	**1,100**
102	14	80	50	4	133	45	0.06	OK	5952	**5,952**	5,949	100%	**317**
103	14	90	50	4	150	48	0.05	OK	7259	**7,259**	7,255	100%	**285**
104	14	100	50	4	167	52	0.06	OK	8682	**8,682**	8,678	100%	**258**
105	14	110	50	4	185	55	0.06	OK	10209	**10,209**	10,204	100%	**250**
106	14	120	50	4	204	58	0.07	OK	11848	**11,848**	11,842	100%	**250**
107	14	130	50	4	220	62	0.07	OK	13629	**13,629**	13,622	100%	**229**
108	14	140	50	4	238	65	0.07	OK	15514	**15,514**	15,507	100%	**223**
109	14	150	50	4	259	68	0.07	OK	17522	**17,522**	17,513	100%	**223**
110	14	160	50	4	297	66	0.07	OK	19617	**19,617**	19,607	100%	**384**
111	14	170	50	4	313	70	0.07	OK	21888	**21,888**	21,877	100%	**350**
112	14	180	50	4	360	68	0.07	OK	24323	**24,323**	24,311	100%	**568**
113	14	190	50	4	380	71	0.08	OK	26847	**26,847**	26,834	100%	**546**

114	14	200	50	4	402	75	0.09	OK	30013	**30,013**	29,998	100%	**516**
115	14	210	50	4	433	76	0.09	OK	32817	**32,817**	32,800	100%	**497**
116	14	220	50	4	455	79	0.09	OK	35814	**35,814**	35,796	100%	**497**
117	14	230	50	4	645	83	0.17	OK	56372	**53,778**	53,751	100%	**506**
118	14	240	50	4	761	77	0.17	OK	62223	**58,960**	58,930	100%	**1,100**
119	14	250	50	4	833	77	0.18	OK	67583	**64,009**	63,977	100%	**1,100**
120	14	260	50	4	909	76	0.18	OK	73454	**69,372**	69,337	100%	**1,100**
121	14	270	50	4	989	76	0.16	OK	78362	**75,061**	75,023	100%	**1,100**
122	14	280	50	4	1075	75	0.16	OK	84733	**81,152**	81,112	100%	**1,100**
123	14	290	50	4	1167	75	0.18	OK	92660	**87,568**	87,525	100%	**1,100**
124	14	300	50	4	1280	74	0.23	OK	103803	**94,642**	94,595	100%	**1,100**
125	16	60	50	4	105	39	0.06	OK	4116	**4,116**	4,114	100%	**413**
126	16	70	50	4	125	43	0.06	OK	5337	**5,337**	5,334	100%	**344**
127	16	80	50	4	143	47	0.05	OK	6682	**6,682**	6,679	100%	**295**
128	16	90	50	4	160	51	0.05	OK	8149	**8,149**	8,145	100%	**258**
129	16	100	50	4	178	55	0.05	OK	9754	**9,754**	9,749	100%	**236**
130	16	110	50	4	196	59	0.05	OK	11477	**11,477**	11,471	100%	**223**
131	16	120	50	4	233	57	0.06	OK	13324	**13,324**	13,317	100%	**424**
132	16	130	50	4	256	60	0.06	OK	15415	**15,415**	15,408	100%	**393**
133	16	140	50	4	272	64	0.06	OK	17447	**17,447**	17,439	100%	**366**
134	16	150	50	4	300	66	0.06	OK	19741	**19,741**	19,731	100%	**358**
135	16	160	50	4	319	69	0.06	OK	21997	**21,997**	21,986	100%	**350**
136	16	170	50	4	360	68	0.06	OK	24590	**24,590**	24,578	100%	**568**
137	16	180	50	4	381	72	0.06	OK	27261	**27,261**	27,247	100%	**536**
138	16	190	50	4	402	75	0.06	OK	30099	**30,099**	30,083	100%	**506**
139	16	200	50	4	553	85	0.09	OK	47029	**47,029**	47,005	100%	**737**
140	16	210	50	4	582	88	0.09	OK	51312	**51,312**	51,286	100%	**737**
141	16	220	50	4	619	90	0.12	OK	56655	**55,866**	55,838	100%	**737**
142	16	230	50	4	687	89	0.12	OK	61600	**60,875**	60,844	100%	**737**
143	16	240	50	4	760	87	0.10	OK	66331	**66,186**	66,153	100%	**737**
144	16	250	50	4	835	86	0.16	OK	74969	**71,793**	71,757	100%	**737**
145	16	260	50	4	921	84	0.18	OK	82327	**77,833**	77,794	100%	**737**
146	16	270	50	4	1006	84	0.14	OK	86763	**84,108**	84,066	100%	**737**
147	16	280	50	4	1181	78	0.22	OK	100604	**91,843**	91,797	100%	**1,100**
148	16	290	50	4	1266	78	0.18	OK	104447	**98,876**	98,827	100%	**1,100**
149	16	300	50	4	1366	78	0.16	OK	111488	**106,460**	106,406	100%	**1,100**

B.1.5 Composite Box Girders

Table B- 6. Composite Box Girders Dimensions and Proportions Checks.

#	w (ft)	a/w (0.8-1.2)	x, Inclination	h (in)	S (ft)	t_{deck} (in)	t_h (in)	b_{fc} (in)	t_{fc} (in)	t_w (in)	D (in)	b_{ft} (in)	t_{ft} (in)	h/tw<150	bfc/2/tfc<12	bfc>d/6	tfc>1.1tw
1	7.67	0.80	4	24	13.80	9	0	7.0	0.375	0.1875	24.75	80.0	0.375	OK	OK	OK	OK
2	7.67	0.80	4	24	13.80	9	0	7.0	0.375	0.1875	24.75	80.0	0.5	OK	OK	OK	OK
3	7.67	0.80	4	24	13.80	9	0	7.0	0.375	0.1875	24.75	80.0	0.75	OK	OK	OK	OK
4	9.33	0.80	4	24	16.80	9	0	7.0	0.375	0.1875	24.75	100.0	0.375	OK	OK	OK	OK
5	9.33	0.80	4	24	16.80	9	0	7.0	0.375	0.1875	24.75	100.0	0.5	OK	OK	OK	OK
6	9.33	0.80	4	24	16.80	9	0	7.0	0.375	0.1875	24.75	100.0	0.75	OK	OK	OK	OK
7	11	0.80	4	24	19.80	9	0	7.0	0.375	0.1875	24.75	120.0	0.375	OK	OK	OK	OK
8	11	0.80	4	24	19.80	9	0	7.0	0.375	0.1875	24.75	120.0	0.5	OK	OK	OK	OK
9	11	0.80	4	24	19.80	9	0	7.0	0.375	0.1875	24.75	120.0	0.75	OK	OK	OK	OK
10	8.67	0.80	4	48	15.60	9	0	9.0	0.5	0.375	49.50	80.0	0.375	OK	OK	OK	OK
11	8.67	0.80	4	48	15.60	9	0	9.0	0.5	0.375	49.50	80.0	0.5	OK	OK	OK	OK
12	8.67	0.80	4	48	15.60	9	0	9.0	0.5	0.375	49.50	80.0	0.75	OK	OK	OK	OK
13	8.67	0.80	4	48	15.60	9	0	9.0	0.5	0.375	49.50	80.0	1	OK	OK	OK	OK
14	8.67	0.80	4	48	15.60	9	0	9.0	0.5	0.375	49.50	80.0	1.25	OK	OK	OK	OK
15	10.3	0.80	4	48	18.60	9	0	9.0	0.5	0.375	49.50	100.0	0.375	OK	OK	OK	OK
16	10.3	0.80	4	48	18.60	9	0	9.0	0.5	0.375	49.50	100.0	0.5	OK	OK	OK	OK
17	10.3	0.80	4	48	18.60	9	0	9.0	0.5	0.375	49.50	100.0	0.75	OK	OK	OK	OK
18	10.3	0.80	4	48	18.60	9	0	9.0	0.5	0.375	49.50	100.0	1	OK	OK	OK	OK
19	10.3	0.80	4	48	18.60	9	0	9.0	0.5	0.375	49.50	100.0	1.25	OK	OK	OK	OK
20	12	0.80	4	48	21.60	9	0	9.0	0.5	0.375	49.50	120.0	0.375	OK	OK	OK	OK
21	12	0.80	4	48	21.60	9	0	9.0	0.5	0.375	49.50	120.0	0.5	OK	OK	OK	OK
22	12	0.80	4	48	21.60	9	0	9.0	0.5	0.375	49.50	120.0	0.75	OK	OK	OK	OK
23	12	0.80	4	48	21.60	9	0	9.0	0.5	0.375	49.50	120.0	1	OK	OK	OK	OK
24	12	0.80	4	48	21.60	9	0	9.0	0.5	0.375	49.50	120.0	1.25	OK	OK	OK	OK
25	9.67	0.80	4	72	17.40	9	0	13.0	0.625	0.5	74.25	80.0	0.375	OK	OK	OK	OK
26	9.67	0.80	4	72	17.40	9	0	13.0	0.625	0.5	74.25	80.0	0.5	OK	OK	OK	OK
27	9.67	0.80	4	72	17.40	9	0	13.0	0.625	0.5	74.25	80.0	0.75	OK	OK	OK	OK
28	9.67	0.80	4	72	17.40	9	0	13.0	0.625	0.5	74.25	80.0	1	OK	OK	OK	OK
29	9.67	0.80	4	72	17.40	9	0	13.0	0.625	0.5	74.25	80.0	1.25	OK	OK	OK	OK
30	11.3	0.80	4	72	20.40	9	0	13.0	0.625	0.5	74.25	100.0	0.375	OK	OK	OK	OK
31	11.3	0.80	4	72	20.40	9	0	13.0	0.625	0.5	74.25	100.0	0.5	OK	OK	OK	OK
32	11.3	0.80	4	72	20.40	9	0	13.0	0.625	0.5	74.25	100.0	0.75	OK	OK	OK	OK
33	11.3	0.80	4	72	20.40	9	0	13.0	0.625	0.5	74.25	100.0	1	OK	OK	OK	OK

34	11.3	0.80	4	72	20.40	9	0	13.0	0.625	0.5	74.25	100.0	1.25	OK	OK	OK	OK
35	13	0.80	4	72	23.40	9	0	13.0	0.625	0.5	74.25	120.0	0.375	OK	OK	OK	OK
36	13	0.80	4	72	23.40	9	0	13.0	0.625	0.5	74.25	120.0	0.5	OK	OK	OK	OK
37	13	0.80	4	72	23.40	9	0	13.0	0.625	0.5	74.25	120.0	0.75	OK	OK	OK	OK
38	13	0.80	4	72	23.40	9	0	13.0	0.625	0.5	74.25	120.0	1	OK	OK	OK	OK
39	13	0.80	4	72	23.40	9	0	13.0	0.625	0.5	74.25	120.0	1.25	OK	OK	OK	OK
40	10.3	0.80	4	86	18.45	9	0	16.0	0.75	0.625	88.75	80.0	0.375	OK	OK	OK	OK
41	10.3	0.80	4	86	18.45	9	0	16.0	0.75	0.625	88.75	80.0	0.5	OK	OK	OK	OK
42	10.3	0.80	4	86	18.45	9	0	16.0	0.75	0.625	88.75	80.0	0.75	OK	OK	OK	OK
43	10.3	0.80	4	86	18.45	9	0	16.0	0.75	0.625	88.75	80.0	1	OK	OK	OK	OK
44	10.3	0.80	4	86	18.45	9	0	16.0	0.75	0.625	88.75	80.0	1.25	OK	OK	OK	OK
45	11.9	0.80	4	86	21.45	9	0	16.0	0.75	0.625	88.75	100.0	0.375	OK	OK	OK	OK
46	11.9	0.80	4	86	21.45	9	0	16.0	0.75	0.625	88.75	100.0	0.5	OK	OK	OK	OK
47	11.9	0.80	4	86	21.45	9	0	16.0	0.75	0.625	88.75	100.0	0.75	OK	OK	OK	OK
48	11.9	0.80	4	86	21.45	9	0	16.0	0.75	0.625	88.75	100.0	1	OK	OK	OK	OK
49	11.9	0.80	4	86	21.45	9	0	16.0	0.75	0.625	88.75	100.0	1.25	OK	OK	OK	OK
50	13.6	0.80	4	86	24.45	9	0	16.0	0.75	0.625	88.75	120.0	0.375	OK	OK	OK	OK
51	13.6	0.80	4	86	24.45	9	0	16.0	0.75	0.625	88.75	120.0	0.5	OK	OK	OK	OK
52	13.6	0.80	4	86	24.45	9	0	16.0	0.75	0.625	88.75	120.0	0.75	OK	OK	OK	OK
53	13.6	0.80	4	86	24.45	9	0	16.0	0.75	0.625	88.75	120.0	1	OK	OK	OK	OK
54	13.6	0.80	4	86	24.45	9	0	16.0	0.75	0.625	88.75	120.0	1.25	OK	OK	OK	OK
55	10.8	0.80	4	100	19.50	9	0	19.0	0.875	0.75	103.00	80.0	0.375	OK	OK	OK	OK
56	10.8	0.80	4	100	19.50	9	0	19.0	0.875	0.75	103.00	80.0	0.5	OK	OK	OK	OK
57	10.8	0.80	4	100	19.50	9	0	19.0	0.875	0.75	103.00	80.0	0.75	OK	OK	OK	OK
58	10.8	0.80	4	100	19.50	9	0	19.0	0.875	0.75	103.00	80.0	1	OK	OK	OK	OK
59	10.8	0.80	4	100	19.50	9	0	19.0	0.875	0.75	103.00	80.0	1.25	OK	OK	OK	OK
60	12.5	0.80	4	100	22.50	9	0	19.0	0.875	0.75	103.00	100.0	0.375	OK	OK	OK	OK
61	12.5	0.80	4	100	22.50	9	0	19.0	0.875	0.75	103.00	100.0	0.5	OK	OK	OK	OK
62	12.5	0.80	4	100	22.50	9	0	19.0	0.875	0.75	103.00	100.0	0.75	OK	OK	OK	OK
63	12.5	0.80	4	100	22.50	9	0	19.0	0.875	0.75	103.00	100.0	1	OK	OK	OK	OK
64	12.5	0.80	4	100	22.50	9	0	19.0	0.875	0.75	103.00	100.0	1.25	OK	OK	OK	OK
65	14.2	0.80	4	100	25.50	9	0	19.0	0.875	0.75	103.00	120.0	0.375	OK	OK	OK	OK
66	14.2	0.80	4	100	25.50	9	0	19.0	0.875	0.75	103.00	120.0	0.5	OK	OK	OK	OK
67	14.2	0.80	4	100	25.50	9	0	19.0	0.875	0.75	103.00	120.0	0.75	OK	OK	OK	OK
68	14.2	0.80	4	100	25.50	9	0	19.0	0.875	0.75	103.00	120.0	1	OK	OK	OK	OK
69	14.2	0.80	4	100	25.50	9	0	19.0	0.875	0.75	103.00	120.0	1.25	OK	OK	OK	OK
70	11.5	0.80	4	115	20.63	9	0	21.0	1	0.875	118.50	80.0	0.5	OK	OK	OK	OK
71	11.5	0.80	4	115	20.63	9	0	21.0	1	0.875	118.50	80.0	0.75	OK	OK	OK	OK
72	11.5	0.80	4	115	20.63	9	0	21.0	1	0.875	118.50	80.0	1	OK	OK	OK	OK

73	13.1	0.80	4	115	23.63	9	0	21.0	1	0.875	118.50	100.0	0.5	OK	OK	OK	OK
74	13.1	0.80	4	115	23.63	9	0	21.0	1	0.875	118.50	100.0	0.75	OK	OK	OK	OK
75	13.1	0.80	4	115	23.63	9	0	21.0	1	0.875	118.50	100.0	1	OK	OK	OK	OK
76	13.1	0.80	4	115	23.63	9	0	21.0	1	0.875	118.50	100.0	1.25	OK	OK	OK	OK
77	14.8	0.80	4	115	26.63	9	0	21.0	1	0.875	118.50	120.0	0.5	OK	OK	OK	OK
78	14.8	0.80	4	115	26.63	9	0	21.0	1	0.875	118.50	120.0	0.75	OK	OK	OK	OK
79	14.8	0.80	4	115	26.63	9	0	21.0	1	0.875	118.50	120.0	1	OK	OK	OK	OK
80	14.8	0.80	4	115	26.63	9	0	21.0	1	0.875	118.50	120.0	1.25	OK	OK	OK	OK

Table B- 7. Nominal Flexural and Shear Resistance for Composite Box Girders Sections.

#	F_y (ksi)	f'$_c$ (ksi)	Weight (lb/ft)	D_p (in)	D_p/D_t	$D_p < 0.42D_t$	M_p (kip-ft)	M_n (kip-ft)	V_{ni} (kip)
1	50	4	155	3.95	0.12	OK	4,912	**4,853**	**36**
2	50	5	189	3.87	0.11	OK	6,251	**6,188**	**36**
3	50	6	259	4.41	0.13	OK	8,816	**8,635**	**36**
4	50	4	181	3.80	0.11	OK	5,935	**5,883**	**36**
5	50	5	224	3.77	0.11	OK	7,602	**7,543**	**36**
6	50	6	311	4.35	0.13	OK	10,808	**10,599**	**36**
7	50	4	207	3.75	0.11	OK	6,955	**6,901**	**36**
8	50	5	259	3.75	0.11	OK	8,952	**8,885**	**36**
9	50	6	363	4.31	0.13	OK	12,802	**12,565**	**36**
10	50	4	264	5.98	0.10	OK	11,757	**11,730**	**145**
11	50	5	299	5.41	0.09	OK	14,175	**14,175**	**145**
12	50	6	368	5.56	0.10	OK	18,754	**18,754**	**145**
13	50	6	438	6.61	0.11	OK	23,063	**22,854**	**145**
14	50	6	507	7.06	0.12	OK	27,347	**26,960**	**145**
15	50	4	290	5.51	0.10	OK	13,568	**13,568**	**145**
16	50	5	334	5.07	0.09	OK	16,556	**16,556**	**145**
17	50	6	420	5.32	0.09	OK	22,268	**22,268**	**145**
18	50	6	507	6.42	0.11	OK	27,675	**27,487**	**145**
19	50	6	594	6.92	0.12	OK	33,045	**32,635**	**145**
20	50	4	316	5.17	0.09	OK	15,369	**15,369**	**145**
21	50	5	368	4.82	0.08	OK	18,929	**18,929**	**145**
22	50	6	472	5.15	0.09	OK	25,778	**25,778**	**145**
23	50	6	577	6.28	0.11	OK	32,287	**32,120**	**145**
24	50	6	681	6.83	0.12	OK	38,743	**38,302**	**145**
25	50	4	418	7.59	0.09	OK	22,741	**22,741**	**229**
26	50	5	453	6.75	0.08	OK	26,326	**26,326**	**229**
27	50	6	522	6.75	0.08	OK	32,955	**32,955**	**229**
28	50	6	592	7.41	0.09	OK	39,179	**39,179**	**229**

29	50	6	661	8.35	0.10	OK	45,318	**45,295**	**229**
30	50	4	444	6.78	0.08	OK	25,411	**25,411**	**229**
31	50	4	488	7.53	0.09	OK	29,217	**29,217**	**229**
32	50	5	574	7.23	0.09	OK	37,527	**37,527**	**229**
33	50	5	661	8.43	0.10	OK	45,154	**45,090**	**229**
34	50	6	748	8.03	0.10	OK	53,554	**53,554**	**229**
35	50	4	470	6.75	0.08	OK	27,981	**27,981**	**229**
36	50	5	522	6.31	0.08	OK	33,163	**33,163**	**229**
37	50	6	626	6.30	0.08	OK	43,052	**43,052**	**229**
38	50	6	731	6.76	0.08	OK	52,500	**52,500**	**229**
39	50	6	835	7.80	0.09	OK	61,785	**61,785**	**229**
40	50	4	572	9.25	0.10	OK	33,874	**33,874**	**374**
41	50	5	607	8.57	0.09	OK	37,764	**37,764**	**374**
42	50	6	677	8.03	0.08	OK	45,705	**45,705**	**374**
43	50	6	746	8.91	0.09	OK	52,951	**52,951**	**374**
44	50	6	815	9.28	0.10	OK	60,681	**60,681**	**374**
45	50	4	599	8.96	0.09	OK	36,560	**36,560**	**374**
46	50	5	642	7.74	0.08	OK	41,925	**41,925**	**374**
47	50	6	729	7.40	0.08	OK	51,742	**51,742**	**374**
48	50	6	815	8.36	0.09	OK	60,863	**60,863**	**374**
49	50	6	902	9.13	0.09	OK	70,440	**70,440**	**374**
50	50	4	625	8.12	0.08	OK	39,747	**39,747**	**374**
51	50	5	677	7.10	0.07	OK	46,035	**46,035**	**374**
52	50	6	781	6.92	0.07	OK	57,743	**57,743**	**374**
53	50	6	885	7.92	0.08	OK	68,744	**68,744**	**374**
54	50	6	989	8.92	0.09	OK	79,651	**79,651**	**374**
55	50	4	756	9.79	0.09	OK	48,250	**48,250**	**557**
56	50	5	790	9.46	0.09	OK	53,210	**53,210**	**557**
57	50	6	860	9.25	0.08	OK	62,363	**62,363**	**557**
58	50	6	929	9.51	0.09	OK	70,810	**70,810**	**557**
59	50	6	999	9.77	0.09	OK	79,257	**79,257**	**557**
60	50	4	782	9.57	0.09	OK	51,906	**51,906**	**557**
61	50	5	825	9.19	0.08	OK	58,004	**58,004**	**557**
62	50	6	912	8.94	0.08	OK	68,849	**68,849**	**557**
63	50	6	999	9.31	0.08	OK	79,941	**79,941**	**557**
64	50	6	1086	9.64	0.09	OK	90,517	**90,517**	**557**
65	50	4	808	9.36	0.08	OK	55,539	**55,539**	**557**
66	50	5	860	8.82	0.08	OK	62,221	**62,221**	**557**
67	50	6	964	8.31	0.08	OK	75,835	**75,835**	**557**

68	50	6	1068	9.11	0.08	OK	89,051	**89,051**	**557**
69	50	6	1172	9.51	0.09	OK	101,763	**101,763**	**557**
70	50	5	1004	10.27	0.08	OK	72,156	**72,156**	**769**
71	50	6	1074	9.80	0.08	OK	84,113	**84,113**	**769**
72	50	6	1143	10.86	0.09	OK	92,325	**92,325**	**769**
73	50	5	1039	9.78	0.08	OK	79,079	**79,079**	**769**
74	50	6	1126	9.56	0.08	OK	92,092	**92,092**	**769**
75	50	6	1213	9.86	0.08	OK	104,193	**104,193**	**769**
76	50	6	1299	13.65	0.11	OK	114,815	**114,164**	**769**
77	50	5	1074	9.54	0.08	OK	84,531	**84,531**	**769**
78	50	6	1178	9.32	0.07	OK	100,059	**100,059**	**769**
79	50	6	1282	9.68	0.08	OK	114,607	**114,607**	**769**
80	50	6	1386	10.76	0.09	OK	127,688	**127,688**	**769**

B.2 Material factor

Data presented below is a fulfillment of the results presented in section 5.6.

B.2.1 Noncomposite rolled I-shaped girders

Table B- 8. Material factor for flexural resistance of noncomposite rolled I-shaped sections

#	Shape	λ	V	Mn (kip-ft)	#	Shape	λ	V	Mn (kip-ft)
1	W44X335	1.114	0.064	6,750	126	W21X73	1.114	0.063	717
2	W44X290	1.113	0.063	5,875	127	W21X68	1.114	0.064	667
3	W44X262	1.114	0.063	5,292	128	W21X62	1.115	0.064	600
4	W44X230	1.114	0.064	4,583	129	W21X55	1.116	0.064	525
5	W40X593	1.112	0.062	11,500	130	W21X48*	1.116	0.065	442
6	W40X503	1.112	0.062	9,667	131	W21X57	1.117	0.065	538
7	W40X431	1.112	0.063	8,167	132	W21X50	1.118	0.066	458
8	W40X397	1.112	0.063	7,500	133	W21X44	1.120	0.066	398
9	W40X372	1.112	0.063	7,000	134	W18X311	1.108	0.060	3,142
10	W40X362	1.112	0.063	6,833	135	W18X283	1.108	0.060	2,817
11	W40X324	1.112	0.063	6,083	136	W18X258	1.108	0.060	2,546
12	W40X297	1.113	0.063	5,542	137	W18X234	1.108	0.060	2,288
13	W40X277	1.112	0.063	5,208	138	W18X211	1.108	0.060	2,042
14	W40X249	1.112	0.062	4,667	139	W18X192	1.108	0.061	1,842
15	W40X215	1.112	0.062	4,017	140	W18X175	1.108	0.061	1,658
16	W40X199	1.114	0.063	3,621	141	W18X158	1.109	0.061	1,483
17	W40X392	1.115	0.064	7,125	142	W18X143	1.109	0.061	1,342
18	W40X331	1.115	0.064	5,958	143	W18X130	1.109	0.061	1,208
19	W40X327	1.115	0.064	5,875	144	W18X119	1.110	0.061	1,092
20	W40X294	1.115	0.064	5,292	145	W18X106	1.110	0.061	958
21	W40X278	1.116	0.064	4,958	146	W18X97	1.110	0.061	879
22	W40X264	1.115	0.064	4,708	147	W18X86	1.110	0.061	775
23	W40X235	1.115	0.064	4,208	148	W18X76	1.110	0.061	679
24	W40X211	1.115	0.064	3,775	149	W18X71	1.113	0.063	608
25	W40X183	1.115	0.064	3,225	150	W18X65	1.113	0.063	554
26	W40X167	1.117	0.065	2,888	151	W18X60	1.113	0.063	513
27	W40X149	1.119	0.066	2,492	152	W18X55	1.113	0.063	467
28	W36X652	1.111	0.062	12,125	153	W18X50	1.113	0.063	421
29	W36X529	1.111	0.062	9,708	154	W18X46	1.115	0.064	378
30	W36X487	1.111	0.062	8,875	155	W18X40	1.115	0.064	327

31	W36X441	1.111	0.062	7,958	**156**	W18X35	1.117	0.065	277
32	W36X395	1.111	0.062	7,125	**157**	W16X100	1.109	0.061	825
33	W36X361	1.111	0.062	6,458	**158**	W16X89	1.109	0.061	729
34	W36X330	1.111	0.062	5,875	**159**	W16X77	1.109	0.061	625
35	W36X302	1.111	0.062	5,333	**160**	W16X67	1.109	0.061	542
36	W36X282	1.112	0.062	4,958	**161**	W16X57	1.112	0.063	438
37	W36X262	1.112	0.062	4,583	**162**	W16X50	1.113	0.063	383
38	W36X247	1.112	0.063	4,292	**163**	W16X45	1.113	0.063	343
39	W36X231	1.112	0.063	4,013	**164**	W16X40	1.113	0.063	304
40	W36X256	1.114	0.064	4,333	**165**	W16X36	1.114	0.064	267
41	W36X232	1.115	0.064	3,900	**166**	W16X31	1.116	0.064	225
42	W36X210	1.116	0.064	3,471	**167**	W16X26	1.117	0.065	184
43	W36X194	1.116	0.064	3,196	**168**	W14X730	1.104	0.058	6,917
44	W36X182	1.116	0.065	2,992	**169**	W14X665	1.104	0.058	6,167
45	W36X170	1.116	0.065	2,783	**170**	W14X605	1.104	0.058	5,500
46	W36X160	1.116	0.065	2,600	**171**	W14X550	1.104	0.058	4,917
47	W36X150	1.117	0.065	2,421	**172**	W14X500	1.104	0.058	4,375
48	W36X135	1.118	0.066	2,121	**173**	W14X455	1.104	0.058	3,900
49	W33X387	1.111	0.062	6,500	**174**	W14X426	1.105	0.058	3,621
50	W33X354	1.111	0.062	5,917	**175**	W14X398	1.105	0.059	3,338
51	W33X318	1.111	0.062	5,292	**176**	W14X370	1.105	0.058	3,067
52	W33X291	1.111	0.062	4,833	**177**	W14X342	1.105	0.059	2,800
53	W33X263	1.111	0.062	4,333	**178**	W14X311	1.105	0.059	2,513
54	W33X241	1.112	0.062	3,917	**179**	W14X283	1.105	0.059	2,258
55	W33X221	1.112	0.062	3,571	**180**	W14X257	1.105	0.059	2,029
56	W33X201	1.112	0.063	3,221	**181**	W14X233	1.105	0.059	1,817
57	W33X169	1.114	0.064	2,621	**182**	W14X211	1.105	0.059	1,625
58	W33X152	1.115	0.064	2,329	**183**	W14X193	1.105	0.059	1,479
59	W33X141	1.116	0.064	2,142	**184**	W14X176	1.105	0.059	1,333
60	W33X130	1.117	0.065	1,946	**185**	W14X159	1.105	0.059	1,196
61	W33X118	1.118	0.065	1,729	**186**	W14X145	1.106	0.059	1,083
62	W30X391	1.110	0.061	6,042	**187**	W14X132	1.106	0.059	975
63	W30X357	1.110	0.061	5,500	**188**	W14X120	1.106	0.059	883
64	W30X326	1.110	0.061	4,958	**189**	W14X109	1.106	0.059	800
65	W30X292	1.110	0.062	4,417	**190**	W14X99*	1.105	0.059	717
66	W30X261	1.111	0.062	3,929	**191**	W14X90*	1.101	0.057	637
67	W30X235	1.110	0.062	3,529	**192**	W14X82	1.108	0.060	579
68	W30X211	1.111	0.062	3,129	**193**	W14X74	1.108	0.060	525
69	W30X191	1.111	0.062	2,813	**194**	W14X68	1.108	0.060	479

70	W30X173	1.112	0.062	2,529	**195**	W14X61	1.108	0.060	425
71	W30X148	1.114	0.064	2,083	**196**	W14X53	1.109	0.061	363
72	W30X132	1.115	0.064	1,821	**197**	W14X48	1.109	0.061	327
73	W30X124	1.116	0.064	1,700	**198**	W14X43	1.109	0.061	290
74	W30X116	1.116	0.065	1,575	**199**	W14X38	1.112	0.062	256
75	W30X108	1.117	0.065	1,442	**200**	W14X34	1.112	0.062	228
76	W30X99	1.118	0.066	1,300	**201**	W14X30	1.113	0.063	197
77	W30X90	1.118	0.066	1,179	**202**	W14X26	1.115	0.064	168
78	W27X539	1.109	0.061	7,875	**203**	W14X22	1.116	0.065	138
79	W27X368	1.110	0.061	5,167	**204**	W12X336	1.105	0.058	2,513
80	W27X336	1.110	0.061	4,708	**205**	W12X305	1.105	0.059	2,238
81	W27X307	1.110	0.061	4,292	**206**	W12X279	1.105	0.059	2,004
82	W27X281	1.110	0.061	3,900	**207**	W12X252	1.105	0.059	1,783
83	W27X258	1.110	0.061	3,550	**208**	W12X230	1.105	0.059	1,608
84	W27X235	1.110	0.062	3,217	**209**	W12X210	1.105	0.059	1,450
85	W27X217	1.110	0.061	2,963	**210**	W12X190	1.105	0.059	1,296
86	W27X194	1.110	0.062	2,629	**211**	W12X170	1.105	0.059	1,146
87	W27X178	1.111	0.062	2,375	**212**	W12X152	1.106	0.059	1,013
88	W27X161	1.111	0.062	2,146	**213**	W12X136	1.106	0.059	892
89	W27X146	1.112	0.062	1,933	**214**	W12X120	1.106	0.059	775
90	W27X129	1.113	0.063	1,646	**215**	W12X106	1.106	0.059	683
91	W27X114	1.115	0.064	1,429	**216**	W12X96	1.106	0.059	613
92	W27X102	1.115	0.064	1,271	**217**	W12X87	1.106	0.059	550
93	W27X94	1.115	0.064	1,158	**218**	W12X79	1.106	0.059	496
94	W27X84	1.116	0.065	1,017	**219**	W12X72	1.106	0.059	450
95	W24X370	1.109	0.061	4,708	**220**	W12X65*	1.103	0.058	396
96	W24X335	1.109	0.061	4,250	**221**	W12X58	1.107	0.060	360
97	W24X306	1.109	0.061	3,842	**222**	W12X53	1.107	0.060	325
98	W24X279	1.109	0.061	3,479	**223**	W12X50	1.108	0.060	300
99	W24X250	1.110	0.061	3,100	**224**	W12X45	1.108	0.061	268
100	W24X229	1.110	0.061	2,813	**225**	W12X40	1.108	0.060	238
101	W24X207	1.110	0.061	2,525	**226**	W12X35	1.110	0.062	213
102	W24X192	1.110	0.061	2,329	**227**	W12X30	1.111	0.062	180
103	W24X176	1.110	0.061	2,129	**228**	W12X26	1.111	0.062	155
104	W24X162	1.110	0.062	1,950	**229**	W12X22	1.116	0.064	122
105	W24X146	1.111	0.062	1,742	**230**	W12X19	1.117	0.065	103
106	W24X131	1.111	0.062	1,542	**231**	W12X16	1.120	0.067	84
107	W24X117	1.112	0.062	1,363	**232**	W12X14	1.120	0.067	73
108	W24X104	1.112	0.062	1,204	**233**	W10X112	1.105	0.059	613

109	W24X103	1.113	0.063	1,167	**234**	W10X100	1.105	0.059	542
110	W24X94	1.114	0.064	1,058	**235**	W10X88	1.105	0.059	471
111	W24X84	1.114	0.064	933	**236**	W10X77	1.106	0.059	407
112	W24X76	1.115	0.064	833	**237**	W10X68	1.106	0.059	355
113	W24X68	1.116	0.065	738	**238**	W10X60	1.106	0.059	311
114	W24X62	1.119	0.066	638	**239**	W10X54	1.106	0.059	278
115	W24X55	1.121	0.067	558	**240**	W10X49	1.106	0.059	252
116	W21X201	1.109	0.061	2,208	**241**	W10X45	1.107	0.060	229
117	W21X182	1.109	0.061	1,983	**242**	W10X39	1.107	0.060	195
118	W21X166	1.109	0.061	1,800	**243**	W10X33	1.108	0.060	162
119	W21X147	1.110	0.061	1,554	**244**	W10X30	1.110	0.061	153
120	W21X132	1.110	0.061	1,388	**245**	W10X26	1.110	0.061	130
121	W21X122	1.110	0.061	1,279	**246**	W10X22	1.111	0.062	108
122	W21X111	1.111	0.062	1,163	**247**	W10X19	1.114	0.063	90
123	W21X101	1.110	0.062	1,054	**248**	W10X17	1.115	0.064	78
124	W21X93	1.114	0.063	921	**249**	W10X15	1.117	0.065	67
125	W21X83	1.114	0.063	817	**250**	W10X12*	1.117	0.065	52

B.2.2 Noncomposite I-shaped plate girders

Table B- 9. Material factor for flexural resistance of noncomposite A709-50 I-shaped plate girders

#	λ	V	$M_{p,nom}$ (kip-ft)	#	λ	V	$M_{p,nom}$ (kip-ft)
1	1.106	0.034	1,990	**33**	1.106	0.034	2,989
2	1.106	0.033	2,574	**34**	1.106	0.033	3,842
3	1.100	0.032	3,223	**35**	1.094	0.030	4,789
4	1.100	0.032	3,934	**36**	1.096	0.033	5,879
5	1.101	0.033	4,762	**37**	1.096	0.032	7,029
6	1.106	0.034	5,577	**38**	1.095	0.031	8,311
7	1.106	0.033	6,495	**39**	1.094	0.030	9,660
8	1.106	0.032	7,494	**40**	1.085	0.032	11,102
9	1.094	0.030	8,577	**41**	1.085	0.032	12,699
10	1.094	0.030	9,749	**42**	1.084	0.031	14,423
11	1.095	0.031	11,085	**43**	1.101	0.033	16,261
12	1.094	0.030	12,420	**44**	1.120	0.035	18,278
13	1.094	0.030	13,855	**45**	1.120	0.035	20,358
14	1.093	0.030	15,403	**46**	1.120	0.035	22,559
15	1.085	0.031	17,051	**47**	1.120	0.035	25,019

16	1.084	0.031	18,813	**48**	1.121	0.036	27,526
17	1.106	0.034	2,490	**49**	1.106	0.033	3,465
18	1.106	0.033	3,205	**50**	1.106	0.033	4,450
19	1.095	0.031	4,012	**51**	1.093	0.029	5,544
20	1.094	0.030	4,886	**52**	1.095	0.032	6,807
21	1.093	0.029	5,834	**53**	1.095	0.031	8,138
22	1.093	0.029	6,887	**54**	1.094	0.030	9,617
23	1.083	0.031	8,019	**55**	1.093	0.029	11,143
24	1.095	0.031	9,337	**56**	1.084	0.031	12,872
25	1.095	0.031	10,681	**57**	1.083	0.031	14,732
26	1.094	0.030	12,137	**58**	1.082	0.031	16,654
27	1.094	0.030	13,669	**59**	1.081	0.031	18,811
28	1.085	0.031	15,369	**60**	1.120	0.035	21,068
29	1.084	0.031	17,141	**61**	1.120	0.035	23,591
30	1.083	0.031	18,985	**62**	1.121	0.036	26,045
31	1.083	0.031	21,013	**63**	1.121	0.036	28,893
32	1.120	0.035	23,240	**64**	1.098	0.034	31,907

Table B- 10. Material factor for flexural resistance of noncomposite A709-50W I-shaped plate girders

#	λ	V	$M_{p,nom}$ (kip-ft)	#	λ	V	$M_{p,nom}$ (kip-ft)
1	1.128	0.028	1,990	**33**	1.128	0.028	2,989
2	1.128	0.028	2,574	**34**	1.128	0.028	3,842
3	1.114	0.029	3,223	**35**	1.099	0.030	4,789
4	1.114	0.029	3,934	**36**	1.104	0.031	5,879
5	1.115	0.030	4,762	**37**	1.103	0.031	7,029
6	1.128	0.029	5,577	**38**	1.101	0.030	8,311
7	1.128	0.028	6,495	**39**	1.099	0.030	9,660
8	1.128	0.027	7,494	**40**	1.095	0.027	11,102
9	1.099	0.030	8,577	**41**	1.094	0.027	12,699
10	1.099	0.030	9,749	**42**	1.093	0.027	14,423
11	1.100	0.030	11,085	**43**	1.100	0.029	16,261
12	1.099	0.030	12,420	**44**	1.109	0.031	18,278
13	1.099	0.030	13,855	**45**	1.109	0.031	20,358
14	1.098	0.030	15,403	**46**	1.108	0.031	22,559
15	1.094	0.027	17,051	**47**	1.108	0.031	25,019
16	1.093	0.027	18,813	**48**	1.108	0.032	27,526
17	1.128	0.028	2,490	**49**	1.128	0.028	3,465

18	1.128	0.028	3,205	**50**	1.128	0.027	4,450
19	1.101	0.030	4,012	**51**	1.097	0.030	5,544
20	1.100	0.030	4,886	**52**	1.102	0.031	6,807
21	1.096	0.030	5,834	**53**	1.101	0.030	8,138
22	1.096	0.031	6,887	**54**	1.099	0.030	9,617
23	1.091	0.027	8,019	**55**	1.097	0.030	11,143
24	1.101	0.030	9,337	**56**	1.093	0.027	12,872
25	1.101	0.030	10,681	**57**	1.091	0.027	14,732
26	1.099	0.030	12,137	**58**	1.090	0.027	16,654
27	1.098	0.030	13,669	**59**	1.089	0.027	18,811
28	1.094	0.027	15,369	**60**	1.109	0.031	21,068
29	1.093	0.027	17,141	**61**	1.108	0.031	23,591
30	1.092	0.027	18,985	**62**	1.108	0.032	26,045
31	1.091	0.027	21,013	**63**	1.107	0.032	28,893
32	1.109	0.031	23,240	**64**	1.077	0.028	31,907

B.2.3 Composite rolled I-shaped girders

Table B- 11. Material factor for flexural resistance of composite rolled I-shaped girders

#	λ	V	$M_{p,nom}$ (kip-ft)	#	λ	V	$M_{p,nom}$ (kip-ft)
1	1.134	0.063	8,078	**123**	1.133	0.061	8,318
2	1.132	0.061	7,052	**124**	1.131	0.062	8,480
3	1.132	0.062	6,552	**125**	1.156	0.064	7,735
4	1.135	0.063	7,695	**126**	1.136	0.062	7,957
5	1.134	0.063	6,968	**127**	1.134	0.063	8,078
6	1.133	0.063	6,042	**128**	1.129	0.062	8,209
7	1.134	0.064	5,589	**129**	1.132	0.062	8,317
8	1.137	0.065	4,881	**130**	1.131	0.062	8,480
9	1.131	0.061	7,630	**131**	1.140	0.063	4,818
10	1.133	0.061	7,193	**132**	1.137	0.065	4,980
11	1.132	0.063	8,026	**133**	1.136	0.066	5,084
12	1.136	0.063	7,290	**134**	1.135	0.066	5,163
13	1.135	0.063	6,667	**135**	1.155	0.066	4,808
14	1.134	0.063	6,186	**136**	1.142	0.065	4,913
15	1.134	0.063	5,849	**137**	1.135	0.065	4,991
16	1.134	0.063	5,490	**138**	1.132	0.065	5,052
17	1.133	0.063	5,183	**139**	1.135	0.066	5,093

18	1.135	0.063	4,792	**140**	1.135	0.066	5,163
19	1.136	0.064	4,342	**141**	1.138	0.063	4,283
20	1.132	0.061	6,039	**142**	1.135	0.064	4,426
21	1.132	0.062	5,201	**143**	1.135	0.065	4,515
22	1.132	0.063	4,752	**144**	1.134	0.065	4,589
23	1.134	0.063	4,307	**145**	1.153	0.065	4,281
24	1.134	0.063	4,000	**146**	1.140	0.064	4,372
25	1.134	0.064	3,656	**147**	1.134	0.065	4,441
26	1.132	0.061	5,956	**148**	1.132	0.065	4,488
27	1.131	0.061	5,448	**149**	1.135	0.065	4,524
28	1.130	0.061	4,983	**150**	1.134	0.065	4,589
29	1.133	0.062	4,265	**151**	1.137	0.063	3,601
30	1.133	0.063	3,825	**152**	1.135	0.064	3,712
31	1.133	0.062	3,620	**153**	1.134	0.064	3,790
32	1.133	0.063	3,408	**154**	1.133	0.064	3,854
33	1.132	0.064	3,178	**155**	1.150	0.064	3,611
34	1.135	0.064	2,860	**156**	1.137	0.064	3,684
35	1.134	0.064	2,604	**157**	1.134	0.064	3,730
36	1.130	0.060	5,205	**158**	1.132	0.064	3,766
37	1.130	0.060	4,816	**159**	1.134	0.064	3,801
38	1.129	0.060	4,406	**160**	1.133	0.064	3,854
39	1.130	0.060	3,929	**161**	1.136	0.064	2,894
40	1.132	0.061	3,536	**162**	1.135	0.064	2,978
41	1.131	0.062	3,173	**163**	1.134	0.064	3,044
42	1.131	0.062	2,860	**164**	1.134	0.064	3,097
43	1.132	0.062	2,575	**165**	1.152	0.064	2,838
44	1.132	0.063	2,332	**166**	1.139	0.063	2,900
45	1.129	0.059	4,497	**167**	1.134	0.064	2,940
46	1.129	0.059	4,195	**168**	1.133	0.064	2,970
47	1.130	0.060	3,694	**169**	1.135	0.064	2,999
48	1.130	0.060	3,363	**170**	1.134	0.064	3,044
49	1.129	0.060	3,033	**171**	1.136	0.063	2,235
50	1.127	0.060	2,739	**172**	1.132	0.063	2,332
51	1.129	0.061	2,727	**173**	1.134	0.063	2,389
52	1.131	0.061	2,437	**174**	1.133	0.063	2,443
53	1.130	0.062	2,199	**175**	1.147	0.063	2,320
54	1.133	0.062	2,001	**176**	1.137	0.063	2,359
55	1.134	0.063	1,809	**177**	1.134	0.063	2,389

56	1.137	0.064	1,661	**178**	1.131	0.063	2,417
57	1.138	0.065	1,443	**179**	1.133	0.063	2,440
58	1.131	0.059	4,764	**180**	1.133	0.063	2,475
59	1.130	0.059	4,358	**181**	1.138	0.065	1,443
60	1.129	0.059	4,011	**182**	1.137	0.064	1,498
61	1.131	0.059	3,478	**183**	1.136	0.063	1,544
62	1.129	0.059	3,159	**184**	1.136	0.063	1,584
63	1.128	0.059	2,951	**185**	1.152	0.065	1,452
64	1.127	0.059	2,708	**186**	1.143	0.064	1,476
65	1.127	0.059	2,499	**187**	1.137	0.064	1,498
66	1.132	0.061	2,256	**188**	1.135	0.064	1,515
67	1.130	0.061	2,034	**189**	1.137	0.064	1,529
68	1.132	0.061	1,810	**190**	1.136	0.064	1,550
69	1.133	0.061	1,699	**191**	1.137	0.063	1,110
70	1.133	0.061	1,564	**192**	1.136	0.062	1,157
71	1.135	0.062	1,349	**193**	1.136	0.061	1,196
72	1.136	0.063	1,190	**194**	1.136	0.060	1,232
73	1.135	0.063	1,400	**195**	1.153	0.063	1,119
74	1.137	0.063	1,238	**196**	1.142	0.062	1,141
75	1.137	0.064	1,110	**197**	1.136	0.062	1,157
76	1.130	0.059	3,924	**198**	1.134	0.062	1,169
77	1.128	0.058	3,577	**199**	1.136	0.062	1,180
78	1.130	0.059	3,177	**200**	1.136	0.062	1,195
79	1.128	0.058	2,932	**201**	1.137	0.062	797
80	1.128	0.058	2,708	**202**	1.135	0.061	849
81	1.126	0.059	2,427	**203**	1.134	0.060	889
82	1.129	0.059	2,164	**204**	1.134	0.058	925
83	1.126	0.058	1,953	**205**	1.135	0.057	958
84	1.128	0.059	1,736	**206**	1.154	0.062	818
85	1.132	0.060	1,655	**207**	1.141	0.061	835
86	1.132	0.060	1,531	**208**	1.135	0.061	849
87	1.131	0.060	1,364	**209**	1.132	0.061	859
88	1.132	0.060	1,263	**210**	1.135	0.060	868
89	1.133	0.060	1,157	**211**	1.134	0.061	880
90	1.134	0.061	1,084	**212**	1.136	0.061	590
91	1.133	0.061	956	**213**	1.135	0.059	632
92	1.135	0.061	849	**214**	1.135	0.057	667
93	1.129	0.058	2,125	**215**	1.135	0.055	700

94	1.127	0.058	1,924	**216**	1.135	0.054	731
95	1.127	0.058	1,681	**217**	1.152	0.060	611
96	1.128	0.058	1,479	**218**	1.140	0.059	623
97	1.132	0.060	1,243	**219**	1.135	0.059	632
98	1.132	0.060	1,111	**220**	1.133	0.059	639
99	1.132	0.059	1,009	**221**	1.135	0.058	645
100	1.131	0.059	911	**222**	1.135	0.058	653
101	1.132	0.059	830	**223**	1.135	0.059	485
102	1.134	0.059	733	**224**	1.134	0.057	523
103	1.135	0.059	632	**225**	1.134	0.054	556
104	1.122	0.056	2,185	**226**	1.135	0.052	588
105	1.126	0.056	1,934	**227**	1.135	0.050	618
106	1.123	0.056	1,773	**228**	1.151	0.058	506
107	1.125	0.057	1,651	**229**	1.140	0.056	516
108	1.127	0.057	1,517	**230**	1.134	0.057	523
109	1.127	0.057	1,394	**231**	1.132	0.057	529
110	1.127	0.056	1,272	**232**	1.134	0.056	533
111	1.129	0.058	1,078	**233**	1.134	0.056	540
112	1.129	0.057	989	**234**	1.139	0.058	325
113	1.128	0.057	897	**235**	1.139	0.054	358
114	1.130	0.058	827	**236**	1.139	0.051	389
115	1.130	0.058	753	**237**	1.140	0.048	418
116	1.131	0.057	675	**238**	1.140	0.046	448
117	1.133	0.057	604	**239**	1.154	0.055	347
118	1.134	0.057	523	**240**	1.144	0.054	353
119	1.133	0.059	4,669	**241**	1.139	0.054	358
120	1.131	0.059	4,291	**242**	1.137	0.054	362
121	1.140	0.060	7,755	**243**	1.139	0.053	365
122	1.135	0.060	8,096	**244**	1.138	0.053	369

B.2.4 Composite I-shaped plate girders

Table B- 12. Material factor for flexural resistance of composite A709-50 I-shaped plate girders

#	λ	V	$M_{p,nom}$ (kip-ft)	#	λ	V	$M_{p,nom}$ (kip-ft)
1	Empty place holder			**75**	1.111	0.037	75,422
2	Empty place holder			**76**	1.110	0.037	82,002
3	Empty place holder			**77**	1.173	0.045	3,234

4	1.174	0.047	2,414	**78**	1.174	0.046	4,193
5	1.175	0.048	3,030	**79**	1.172	0.047	5,222
6	1.156	0.046	3,716	**80**	1.153	0.046	6,355
7	1.176	0.048	4,449	**81**	1.173	0.048	7,591
8	1.173	0.048	5,218	**82**	1.173	0.049	8,929
9	1.155	0.047	6,094	**83**	1.153	0.047	10,369
10	1.160	0.047	7,023	**84**	1.150	0.045	11,904
11	1.143	0.046	8,215	**85**	1.153	0.046	13,572
12	1.148	0.046	9,273	**86**	1.153	0.048	15,371
13	1.149	0.044	10,422	**87**	1.155	0.049	17,247
14	1.149	0.044	11,591	**88**	1.155	0.048	19,232
15	1.155	0.047	12,980	**89**	1.144	0.044	21,314
16	1.152	0.046	14,708	**90**	1.110	0.039	24,070
17	1.153	0.046	16,555	**91**	1.112	0.039	26,418
18	1.152	0.045	18,600	**92**	1.098	0.037	40,198
19	1.141	0.043	21,745	**93**	1.099	0.037	46,317
20	1.125	0.042	23,650	**94**	1.095	0.037	47,420
21	1.125	0.040	26,064	**95**	1.124	0.041	51,744
22	1.107	0.037	38,779	**96**	1.123	0.041	56,268
23	1.102	0.036	41,401	**97**	1.125	0.039	67,561
24	1.100	0.036	44,956	**98**	1.126	0.039	71,846
25	1.131	0.039	49,892	**99**	1.113	0.038	79,677
26	1.131	0.039	54,457	**100**	1.112	0.038	85,537
27	1.128	0.039	55,816	**101**	1.107	0.039	89,301
28	1.123	0.039	58,797	**102**	1.173	0.048	5,952
29	1.123	0.040	63,559	**103**	1.152	0.046	7,258
30	1.123	0.037	71,878	**104**	1.152	0.046	8,663
31	1.174	0.045	2,302	**105**	1.148	0.044	10,169
32	1.173	0.047	2,981	**106**	1.133	0.040	11,789
33	1.174	0.047	3,723	**107**	1.133	0.040	13,551
34	1.174	0.048	4,537	**108**	1.130	0.039	15,417
35	1.175	0.048	5,422	**109**	1.118	0.041	17,402
36	1.175	0.047	6,382	**110**	1.137	0.042	19,617
37	1.175	0.048	7,434	**111**	1.140	0.044	21,888
38	1.173	0.049	8,570	**112**	1.116	0.041	24,323
39	1.174	0.050	9,763	**113**	1.117	0.040	26,847
40	1.154	0.046	11,018	**114**	1.107	0.040	30,013
41	1.152	0.044	12,350	**115**	1.110	0.039	32,817

42	1.154	0.049	14,302	**116**	1.104	0.037	35,814
43	1.155	0.048	15,835	**117**	1.125	0.042	56,372
44	1.155	0.048	17,468	**118**	1.100	0.037	62,223
45	1.152	0.046	19,208	**119**	1.097	0.036	67,583
46	1.138	0.042	21,379	**120**	1.123	0.040	73,454
47	1.117	0.040	24,397	**121**	1.124	0.040	78,362
48	1.118	0.040	26,999	**122**	1.124	0.041	84,733
49	1.121	0.040	30,171	**123**	1.108	0.040	92,660
50	1.126	0.040	46,002	**124**	1.108	0.040	103,803
51	1.128	0.040	51,904	**125**	1.153	0.045	4,116
52	1.133	0.040	56,855	**126**	1.173	0.047	5,337
53	1.133	0.039	61,870	**127**	1.173	0.048	6,682
54	1.119	0.037	67,879	**128**	1.173	0.049	8,149
55	1.113	0.037	71,823	**129**	1.172	0.049	9,744
56	1.174	0.047	6,507	**130**	1.151	0.046	11,449
57	1.174	0.047	7,659	**131**	1.155	0.049	13,255
58	1.154	0.046	8,901	**132**	1.155	0.049	15,322
59	1.152	0.046	10,229	**133**	1.155	0.049	17,337
60	1.150	0.045	11,675	**134**	1.152	0.047	19,600
61	1.154	0.047	13,193	**135**	1.141	0.044	21,997
62	1.155	0.047	14,803	**136**	1.112	0.040	24,590
63	1.158	0.047	16,523	**137**	1.113	0.041	27,261
64	1.147	0.047	18,719	**138**	1.114	0.041	30,099
65	1.147	0.045	20,671	**139**	1.105	0.037	47,029
66	1.115	0.040	22,910	**140**	1.098	0.037	51,312
67	1.115	0.040	25,055	**141**	1.096	0.037	56,655
68	1.114	0.040	27,295	**142**	1.122	0.040	61,600
69	1.114	0.040	30,048	**143**	1.123	0.040	66,331
70	1.108	0.037	33,675	**144**	1.124	0.041	74,969
71	1.122	0.040	50,995	**145**	1.108	0.040	82,327
72	1.126	0.041	56,548	**146**	1.106	0.041	86,763
73	1.132	0.040	67,296	**147**	1.110	0.040	100,604
74	1.117	0.038	72,335	**148**	1.107	0.041	104,447
75	1.111	0.037	75,422	**149**	1.105	0.041	111,488

Table B- 13. Material factor for flexural resistance of composite A709-50W I-shaped plate girders

#	λ	V	$M_{p,nom}$ (kip-ft)	#	λ	V	$M_{p,nom}$ (kip-ft)

1	Empty place holder			**75**	1.099	0.032	75,422
2	Empty place holder			**76**	1.096	0.032	82,002
3	Empty place holder			**77**	1.196	0.037	3,234
4	1.197	0.040	2,414	**78**	1.197	0.038	4,193
5	1.197	0.041	3,030	**79**	1.196	0.039	5,222
6	1.178	0.039	3,716	**80**	1.176	0.038	6,355
7	1.199	0.041	4,449	**81**	1.197	0.039	7,591
8	1.196	0.041	5,218	**82**	1.197	0.040	8,929
9	1.177	0.039	6,094	**83**	1.176	0.039	10,369
10	1.182	0.040	7,023	**84**	1.172	0.037	11,904
11	1.165	0.039	8,215	**85**	1.175	0.039	13,572
12	1.170	0.038	9,273	**86**	1.176	0.040	15,371
13	1.170	0.037	10,422	**87**	1.177	0.040	17,247
14	1.171	0.037	11,591	**88**	1.177	0.040	19,232
15	1.177	0.040	12,980	**89**	1.157	0.040	21,314
16	1.173	0.040	14,708	**90**	1.130	0.033	24,070
17	1.173	0.040	16,555	**91**	1.132	0.034	26,418
18	1.172	0.040	18,600	**92**	1.109	0.032	40,198
19	1.149	0.042	21,745	**93**	1.109	0.034	46,317
20	1.143	0.038	23,650	**94**	1.105	0.032	47,420
21	1.142	0.037	26,064	**95**	1.119	0.036	51,744
22	1.115	0.035	38,779	**96**	1.117	0.037	56,268
23	1.110	0.033	41,401	**97**	1.122	0.036	67,561
24	1.108	0.033	44,956	**98**	1.121	0.035	71,846
25	1.122	0.036	49,892	**99**	1.101	0.033	79,677
26	1.121	0.036	54,457	**100**	1.098	0.033	85,537
27	1.118	0.035	55,816	**101**	1.093	0.032	89,301
28	1.112	0.035	58,797	**102**	1.197	0.039	5,952
29	1.111	0.036	63,559	**103**	1.175	0.038	7,258
30	1.113	0.033	71,878	**104**	1.175	0.038	8,663
31	1.197	0.038	2,302	**105**	1.170	0.036	10,169
32	1.196	0.039	2,981	**106**	1.142	0.038	11,789
33	1.197	0.040	3,723	**107**	1.143	0.038	13,551
34	1.197	0.040	4,537	**108**	1.138	0.038	15,417
35	1.198	0.040	5,422	**109**	1.129	0.035	17,402
36	1.199	0.039	6,382	**110**	1.148	0.039	19,617
37	1.198	0.040	7,434	**111**	1.152	0.039	21,888
38	1.197	0.041	8,570	**112**	1.136	0.035	24,323

39	1.198	0.041	9,763	**113**	1.137	0.034	26,847
40	1.176	0.038	11,018	**114**	1.127	0.034	30,013
41	1.174	0.036	12,350	**115**	1.130	0.033	32,817
42	1.177	0.041	14,302	**116**	1.114	0.035	35,814
43	1.178	0.040	15,835	**117**	1.117	0.038	56,372
44	1.177	0.040	17,468	**118**	1.110	0.033	62,223
45	1.174	0.039	19,208	**119**	1.107	0.033	67,583
46	1.149	0.039	21,379	**120**	1.119	0.036	73,454
47	1.135	0.035	24,397	**121**	1.118	0.036	78,362
48	1.136	0.035	26,999	**122**	1.116	0.037	84,733
49	1.139	0.036	30,171	**123**	1.093	0.033	92,660
50	1.122	0.037	46,002	**124**	1.091	0.033	103,803
51	1.126	0.037	51,904	**125**	1.175	0.037	4,116
52	1.127	0.037	56,855	**126**	1.197	0.039	5,337
53	1.125	0.037	61,870	**127**	1.198	0.040	6,682
54	1.108	0.033	67,879	**128**	1.197	0.040	8,149
55	1.100	0.032	71,823	**129**	1.196	0.040	9,744
56	1.197	0.039	6,507	**130**	1.174	0.038	11,449
57	1.198	0.039	7,659	**131**	1.178	0.041	13,255
58	1.176	0.039	8,901	**132**	1.178	0.040	15,322
59	1.175	0.038	10,229	**133**	1.178	0.040	17,337
60	1.172	0.037	11,675	**134**	1.175	0.039	19,600
61	1.176	0.039	13,193	**135**	1.153	0.039	21,997
62	1.177	0.039	14,803	**136**	1.132	0.034	24,590
63	1.181	0.039	16,523	**137**	1.133	0.034	27,261
64	1.169	0.039	18,719	**138**	1.134	0.035	30,099
65	1.169	0.038	20,671	**139**	1.115	0.035	47,029
66	1.134	0.034	22,910	**140**	1.110	0.032	51,312
67	1.134	0.034	25,055	**141**	1.107	0.032	56,655
68	1.134	0.034	27,295	**142**	1.119	0.036	61,600
69	1.133	0.034	30,048	**143**	1.118	0.036	66,331
70	1.117	0.035	33,675	**144**	1.117	0.037	74,969
71	1.117	0.036	50,995	**145**	1.095	0.034	82,327
72	1.118	0.037	56,548	**146**	1.092	0.034	86,763
73	1.126	0.037	67,296	**147**	1.095	0.034	100,604
74	1.106	0.033	72,335	**148**	1.091	0.034	104,447
75	1.099	0.032	75,422	**149**	1.088	0.034	111,488

B.2.5 Composite box girders

Table B- 14. Material factor for flexural resistance of composite A709-50 box girders

#	λ	V	$M_{p,nom}$ (kip-ft)	#	λ	V	$M_{p,nom}$ (kip-ft)
1	1.173	0.054	4,912	**41**	1.179	0.047	37,764
2	1.174	0.055	6,251	**42**	1.144	0.041	45,705
3	1.122	0.046	8,816	**43**	1.142	0.041	52,951
4	1.172	0.055	5,935	**44**	1.120	0.038	60,681
5	1.173	0.057	7,602	**45**	1.182	0.048	36,560
6	1.121	0.046	10,808	**46**	1.175	0.046	41,925
7	1.172	0.057	6,955	**47**	1.140	0.041	51,742
8	1.173	0.058	8,952	**48**	1.137	0.041	60,863
9	1.120	0.047	12,802	**49**	1.114	0.038	70,440
10	1.175	0.047	11,757	**50**	1.177	0.047	39,747
11	1.175	0.048	14,175	**51**	1.174	0.046	46,035
12	1.130	0.041	18,754	**52**	1.137	0.041	57,743
13	1.127	0.043	23,063	**53**	1.133	0.041	68,744
14	1.109	0.038	27,347	**54**	1.117	0.037	79,651
15	1.174	0.048	13,568	**55**	1.125	0.041	48,250
16	1.174	0.049	16,556	**56**	1.133	0.041	53,210
17	1.127	0.042	22,268	**57**	1.110	0.038	62,363
18	1.125	0.044	27,675	**58**	1.112	0.037	70,810
19	1.106	0.039	33,045	**59**	1.101	0.033	79,257
20	1.174	0.049	15,369	**60**	1.130	0.041	51,906
21	1.174	0.051	18,929	**61**	1.133	0.041	58,004
22	1.125	0.043	25,778	**62**	1.116	0.037	68,849
23	1.123	0.045	32,287	**63**	1.110	0.038	79,941
24	1.104	0.039	38,743	**64**	1.100	0.034	90,517
25	1.176	0.047	22,741	**65**	1.132	0.041	55,539
26	1.174	0.046	26,326	**66**	1.143	0.042	62,221
27	1.138	0.040	32,955	**67**	1.114	0.037	75,835
28	1.134	0.040	39,179	**68**	1.108	0.038	89,051
29	1.118	0.037	45,318	**69**	1.098	0.035	101,763
30	1.173	0.047	25,411	**70**	1.147	0.040	72,156
31	1.175	0.047	29,217	**71**	1.113	0.037	84,113
32	1.134	0.041	37,527	**72**	1.128	0.035	92,325
33	1.133	0.042	45,154	**73**	1.131	0.040	79,079
34	1.113	0.037	53,554	**74**	1.112	0.038	92,092
35	1.174	0.047	27,981	**75**	1.112	0.036	104,193
36	1.174	0.047	33,163	**76**	1.112	0.032	114,815
37	1.132	0.041	43,052	**77**	1.134	0.041	84,531
38	1.128	0.042	52,500	**78**	1.110	0.038	100,059
39	1.111	0.038	61,785	**79**	1.112	0.037	114,607
40	1.170	0.048	33,874	**80**	1.112	0.033	127,688

Table B- 15. Material factor for flexural resistance of composite A709-50W box girders

#	λ	V	$M_{p,nom}$ (kip-ft)	#	λ	V	$M_{p,nom}$ (kip-ft)
1	1.196	0.045	4,912	**41**	1.203	0.039	37,764
2	1.197	0.045	6,251	**42**	1.166	0.034	45,705
3	1.142	0.038	8,816	**43**	1.164	0.034	52,951
4	1.195	0.046	5,935	**44**	1.125	0.040	60,681
5	1.197	0.047	7,602	**45**	1.207	0.039	36,560
6	1.141	0.039	10,808	**46**	1.199	0.038	41,925
7	1.196	0.047	6,955	**47**	1.162	0.034	51,742
8	1.197	0.047	8,952	**48**	1.158	0.034	60,863
9	1.140	0.040	12,802	**49**	1.118	0.041	70,440
10	1.198	0.039	11,757	**50**	1.202	0.039	39,747
11	1.198	0.039	14,175	**51**	1.198	0.038	46,035
12	1.151	0.035	18,754	**52**	1.158	0.034	57,743
13	1.148	0.036	23,063	**53**	1.155	0.034	68,744
14	1.108	0.044	27,347	**54**	1.120	0.042	79,651
15	1.198	0.040	13,568	**55**	1.145	0.036	48,250
16	1.198	0.041	16,556	**56**	1.154	0.034	53,210
17	1.148	0.035	22,268	**57**	1.131	0.032	62,363
18	1.146	0.037	27,675	**58**	1.133	0.031	70,810
19	1.104	0.046	33,045	**59**	1.107	0.035	79,257
20	1.197	0.041	15,369	**60**	1.151	0.035	51,906
21	1.198	0.042	18,929	**61**	1.155	0.034	58,004
22	1.146	0.036	25,778	**62**	1.136	0.031	68,849
23	1.144	0.037	32,287	**63**	1.131	0.032	79,941
24	1.102	0.047	38,743	**64**	1.104	0.037	90,517
25	1.200	0.039	22,741	**65**	1.154	0.035	55,539
26	1.198	0.038	26,326	**66**	1.166	0.035	62,221
27	1.159	0.033	32,955	**67**	1.134	0.031	75,835
28	1.155	0.034	39,179	**68**	1.129	0.032	89,051
29	1.120	0.041	45,318	**69**	1.101	0.039	101,763
30	1.197	0.039	25,411	**70**	1.167	0.034	72,156
31	1.199	0.039	29,217	**71**	1.133	0.031	84,113
32	1.155	0.034	37,527	**72**	1.147	0.030	92,325
33	1.154	0.035	45,154	**73**	1.152	0.034	79,079
34	1.115	0.042	53,554	**74**	1.132	0.032	92,092
35	1.198	0.039	27,981	**75**	1.132	0.030	104,193
36	1.199	0.039	33,163	**76**	1.118	0.034	114,815
37	1.153	0.034	43,052	**77**	1.156	0.034	84,531
38	1.149	0.035	52,500	**78**	1.130	0.032	100,059
39	1.111	0.043	61,785	**79**	1.132	0.031	114,607
40	1.194	0.040	33,874	**80**	1.116	0.035	127,688

Appendix C

Appendix C fully corresponds to Chapter 6: Reliability analysis for steel bridge girder.

C.1 Reliability Indices

Tables in this section present calculated reliability indices for all steel sections analyzed.

C.1.1 Flexural resistance of noncomposite rolled I-shaped girders

Table C- 1. Reliability Indices for Noncomposite Rolled I-shaped Girdes for ADTT 250 and L=30, 60ft.

		L=30 ft						L=60 ft					
	Φ	1.00		0.95		1.05		1.00		0.95		1.05	
#	Shape \ D/(D+L)	0.25	0.40	0.25	0.40	0.25	0.40	0.35	0.55	0.35	0.55	0.35	0.55
1	W44X335	3.76	3.94	4.26	4.50	3.30	3.44	3.76	4.02	4.29	4.64	3.28	3.45
2	W44X290	3.75	3.94	4.26	4.50	3.30	3.43	3.76	4.01	4.29	4.64	3.28	3.45
3	W44X262	3.75	3.94	4.26	4.50	3.30	3.43	3.76	4.01	4.29	4.64	3.28	3.45
4	W44X230	3.75	3.94	4.26	4.50	3.30	3.44	3.76	4.02	4.29	4.64	3.28	3.45
5	W40X593	3.75	3.94	4.25	4.50	3.29	3.43	3.75	4.01	4.29	4.63	3.27	3.44
6	W40X503	3.75	3.94	4.25	4.50	3.29	3.43	3.75	4.01	4.29	4.63	3.27	3.45
7	W40X431	3.75	3.94	4.25	4.50	3.29	3.43	3.76	4.01	4.29	4.63	3.27	3.45
8	W40X397	3.75	3.94	4.25	4.50	3.29	3.43	3.76	4.01	4.29	4.64	3.27	3.45
9	W40X372	3.75	3.94	4.25	4.50	3.29	3.43	3.76	4.01	4.29	4.63	3.27	3.45
10	W40X362	3.75	3.94	4.25	4.50	3.29	3.43	3.76	4.01	4.29	4.63	3.27	3.45
11	W40X324	3.75	3.94	4.25	4.50	3.29	3.43	3.76	4.01	4.29	4.63	3.27	3.45
12	W40X297	3.75	3.94	4.25	4.50	3.29	3.43	3.76	4.01	4.29	4.63	3.27	3.45
13	W40X277	3.75	3.94	4.25	4.50	3.29	3.43	3.75	4.01	4.29	4.63	3.27	3.45
14	W40X249	3.75	3.94	4.25	4.50	3.29	3.43	3.76	4.01	4.29	4.63	3.27	3.45
15	W40X215	3.75	3.94	4.25	4.50	3.29	3.43	3.76	4.01	4.29	4.63	3.27	3.45
16	W40X199	3.75	3.94	4.26	4.50	3.30	3.43	3.76	4.01	4.29	4.64	3.28	3.45
17	W40X392	3.76	3.94	4.26	4.50	3.30	3.44	3.76	4.02	4.29	4.64	3.28	3.45
18	W40X331	3.76	3.95	4.26	4.51	3.30	3.44	3.76	4.02	4.29	4.64	3.28	3.45
19	W40X327	3.76	3.94	4.26	4.50	3.30	3.44	3.76	4.02	4.29	4.64	3.28	3.45
20	W40X294	3.76	3.94	4.26	4.50	3.30	3.44	3.76	4.02	4.29	4.64	3.28	3.45
21	W40X278	3.76	3.95	4.26	4.51	3.30	3.44	3.76	4.02	4.30	4.64	3.28	3.46
22	W40X264	3.76	3.95	4.26	4.51	3.30	3.44	3.76	4.02	4.30	4.64	3.28	3.46
23	W40X235	3.76	3.94	4.26	4.50	3.30	3.44	3.76	4.02	4.29	4.64	3.28	3.45
24	W40X211	3.76	3.94	4.26	4.50	3.30	3.44	3.76	4.02	4.29	4.64	3.28	3.45
25	W40X183	3.76	3.94	4.26	4.50	3.30	3.44	3.76	4.02	4.29	4.64	3.28	3.45
26	W40X167	3.76	3.95	4.26	4.51	3.30	3.44	3.77	4.02	4.30	4.64	3.28	3.46
27	W40X149	3.77	3.95	4.27	4.51	3.31	3.45	3.77	4.03	4.30	4.65	3.29	3.46
28	W36X652	3.74	3.93	4.25	4.49	3.29	3.42	3.75	4.01	4.28	4.63	3.27	3.44
29	W36X529	3.75	3.93	4.25	4.50	3.29	3.43	3.75	4.01	4.29	4.63	3.27	3.44
30	W36X487	3.75	3.93	4.25	4.50	3.29	3.43	3.75	4.01	4.29	4.63	3.27	3.44

31	W36X441	3.75	3.93	4.25	4.50	3.29	3.43	3.75	4.01	4.28	4.63	3.27	3.44
32	W36X395	3.75	3.94	4.25	4.50	3.29	3.43	3.75	4.01	4.29	4.63	3.27	3.44
33	W36X361	3.75	3.94	4.25	4.50	3.29	3.43	3.75	4.01	4.29	4.63	3.27	3.44
34	W36X330	3.75	3.94	4.25	4.50	3.29	3.43	3.75	4.01	4.29	4.63	3.27	3.44
35	W36X302	3.75	3.94	4.25	4.50	3.29	3.43	3.75	4.01	4.29	4.63	3.27	3.44
36	W36X282	3.75	3.94	4.25	4.50	3.29	3.43	3.75	4.01	4.29	4.63	3.27	3.44
37	W36X262	3.75	3.94	4.25	4.50	3.29	3.43	3.75	4.01	4.29	4.63	3.27	3.44
38	W36X247	3.75	3.94	4.25	4.50	3.29	3.43	3.76	4.01	4.29	4.63	3.27	3.45
39	W36X231	3.75	3.94	4.25	4.50	3.29	3.43	3.75	4.01	4.29	4.63	3.27	3.45
40	W36X256	3.75	3.94	4.26	4.50	3.30	3.44	3.76	4.02	4.29	4.64	3.28	3.45
41	W36X232	3.75	3.94	4.26	4.50	3.30	3.44	3.76	4.02	4.29	4.64	3.28	3.45
42	W36X210	3.76	3.95	4.26	4.50	3.30	3.44	3.76	4.02	4.30	4.64	3.28	3.46
43	W36X194	3.76	3.94	4.26	4.50	3.30	3.44	3.76	4.02	4.29	4.64	3.28	3.45
44	W36X182	3.76	3.95	4.26	4.51	3.30	3.44	3.76	4.02	4.30	4.64	3.28	3.46
45	W36X170	3.76	3.95	4.26	4.51	3.30	3.44	3.77	4.02	4.30	4.64	3.28	3.46
46	W36X160	3.76	3.95	4.26	4.51	3.30	3.44	3.76	4.02	4.30	4.64	3.28	3.46
47	W36X150	3.76	3.95	4.26	4.51	3.31	3.44	3.77	4.02	4.30	4.64	3.29	3.46
48	W36X135	3.76	3.95	4.27	4.51	3.31	3.45	3.77	4.02	4.30	4.65	3.29	3.46
49	W33X387	3.75	3.94	4.25	4.50	3.29	3.43	3.75	4.01	4.29	4.63	3.27	3.44
50	W33X354	3.75	3.93	4.25	4.50	3.29	3.43	3.75	4.01	4.28	4.63	3.27	3.44
51	W33X318	3.75	3.94	4.25	4.50	3.29	3.43	3.75	4.01	4.29	4.63	3.27	3.44
52	W33X291	3.75	3.93	4.25	4.50	3.29	3.43	3.75	4.01	4.29	4.63	3.27	3.44
53	W33X263	3.75	3.94	4.25	4.50	3.29	3.43	3.75	4.01	4.29	4.63	3.27	3.44
54	W33X241	3.75	3.94	4.25	4.50	3.29	3.43	3.75	4.01	4.29	4.63	3.27	3.44
55	W33X221	3.75	3.94	4.25	4.50	3.29	3.43	3.75	4.01	4.29	4.63	3.27	3.45
56	W33X201	3.75	3.94	4.25	4.50	3.29	3.43	3.76	4.01	4.29	4.63	3.27	3.45
57	W33X169	3.76	3.94	4.26	4.50	3.30	3.44	3.76	4.02	4.29	4.64	3.28	3.45
58	W33X152	3.76	3.94	4.26	4.50	3.30	3.44	3.76	4.02	4.29	4.64	3.28	3.45
59	W33X141	3.76	3.94	4.26	4.50	3.30	3.44	3.76	4.02	4.29	4.64	3.28	3.45
60	W33X130	3.76	3.95	4.26	4.51	3.30	3.44	3.77	4.02	4.30	4.64	3.28	3.46
61	W33X118	3.76	3.95	4.27	4.51	3.31	3.44	3.77	4.02	4.30	4.64	3.29	3.46
62	W30X391	3.74	3.93	4.25	4.49	3.29	3.42	3.75	4.01	4.28	4.63	3.27	3.44
63	W30X357	3.74	3.93	4.25	4.49	3.29	3.42	3.75	4.01	4.28	4.63	3.27	3.44
64	W30X326	3.74	3.93	4.25	4.49	3.29	3.42	3.75	4.01	4.28	4.63	3.27	3.44
65	W30X292	3.74	3.93	4.25	4.49	3.29	3.43	3.75	4.01	4.28	4.63	3.27	3.44
66	W30X261	3.75	3.93	4.25	4.50	3.29	3.43	3.75	4.01	4.28	4.63	3.27	3.44
67	W30X235	3.74	3.93	4.25	4.49	3.29	3.42	3.75	4.00	4.28	4.63	3.27	3.44
68	W30X211	3.75	3.94	4.25	4.50	3.29	3.43	3.75	4.01	4.29	4.63	3.27	3.44
69	W30X191	3.75	3.94	4.25	4.50	3.29	3.43	3.75	4.01	4.29	4.63	3.27	3.44
70	W30X173	3.75	3.94	4.25	4.50	3.29	3.43	3.75	4.01	4.29	4.63	3.27	3.45
71	W30X148	3.75	3.94	4.26	4.50	3.30	3.43	3.76	4.01	4.29	4.64	3.28	3.45
72	W30X132	3.76	3.95	4.26	4.51	3.30	3.44	3.76	4.02	4.30	4.64	3.28	3.45
73	W30X124	3.76	3.95	4.26	4.51	3.30	3.44	3.76	4.02	4.30	4.64	3.28	3.46
74	W30X116	3.76	3.95	4.26	4.51	3.30	3.44	3.77	4.02	4.30	4.64	3.28	3.46
75	W30X108	3.76	3.95	4.26	4.51	3.31	3.44	3.77	4.02	4.30	4.64	3.29	3.46
76	W30X99	3.77	3.95	4.27	4.51	3.31	3.45	3.77	4.03	4.30	4.65	3.29	3.46
77	W30X90	3.76	3.95	4.27	4.51	3.31	3.45	3.77	4.02	4.30	4.65	3.29	3.46
78	W27X539	3.74	3.93	4.25	4.49	3.28	3.42	3.75	4.00	4.28	4.63	3.26	3.44

79	W27X368	3.74	3.93	4.25	4.49	3.28	3.42	3.75	4.00	4.28	4.63	3.26	3.44
80	W27X336	3.74	3.93	4.25	4.49	3.29	3.42	3.75	4.01	4.28	4.63	3.26	3.44
81	W27X307	3.74	3.93	4.25	4.49	3.28	3.42	3.75	4.00	4.28	4.63	3.26	3.44
82	W27X281	3.74	3.93	4.25	4.49	3.29	3.42	3.75	4.01	4.28	4.63	3.27	3.44
83	W27X258	3.74	3.93	4.25	4.49	3.29	3.42	3.75	4.00	4.28	4.63	3.26	3.44
84	W27X235	3.74	3.93	4.25	4.49	3.29	3.42	3.75	4.01	4.28	4.63	3.27	3.44
85	W27X217	3.74	3.93	4.25	4.49	3.29	3.42	3.75	4.01	4.28	4.63	3.27	3.44
86	W27X194	3.74	3.93	4.25	4.49	3.29	3.42	3.75	4.01	4.28	4.63	3.27	3.44
87	W27X178	3.75	3.93	4.25	4.50	3.29	3.43	3.75	4.01	4.29	4.63	3.27	3.44
88	W27X161	3.75	3.94	4.25	4.50	3.29	3.43	3.75	4.01	4.29	4.63	3.27	3.44
89	W27X146	3.75	3.94	4.25	4.50	3.29	3.43	3.75	4.01	4.29	4.63	3.27	3.45
90	W27X129	3.75	3.94	4.26	4.50	3.30	3.43	3.76	4.01	4.29	4.64	3.28	3.45
91	W27X114	3.75	3.94	4.26	4.50	3.30	3.44	3.76	4.02	4.29	4.64	3.28	3.45
92	W27X102	3.76	3.94	4.26	4.50	3.30	3.44	3.76	4.02	4.29	4.64	3.28	3.45
93	W27X94	3.76	3.94	4.26	4.50	3.30	3.44	3.76	4.02	4.29	4.64	3.28	3.45
94	W27X84	3.76	3.95	4.26	4.51	3.30	3.44	3.77	4.02	4.30	4.64	3.28	3.46
95	W24X370	3.74	3.93	4.25	4.49	3.28	3.42	3.75	4.00	4.28	4.63	3.26	3.44
96	W24X335	3.74	3.93	4.25	4.49	3.28	3.42	3.75	4.00	4.28	4.63	3.26	3.44
97	W24X306	3.74	3.93	4.25	4.49	3.28	3.42	3.75	4.00	4.28	4.63	3.26	3.44
98	W24X279	3.74	3.93	4.25	4.49	3.28	3.42	3.75	4.00	4.28	4.63	3.26	3.44
99	W24X250	3.74	3.93	4.25	4.49	3.28	3.42	3.75	4.00	4.28	4.63	3.26	3.44
100	W24X229	3.74	3.93	4.25	4.49	3.28	3.42	3.75	4.00	4.28	4.63	3.26	3.44
101	W24X207	3.74	3.93	4.25	4.49	3.29	3.42	3.75	4.01	4.28	4.63	3.27	3.44
102	W24X192	3.74	3.93	4.25	4.50	3.29	3.42	3.75	4.01	4.28	4.63	3.27	3.44
103	W24X176	3.74	3.93	4.25	4.49	3.29	3.42	3.75	4.01	4.28	4.63	3.27	3.44
104	W24X162	3.74	3.93	4.25	4.49	3.29	3.43	3.75	4.01	4.28	4.63	3.27	3.44
105	W24X146	3.74	3.93	4.25	4.49	3.29	3.43	3.75	4.01	4.28	4.63	3.27	3.44
106	W24X131	3.75	3.93	4.25	4.50	3.29	3.43	3.75	4.01	4.29	4.63	3.27	3.44
107	W24X117	3.75	3.94	4.25	4.50	3.29	3.43	3.75	4.01	4.29	4.63	3.27	3.45
108	W24X104	3.75	3.94	4.25	4.50	3.29	3.43	3.75	4.01	4.29	4.63	3.27	3.45
109	W24X103	3.75	3.94	4.26	4.50	3.30	3.43	3.76	4.01	4.29	4.64	3.28	3.45
110	W24X94	3.76	3.94	4.26	4.50	3.30	3.44	3.76	4.02	4.29	4.64	3.28	3.45
111	W24X84	3.75	3.94	4.26	4.50	3.30	3.44	3.76	4.02	4.29	4.64	3.28	3.45
112	W24X76	3.76	3.95	4.26	4.51	3.30	3.44	3.76	4.02	4.30	4.64	3.28	3.45
113	W24X68	3.76	3.95	4.26	4.50	3.30	3.44	3.76	4.02	4.30	4.64	3.28	3.46
114	W24X62	3.77	3.96	4.27	4.51	3.31	3.45	3.78	4.03	4.31	4.65	3.29	3.46
115	W24X55	3.77	3.96	4.27	4.52	3.31	3.45	3.78	4.03	4.30	4.65	3.29	3.47
116	W21X201	3.74	3.93	4.25	4.49	3.28	3.42	3.75	4.00	4.28	4.63	3.26	3.44
117	W21X182	3.74	3.93	4.25	4.49	3.28	3.42	3.75	4.00	4.28	4.63	3.26	3.44
118	W21X166	3.74	3.93	4.25	4.49	3.28	3.42	3.75	4.00	4.28	4.63	3.26	3.44
119	W21X147	3.75	3.94	4.25	4.50	3.29	3.43	3.75	4.01	4.29	4.63	3.27	3.44
120	W21X132	3.74	3.93	4.25	4.49	3.29	3.42	3.75	4.01	4.28	4.63	3.27	3.44
121	W21X122	3.74	3.93	4.25	4.49	3.29	3.42	3.75	4.01	4.28	4.63	3.27	3.44
122	W21X111	3.75	3.94	4.25	4.50	3.29	3.43	3.75	4.01	4.29	4.63	3.27	3.44
123	W21X101	3.75	3.93	4.25	4.49	3.29	3.42	3.75	4.01	4.28	4.63	3.27	3.44
124	W21X93	3.75	3.94	4.26	4.50	3.30	3.44	3.76	4.02	4.29	4.64	3.28	3.45
125	W21X83	3.76	3.94	4.26	4.50	3.30	3.43	3.76	4.01	4.29	4.64	3.28	3.45
126	W21X73	3.76	3.94	4.26	4.50	3.30	3.43	3.76	4.02	4.29	4.64	3.28	3.45

127	W21X68	3.75	3.94	4.26	4.50	3.30	3.44	3.76	4.02	4.29	4.64	3.28	3.45
128	W21X62	3.75	3.94	4.26	4.50	3.30	3.44	3.76	4.02	4.29	4.64	3.28	3.45
129	W21X55	3.76	3.95	4.26	4.50	3.30	3.44	3.76	4.02	4.30	4.64	3.28	3.45
130	W21X48*	3.76	3.95	4.26	4.51	3.30	3.44	3.76	4.02	4.30	4.64	3.28	3.45
131	W21X57	3.76	3.94	4.26	4.50	3.30	3.44	3.76	4.02	4.29	4.64	3.28	3.45
132	W21X50	3.77	3.95	4.27	4.51	3.31	3.44	3.77	4.02	4.30	4.64	3.29	3.46
133	W21X44	3.77	3.95	4.26	4.51	3.31	3.45	3.77	4.03	4.31	4.65	3.29	3.46
134	W18X311	3.74	3.93	4.24	4.49	3.28	3.42	3.74	4.00	4.28	4.63	3.26	3.43
135	W18X283	3.74	3.93	4.25	4.49	3.28	3.42	3.75	4.00	4.28	4.63	3.26	3.44
136	W18X258	3.74	3.93	4.24	4.49	3.28	3.42	3.74	4.00	4.28	4.63	3.26	3.43
137	W18X234	3.74	3.93	4.25	4.49	3.28	3.42	3.75	4.00	4.28	4.63	3.26	3.44
138	W18X211	3.74	3.93	4.24	4.49	3.28	3.42	3.74	4.00	4.28	4.63	3.26	3.43
139	W18X192	3.74	3.93	4.24	4.49	3.28	3.42	3.74	4.00	4.28	4.63	3.26	3.44
140	W18X175	3.74	3.93	4.25	4.49	3.28	3.42	3.75	4.00	4.28	4.63	3.26	3.44
141	W18X158	3.74	3.93	4.25	4.49	3.28	3.42	3.75	4.00	4.28	4.63	3.26	3.44
142	W18X143	3.74	3.93	4.24	4.49	3.28	3.42	3.74	4.00	4.28	4.63	3.26	3.44
143	W18X130	3.74	3.93	4.25	4.49	3.28	3.42	3.75	4.00	4.28	4.63	3.26	3.44
144	W18X119	3.74	3.93	4.25	4.49	3.28	3.42	3.75	4.00	4.28	4.63	3.27	3.44
145	W18X106	3.74	3.93	4.25	4.49	3.28	3.42	3.75	4.01	4.28	4.63	3.26	3.44
146	W18X97	3.74	3.93	4.25	4.49	3.28	3.42	3.75	4.00	4.28	4.63	3.26	3.44
147	W18X86	3.74	3.93	4.25	4.49	3.29	3.42	3.75	4.01	4.28	4.63	3.27	3.44
148	W18X76	3.75	3.93	4.25	4.49	3.29	3.42	3.75	4.01	4.28	4.63	3.27	3.44
149	W18X71	3.75	3.94	4.26	4.50	3.29	3.43	3.76	4.01	4.29	4.64	3.27	3.45
150	W18X65	3.75	3.94	4.26	4.50	3.29	3.43	3.76	4.01	4.29	4.64	3.28	3.45
151	W18X60	3.75	3.94	4.26	4.50	3.29	3.43	3.76	4.01	4.29	4.64	3.27	3.45
152	W18X55	3.75	3.94	4.26	4.50	3.30	3.44	3.76	4.01	4.29	4.64	3.28	3.45
153	W18X50	3.75	3.94	4.26	4.50	3.30	3.43	3.76	4.01	4.29	4.64	3.27	3.45
154	W18X46	3.76	3.94	4.26	4.51	3.30	3.44	3.77	4.02	4.29	4.64	3.28	3.45
155	W18X40	3.76	3.94	4.26	4.51	3.30	3.44	3.77	4.02	4.29	4.64	3.28	3.46
156	W18X35	3.76	3.95	4.27	4.50	3.31	3.44	3.77	4.02	4.29	4.65	3.28	3.46
157	W16X100	3.74	3.93	4.24	4.49	3.28	3.42	3.75	4.00	4.28	4.63	3.26	3.44
158	W16X89	3.74	3.93	4.25	4.49	3.28	3.42	3.75	4.00	4.28	4.63	3.26	3.44
159	W16X77	3.74	3.93	4.25	4.49	3.28	3.42	3.74	4.00	4.28	4.63	3.26	3.44
160	W16X67	3.74	3.93	4.24	4.49	3.28	3.42	3.75	4.00	4.28	4.63	3.26	3.43
161	W16X57	3.75	3.94	4.26	4.50	3.29	3.43	3.76	4.01	4.29	4.63	3.27	3.45
162	W16X50	3.75	3.94	4.25	4.50	3.29	3.43	3.75	4.01	4.29	4.63	3.27	3.44
163	W16X45	3.75	3.94	4.25	4.50	3.29	3.43	3.76	4.01	4.29	4.64	3.28	3.44
164	W16X40	3.75	3.94	4.25	4.50	3.29	3.43	3.76	4.01	4.29	4.64	3.27	3.45
165	W16X36	3.75	3.94	4.26	4.50	3.30	3.43	3.76	4.01	4.29	4.63	3.28	3.45
166	W16X31	3.76	3.95	4.26	4.51	3.30	3.44	3.76	4.02	4.30	4.64	3.28	3.46
167	W16X26	3.77	3.94	4.25	4.51	3.30	3.45	3.77	4.03	4.30	4.64	3.28	3.46
168	W14X730	3.73	3.92	4.23	4.48	3.27	3.41	3.73	3.99	4.27	4.62	3.25	3.42
169	W14X665	3.73	3.92	4.23	4.48	3.27	3.41	3.73	3.99	4.27	4.62	3.25	3.42
170	W14X605	3.73	3.92	4.24	4.48	3.27	3.41	3.73	3.99	4.27	4.62	3.25	3.42
171	W14X550	3.73	3.92	4.24	4.48	3.27	3.41	3.73	3.99	4.27	4.62	3.25	3.42
172	W14X500	3.73	3.92	4.24	4.48	3.27	3.41	3.74	3.99	4.27	4.62	3.25	3.43
173	W14X455	3.73	3.92	4.24	4.48	3.27	3.41	3.74	3.99	4.27	4.62	3.25	3.42
174	W14X426	3.73	3.92	4.24	4.48	3.27	3.41	3.74	3.99	4.27	4.62	3.25	3.42

175	W14X398	3.73	3.92	4.24	4.48	3.27	3.41	3.74	3.99	4.27	4.62	3.25	3.43
176	W14X370	3.73	3.92	4.24	4.48	3.27	3.41	3.74	3.99	4.27	4.62	3.25	3.43
177	W14X342	3.73	3.92	4.24	4.48	3.27	3.41	3.74	3.99	4.27	4.62	3.25	3.42
178	W14X311	3.73	3.92	4.24	4.48	3.27	3.41	3.74	3.99	4.27	4.62	3.25	3.43
179	W14X283	3.73	3.92	4.24	4.48	3.27	3.41	3.74	3.99	4.27	4.62	3.25	3.43
180	W14X257	3.73	3.92	4.24	4.48	3.27	3.41	3.74	3.99	4.27	4.62	3.25	3.43
181	W14X233	3.73	3.92	4.24	4.48	3.27	3.41	3.74	3.99	4.27	4.62	3.25	3.43
182	W14X211	3.73	3.92	4.24	4.48	3.27	3.41	3.74	4.00	4.27	4.62	3.25	3.43
183	W14X193	3.73	3.92	4.24	4.48	3.27	3.41	3.74	3.99	4.27	4.62	3.25	3.43
184	W14X176	3.73	3.92	4.24	4.48	3.27	3.41	3.74	3.99	4.27	4.62	3.25	3.43
185	W14X159	3.73	3.92	4.24	4.48	3.27	3.41	3.74	3.99	4.27	4.62	3.25	3.43
186	W14X145	3.73	3.92	4.24	4.48	3.27	3.41	3.74	4.00	4.27	4.62	3.25	3.43
187	W14X132	3.74	3.92	4.24	4.49	3.27	3.41	3.74	4.00	4.27	4.62	3.26	3.43
188	W14X120	3.73	3.92	4.24	4.49	3.27	3.41	3.74	3.99	4.27	4.62	3.25	3.43
189	W14X109	3.73	3.92	4.24	4.48	3.27	3.41	3.74	4.00	4.27	4.62	3.25	3.43
190	W14X99	3.73	3.92	4.24	4.48	3.27	3.41	3.74	3.99	4.27	4.62	3.25	3.43
191	W14X90	3.72	3.91	4.23	4.48	3.26	3.40	3.73	3.98	4.26	4.61	3.24	3.41
192	W14X82	3.74	3.93	4.25	4.49	3.28	3.42	3.75	4.00	4.28	4.63	3.26	3.44
193	W14X74	3.74	3.93	4.24	4.49	3.28	3.42	3.74	4.00	4.28	4.62	3.26	3.43
194	W14X68	3.74	3.93	4.24	4.49	3.28	3.42	3.74	4.00	4.28	4.63	3.26	3.44
195	W14X61	3.74	3.92	4.24	4.49	3.28	3.42	3.74	4.00	4.28	4.62	3.26	3.43
196	W14X53	3.74	3.93	4.25	4.49	3.28	3.42	3.75	4.01	4.28	4.63	3.26	3.43
197	W14X48	3.74	3.93	4.25	4.49	3.28	3.42	3.74	4.00	4.28	4.63	3.26	3.44
198	W14X43	3.74	3.93	4.25	4.49	3.28	3.43	3.75	4.00	4.28	4.63	3.27	3.44
199	W14X38	3.74	3.93	4.25	4.50	3.29	3.43	3.75	4.01	4.28	4.63	3.27	3.44
200	W14X34	3.76	3.94	4.25	4.51	3.29	3.43	3.75	4.01	4.29	4.64	3.27	3.44
201	W14X30	3.75	3.93	4.25	4.50	3.29	3.43	3.75	4.02	4.29	4.62	3.28	3.45
202	W14X26	3.76	3.94	4.25	4.50	3.30	3.43	3.76	4.02	4.29	4.64	3.28	3.46
203	W14X22	3.76	3.96	4.26	4.52	3.30	3.44	3.76	4.02	4.31	4.64	3.28	3.46
204	W12X336	3.73	3.92	4.24	4.48	3.27	3.41	3.74	3.99	4.27	4.62	3.25	3.43
205	W12X305	3.73	3.92	4.24	4.48	3.27	3.41	3.74	3.99	4.27	4.62	3.25	3.42
206	W12X279	3.73	3.92	4.24	4.48	3.27	3.41	3.74	3.99	4.27	4.62	3.25	3.43
207	W12X252	3.73	3.92	4.24	4.48	3.27	3.41	3.74	3.99	4.27	4.62	3.25	3.43
208	W12X230	3.73	3.92	4.24	4.48	3.27	3.41	3.74	4.00	4.27	4.62	3.25	3.43
209	W12X210	3.73	3.92	4.24	4.48	3.27	3.41	3.74	3.99	4.27	4.62	3.25	3.43
210	W12X190	3.73	3.92	4.24	4.48	3.27	3.41	3.74	3.99	4.27	4.62	3.25	3.43
211	W12X170	3.73	3.92	4.24	4.48	3.27	3.41	3.74	4.00	4.27	4.62	3.25	3.43
212	W12X152	3.73	3.92	4.24	4.49	3.27	3.41	3.74	4.00	4.27	4.62	3.25	3.43
213	W12X136	3.73	3.92	4.24	4.48	3.27	3.41	3.74	4.00	4.28	4.62	3.25	3.43
214	W12X120	3.73	3.92	4.24	4.48	3.27	3.41	3.74	4.00	4.27	4.62	3.25	3.43
215	W12X106	3.73	3.92	4.24	4.48	3.27	3.41	3.74	3.99	4.27	4.62	3.25	3.43
216	W12X96	3.73	3.92	4.24	4.49	3.27	3.41	3.74	4.00	4.27	4.62	3.25	3.43
217	W12X87	3.73	3.92	4.24	4.48	3.27	3.41	3.74	3.99	4.27	4.62	3.25	3.43
218	W12X79	3.73	3.92	4.24	4.49	3.27	3.41	3.74	4.00	4.27	4.62	3.26	3.43
219	W12X72	3.74	3.92	4.24	4.49	3.27	3.41	3.74	4.00	4.28	4.62	3.25	3.43
220	W12X65	3.72	3.91	4.23	4.48	3.27	3.40	3.73	3.99	4.27	4.61	3.24	3.42
221	W12X58	3.73	3.93	4.24	4.49	3.28	3.41	3.74	4.00	4.28	4.63	3.25	3.43
222	W12X53	3.74	3.93	4.24	4.49	3.28	3.42	3.74	4.00	4.27	4.62	3.26	3.43

223	W12X50	3.74	3.92	4.25	4.49	3.28	3.42	3.74	4.00	4.28	4.63	3.26	3.44
224	W12X45	3.74	3.93	4.25	4.48	3.28	3.42	3.74	4.00	4.27	4.63	3.26	3.43
225	W12X40	3.74	3.94	4.25	4.49	3.28	3.42	3.75	4.00	4.28	4.63	3.26	3.44
226	W12X35	3.74	3.93	4.25	4.50	3.29	3.43	3.75	4.01	4.28	4.64	3.27	3.44
227	W12X30	3.74	3.94	4.25	4.50	3.29	3.43	3.75	4.00	4.28	4.64	3.27	3.44
228	W12X26	3.73	3.94	4.26	4.49	3.28	3.43	3.75	4.01	4.28	4.64	3.28	3.43
229	W12X22	3.76	3.95	4.26	4.51	3.29	3.45	3.76	4.03	4.30	4.65	3.29	3.46
230	W12X19	3.75	3.96	4.27	4.51	3.31	3.44	3.76	4.03	4.31	4.64	3.28	3.46
231	W12X16	3.76	3.93	4.25	4.51	3.31	3.44	3.77	4.01	4.31	4.63	3.29	3.46
232	W12X14	3.76	3.95	4.28	4.51	3.32	3.44	3.77	4.02	4.30	4.65	3.29	3.47
233	W10X112	3.73	3.92	4.24	4.48	3.27	3.41	3.74	4.00	4.27	4.62	3.25	3.43
234	W10X100	3.73	3.92	4.23	4.48	3.27	3.41	3.74	3.99	4.27	4.62	3.25	3.42
235	W10X88	3.73	3.92	4.24	4.48	3.27	3.41	3.73	3.99	4.27	4.62	3.25	3.43
236	W10X77	3.73	3.92	4.24	4.49	3.27	3.41	3.74	3.99	4.27	4.62	3.25	3.43
237	W10X68	3.73	3.92	4.24	4.48	3.27	3.41	3.74	4.00	4.27	4.62	3.25	3.43
238	W10X60	3.74	3.92	4.24	4.48	3.27	3.41	3.74	4.00	4.28	4.62	3.25	3.42
239	W10X54	3.73	3.92	4.24	4.48	3.27	3.41	3.74	4.00	4.27	4.62	3.26	3.43
240	W10X49	3.73	3.92	4.24	4.48	3.27	3.41	3.74	4.00	4.27	4.62	3.25	3.43
241	W10X45	3.74	3.92	4.25	4.49	3.27	3.41	3.74	4.00	4.27	4.63	3.25	3.43
242	W10X39	3.74	3.93	4.24	4.48	3.28	3.42	3.75	4.00	4.28	4.62	3.26	3.44
243	W10X33	3.75	3.92	4.25	4.48	3.28	3.42	3.74	4.00	4.29	4.63	3.26	3.44
244	W10X30	3.74	3.93	4.24	4.50	3.29	3.43	3.75	4.01	4.28	4.63	3.27	3.44
245	W10X26	3.75	3.93	4.25	4.49	3.28	3.42	3.76	4.01	4.28	4.64	3.27	3.44
246	W10X22	3.75	3.94	4.25	4.50	3.29	3.42	3.76	4.01	4.29	4.63	3.28	3.44
247	W10X19	3.75	3.94	4.27	4.49	3.29	3.45	3.76	4.00	4.27	4.61	3.27	3.45
248	W10X17	3.75	3.95	4.25	4.52	3.29	3.44	3.75	4.02	4.28	4.64	3.27	3.47
249	W10X15	3.76	3.95	4.26	4.50	3.30	3.45	3.78	4.00	4.32	4.65	3.29	3.46
250	W10X12	3.78	3.97	4.25	4.53	3.31	3.42	3.73	4.04	4.30	4.64	3.29	3.46
	MIN	**3.72**	**3.91**	**4.23**	**4.48**	**3.26**	**3.40**	**3.73**	**3.98**	**4.26**	**4.61**	**3.24**	**3.41**
	MAX	**3.78**	**3.97**	**4.28**	**4.53**	**3.32**	**3.45**	**3.78**	**4.04**	**4.32**	**4.65**	**3.29**	**3.47**
	AVE	**3.75**	**3.93**	**4.25**	**4.50**	**3.29**	**3.43**	**3.75**	**4.01**	**4.29**	**4.63**	**3.27**	**3.44**

Table C- 2. Reliability Indices for Noncomposite Rolled I-shaped Girdes for ADTT 250 and L=90, 120, 200ft.

		L=90 ft						**L=120 ft**						**L=200 ft**					
	Φ	**1.00**		**0.95**		**1.05**		**1.00**		**0.95**		**1.05**		**1.00**		**0.95**		**1.05**	
#	**Shape \ D/(D+L)**	**0.45**	**0.60**	**0.45**	**0.60**	**0.45**	**0.60**	**0.50**	**0.65**	**0.50**	**0.65**	**0.50**	**0.65**	**0.60**	**0.75**	**0.60**	**0.75**	**0.60**	**0.75**
1	W44X335	3.84	4.01	4.41	4.66	3.32	3.43	4.01	4.13	4.62	4.80	3.47	3.52	4.37	4.21	5.04	4.93	3.76	3.57
2	W44X290	3.84	4.01	4.41	4.65	3.32	3.43	4.01	4.13	4.61	4.80	3.47	3.52	4.37	4.21	5.04	4.93	3.76	3.56
3	W44X262	3.84	4.01	4.41	4.65	3.32	3.43	4.01	4.13	4.61	4.80	3.47	3.52	4.37	4.21	5.04	4.93	3.76	3.56
4	W44X230	3.84	4.01	4.41	4.65	3.32	3.43	4.01	4.13	4.61	4.80	3.47	3.52	4.37	4.21	5.04	4.93	3.76	3.56
5	W40X593	3.83	4.00	4.40	4.65	3.31	3.42	4.01	4.12	4.61	4.80	3.46	3.51	4.36	4.21	5.03	4.92	3.76	3.56
6	W40X503	3.83	4.01	4.40	4.65	3.31	3.42	4.01	4.12	4.61	4.80	3.46	3.51	4.36	4.21	5.03	4.93	3.76	3.56
7	W40X431	3.83	4.01	4.40	4.65	3.31	3.42	4.01	4.12	4.61	4.80	3.46	3.51	4.36	4.21	5.03	4.93	3.76	3.56
8	W40X397	3.83	4.01	4.40	4.65	3.31	3.42	4.01	4.13	4.61	4.80	3.46	3.51	4.37	4.21	5.03	4.93	3.76	3.56
9	W40X372	3.83	4.01	4.40	4.65	3.31	3.42	4.01	4.12	4.61	4.80	3.46	3.51	4.36	4.21	5.03	4.93	3.76	3.56

10	W40X362	3.83	4.01	4.40	4.65	3.31	3.42	4.01	4.12	4.61	4.80	3.46	3.51	4.36	4.21	5.03	4.93	3.76	3.56
11	W40X324	3.83	4.01	4.40	4.65	3.31	3.42	4.01	4.13	4.61	4.80	3.46	3.51	4.37	4.21	5.03	4.93	3.76	3.56
12	W40X297	3.83	4.01	4.40	4.65	3.31	3.42	4.01	4.13	4.61	4.80	3.46	3.51	4.37	4.21	5.03	4.93	3.76	3.56
13	W40X277	3.83	4.01	4.40	4.65	3.31	3.42	4.01	4.12	4.61	4.80	3.46	3.51	4.36	4.21	5.03	4.93	3.76	3.56
14	W40X249	3.83	4.01	4.40	4.65	3.31	3.42	4.01	4.12	4.61	4.80	3.46	3.51	4.36	4.21	5.03	4.93	3.76	3.56
15	W40X215	3.83	4.01	4.40	4.65	3.31	3.42	4.01	4.13	4.61	4.80	3.46	3.51	4.37	4.21	5.03	4.93	3.76	3.56
16	W40X199	3.84	4.01	4.41	4.65	3.32	3.43	4.01	4.13	4.61	4.80	3.47	3.52	4.37	4.21	5.04	4.93	3.76	3.56
17	W40X392	3.84	4.01	4.41	4.66	3.32	3.43	4.01	4.13	4.62	4.80	3.47	3.52	4.37	4.21	5.04	4.93	3.77	3.57
18	W40X331	3.84	4.01	4.41	4.66	3.32	3.43	4.02	4.13	4.62	4.81	3.47	3.52	4.37	4.22	5.04	4.93	3.77	3.57
19	W40X327	3.84	4.01	4.41	4.66	3.32	3.43	4.01	4.13	4.62	4.80	3.47	3.52	4.37	4.21	5.04	4.93	3.77	3.57
20	W40X294	3.84	4.01	4.41	4.66	3.32	3.43	4.01	4.13	4.62	4.80	3.47	3.52	4.37	4.21	5.04	4.93	3.77	3.57
21	W40X278	3.84	4.01	4.41	4.66	3.32	3.43	4.02	4.13	4.62	4.81	3.47	3.52	4.37	4.22	5.04	4.93	3.77	3.57
22	W40X264	3.84	4.01	4.41	4.66	3.32	3.43	4.02	4.13	4.62	4.81	3.47	3.52	4.37	4.22	5.04	4.93	3.77	3.57
23	W40X235	3.84	4.01	4.41	4.66	3.32	3.43	4.01	4.13	4.61	4.80	3.47	3.52	4.37	4.21	5.04	4.93	3.76	3.56
24	W40X211	3.84	4.01	4.41	4.66	3.32	3.43	4.01	4.13	4.62	4.80	3.47	3.52	4.37	4.21	5.04	4.93	3.77	3.57
25	W40X183	3.84	4.01	4.41	4.66	3.32	3.43	4.01	4.13	4.62	4.80	3.47	3.52	4.37	4.21	5.04	4.93	3.77	3.57
26	W40X167	3.84	4.02	4.41	4.66	3.33	3.44	4.02	4.13	4.62	4.81	3.47	3.53	4.37	4.22	5.04	4.93	3.77	3.57
27	W40X149	3.85	4.02	4.42	4.66	3.33	3.44	4.02	4.14	4.62	4.81	3.48	3.53	4.38	4.22	5.04	4.94	3.77	3.58
28	W36X652	3.83	4.00	4.40	4.65	3.31	3.42	4.00	4.12	4.61	4.80	3.46	3.51	4.36	4.20	5.03	4.92	3.75	3.55
29	W36X529	3.83	4.00	4.40	4.65	3.31	3.42	4.00	4.12	4.61	4.80	3.46	3.51	4.36	4.21	5.03	4.93	3.76	3.56
30	W36X487	3.83	4.00	4.40	4.65	3.31	3.42	4.01	4.12	4.61	4.80	3.46	3.51	4.36	4.21	5.03	4.93	3.76	3.56
31	W36X441	3.83	4.00	4.40	4.65	3.31	3.42	4.00	4.12	4.61	4.80	3.46	3.51	4.36	4.20	5.03	4.92	3.75	3.55
32	W36X395	3.83	4.00	4.40	4.65	3.31	3.42	4.00	4.12	4.61	4.80	3.46	3.51	4.36	4.21	5.03	4.92	3.76	3.56
33	W36X361	3.83	4.00	4.40	4.65	3.31	3.42	4.01	4.12	4.61	4.80	3.46	3.51	4.36	4.21	5.03	4.93	3.76	3.56
34	W36X330	3.83	4.00	4.40	4.65	3.31	3.42	4.01	4.12	4.61	4.80	3.46	3.51	4.36	4.21	5.03	4.93	3.76	3.56
35	W36X302	3.83	4.00	4.40	4.65	3.31	3.42	4.01	4.12	4.61	4.80	3.46	3.51	4.36	4.21	5.03	4.93	3.76	3.56
36	W36X282	3.83	4.01	4.40	4.65	3.31	3.42	4.01	4.12	4.61	4.80	3.46	3.51	4.36	4.21	5.03	4.93	3.76	3.56
37	W36X262	3.83	4.00	4.40	4.65	3.31	3.42	4.01	4.12	4.61	4.80	3.46	3.51	4.36	4.21	5.03	4.92	3.76	3.56
38	W36X247	3.83	4.01	4.40	4.65	3.31	3.42	4.01	4.12	4.61	4.80	3.46	3.51	4.36	4.21	5.03	4.93	3.76	3.56
39	W36X231	3.83	4.01	4.40	4.65	3.31	3.42	4.01	4.12	4.61	4.80	3.46	3.51	4.36	4.21	5.03	4.93	3.76	3.56
40	W36X256	3.84	4.01	4.41	4.65	3.32	3.43	4.01	4.13	4.61	4.80	3.47	3.52	4.37	4.21	5.04	4.93	3.76	3.56
41	W36X232	3.84	4.01	4.41	4.65	3.32	3.43	4.01	4.13	4.61	4.80	3.47	3.52	4.37	4.21	5.04	4.93	3.76	3.56
42	W36X210	3.84	4.01	4.41	4.66	3.32	3.43	4.02	4.13	4.62	4.81	3.47	3.52	4.37	4.22	5.04	4.93	3.77	3.57
43	W36X194	3.84	4.01	4.41	4.66	3.32	3.43	4.01	4.13	4.62	4.80	3.47	3.52	4.37	4.21	5.04	4.93	3.77	3.57
44	W36X182	3.84	4.01	4.41	4.66	3.32	3.43	4.02	4.13	4.62	4.80	3.47	3.52	4.37	4.21	5.04	4.93	3.77	3.57
45	W36X170	3.84	4.02	4.41	4.66	3.33	3.43	4.02	4.13	4.62	4.81	3.47	3.52	4.37	4.22	5.04	4.94	3.77	3.57
46	W36X160	3.84	4.01	4.41	4.66	3.32	3.43	4.02	4.13	4.62	4.80	3.47	3.52	4.37	4.22	5.04	4.93	3.77	3.57
47	W36X150	3.84	4.02	4.41	4.66	3.33	3.44	4.02	4.14	4.62	4.81	3.48	3.53	4.37	4.22	5.04	4.94	3.77	3.57
48	W36X135	3.85	4.02	4.42	4.66	3.33	3.44	4.02	4.14	4.62	4.81	3.48	3.53	4.38	4.22	5.04	4.94	3.77	3.58
49	W33X387	3.83	4.00	4.40	4.65	3.31	3.42	4.01	4.12	4.61	4.80	3.46	3.51	4.36	4.21	5.03	4.93	3.76	3.56
50	W33X354	3.83	4.00	4.40	4.65	3.31	3.42	4.00	4.12	4.61	4.80	3.46	3.51	4.36	4.21	5.03	4.92	3.76	3.55
51	W33X318	3.83	4.00	4.40	4.65	3.31	3.42	4.01	4.12	4.61	4.80	3.46	3.51	4.36	4.21	5.03	4.93	3.76	3.56
52	W33X291	3.83	4.00	4.40	4.65	3.31	3.42	4.01	4.12	4.61	4.80	3.46	3.51	4.36	4.21	5.03	4.92	3.76	3.56
53	W33X263	3.83	4.00	4.40	4.65	3.31	3.42	4.01	4.12	4.61	4.80	3.46	3.51	4.36	4.21	5.03	4.93	3.76	3.56
54	W33X241	3.83	4.01	4.40	4.65	3.31	3.42	4.01	4.12	4.61	4.80	3.46	3.51	4.36	4.21	5.03	4.93	3.76	3.56
55	W33X221	3.83	4.01	4.40	4.65	3.31	3.42	4.01	4.12	4.61	4.80	3.46	3.51	4.36	4.21	5.03	4.93	3.76	3.56
56	W33X201	3.83	4.01	4.40	4.65	3.31	3.42	4.01	4.12	4.61	4.80	3.46	3.51	4.36	4.21	5.03	4.93	3.76	3.56
57	W33X169	3.84	4.01	4.41	4.66	3.32	3.43	4.01	4.13	4.61	4.80	3.47	3.52	4.37	4.21	5.04	4.93	3.76	3.56

58	W33X152	3.84	4.01	4.41	4.65	3.32	3.43	4.01	4.13	4.61	4.80	3.47	3.52	4.37	4.21	5.04	4.93	3.76	3.56
59	W33X141	3.84	4.01	4.41	4.65	3.32	3.43	4.01	4.13	4.61	4.80	3.47	3.52	4.37	4.21	5.04	4.93	3.77	3.57
60	W33X130	3.84	4.02	4.41	4.66	3.33	3.43	4.02	4.13	4.62	4.81	3.47	3.52	4.37	4.22	5.04	4.93	3.77	3.57
61	W33X118	3.85	4.02	4.41	4.66	3.33	3.44	4.02	4.14	4.62	4.81	3.48	3.53	4.37	4.22	5.04	4.94	3.77	3.57
62	W30X391	3.83	4.00	4.40	4.65	3.31	3.42	4.00	4.12	4.61	4.80	3.46	3.51	4.36	4.20	5.03	4.92	3.75	3.55
63	W30X357	3.83	4.00	4.40	4.65	3.31	3.42	4.00	4.12	4.61	4.80	3.46	3.51	4.36	4.20	5.03	4.92	3.75	3.55
64	W30X326	3.83	4.00	4.40	4.65	3.31	3.42	4.00	4.12	4.61	4.80	3.46	3.51	4.36	4.20	5.03	4.92	3.75	3.55
65	W30X292	3.83	4.00	4.40	4.65	3.31	3.42	4.00	4.12	4.61	4.80	3.46	3.51	4.36	4.20	5.03	4.92	3.75	3.55
66	W30X261	3.83	4.00	4.40	4.65	3.31	3.42	4.00	4.12	4.61	4.80	3.46	3.51	4.36	4.20	5.03	4.92	3.75	3.55
67	W30X235	3.83	4.00	4.40	4.65	3.31	3.42	4.00	4.12	4.61	4.79	3.46	3.51	4.36	4.20	5.03	4.92	3.75	3.55
68	W30X211	3.83	4.00	4.40	4.65	3.31	3.42	4.01	4.12	4.61	4.80	3.46	3.51	4.36	4.21	5.03	4.93	3.76	3.56
69	W30X191	3.83	4.00	4.40	4.65	3.31	3.42	4.01	4.12	4.61	4.80	3.46	3.51	4.36	4.21	5.03	4.92	3.76	3.56
70	W30X173	3.83	4.01	4.40	4.65	3.31	3.42	4.01	4.12	4.61	4.80	3.46	3.51	4.36	4.21	5.03	4.93	3.76	3.56
71	W30X148	3.84	4.01	4.41	4.65	3.32	3.43	4.01	4.13	4.61	4.80	3.47	3.52	4.37	4.21	5.04	4.93	3.76	3.56
72	W30X132	3.84	4.01	4.41	4.66	3.32	3.43	4.01	4.13	4.62	4.80	3.47	3.52	4.37	4.21	5.04	4.93	3.77	3.57
73	W30X124	3.84	4.01	4.41	4.66	3.32	3.43	4.02	4.13	4.62	4.80	3.47	3.52	4.37	4.22	5.04	4.93	3.77	3.57
74	W30X116	3.84	4.02	4.41	4.66	3.33	3.43	4.02	4.13	4.62	4.81	3.47	3.53	4.37	4.22	5.04	4.93	3.77	3.57
75	W30X108	3.85	4.02	4.41	4.66	3.33	3.44	4.02	4.14	4.62	4.81	3.48	3.53	4.37	4.22	5.04	4.94	3.77	3.57
76	W30X99	3.85	4.02	4.42	4.66	3.33	3.44	4.02	4.14	4.62	4.81	3.48	3.53	4.38	4.22	5.04	4.94	3.77	3.58
77	W30X90	3.85	4.02	4.42	4.66	3.33	3.44	4.02	4.14	4.62	4.81	3.48	3.53	4.37	4.22	5.04	4.94	3.77	3.57
78	W27X539	3.82	4.00	4.40	4.64	3.30	3.41	4.00	4.12	4.60	4.79	3.45	3.50	4.36	4.20	5.03	4.92	3.75	3.55
79	W27X368	3.82	4.00	4.40	4.65	3.31	3.41	4.00	4.12	4.60	4.79	3.45	3.51	4.36	4.20	5.03	4.92	3.75	3.55
80	W27X336	3.83	4.00	4.40	4.65	3.31	3.42	4.00	4.12	4.61	4.80	3.46	3.51	4.36	4.20	5.03	4.92	3.75	3.55
81	W27X307	3.82	4.00	4.40	4.65	3.31	3.41	4.00	4.12	4.60	4.79	3.45	3.51	4.36	4.20	5.03	4.92	3.75	3.55
82	W27X281	3.83	4.00	4.40	4.65	3.31	3.42	4.00	4.12	4.61	4.79	3.46	3.51	4.36	4.20	5.03	4.92	3.75	3.55
83	W27X258	3.83	4.00	4.40	4.65	3.31	3.42	4.00	4.12	4.60	4.79	3.46	3.51	4.36	4.20	5.03	4.92	3.75	3.55
84	W27X235	3.83	4.00	4.40	4.65	3.31	3.42	4.00	4.12	4.61	4.80	3.46	3.51	4.36	4.20	5.03	4.92	3.75	3.55
85	W27X217	3.83	4.00	4.40	4.65	3.31	3.42	4.00	4.12	4.61	4.80	3.46	3.51	4.36	4.20	5.03	4.92	3.75	3.55
86	W27X194	3.83	4.00	4.40	4.65	3.31	3.42	4.00	4.12	4.61	4.80	3.46	3.51	4.36	4.20	5.03	4.92	3.75	3.55
87	W27X178	3.83	4.00	4.40	4.65	3.31	3.42	4.00	4.12	4.61	4.80	3.46	3.51	4.36	4.21	5.03	4.92	3.76	3.56
88	W27X161	3.83	4.00	4.40	4.65	3.31	3.42	4.01	4.12	4.61	4.80	3.46	3.51	4.36	4.21	5.03	4.93	3.76	3.56
89	W27X146	3.83	4.01	4.40	4.65	3.31	3.42	4.01	4.12	4.61	4.80	3.46	3.51	4.36	4.21	5.03	4.93	3.76	3.56
90	W27X129	3.84	4.01	4.41	4.65	3.32	3.43	4.01	4.13	4.61	4.80	3.47	3.52	4.37	4.21	5.04	4.93	3.76	3.56
91	W27X114	3.84	4.01	4.41	4.66	3.32	3.43	4.01	4.13	4.61	4.80	3.47	3.52	4.37	4.21	5.04	4.93	3.76	3.57
92	W27X102	3.84	4.01	4.41	4.65	3.32	3.43	4.01	4.13	4.61	4.80	3.47	3.52	4.37	4.21	5.04	4.93	3.76	3.56
93	W27X94	3.84	4.01	4.41	4.66	3.32	3.43	4.01	4.13	4.61	4.80	3.47	3.52	4.37	4.21	5.04	4.93	3.77	3.57
94	W27X84	3.84	4.02	4.41	4.66	3.33	3.43	4.02	4.14	4.62	4.81	3.47	3.52	4.37	4.22	5.04	4.93	3.77	3.57
95	W24X370	3.82	4.00	4.40	4.65	3.30	3.41	4.00	4.12	4.60	4.79	3.45	3.51	4.36	4.20	5.03	4.92	3.75	3.55
96	W24X335	3.82	4.00	4.40	4.64	3.30	3.41	4.00	4.12	4.60	4.79	3.45	3.50	4.36	4.20	5.03	4.92	3.75	3.55
97	W24X306	3.82	4.00	4.40	4.65	3.30	3.41	4.00	4.12	4.60	4.79	3.45	3.51	4.36	4.20	5.03	4.92	3.75	3.55
98	W24X279	3.83	4.00	4.40	4.65	3.31	3.42	4.00	4.12	4.60	4.80	3.46	3.51	4.36	4.20	5.03	4.92	3.75	3.55
99	W24X250	3.82	4.00	4.40	4.65	3.31	3.41	4.00	4.12	4.61	4.79	3.45	3.51	4.36	4.20	5.03	4.92	3.75	3.55
100	W24X229	3.83	4.00	4.40	4.65	3.31	3.42	4.00	4.12	4.61	4.80	3.46	3.51	4.36	4.20	5.03	4.92	3.75	3.55
101	W24X207	3.83	4.00	4.40	4.65	3.31	3.42	4.00	4.12	4.61	4.80	3.46	3.51	4.36	4.20	5.03	4.92	3.75	3.55
102	W24X192	3.83	4.00	4.40	4.65	3.31	3.42	4.00	4.12	4.61	4.80	3.46	3.51	4.36	4.20	5.03	4.92	3.75	3.55
103	W24X176	3.83	4.00	4.40	4.65	3.31	3.42	4.00	4.12	4.61	4.80	3.46	3.51	4.36	4.20	5.03	4.93	3.75	3.55
104	W24X162	3.83	4.00	4.40	4.65	3.31	3.42	4.00	4.12	4.61	4.80	3.46	3.51	4.36	4.20	5.03	4.92	3.75	3.55
105	W24X146	3.83	4.00	4.40	4.65	3.31	3.42	4.00	4.12	4.61	4.80	3.46	3.51	4.36	4.20	5.03	4.92	3.75	3.56

106	W24X131	3.83	4.00	4.40	4.65	3.31	3.42	4.00	4.12	4.61	4.80	3.46	3.51	4.36	4.20	5.03	4.92	3.76	3.56
107	W24X117	3.83	4.00	4.40	4.65	3.31	3.42	4.01	4.12	4.61	4.80	3.46	3.51	4.36	4.21	5.03	4.93	3.76	3.56
108	W24X104	3.83	4.01	4.40	4.65	3.31	3.42	4.01	4.12	4.61	4.80	3.46	3.51	4.37	4.21	5.03	4.93	3.76	3.56
109	W24X103	3.83	4.01	4.41	4.65	3.32	3.43	4.01	4.13	4.61	4.80	3.47	3.52	4.37	4.21	5.04	4.93	3.76	3.56
110	W24X94	3.84	4.01	4.41	4.66	3.32	3.43	4.01	4.13	4.62	4.81	3.47	3.52	4.37	4.21	5.04	4.93	3.76	3.56
111	W24X84	3.84	4.01	4.41	4.65	3.32	3.43	4.01	4.13	4.62	4.80	3.47	3.52	4.37	4.21	5.04	4.93	3.77	3.56
112	W24X76	3.84	4.01	4.41	4.66	3.32	3.43	4.02	4.13	4.62	4.81	3.47	3.52	4.37	4.21	5.04	4.93	3.77	3.57
113	W24X68	3.84	4.01	4.41	4.66	3.32	3.43	4.02	4.13	4.62	4.81	3.47	3.52	4.37	4.22	5.04	4.93	3.77	3.57
114	W24X62	3.85	4.02	4.42	4.66	3.34	3.45	4.03	4.14	4.62	4.82	3.48	3.53	4.38	4.23	5.05	4.94	3.78	3.58
115	W24X55	3.85	4.02	4.42	4.66	3.34	3.44	4.03	4.14	4.63	4.81	3.48	3.54	4.38	4.22	5.04	4.94	3.78	3.58
116	W21X201	3.82	4.00	4.40	4.64	3.30	3.41	4.00	4.12	4.60	4.79	3.45	3.50	4.36	4.20	5.03	4.92	3.75	3.55
117	W21X182	3.82	4.00	4.40	4.65	3.30	3.42	4.00	4.12	4.60	4.79	3.45	3.51	4.36	4.20	5.03	4.92	3.75	3.55
118	W21X166	3.82	4.00	4.40	4.65	3.30	3.41	4.00	4.12	4.60	4.80	3.45	3.51	4.36	4.20	5.03	4.92	3.75	3.55
119	W21X147	3.83	4.00	4.40	4.65	3.31	3.42	4.00	4.12	4.61	4.80	3.46	3.51	4.36	4.20	5.03	4.93	3.76	3.56
120	W21X132	3.83	4.00	4.40	4.65	3.31	3.42	4.00	4.12	4.61	4.80	3.46	3.51	4.36	4.20	5.03	4.92	3.75	3.55
121	W21X122	3.83	4.00	4.40	4.65	3.31	3.42	4.00	4.12	4.61	4.80	3.46	3.51	4.36	4.20	5.03	4.92	3.75	3.55
122	W21X111	3.83	4.00	4.40	4.65	3.31	3.42	4.01	4.12	4.61	4.80	3.46	3.51	4.36	4.20	5.03	4.93	3.76	3.55
123	W21X101	3.83	4.00	4.40	4.65	3.31	3.42	4.00	4.12	4.61	4.80	3.46	3.51	4.36	4.20	5.03	4.92	3.75	3.55
124	W21X93	3.84	4.01	4.41	4.65	3.32	3.43	4.01	4.13	4.61	4.81	3.47	3.52	4.37	4.21	5.04	4.93	3.77	3.56
125	W21X83	3.84	4.01	4.41	4.65	3.32	3.43	4.01	4.13	4.62	4.80	3.47	3.52	4.37	4.21	5.04	4.93	3.76	3.57
126	W21X73	3.84	4.01	4.41	4.65	3.32	3.43	4.01	4.13	4.62	4.80	3.47	3.52	4.37	4.21	5.04	4.93	3.76	3.56
127	W21X68	3.84	4.01	4.41	4.65	3.32	3.43	4.01	4.13	4.61	4.80	3.47	3.52	4.37	4.21	5.03	4.93	3.76	3.56
128	W21X62	3.84	4.01	4.41	4.66	3.32	3.43	4.01	4.13	4.61	4.80	3.47	3.52	4.37	4.21	5.04	4.92	3.76	3.56
129	W21X55	3.84	4.01	4.41	4.66	3.32	3.43	4.01	4.13	4.62	4.81	3.47	3.52	4.37	4.22	5.03	4.93	3.77	3.56
130	W21X48*	3.84	4.02	4.41	4.66	3.32	3.43	4.02	4.13	4.62	4.81	3.47	3.52	4.37	4.22	5.04	4.93	3.77	3.57
131	W21X57	3.84	4.02	4.41	4.66	3.32	3.43	4.02	4.13	4.62	4.81	3.47	3.52	4.37	4.21	5.04	4.93	3.76	3.57
132	W21X50	3.85	4.02	4.41	4.66	3.33	3.44	4.02	4.13	4.62	4.80	3.48	3.53	4.38	4.21	5.04	4.94	3.77	3.57
133	W21X44	3.85	4.02	4.42	4.67	3.33	3.44	4.03	4.14	4.62	4.81	3.48	3.53	4.38	4.22	5.05	4.94	3.78	3.58
134	W18X311	3.82	3.99	4.39	4.64	3.30	3.41	4.00	4.11	4.60	4.79	3.45	3.50	4.35	4.20	5.03	4.92	3.75	3.55
135	W18X283	3.82	4.00	4.39	4.64	3.30	3.41	4.00	4.12	4.60	4.79	3.45	3.50	4.36	4.20	5.03	4.92	3.75	3.55
136	W18X258	3.82	4.00	4.39	4.64	3.30	3.41	4.00	4.11	4.60	4.79	3.45	3.50	4.36	4.20	5.03	4.92	3.75	3.55
137	W18X234	3.82	4.00	4.40	4.64	3.30	3.41	4.00	4.12	4.60	4.79	3.45	3.50	4.36	4.20	5.03	4.92	3.75	3.55
138	W18X211	3.82	4.00	4.40	4.64	3.30	3.41	4.00	4.11	4.60	4.79	3.45	3.50	4.35	4.20	5.03	4.92	3.75	3.55
139	W18X192	3.82	4.00	4.39	4.64	3.30	3.41	4.00	4.11	4.60	4.79	3.45	3.50	4.36	4.20	5.03	4.92	3.75	3.55
140	W18X175	3.82	4.00	4.40	4.64	3.30	3.41	4.00	4.12	4.60	4.79	3.45	3.50	4.36	4.20	5.03	4.92	3.75	3.55
141	W18X158	3.82	4.00	4.40	4.64	3.30	3.41	4.00	4.12	4.60	4.79	3.45	3.50	4.36	4.20	5.03	4.92	3.75	3.55
142	W18X143	3.82	4.00	4.39	4.64	3.30	3.41	4.00	4.12	4.60	4.79	3.45	3.50	4.36	4.20	5.03	4.92	3.75	3.55
143	W18X130	3.82	4.00	4.39	4.64	3.30	3.41	4.00	4.12	4.60	4.79	3.45	3.50	4.36	4.20	5.03	4.92	3.75	3.55
144	W18X119	3.83	4.00	4.40	4.65	3.31	3.42	4.00	4.12	4.60	4.79	3.46	3.51	4.36	4.20	5.03	4.92	3.75	3.55
145	W18X106	3.83	4.00	4.40	4.65	3.31	3.42	4.00	4.12	4.60	4.79	3.46	3.51	4.36	4.20	5.03	4.92	3.75	3.55
146	W18X97	3.83	4.00	4.40	4.65	3.31	3.41	4.00	4.12	4.60	4.80	3.46	3.51	4.36	4.20	5.03	4.92	3.75	3.55
147	W18X86	3.83	4.00	4.40	4.65	3.31	3.42	4.00	4.12	4.61	4.80	3.46	3.51	4.36	4.20	5.03	4.93	3.75	3.55
148	W18X76	3.83	4.00	4.40	4.64	3.31	3.42	4.00	4.12	4.61	4.80	3.46	3.51	4.36	4.20	5.03	4.92	3.75	3.55
149	W18X71	3.83	4.01	4.40	4.65	3.32	3.43	4.01	4.12	4.61	4.80	3.46	3.52	4.37	4.21	5.03	4.93	3.76	3.56
150	W18X65	3.84	4.01	4.41	4.65	3.32	3.42	4.01	4.13	4.61	4.80	3.46	3.52	4.37	4.21	5.03	4.93	3.76	3.56
151	W18X60	3.83	4.00	4.41	4.65	3.31	3.42	4.01	4.13	4.61	4.80	3.46	3.51	4.36	4.21	5.03	4.92	3.76	3.56
152	W18X55	3.84	4.01	4.41	4.65	3.32	3.43	4.01	4.13	4.62	4.80	3.46	3.52	4.37	4.21	5.04	4.93	3.76	3.56
153	W18X50	3.84	4.01	4.41	4.65	3.31	3.43	4.01	4.12	4.61	4.80	3.47	3.51	4.37	4.21	5.03	4.93	3.76	3.56

154	W18X46	3.84	4.01	4.41	4.66	3.32	3.43	4.02	4.13	4.62	4.81	3.47	3.52	4.37	4.21	5.03	4.93	3.76	3.57
155	W18X40	3.84	4.02	4.41	4.66	3.32	3.43	4.02	4.13	4.61	4.80	3.47	3.52	4.37	4.21	5.04	4.93	3.77	3.57
156	W18X35	3.84	4.02	4.42	4.66	3.33	3.44	4.02	4.14	4.62	4.80	3.48	3.53	4.38	4.21	5.05	4.94	3.77	3.57
157	W16X100	3.82	4.00	4.40	4.65	3.30	3.41	4.00	4.12	4.60	4.79	3.45	3.51	4.36	4.20	5.03	4.92	3.75	3.55
158	W16X89	3.82	4.00	4.40	4.65	3.30	3.42	4.00	4.12	4.61	4.80	3.45	3.51	4.36	4.20	5.03	4.93	3.75	3.55
159	W16X77	3.82	4.00	4.40	4.65	3.31	3.42	4.00	4.12	4.61	4.80	3.45	3.51	4.36	4.20	5.03	4.93	3.75	3.55
160	W16X67	3.82	4.00	4.39	4.64	3.30	3.41	4.00	4.12	4.60	4.80	3.45	3.51	4.36	4.20	5.03	4.92	3.75	3.55
161	W16X57	3.83	4.00	4.40	4.66	3.31	3.43	4.00	4.13	4.61	4.80	3.46	3.52	4.36	4.21	5.04	4.93	3.76	3.56
162	W16X50	3.84	4.01	4.41	4.65	3.32	3.43	4.01	4.13	4.62	4.80	3.46	3.52	4.36	4.21	5.04	4.93	3.76	3.56
163	W16X45	3.84	4.01	4.41	4.66	3.32	3.43	4.01	4.13	4.61	4.80	3.47	3.51	4.36	4.21	5.03	4.92	3.76	3.56
164	W16X40	3.83	4.01	4.40	4.65	3.32	3.42	4.01	4.13	4.61	4.81	3.46	3.51	4.37	4.22	5.03	4.92	3.76	3.56
165	W16X36	3.83	4.01	4.40	4.66	3.32	3.42	4.01	4.13	4.62	4.81	3.47	3.51	4.37	4.21	5.03	4.93	3.76	3.56
166	W16X31	3.84	4.02	4.40	4.66	3.32	3.43	4.01	4.14	4.62	4.80	3.48	3.52	4.37	4.22	5.05	4.93	3.76	3.57
167	W16X26	3.84	4.02	4.42	4.66	3.33	3.44	4.02	4.13	4.63	4.81	3.48	3.52	4.38	4.21	5.05	4.94	3.78	3.57
168	W14X730	3.81	3.99	4.39	4.63	3.29	3.40	3.99	4.10	4.59	4.78	3.44	3.49	4.35	4.19	5.02	4.91	3.74	3.54
169	W14X665	3.81	3.99	4.39	4.64	3.29	3.40	3.99	4.11	4.59	4.79	3.44	3.49	4.35	4.19	5.02	4.91	3.74	3.54
170	W14X605	3.81	3.99	4.39	4.64	3.29	3.40	3.99	4.11	4.59	4.79	3.44	3.49	4.35	4.19	5.02	4.91	3.74	3.54
171	W14X550	3.81	3.99	4.39	4.64	3.29	3.40	3.99	4.11	4.59	4.78	3.44	3.49	4.35	4.19	5.02	4.91	3.74	3.54
172	W14X500	3.81	3.99	4.39	4.64	3.29	3.40	3.99	4.11	4.60	4.79	3.44	3.49	4.35	4.19	5.02	4.92	3.74	3.54
173	W14X455	3.81	3.99	4.39	4.64	3.29	3.40	3.99	4.11	4.59	4.79	3.44	3.49	4.35	4.19	5.02	4.91	3.74	3.54
174	W14X426	3.81	3.99	4.39	4.64	3.29	3.40	3.99	4.11	4.59	4.79	3.44	3.49	4.35	4.19	5.02	4.91	3.74	3.54
175	W14X398	3.81	3.99	4.39	4.64	3.29	3.40	3.99	4.11	4.60	4.79	3.44	3.49	4.35	4.19	5.02	4.92	3.74	3.54
176	W14X370	3.81	3.99	4.39	4.64	3.29	3.40	3.99	4.11	4.60	4.79	3.44	3.49	4.35	4.19	5.02	4.91	3.74	3.54
177	W14X342	3.81	3.99	4.39	4.64	3.29	3.40	3.99	4.11	4.59	4.79	3.44	3.49	4.35	4.19	5.02	4.91	3.74	3.54
178	W14X311	3.81	3.99	4.39	4.64	3.29	3.40	3.99	4.11	4.60	4.79	3.44	3.49	4.35	4.19	5.02	4.92	3.74	3.54
179	W14X283	3.81	3.99	4.39	4.64	3.29	3.40	3.99	4.11	4.60	4.79	3.44	3.49	4.35	4.19	5.02	4.91	3.74	3.54
180	W14X257	3.81	3.99	4.39	4.64	3.29	3.40	3.99	4.11	4.60	4.79	3.44	3.49	4.35	4.19	5.02	4.92	3.74	3.54
181	W14X233	3.81	3.99	4.39	4.64	3.29	3.40	3.99	4.11	4.59	4.78	3.44	3.49	4.35	4.19	5.02	4.92	3.74	3.54
182	W14X211	3.82	3.99	4.39	4.64	3.30	3.40	3.99	4.11	4.60	4.79	3.44	3.50	4.35	4.19	5.02	4.92	3.74	3.54
183	W14X193	3.81	3.99	4.39	4.64	3.30	3.40	3.99	4.11	4.60	4.79	3.44	3.50	4.35	4.19	5.02	4.91	3.74	3.54
184	W14X176	3.81	3.99	4.39	4.64	3.29	3.40	3.99	4.11	4.60	4.79	3.44	3.49	4.35	4.19	5.02	4.92	3.74	3.54
185	W14X159	3.82	3.99	4.39	4.64	3.29	3.41	3.99	4.11	4.60	4.79	3.44	3.50	4.35	4.19	5.02	4.92	3.74	3.54
186	W14X145	3.82	3.99	4.39	4.64	3.29	3.40	3.99	4.11	4.60	4.79	3.44	3.50	4.35	4.19	5.02	4.92	3.74	3.54
187	W14X132	3.82	3.99	4.39	4.64	3.30	3.41	4.00	4.11	4.60	4.79	3.45	3.50	4.35	4.19	5.02	4.92	3.75	3.54
188	W14X120	3.82	3.99	4.39	4.64	3.30	3.40	3.99	4.11	4.60	4.79	3.45	3.50	4.35	4.20	5.02	4.92	3.74	3.54
189	W14X109	3.81	3.99	4.39	4.64	3.29	3.40	3.99	4.11	4.59	4.78	3.44	3.49	4.35	4.19	5.02	4.91	3.74	3.54
190	W14X99	3.81	3.99	4.39	4.64	3.29	3.40	3.99	4.11	4.60	4.79	3.44	3.50	4.35	4.19	5.02	4.91	3.74	3.54
191	W14X90	3.80	3.98	4.38	4.63	3.28	3.39	3.98	4.10	4.59	4.78	3.43	3.48	4.34	4.18	5.02	4.91	3.73	3.53
192	W14X82	3.82	4.00	4.39	4.64	3.30	3.41	4.00	4.12	4.60	4.79	3.45	3.50	4.36	4.20	5.03	4.92	3.75	3.55
193	W14X74	3.82	4.00	4.39	4.64	3.30	3.41	4.00	4.11	4.60	4.79	3.45	3.50	4.35	4.20	5.03	4.92	3.74	3.55
194	W14X68	3.82	3.99	4.39	4.64	3.30	3.41	4.00	4.11	4.61	4.80	3.45	3.50	4.35	4.20	5.03	4.92	3.75	3.55
195	W14X61	3.82	4.00	4.39	4.64	3.30	3.41	4.00	4.11	4.60	4.79	3.45	3.50	4.36	4.20	5.03	4.92	3.75	3.55
196	W14X53	3.82	4.00	4.39	4.65	3.30	3.41	4.00	4.11	4.61	4.79	3.45	3.51	4.36	4.20	5.03	4.92	3.75	3.55
197	W14X48	3.82	4.00	4.40	4.64	3.30	3.41	4.00	4.11	4.60	4.79	3.45	3.50	4.36	4.20	5.03	4.92	3.75	3.55
198	W14X43	3.82	4.00	4.39	4.65	3.31	3.41	3.99	4.12	4.60	4.79	3.46	3.51	4.36	4.20	5.03	4.92	3.75	3.56
199	W14X38	3.83	4.00	4.40	4.66	3.31	3.42	4.00	4.13	4.61	4.79	3.46	3.51	4.36	4.20	5.03	4.92	3.76	3.55
200	W14X34	3.83	4.01	4.41	4.65	3.32	3.42	4.01	4.13	4.61	4.79	3.46	3.51	4.36	4.20	5.03	4.93	3.76	3.56
201	W14X30	3.83	4.01	4.41	4.65	3.31	3.42	4.01	4.13	4.61	4.81	3.47	3.51	4.36	4.20	5.04	4.92	3.76	3.56

202	W14X26	3.84	4.01	4.41	4.66	3.32	3.43	4.00	4.12	4.63	4.81	3.47	3.53	4.36	4.22	5.04	4.93	3.77	3.57
203	W14X22	3.84	4.01	4.42	4.67	3.32	3.43	4.01	4.12	4.62	4.81	3.47	3.53	4.38	4.20	5.03	4.93	3.76	3.58
204	W12X336	3.81	3.99	4.39	4.64	3.29	3.40	3.99	4.11	4.60	4.79	3.44	3.49	4.35	4.19	5.02	4.92	3.74	3.54
205	W12X305	3.81	3.99	4.39	4.64	3.29	3.40	3.99	4.11	4.59	4.79	3.44	3.49	4.35	4.19	5.02	4.91	3.74	3.54
206	W12X279	3.81	3.99	4.39	4.64	3.29	3.40	3.99	4.11	4.59	4.78	3.44	3.49	4.35	4.19	5.02	4.91	3.74	3.54
207	W12X252	3.81	3.99	4.39	4.64	3.29	3.40	3.99	4.11	4.60	4.79	3.44	3.49	4.35	4.19	5.02	4.92	3.74	3.54
208	W12X230	3.81	3.99	4.39	4.64	3.29	3.40	3.99	4.11	4.60	4.79	3.44	3.50	4.35	4.19	5.02	4.92	3.74	3.54
209	W12X210	3.81	3.99	4.39	4.64	3.29	3.40	3.99	4.11	4.60	4.79	3.44	3.49	4.35	4.19	5.02	4.92	3.74	3.54
210	W12X190	3.81	3.99	4.39	4.64	3.29	3.40	3.99	4.11	4.60	4.79	3.44	3.50	4.35	4.19	5.02	4.91	3.74	3.54
211	W12X170	3.82	3.99	4.39	4.64	3.29	3.40	3.99	4.11	4.60	4.79	3.44	3.50	4.35	4.20	5.02	4.92	3.74	3.54
212	W12X152	3.81	3.99	4.39	4.64	3.30	3.40	3.99	4.11	4.60	4.79	3.44	3.50	4.35	4.19	5.02	4.92	3.74	3.54
213	W12X136	3.81	3.99	4.39	4.64	3.29	3.41	3.99	4.11	4.60	4.79	3.45	3.50	4.35	4.19	5.02	4.91	3.74	3.54
214	W12X120	3.82	3.99	4.39	4.64	3.30	3.40	3.99	4.11	4.60	4.79	3.44	3.50	4.35	4.19	5.02	4.92	3.74	3.54
215	W12X106	3.82	3.99	4.39	4.64	3.30	3.40	3.99	4.11	4.59	4.79	3.45	3.50	4.35	4.19	5.02	4.92	3.74	3.54
216	W12X96	3.82	3.99	4.39	4.64	3.30	3.41	3.99	4.11	4.60	4.79	3.44	3.50	4.35	4.20	5.02	4.91	3.74	3.54
217	W12X87	3.82	3.99	4.39	4.64	3.30	3.41	3.99	4.11	4.60	4.78	3.44	3.49	4.35	4.19	5.02	4.92	3.74	3.54
218	W12X79	3.82	3.99	4.39	4.64	3.30	3.41	3.99	4.11	4.60	4.79	3.45	3.50	4.35	4.19	5.02	4.92	3.75	3.54
219	W12X72	3.82	3.99	4.39	4.64	3.30	3.41	4.00	4.11	4.60	4.79	3.44	3.50	4.35	4.20	5.03	4.92	3.74	3.54
220	W12X65	3.80	3.98	4.38	4.63	3.29	3.40	3.99	4.10	4.60	4.78	3.43	3.49	4.34	4.19	5.02	4.91	3.73	3.53
221	W12X58	3.82	3.99	4.39	4.64	3.30	3.41	4.00	4.11	4.60	4.79	3.45	3.50	4.35	4.20	5.03	4.92	3.74	3.54
222	W12X53	3.82	4.00	4.40	4.64	3.30	3.41	4.00	4.12	4.60	4.79	3.45	3.50	4.35	4.20	5.02	4.92	3.75	3.54
223	W12X50	3.82	4.00	4.40	4.64	3.30	3.42	4.00	4.12	4.60	4.79	3.45	3.50	4.36	4.20	5.02	4.93	3.75	3.55
224	W12X45	3.82	4.00	4.40	4.65	3.31	3.41	4.00	4.12	4.60	4.78	3.45	3.51	4.36	4.20	5.03	4.92	3.75	3.55
225	W12X40	3.83	3.99	4.39	4.64	3.30	3.42	4.00	4.11	4.60	4.79	3.45	3.51	4.36	4.20	5.04	4.92	3.74	3.55
226	W12X35	3.82	4.00	4.40	4.65	3.31	3.42	4.00	4.12	4.61	4.79	3.46	3.51	4.36	4.21	5.04	4.92	3.76	3.56
227	W12X30	3.83	4.00	4.40	4.65	3.30	3.43	4.00	4.13	4.61	4.80	3.46	3.51	4.37	4.20	5.03	4.92	3.75	3.55
228	W12X26	3.83	4.00	4.40	4.64	3.31	3.42	4.00	4.12	4.61	4.80	3.46	3.52	4.36	4.20	5.03	4.92	3.76	3.55
229	W12X22	3.84	4.01	4.41	4.65	3.33	3.43	4.02	4.14	4.64	4.82	3.48	3.52	4.37	4.22	5.04	4.95	3.76	3.57
230	W12X19	3.85	4.03	4.43	4.66	3.33	3.42	4.02	4.12	4.61	4.82	3.47	3.53	4.38	4.22	5.04	4.93	3.77	3.57
231	W12X16	3.84	4.02	4.41	4.65	3.35	3.44	4.02	4.15	4.61	4.82	3.48	3.52	4.40	4.23	5.05	4.90	3.77	3.58
232	W12X14	3.86	4.04	4.42	4.66	3.32	3.45	4.04	4.14	4.62	4.78	3.49	3.53	4.38	4.22	5.03	4.90	3.80	3.58
233	W10X112	3.81	3.99	4.39	4.64	3.29	3.40	3.99	4.10	4.60	4.78	3.44	3.49	4.35	4.19	5.02	4.91	3.74	3.54
234	W10X100	3.82	3.99	4.39	4.63	3.29	3.40	3.99	4.11	4.59	4.78	3.44	3.49	4.35	4.19	5.02	4.92	3.74	3.54
235	W10X88	3.81	3.99	4.39	4.64	3.29	3.40	3.99	4.10	4.60	4.79	3.44	3.49	4.35	4.19	5.03	4.92	3.74	3.54
236	W10X77	3.81	3.99	4.39	4.64	3.30	3.40	3.99	4.11	4.60	4.79	3.44	3.49	4.35	4.19	5.02	4.92	3.74	3.54
237	W10X68	3.82	3.99	4.39	4.63	3.30	3.40	3.99	4.11	4.60	4.78	3.45	3.49	4.35	4.19	5.02	4.91	3.74	3.54
238	W10X60	3.81	3.99	4.39	4.64	3.29	3.40	3.99	4.11	4.60	4.79	3.45	3.49	4.35	4.19	5.02	4.92	3.74	3.54
239	W10X54	3.82	3.99	4.39	4.64	3.29	3.40	4.00	4.10	4.60	4.79	3.44	3.50	4.35	4.19	5.02	4.91	3.74	3.54
240	W10X49	3.81	3.99	4.38	4.64	3.29	3.41	3.99	4.11	4.60	4.78	3.44	3.49	4.36	4.19	5.02	4.92	3.74	3.54
241	W10X45	3.82	4.00	4.39	4.63	3.29	3.41	4.00	4.11	4.59	4.80	3.45	3.49	4.35	4.19	5.01	4.91	3.75	3.54
242	W10X39	3.82	4.00	4.39	4.64	3.30	3.40	3.99	4.12	4.60	4.79	3.45	3.50	4.35	4.19	5.03	4.93	3.75	3.54
243	W10X33	3.82	3.99	4.40	4.65	3.30	3.40	4.00	4.12	4.60	4.78	3.45	3.50	4.35	4.19	5.03	4.92	3.75	3.55
244	W10X30	3.82	4.01	4.40	4.65	3.31	3.42	4.01	4.12	4.61	4.78	3.44	3.50	4.36	4.21	5.02	4.93	3.76	3.57
245	W10X26	3.82	4.00	4.42	4.64	3.31	3.41	4.00	4.12	4.61	4.78	3.46	3.51	4.36	4.20	5.01	4.91	3.74	3.54
246	W10X22	3.83	4.00	4.41	4.66	3.31	3.43	4.01	4.12	4.61	4.79	3.46	3.52	4.38	4.21	5.03	4.91	3.75	3.55
247	W10X19	3.83	4.00	4.41	4.66	3.31	3.44	4.01	4.13	4.63	4.81	3.47	3.51	4.37	4.22	5.01	4.93	3.78	3.57
248	W10X17	3.84	4.02	4.42	4.67	3.32	3.44	4.01	4.15	4.61	4.79	3.47	3.52	4.37	4.21	5.04	4.92	3.76	3.56
249	W10X15	3.85	4.01	4.44	4.68	3.32	3.46	4.02	4.11	4.63	4.81	3.47	3.53	4.35	4.25	5.08	4.96	3.75	3.58

250	W10X12	3.86	4.03	4.41	4.69	3.34	3.45	4.01	4.11	4.64	4.79	3.47	3.49	4.39	4.23	5.08	4.98	3.77	3.54
	MIN	**3.80**	**3.98**	**4.38**	**4.63**	**3.28**	**3.39**	**3.98**	**4.10**	**4.59**	**4.78**	**3.43**	**3.48**	**4.34**	**4.18**	**5.01**	**4.90**	**3.73**	**3.53**
	MAX	**3.86**	**4.04**	**4.44**	**4.69**	**3.35**	**3.46**	**4.04**	**4.15**	**4.64**	**4.82**	**3.49**	**3.54**	**4.40**	**4.25**	**5.08**	**4.98**	**3.80**	**3.58**
	AVE	**3.83**	**4.00**	**4.40**	**4.65**	**3.31**	**3.42**	**4.00**	**4.12**	**4.61**	**4.80**	**3.46**	**3.51**	**4.36**	**4.21**	**5.03**	**4.92**	**3.76**	**3.56**

Table C- 3. Reliability Indices for Noncomposite Rolled I-shaped Girdes for ADTT 1’000 and L=30, 60ft.

		L=30 ft						**L=60 ft**					
	Φ	**1.00**		**0.95**		**1.05**		**1.00**		**0.95**		**1.05**	
#	**Shape \ D/(D+L)**	**0.25**	**0.40**	**0.25**	**0.40**	**0.25**	**0.40**	**0.35**	**0.55**	**0.35**	**0.55**	**0.35**	**0.55**
1	W44X335	3.64	3.83	4.13	4.38	3.18	3.33	3.65	3.91	4.17	4.53	3.17	3.35
2	W44X290	3.63	3.83	4.13	4.38	3.18	3.32	3.64	3.91	4.17	4.53	3.17	3.35
3	W44X262	3.63	3.82	4.13	4.38	3.18	3.32	3.64	3.91	4.17	4.52	3.17	3.35
4	W44X230	3.64	3.83	4.13	4.38	3.18	3.33	3.65	3.91	4.17	4.53	3.17	3.35
5	W40X593	3.63	3.82	4.13	4.37	3.18	3.32	3.64	3.90	4.16	4.52	3.16	3.35
6	W40X503	3.63	3.82	4.13	4.37	3.18	3.32	3.64	3.91	4.17	4.52	3.16	3.35
7	W40X431	3.63	3.82	4.13	4.37	3.18	3.32	3.64	3.91	4.17	4.52	3.16	3.35
8	W40X397	3.63	3.82	4.13	4.38	3.18	3.32	3.64	3.91	4.17	4.52	3.16	3.35
9	W40X372	3.63	3.82	4.13	4.38	3.18	3.32	3.64	3.91	4.17	4.52	3.16	3.35
10	W40X362	3.63	3.82	4.13	4.38	3.18	3.32	3.64	3.91	4.17	4.52	3.16	3.35
11	W40X324	3.63	3.82	4.13	4.38	3.18	3.32	3.64	3.91	4.17	4.52	3.16	3.35
12	W40X297	3.63	3.82	4.13	4.38	3.18	3.32	3.64	3.91	4.17	4.52	3.16	3.35
13	W40X277	3.63	3.82	4.13	4.37	3.18	3.32	3.64	3.91	4.17	4.52	3.16	3.35
14	W40X249	3.63	3.82	4.13	4.37	3.18	3.32	3.64	3.91	4.17	4.52	3.16	3.35
15	W40X215	3.63	3.82	4.13	4.38	3.18	3.32	3.64	3.91	4.17	4.52	3.16	3.35
16	W40X199	3.63	3.83	4.13	4.38	3.18	3.32	3.64	3.91	4.17	4.52	3.17	3.35
17	W40X392	3.64	3.83	4.13	4.38	3.19	3.33	3.65	3.91	4.17	4.53	3.17	3.36
18	W40X331	3.64	3.83	4.13	4.38	3.19	3.33	3.65	3.91	4.17	4.53	3.17	3.36
19	W40X327	3.64	3.83	4.13	4.38	3.19	3.33	3.65	3.91	4.17	4.53	3.17	3.36
20	W40X294	3.64	3.83	4.13	4.38	3.19	3.33	3.65	3.91	4.17	4.53	3.17	3.36
21	W40X278	3.64	3.83	4.14	4.38	3.19	3.33	3.65	3.92	4.17	4.53	3.17	3.36
22	W40X264	3.64	3.83	4.14	4.38	3.19	3.33	3.65	3.91	4.17	4.53	3.17	3.36
23	W40X235	3.64	3.83	4.13	4.38	3.19	3.33	3.65	3.91	4.17	4.53	3.17	3.35
24	W40X211	3.64	3.83	4.13	4.38	3.19	3.33	3.65	3.91	4.17	4.53	3.17	3.36
25	W40X183	3.64	3.83	4.13	4.38	3.19	3.33	3.65	3.91	4.17	4.53	3.17	3.36
26	W40X167	3.64	3.83	4.14	4.38	3.19	3.33	3.65	3.92	4.18	4.53	3.18	3.36
27	W40X149	3.65	3.84	4.14	4.39	3.20	3.34	3.66	3.92	4.18	4.54	3.18	3.37
28	W36X652	3.63	3.82	4.12	4.37	3.17	3.31	3.64	3.90	4.16	4.52	3.16	3.34
29	W36X529	3.63	3.82	4.12	4.37	3.17	3.32	3.64	3.90	4.16	4.52	3.16	3.34
30	W36X487	3.63	3.82	4.12	4.37	3.17	3.32	3.64	3.90	4.16	4.52	3.16	3.34
31	W36X441	3.63	3.82	4.12	4.37	3.17	3.32	3.64	3.90	4.16	4.52	3.16	3.34
32	W36X395	3.63	3.82	4.12	4.37	3.17	3.32	3.64	3.90	4.16	4.52	3.16	3.34
33	W36X361	3.63	3.82	4.13	4.37	3.18	3.32	3.64	3.90	4.16	4.52	3.16	3.35
34	W36X330	3.63	3.82	4.13	4.37	3.18	3.32	3.64	3.90	4.16	4.52	3.16	3.35
35	W36X302	3.63	3.82	4.13	4.37	3.18	3.32	3.64	3.90	4.16	4.52	3.16	3.35
36	W36X282	3.63	3.82	4.13	4.37	3.18	3.32	3.64	3.90	4.17	4.52	3.16	3.35

37	W36X262	3.63	3.82	4.13	4.37	3.18	3.32	3.64	3.90	4.17	4.52	3.16	3.35
38	W36X247	3.63	3.82	4.13	4.37	3.18	3.32	3.64	3.91	4.17	4.52	3.16	3.35
39	W36X231	3.63	3.82	4.13	4.37	3.18	3.32	3.64	3.91	4.17	4.52	3.16	3.35
40	W36X256	3.64	3.83	4.13	4.38	3.18	3.33	3.65	3.91	4.17	4.53	3.17	3.35
41	W36X232	3.64	3.83	4.13	4.38	3.18	3.33	3.65	3.91	4.17	4.53	3.17	3.35
42	W36X210	3.64	3.83	4.14	4.38	3.19	3.33	3.65	3.91	4.17	4.53	3.17	3.36
43	W36X194	3.64	3.83	4.13	4.38	3.19	3.33	3.65	3.91	4.17	4.53	3.17	3.36
44	W36X182	3.64	3.83	4.13	4.38	3.19	3.33	3.65	3.91	4.17	4.53	3.17	3.36
45	W36X170	3.64	3.83	4.14	4.38	3.19	3.33	3.65	3.92	4.18	4.53	3.17	3.36
46	W36X160	3.64	3.83	4.14	4.38	3.19	3.33	3.65	3.91	4.17	4.53	3.17	3.36
47	W36X150	3.64	3.83	4.14	4.39	3.19	3.33	3.65	3.92	4.18	4.53	3.18	3.36
48	W36X135	3.65	3.84	4.14	4.39	3.20	3.34	3.66	3.92	4.18	4.54	3.18	3.37
49	W33X387	3.63	3.82	4.13	4.37	3.18	3.32	3.64	3.90	4.16	4.52	3.16	3.35
50	W33X354	3.63	3.82	4.12	4.37	3.17	3.32	3.64	3.90	4.16	4.52	3.16	3.34
51	W33X318	3.63	3.82	4.12	4.37	3.17	3.32	3.64	3.90	4.16	4.52	3.16	3.35
52	W33X291	3.63	3.82	4.12	4.37	3.17	3.32	3.64	3.90	4.16	4.52	3.16	3.34
53	W33X263	3.63	3.82	4.12	4.37	3.18	3.32	3.64	3.90	4.16	4.52	3.16	3.34
54	W33X241	3.63	3.82	4.13	4.37	3.18	3.32	3.64	3.90	4.17	4.52	3.16	3.35
55	W33X221	3.63	3.82	4.13	4.37	3.18	3.32	3.64	3.91	4.17	4.52	3.16	3.35
56	W33X201	3.63	3.82	4.13	4.37	3.18	3.32	3.64	3.91	4.17	4.52	3.16	3.35
57	W33X169	3.64	3.83	4.13	4.38	3.18	3.33	3.65	3.91	4.17	4.53	3.17	3.35
58	W33X152	3.64	3.83	4.13	4.38	3.19	3.33	3.65	3.91	4.17	4.53	3.17	3.35
59	W33X141	3.64	3.83	4.13	4.38	3.19	3.33	3.65	3.91	4.17	4.53	3.17	3.36
60	W33X130	3.64	3.83	4.14	4.38	3.19	3.33	3.65	3.92	4.18	4.53	3.17	3.36
61	W33X118	3.64	3.84	4.14	4.39	3.19	3.33	3.65	3.92	4.18	4.53	3.18	3.36
62	W30X391	3.62	3.82	4.12	4.37	3.17	3.31	3.63	3.90	4.16	4.52	3.16	3.34
63	W30X357	3.62	3.82	4.12	4.37	3.17	3.31	3.63	3.90	4.16	4.52	3.16	3.34
64	W30X326	3.63	3.82	4.12	4.37	3.17	3.31	3.63	3.90	4.16	4.52	3.16	3.34
65	W30X292	3.63	3.82	4.12	4.37	3.17	3.31	3.64	3.90	4.16	4.52	3.16	3.34
66	W30X261	3.63	3.82	4.12	4.37	3.17	3.32	3.64	3.90	4.16	4.52	3.16	3.34
67	W30X235	3.62	3.82	4.12	4.37	3.17	3.31	3.63	3.90	4.16	4.52	3.16	3.34
68	W30X211	3.63	3.82	4.13	4.37	3.18	3.32	3.64	3.90	4.16	4.52	3.16	3.34
69	W30X191	3.63	3.82	4.12	4.37	3.18	3.32	3.64	3.90	4.16	4.52	3.16	3.34
70	W30X173	3.63	3.82	4.13	4.37	3.18	3.32	3.64	3.90	4.17	4.52	3.16	3.35
71	W30X148	3.63	3.83	4.13	4.38	3.18	3.32	3.64	3.91	4.17	4.53	3.17	3.35
72	W30X132	3.64	3.83	4.13	4.38	3.19	3.33	3.65	3.91	4.17	4.53	3.17	3.36
73	W30X124	3.64	3.83	4.14	4.38	3.19	3.33	3.65	3.91	4.17	4.53	3.17	3.36
74	W30X116	3.64	3.83	4.14	4.38	3.19	3.33	3.65	3.92	4.18	4.53	3.18	3.36
75	W30X108	3.64	3.83	4.14	4.39	3.19	3.33	3.65	3.92	4.18	4.53	3.18	3.36
76	W30X99	3.65	3.84	4.14	4.39	3.20	3.34	3.66	3.92	4.18	4.54	3.18	3.36
77	W30X90	3.64	3.84	4.14	4.39	3.19	3.33	3.66	3.92	4.18	4.53	3.18	3.36
78	W27X539	3.62	3.81	4.12	4.37	3.17	3.31	3.63	3.90	4.16	4.51	3.15	3.34
79	W27X368	3.62	3.81	4.12	4.37	3.17	3.31	3.63	3.90	4.16	4.52	3.15	3.34
80	W27X336	3.62	3.82	4.12	4.37	3.17	3.31	3.63	3.90	4.16	4.52	3.16	3.34
81	W27X307	3.62	3.81	4.12	4.37	3.17	3.31	3.63	3.90	4.16	4.52	3.15	3.34
82	W27X281	3.62	3.82	4.12	4.37	3.17	3.31	3.63	3.90	4.16	4.52	3.16	3.34
83	W27X258	3.62	3.82	4.12	4.37	3.17	3.31	3.63	3.90	4.16	4.52	3.16	3.34
84	W27X235	3.62	3.82	4.12	4.37	3.17	3.31	3.63	3.90	4.16	4.52	3.16	3.34

85	W27X217	3.62	3.82	4.12	4.37	3.17	3.31	3.64	3.90	4.16	4.52	3.16	3.34
86	W27X194	3.62	3.82	4.12	4.37	3.17	3.31	3.64	3.90	4.16	4.52	3.16	3.34
87	W27X178	3.63	3.82	4.12	4.37	3.17	3.32	3.64	3.90	4.16	4.52	3.16	3.35
88	W27X161	3.63	3.82	4.13	4.37	3.18	3.32	3.64	3.90	4.16	4.52	3.16	3.35
89	W27X146	3.63	3.82	4.13	4.37	3.18	3.32	3.64	3.90	4.17	4.52	3.16	3.35
90	W27X129	3.63	3.82	4.13	4.38	3.18	3.32	3.64	3.91	4.17	4.53	3.17	3.35
91	W27X114	3.64	3.83	4.13	4.38	3.18	3.33	3.64	3.91	4.17	4.53	3.17	3.35
92	W27X102	3.64	3.83	4.13	4.38	3.19	3.33	3.65	3.91	4.17	4.53	3.17	3.35
93	W27X94	3.64	3.83	4.13	4.38	3.19	3.33	3.65	3.91	4.17	4.53	3.17	3.36
94	W27X84	3.64	3.83	4.14	4.38	3.19	3.33	3.65	3.92	4.18	4.53	3.18	3.36
95	W24X370	3.62	3.81	4.12	4.37	3.17	3.31	3.63	3.90	4.16	4.52	3.15	3.34
96	W24X335	3.62	3.81	4.12	4.37	3.17	3.31	3.63	3.90	4.16	4.52	3.15	3.34
97	W24X306	3.62	3.81	4.12	4.37	3.17	3.31	3.63	3.90	4.16	4.52	3.15	3.34
98	W24X279	3.62	3.81	4.12	4.37	3.17	3.31	3.63	3.90	4.16	4.52	3.16	3.34
99	W24X250	3.62	3.81	4.12	4.37	3.17	3.31	3.63	3.90	4.16	4.52	3.15	3.34
100	W24X229	3.62	3.82	4.12	4.37	3.17	3.31	3.63	3.90	4.16	4.52	3.16	3.34
101	W24X207	3.62	3.82	4.12	4.37	3.17	3.31	3.63	3.90	4.16	4.52	3.16	3.34
102	W24X192	3.62	3.82	4.12	4.37	3.17	3.31	3.63	3.90	4.16	4.52	3.16	3.34
103	W24X176	3.62	3.82	4.12	4.37	3.17	3.31	3.63	3.90	4.16	4.52	3.16	3.34
104	W24X162	3.63	3.82	4.12	4.37	3.17	3.31	3.64	3.90	4.16	4.52	3.16	3.34
105	W24X146	3.63	3.82	4.12	4.37	3.17	3.31	3.64	3.90	4.16	4.52	3.16	3.34
106	W24X131	3.63	3.82	4.12	4.37	3.18	3.32	3.64	3.90	4.16	4.52	3.16	3.35
107	W24X117	3.63	3.82	4.13	4.37	3.18	3.32	3.64	3.90	4.16	4.52	3.16	3.35
108	W24X104	3.63	3.82	4.13	4.38	3.18	3.32	3.64	3.91	4.17	4.52	3.16	3.35
109	W24X103	3.63	3.82	4.13	4.38	3.18	3.32	3.64	3.91	4.17	4.52	3.17	3.35
110	W24X94	3.64	3.83	4.13	4.38	3.18	3.32	3.64	3.91	4.17	4.53	3.17	3.35
111	W24X84	3.64	3.83	4.13	4.38	3.18	3.33	3.65	3.91	4.17	4.53	3.17	3.35
112	W24X76	3.64	3.83	4.13	4.38	3.19	3.33	3.65	3.91	4.18	4.53	3.17	3.36
113	W24X68	3.64	3.83	4.13	4.38	3.19	3.33	3.65	3.91	4.17	4.53	3.17	3.36
114	W24X62	3.65	3.84	4.15	4.39	3.20	3.34	3.66	3.92	4.18	4.54	3.18	3.37
115	W24X55	3.65	3.84	4.14	4.39	3.20	3.34	3.66	3.92	4.18	4.54	3.19	3.37
116	W21X201	3.62	3.81	4.12	4.37	3.17	3.31	3.63	3.90	4.16	4.52	3.15	3.34
117	W21X182	3.62	3.81	4.12	4.37	3.17	3.31	3.63	3.90	4.16	4.52	3.15	3.34
118	W21X166	3.62	3.81	4.12	4.37	3.17	3.31	3.63	3.90	4.16	4.52	3.15	3.34
119	W21X147	3.63	3.82	4.12	4.37	3.17	3.31	3.64	3.90	4.16	4.52	3.16	3.34
120	W21X132	3.62	3.82	4.12	4.37	3.17	3.31	3.63	3.90	4.16	4.52	3.16	3.34
121	W21X122	3.63	3.82	4.12	4.37	3.17	3.31	3.64	3.90	4.16	4.52	3.16	3.34
122	W21X111	3.63	3.82	4.12	4.37	3.17	3.32	3.64	3.90	4.16	4.52	3.16	3.34
123	W21X101	3.63	3.82	4.12	4.37	3.17	3.32	3.64	3.90	4.16	4.52	3.16	3.34
124	W21X93	3.63	3.83	4.13	4.38	3.18	3.32	3.65	3.91	4.17	4.53	3.17	3.35
125	W21X83	3.63	3.83	4.13	4.38	3.18	3.32	3.64	3.91	4.17	4.52	3.17	3.35
126	W21X73	3.63	3.83	4.13	4.38	3.18	3.32	3.65	3.91	4.17	4.53	3.17	3.35
127	W21X68	3.63	3.83	4.13	4.38	3.18	3.32	3.64	3.91	4.17	4.53	3.17	3.35
128	W21X62	3.64	3.83	4.13	4.38	3.19	3.33	3.65	3.91	4.17	4.53	3.17	3.35
129	W21X55	3.64	3.83	4.13	4.38	3.19	3.33	3.65	3.91	4.17	4.53	3.17	3.36
130	W21X48*	3.64	3.83	4.14	4.38	3.19	3.33	3.65	3.91	4.18	4.53	3.17	3.36
131	W21X57	3.64	3.83	4.13	4.38	3.19	3.33	3.65	3.91	4.17	4.53	3.17	3.36
132	W21X50	3.64	3.84	4.14	4.39	3.19	3.34	3.65	3.92	4.18	4.53	3.18	3.37

133	W21X44	3.65	3.84	4.14	4.39	3.20	3.34	3.66	3.92	4.18	4.54	3.18	3.37
134	W18X311	3.62	3.81	4.12	4.36	3.16	3.31	3.63	3.89	4.16	4.51	3.15	3.33
135	W18X283	3.62	3.81	4.12	4.37	3.17	3.31	3.63	3.90	4.16	4.52	3.15	3.34
136	W18X258	3.62	3.81	4.12	4.37	3.17	3.31	3.63	3.90	4.16	4.51	3.15	3.34
137	W18X234	3.62	3.81	4.12	4.37	3.17	3.31	3.63	3.90	4.16	4.51	3.15	3.34
138	W18X211	3.62	3.81	4.12	4.37	3.17	3.31	3.63	3.89	4.16	4.51	3.15	3.34
139	W18X192	3.62	3.81	4.12	4.37	3.17	3.31	3.63	3.90	4.16	4.51	3.15	3.34
140	W18X175	3.62	3.81	4.12	4.37	3.17	3.31	3.63	3.90	4.16	4.51	3.15	3.34
141	W18X158	3.62	3.81	4.12	4.37	3.17	3.31	3.63	3.90	4.16	4.52	3.15	3.34
142	W18X143	3.62	3.81	4.12	4.37	3.17	3.31	3.63	3.90	4.16	4.52	3.15	3.34
143	W18X130	3.62	3.81	4.12	4.37	3.17	3.31	3.63	3.90	4.16	4.51	3.15	3.34
144	W18X119	3.62	3.82	4.12	4.37	3.17	3.31	3.63	3.90	4.16	4.52	3.16	3.34
145	W18X106	3.62	3.82	4.12	4.37	3.17	3.31	3.63	3.90	4.16	4.52	3.16	3.34
146	W18X97	3.62	3.82	4.12	4.37	3.17	3.31	3.63	3.90	4.16	4.52	3.16	3.34
147	W18X86	3.62	3.82	4.12	4.37	3.17	3.31	3.63	3.90	4.16	4.52	3.16	3.34
148	W18X76	3.63	3.82	4.12	4.37	3.17	3.31	3.64	3.90	4.16	4.52	3.16	3.34
149	W18X71	3.63	3.82	4.13	4.38	3.18	3.32	3.64	3.91	4.17	4.52	3.17	3.35
150	W18X65	3.63	3.82	4.13	4.38	3.18	3.32	3.64	3.91	4.17	4.53	3.16	3.35
151	W18X60	3.63	3.82	4.13	4.38	3.18	3.32	3.64	3.91	4.17	4.52	3.16	3.35
152	W18X55	3.64	3.83	4.13	4.38	3.18	3.32	3.65	3.91	4.17	4.53	3.17	3.35
153	W18X50	3.63	3.82	4.13	4.38	3.18	3.32	3.64	3.90	4.17	4.53	3.17	3.35
154	W18X46	3.63	3.83	4.13	4.38	3.19	3.33	3.65	3.91	4.17	4.53	3.17	3.36
155	W18X40	3.64	3.83	4.14	4.37	3.19	3.33	3.65	3.91	4.17	4.53	3.17	3.36
156	W18X35	3.64	3.83	4.14	4.38	3.19	3.33	3.65	3.92	4.18	4.53	3.18	3.36
157	W16X100	3.62	3.81	4.12	4.37	3.17	3.31	3.63	3.90	4.16	4.52	3.15	3.34
158	W16X89	3.62	3.81	4.12	4.37	3.17	3.31	3.63	3.90	4.16	4.52	3.15	3.34
159	W16X77	3.62	3.81	4.12	4.37	3.17	3.31	3.63	3.90	4.16	4.52	3.15	3.34
160	W16X67	3.62	3.82	4.12	4.37	3.17	3.31	3.63	3.90	4.16	4.52	3.15	3.34
161	W16X57	3.63	3.82	4.13	4.38	3.18	3.32	3.64	3.91	4.17	4.52	3.16	3.35
162	W16X50	3.63	3.82	4.13	4.38	3.18	3.32	3.64	3.90	4.17	4.53	3.16	3.35
163	W16X45	3.63	3.82	4.13	4.37	3.18	3.32	3.64	3.90	4.17	4.52	3.16	3.35
164	W16X40	3.63	3.82	4.13	4.38	3.18	3.32	3.64	3.90	4.17	4.53	3.16	3.35
165	W16X36	3.64	3.82	4.13	4.39	3.18	3.33	3.64	3.91	4.16	4.53	3.16	3.35
166	W16X31	3.64	3.83	4.13	4.39	3.19	3.33	3.65	3.92	4.18	4.53	3.18	3.36
167	W16X26	3.65	3.83	4.13	4.38	3.19	3.33	3.65	3.91	4.18	4.53	3.18	3.37
168	W14X730	3.61	3.80	4.11	4.36	3.15	3.30	3.62	3.89	4.15	4.51	3.14	3.32
169	W14X665	3.61	3.80	4.11	4.36	3.15	3.30	3.62	3.89	4.15	4.51	3.14	3.32
170	W14X605	3.61	3.80	4.11	4.36	3.15	3.30	3.62	3.89	4.15	4.51	3.14	3.32
171	W14X550	3.61	3.80	4.11	4.36	3.15	3.30	3.62	3.89	4.15	4.51	3.14	3.32
172	W14X500	3.61	3.80	4.11	4.36	3.16	3.30	3.62	3.89	4.15	4.51	3.14	3.33
173	W14X455	3.61	3.80	4.11	4.36	3.16	3.30	3.62	3.89	4.15	4.51	3.14	3.33
174	W14X426	3.61	3.80	4.11	4.36	3.16	3.30	3.62	3.89	4.15	4.51	3.14	3.33
175	W14X398	3.61	3.80	4.11	4.36	3.16	3.30	3.62	3.89	4.15	4.51	3.14	3.33
176	W14X370	3.61	3.80	4.11	4.36	3.16	3.30	3.62	3.89	4.15	4.51	3.14	3.33
177	W14X342	3.61	3.80	4.11	4.36	3.16	3.30	3.62	3.89	4.15	4.51	3.14	3.33
178	W14X311	3.61	3.80	4.11	4.36	3.16	3.30	3.62	3.89	4.15	4.51	3.14	3.33
179	W14X283	3.61	3.80	4.11	4.36	3.16	3.30	3.62	3.89	4.15	4.51	3.14	3.33
180	W14X257	3.61	3.80	4.11	4.36	3.16	3.30	3.62	3.89	4.15	4.51	3.14	3.33

181	W14X233	3.61	3.80	4.11	4.36	3.16	3.30	3.62	3.89	4.15	4.51	3.14	3.33
182	W14X211	3.61	3.81	4.11	4.36	3.16	3.30	3.62	3.89	4.15	4.51	3.14	3.33
183	W14X193	3.61	3.80	4.11	4.36	3.16	3.30	3.62	3.89	4.15	4.51	3.14	3.33
184	W14X176	3.61	3.80	4.11	4.36	3.16	3.30	3.62	3.89	4.15	4.51	3.14	3.33
185	W14X159	3.61	3.80	4.11	4.36	3.16	3.30	3.62	3.89	4.15	4.51	3.14	3.33
186	W14X145	3.61	3.81	4.11	4.36	3.16	3.30	3.62	3.89	4.15	4.51	3.14	3.33
187	W14X132	3.61	3.81	4.11	4.36	3.16	3.30	3.62	3.89	4.15	4.51	3.14	3.33
188	W14X120	3.61	3.81	4.11	4.36	3.16	3.30	3.62	3.89	4.15	4.51	3.14	3.33
189	W14X109	3.61	3.80	4.11	4.36	3.16	3.30	3.62	3.89	4.15	4.51	3.14	3.33
190	W14X99	3.61	3.80	4.11	4.36	3.16	3.30	3.62	3.89	4.15	4.51	3.14	3.33
191	W14X90	3.60	3.79	4.10	4.35	3.14	3.29	3.61	3.88	4.14	4.50	3.13	3.31
192	W14X82	3.62	3.81	4.12	4.37	3.17	3.31	3.63	3.90	4.16	4.51	3.15	3.34
193	W14X74	3.62	3.81	4.12	4.37	3.16	3.31	3.63	3.90	4.16	4.51	3.15	3.33
194	W14X68	3.62	3.81	4.12	4.36	3.16	3.31	3.63	3.89	4.16	4.51	3.15	3.34
195	W14X61	3.62	3.81	4.12	4.37	3.17	3.31	3.63	3.90	4.16	4.51	3.15	3.34
196	W14X53	3.62	3.82	4.12	4.37	3.17	3.31	3.63	3.90	4.16	4.52	3.15	3.34
197	W14X48	3.62	3.81	4.12	4.37	3.17	3.31	3.63	3.90	4.16	4.52	3.15	3.34
198	W14X43	3.62	3.81	4.12	4.37	3.17	3.31	3.64	3.90	4.16	4.52	3.15	3.34
199	W14X38	3.63	3.82	4.12	4.38	3.17	3.31	3.64	3.90	4.17	4.53	3.16	3.35
200	W14X34	3.63	3.82	4.12	4.38	3.18	3.32	3.64	3.91	4.17	4.54	3.17	3.35
201	W14X30	3.63	3.82	4.13	4.38	3.18	3.32	3.64	3.90	4.17	4.53	3.17	3.35
202	W14X26	3.64	3.83	4.14	4.38	3.18	3.33	3.64	3.91	4.17	4.53	3.17	3.35
203	W14X22	3.64	3.83	4.13	4.37	3.20	3.33	3.65	3.93	4.18	4.52	3.17	3.36
204	W12X336	3.61	3.80	4.11	4.36	3.16	3.30	3.62	3.89	4.15	4.51	3.14	3.33
205	W12X305	3.61	3.80	4.11	4.36	3.16	3.30	3.62	3.89	4.15	4.51	3.14	3.33
206	W12X279	3.61	3.80	4.11	4.36	3.16	3.30	3.62	3.89	4.15	4.51	3.14	3.33
207	W12X252	3.61	3.80	4.11	4.36	3.16	3.30	3.62	3.89	4.15	4.51	3.14	3.33
208	W12X230	3.61	3.80	4.11	4.36	3.16	3.30	3.62	3.89	4.15	4.51	3.14	3.33
209	W12X210	3.61	3.80	4.11	4.36	3.16	3.30	3.62	3.89	4.15	4.51	3.14	3.33
210	W12X190	3.61	3.80	4.11	4.36	3.16	3.30	3.62	3.89	4.15	4.51	3.14	3.33
211	W12X170	3.61	3.80	4.11	4.36	3.16	3.30	3.62	3.89	4.15	4.51	3.14	3.33
212	W12X152	3.61	3.80	4.11	4.36	3.16	3.30	3.62	3.89	4.15	4.51	3.14	3.33
213	W12X136	3.61	3.80	4.11	4.36	3.16	3.30	3.62	3.89	4.15	4.51	3.14	3.33
214	W12X120	3.61	3.81	4.11	4.36	3.16	3.30	3.62	3.89	4.15	4.51	3.14	3.33
215	W12X106	3.61	3.81	4.11	4.36	3.16	3.30	3.62	3.89	4.15	4.51	3.14	3.33
216	W12X96	3.62	3.81	4.11	4.36	3.16	3.30	3.63	3.89	4.15	4.51	3.14	3.33
217	W12X87	3.61	3.81	4.11	4.36	3.16	3.30	3.62	3.89	4.15	4.51	3.14	3.33
218	W12X79	3.61	3.81	4.11	4.36	3.16	3.30	3.63	3.89	4.15	4.51	3.15	3.33
219	W12X72	3.62	3.81	4.11	4.36	3.16	3.30	3.62	3.89	4.15	4.50	3.14	3.33
220	W12X65	3.60	3.80	4.10	4.35	3.15	3.29	3.62	3.88	4.14	4.50	3.13	3.32
221	W12X58	3.62	3.81	4.12	4.36	3.16	3.30	3.63	3.89	4.15	4.52	3.15	3.33
222	W12X53	3.62	3.81	4.12	4.36	3.16	3.30	3.63	3.89	4.16	4.51	3.15	3.33
223	W12X50	3.62	3.81	4.12	4.37	3.17	3.31	3.63	3.90	4.16	4.51	3.15	3.34
224	W12X45	3.62	3.81	4.12	4.37	3.17	3.31	3.63	3.90	4.16	4.52	3.15	3.34
225	W12X40	3.62	3.81	4.12	4.37	3.16	3.31	3.63	3.90	4.16	4.52	3.15	3.33
226	W12X35	3.63	3.81	4.13	4.37	3.17	3.31	3.64	3.91	4.16	4.53	3.16	3.34
227	W12X30	3.63	3.82	4.12	4.37	3.17	3.31	3.63	3.91	4.16	4.52	3.16	3.34
228	W12X26	3.62	3.81	4.13	4.37	3.18	3.32	3.64	3.89	4.17	4.51	3.16	3.35

229	W12X22	3.63	3.82	4.13	4.40	3.19	3.34	3.65	3.90	4.19	4.53	3.17	3.37
230	W12X19	3.65	3.84	4.13	4.37	3.18	3.34	3.65	3.90	4.17	4.53	3.18	3.37
231	W12X16	3.65	3.85	4.14	4.40	3.19	3.35	3.65	3.93	4.18	4.53	3.18	3.37
232	W12X14	3.66	3.85	4.15	4.39	3.20	3.35	3.67	3.92	4.19	4.55	3.17	3.35
233	W10X112	3.61	3.80	4.11	4.36	3.16	3.30	3.62	3.89	4.15	4.51	3.14	3.33
234	W10X100	3.61	3.80	4.11	4.36	3.16	3.30	3.62	3.89	4.15	4.51	3.14	3.33
235	W10X88	3.61	3.80	4.11	4.36	3.16	3.30	3.62	3.89	4.15	4.51	3.14	3.33
236	W10X77	3.61	3.81	4.11	4.36	3.16	3.30	3.62	3.89	4.15	4.51	3.14	3.33
237	W10X68	3.61	3.81	4.11	4.36	3.16	3.30	3.62	3.89	4.15	4.50	3.14	3.33
238	W10X60	3.61	3.81	4.11	4.36	3.16	3.30	3.63	3.89	4.15	4.50	3.14	3.33
239	W10X54	3.61	3.81	4.11	4.36	3.16	3.30	3.62	3.89	4.15	4.51	3.14	3.32
240	W10X49	3.61	3.80	4.11	4.35	3.16	3.30	3.62	3.89	4.15	4.51	3.15	3.33
241	W10X45	3.62	3.81	4.12	4.36	3.16	3.31	3.62	3.89	4.15	4.51	3.14	3.34
242	W10X39	3.62	3.81	4.12	4.36	3.16	3.30	3.63	3.89	4.16	4.52	3.15	3.34
243	W10X33	3.62	3.82	4.11	4.36	3.16	3.31	3.63	3.89	4.15	4.51	3.15	3.34
244	W10X30	3.62	3.82	4.12	4.37	3.17	3.32	3.64	3.89	4.16	4.51	3.16	3.35
245	W10X26	3.62	3.83	4.12	4.37	3.17	3.31	3.64	3.92	4.16	4.51	3.16	3.34
246	W10X22	3.63	3.81	4.13	4.37	3.18	3.32	3.64	3.90	4.16	4.51	3.17	3.35
247	W10X19	3.63	3.83	4.12	4.37	3.18	3.32	3.65	3.92	4.19	4.53	3.18	3.35
248	W10X17	3.65	3.84	4.13	4.37	3.18	3.33	3.65	3.91	4.18	4.52	3.16	3.37
249	W10X15	3.67	3.84	4.13	4.41	3.19	3.32	3.66	3.94	4.19	4.53	3.19	3.36
250	W10X12	3.64	3.83	4.13	4.41	3.21	3.37	3.65	3.91	4.17	4.50	3.17	3.35
	MIN	**3.60**	**3.79**	**4.10**	**4.35**	**3.14**	**3.29**	**3.61**	**3.88**	**4.14**	**4.50**	**3.13**	**3.31**
	MAX	**3.67**	**3.85**	**4.15**	**4.41**	**3.21**	**3.37**	**3.67**	**3.94**	**4.19**	**4.55**	**3.19**	**3.37**
	AVE	**3.63**	**3.82**	**4.12**	**4.37**	**3.17**	**3.32**	**3.64**	**3.90**	**4.16**	**4.52**	**3.16**	**3.34**

Table C- 4. Reliability Indices for Noncomposite Rolled I-shaped Girdes for ADTT 1'000 and L=90, 120, 200ft.

		L=90 ft						L=120 ft						L=200 ft					
	Φ	1.00		0.95		1.05		1.00		0.95		1.05		1.00		0.95		1.05	
#	Shape \ D/(D+L)	0.45	0.60	0.45	0.60	0.45	0.60	0.50	0.65	0.50	0.65	0.50	0.65	0.60	0.75	0.60	0.75	0.60	0.75
1	W44X335	3.78	3.96	4.35	4.60	3.27	3.38	3.90	4.04	4.50	4.71	3.37	3.43	4.27	4.14	4.93	4.86	3.67	3.50
2	W44X290	3.78	3.96	4.35	4.60	3.26	3.38	3.90	4.04	4.50	4.70	3.36	3.43	4.26	4.14	4.92	4.86	3.66	3.50
3	W44X262	3.78	3.96	4.35	4.60	3.27	3.38	3.90	4.04	4.50	4.70	3.36	3.43	4.26	4.14	4.92	4.86	3.66	3.50
4	W44X230	3.78	3.96	4.35	4.60	3.27	3.38	3.90	4.04	4.50	4.70	3.36	3.43	4.26	4.14	4.92	4.86	3.67	3.50
5	W40X593	3.77	3.95	4.34	4.60	3.26	3.37	3.90	4.03	4.49	4.70	3.36	3.43	4.26	4.14	4.92	4.85	3.66	3.49
6	W40X503	3.78	3.96	4.34	4.60	3.26	3.38	3.90	4.03	4.49	4.70	3.36	3.43	4.26	4.14	4.92	4.85	3.66	3.49
7	W40X431	3.78	3.96	4.34	4.60	3.26	3.38	3.90	4.03	4.49	4.70	3.36	3.43	4.26	4.14	4.92	4.85	3.66	3.49
8	W40X397	3.78	3.96	4.35	4.60	3.26	3.38	3.90	4.03	4.49	4.70	3.36	3.43	4.26	4.14	4.92	4.85	3.66	3.49
9	W40X372	3.78	3.96	4.34	4.60	3.26	3.38	3.90	4.03	4.49	4.70	3.36	3.43	4.26	4.14	4.92	4.85	3.66	3.49
10	W40X362	3.78	3.96	4.34	4.60	3.26	3.38	3.90	4.03	4.49	4.70	3.36	3.43	4.26	4.14	4.92	4.85	3.66	3.49
11	W40X324	3.78	3.96	4.34	4.60	3.26	3.38	3.90	4.03	4.49	4.70	3.36	3.43	4.26	4.14	4.92	4.85	3.66	3.49
12	W40X297	3.78	3.96	4.35	4.60	3.26	3.38	3.90	4.03	4.49	4.70	3.36	3.43	4.26	4.14	4.92	4.85	3.66	3.49
13	W40X277	3.78	3.96	4.34	4.60	3.26	3.38	3.90	4.03	4.49	4.70	3.36	3.43	4.26	4.14	4.92	4.85	3.66	3.49
14	W40X249	3.78	3.96	4.34	4.60	3.26	3.38	3.90	4.03	4.49	4.70	3.36	3.43	4.26	4.14	4.92	4.85	3.66	3.49
15	W40X215	3.78	3.96	4.35	4.60	3.26	3.38	3.90	4.03	4.49	4.70	3.36	3.43	4.26	4.14	4.92	4.85	3.66	3.49

16	W40X199	3.78	3.96	4.35	4.60	3.27	3.38	3.90	4.04	4.50	4.70	3.36	3.43	4.26	4.14	4.92	4.86	3.66	3.50
17	W40X392	3.78	3.96	4.35	4.60	3.27	3.38	3.90	4.04	4.50	4.71	3.37	3.44	4.27	4.14	4.93	4.86	3.67	3.50
18	W40X331	3.78	3.96	4.35	4.61	3.27	3.39	3.91	4.04	4.50	4.71	3.37	3.44	4.27	4.15	4.93	4.86	3.67	3.50
19	W40X327	3.78	3.96	4.35	4.60	3.27	3.38	3.90	4.04	4.50	4.71	3.37	3.44	4.27	4.14	4.93	4.86	3.67	3.50
20	W40X294	3.78	3.96	4.35	4.60	3.27	3.38	3.90	4.04	4.50	4.71	3.37	3.44	4.27	4.14	4.93	4.86	3.67	3.50
21	W40X278	3.79	3.97	4.35	4.61	3.27	3.39	3.91	4.04	4.50	4.71	3.37	3.44	4.27	4.15	4.93	4.86	3.67	3.50
22	W40X264	3.78	3.97	4.35	4.61	3.27	3.39	3.91	4.04	4.50	4.71	3.37	3.44	4.27	4.15	4.93	4.86	3.67	3.50
23	W40X235	3.78	3.96	4.35	4.60	3.27	3.38	3.90	4.04	4.50	4.71	3.37	3.43	4.26	4.14	4.93	4.86	3.67	3.50
24	W40X211	3.78	3.96	4.35	4.60	3.27	3.38	3.90	4.04	4.50	4.71	3.37	3.44	4.27	4.14	4.93	4.86	3.67	3.50
25	W40X183	3.78	3.96	4.35	4.60	3.27	3.38	3.90	4.04	4.50	4.71	3.37	3.44	4.27	4.14	4.93	4.86	3.67	3.50
26	W40X167	3.79	3.97	4.35	4.61	3.27	3.39	3.91	4.04	4.50	4.71	3.37	3.44	4.27	4.15	4.93	4.86	3.67	3.50
27	W40X149	3.79	3.97	4.36	4.61	3.28	3.39	3.91	4.05	4.51	4.71	3.38	3.45	4.27	4.15	4.93	4.86	3.68	3.51
28	W36X652	3.77	3.95	4.34	4.59	3.26	3.37	3.89	4.03	4.49	4.70	3.35	3.42	4.25	4.13	4.92	4.85	3.66	3.49
29	W36X529	3.77	3.95	4.34	4.60	3.26	3.37	3.89	4.03	4.49	4.70	3.35	3.42	4.26	4.14	4.92	4.85	3.66	3.49
30	W36X487	3.77	3.95	4.34	4.60	3.26	3.37	3.89	4.03	4.49	4.70	3.36	3.42	4.26	4.14	4.92	4.85	3.66	3.49
31	W36X441	3.77	3.95	4.34	4.60	3.26	3.37	3.89	4.03	4.49	4.70	3.35	3.42	4.26	4.13	4.92	4.85	3.66	3.49
32	W36X395	3.77	3.95	4.34	4.60	3.26	3.37	3.89	4.03	4.49	4.70	3.36	3.42	4.26	4.13	4.92	4.85	3.66	3.49
33	W36X361	3.77	3.95	4.34	4.60	3.26	3.37	3.90	4.03	4.49	4.70	3.36	3.43	4.26	4.14	4.92	4.85	3.66	3.49
34	W36X330	3.77	3.95	4.34	4.60	3.26	3.37	3.90	4.03	4.49	4.70	3.36	3.43	4.26	4.14	4.92	4.85	3.66	3.49
35	W36X302	3.77	3.96	4.34	4.60	3.26	3.37	3.90	4.03	4.49	4.70	3.36	3.43	4.26	4.14	4.92	4.85	3.66	3.49
36	W36X282	3.77	3.96	4.34	4.60	3.26	3.37	3.90	4.03	4.49	4.70	3.36	3.43	4.26	4.14	4.92	4.85	3.66	3.49
37	W36X262	3.77	3.96	4.34	4.60	3.26	3.37	3.90	4.03	4.49	4.70	3.36	3.43	4.26	4.14	4.92	4.85	3.66	3.49
38	W36X247	3.78	3.96	4.34	4.60	3.26	3.38	3.90	4.03	4.49	4.70	3.36	3.43	4.26	4.14	4.92	4.85	3.66	3.49
39	W36X231	3.78	3.96	4.34	4.60	3.26	3.38	3.90	4.03	4.49	4.70	3.36	3.43	4.26	4.14	4.92	4.85	3.66	3.49
40	W36X256	3.78	3.96	4.35	4.60	3.27	3.38	3.90	4.04	4.50	4.70	3.36	3.43	4.26	4.14	4.92	4.86	3.67	3.50
41	W36X232	3.78	3.96	4.35	4.60	3.27	3.38	3.90	4.04	4.50	4.70	3.36	3.43	4.26	4.14	4.92	4.86	3.67	3.50
42	W36X210	3.78	3.96	4.35	4.60	3.27	3.39	3.91	4.04	4.50	4.71	3.37	3.44	4.27	4.15	4.93	4.86	3.67	3.50
43	W36X194	3.78	3.96	4.35	4.60	3.27	3.38	3.90	4.04	4.50	4.71	3.37	3.44	4.27	4.14	4.93	4.86	3.67	3.50
44	W36X182	3.78	3.96	4.35	4.60	3.27	3.39	3.91	4.04	4.50	4.71	3.37	3.44	4.27	4.14	4.93	4.86	3.67	3.50
45	W36X170	3.79	3.97	4.35	4.61	3.27	3.39	3.91	4.04	4.50	4.71	3.37	3.44	4.27	4.15	4.93	4.86	3.67	3.50
46	W36X160	3.79	3.97	4.35	4.60	3.27	3.39	3.91	4.04	4.50	4.71	3.37	3.44	4.27	4.15	4.93	4.86	3.67	3.50
47	W36X150	3.79	3.97	4.36	4.61	3.28	3.39	3.91	4.04	4.50	4.71	3.37	3.44	4.27	4.15	4.93	4.86	3.67	3.51
48	W36X135	3.79	3.97	4.36	4.61	3.28	3.39	3.91	4.05	4.51	4.71	3.38	3.45	4.27	4.15	4.93	4.86	3.68	3.51
49	W33X387	3.77	3.96	4.34	4.60	3.26	3.37	3.90	4.03	4.49	4.70	3.36	3.43	4.26	4.14	4.92	4.85	3.66	3.49
50	W33X354	3.77	3.95	4.34	4.60	3.26	3.37	3.89	4.03	4.49	4.70	3.35	3.42	4.26	4.14	4.92	4.85	3.66	3.49
51	W33X318	3.77	3.95	4.34	4.60	3.26	3.37	3.90	4.03	4.49	4.70	3.36	3.43	4.26	4.14	4.92	4.85	3.66	3.49
52	W33X291	3.77	3.95	4.34	4.60	3.26	3.37	3.89	4.03	4.49	4.70	3.35	3.42	4.26	4.14	4.92	4.85	3.66	3.49
53	W33X263	3.77	3.95	4.34	4.60	3.26	3.37	3.89	4.03	4.49	4.70	3.36	3.42	4.26	4.14	4.92	4.85	3.66	3.49
54	W33X241	3.77	3.96	4.34	4.60	3.26	3.38	3.90	4.03	4.49	4.70	3.36	3.43	4.26	4.14	4.92	4.85	3.66	3.49
55	W33X221	3.78	3.96	4.34	4.60	3.26	3.38	3.90	4.03	4.49	4.70	3.36	3.43	4.26	4.14	4.92	4.85	3.66	3.49
56	W33X201	3.78	3.96	4.34	4.60	3.26	3.38	3.90	4.03	4.49	4.70	3.36	3.43	4.26	4.14	4.92	4.85	3.66	3.49
57	W33X169	3.78	3.96	4.35	4.60	3.27	3.38	3.90	4.04	4.50	4.71	3.37	3.43	4.26	4.14	4.93	4.86	3.67	3.50
58	W33X152	3.78	3.96	4.35	4.60	3.27	3.38	3.90	4.04	4.50	4.71	3.37	3.43	4.26	4.14	4.93	4.86	3.67	3.50
59	W33X141	3.78	3.96	4.35	4.60	3.27	3.38	3.90	4.04	4.50	4.70	3.37	3.44	4.26	4.14	4.92	4.86	3.67	3.50
60	W33X130	3.79	3.97	4.35	4.61	3.27	3.39	3.91	4.04	4.50	4.71	3.37	3.44	4.27	4.15	4.93	4.86	3.67	3.50
61	W33X118	3.79	3.97	4.36	4.61	3.28	3.39	3.91	4.04	4.50	4.71	3.38	3.44	4.27	4.15	4.93	4.86	3.67	3.51
62	W30X391	3.77	3.95	4.34	4.59	3.25	3.37	3.89	4.03	4.49	4.70	3.35	3.42	4.26	4.13	4.92	4.85	3.65	3.49
63	W30X357	3.77	3.95	4.34	4.59	3.26	3.37	3.89	4.03	4.49	4.70	3.35	3.42	4.25	4.13	4.92	4.85	3.65	3.49

64	W30X326	3.77	3.95	4.34	4.59	3.26	3.37	3.89	4.03	4.49	4.70	3.35	3.42	4.26	4.13	4.92	4.85	3.66	3.49
65	W30X292	3.77	3.95	4.34	4.60	3.26	3.37	3.89	4.03	4.49	4.70	3.35	3.42	4.26	4.13	4.92	4.85	3.66	3.49
66	W30X261	3.77	3.95	4.34	4.59	3.26	3.37	3.89	4.03	4.49	4.70	3.35	3.42	4.26	4.13	4.92	4.85	3.66	3.49
67	W30X235	3.77	3.95	4.34	4.59	3.25	3.37	3.89	4.03	4.49	4.70	3.35	3.42	4.25	4.13	4.92	4.85	3.65	3.49
68	W30X211	3.77	3.96	4.34	4.60	3.26	3.37	3.90	4.03	4.49	4.70	3.36	3.43	4.26	4.14	4.92	4.85	3.66	3.49
69	W30X191	3.77	3.95	4.34	4.60	3.26	3.37	3.90	4.03	4.49	4.70	3.36	3.42	4.26	4.14	4.92	4.85	3.66	3.49
70	W30X173	3.78	3.96	4.34	4.60	3.26	3.38	3.90	4.03	4.49	4.70	3.36	3.43	4.26	4.14	4.92	4.85	3.66	3.49
71	W30X148	3.78	3.96	4.35	4.60	3.27	3.38	3.90	4.04	4.50	4.71	3.36	3.43	4.26	4.14	4.92	4.86	3.66	3.50
72	W30X132	3.78	3.96	4.35	4.60	3.27	3.39	3.91	4.04	4.50	4.71	3.37	3.44	4.27	4.15	4.93	4.86	3.67	3.50
73	W30X124	3.78	3.96	4.35	4.61	3.27	3.39	3.91	4.04	4.50	4.71	3.37	3.44	4.27	4.15	4.93	4.86	3.67	3.50
74	W30X116	3.79	3.97	4.35	4.61	3.27	3.39	3.91	4.04	4.50	4.71	3.37	3.44	4.27	4.15	4.93	4.86	3.67	3.51
75	W30X108	3.79	3.97	4.36	4.61	3.28	3.39	3.91	4.04	4.50	4.71	3.37	3.44	4.27	4.15	4.93	4.86	3.67	3.51
76	W30X99	3.79	3.97	4.36	4.61	3.28	3.39	3.91	4.05	4.51	4.71	3.37	3.44	4.27	4.15	4.93	4.86	3.68	3.51
77	W30X90	3.79	3.97	4.36	4.61	3.28	3.39	3.91	4.05	4.50	4.71	3.37	3.44	4.27	4.15	4.93	4.86	3.67	3.51
78	W27X539	3.77	3.95	4.34	4.59	3.25	3.37	3.89	4.02	4.48	4.69	3.35	3.42	4.25	4.13	4.91	4.85	3.65	3.48
79	W27X368	3.77	3.95	4.34	4.59	3.25	3.37	3.89	4.03	4.49	4.70	3.35	3.42	4.25	4.13	4.92	4.85	3.65	3.48
80	W27X336	3.77	3.95	4.34	4.59	3.25	3.37	3.89	4.03	4.49	4.70	3.35	3.42	4.25	4.13	4.92	4.85	3.65	3.49
81	W27X307	3.77	3.95	4.34	4.59	3.25	3.37	3.89	4.02	4.49	4.70	3.35	3.42	4.25	4.13	4.92	4.85	3.65	3.48
82	W27X281	3.77	3.95	4.34	4.59	3.25	3.37	3.89	4.03	4.49	4.70	3.35	3.42	4.25	4.13	4.92	4.85	3.65	3.49
83	W27X258	3.77	3.95	4.34	4.59	3.25	3.37	3.89	4.03	4.49	4.70	3.35	3.42	4.25	4.13	4.92	4.85	3.65	3.49
84	W27X235	3.77	3.95	4.34	4.59	3.26	3.37	3.89	4.03	4.49	4.70	3.35	3.42	4.26	4.13	4.92	4.85	3.66	3.49
85	W27X217	3.77	3.95	4.34	4.60	3.26	3.37	3.89	4.03	4.49	4.70	3.35	3.42	4.26	4.13	4.92	4.85	3.66	3.49
86	W27X194	3.77	3.95	4.34	4.59	3.26	3.37	3.89	4.03	4.49	4.70	3.35	3.42	4.25	4.13	4.92	4.85	3.66	3.49
87	W27X178	3.77	3.95	4.34	4.60	3.26	3.37	3.89	4.03	4.49	4.70	3.36	3.42	4.26	4.13	4.92	4.85	3.66	3.49
88	W27X161	3.77	3.96	4.34	4.60	3.26	3.37	3.90	4.03	4.49	4.70	3.36	3.43	4.26	4.14	4.92	4.85	3.66	3.49
89	W27X146	3.78	3.96	4.34	4.60	3.26	3.38	3.90	4.03	4.49	4.70	3.36	3.43	4.26	4.14	4.92	4.85	3.66	3.49
90	W27X129	3.78	3.96	4.35	4.60	3.27	3.38	3.90	4.04	4.50	4.70	3.36	3.43	4.26	4.14	4.92	4.86	3.66	3.50
91	W27X114	3.78	3.96	4.35	4.60	3.27	3.38	3.90	4.04	4.50	4.71	3.36	3.43	4.26	4.14	4.92	4.86	3.67	3.50
92	W27X102	3.78	3.96	4.35	4.60	3.27	3.38	3.90	4.04	4.50	4.70	3.37	3.43	4.26	4.14	4.93	4.86	3.67	3.50
93	W27X94	3.78	3.96	4.35	4.60	3.27	3.38	3.90	4.04	4.50	4.71	3.37	3.44	4.26	4.14	4.92	4.85	3.67	3.50
94	W27X84	3.79	3.97	4.35	4.61	3.27	3.39	3.91	4.04	4.50	4.71	3.37	3.44	4.27	4.15	4.93	4.86	3.67	3.51
95	W24X370	3.77	3.95	4.34	4.59	3.25	3.37	3.89	4.03	4.49	4.70	3.35	3.42	4.25	4.13	4.92	4.85	3.65	3.48
96	W24X335	3.77	3.95	4.34	4.59	3.25	3.37	3.89	4.02	4.49	4.70	3.35	3.42	4.25	4.13	4.92	4.85	3.65	3.48
97	W24X306	3.77	3.95	4.34	4.59	3.25	3.37	3.89	4.03	4.49	4.70	3.35	3.42	4.25	4.13	4.92	4.85	3.65	3.49
98	W24X279	3.77	3.95	4.34	4.59	3.25	3.37	3.89	4.03	4.49	4.70	3.35	3.42	4.25	4.13	4.92	4.85	3.65	3.49
99	W24X250	3.77	3.95	4.34	4.59	3.25	3.37	3.89	4.03	4.49	4.70	3.35	3.42	4.25	4.13	4.92	4.85	3.65	3.49
100	W24X229	3.77	3.95	4.34	4.59	3.25	3.37	3.89	4.03	4.49	4.70	3.35	3.42	4.25	4.13	4.92	4.85	3.65	3.49
101	W24X207	3.77	3.95	4.34	4.59	3.25	3.37	3.89	4.03	4.49	4.70	3.35	3.42	4.26	4.13	4.92	4.85	3.65	3.49
102	W24X192	3.77	3.95	4.34	4.60	3.26	3.37	3.89	4.03	4.49	4.70	3.35	3.42	4.26	4.13	4.92	4.85	3.65	3.49
103	W24X176	3.77	3.95	4.34	4.59	3.25	3.37	3.89	4.03	4.49	4.70	3.35	3.42	4.25	4.13	4.92	4.85	3.65	3.49
104	W24X162	3.77	3.95	4.34	4.59	3.26	3.37	3.89	4.03	4.49	4.70	3.35	3.42	4.26	4.13	4.92	4.85	3.66	3.49
105	W24X146	3.77	3.95	4.34	4.59	3.26	3.37	3.89	4.03	4.49	4.70	3.35	3.42	4.26	4.13	4.92	4.85	3.66	3.49
106	W24X131	3.77	3.95	4.34	4.60	3.26	3.37	3.90	4.03	4.49	4.70	3.36	3.42	4.26	4.14	4.92	4.85	3.66	3.49
107	W24X117	3.77	3.96	4.34	4.60	3.26	3.37	3.90	4.03	4.49	4.70	3.36	3.43	4.26	4.14	4.92	4.85	3.66	3.49
108	W24X104	3.78	3.96	4.34	4.60	3.26	3.38	3.90	4.03	4.49	4.70	3.36	3.43	4.26	4.14	4.92	4.85	3.66	3.49
109	W24X103	3.78	3.96	4.35	4.60	3.26	3.38	3.90	4.03	4.50	4.70	3.36	3.43	4.26	4.14	4.92	4.86	3.66	3.50
110	W24X94	3.78	3.96	4.35	4.60	3.27	3.38	3.90	4.04	4.50	4.71	3.36	3.43	4.26	4.14	4.92	4.85	3.67	3.50
111	W24X84	3.78	3.96	4.35	4.60	3.27	3.38	3.90	4.04	4.50	4.71	3.36	3.43	4.27	4.14	4.92	4.86	3.66	3.50

112	W24X76	3.78	3.97	4.35	4.61	3.27	3.38	3.91	4.04	4.50	4.71	3.37	3.44	4.27	4.14	4.93	4.86	3.67	3.50
113	W24X68	3.78	3.97	4.35	4.61	3.27	3.39	3.91	4.04	4.50	4.71	3.37	3.44	4.27	4.14	4.93	4.86	3.67	3.50
114	W24X62	3.80	3.97	4.36	4.62	3.28	3.40	3.92	4.05	4.50	4.71	3.38	3.45	4.28	4.16	4.94	4.86	3.68	3.51
115	W24X55	3.80	3.98	4.36	4.61	3.28	3.40	3.92	4.05	4.51	4.72	3.38	3.45	4.27	4.16	4.94	4.87	3.68	3.51
116	W21X201	3.77	3.95	4.34	4.59	3.25	3.37	3.89	4.03	4.49	4.70	3.35	3.42	4.25	4.13	4.92	4.85	3.65	3.48
117	W21X182	3.77	3.95	4.34	4.59	3.25	3.37	3.89	4.03	4.49	4.70	3.35	3.42	4.25	4.13	4.92	4.85	3.65	3.49
118	W21X166	3.77	3.95	4.34	4.59	3.25	3.37	3.89	4.03	4.49	4.70	3.35	3.42	4.25	4.13	4.92	4.85	3.65	3.48
119	W21X147	3.77	3.95	4.34	4.60	3.26	3.37	3.89	4.03	4.49	4.70	3.35	3.42	4.26	4.14	4.92	4.85	3.66	3.49
120	W21X132	3.77	3.95	4.34	4.59	3.26	3.37	3.89	4.03	4.49	4.70	3.35	3.42	4.25	4.13	4.92	4.85	3.65	3.49
121	W21X122	3.77	3.95	4.34	4.59	3.26	3.37	3.89	4.03	4.49	4.70	3.35	3.42	4.26	4.13	4.92	4.85	3.65	3.49
122	W21X111	3.77	3.95	4.34	4.60	3.26	3.37	3.89	4.03	4.49	4.70	3.36	3.42	4.26	4.14	4.92	4.85	3.66	3.49
123	W21X101	3.77	3.95	4.34	4.60	3.26	3.37	3.89	4.03	4.49	4.70	3.35	3.42	4.25	4.13	4.92	4.85	3.66	3.49
124	W21X93	3.78	3.96	4.35	4.60	3.27	3.38	3.90	4.04	4.50	4.71	3.36	3.43	4.26	4.14	4.93	4.86	3.67	3.50
125	W21X83	3.78	3.96	4.35	4.60	3.27	3.38	3.90	4.04	4.50	4.70	3.36	3.43	4.26	4.14	4.93	4.85	3.67	3.50
126	W21X73	3.78	3.96	4.35	4.60	3.27	3.38	3.90	4.04	4.50	4.70	3.36	3.43	4.26	4.14	4.92	4.86	3.66	3.50
127	W21X68	3.78	3.96	4.35	4.60	3.27	3.38	3.90	4.04	4.49	4.70	3.36	3.43	4.26	4.14	4.93	4.85	3.67	3.50
128	W21X62	3.78	3.96	4.35	4.60	3.27	3.38	3.90	4.04	4.50	4.70	3.36	3.43	4.27	4.15	4.92	4.85	3.67	3.50
129	W21X55	3.79	3.97	4.35	4.61	3.27	3.39	3.91	4.04	4.50	4.71	3.37	3.44	4.27	4.14	4.93	4.86	3.67	3.50
130	W21X48*	3.79	3.97	4.35	4.61	3.27	3.39	3.91	4.04	4.50	4.71	3.37	3.44	4.27	4.15	4.93	4.86	3.67	3.50
131	W21X57	3.79	3.96	4.35	4.60	3.27	3.39	3.91	4.04	4.50	4.70	3.37	3.44	4.27	4.15	4.93	4.86	3.67	3.50
132	W21X50	3.79	3.97	4.36	4.61	3.28	3.39	3.91	4.04	4.50	4.71	3.37	3.44	4.27	4.15	4.93	4.85	3.67	3.51
133	W21X44	3.79	3.97	4.36	4.61	3.28	3.40	3.91	4.05	4.51	4.72	3.38	3.45	4.27	4.16	4.93	4.86	3.68	3.51
134	W18X311	3.76	3.95	4.33	4.59	3.25	3.36	3.89	4.02	4.48	4.69	3.35	3.41	4.25	4.13	4.91	4.85	3.65	3.48
135	W18X283	3.77	3.95	4.34	4.59	3.25	3.37	3.89	4.02	4.49	4.69	3.35	3.42	4.25	4.13	4.92	4.85	3.65	3.48
136	W18X258	3.77	3.95	4.34	4.59	3.25	3.36	3.89	4.02	4.48	4.69	3.35	3.42	4.25	4.13	4.91	4.85	3.65	3.48
137	W18X234	3.77	3.95	4.34	4.59	3.25	3.36	3.89	4.02	4.48	4.69	3.35	3.42	4.25	4.13	4.92	4.85	3.65	3.48
138	W18X211	3.77	3.95	4.33	4.59	3.25	3.36	3.89	4.02	4.48	4.69	3.35	3.42	4.25	4.13	4.91	4.84	3.65	3.48
139	W18X192	3.77	3.95	4.34	4.59	3.25	3.36	3.89	4.02	4.49	4.69	3.35	3.42	4.25	4.13	4.91	4.85	3.65	3.48
140	W18X175	3.77	3.95	4.34	4.59	3.25	3.37	3.89	4.02	4.49	4.70	3.35	3.42	4.25	4.13	4.92	4.85	3.65	3.48
141	W18X158	3.77	3.95	4.34	4.59	3.25	3.37	3.89	4.03	4.49	4.69	3.35	3.42	4.25	4.13	4.92	4.85	3.65	3.48
142	W18X143	3.77	3.95	4.34	4.59	3.25	3.37	3.89	4.02	4.48	4.69	3.35	3.42	4.25	4.13	4.91	4.85	3.65	3.48
143	W18X130	3.77	3.95	4.34	4.59	3.25	3.37	3.89	4.02	4.49	4.70	3.35	3.42	4.25	4.13	4.92	4.85	3.65	3.48
144	W18X119	3.77	3.95	4.34	4.59	3.25	3.37	3.89	4.03	4.49	4.70	3.35	3.42	4.25	4.14	4.92	4.85	3.65	3.49
145	W18X106	3.77	3.95	4.34	4.59	3.25	3.37	3.89	4.03	4.49	4.70	3.35	3.42	4.25	4.13	4.92	4.85	3.65	3.49
146	W18X97	3.77	3.95	4.34	4.59	3.26	3.37	3.89	4.03	4.49	4.70	3.35	3.42	4.26	4.13	4.92	4.85	3.65	3.49
147	W18X86	3.77	3.95	4.34	4.59	3.26	3.37	3.89	4.03	4.49	4.70	3.35	3.42	4.25	4.13	4.92	4.85	3.66	3.49
148	W18X76	3.77	3.96	4.34	4.59	3.26	3.37	3.89	4.03	4.49	4.70	3.35	3.42	4.25	4.13	4.92	4.85	3.66	3.49
149	W18X71	3.78	3.96	4.35	4.60	3.26	3.38	3.90	4.03	4.49	4.70	3.36	3.43	4.26	4.14	4.92	4.85	3.66	3.50
150	W18X65	3.78	3.96	4.35	4.60	3.27	3.38	3.90	4.03	4.49	4.70	3.36	3.43	4.26	4.14	4.92	4.86	3.66	3.50
151	W18X60	3.78	3.96	4.35	4.60	3.26	3.38	3.90	4.03	4.49	4.70	3.36	3.43	4.26	4.14	4.92	4.85	3.66	3.49
152	W18X55	3.78	3.96	4.35	4.60	3.27	3.38	3.90	4.04	4.50	4.71	3.36	3.43	4.26	4.14	4.93	4.85	3.66	3.50
153	W18X50	3.78	3.96	4.34	4.60	3.26	3.38	3.90	4.04	4.50	4.70	3.36	3.43	4.26	4.14	4.92	4.86	3.66	3.49
154	W18X46	3.79	3.96	4.35	4.60	3.27	3.38	3.91	4.04	4.50	4.71	3.37	3.44	4.27	4.14	4.93	4.86	3.67	3.50
155	W18X40	3.78	3.97	4.35	4.60	3.27	3.38	3.90	4.04	4.50	4.71	3.37	3.43	4.27	4.14	4.92	4.86	3.67	3.50
156	W18X35	3.79	3.97	4.35	4.61	3.27	3.39	3.90	4.05	4.51	4.70	3.37	3.44	4.27	4.15	4.92	4.86	3.67	3.51
157	W16X100	3.77	3.95	4.34	4.59	3.25	3.37	3.89	4.03	4.49	4.70	3.35	3.42	4.25	4.13	4.92	4.85	3.65	3.49
158	W16X89	3.77	3.95	4.34	4.60	3.25	3.37	3.89	4.03	4.49	4.70	3.35	3.42	4.25	4.13	4.92	4.85	3.65	3.49
159	W16X77	3.77	3.95	4.34	4.59	3.25	3.37	3.89	4.03	4.49	4.69	3.35	3.42	4.25	4.13	4.92	4.85	3.65	3.49

160	W16X67	3.77	3.95	4.34	4.59	3.25	3.37	3.89	4.02	4.49	4.69	3.35	3.42	4.25	4.13	4.91	4.84	3.65	3.49
161	W16X57	3.77	3.96	4.34	4.60	3.26	3.38	3.89	4.03	4.49	4.70	3.36	3.43	4.26	4.14	4.92	4.86	3.66	3.50
162	W16X50	3.77	3.96	4.35	4.60	3.26	3.38	3.90	4.03	4.49	4.71	3.36	3.43	4.26	4.14	4.92	4.86	3.66	3.49
163	W16X45	3.78	3.96	4.34	4.60	3.27	3.38	3.90	4.03	4.49	4.70	3.36	3.43	4.26	4.15	4.92	4.86	3.66	3.50
164	W16X40	3.78	3.96	4.34	4.60	3.26	3.37	3.90	4.03	4.50	4.70	3.36	3.43	4.26	4.14	4.92	4.85	3.66	3.49
165	W16X36	3.78	3.96	4.35	4.60	3.26	3.38	3.90	4.04	4.49	4.70	3.37	3.43	4.26	4.14	4.93	4.85	3.66	3.50
166	W16X31	3.78	3.97	4.35	4.60	3.27	3.39	3.90	4.03	4.50	4.71	3.37	3.44	4.27	4.15	4.93	4.86	3.68	3.50
167	W16X26	3.79	3.98	4.36	4.60	3.27	3.39	3.91	4.04	4.50	4.70	3.37	3.44	4.27	4.15	4.93	4.87	3.67	3.50
168	W14X730	3.75	3.94	4.33	4.58	3.24	3.35	3.88	4.01	4.48	4.69	3.33	3.40	4.24	4.12	4.91	4.84	3.64	3.47
169	W14X665	3.76	3.94	4.33	4.58	3.24	3.35	3.88	4.01	4.48	4.69	3.33	3.40	4.24	4.12	4.91	4.84	3.64	3.47
170	W14X605	3.76	3.94	4.33	4.58	3.24	3.35	3.88	4.01	4.48	4.69	3.34	3.41	4.24	4.12	4.91	4.84	3.64	3.47
171	W14X550	3.76	3.94	4.33	4.58	3.24	3.35	3.88	4.01	4.48	4.69	3.34	3.41	4.24	4.12	4.91	4.84	3.64	3.47
172	W14X500	3.76	3.94	4.33	4.58	3.24	3.35	3.88	4.01	4.48	4.69	3.34	3.41	4.24	4.12	4.91	4.84	3.64	3.47
173	W14X455	3.76	3.94	4.33	4.58	3.24	3.35	3.88	4.01	4.48	4.69	3.34	3.41	4.24	4.12	4.91	4.84	3.64	3.47
174	W14X426	3.76	3.94	4.33	4.58	3.24	3.35	3.88	4.01	4.48	4.69	3.34	3.41	4.24	4.12	4.91	4.84	3.64	3.47
175	W14X398	3.76	3.94	4.33	4.58	3.24	3.35	3.88	4.01	4.48	4.69	3.34	3.41	4.24	4.12	4.91	4.84	3.64	3.47
176	W14X370	3.76	3.94	4.33	4.58	3.24	3.36	3.88	4.02	4.48	4.69	3.34	3.41	4.24	4.12	4.91	4.84	3.64	3.47
177	W14X342	3.76	3.94	4.33	4.58	3.24	3.35	3.88	4.01	4.48	4.69	3.34	3.41	4.24	4.12	4.91	4.84	3.64	3.47
178	W14X311	3.76	3.94	4.33	4.59	3.24	3.36	3.88	4.02	4.48	4.69	3.34	3.41	4.24	4.12	4.91	4.84	3.64	3.47
179	W14X283	3.76	3.94	4.33	4.58	3.24	3.35	3.88	4.02	4.48	4.69	3.34	3.41	4.24	4.12	4.91	4.84	3.64	3.47
180	W14X257	3.76	3.94	4.33	4.59	3.24	3.36	3.88	4.02	4.48	4.69	3.34	3.41	4.24	4.12	4.91	4.84	3.64	3.47
181	W14X233	3.76	3.94	4.33	4.58	3.24	3.36	3.88	4.02	4.48	4.69	3.34	3.41	4.24	4.12	4.91	4.84	3.64	3.47
182	W14X211	3.76	3.94	4.33	4.59	3.24	3.36	3.88	4.02	4.48	4.69	3.34	3.41	4.25	4.12	4.91	4.84	3.64	3.47
183	W14X193	3.76	3.94	4.33	4.58	3.24	3.36	3.88	4.02	4.48	4.69	3.34	3.41	4.24	4.12	4.91	4.84	3.64	3.47
184	W14X176	3.76	3.94	4.33	4.59	3.24	3.36	3.88	4.02	4.48	4.69	3.34	3.41	4.24	4.12	4.91	4.84	3.64	3.47
185	W14X159	3.76	3.94	4.33	4.58	3.24	3.36	3.88	4.02	4.48	4.69	3.34	3.41	4.25	4.12	4.91	4.84	3.64	3.48
186	W14X145	3.76	3.94	4.33	4.59	3.24	3.36	3.88	4.02	4.48	4.69	3.34	3.41	4.24	4.12	4.91	4.84	3.64	3.48
187	W14X132	3.76	3.94	4.33	4.59	3.24	3.36	3.88	4.02	4.48	4.69	3.34	3.41	4.25	4.13	4.91	4.84	3.64	3.48
188	W14X120	3.76	3.94	4.33	4.59	3.24	3.36	3.88	4.02	4.48	4.69	3.34	3.41	4.25	4.12	4.91	4.84	3.65	3.48
189	W14X109	3.76	3.94	4.33	4.58	3.24	3.36	3.88	4.02	4.48	4.69	3.34	3.41	4.24	4.12	4.91	4.84	3.64	3.47
190	W14X99	3.76	3.94	4.33	4.58	3.24	3.36	3.88	4.02	4.48	4.69	3.34	3.41	4.25	4.12	4.91	4.84	3.64	3.47
191	W14X90	3.75	3.93	4.32	4.58	3.23	3.34	3.87	4.01	4.47	4.68	3.33	3.40	4.24	4.11	4.90	4.84	3.63	3.46
192	W14X82	3.76	3.95	4.34	4.59	3.25	3.37	3.89	4.02	4.49	4.70	3.34	3.42	4.25	4.13	4.92	4.85	3.65	3.48
193	W14X74	3.76	3.95	4.33	4.59	3.25	3.36	3.89	4.02	4.48	4.69	3.35	3.41	4.25	4.13	4.91	4.84	3.65	3.48
194	W14X68	3.76	3.95	4.34	4.59	3.25	3.37	3.89	4.02	4.48	4.69	3.35	3.42	4.25	4.13	4.91	4.84	3.65	3.48
195	W14X61	3.77	3.95	4.33	4.59	3.25	3.36	3.89	4.02	4.48	4.69	3.34	3.41	4.25	4.13	4.91	4.84	3.65	3.48
196	W14X53	3.77	3.95	4.34	4.60	3.25	3.37	3.89	4.02	4.49	4.70	3.35	3.41	4.26	4.13	4.91	4.85	3.66	3.48
197	W14X48	3.77	3.95	4.34	4.59	3.25	3.37	3.89	4.03	4.48	4.70	3.35	3.42	4.25	4.14	4.91	4.85	3.65	3.48
198	W14X43	3.77	3.96	4.34	4.59	3.25	3.37	3.89	4.03	4.49	4.70	3.35	3.42	4.25	4.13	4.92	4.85	3.66	3.49
199	W14X38	3.77	3.95	4.34	4.59	3.26	3.38	3.90	4.03	4.50	4.70	3.36	3.43	4.26	4.14	4.92	4.85	3.65	3.50
200	W14X34	3.77	3.96	4.35	4.61	3.27	3.38	3.90	4.03	4.50	4.71	3.35	3.43	4.25	4.14	4.92	4.85	3.66	3.49
201	W14X30	3.77	3.96	4.35	4.60	3.26	3.37	3.90	4.04	4.49	4.70	3.36	3.43	4.25	4.14	4.93	4.85	3.67	3.49
202	W14X26	3.79	3.96	4.35	4.61	3.27	3.38	3.91	4.04	4.50	4.70	3.36	3.43	4.26	4.14	4.93	4.87	3.66	3.50
203	W14X22	3.78	3.98	4.35	4.60	3.27	3.39	3.90	4.04	4.49	4.71	3.37	3.44	4.26	4.14	4.92	4.87	3.67	3.50
204	W12X336	3.76	3.94	4.33	4.58	3.24	3.35	3.88	4.02	4.48	4.69	3.34	3.41	4.24	4.12	4.91	4.84	3.64	3.47
205	W12X305	3.76	3.94	4.33	4.58	3.24	3.35	3.88	4.02	4.48	4.69	3.34	3.41	4.24	4.12	4.91	4.84	3.64	3.47
206	W12X279	3.76	3.94	4.33	4.58	3.24	3.36	3.88	4.01	4.48	4.69	3.34	3.41	4.24	4.12	4.91	4.84	3.64	3.47
207	W12X252	3.76	3.94	4.33	4.59	3.24	3.36	3.88	4.02	4.48	4.69	3.34	3.41	4.24	4.12	4.91	4.84	3.64	3.47

208	W12X230	3.76	3.94	4.33	4.58	3.24	3.36	3.88	4.02	4.48	4.69	3.34	3.41	4.24	4.12	4.91	4.84	3.64	3.47
209	W12X210	3.76	3.94	4.33	4.59	3.24	3.36	3.88	4.02	4.48	4.69	3.34	3.41	4.24	4.12	4.91	4.84	3.64	3.47
210	W12X190	3.76	3.94	4.33	4.58	3.24	3.36	3.88	4.02	4.48	4.69	3.34	3.41	4.24	4.12	4.91	4.84	3.64	3.47
211	W12X170	3.76	3.94	4.33	4.59	3.24	3.36	3.88	4.02	4.48	4.69	3.34	3.41	4.25	4.12	4.91	4.84	3.64	3.48
212	W12X152	3.76	3.94	4.33	4.59	3.24	3.36	3.88	4.02	4.48	4.69	3.34	3.41	4.24	4.12	4.91	4.84	3.64	3.47
213	W12X136	3.76	3.94	4.33	4.59	3.24	3.36	3.88	4.02	4.48	4.69	3.34	3.41	4.25	4.12	4.91	4.84	3.64	3.47
214	W12X120	3.76	3.94	4.33	4.59	3.24	3.36	3.88	4.02	4.48	4.69	3.34	3.41	4.25	4.13	4.91	4.84	3.64	3.47
215	W12X106	3.76	3.94	4.33	4.58	3.24	3.36	3.88	4.02	4.48	4.69	3.34	3.41	4.24	4.13	4.91	4.84	3.64	3.47
216	W12X96	3.76	3.94	4.33	4.58	3.24	3.36	3.88	4.02	4.48	4.69	3.34	3.41	4.24	4.12	4.91	4.84	3.64	3.48
217	W12X87	3.76	3.94	4.33	4.58	3.24	3.36	3.88	4.02	4.48	4.68	3.34	3.41	4.24	4.12	4.91	4.84	3.64	3.48
218	W12X79	3.76	3.94	4.33	4.59	3.24	3.36	3.88	4.02	4.48	4.69	3.34	3.41	4.24	4.12	4.91	4.85	3.65	3.47
219	W12X72	3.76	3.95	4.33	4.59	3.24	3.36	3.88	4.02	4.48	4.68	3.34	3.41	4.24	4.12	4.91	4.84	3.64	3.48
220	W12X65	3.75	3.93	4.33	4.58	3.23	3.35	3.88	4.01	4.47	4.69	3.33	3.40	4.24	4.11	4.91	4.84	3.64	3.46
221	W12X58	3.76	3.94	4.33	4.59	3.24	3.36	3.88	4.02	4.48	4.69	3.34	3.41	4.24	4.13	4.91	4.85	3.65	3.48
222	W12X53	3.76	3.95	4.33	4.59	3.25	3.36	3.89	4.02	4.49	4.69	3.35	3.41	4.25	4.13	4.91	4.84	3.65	3.48
223	W12X50	3.76	3.94	4.34	4.60	3.25	3.37	3.89	4.02	4.49	4.69	3.35	3.42	4.25	4.13	4.91	4.85	3.65	3.48
224	W12X45	3.77	3.95	4.34	4.59	3.25	3.36	3.89	4.03	4.48	4.70	3.35	3.42	4.25	4.13	4.91	4.85	3.65	3.49
225	W12X40	3.77	3.95	4.34	4.58	3.25	3.36	3.88	4.03	4.48	4.70	3.35	3.41	4.25	4.13	4.91	4.85	3.66	3.48
226	W12X35	3.77	3.96	4.33	4.60	3.26	3.38	3.90	4.02	4.50	4.70	3.35	3.42	4.26	4.13	4.91	4.84	3.65	3.49
227	W12X30	3.77	3.95	4.34	4.60	3.26	3.37	3.89	4.03	4.49	4.69	3.35	3.43	4.25	4.14	4.93	4.85	3.66	3.48
228	W12X26	3.79	3.95	4.34	4.60	3.25	3.37	3.90	4.04	4.49	4.70	3.36	3.42	4.26	4.14	4.91	4.85	3.65	3.50
229	W12X22	3.79	3.98	4.36	4.60	3.27	3.39	3.91	4.03	4.50	4.71	3.36	3.44	4.27	4.15	4.91	4.84	3.67	3.49
230	W12X19	3.79	3.96	4.36	4.62	3.26	3.39	3.91	4.05	4.50	4.70	3.38	3.44	4.28	4.17	4.92	4.85	3.68	3.51
231	W12X16	3.79	3.98	4.36	4.59	3.28	3.40	3.91	4.03	4.50	4.69	3.36	3.44	4.28	4.14	4.94	4.86	3.67	3.52
232	W12X14	3.80	3.96	4.35	4.62	3.29	3.42	3.93	4.04	4.50	4.75	3.39	3.43	4.29	4.14	4.92	4.88	3.68	3.52
233	W10X112	3.76	3.94	4.33	4.58	3.24	3.35	3.88	4.02	4.48	4.69	3.34	3.41	4.24	4.12	4.91	4.84	3.64	3.47
234	W10X100	3.76	3.94	4.33	4.58	3.24	3.36	3.88	4.01	4.48	4.69	3.34	3.41	4.24	4.12	4.90	4.84	3.64	3.47
235	W10X88	3.76	3.94	4.33	4.58	3.24	3.36	3.88	4.01	4.48	4.69	3.34	3.41	4.25	4.12	4.91	4.84	3.64	3.47
236	W10X77	3.76	3.94	4.33	4.58	3.24	3.36	3.88	4.02	4.48	4.68	3.34	3.41	4.25	4.12	4.91	4.85	3.65	3.47
237	W10X68	3.76	3.94	4.33	4.58	3.24	3.36	3.88	4.02	4.48	4.69	3.34	3.40	4.25	4.12	4.91	4.85	3.65	3.47
238	W10X60	3.76	3.94	4.33	4.59	3.24	3.35	3.88	4.02	4.48	4.69	3.34	3.41	4.24	4.13	4.90	4.83	3.64	3.47
239	W10X54	3.76	3.94	4.32	4.58	3.24	3.36	3.88	4.02	4.48	4.69	3.34	3.41	4.25	4.13	4.90	4.83	3.64	3.48
240	W10X49	3.76	3.94	4.33	4.58	3.24	3.36	3.87	4.02	4.47	4.69	3.34	3.41	4.24	4.12	4.91	4.84	3.65	3.47
241	W10X45	3.76	3.94	4.34	4.58	3.25	3.36	3.89	4.02	4.48	4.70	3.34	3.41	4.25	4.13	4.91	4.84	3.64	3.48
242	W10X39	3.76	3.94	4.34	4.60	3.25	3.36	3.89	4.02	4.48	4.70	3.35	3.42	4.25	4.13	4.91	4.85	3.64	3.48
243	W10X33	3.77	3.95	4.35	4.59	3.25	3.36	3.88	4.02	4.49	4.70	3.34	3.41	4.26	4.13	4.93	4.83	3.65	3.47
244	W10X30	3.76	3.96	4.34	4.59	3.25	3.37	3.89	4.04	4.49	4.69	3.35	3.42	4.26	4.14	4.92	4.83	3.66	3.48
245	W10X26	3.76	3.94	4.34	4.58	3.26	3.38	3.89	4.02	4.47	4.69	3.36	3.43	4.25	4.14	4.91	4.85	3.66	3.48
246	W10X22	3.77	3.95	4.36	4.59	3.26	3.38	3.88	4.04	4.50	4.70	3.34	3.42	4.26	4.14	4.93	4.86	3.65	3.50
247	W10X19	3.78	3.95	4.36	4.61	3.27	3.40	3.89	4.02	4.47	4.69	3.36	3.42	4.28	4.15	4.93	4.85	3.65	3.49
248	W10X17	3.79	3.96	4.34	4.61	3.27	3.38	3.89	4.04	4.47	4.70	3.37	3.44	4.26	4.14	4.93	4.86	3.67	3.49
249	W10X15	3.79	3.96	4.35	4.62	3.29	3.38	3.91	4.02	4.53	4.68	3.38	3.46	4.25	4.14	4.94	4.86	3.68	3.51
250	W10X12	3.80	4.00	4.35	4.66	3.29	3.39	3.95	4.05	4.52	4.73	3.34	3.46	4.28	4.13	4.96	4.86	3.66	3.52
	MIN	**3.75**	**3.93**	**4.32**	**4.58**	**3.23**	**3.34**	**3.87**	**4.01**	**4.47**	**4.68**	**3.33**	**3.40**	**4.24**	**4.11**	**4.90**	**4.83**	**3.63**	**3.46**
	MAX	**3.80**	**4.00**	**4.36**	**4.66**	**3.29**	**3.42**	**3.95**	**4.05**	**4.53**	**4.75**	**3.39**	**3.46**	**4.29**	**4.17**	**4.96**	**4.88**	**3.68**	**3.52**
	AVE	**3.77**	**3.95**	**4.34**	**4.60**	**3.26**	**3.37**	**3.89**	**4.03**	**4.49**	**4.70**	**3.35**	**3.42**	**4.26**	**4.14**	**4.92**	**4.85**	**3.66**	**3.49**

Table C- 5. Reliability Indices for Noncomposite Rolled I-shaped Girdes for ADTT 2'500 and L=30, 60ft.

		L=30 ft						L=60 ft					
	Φ	1.00		0.95		1.05		1.00		0.95		1.05	
#	Shape \ D/(D+L)	0.25	0.40	0.25	0.40	0.25	0.40	0.35	0.55	0.35	0.55	0.35	0.55
1	W44X335	3.64	3.83	4.133	4.38	3.18	3.33	3.59	3.86	4.112	4.473	3.12	3.31
2	W44X290	3.63	3.83	4.131	4.378	3.18	3.32	3.59	3.86	4.11	4.47	3.11	3.30
3	W44X262	3.63	3.82	4.131	4.378	3.18	3.32	3.59	3.86	4.11	4.471	3.11	3.30
4	W44X230	3.64	3.83	4.132	4.378	3.18	3.33	3.59	3.86	4.111	4.471	3.12	3.31
5	W40X593	3.63	3.82	4.125	4.372	3.18	3.32	3.58	3.85	4.104	4.465	3.11	3.30
6	W40X503	3.63	3.82	4.126	4.374	3.18	3.32	3.58	3.85	4.106	4.467	3.11	3.30
7	W40X431	3.63	3.82	4.128	4.375	3.18	3.32	3.58	3.85	4.107	4.468	3.11	3.30
8	W40X397	3.63	3.82	4.128	4.376	3.18	3.32	3.58	3.86	4.107	4.468	3.11	3.30
9	W40X372	3.63	3.82	4.128	4.375	3.18	3.32	3.58	3.86	4.107	4.468	3.11	3.30
10	W40X362	3.63	3.82	4.128	4.375	3.18	3.32	3.58	3.86	4.107	4.468	3.11	3.30
11	W40X324	3.63	3.82	4.128	4.375	3.18	3.32	3.58	3.86	4.107	4.468	3.11	3.30
12	W40X297	3.63	3.82	4.128	4.375	3.18	3.32	3.59	3.86	4.107	4.468	3.11	3.30
13	W40X277	3.63	3.82	4.127	4.374	3.18	3.32	3.58	3.85	4.106	4.467	3.11	3.30
14	W40X249	3.63	3.82	4.127	4.374	3.18	3.32	3.58	3.85	4.106	4.467	3.11	3.30
15	W40X215	3.63	3.82	4.128	4.375	3.18	3.32	3.58	3.86	4.107	4.468	3.11	3.30
16	W40X199	3.63	3.83	4.131	4.377	3.18	3.32	3.59	3.86	4.11	4.471	3.11	3.30
17	W40X392	3.64	3.83	4.133	4.38	3.19	3.33	3.59	3.86	4.113	4.473	3.12	3.31
18	W40X331	3.64	3.83	4.135	4.381	3.19	3.33	3.59	3.86	4.114	4.474	3.12	3.31
19	W40X327	3.64	3.83	4.133	4.38	3.19	3.33	3.59	3.86	4.113	4.473	3.12	3.31
20	W40X294	3.64	3.83	4.134	4.381	3.19	3.33	3.59	3.86	4.113	4.473	3.12	3.31
21	W40X278	3.64	3.83	4.135	4.383	3.19	3.33	3.59	3.86	4.115	4.475	3.12	3.31
22	W40X264	3.64	3.83	4.135	4.382	3.19	3.33	3.59	3.86	4.115	4.475	3.12	3.31
23	W40X235	3.64	3.83	4.133	4.38	3.19	3.33	3.59	3.86	4.112	4.473	3.12	3.31
24	W40X211	3.64	3.83	4.133	4.381	3.19	3.33	3.59	3.86	4.114	4.474	3.12	3.31
25	W40X183	3.64	3.83	4.133	4.38	3.19	3.33	3.59	3.86	4.113	4.474	3.12	3.31
26	W40X167	3.64	3.83	4.138	4.384	3.19	3.33	3.60	3.87	4.117	4.476	3.12	3.31
27	W40X149	3.65	3.84	4.141	4.388	3.20	3.34	3.60	3.87	4.122	4.48	3.13	3.32
28	W36X652	3.63	3.82	4.123	4.37	3.17	3.31	3.58	3.85	4.102	4.463	3.10	3.29
29	W36X529	3.63	3.82	4.124	4.372	3.17	3.32	3.58	3.85	4.103	4.465	3.10	3.30
30	W36X487	3.63	3.82	4.124	4.372	3.17	3.32	3.58	3.85	4.104	4.465	3.11	3.30
31	W36X441	3.63	3.82	4.124	4.371	3.17	3.32	3.58	3.85	4.103	4.464	3.10	3.30
32	W36X395	3.63	3.82	4.124	4.372	3.17	3.32	3.58	3.85	4.104	4.465	3.11	3.30
33	W36X361	3.63	3.82	4.125	4.373	3.18	3.32	3.58	3.85	4.104	4.465	3.11	3.30
34	W36X330	3.63	3.82	4.125	4.373	3.18	3.32	3.58	3.85	4.105	4.466	3.11	3.30
35	W36X302	3.63	3.82	4.126	4.373	3.18	3.32	3.58	3.85	4.105	4.466	3.11	3.30
36	W36X282	3.63	3.82	4.126	4.373	3.18	3.32	3.58	3.85	4.105	4.467	3.11	3.30
37	W36X262	3.63	3.82	4.126	4.373	3.18	3.32	3.58	3.85	4.105	4.466	3.11	3.30
38	W36X247	3.63	3.82	4.127	4.375	3.18	3.32	3.58	3.85	4.106	4.468	3.11	3.30
39	W36X231	3.63	3.82	4.127	4.374	3.18	3.32	3.58	3.85	4.106	4.467	3.11	3.30
40	W36X256	3.64	3.83	4.132	4.379	3.18	3.33	3.59	3.86	4.111	4.471	3.12	3.31
41	W36X232	3.64	3.83	4.132	4.379	3.18	3.33	3.59	3.86	4.112	4.471	3.12	3.31
42	W36X210	3.64	3.83	4.135	4.382	3.19	3.33	3.59	3.86	4.114	4.475	3.12	3.31
43	W36X194	3.64	3.83	4.134	4.381	3.19	3.33	3.59	3.86	4.113	4.473	3.12	3.31
44	W36X182	3.64	3.83	4.135	4.381	3.19	3.33	3.59	3.86	4.114	4.474	3.12	3.31

45	W36X170	3.64	3.83	4.137	4.384	3.19	3.33	3.59	3.87	4.116	4.476	3.12	3.31
46	W36X160	3.64	3.83	4.135	4.382	3.19	3.33	3.59	3.86	4.114	4.475	3.12	3.31
47	W36X150	3.64	3.83	4.138	4.385	3.19	3.33	3.60	3.87	4.118	4.478	3.12	3.31
48	W36X135	3.65	3.84	4.142	4.388	3.20	3.34	3.60	3.87	4.122	4.481	3.13	3.32
49	W33X387	3.63	3.82	4.126	4.373	3.18	3.32	3.58	3.85	4.105	4.466	3.11	3.30
50	W33X354	3.63	3.82	4.124	4.371	3.17	3.32	3.58	3.85	4.103	4.465	3.10	3.29
51	W33X318	3.63	3.82	4.125	4.373	3.17	3.32	3.58	3.85	4.104	4.466	3.11	3.30
52	W33X291	3.63	3.82	4.124	4.372	3.17	3.32	3.58	3.85	4.104	4.465	3.11	3.30
53	W33X263	3.63	3.82	4.125	4.372	3.18	3.32	3.58	3.85	4.104	4.465	3.11	3.30
54	W33X241	3.63	3.82	4.126	4.374	3.18	3.32	3.58	3.85	4.105	4.467	3.11	3.30
55	W33X221	3.63	3.82	4.127	4.374	3.18	3.32	3.58	3.85	4.106	4.466	3.11	3.30
56	W33X201	3.63	3.82	4.127	4.374	3.18	3.32	3.58	3.85	4.106	4.467	3.11	3.30
57	W33X169	3.64	3.83	4.133	4.38	3.18	3.33	3.59	3.86	4.112	4.472	3.12	3.31
58	W33X152	3.64	3.83	4.133	4.38	3.19	3.33	3.59	3.86	4.112	4.472	3.12	3.31
59	W33X141	3.64	3.83	4.133	4.38	3.19	3.33	3.59	3.86	4.112	4.472	3.12	3.31
60	W33X130	3.64	3.83	4.137	4.383	3.19	3.33	3.60	3.87	4.117	4.477	3.12	3.31
61	W33X118	3.64	3.84	4.139	4.386	3.19	3.33	3.60	3.87	4.119	4.479	3.13	3.31
62	W30X391	3.62	3.82	4.122	4.37	3.17	3.31	3.58	3.85	4.102	4.463	3.10	3.29
63	W30X357	3.62	3.82	4.122	4.37	3.17	3.31	3.58	3.85	4.102	4.463	3.10	3.29
64	W30X326	3.63	3.82	4.123	4.37	3.17	3.31	3.58	3.85	4.102	4.463	3.10	3.29
65	W30X292	3.63	3.82	4.123	4.371	3.17	3.31	3.58	3.85	4.102	4.464	3.10	3.29
66	W30X261	3.63	3.82	4.124	4.371	3.17	3.32	3.58	3.85	4.103	4.464	3.10	3.29
67	W30X235	3.62	3.82	4.121	4.369	3.17	3.31	3.58	3.85	4.101	4.461	3.10	3.29
68	W30X211	3.63	3.82	4.125	4.373	3.18	3.32	3.58	3.85	4.105	4.466	3.11	3.30
69	W30X191	3.63	3.82	4.124	4.372	3.18	3.32	3.58	3.85	4.104	4.465	3.11	3.30
70	W30X173	3.63	3.82	4.126	4.373	3.18	3.32	3.58	3.85	4.106	4.467	3.11	3.30
71	W30X148	3.63	3.83	4.131	4.378	3.18	3.32	3.59	3.86	4.11	4.471	3.11	3.30
72	W30X132	3.64	3.83	4.133	4.382	3.19	3.33	3.59	3.86	4.114	4.474	3.12	3.31
73	W30X124	3.64	3.83	4.135	4.381	3.19	3.33	3.59	3.86	4.114	4.474	3.12	3.31
74	W30X116	3.64	3.83	4.137	4.385	3.19	3.33	3.60	3.87	4.117	4.476	3.12	3.31
75	W30X108	3.64	3.83	4.138	4.386	3.19	3.33	3.60	3.87	4.119	4.479	3.12	3.31
76	W30X99	3.65	3.84	4.14	4.389	3.20	3.34	3.60	3.87	4.121	4.48	3.13	3.32
77	W30X90	3.64	3.84	4.14	4.385	3.19	3.33	3.60	3.87	4.12	4.48	3.13	3.31
78	W27X539	3.62	3.81	4.119	4.366	3.17	3.31	3.57	3.85	4.098	4.459	3.10	3.29
79	W27X368	3.62	3.81	4.121	4.369	3.17	3.31	3.58	3.85	4.1	4.462	3.10	3.29
80	W27X336	3.62	3.82	4.122	4.37	3.17	3.31	3.58	3.85	4.101	4.463	3.10	3.29
81	W27X307	3.62	3.81	4.12	4.368	3.17	3.31	3.58	3.85	4.099	4.461	3.10	3.29
82	W27X281	3.62	3.82	4.122	4.37	3.17	3.31	3.58	3.85	4.101	4.463	3.10	3.29
83	W27X258	3.62	3.82	4.121	4.369	3.17	3.31	3.58	3.85	4.101	4.462	3.10	3.29
84	W27X235	3.62	3.82	4.122	4.37	3.17	3.31	3.58	3.85	4.102	4.463	3.10	3.29
85	W27X217	3.62	3.82	4.123	4.371	3.17	3.31	3.58	3.85	4.103	4.464	3.10	3.29
86	W27X194	3.62	3.82	4.123	4.37	3.17	3.31	3.58	3.85	4.102	4.463	3.10	3.29
87	W27X178	3.63	3.82	4.125	4.372	3.17	3.32	3.58	3.85	4.104	4.465	3.11	3.30
88	W27X161	3.63	3.82	4.125	4.373	3.18	3.32	3.58	3.85	4.104	4.466	3.11	3.30
89	W27X146	3.63	3.82	4.126	4.375	3.18	3.32	3.58	3.85	4.106	4.467	3.11	3.30
90	W27X129	3.63	3.82	4.131	4.378	3.18	3.32	3.59	3.86	4.11	4.47	3.11	3.30
91	W27X114	3.64	3.83	4.132	4.379	3.18	3.33	3.59	3.86	4.113	4.471	3.12	3.31
92	W27X102	3.64	3.83	4.133	4.38	3.19	3.33	3.59	3.86	4.112	4.472	3.12	3.31

93	W27X94	3.64	3.83	4.133	4.381	3.19	3.33	3.59	3.86	4.113	4.473	3.12	3.31
94	W27X84	3.64	3.83	4.138	4.383	3.19	3.33	3.60	3.87	4.116	4.475	3.12	3.31
95	W24X370	3.62	3.81	4.12	4.368	3.17	3.31	3.58	3.85	4.099	4.462	3.10	3.29
96	W24X335	3.62	3.81	4.12	4.367	3.17	3.31	3.58	3.85	4.099	4.461	3.10	3.29
97	W24X306	3.62	3.81	4.12	4.368	3.17	3.31	3.58	3.85	4.1	4.461	3.10	3.29
98	W24X279	3.62	3.81	4.121	4.369	3.17	3.31	3.58	3.85	4.101	4.462	3.10	3.29
99	W24X250	3.62	3.81	4.121	4.369	3.17	3.31	3.58	3.85	4.1	4.462	3.10	3.29
100	W24X229	3.62	3.82	4.121	4.369	3.17	3.31	3.58	3.85	4.101	4.463	3.10	3.29
101	W24X207	3.62	3.82	4.122	4.369	3.17	3.31	3.58	3.85	4.101	4.463	3.10	3.29
102	W24X192	3.62	3.82	4.123	4.37	3.17	3.31	3.58	3.85	4.102	4.463	3.10	3.29
103	W24X176	3.62	3.82	4.122	4.369	3.17	3.31	3.58	3.85	4.101	4.463	3.10	3.29
104	W24X162	3.63	3.82	4.123	4.371	3.17	3.31	3.58	3.85	4.102	4.463	3.10	3.29
105	W24X146	3.63	3.82	4.124	4.371	3.17	3.31	3.58	3.85	4.103	4.463	3.10	3.30
106	W24X131	3.63	3.82	4.124	4.372	3.18	3.32	3.58	3.85	4.104	4.464	3.11	3.30
107	W24X117	3.63	3.82	4.126	4.374	3.18	3.32	3.58	3.85	4.106	4.466	3.11	3.30
108	W24X104	3.63	3.82	4.126	4.375	3.18	3.32	3.58	3.85	4.106	4.468	3.11	3.30
109	W24X103	3.63	3.82	4.13	4.376	3.18	3.32	3.59	3.86	4.109	4.47	3.11	3.30
110	W24X94	3.64	3.83	4.131	4.378	3.18	3.32	3.59	3.86	4.112	4.473	3.11	3.30
111	W24X84	3.64	3.83	4.132	4.38	3.18	3.33	3.59	3.86	4.113	4.474	3.12	3.30
112	W24X76	3.64	3.83	4.135	4.382	3.19	3.33	3.59	3.86	4.113	4.474	3.12	3.31
113	W24X68	3.64	3.83	4.134	4.381	3.19	3.33	3.59	3.86	4.114	4.473	3.12	3.31
114	W24X62	3.65	3.84	4.145	4.39	3.20	3.34	3.60	3.87	4.124	4.481	3.13	3.32
115	W24X55	3.65	3.84	4.143	4.391	3.20	3.34	3.60	3.87	4.124	4.483	3.13	3.32
116	W21X201	3.62	3.81	4.12	4.368	3.17	3.31	3.58	3.85	4.099	4.461	3.10	3.29
117	W21X182	3.62	3.81	4.12	4.368	3.17	3.31	3.58	3.85	4.101	4.461	3.10	3.29
118	W21X166	3.62	3.81	4.12	4.368	3.17	3.31	3.58	3.85	4.1	4.463	3.10	3.29
119	W21X147	3.63	3.82	4.124	4.372	3.17	3.31	3.58	3.85	4.103	4.465	3.10	3.29
120	W21X132	3.62	3.82	4.123	4.369	3.17	3.31	3.58	3.85	4.102	4.462	3.10	3.29
121	W21X122	3.63	3.82	4.123	4.371	3.17	3.31	3.58	3.85	4.103	4.465	3.10	3.29
122	W21X111	3.63	3.82	4.124	4.373	3.17	3.32	3.58	3.85	4.103	4.466	3.10	3.30
123	W21X101	3.63	3.82	4.123	4.37	3.17	3.32	3.58	3.85	4.103	4.464	3.10	3.29
124	W21X93	3.63	3.83	4.131	4.378	3.18	3.32	3.59	3.86	4.112	4.472	3.12	3.31
125	W21X83	3.63	3.83	4.132	4.377	3.18	3.32	3.59	3.86	4.11	4.47	3.11	3.30
126	W21X73	3.63	3.83	4.132	4.378	3.18	3.32	3.59	3.86	4.11	4.469	3.11	3.30
127	W21X68	3.63	3.83	4.131	4.38	3.18	3.32	3.59	3.86	4.112	4.468	3.11	3.31
128	W21X62	3.64	3.83	4.13	4.378	3.19	3.33	3.59	3.86	4.11	4.474	3.12	3.31
129	W21X55	3.64	3.83	4.134	4.382	3.19	3.33	3.59	3.86	4.112	4.479	3.12	3.31
130	W21X48*	3.64	3.83	4.137	4.38	3.19	3.33	3.59	3.86	4.116	4.477	3.12	3.31
131	W21X57	3.64	3.83	4.134	4.379	3.19	3.33	3.59	3.86	4.115	4.474	3.12	3.31
132	W21X50	3.64	3.84	4.143	4.386	3.19	3.34	3.60	3.87	4.119	4.476	3.13	3.32
133	W21X44	3.65	3.84	4.142	4.388	3.20	3.34	3.60	3.87	4.125	4.481	3.13	3.32
134	W18X311	3.62	3.81	4.116	4.364	3.16	3.31	3.57	3.84	4.096	4.458	3.09	3.29
135	W18X283	3.62	3.81	4.118	4.367	3.17	3.31	3.57	3.85	4.098	4.46	3.10	3.29
136	W18X258	3.62	3.81	4.117	4.365	3.17	3.31	3.57	3.84	4.096	4.459	3.10	3.29
137	W18X234	3.62	3.81	4.119	4.366	3.17	3.31	3.57	3.84	4.097	4.459	3.10	3.29
138	W18X211	3.62	3.81	4.117	4.366	3.17	3.31	3.57	3.84	4.097	4.458	3.10	3.29
139	W18X192	3.62	3.81	4.118	4.366	3.17	3.31	3.57	3.84	4.096	4.458	3.10	3.29
140	W18X175	3.62	3.81	4.118	4.366	3.17	3.31	3.57	3.84	4.099	4.46	3.10	3.29

141	W18X158	3.62	3.81	4.12	4.368	3.17	3.31	3.57	3.85	4.098	4.46	3.10	3.29
142	W18X143	3.62	3.81	4.118	4.366	3.17	3.31	3.57	3.84	4.097	4.46	3.10	3.29
143	W18X130	3.62	3.81	4.119	4.368	3.17	3.31	3.57	3.85	4.1	4.461	3.10	3.29
144	W18X119	3.62	3.82	4.12	4.37	3.17	3.31	3.58	3.85	4.102	4.464	3.10	3.29
145	W18X106	3.62	3.82	4.122	4.368	3.17	3.31	3.58	3.85	4.1	4.463	3.10	3.29
146	W18X97	3.62	3.82	4.121	4.369	3.17	3.31	3.58	3.85	4.102	4.462	3.10	3.29
147	W18X86	3.62	3.82	4.123	4.37	3.17	3.31	3.58	3.85	4.103	4.463	3.10	3.29
148	W18X76	3.63	3.82	4.122	4.372	3.17	3.31	3.58	3.85	4.103	4.461	3.10	3.29
149	W18X71	3.63	3.82	4.129	4.375	3.18	3.32	3.58	3.86	4.107	4.471	3.11	3.30
150	W18X65	3.63	3.82	4.129	4.378	3.18	3.32	3.59	3.86	4.108	4.47	3.11	3.30
151	W18X60	3.63	3.82	4.13	4.375	3.18	3.32	3.58	3.85	4.11	4.466	3.11	3.30
152	W18X55	3.64	3.83	4.129	4.376	3.18	3.32	3.59	3.86	4.108	4.474	3.11	3.30
153	W18X50	3.63	3.82	4.128	4.375	3.18	3.32	3.58	3.86	4.103	4.469	3.11	3.30
154	W18X46	3.63	3.83	4.133	4.38	3.19	3.33	3.59	3.86	4.11	4.47	3.12	3.31
155	W18X40	3.64	3.83	4.136	4.374	3.19	3.33	3.59	3.86	4.115	4.48	3.12	3.31
156	W18X35	3.64	3.83	4.138	4.384	3.19	3.33	3.60	3.87	4.115	4.473	3.12	3.31
157	W16X100	3.62	3.81	4.119	4.367	3.17	3.31	3.58	3.85	4.101	4.462	3.10	3.29
158	W16X89	3.62	3.81	4.12	4.371	3.17	3.31	3.58	3.85	4.1	4.46	3.10	3.29
159	W16X77	3.62	3.81	4.119	4.367	3.17	3.31	3.58	3.85	4.099	4.458	3.10	3.29
160	W16X67	3.62	3.82	4.118	4.369	3.17	3.31	3.57	3.85	4.099	4.461	3.10	3.29
161	W16X57	3.63	3.82	4.13	4.378	3.18	3.32	3.58	3.85	4.106	4.467	3.11	3.30
162	W16X50	3.63	3.82	4.129	4.378	3.18	3.32	3.58	3.86	4.103	4.461	3.11	3.30
163	W16X45	3.63	3.82	4.132	4.373	3.18	3.32	3.59	3.86	4.107	4.475	3.11	3.30
164	W16X40	3.63	3.82	4.13	4.379	3.18	3.32	3.59	3.86	4.108	4.468	3.11	3.30
165	W16X36	3.64	3.82	4.132	4.385	3.18	3.33	3.59	3.86	4.112	4.471	3.11	3.30
166	W16X31	3.64	3.83	4.133	4.39	3.19	3.33	3.60	3.87	4.106	4.479	3.12	3.31
167	W16X26	3.65	3.83	4.133	4.379	3.19	3.33	3.60	3.87	4.119	4.473	3.13	3.32
168	W14X730	3.61	3.80	4.108	4.356	3.15	3.30	3.56	3.83	4.087	4.45	3.08	3.27
169	W14X665	3.61	3.80	4.108	4.357	3.15	3.30	3.56	3.83	4.088	4.451	3.08	3.28
170	W14X605	3.61	3.80	4.108	4.357	3.15	3.30	3.56	3.83	4.088	4.451	3.09	3.28
171	W14X550	3.61	3.80	4.108	4.357	3.15	3.30	3.56	3.83	4.088	4.45	3.09	3.28
172	W14X500	3.61	3.80	4.11	4.358	3.16	3.30	3.56	3.84	4.089	4.452	3.09	3.28
173	W14X455	3.61	3.80	4.109	4.357	3.16	3.30	3.56	3.84	4.089	4.451	3.09	3.28
174	W14X426	3.61	3.80	4.109	4.358	3.16	3.30	3.56	3.84	4.088	4.451	3.09	3.28
175	W14X398	3.61	3.80	4.11	4.358	3.16	3.30	3.56	3.84	4.089	4.452	3.09	3.28
176	W14X370	3.61	3.80	4.11	4.358	3.16	3.30	3.56	3.84	4.089	4.453	3.09	3.28
177	W14X342	3.61	3.80	4.109	4.357	3.16	3.30	3.56	3.84	4.088	4.451	3.09	3.28
178	W14X311	3.61	3.80	4.111	4.359	3.16	3.30	3.56	3.84	4.09	4.453	3.09	3.28
179	W14X283	3.61	3.80	4.11	4.358	3.16	3.30	3.56	3.84	4.089	4.452	3.09	3.28
180	W14X257	3.61	3.80	4.111	4.359	3.16	3.30	3.56	3.84	4.09	4.453	3.09	3.28
181	W14X233	3.61	3.80	4.11	4.36	3.16	3.30	3.56	3.84	4.089	4.452	3.09	3.28
182	W14X211	3.61	3.81	4.112	4.36	3.16	3.30	3.57	3.84	4.091	4.455	3.09	3.28
183	W14X193	3.61	3.80	4.111	4.359	3.16	3.30	3.57	3.84	4.09	4.453	3.09	3.28
184	W14X176	3.61	3.80	4.111	4.36	3.16	3.30	3.56	3.84	4.09	4.453	3.09	3.28
185	W14X159	3.61	3.80	4.112	4.361	3.16	3.30	3.57	3.84	4.092	4.455	3.09	3.28
186	W14X145	3.61	3.81	4.111	4.36	3.16	3.30	3.57	3.84	4.09	4.452	3.09	3.28
187	W14X132	3.61	3.81	4.113	4.36	3.16	3.30	3.57	3.84	4.092	4.455	3.09	3.28
188	W14X120	3.61	3.81	4.112	4.361	3.16	3.30	3.57	3.84	4.092	4.453	3.09	3.28

189	W14X109	3.61	3.80	4.112	4.359	3.16	3.30	3.57	3.84	4.092	4.452	3.09	3.28
190	W14X99	3.61	3.80	4.112	4.36	3.16	3.30	3.56	3.84	4.088	4.451	3.09	3.28
191	W14X90	3.60	3.79	4.103	4.351	3.14	3.29	3.55	3.82	4.078	4.445	3.07	3.27
192	W14X82	3.62	3.81	4.119	4.367	3.17	3.31	3.57	3.84	4.099	4.456	3.10	3.29
193	W14X74	3.62	3.81	4.116	4.366	3.16	3.31	3.57	3.84	4.099	4.458	3.09	3.29
194	W14X68	3.62	3.81	4.118	4.364	3.16	3.31	3.57	3.84	4.096	4.46	3.10	3.28
195	W14X61	3.62	3.81	4.119	4.366	3.17	3.31	3.57	3.84	4.095	4.451	3.09	3.28
196	W14X53	3.62	3.82	4.117	4.367	3.17	3.31	3.57	3.85	4.096	4.464	3.10	3.29
197	W14X48	3.62	3.81	4.122	4.366	3.17	3.31	3.57	3.85	4.097	4.46	3.10	3.29
198	W14X43	3.62	3.81	4.123	4.372	3.17	3.31	3.58	3.85	4.103	4.459	3.10	3.30
199	W14X38	3.63	3.82	4.124	4.375	3.17	3.31	3.58	3.85	4.106	4.473	3.11	3.30
200	W14X34	3.63	3.82	4.12	4.381	3.18	3.32	3.58	3.85	4.108	4.467	3.11	3.30
201	W14X30	3.63	3.82	4.13	4.381	3.18	3.32	3.58	3.85	4.112	4.462	3.11	3.30
202	W14X26	3.64	3.83	4.135	4.376	3.18	3.33	3.60	3.86	4.114	4.48	3.12	3.31
203	W14X22	3.64	3.83	4.131	4.373	3.20	3.33	3.60	3.86	4.125	4.473	3.12	3.31
204	W12X336	3.61	3.80	4.11	4.358	3.16	3.30	3.56	3.84	4.089	4.452	3.09	3.28
205	W12X305	3.61	3.80	4.109	4.359	3.16	3.30	3.56	3.84	4.089	4.452	3.09	3.28
206	W12X279	3.61	3.80	4.11	4.358	3.16	3.30	3.56	3.84	4.089	4.452	3.09	3.28
207	W12X252	3.61	3.80	4.11	4.359	3.16	3.30	3.57	3.84	4.09	4.452	3.09	3.28
208	W12X230	3.61	3.80	4.111	4.36	3.16	3.30	3.57	3.84	4.091	4.453	3.09	3.28
209	W12X210	3.61	3.80	4.112	4.36	3.16	3.30	3.57	3.84	4.09	4.453	3.09	3.28
210	W12X190	3.61	3.80	4.11	4.359	3.16	3.30	3.56	3.84	4.09	4.453	3.09	3.28
211	W12X170	3.61	3.80	4.111	4.36	3.16	3.30	3.57	3.84	4.091	4.454	3.09	3.28
212	W12X152	3.61	3.80	4.113	4.36	3.16	3.30	3.57	3.84	4.092	4.455	3.09	3.28
213	W12X136	3.61	3.80	4.113	4.359	3.16	3.30	3.57	3.84	4.091	4.454	3.09	3.28
214	W12X120	3.61	3.81	4.113	4.361	3.16	3.30	3.57	3.84	4.092	4.452	3.09	3.28
215	W12X106	3.61	3.81	4.111	4.361	3.16	3.30	3.57	3.84	4.092	4.454	3.09	3.28
216	W12X96	3.62	3.81	4.113	4.363	3.16	3.30	3.57	3.84	4.09	4.457	3.09	3.28
217	W12X87	3.61	3.81	4.112	4.361	3.16	3.30	3.57	3.84	4.091	4.452	3.09	3.28
218	W12X79	3.61	3.81	4.11	4.362	3.16	3.30	3.57	3.84	4.093	4.457	3.09	3.28
219	W12X72	3.62	3.81	4.111	4.358	3.16	3.30	3.57	3.84	4.092	4.457	3.09	3.28
220	W12X65	3.60	3.80	4.1	4.354	3.15	3.29	3.56	3.83	4.086	4.443	3.08	3.27
221	W12X58	3.62	3.81	4.116	4.364	3.16	3.30	3.57	3.84	4.092	4.457	3.10	3.28
222	W12X53	3.62	3.81	4.115	4.359	3.16	3.30	3.57	3.84	4.094	4.453	3.09	3.28
223	W12X50	3.62	3.81	4.118	4.371	3.17	3.31	3.57	3.85	4.098	4.463	3.10	3.29
224	W12X45	3.62	3.81	4.117	4.372	3.17	3.31	3.57	3.85	4.101	4.463	3.10	3.29
225	W12X40	3.62	3.81	4.119	4.371	3.16	3.31	3.57	3.85	4.101	4.467	3.10	3.29
226	W12X35	3.63	3.81	4.132	4.371	3.17	3.31	3.58	3.85	4.103	4.454	3.10	3.29
227	W12X30	3.63	3.82	4.119	4.374	3.17	3.31	3.58	3.85	4.108	4.47	3.11	3.30
228	W12X26	3.62	3.81	4.126	4.37	3.18	3.32	3.58	3.85	4.109	4.46	3.10	3.29
229	W12X22	3.63	3.82	4.133	4.397	3.19	3.34	3.59	3.85	4.11	4.489	3.12	3.31
230	W12X19	3.65	3.84	4.131	4.372	3.18	3.34	3.59	3.86	4.112	4.49	3.12	3.31
231	W12X16	3.65	3.85	4.136	4.402	3.19	3.35	3.60	3.87	4.119	4.488	3.13	3.32
232	W12X14	3.66	3.85	4.152	4.385	3.20	3.35	3.59	3.90	4.134	4.47	3.14	3.32
233	W10X112	3.61	3.80	4.111	4.358	3.16	3.30	3.57	3.84	4.089	4.453	3.09	3.28
234	W10X100	3.61	3.80	4.11	4.357	3.16	3.30	3.56	3.83	4.091	4.451	3.09	3.28
235	W10X88	3.61	3.80	4.109	4.359	3.16	3.30	3.57	3.84	4.09	4.449	3.09	3.28
236	W10X77	3.61	3.81	4.11	4.364	3.16	3.30	3.56	3.84	4.087	4.453	3.09	3.28

237	W10X68	3.61	3.81	4.113	4.359	3.16	3.30	3.57	3.84	4.092	4.454	3.09	3.28
238	W10X60	3.61	3.81	4.111	4.362	3.16	3.30	3.56	3.84	4.095	4.46	3.09	3.28
239	W10X54	3.61	3.81	4.114	4.358	3.16	3.30	3.57	3.84	4.089	4.447	3.09	3.28
240	W10X49	3.61	3.80	4.112	4.352	3.16	3.30	3.57	3.84	4.088	4.452	3.09	3.28
241	W10X45	3.62	3.81	4.119	4.355	3.16	3.31	3.56	3.84	4.096	4.456	3.09	3.29
242	W10X39	3.62	3.81	4.119	4.363	3.16	3.30	3.58	3.84	4.099	4.445	3.09	3.28
243	W10X33	3.62	3.82	4.115	4.36	3.16	3.31	3.58	3.84	4.091	4.46	3.09	3.29
244	W10X30	3.62	3.82	4.121	4.369	3.17	3.32	3.57	3.84	4.107	4.447	3.10	3.29
245	W10X26	3.62	3.83	4.116	4.374	3.17	3.31	3.58	3.85	4.092	4.456	3.10	3.30
246	W10X22	3.63	3.81	4.127	4.37	3.18	3.32	3.58	3.84	4.102	4.461	3.10	3.30
247	W10X19	3.63	3.83	4.12	4.367	3.18	3.32	3.58	3.87	4.094	4.466	3.11	3.31
248	W10X17	3.65	3.84	4.133	4.375	3.18	3.33	3.59	3.85	4.096	4.475	3.11	3.30
249	W10X15	3.67	3.84	4.131	4.412	3.19	3.32	3.59	3.88	4.114	4.476	3.13	3.30
250	W10X12	3.64	3.83	4.133	4.409	3.21	3.37	3.61	3.88	4.115	4.457	3.14	3.29
	MIN	**3.60**	**3.79**	**4.10**	**4.35**	**3.14**	**3.29**	**3.55**	**3.82**	**4.08**	**4.44**	**3.07**	**3.27**
	MAX	**3.67**	**3.85**	**4.15**	**4.41**	**3.21**	**3.37**	**3.61**	**3.90**	**4.13**	**4.49**	**3.14**	**3.32**
	AVE	**3.63**	**3.82**	**4.12**	**4.37**	**3.17**	**3.32**	**3.58**	**3.85**	**4.10**	**4.46**	**3.11**	**3.30**

Table C- 6. Reliability Indices for Noncomposite Rolled I-shaped Girdes for ADTT 2’500 and L=90, 120, 200ft.

		L=90 ft						L=120 ft						L=200 ft					
	Φ	1.00		0.95		1.05		1.00		0.95		1.05		1.00		0.95		1.05	
#	**Shape \ D/(D+L)**	**0.45**	**0.60**	**0.45**	**0.60**	**0.45**	**0.60**	**0.50**	**0.65**	**0.50**	**0.65**	**0.50**	**0.65**	**0.60**	**0.75**	**0.60**	**0.75**	**0.60**	**0.75**
1	W44X335	3.73	3.91	4.29	4.55	3.22	3.34	3.74	3.90	4.33	4.56	3.21	3.31	4.21	4.11	4.87	4.82	3.62	3.47
2	W44X290	3.73	3.91	4.29	4.55	3.21	3.34	3.74	3.90	4.33	4.56	3.21	3.31	4.21	4.11	4.87	4.82	3.62	3.46
3	W44X262	3.72	3.91	4.29	4.55	3.21	3.33	3.74	3.90	4.33	4.56	3.21	3.31	4.21	4.11	4.87	4.82	3.62	3.46
4	W44X230	3.73	3.91	4.29	4.55	3.22	3.34	3.74	3.90	4.33	4.56	3.21	3.31	4.21	4.11	4.87	4.82	3.62	3.47
5	W40X593	3.72	3.91	4.28	4.54	3.21	3.33	3.73	3.90	4.32	4.56	3.21	3.30	4.21	4.10	4.86	4.81	3.61	3.46
6	W40X503	3.72	3.91	4.29	4.55	3.21	3.33	3.74	3.90	4.32	4.56	3.21	3.30	4.21	4.10	4.87	4.82	3.61	3.46
7	W40X431	3.72	3.91	4.29	4.55	3.21	3.33	3.74	3.90	4.32	4.56	3.21	3.30	4.21	4.10	4.87	4.82	3.61	3.46
8	W40X397	3.72	3.91	4.29	4.55	3.21	3.33	3.74	3.90	4.32	4.56	3.21	3.30	4.21	4.10	4.87	4.82	3.61	3.46
9	W40X372	3.72	3.91	4.29	4.55	3.21	3.33	3.74	3.90	4.32	4.56	3.21	3.30	4.21	4.10	4.87	4.82	3.61	3.46
10	W40X362	3.72	3.91	4.29	4.55	3.21	3.33	3.74	3.90	4.32	4.56	3.21	3.30	4.21	4.10	4.87	4.82	3.61	3.46
11	W40X324	3.72	3.91	4.29	4.55	3.21	3.33	3.74	3.90	4.32	4.56	3.21	3.30	4.21	4.10	4.87	4.82	3.61	3.46
12	W40X297	3.72	3.91	4.29	4.55	3.21	3.33	3.74	3.90	4.32	4.56	3.21	3.30	4.21	4.10	4.87	4.82	3.61	3.46
13	W40X277	3.72	3.91	4.29	4.55	3.21	3.33	3.74	3.90	4.32	4.56	3.21	3.30	4.21	4.10	4.87	4.82	3.61	3.46
14	W40X249	3.72	3.91	4.29	4.55	3.21	3.33	3.74	3.90	4.32	4.56	3.21	3.30	4.21	4.10	4.87	4.82	3.61	3.46
15	W40X215	3.72	3.91	4.29	4.55	3.21	3.33	3.74	3.90	4.32	4.56	3.21	3.30	4.21	4.10	4.87	4.82	3.61	3.46
16	W40X199	3.73	3.91	4.29	4.55	3.21	3.33	3.74	3.90	4.32	4.56	3.21	3.31	4.21	4.11	4.87	4.82	3.62	3.46
17	W40X392	3.73	3.91	4.29	4.55	3.22	3.34	3.74	3.90	4.33	4.56	3.22	3.31	4.21	4.11	4.87	4.82	3.62	3.47
18	W40X331	3.73	3.92	4.29	4.55	3.22	3.34	3.75	3.91	4.33	4.56	3.22	3.31	4.21	4.11	4.87	4.82	3.62	3.47
19	W40X327	3.73	3.91	4.29	4.55	3.22	3.34	3.74	3.90	4.33	4.56	3.22	3.31	4.21	4.11	4.87	4.82	3.62	3.47
20	W40X294	3.73	3.91	4.29	4.55	3.22	3.34	3.74	3.90	4.33	4.56	3.22	3.31	4.21	4.11	4.87	4.82	3.62	3.47
21	W40X278	3.73	3.92	4.29	4.55	3.22	3.34	3.75	3.91	4.33	4.57	3.22	3.31	4.22	4.11	4.87	4.82	3.62	3.47
22	W40X264	3.73	3.92	4.29	4.55	3.22	3.34	3.75	3.91	4.33	4.57	3.22	3.31	4.22	4.11	4.87	4.82	3.62	3.47
23	W40X235	3.73	3.91	4.29	4.55	3.22	3.34	3.74	3.90	4.33	4.56	3.21	3.31	4.21	4.11	4.87	4.82	3.62	3.47

24	W40X211	3.73	3.91	4.29	4.55	3.22	3.34	3.74	3.91	4.33	4.56	3.22	3.31	4.21	4.11	4.87	4.82	3.62	3.47
25	W40X183	3.73	3.91	4.29	4.55	3.22	3.34	3.74	3.90	4.33	4.56	3.22	3.31	4.21	4.11	4.87	4.82	3.62	3.47
26	W40X167	3.73	3.92	4.30	4.56	3.22	3.34	3.75	3.91	4.33	4.57	3.22	3.31	4.22	4.11	4.87	4.82	3.62	3.47
27	W40X149	3.74	3.92	4.30	4.56	3.23	3.35	3.75	3.91	4.34	4.57	3.23	3.32	4.22	4.12	4.88	4.83	3.63	3.48
28	W36X652	3.72	3.90	4.28	4.54	3.20	3.33	3.73	3.89	4.32	4.55	3.20	3.30	4.20	4.10	4.86	4.81	3.61	3.45
29	W36X529	3.72	3.90	4.28	4.54	3.21	3.33	3.73	3.89	4.32	4.56	3.20	3.30	4.21	4.10	4.86	4.81	3.61	3.46
30	W36X487	3.72	3.91	4.28	4.54	3.21	3.33	3.73	3.90	4.32	4.56	3.20	3.30	4.20	4.10	4.86	4.81	3.61	3.46
31	W36X441	3.72	3.90	4.28	4.54	3.20	3.33	3.73	3.89	4.32	4.55	3.20	3.30	4.20	4.10	4.86	4.81	3.61	3.46
32	W36X395	3.72	3.91	4.28	4.54	3.21	3.33	3.73	3.89	4.32	4.55	3.20	3.30	4.20	4.10	4.86	4.81	3.61	3.46
33	W36X361	3.72	3.91	4.28	4.54	3.21	3.33	3.73	3.90	4.32	4.56	3.20	3.30	4.21	4.10	4.86	4.81	3.61	3.46
34	W36X330	3.72	3.91	4.28	4.54	3.21	3.33	3.74	3.90	4.32	4.56	3.20	3.30	4.21	4.10	4.87	4.81	3.61	3.46
35	W36X302	3.72	3.91	4.29	4.55	3.21	3.33	3.74	3.90	4.32	4.56	3.21	3.30	4.21	4.10	4.87	4.81	3.61	3.46
36	W36X282	3.72	3.91	4.29	4.55	3.21	3.33	3.74	3.90	4.32	4.56	3.21	3.30	4.21	4.10	4.87	4.82	3.61	3.46
37	W36X262	3.72	3.91	4.28	4.54	3.21	3.33	3.74	3.90	4.32	4.56	3.21	3.30	4.21	4.10	4.86	4.81	3.61	3.46
38	W36X247	3.72	3.91	4.29	4.55	3.21	3.33	3.74	3.90	4.32	4.56	3.21	3.30	4.21	4.10	4.87	4.82	3.61	3.46
39	W36X231	3.72	3.91	4.29	4.55	3.21	3.33	3.74	3.90	4.32	4.56	3.21	3.30	4.21	4.10	4.87	4.81	3.61	3.46
40	W36X256	3.73	3.91	4.29	4.55	3.22	3.34	3.74	3.90	4.33	4.56	3.21	3.31	4.21	4.11	4.87	4.82	3.62	3.47
41	W36X232	3.73	3.91	4.29	4.55	3.22	3.34	3.74	3.90	4.33	4.56	3.21	3.31	4.21	4.11	4.87	4.82	3.62	3.47
42	W36X210	3.73	3.92	4.29	4.55	3.22	3.34	3.75	3.91	4.33	4.56	3.22	3.31	4.22	4.11	4.87	4.82	3.62	3.47
43	W36X194	3.73	3.92	4.29	4.55	3.22	3.34	3.74	3.91	4.33	4.56	3.22	3.31	4.21	4.11	4.87	4.82	3.62	3.47
44	W36X182	3.73	3.92	4.29	4.55	3.22	3.34	3.75	3.91	4.33	4.56	3.22	3.31	4.21	4.11	4.87	4.82	3.62	3.47
45	W36X170	3.73	3.92	4.29	4.56	3.22	3.34	3.75	3.91	4.33	4.57	3.22	3.31	4.22	4.11	4.87	4.82	3.62	3.47
46	W36X160	3.73	3.92	4.29	4.55	3.22	3.34	3.75	3.91	4.33	4.56	3.22	3.31	4.22	4.11	4.87	4.82	3.62	3.47
47	W36X150	3.73	3.92	4.30	4.56	3.22	3.34	3.75	3.91	4.33	4.57	3.22	3.32	4.22	4.11	4.87	4.82	3.62	3.47
48	W36X135	3.74	3.92	4.30	4.56	3.23	3.35	3.75	3.91	4.34	4.57	3.23	3.32	4.22	4.12	4.88	4.83	3.63	3.48
49	W33X387	3.72	3.91	4.28	4.55	3.21	3.33	3.74	3.90	4.32	4.56	3.20	3.30	4.21	4.10	4.87	4.82	3.61	3.46
50	W33X354	3.72	3.90	4.28	4.54	3.20	3.33	3.73	3.89	4.32	4.56	3.20	3.30	4.20	4.10	4.86	4.81	3.61	3.46
51	W33X318	3.72	3.91	4.28	4.55	3.21	3.33	3.74	3.90	4.32	4.56	3.20	3.30	4.21	4.10	4.87	4.82	3.61	3.46
52	W33X291	3.72	3.90	4.28	4.54	3.21	3.33	3.73	3.89	4.32	4.56	3.20	3.30	4.20	4.10	4.86	4.81	3.61	3.46
53	W33X263	3.72	3.91	4.28	4.54	3.21	3.33	3.73	3.90	4.32	4.56	3.20	3.30	4.21	4.10	4.86	4.81	3.61	3.46
54	W33X241	3.72	3.91	4.29	4.55	3.21	3.33	3.74	3.90	4.32	4.56	3.21	3.30	4.21	4.10	4.87	4.82	3.61	3.46
55	W33X221	3.72	3.91	4.29	4.55	3.21	3.33	3.74	3.90	4.32	4.56	3.21	3.30	4.21	4.10	4.87	4.82	3.61	3.46
56	W33X201	3.72	3.91	4.29	4.55	3.21	3.33	3.74	3.90	4.32	4.56	3.21	3.30	4.21	4.10	4.87	4.82	3.61	3.46
57	W33X169	3.73	3.91	4.29	4.55	3.22	3.34	3.74	3.90	4.33	4.56	3.21	3.31	4.21	4.11	4.87	4.82	3.62	3.47
58	W33X152	3.73	3.91	4.29	4.55	3.22	3.34	3.74	3.90	4.33	4.56	3.22	3.31	4.21	4.11	4.87	4.82	3.62	3.47
59	W33X141	3.73	3.91	4.29	4.55	3.22	3.34	3.74	3.90	4.33	4.56	3.22	3.31	4.21	4.11	4.87	4.82	3.62	3.47
60	W33X130	3.73	3.92	4.29	4.55	3.22	3.34	3.75	3.91	4.33	4.57	3.22	3.31	4.22	4.11	4.87	4.82	3.62	3.47
61	W33X118	3.74	3.92	4.30	4.56	3.23	3.35	3.75	3.91	4.33	4.57	3.22	3.32	4.22	4.12	4.88	4.82	3.63	3.48
62	W30X391	3.72	3.90	4.28	4.54	3.20	3.32	3.73	3.89	4.32	4.55	3.20	3.30	4.20	4.10	4.86	4.81	3.61	3.45
63	W30X357	3.72	3.90	4.28	4.54	3.20	3.32	3.73	3.89	4.32	4.55	3.20	3.30	4.20	4.10	4.86	4.81	3.61	3.45
64	W30X326	3.72	3.90	4.28	4.54	3.20	3.33	3.73	3.89	4.32	4.55	3.20	3.30	4.20	4.10	4.86	4.81	3.61	3.45
65	W30X292	3.72	3.90	4.28	4.54	3.20	3.33	3.73	3.89	4.32	4.55	3.20	3.30	4.20	4.10	4.86	4.81	3.61	3.46
66	W30X261	3.72	3.90	4.28	4.54	3.20	3.33	3.73	3.89	4.32	4.55	3.20	3.30	4.20	4.10	4.86	4.81	3.61	3.46
67	W30X235	3.72	3.90	4.28	4.54	3.20	3.32	3.73	3.89	4.32	4.55	3.20	3.29	4.20	4.10	4.86	4.81	3.60	3.45
68	W30X211	3.72	3.91	4.28	4.54	3.21	3.33	3.73	3.90	4.32	4.56	3.20	3.30	4.21	4.10	4.87	4.81	3.61	3.46
69	W30X191	3.72	3.91	4.28	4.54	3.21	3.33	3.73	3.89	4.32	4.56	3.20	3.30	4.20	4.10	4.86	4.81	3.61	3.46
70	W30X173	3.72	3.91	4.29	4.55	3.21	3.33	3.74	3.90	4.32	4.56	3.21	3.30	4.21	4.10	4.87	4.82	3.61	3.46
71	W30X148	3.73	3.91	4.29	4.55	3.21	3.34	3.74	3.90	4.33	4.56	3.21	3.31	4.21	4.11	4.87	4.82	3.62	3.46

72	W30X132	3.73	3.92	4.29	4.55	3.22	3.34	3.74	3.91	4.33	4.56	3.22	3.31	4.21	4.11	4.87	4.82	3.62	3.47
73	W30X124	3.73	3.92	4.29	4.55	3.22	3.34	3.75	3.91	4.33	4.56	3.22	3.31	4.22	4.11	4.87	4.82	3.62	3.47
74	W30X116	3.73	3.92	4.30	4.55	3.22	3.34	3.75	3.91	4.33	4.57	3.22	3.31	4.22	4.11	4.87	4.82	3.62	3.47
75	W30X108	3.73	3.92	4.30	4.56	3.22	3.34	3.75	3.91	4.33	4.57	3.22	3.32	4.22	4.12	4.88	4.83	3.63	3.47
76	W30X99	3.74	3.92	4.30	4.56	3.23	3.35	3.75	3.91	4.33	4.57	3.23	3.32	4.22	4.12	4.88	4.83	3.63	3.48
77	W30X90	3.74	3.92	4.30	4.56	3.23	3.35	3.75	3.91	4.33	4.57	3.22	3.32	4.22	4.12	4.88	4.82	3.63	3.48
78	W27X539	3.71	3.90	4.28	4.54	3.20	3.32	3.73	3.89	4.31	4.55	3.20	3.29	4.20	4.09	4.86	4.81	3.60	3.45
79	W27X368	3.71	3.90	4.28	4.54	3.20	3.32	3.73	3.89	4.32	4.55	3.20	3.29	4.20	4.10	4.86	4.81	3.60	3.45
80	W27X336	3.72	3.90	4.28	4.54	3.20	3.32	3.73	3.89	4.32	4.55	3.20	3.29	4.20	4.10	4.86	4.81	3.61	3.45
81	W27X307	3.71	3.90	4.28	4.54	3.20	3.32	3.73	3.89	4.31	4.55	3.20	3.29	4.20	4.10	4.86	4.81	3.60	3.45
82	W27X281	3.72	3.90	4.28	4.54	3.20	3.32	3.73	3.89	4.32	4.55	3.20	3.29	4.20	4.10	4.86	4.81	3.61	3.45
83	W27X258	3.71	3.90	4.28	4.54	3.20	3.32	3.73	3.89	4.32	4.55	3.20	3.29	4.20	4.10	4.86	4.81	3.61	3.45
84	W27X235	3.72	3.90	4.28	4.54	3.20	3.32	3.73	3.89	4.32	4.55	3.20	3.30	4.20	4.10	4.86	4.81	3.61	3.45
85	W27X217	3.72	3.90	4.28	4.54	3.20	3.33	3.73	3.89	4.32	4.55	3.20	3.30	4.20	4.10	4.86	4.81	3.61	3.46
86	W27X194	3.72	3.90	4.28	4.54	3.20	3.33	3.73	3.89	4.32	4.55	3.20	3.30	4.20	4.10	4.86	4.81	3.61	3.45
87	W27X178	3.72	3.91	4.28	4.55	3.21	3.33	3.73	3.89	4.32	4.56	3.20	3.30	4.21	4.10	4.86	4.81	3.61	3.46
88	W27X161	3.72	3.91	4.28	4.55	3.21	3.33	3.74	3.90	4.32	4.56	3.20	3.30	4.21	4.10	4.87	4.81	3.61	3.46
89	W27X146	3.72	3.91	4.29	4.55	3.21	3.33	3.74	3.90	4.32	4.56	3.21	3.30	4.21	4.10	4.87	4.81	3.61	3.46
90	W27X129	3.73	3.91	4.29	4.55	3.21	3.33	3.74	3.90	4.32	4.56	3.21	3.31	4.21	4.11	4.87	4.82	3.62	3.47
91	W27X114	3.73	3.91	4.29	4.55	3.22	3.34	3.74	3.90	4.33	4.56	3.21	3.31	4.21	4.11	4.87	4.82	3.62	3.47
92	W27X102	3.73	3.91	4.29	4.55	3.22	3.34	3.74	3.90	4.33	4.56	3.21	3.31	4.21	4.11	4.87	4.82	3.62	3.47
93	W27X94	3.73	3.91	4.29	4.55	3.22	3.34	3.74	3.90	4.33	4.56	3.22	3.31	4.21	4.11	4.87	4.82	3.62	3.47
94	W27X84	3.73	3.92	4.30	4.55	3.22	3.34	3.75	3.91	4.33	4.56	3.22	3.31	4.22	4.11	4.87	4.82	3.62	3.47
95	W24X370	3.71	3.90	4.28	4.54	3.20	3.32	3.73	3.89	4.32	4.55	3.20	3.29	4.20	4.10	4.86	4.81	3.60	3.45
96	W24X335	3.71	3.90	4.28	4.54	3.20	3.32	3.73	3.89	4.31	4.55	3.20	3.29	4.20	4.10	4.86	4.81	3.60	3.45
97	W24X306	3.71	3.90	4.28	4.54	3.20	3.32	3.73	3.89	4.31	4.55	3.20	3.29	4.20	4.10	4.86	4.81	3.60	3.45
98	W24X279	3.71	3.90	4.28	4.54	3.20	3.32	3.73	3.89	4.32	4.55	3.20	3.29	4.20	4.10	4.86	4.81	3.60	3.45
99	W24X250	3.71	3.90	4.28	4.54	3.20	3.32	3.73	3.89	4.32	4.55	3.20	3.29	4.20	4.10	4.86	4.81	3.60	3.45
100	W24X229	3.71	3.90	4.28	4.54	3.20	3.32	3.73	3.89	4.32	4.55	3.20	3.29	4.20	4.10	4.86	4.81	3.61	3.45
101	W24X207	3.72	3.90	4.28	4.54	3.20	3.32	3.73	3.89	4.32	4.55	3.20	3.29	4.20	4.10	4.86	4.81	3.61	3.45
102	W24X192	3.72	3.90	4.28	4.54	3.20	3.33	3.73	3.89	4.32	4.55	3.20	3.30	4.20	4.10	4.86	4.81	3.61	3.46
103	W24X176	3.72	3.90	4.28	4.54	3.20	3.32	3.73	3.89	4.32	4.55	3.20	3.29	4.20	4.10	4.86	4.81	3.61	3.45
104	W24X162	3.72	3.90	4.28	4.54	3.20	3.32	3.73	3.89	4.32	4.55	3.20	3.30	4.20	4.10	4.86	4.81	3.61	3.46
105	W24X146	3.72	3.90	4.28	4.54	3.20	3.33	3.73	3.89	4.32	4.55	3.20	3.30	4.20	4.10	4.86	4.81	3.61	3.46
106	W24X131	3.72	3.91	4.28	4.54	3.21	3.33	3.73	3.89	4.32	4.55	3.20	3.30	4.20	4.10	4.87	4.81	3.61	3.46
107	W24X117	3.72	3.91	4.29	4.55	3.21	3.33	3.74	3.90	4.32	4.56	3.21	3.30	4.21	4.10	4.87	4.82	3.61	3.46
108	W24X104	3.72	3.91	4.29	4.55	3.21	3.33	3.74	3.90	4.32	4.56	3.21	3.30	4.21	4.10	4.87	4.81	3.61	3.46
109	W24X103	3.73	3.91	4.29	4.55	3.21	3.33	3.74	3.90	4.32	4.56	3.21	3.31	4.21	4.11	4.87	4.82	3.62	3.46
110	W24X94	3.73	3.91	4.29	4.55	3.22	3.34	3.74	3.90	4.33	4.56	3.21	3.31	4.21	4.11	4.87	4.82	3.62	3.47
111	W24X84	3.73	3.91	4.29	4.55	3.22	3.34	3.74	3.91	4.33	4.56	3.21	3.31	4.21	4.11	4.87	4.82	3.62	3.47
112	W24X76	3.73	3.92	4.29	4.55	3.22	3.34	3.74	3.91	4.33	4.56	3.22	3.31	4.22	4.11	4.87	4.82	3.62	3.47
113	W24X68	3.73	3.92	4.29	4.55	3.22	3.34	3.75	3.91	4.33	4.56	3.22	3.31	4.21	4.11	4.87	4.82	3.62	3.47
114	W24X62	3.74	3.93	4.30	4.56	3.23	3.35	3.76	3.92	4.34	4.57	3.23	3.32	4.22	4.12	4.88	4.83	3.63	3.48
115	W24X55	3.74	3.93	4.30	4.57	3.23	3.35	3.76	3.92	4.34	4.57	3.23	3.33	4.22	4.12	4.87	4.83	3.63	3.48
116	W21X201	3.71	3.90	4.28	4.54	3.20	3.32	3.73	3.89	4.32	4.55	3.20	3.29	4.20	4.10	4.86	4.81	3.60	3.45
117	W21X182	3.71	3.90	4.28	4.54	3.20	3.32	3.73	3.89	4.32	4.55	3.20	3.29	4.20	4.10	4.86	4.81	3.61	3.45
118	W21X166	3.71	3.90	4.28	4.54	3.20	3.32	3.73	3.89	4.32	4.55	3.20	3.29	4.20	4.10	4.86	4.81	3.60	3.45
119	W21X147	3.72	3.91	4.28	4.54	3.20	3.33	3.73	3.90	4.32	4.56	3.20	3.30	4.20	4.10	4.86	4.82	3.61	3.46

120	W21X132	3.72	3.90	4.28	4.54	3.20	3.32	3.73	3.89	4.32	4.55	3.20	3.29	4.20	4.10	4.86	4.81	3.61	3.45
121	W21X122	3.72	3.90	4.28	4.54	3.20	3.33	3.73	3.89	4.32	4.55	3.20	3.30	4.20	4.10	4.86	4.81	3.61	3.46
122	W21X111	3.72	3.91	4.28	4.54	3.21	3.33	3.73	3.89	4.32	4.55	3.20	3.30	4.21	4.10	4.86	4.81	3.61	3.46
123	W21X101	3.72	3.90	4.28	4.54	3.20	3.32	3.73	3.89	4.32	4.56	3.20	3.30	4.21	4.10	4.87	4.81	3.61	3.45
124	W21X93	3.73	3.91	4.29	4.55	3.22	3.34	3.74	3.90	4.33	4.56	3.21	3.31	4.22	4.11	4.87	4.82	3.62	3.47
125	W21X83	3.73	3.91	4.29	4.55	3.21	3.34	3.74	3.90	4.33	4.56	3.21	3.30	4.21	4.11	4.87	4.82	3.62	3.47
126	W21X73	3.72	3.91	4.29	4.55	3.21	3.34	3.74	3.90	4.33	4.56	3.21	3.30	4.21	4.11	4.87	4.82	3.62	3.47
127	W21X68	3.72	3.91	4.29	4.55	3.22	3.34	3.74	3.90	4.33	4.56	3.21	3.31	4.21	4.11	4.87	4.82	3.62	3.46
128	W21X62	3.73	3.91	4.29	4.55	3.22	3.34	3.74	3.91	4.33	4.56	3.22	3.31	4.21	4.10	4.87	4.82	3.62	3.47
129	W21X55	3.73	3.91	4.30	4.55	3.22	3.34	3.75	3.91	4.33	4.56	3.22	3.31	4.22	4.11	4.88	4.82	3.62	3.47
130	W21X48*	3.73	3.92	4.30	4.55	3.22	3.34	3.75	3.90	4.33	4.57	3.22	3.31	4.22	4.11	4.87	4.82	3.62	3.47
131	W21X57	3.73	3.92	4.29	4.55	3.22	3.34	3.75	3.91	4.33	4.57	3.22	3.31	4.21	4.11	4.88	4.82	3.62	3.47
132	W21X50	3.74	3.92	4.30	4.55	3.23	3.35	3.75	3.91	4.33	4.57	3.22	3.32	4.22	4.12	4.88	4.82	3.63	3.48
133	W21X44	3.74	3.93	4.30	4.56	3.23	3.35	3.76	3.92	4.34	4.57	3.23	3.32	4.22	4.12	4.88	4.83	3.63	3.48
134	W18X311	3.71	3.90	4.28	4.54	3.20	3.32	3.73	3.89	4.31	4.55	3.19	3.29	4.20	4.09	4.86	4.81	3.60	3.45
135	W18X283	3.71	3.90	4.28	4.54	3.20	3.32	3.73	3.89	4.31	4.55	3.20	3.29	4.20	4.10	4.86	4.81	3.60	3.45
136	W18X258	3.71	3.90	4.28	4.54	3.20	3.32	3.73	3.89	4.31	4.55	3.19	3.29	4.20	4.09	4.86	4.81	3.60	3.45
137	W18X234	3.71	3.90	4.28	4.54	3.20	3.32	3.73	3.89	4.31	4.55	3.19	3.29	4.20	4.09	4.86	4.81	3.60	3.45
138	W18X211	3.71	3.90	4.28	4.54	3.20	3.32	3.73	3.89	4.31	4.55	3.19	3.29	4.20	4.10	4.86	4.81	3.60	3.45
139	W18X192	3.71	3.90	4.28	4.54	3.20	3.32	3.73	3.89	4.31	4.55	3.19	3.29	4.20	4.09	4.86	4.81	3.60	3.45
140	W18X175	3.71	3.90	4.28	4.54	3.20	3.32	3.73	3.89	4.31	4.55	3.20	3.29	4.20	4.10	4.86	4.81	3.60	3.45
141	W18X158	3.71	3.90	4.28	4.54	3.20	3.32	3.73	3.89	4.32	4.55	3.20	3.29	4.20	4.10	4.86	4.81	3.60	3.45
142	W18X143	3.71	3.90	4.28	4.54	3.20	3.32	3.73	3.89	4.31	4.55	3.20	3.29	4.20	4.10	4.86	4.81	3.60	3.45
143	W18X130	3.71	3.90	4.28	4.54	3.20	3.32	3.73	3.89	4.31	4.55	3.20	3.29	4.20	4.09	4.86	4.81	3.60	3.45
144	W18X119	3.71	3.90	4.28	4.54	3.20	3.32	3.73	3.89	4.32	4.55	3.20	3.29	4.20	4.10	4.86	4.81	3.61	3.45
145	W18X106	3.72	3.90	4.28	4.54	3.20	3.32	3.73	3.89	4.32	4.55	3.20	3.29	4.20	4.10	4.86	4.81	3.60	3.45
146	W18X97	3.71	3.90	4.28	4.54	3.20	3.32	3.73	3.89	4.32	4.56	3.20	3.29	4.20	4.10	4.86	4.81	3.61	3.45
147	W18X86	3.72	3.90	4.28	4.54	3.20	3.32	3.73	3.89	4.32	4.55	3.20	3.29	4.20	4.10	4.86	4.81	3.61	3.46
148	W18X76	3.72	3.90	4.28	4.54	3.20	3.32	3.73	3.89	4.32	4.55	3.20	3.30	4.20	4.10	4.86	4.81	3.61	3.46
149	W18X71	3.72	3.91	4.29	4.55	3.21	3.33	3.74	3.90	4.32	4.56	3.21	3.30	4.21	4.11	4.87	4.82	3.61	3.46
150	W18X65	3.72	3.91	4.29	4.55	3.21	3.33	3.74	3.90	4.32	4.56	3.21	3.31	4.21	4.11	4.87	4.82	3.61	3.46
151	W18X60	3.72	3.91	4.28	4.55	3.21	3.33	3.74	3.90	4.32	4.56	3.21	3.30	4.21	4.11	4.86	4.82	3.61	3.46
152	W18X55	3.73	3.91	4.29	4.55	3.21	3.33	3.74	3.90	4.32	4.56	3.21	3.30	4.21	4.10	4.87	4.82	3.61	3.46
153	W18X50	3.72	3.91	4.29	4.55	3.21	3.33	3.74	3.90	4.32	4.56	3.21	3.30	4.21	4.10	4.87	4.82	3.62	3.46
154	W18X46	3.73	3.92	4.29	4.54	3.22	3.34	3.74	3.90	4.33	4.56	3.22	3.31	4.21	4.11	4.87	4.82	3.62	3.47
155	W18X40	3.73	3.92	4.29	4.56	3.22	3.34	3.75	3.91	4.33	4.56	3.22	3.31	4.21	4.11	4.87	4.82	3.62	3.47
156	W18X35	3.73	3.92	4.30	4.55	3.23	3.35	3.75	3.91	4.33	4.57	3.22	3.32	4.22	4.12	4.88	4.84	3.63	3.48
157	W16X100	3.71	3.90	4.28	4.54	3.20	3.32	3.73	3.89	4.32	4.55	3.20	3.29	4.20	4.10	4.86	4.81	3.60	3.45
158	W16X89	3.71	3.90	4.28	4.54	3.20	3.32	3.73	3.89	4.32	4.55	3.20	3.29	4.20	4.10	4.86	4.82	3.60	3.46
159	W16X77	3.71	3.90	4.28	4.54	3.20	3.32	3.73	3.89	4.32	4.55	3.20	3.29	4.20	4.10	4.86	4.81	3.61	3.45
160	W16X67	3.71	3.90	4.28	4.54	3.20	3.32	3.73	3.89	4.31	4.55	3.20	3.29	4.20	4.09	4.86	4.81	3.60	3.45
161	W16X57	3.72	3.91	4.29	4.55	3.21	3.33	3.74	3.90	4.32	4.56	3.21	3.30	4.21	4.11	4.87	4.82	3.61	3.46
162	W16X50	3.72	3.90	4.29	4.55	3.21	3.33	3.74	3.90	4.32	4.55	3.21	3.30	4.21	4.11	4.87	4.82	3.61	3.46
163	W16X45	3.72	3.91	4.29	4.55	3.21	3.33	3.74	3.90	4.32	4.55	3.21	3.31	4.21	4.11	4.87	4.82	3.61	3.46
164	W16X40	3.72	3.91	4.29	4.54	3.21	3.33	3.74	3.90	4.32	4.56	3.21	3.30	4.21	4.11	4.87	4.81	3.61	3.46
165	W16X36	3.72	3.91	4.29	4.55	3.21	3.34	3.74	3.91	4.32	4.56	3.21	3.30	4.21	4.11	4.87	4.82	3.62	3.46
166	W16X31	3.73	3.92	4.29	4.55	3.22	3.34	3.75	3.91	4.33	4.55	3.22	3.31	4.21	4.11	4.87	4.82	3.62	3.47
167	W16X26	3.74	3.91	4.30	4.56	3.23	3.34	3.76	3.91	4.33	4.57	3.23	3.32	4.22	4.10	4.88	4.84	3.63	3.47

168	W14X730	3.70	3.89	4.27	4.53	3.18	3.31	3.72	3.88	4.30	4.54	3.18	3.28	4.19	4.08	4.85	4.80	3.59	3.44
169	W14X665	3.70	3.89	4.27	4.53	3.18	3.31	3.72	3.88	4.30	4.54	3.18	3.28	4.19	4.09	4.85	4.80	3.59	3.44
170	W14X605	3.70	3.89	4.27	4.53	3.19	3.31	3.72	3.88	4.30	4.54	3.18	3.28	4.19	4.09	4.85	4.80	3.59	3.44
171	W14X550	3.70	3.89	4.27	4.53	3.19	3.31	3.72	3.88	4.30	4.54	3.18	3.28	4.19	4.09	4.85	4.80	3.59	3.44
172	W14X500	3.70	3.89	4.27	4.53	3.19	3.31	3.72	3.88	4.31	4.54	3.18	3.28	4.19	4.09	4.85	4.80	3.59	3.44
173	W14X455	3.70	3.89	4.27	4.53	3.19	3.31	3.72	3.88	4.31	4.54	3.18	3.28	4.19	4.09	4.85	4.80	3.59	3.44
174	W14X426	3.70	3.89	4.27	4.53	3.19	3.31	3.72	3.88	4.31	4.54	3.18	3.28	4.19	4.09	4.85	4.80	3.59	3.44
175	W14X398	3.70	3.89	4.27	4.53	3.19	3.31	3.72	3.88	4.31	4.54	3.18	3.28	4.19	4.09	4.85	4.80	3.59	3.44
176	W14X370	3.70	3.89	4.27	4.53	3.19	3.31	3.72	3.88	4.31	4.54	3.18	3.28	4.19	4.09	4.85	4.80	3.59	3.44
177	W14X342	3.70	3.89	4.27	4.53	3.19	3.31	3.72	3.88	4.30	4.54	3.18	3.28	4.19	4.09	4.85	4.80	3.59	3.44
178	W14X311	3.70	3.89	4.27	4.53	3.19	3.31	3.72	3.88	4.31	4.54	3.19	3.28	4.19	4.09	4.85	4.80	3.59	3.44
179	W14X283	3.70	3.89	4.27	4.53	3.19	3.31	3.72	3.88	4.31	4.54	3.18	3.28	4.19	4.09	4.85	4.80	3.59	3.44
180	W14X257	3.70	3.89	4.27	4.53	3.19	3.31	3.72	3.88	4.31	4.54	3.19	3.28	4.19	4.09	4.85	4.80	3.59	3.44
181	W14X233	3.70	3.89	4.27	4.53	3.19	3.31	3.72	3.88	4.31	4.54	3.19	3.28	4.19	4.09	4.85	4.80	3.59	3.44
182	W14X211	3.70	3.89	4.27	4.53	3.19	3.31	3.72	3.88	4.31	4.54	3.19	3.28	4.19	4.09	4.86	4.80	3.59	3.44
183	W14X193	3.70	3.89	4.27	4.53	3.19	3.31	3.72	3.88	4.31	4.54	3.19	3.28	4.19	4.09	4.86	4.80	3.59	3.44
184	W14X176	3.70	3.89	4.27	4.53	3.19	3.31	3.72	3.88	4.31	4.55	3.19	3.28	4.19	4.09	4.86	4.80	3.59	3.44
185	W14X159	3.70	3.89	4.27	4.53	3.19	3.31	3.72	3.88	4.31	4.55	3.19	3.28	4.19	4.09	4.85	4.80	3.59	3.44
186	W14X145	3.70	3.89	4.27	4.53	3.19	3.31	3.72	3.88	4.31	4.54	3.19	3.28	4.19	4.09	4.86	4.81	3.59	3.44
187	W14X132	3.71	3.89	4.27	4.54	3.19	3.31	3.72	3.88	4.31	4.55	3.19	3.28	4.19	4.09	4.85	4.81	3.60	3.44
188	W14X120	3.70	3.89	4.27	4.53	3.19	3.31	3.72	3.88	4.31	4.54	3.19	3.28	4.20	4.09	4.86	4.81	3.59	3.44
189	W14X109	3.70	3.89	4.27	4.53	3.19	3.31	3.72	3.88	4.31	4.54	3.19	3.28	4.19	4.09	4.85	4.80	3.60	3.44
190	W14X99	3.70	3.89	4.27	4.53	3.19	3.31	3.72	3.88	4.31	4.54	3.19	3.28	4.19	4.09	4.85	4.81	3.60	3.44
191	W14X90	3.69	3.88	4.26	4.52	3.18	3.30	3.71	3.87	4.30	4.54	3.17	3.27	4.18	4.08	4.85	4.80	3.58	3.43
192	W14X82	3.71	3.90	4.28	4.54	3.20	3.32	3.73	3.89	4.31	4.55	3.20	3.29	4.20	4.09	4.86	4.81	3.60	3.45
193	W14X74	3.71	3.90	4.28	4.54	3.20	3.32	3.73	3.89	4.31	4.55	3.20	3.29	4.19	4.10	4.86	4.81	3.60	3.45
194	W14X68	3.71	3.90	4.28	4.54	3.20	3.32	3.73	3.89	4.31	4.55	3.19	3.29	4.20	4.09	4.86	4.81	3.60	3.45
195	W14X61	3.71	3.90	4.27	4.54	3.19	3.31	3.73	3.89	4.31	4.55	3.20	3.29	4.20	4.09	4.86	4.81	3.60	3.45
196	W14X53	3.72	3.90	4.28	4.54	3.20	3.32	3.73	3.89	4.31	4.56	3.20	3.29	4.21	4.09	4.86	4.81	3.60	3.45
197	W14X48	3.71	3.90	4.28	4.53	3.20	3.32	3.73	3.89	4.32	4.55	3.20	3.29	4.20	4.10	4.86	4.81	3.60	3.45
198	W14X43	3.71	3.90	4.28	4.54	3.21	3.32	3.73	3.89	4.31	4.56	3.20	3.30	4.20	4.11	4.87	4.82	3.60	3.45
199	W14X38	3.72	3.90	4.29	4.55	3.21	3.33	3.74	3.89	4.32	4.56	3.21	3.30	4.20	4.09	4.87	4.82	3.61	3.46
200	W14X34	3.72	3.91	4.29	4.55	3.20	3.33	3.74	3.90	4.32	4.56	3.21	3.30	4.22	4.10	4.87	4.82	3.61	3.46
201	W14X30	3.72	3.91	4.28	4.54	3.21	3.33	3.74	3.91	4.32	4.56	3.21	3.30	4.20	4.10	4.86	4.82	3.61	3.47
202	W14X26	3.74	3.91	4.29	4.55	3.21	3.34	3.75	3.90	4.32	4.56	3.21	3.31	4.22	4.12	4.87	4.82	3.62	3.47
203	W14X22	3.73	3.91	4.29	4.57	3.22	3.33	3.74	3.92	4.33	4.56	3.22	3.32	4.22	4.10	4.87	4.84	3.63	3.47
204	W12X336	3.70	3.89	4.27	4.53	3.19	3.31	3.72	3.88	4.31	4.54	3.18	3.28	4.19	4.09	4.85	4.80	3.59	3.44
205	W12X305	3.70	3.89	4.27	4.53	3.19	3.31	3.72	3.88	4.31	4.54	3.18	3.28	4.19	4.09	4.85	4.80	3.59	3.44
206	W12X279	3.70	3.89	4.27	4.53	3.19	3.31	3.72	3.88	4.30	4.54	3.19	3.28	4.19	4.09	4.85	4.80	3.59	3.44
207	W12X252	3.70	3.89	4.27	4.53	3.19	3.31	3.72	3.88	4.31	4.54	3.19	3.28	4.19	4.09	4.85	4.80	3.59	3.44
208	W12X230	3.70	3.89	4.27	4.53	3.19	3.31	3.72	3.88	4.31	4.54	3.19	3.28	4.19	4.09	4.86	4.80	3.59	3.44
209	W12X210	3.70	3.89	4.27	4.53	3.19	3.31	3.72	3.88	4.31	4.54	3.19	3.28	4.19	4.09	4.85	4.80	3.59	3.44
210	W12X190	3.70	3.89	4.27	4.53	3.19	3.31	3.72	3.88	4.31	4.54	3.19	3.28	4.19	4.09	4.85	4.80	3.59	3.44
211	W12X170	3.70	3.89	4.27	4.53	3.19	3.31	3.72	3.88	4.31	4.55	3.19	3.28	4.19	4.09	4.85	4.80	3.59	3.44
212	W12X152	3.70	3.89	4.27	4.53	3.19	3.31	3.72	3.88	4.31	4.55	3.19	3.28	4.19	4.09	4.85	4.81	3.59	3.44
213	W12X136	3.70	3.89	4.27	4.53	3.19	3.31	3.72	3.88	4.31	4.54	3.19	3.28	4.19	4.09	4.85	4.81	3.59	3.44
214	W12X120	3.71	3.89	4.27	4.54	3.19	3.31	3.72	3.88	4.31	4.54	3.19	3.28	4.19	4.09	4.86	4.80	3.60	3.44
215	W12X106	3.70	3.89	4.27	4.53	3.19	3.31	3.72	3.88	4.31	4.54	3.19	3.28	4.19	4.09	4.85	4.81	3.59	3.44

216	W12X96	3.71	3.89	4.27	4.53	3.19	3.31	3.72	3.88	4.31	4.55	3.19	3.28	4.19	4.09	4.86	4.81	3.59	3.44
217	W12X87	3.70	3.89	4.28	4.53	3.19	3.32	3.72	3.88	4.31	4.55	3.19	3.28	4.20	4.09	4.85	4.81	3.59	3.44
218	W12X79	3.70	3.89	4.27	4.54	3.19	3.31	3.72	3.88	4.31	4.54	3.19	3.28	4.19	4.09	4.86	4.81	3.60	3.44
219	W12X72	3.70	3.90	4.28	4.53	3.19	3.31	3.72	3.88	4.31	4.55	3.19	3.28	4.20	4.09	4.86	4.80	3.60	3.44
220	W12X65	3.69	3.89	4.27	4.53	3.18	3.30	3.71	3.88	4.30	4.54	3.18	3.28	4.19	4.08	4.85	4.80	3.59	3.43
221	W12X58	3.71	3.89	4.27	4.54	3.19	3.31	3.72	3.89	4.31	4.54	3.19	3.29	4.19	4.09	4.85	4.81	3.60	3.45
222	W12X53	3.71	3.89	4.27	4.53	3.20	3.32	3.73	3.88	4.31	4.54	3.19	3.29	4.20	4.09	4.86	4.80	3.60	3.44
223	W12X50	3.71	3.90	4.28	4.54	3.20	3.32	3.73	3.89	4.32	4.55	3.20	3.29	4.20	4.09	4.85	4.81	3.60	3.45
224	W12X45	3.71	3.90	4.27	4.54	3.20	3.32	3.73	3.89	4.32	4.55	3.19	3.29	4.20	4.09	4.86	4.81	3.60	3.45
225	W12X40	3.71	3.90	4.28	4.54	3.20	3.32	3.73	3.89	4.31	4.55	3.20	3.30	4.20	4.10	4.86	4.81	3.61	3.45
226	W12X35	3.72	3.90	4.28	4.54	3.21	3.33	3.73	3.89	4.32	4.56	3.20	3.31	4.21	4.10	4.87	4.80	3.60	3.45
227	W12X30	3.72	3.90	4.28	4.53	3.20	3.33	3.73	3.89	4.31	4.55	3.20	3.30	4.20	4.09	4.87	4.81	3.60	3.46
228	W12X26	3.72	3.90	4.28	4.56	3.21	3.33	3.73	3.90	4.31	4.55	3.21	3.30	4.20	4.09	4.85	4.81	3.61	3.45
229	W12X22	3.72	3.92	4.30	4.56	3.22	3.35	3.75	3.91	4.33	4.56	3.23	3.31	4.23	4.12	4.86	4.83	3.62	3.47
230	W12X19	3.74	3.91	4.30	4.57	3.22	3.34	3.76	3.90	4.33	4.56	3.21	3.31	4.21	4.11	4.90	4.84	3.63	3.48
231	W12X16	3.75	3.92	4.32	4.55	3.22	3.35	3.75	3.91	4.34	4.57	3.22	3.31	4.23	4.13	4.87	4.83	3.62	3.47
232	W12X14	3.74	3.91	4.31	4.56	3.24	3.34	3.76	3.90	4.33	4.58	3.22	3.32	4.23	4.13	4.89	4.80	3.63	3.46
233	W10X112	3.70	3.89	4.27	4.53	3.19	3.31	3.72	3.88	4.31	4.55	3.19	3.28	4.19	4.09	4.85	4.80	3.59	3.44
234	W10X100	3.70	3.89	4.27	4.53	3.19	3.31	3.72	3.88	4.31	4.54	3.19	3.28	4.19	4.09	4.85	4.80	3.60	3.44
235	W10X88	3.70	3.89	4.27	4.53	3.19	3.31	3.72	3.88	4.31	4.54	3.19	3.28	4.19	4.08	4.85	4.80	3.59	3.44
236	W10X77	3.71	3.90	4.27	4.53	3.19	3.31	3.72	3.88	4.31	4.54	3.19	3.28	4.19	4.09	4.86	4.81	3.59	3.44
237	W10X68	3.70	3.89	4.27	4.54	3.19	3.31	3.72	3.88	4.31	4.54	3.19	3.28	4.19	4.09	4.85	4.81	3.59	3.44
238	W10X60	3.71	3.89	4.27	4.53	3.19	3.31	3.72	3.89	4.31	4.54	3.19	3.29	4.19	4.09	4.85	4.80	3.59	3.44
239	W10X54	3.70	3.89	4.27	4.53	3.19	3.31	3.72	3.88	4.31	4.54	3.18	3.28	4.20	4.09	4.85	4.80	3.60	3.44
240	W10X49	3.70	3.88	4.27	4.53	3.19	3.31	3.72	3.88	4.31	4.54	3.18	3.28	4.19	4.09	4.85	4.81	3.60	3.45
241	W10X45	3.71	3.89	4.27	4.54	3.19	3.31	3.72	3.88	4.31	4.56	3.20	3.29	4.19	4.09	4.86	4.80	3.59	3.45
242	W10X39	3.71	3.90	4.27	4.54	3.20	3.32	3.72	3.89	4.30	4.55	3.20	3.28	4.20	4.10	4.86	4.81	3.60	3.44
243	W10X33	3.71	3.89	4.28	4.54	3.20	3.33	3.72	3.89	4.31	4.56	3.19	3.30	4.20	4.09	4.86	4.80	3.59	3.45
244	W10X30	3.71	3.91	4.29	4.54	3.21	3.33	3.73	3.90	4.31	4.55	3.21	3.29	4.20	4.08	4.85	4.80	3.61	3.45
245	W10X26	3.71	3.90	4.29	4.54	3.20	3.33	3.74	3.89	4.32	4.57	3.20	3.30	4.21	4.11	4.86	4.80	3.61	3.46
246	W10X22	3.73	3.91	4.29	4.54	3.20	3.33	3.74	3.90	4.33	4.53	3.20	3.31	4.21	4.12	4.84	4.81	3.61	3.46
247	W10X19	3.72	3.90	4.29	4.56	3.22	3.35	3.73	3.92	4.33	4.58	3.22	3.32	4.21	4.10	4.87	4.82	3.61	3.46
248	W10X17	3.73	3.92	4.31	4.59	3.22	3.33	3.75	3.91	4.33	4.59	3.22	3.31	4.21	4.11	4.85	4.83	3.63	3.47
249	W10X15	3.74	3.91	4.28	4.53	3.21	3.33	3.74	3.89	4.32	4.57	3.23	3.34	4.19	4.12	4.84	4.83	3.64	3.49
250	W10X12	3.77	3.94	4.32	4.55	3.22	3.34	3.73	3.92	4.31	4.54	3.25	3.33	4.20	4.13	4.92	4.83	3.59	3.49
	MIN	**3.69**	**3.88**	**4.26**	**4.52**	**3.18**	**3.30**	**3.71**	**3.87**	**4.30**	**4.53**	**3.17**	**3.27**	**4.18**	**4.08**	**4.84**	**4.80**	**3.58**	**3.43**
	MAX	**3.77**	**3.94**	**4.32**	**4.59**	**3.24**	**3.35**	**3.76**	**3.92**	**4.34**	**4.59**	**3.25**	**3.34**	**4.23**	**4.13**	**4.92**	**4.84**	**3.64**	**3.49**
	AVE	**3.72**	**3.90**	**4.28**	**4.54**	**3.21**	**3.33**	**3.73**	**3.89**	**4.32**	**4.56**	**3.20**	**3.30**	**4.20**	**4.10**	**4.86**	**4.81**	**3.61**	**3.46**

Table C- 7. Reliability Indices for Noncomposite Rolled I-shaped Girdes for ADTT 5'000 and L=30, 60ft.

		L=30 ft						L=60 ft					
	Φ	1.00		0.95		1.05		1.00		0.95		1.05	
#	Shape \ D/(D+L)	0.25	0.40	0.25	0.40	0.25	0.40	0.35	0.55	0.35	0.55	0.35	0.55
1	W44X335	3.52	3.71	4.01	4.26	3.07	3.22	3.48	3.76	4.00	4.36	3.01	3.21
2	W44X290	3.52	3.71	4.01	4.26	3.07	3.22	3.48	3.76	3.99	4.36	3.01	3.21

3	W44X262	3.52	3.71	4.01	4.26	3.07	3.22	3.48	3.76	3.99	4.36	3.01	3.21
4	W44X230	3.52	3.71	4.01	4.26	3.07	3.22	3.48	3.76	3.99	4.36	3.01	3.21
5	W40X593	3.51	3.71	4.00	4.25	3.07	3.21	3.47	3.75	3.99	4.36	3.00	3.20
6	W40X503	3.51	3.71	4.00	4.25	3.07	3.21	3.47	3.75	3.99	4.36	3.00	3.20
7	W40X431	3.51	3.71	4.00	4.25	3.07	3.21	3.47	3.75	3.99	4.36	3.00	3.20
8	W40X397	3.51	3.71	4.01	4.25	3.07	3.21	3.47	3.75	3.99	4.36	3.00	3.20
9	W40X372	3.51	3.71	4.01	4.25	3.07	3.21	3.47	3.75	3.99	4.36	3.00	3.20
10	W40X362	3.51	3.71	4.01	4.25	3.07	3.21	3.47	3.75	3.99	4.36	3.00	3.20
11	W40X324	3.51	3.71	4.01	4.25	3.07	3.21	3.47	3.75	3.99	4.36	3.00	3.20
12	W40X297	3.51	3.71	4.01	4.25	3.07	3.21	3.47	3.75	3.99	4.36	3.01	3.21
13	W40X277	3.51	3.71	4.00	4.25	3.07	3.21	3.47	3.75	3.99	4.36	3.00	3.20
14	W40X249	3.51	3.71	4.00	4.25	3.07	3.21	3.47	3.75	3.99	4.36	3.00	3.20
15	W40X215	3.51	3.71	4.01	4.25	3.07	3.21	3.47	3.75	3.99	4.36	3.00	3.20
16	W40X199	3.52	3.71	4.01	4.26	3.07	3.22	3.48	3.76	3.99	4.36	3.01	3.21
17	W40X392	3.52	3.71	4.01	4.26	3.08	3.22	3.48	3.76	4.00	4.37	3.01	3.21
18	W40X331	3.52	3.72	4.01	4.26	3.08	3.22	3.48	3.76	4.00	4.37	3.01	3.21
19	W40X327	3.52	3.71	4.01	4.26	3.08	3.22	3.48	3.76	4.00	4.36	3.01	3.21
20	W40X294	3.52	3.71	4.01	4.26	3.08	3.22	3.48	3.76	4.00	4.37	3.01	3.21
21	W40X278	3.52	3.72	4.01	4.26	3.08	3.22	3.48	3.76	4.00	4.37	3.02	3.21
22	W40X264	3.52	3.72	4.01	4.26	3.08	3.22	3.48	3.76	4.00	4.37	3.01	3.21
23	W40X235	3.52	3.71	4.01	4.26	3.07	3.22	3.48	3.76	3.99	4.36	3.01	3.21
24	W40X211	3.52	3.71	4.01	4.26	3.08	3.22	3.48	3.76	4.00	4.37	3.01	3.21
25	W40X183	3.52	3.71	4.01	4.26	3.08	3.22	3.48	3.76	4.00	4.37	3.01	3.21
26	W40X167	3.53	3.72	4.02	4.26	3.08	3.23	3.49	3.76	4.00	4.37	3.02	3.22
27	W40X149	3.53	3.72	4.02	4.27	3.09	3.23	3.49	3.77	4.00	4.37	3.02	3.22
28	W36X652	3.51	3.70	4.00	4.25	3.06	3.21	3.47	3.75	3.98	4.35	3.00	3.20
29	W36X529	3.51	3.70	4.00	4.25	3.06	3.21	3.47	3.75	3.99	4.36	3.00	3.20
30	W36X487	3.51	3.70	4.00	4.25	3.06	3.21	3.47	3.75	3.99	4.36	3.00	3.20
31	W36X441	3.51	3.70	4.00	4.25	3.06	3.21	3.47	3.75	3.99	4.36	3.00	3.20
32	W36X395	3.51	3.70	4.00	4.25	3.06	3.21	3.47	3.75	3.99	4.36	3.00	3.20
33	W36X361	3.51	3.71	4.00	4.25	3.06	3.21	3.47	3.75	3.99	4.36	3.00	3.20
34	W36X330	3.51	3.71	4.00	4.25	3.07	3.21	3.47	3.75	3.99	4.36	3.00	3.20
35	W36X302	3.51	3.71	4.00	4.25	3.07	3.21	3.47	3.75	3.99	4.36	3.00	3.20
36	W36X282	3.51	3.71	4.00	4.25	3.07	3.21	3.47	3.75	3.99	4.36	3.00	3.20
37	W36X262	3.51	3.71	4.00	4.25	3.07	3.21	3.47	3.75	3.99	4.36	3.00	3.20
38	W36X247	3.51	3.71	4.00	4.25	3.07	3.21	3.47	3.75	3.99	4.36	3.00	3.20
39	W36X231	3.51	3.71	4.00	4.25	3.07	3.21	3.47	3.75	3.99	4.36	3.00	3.20
40	W36X256	3.52	3.71	4.01	4.26	3.07	3.22	3.48	3.76	3.99	4.36	3.01	3.21
41	W36X232	3.52	3.71	4.01	4.26	3.07	3.22	3.48	3.76	3.99	4.36	3.01	3.21
42	W36X210	3.52	3.72	4.01	4.26	3.08	3.22	3.48	3.76	4.00	4.37	3.01	3.21
43	W36X194	3.52	3.72	4.01	4.26	3.08	3.22	3.48	3.76	4.00	4.37	3.01	3.21
44	W36X182	3.52	3.72	4.01	4.26	3.08	3.22	3.48	3.76	4.00	4.37	3.01	3.21
45	W36X170	3.52	3.72	4.01	4.26	3.08	3.22	3.48	3.76	4.00	4.37	3.02	3.22
46	W36X160	3.52	3.72	4.01	4.26	3.08	3.22	3.48	3.76	4.00	4.37	3.02	3.21
47	W36X150	3.53	3.72	4.02	4.27	3.08	3.23	3.49	3.77	4.00	4.37	3.02	3.22
48	W36X135	3.53	3.72	4.02	4.27	3.09	3.23	3.49	3.77	4.00	4.37	3.02	3.22
49	W33X387	3.51	3.71	4.00	4.25	3.06	3.21	3.47	3.75	3.99	4.36	3.00	3.20
50	W33X354	3.51	3.70	4.00	4.25	3.06	3.21	3.47	3.75	3.99	4.36	3.00	3.20

51	W33X318	3.51	3.70	4.00	4.25	3.06	3.21	3.47	3.75	3.99	4.36	3.00	3.20
52	W33X291	3.51	3.70	4.00	4.25	3.06	3.21	3.47	3.75	3.99	4.36	3.00	3.20
53	W33X263	3.51	3.70	4.00	4.25	3.06	3.21	3.47	3.75	3.99	4.36	3.00	3.20
54	W33X241	3.51	3.71	4.00	4.25	3.07	3.21	3.47	3.75	3.99	4.36	3.00	3.20
55	W33X221	3.51	3.71	4.00	4.25	3.07	3.21	3.47	3.75	3.99	4.36	3.00	3.20
56	W33X201	3.51	3.71	4.00	4.25	3.07	3.21	3.47	3.75	3.99	4.36	3.00	3.20
57	W33X169	3.52	3.71	4.01	4.26	3.07	3.22	3.48	3.76	4.00	4.37	3.01	3.21
58	W33X152	3.52	3.71	4.01	4.26	3.08	3.22	3.48	3.76	4.00	4.36	3.01	3.21
59	W33X141	3.52	3.71	4.01	4.26	3.08	3.22	3.48	3.76	4.00	4.36	3.01	3.21
60	W33X130	3.52	3.72	4.01	4.26	3.08	3.22	3.48	3.76	4.00	4.37	3.02	3.22
61	W33X118	3.53	3.72	4.02	4.27	3.08	3.23	3.49	3.77	4.00	4.37	3.02	3.22
62	W30X391	3.51	3.70	4.00	4.25	3.06	3.21	3.47	3.75	3.98	4.36	3.00	3.20
63	W30X357	3.51	3.70	4.00	4.25	3.06	3.21	3.47	3.75	3.98	4.35	3.00	3.20
64	W30X326	3.51	3.70	4.00	4.25	3.06	3.21	3.47	3.75	3.98	4.36	3.00	3.20
65	W30X292	3.51	3.70	4.00	4.25	3.06	3.21	3.47	3.75	3.99	4.36	3.00	3.20
66	W30X261	3.51	3.70	4.00	4.25	3.06	3.21	3.47	3.75	3.99	4.36	3.00	3.20
67	W30X235	3.51	3.70	4.00	4.25	3.06	3.21	3.47	3.75	3.98	4.35	3.00	3.20
68	W30X211	3.51	3.71	4.00	4.25	3.06	3.21	3.47	3.75	3.99	4.36	3.00	3.20
69	W30X191	3.51	3.70	4.00	4.25	3.06	3.21	3.47	3.75	3.99	4.36	3.00	3.20
70	W30X173	3.51	3.71	4.00	4.25	3.07	3.21	3.47	3.75	3.99	4.36	3.00	3.20
71	W30X148	3.52	3.71	4.01	4.26	3.07	3.22	3.48	3.76	3.99	4.36	3.01	3.21
72	W30X132	3.52	3.72	4.01	4.26	3.08	3.22	3.48	3.76	4.00	4.37	3.01	3.21
73	W30X124	3.52	3.72	4.01	4.26	3.08	3.22	3.48	3.76	4.00	4.37	3.01	3.21
74	W30X116	3.53	3.72	4.02	4.26	3.08	3.23	3.48	3.76	4.00	4.37	3.02	3.22
75	W30X108	3.53	3.72	4.02	4.27	3.08	3.23	3.49	3.77	4.00	4.37	3.02	3.22
76	W30X99	3.53	3.72	4.02	4.27	3.08	3.23	3.49	3.77	4.00	4.37	3.02	3.22
77	W30X90	3.53	3.72	4.02	4.27	3.08	3.23	3.49	3.77	4.00	4.37	3.02	3.22
78	W27X539	3.50	3.70	4.00	4.25	3.06	3.20	3.46	3.74	3.98	4.35	2.99	3.19
79	W27X368	3.51	3.70	4.00	4.25	3.06	3.20	3.47	3.75	3.98	4.35	3.00	3.20
80	W27X336	3.51	3.70	4.00	4.25	3.06	3.21	3.47	3.75	3.98	4.35	3.00	3.20
81	W27X307	3.51	3.70	4.00	4.25	3.06	3.20	3.47	3.75	3.98	4.35	3.00	3.19
82	W27X281	3.51	3.70	4.00	4.25	3.06	3.21	3.47	3.75	3.98	4.35	3.00	3.20
83	W27X258	3.51	3.70	4.00	4.25	3.06	3.21	3.47	3.75	3.98	4.35	3.00	3.20
84	W27X235	3.51	3.70	4.00	4.25	3.06	3.21	3.47	3.75	3.98	4.35	3.00	3.20
85	W27X217	3.51	3.70	4.00	4.25	3.06	3.21	3.47	3.75	3.99	4.36	3.00	3.20
86	W27X194	3.51	3.70	4.00	4.25	3.06	3.21	3.47	3.75	3.98	4.36	3.00	3.20
87	W27X178	3.51	3.71	4.00	4.25	3.06	3.21	3.47	3.75	3.99	4.36	3.00	3.20
88	W27X161	3.51	3.71	4.00	4.25	3.07	3.21	3.47	3.75	3.99	4.36	3.00	3.20
89	W27X146	3.51	3.71	4.00	4.25	3.07	3.21	3.47	3.75	3.99	4.36	3.00	3.20
90	W27X129	3.52	3.71	4.01	4.26	3.07	3.22	3.48	3.76	3.99	4.36	3.01	3.21
91	W27X114	3.52	3.71	4.01	4.26	3.07	3.22	3.48	3.76	3.99	4.36	3.01	3.21
92	W27X102	3.52	3.71	4.01	4.26	3.07	3.22	3.48	3.76	4.00	4.36	3.01	3.21
93	W27X94	3.52	3.71	4.01	4.26	3.08	3.22	3.48	3.76	4.00	4.36	3.01	3.21
94	W27X84	3.53	3.72	4.01	4.26	3.08	3.22	3.48	3.77	4.00	4.37	3.02	3.22
95	W24X370	3.51	3.70	4.00	4.25	3.06	3.20	3.46	3.75	3.98	4.35	2.99	3.20
96	W24X335	3.51	3.70	4.00	4.25	3.06	3.20	3.46	3.74	3.98	4.35	2.99	3.19
97	W24X306	3.51	3.70	4.00	4.25	3.06	3.20	3.47	3.75	3.98	4.35	3.00	3.20
98	W24X279	3.51	3.70	4.00	4.25	3.06	3.20	3.47	3.75	3.98	4.35	3.00	3.20

99	W24X250	3.51	3.70	4.00	4.25	3.06	3.20	3.47	3.75	3.98	4.35	3.00	3.20
100	W24X229	3.51	3.70	4.00	4.25	3.06	3.20	3.47	3.75	3.98	4.35	3.00	3.20
101	W24X207	3.51	3.70	4.00	4.25	3.06	3.21	3.47	3.75	3.98	4.35	3.00	3.20
102	W24X192	3.51	3.70	4.00	4.25	3.06	3.21	3.47	3.75	3.98	4.36	3.00	3.20
103	W24X176	3.51	3.70	4.00	4.25	3.06	3.21	3.47	3.75	3.98	4.36	3.00	3.20
104	W24X162	3.51	3.70	4.00	4.25	3.06	3.21	3.47	3.75	3.98	4.35	3.00	3.20
105	W24X146	3.51	3.70	4.00	4.25	3.06	3.21	3.47	3.75	3.99	4.36	3.00	3.20
106	W24X131	3.51	3.70	4.00	4.25	3.07	3.21	3.47	3.75	3.99	4.36	3.00	3.20
107	W24X117	3.51	3.71	4.00	4.25	3.07	3.21	3.47	3.75	3.99	4.36	3.00	3.20
108	W24X104	3.51	3.71	4.00	4.25	3.07	3.21	3.47	3.75	3.99	4.36	3.00	3.20
109	W24X103	3.52	3.71	4.01	4.26	3.07	3.22	3.48	3.76	3.99	4.36	3.01	3.21
110	W24X94	3.52	3.71	4.01	4.26	3.07	3.22	3.48	3.76	3.99	4.36	3.01	3.21
111	W24X84	3.52	3.71	4.01	4.26	3.07	3.22	3.48	3.76	4.00	4.37	3.01	3.21
112	W24X76	3.52	3.72	4.01	4.26	3.08	3.22	3.48	3.76	4.00	4.37	3.01	3.21
113	W24X68	3.52	3.72	4.01	4.26	3.08	3.22	3.48	3.76	4.00	4.37	3.02	3.21
114	W24X62	3.53	3.73	4.02	4.27	3.09	3.23	3.49	3.77	4.01	4.38	3.03	3.23
115	W24X55	3.54	3.73	4.02	4.27	3.09	3.23	3.49	3.77	4.01	4.38	3.03	3.23
116	W21X201	3.50	3.70	4.00	4.25	3.06	3.20	3.46	3.74	3.98	4.35	2.99	3.19
117	W21X182	3.51	3.70	4.00	4.25	3.06	3.20	3.46	3.75	3.98	4.35	2.99	3.20
118	W21X166	3.51	3.70	4.00	4.25	3.06	3.20	3.46	3.75	3.98	4.35	2.99	3.20
119	W21X147	3.51	3.70	4.00	4.25	3.06	3.21	3.47	3.75	3.99	4.36	3.00	3.20
120	W21X132	3.51	3.70	4.00	4.25	3.06	3.21	3.47	3.75	3.98	4.35	3.00	3.20
121	W21X122	3.51	3.70	4.00	4.25	3.06	3.21	3.47	3.75	3.99	4.36	3.00	3.20
122	W21X111	3.51	3.70	4.00	4.25	3.06	3.21	3.47	3.75	3.99	4.36	3.00	3.20
123	W21X101	3.51	3.70	4.00	4.25	3.06	3.21	3.47	3.75	3.99	4.36	3.00	3.20
124	W21X93	3.52	3.71	4.01	4.26	3.07	3.22	3.48	3.76	4.00	4.37	3.01	3.21
125	W21X83	3.52	3.71	4.01	4.26	3.07	3.22	3.48	3.76	3.99	4.36	3.01	3.21
126	W21X73	3.52	3.71	4.01	4.26	3.07	3.22	3.48	3.76	4.00	4.36	3.01	3.21
127	W21X68	3.52	3.71	4.01	4.26	3.07	3.22	3.48	3.76	3.99	4.36	3.01	3.21
128	W21X62	3.52	3.71	4.01	4.26	3.08	3.22	3.48	3.76	4.00	4.36	3.01	3.21
129	W21X55	3.52	3.72	4.01	4.26	3.08	3.22	3.48	3.76	4.00	4.37	3.01	3.21
130	W21X48*	3.52	3.72	4.02	4.26	3.08	3.22	3.48	3.76	4.00	4.37	3.01	3.21
131	W21X57	3.52	3.72	4.01	4.26	3.08	3.22	3.48	3.76	4.00	4.36	3.02	3.21
132	W21X50	3.53	3.72	4.02	4.27	3.09	3.23	3.49	3.77	4.00	4.37	3.02	3.22
133	W21X44	3.53	3.73	4.02	4.28	3.09	3.23	3.49	3.77	4.01	4.38	3.02	3.23
134	W18X311	3.50	3.70	3.99	4.24	3.05	3.20	3.46	3.74	3.98	4.35	2.99	3.19
135	W18X283	3.50	3.70	3.99	4.25	3.06	3.20	3.46	3.74	3.98	4.35	2.99	3.19
136	W18X258	3.50	3.70	3.99	4.24	3.05	3.20	3.46	3.74	3.98	4.35	2.99	3.19
137	W18X234	3.50	3.70	3.99	4.24	3.06	3.20	3.46	3.74	3.98	4.35	2.99	3.19
138	W18X211	3.50	3.70	3.99	4.24	3.05	3.20	3.46	3.74	3.98	4.35	2.99	3.19
139	W18X192	3.50	3.70	3.99	4.24	3.06	3.20	3.46	3.74	3.98	4.35	2.99	3.19
140	W18X175	3.50	3.70	4.00	4.24	3.06	3.20	3.46	3.74	3.98	4.35	2.99	3.19
141	W18X158	3.50	3.70	4.00	4.25	3.06	3.20	3.46	3.75	3.98	4.35	2.99	3.19
142	W18X143	3.50	3.70	4.00	4.24	3.06	3.20	3.46	3.74	3.98	4.35	2.99	3.19
143	W18X130	3.50	3.70	4.00	4.25	3.06	3.20	3.46	3.74	3.98	4.35	2.99	3.19
144	W18X119	3.51	3.70	4.00	4.25	3.06	3.21	3.47	3.75	3.98	4.35	3.00	3.20
145	W18X106	3.51	3.70	4.00	4.25	3.06	3.21	3.47	3.75	3.98	4.35	3.00	3.20
146	W18X97	3.51	3.70	4.00	4.25	3.06	3.21	3.47	3.75	3.98	4.35	3.00	3.20

147	W18X86	3.51	3.70	4.00	4.25	3.06	3.21	3.47	3.75	3.98	4.36	3.00	3.20
148	W18X76	3.51	3.70	4.00	4.25	3.06	3.21	3.47	3.75	3.99	4.36	3.00	3.20
149	W18X71	3.52	3.71	4.00	4.25	3.07	3.21	3.47	3.75	3.99	4.36	3.00	3.21
150	W18X65	3.52	3.71	4.01	4.26	3.07	3.22	3.48	3.75	3.99	4.36	3.01	3.21
151	W18X60	3.51	3.71	4.01	4.25	3.07	3.21	3.47	3.75	3.99	4.36	3.01	3.21
152	W18X55	3.52	3.71	4.01	4.26	3.07	3.22	3.48	3.76	3.99	4.36	3.01	3.21
153	W18X50	3.52	3.71	4.01	4.26	3.07	3.22	3.48	3.76	3.99	4.36	3.01	3.20
154	W18X46	3.52	3.71	4.01	4.26	3.08	3.22	3.48	3.76	3.99	4.36	3.02	3.21
155	W18X40	3.52	3.72	4.01	4.27	3.08	3.22	3.48	3.76	4.00	4.36	3.02	3.22
156	W18X35	3.52	3.72	4.01	4.27	3.08	3.23	3.48	3.77	4.00	4.37	3.02	3.22
157	W16X100	3.50	3.70	4.00	4.25	3.06	3.20	3.46	3.75	3.98	4.35	2.99	3.19
158	W16X89	3.51	3.70	4.00	4.25	3.06	3.20	3.47	3.75	3.98	4.35	3.00	3.20
159	W16X77	3.51	3.70	4.00	4.25	3.06	3.20	3.47	3.74	3.98	4.36	2.99	3.19
160	W16X67	3.50	3.70	4.00	4.25	3.06	3.20	3.46	3.74	3.98	4.35	2.99	3.19
161	W16X57	3.51	3.71	4.00	4.26	3.07	3.22	3.47	3.75	3.99	4.36	3.01	3.21
162	W16X50	3.51	3.71	4.00	4.25	3.07	3.21	3.47	3.75	3.99	4.36	3.01	3.21
163	W16X45	3.51	3.71	4.00	4.26	3.07	3.21	3.48	3.76	3.99	4.36	3.00	3.21
164	W16X40	3.52	3.71	4.00	4.25	3.07	3.21	3.47	3.75	3.99	4.36	3.01	3.20
165	W16X36	3.52	3.71	4.01	4.25	3.07	3.22	3.48	3.76	3.99	4.36	3.01	3.21
166	W16X31	3.53	3.72	4.02	4.27	3.08	3.22	3.48	3.77	4.00	4.36	3.02	3.22
167	W16X26	3.53	3.72	4.01	4.27	3.08	3.22	3.49	3.77	4.00	4.36	3.02	3.22
168	W14X730	3.49	3.69	3.98	4.24	3.04	3.19	3.45	3.73	3.97	4.34	2.98	3.18
169	W14X665	3.49	3.69	3.98	4.24	3.04	3.19	3.45	3.73	3.97	4.34	2.98	3.18
170	W14X605	3.49	3.69	3.99	4.24	3.04	3.19	3.45	3.73	3.97	4.34	2.98	3.18
171	W14X550	3.49	3.69	3.99	4.24	3.04	3.19	3.45	3.73	3.97	4.34	2.98	3.18
172	W14X500	3.49	3.69	3.99	4.24	3.04	3.19	3.45	3.73	3.97	4.34	2.98	3.18
173	W14X455	3.49	3.69	3.99	4.24	3.04	3.19	3.45	3.73	3.97	4.34	2.98	3.18
174	W14X426	3.49	3.69	3.99	4.24	3.04	3.19	3.45	3.73	3.97	4.34	2.98	3.18
175	W14X398	3.49	3.69	3.99	4.24	3.04	3.19	3.45	3.73	3.97	4.34	2.98	3.18
176	W14X370	3.49	3.69	3.99	4.24	3.05	3.19	3.45	3.73	3.97	4.34	2.98	3.18
177	W14X342	3.49	3.69	3.99	4.24	3.04	3.19	3.45	3.73	3.97	4.34	2.98	3.18
178	W14X311	3.49	3.69	3.99	4.24	3.05	3.19	3.45	3.73	3.97	4.34	2.98	3.18
179	W14X283	3.49	3.69	3.99	4.24	3.04	3.19	3.45	3.73	3.97	4.34	2.98	3.18
180	W14X257	3.49	3.69	3.99	4.24	3.05	3.19	3.45	3.73	3.97	4.34	2.98	3.18
181	W14X233	3.49	3.69	3.99	4.24	3.05	3.19	3.45	3.73	3.97	4.34	2.98	3.18
182	W14X211	3.50	3.69	3.99	4.24	3.05	3.19	3.45	3.74	3.97	4.35	2.98	3.18
183	W14X193	3.50	3.69	3.99	4.24	3.05	3.19	3.45	3.74	3.97	4.34	2.98	3.18
184	W14X176	3.49	3.69	3.99	4.24	3.05	3.19	3.45	3.74	3.97	4.35	2.98	3.18
185	W14X159	3.50	3.69	3.99	4.24	3.05	3.19	3.45	3.74	3.97	4.35	2.98	3.18
186	W14X145	3.49	3.69	3.99	4.24	3.05	3.19	3.45	3.74	3.97	4.35	2.98	3.18
187	W14X132	3.50	3.69	3.99	4.24	3.05	3.19	3.46	3.74	3.97	4.35	2.98	3.19
188	W14X120	3.50	3.69	3.99	4.24	3.05	3.19	3.46	3.74	3.97	4.35	2.98	3.19
189	W14X109	3.49	3.69	3.99	4.24	3.05	3.19	3.45	3.73	3.97	4.34	2.98	3.18
190	W14X99	3.49	3.69	3.99	4.24	3.05	3.19	3.45	3.73	3.97	4.35	2.98	3.18
191	W14X90	3.48	3.68	3.98	4.23	3.03	3.18	3.44	3.73	3.96	4.33	2.97	3.17
192	W14X82	3.50	3.70	4.00	4.25	3.06	3.20	3.46	3.74	3.98	4.35	2.99	3.19
193	W14X74	3.50	3.69	3.99	4.24	3.05	3.20	3.46	3.74	3.98	4.35	2.99	3.19
194	W14X68	3.50	3.69	3.99	4.24	3.05	3.20	3.46	3.74	3.98	4.36	2.99	3.19

195	W14X61	3.50	3.70	3.99	4.24	3.05	3.20	3.46	3.74	3.98	4.35	2.99	3.19
196	W14X53	3.51	3.70	3.99	4.25	3.06	3.20	3.47	3.74	3.98	4.35	3.00	3.20
197	W14X48	3.51	3.70	3.99	4.25	3.06	3.20	3.46	3.75	3.99	4.35	2.99	3.19
198	W14X43	3.50	3.70	4.00	4.25	3.06	3.20	3.47	3.75	3.98	4.36	3.00	3.19
199	W14X38	3.51	3.70	4.00	4.26	3.06	3.21	3.47	3.75	3.99	4.35	3.00	3.20
200	W14X34	3.52	3.71	4.01	4.25	3.07	3.21	3.48	3.75	3.99	4.37	3.01	3.20
201	W14X30	3.52	3.71	4.01	4.26	3.07	3.22	3.47	3.75	3.99	4.36	3.01	3.21
202	W14X26	3.52	3.71	4.01	4.27	3.08	3.21	3.48	3.76	4.00	4.37	3.01	3.21
203	W14X22	3.52	3.71	4.01	4.26	3.08	3.23	3.48	3.75	4.00	4.37	3.02	3.21
204	W12X336	3.49	3.69	3.99	4.24	3.05	3.19	3.45	3.73	3.97	4.34	2.98	3.18
205	W12X305	3.49	3.69	3.99	4.24	3.05	3.19	3.45	3.73	3.97	4.34	2.98	3.18
206	W12X279	3.49	3.69	3.99	4.24	3.05	3.19	3.45	3.73	3.97	4.34	2.98	3.18
207	W12X252	3.49	3.69	3.99	4.24	3.05	3.19	3.45	3.73	3.97	4.34	2.98	3.18
208	W12X230	3.50	3.69	3.99	4.24	3.05	3.19	3.45	3.74	3.97	4.34	2.98	3.18
209	W12X210	3.50	3.69	3.99	4.24	3.05	3.19	3.45	3.74	3.97	4.34	2.98	3.18
210	W12X190	3.49	3.69	3.99	4.24	3.05	3.19	3.46	3.74	3.97	4.34	2.98	3.18
211	W12X170	3.49	3.69	3.99	4.24	3.05	3.19	3.45	3.74	3.97	4.34	2.98	3.18
212	W12X152	3.50	3.69	3.99	4.24	3.05	3.19	3.46	3.74	3.98	4.34	2.98	3.18
213	W12X136	3.50	3.69	3.99	4.24	3.05	3.19	3.46	3.74	3.97	4.35	2.98	3.19
214	W12X120	3.50	3.69	3.99	4.24	3.05	3.19	3.45	3.74	3.97	4.34	2.98	3.18
215	W12X106	3.50	3.69	3.99	4.24	3.05	3.19	3.45	3.74	3.98	4.34	2.98	3.18
216	W12X96	3.50	3.69	3.99	4.24	3.05	3.19	3.46	3.74	3.97	4.35	2.99	3.18
217	W12X87	3.50	3.69	3.99	4.24	3.05	3.19	3.46	3.73	3.98	4.35	2.98	3.19
218	W12X79	3.50	3.69	3.99	4.24	3.05	3.20	3.46	3.74	3.98	4.35	2.99	3.19
219	W12X72	3.49	3.69	3.99	4.24	3.05	3.20	3.46	3.74	3.97	4.35	2.98	3.19
220	W12X65	3.49	3.68	3.98	4.23	3.04	3.18	3.45	3.73	3.97	4.34	2.97	3.18
221	W12X58	3.50	3.69	3.99	4.24	3.05	3.19	3.46	3.74	3.98	4.34	2.99	3.19
222	W12X53	3.50	3.70	3.99	4.24	3.05	3.20	3.46	3.74	3.98	4.35	2.99	3.19
223	W12X50	3.50	3.70	3.99	4.24	3.06	3.20	3.46	3.74	3.98	4.35	2.99	3.19
224	W12X45	3.51	3.70	3.99	4.25	3.06	3.20	3.46	3.74	3.98	4.35	2.99	3.20
225	W12X40	3.50	3.70	3.99	4.25	3.06	3.20	3.46	3.74	3.98	4.35	2.99	3.19
226	W12X35	3.51	3.71	4.00	4.25	3.07	3.20	3.48	3.75	3.98	4.36	3.00	3.20
227	W12X30	3.51	3.70	4.00	4.25	3.06	3.20	3.47	3.75	3.99	4.35	3.00	3.20
228	W12X26	3.51	3.71	4.00	4.25	3.07	3.21	3.47	3.74	3.99	4.37	2.99	3.20
229	W12X22	3.52	3.71	4.01	4.27	3.08	3.22	3.48	3.76	4.00	4.37	3.02	3.21
230	W12X19	3.51	3.72	4.01	4.27	3.08	3.23	3.50	3.78	4.01	4.37	3.03	3.23
231	W12X16	3.54	3.74	4.02	4.28	3.09	3.22	3.49	3.78	4.02	4.37	3.02	3.22
232	W12X14	3.54	3.73	4.02	4.28	3.09	3.23	3.49	3.77	4.01	4.37	3.04	3.23
233	W10X112	3.50	3.69	3.99	4.24	3.05	3.19	3.46	3.74	3.97	4.34	2.98	3.18
234	W10X100	3.49	3.69	3.99	4.24	3.05	3.19	3.45	3.74	3.97	4.34	2.98	3.18
235	W10X88	3.49	3.69	3.99	4.24	3.05	3.19	3.45	3.74	3.97	4.34	2.98	3.18
236	W10X77	3.50	3.69	3.99	4.24	3.05	3.19	3.46	3.73	3.98	4.35	2.98	3.18
237	W10X68	3.50	3.69	3.99	4.24	3.05	3.19	3.45	3.74	3.97	4.35	2.98	3.18
238	W10X60	3.49	3.69	3.99	4.24	3.05	3.19	3.46	3.74	3.98	4.34	2.98	3.19
239	W10X54	3.49	3.69	3.99	4.24	3.05	3.19	3.46	3.73	3.97	4.35	2.99	3.18
240	W10X49	3.49	3.69	3.99	4.24	3.05	3.19	3.45	3.74	3.98	4.34	2.98	3.18
241	W10X45	3.50	3.70	3.99	4.24	3.05	3.19	3.46	3.74	3.98	4.35	2.99	3.19
242	W10X39	3.50	3.69	3.99	4.25	3.05	3.20	3.46	3.74	3.98	4.35	2.99	3.19

243	W10X33		3.50	3.70	4.00	4.24	3.06	3.20	3.46	3.74	3.98	4.36	2.99	3.19
244	W10X30		3.51	3.71	4.00	4.25	3.06	3.21	3.47	3.76	3.99	4.35	3.00	3.19
245	W10X26		3.51	3.71	4.00	4.26	3.06	3.21	3.46	3.75	3.98	4.36	3.00	3.20
246	W10X22		3.52	3.71	3.99	4.26	3.06	3.21	3.47	3.75	4.00	4.37	3.00	3.19
247	W10X19		3.52	3.73	4.01	4.26	3.07	3.22	3.48	3.78	4.00	4.37	3.00	3.21
248	W10X17		3.52	3.71	4.01	4.28	3.07	3.22	3.48	3.77	4.00	4.35	3.00	3.20
249	W10X15		3.53	3.72	4.01	4.25	3.09	3.24	3.49	3.75	4.00	4.35	3.01	3.21
250	W10X12		3.52	3.74	4.03	4.30	3.07	3.23	3.47	3.75	4.02	4.35	3.01	3.22
		MIN	**3.48**	**3.68**	**3.98**	**4.23**	**3.03**	**3.18**	**3.44**	**3.73**	**3.96**	**4.33**	**2.97**	**3.17**
		MAX	**3.54**	**3.74**	**4.03**	**4.30**	**3.09**	**3.24**	**3.50**	**3.78**	**4.02**	**4.38**	**3.04**	**3.23**
		AVE	**3.51**	**3.70**	**4.00**	**4.25**	**3.06**	**3.21**	**3.47**	**3.75**	**3.99**	**4.36**	**3.00**	**3.20**

Table C- 8. Reliability Indices for Noncomposite Rolled I-shaped Girdes for ADTT 5'000 and L=90, 120, 200ft.

a	a	**L=90 ft**						**L=120 ft**						**L=200 ft**					
	Φ	**1.00**		**0.95**		**1.05**		**1.00**		**0.95**		**1.05**		**1.00**		**0.95**		**1.05**	
#	**Shape \ D/(D+L)**	**0.45**	**0.60**	**0.45**	**0.60**	**0.45**	**0.60**	**0.50**	**0.65**	**0.50**	**0.65**	**0.50**	**0.65**	**0.60**	**0.75**	**0.60**	**0.75**	**0.60**	**0.75**
1	W44X335	3.62	3.82	4.18	4.45	3.11	3.25	3.64	3.82	4.22	4.47	3.12	3.23	4.06	4.01	4.71	4.71	3.48	3.37
2	W44X290	3.62	3.82	4.17	4.45	3.11	3.24	3.64	3.81	4.21	4.47	3.11	3.22	4.06	4.00	4.71	4.71	3.47	3.37
3	W44X262	3.62	3.82	4.17	4.45	3.11	3.24	3.64	3.81	4.21	4.47	3.11	3.22	4.06	4.00	4.71	4.71	3.47	3.37
4	W44X230	3.62	3.82	4.18	4.45	3.11	3.25	3.64	3.81	4.22	4.47	3.12	3.23	4.06	4.01	4.71	4.71	3.47	3.37
5	W40X593	3.61	3.81	4.17	4.44	3.11	3.24	3.63	3.81	4.21	4.46	3.11	3.22	4.05	4.00	4.70	4.70	3.47	3.36
6	W40X503	3.61	3.81	4.17	4.44	3.11	3.24	3.63	3.81	4.21	4.46	3.11	3.22	4.06	4.00	4.70	4.71	3.47	3.36
7	W40X431	3.61	3.81	4.17	4.44	3.11	3.24	3.63	3.81	4.21	4.46	3.11	3.22	4.06	4.00	4.70	4.71	3.47	3.36
8	W40X397	3.61	3.81	4.17	4.45	3.11	3.24	3.63	3.81	4.21	4.46	3.11	3.22	4.06	4.00	4.71	4.71	3.47	3.36
9	W40X372	3.61	3.81	4.17	4.44	3.11	3.24	3.63	3.81	4.21	4.46	3.11	3.22	4.06	4.00	4.70	4.71	3.47	3.36
10	W40X362	3.61	3.81	4.17	4.44	3.11	3.24	3.63	3.81	4.21	4.46	3.11	3.22	4.06	4.00	4.70	4.71	3.47	3.36
11	W40X324	3.61	3.81	4.17	4.44	3.11	3.24	3.63	3.81	4.21	4.46	3.11	3.22	4.06	4.00	4.70	4.71	3.47	3.36
12	W40X297	3.61	3.81	4.17	4.45	3.11	3.24	3.63	3.81	4.21	4.46	3.11	3.22	4.06	4.00	4.71	4.71	3.47	3.36
13	W40X277	3.61	3.81	4.17	4.44	3.11	3.24	3.63	3.81	4.21	4.46	3.11	3.22	4.06	4.00	4.70	4.71	3.47	3.36
14	W40X249	3.61	3.81	4.17	4.44	3.11	3.24	3.63	3.81	4.21	4.46	3.11	3.22	4.06	4.00	4.70	4.71	3.47	3.36
15	W40X215	3.61	3.81	4.17	4.44	3.11	3.24	3.63	3.81	4.21	4.46	3.11	3.22	4.06	4.00	4.70	4.71	3.47	3.36
16	W40X199	3.62	3.82	4.17	4.45	3.11	3.24	3.64	3.81	4.21	4.47	3.11	3.22	4.06	4.00	4.71	4.71	3.47	3.37
17	W40X392	3.62	3.82	4.18	4.45	3.12	3.25	3.64	3.82	4.22	4.47	3.12	3.23	4.06	4.01	4.71	4.71	3.48	3.37
18	W40X331	3.62	3.82	4.18	4.45	3.12	3.25	3.64	3.82	4.22	4.47	3.12	3.23	4.06	4.01	4.71	4.71	3.48	3.37
19	W40X327	3.62	3.82	4.18	4.45	3.12	3.25	3.64	3.82	4.22	4.47	3.12	3.23	4.06	4.01	4.71	4.71	3.48	3.37
20	W40X294	3.62	3.82	4.18	4.45	3.12	3.25	3.64	3.82	4.22	4.47	3.12	3.23	4.06	4.01	4.71	4.71	3.48	3.37
21	W40X278	3.62	3.82	4.18	4.45	3.12	3.25	3.64	3.82	4.22	4.47	3.12	3.23	4.06	4.01	4.71	4.71	3.48	3.37
22	W40X264	3.62	3.82	4.18	4.45	3.12	3.25	3.64	3.82	4.22	4.47	3.12	3.23	4.06	4.01	4.71	4.71	3.48	3.37
23	W40X235	3.62	3.82	4.18	4.45	3.11	3.25	3.64	3.82	4.22	4.47	3.12	3.23	4.06	4.01	4.71	4.71	3.48	3.37
24	W40X211	3.62	3.82	4.18	4.45	3.12	3.25	3.64	3.82	4.22	4.47	3.12	3.23	4.06	4.01	4.71	4.71	3.48	3.37
25	W40X183	3.62	3.82	4.18	4.45	3.12	3.25	3.64	3.82	4.22	4.47	3.12	3.23	4.06	4.01	4.71	4.71	3.48	3.37
26	W40X167	3.63	3.82	4.18	4.45	3.12	3.25	3.64	3.82	4.22	4.47	3.12	3.23	4.07	4.01	4.71	4.71	3.48	3.38
27	W40X149	3.63	3.83	4.19	4.46	3.13	3.26	3.65	3.83	4.23	4.48	3.13	3.24	4.07	4.01	4.71	4.72	3.49	3.38
28	W36X652	3.61	3.81	4.17	4.44	3.10	3.23	3.63	3.81	4.21	4.46	3.10	3.21	4.05	4.00	4.70	4.70	3.46	3.36
29	W36X529	3.61	3.81	4.17	4.44	3.10	3.24	3.63	3.81	4.21	4.46	3.11	3.21	4.05	4.00	4.70	4.70	3.47	3.36

30	W36X487	3.61	3.81	4.17	4.44	3.10	3.24	3.63	3.81	4.21	4.46	3.11	3.22	4.05	4.00	4.70	4.70	3.47	3.36
31	W36X441	3.61	3.81	4.17	4.44	3.10	3.24	3.63	3.81	4.21	4.46	3.10	3.21	4.05	4.00	4.70	4.70	3.46	3.36
32	W36X395	3.61	3.81	4.17	4.44	3.10	3.24	3.63	3.81	4.21	4.46	3.11	3.22	4.05	4.00	4.70	4.70	3.47	3.36
33	W36X361	3.61	3.81	4.17	4.44	3.10	3.24	3.63	3.81	4.21	4.46	3.11	3.22	4.05	4.00	4.70	4.70	3.47	3.36
34	W36X330	3.61	3.81	4.17	4.44	3.10	3.24	3.63	3.81	4.21	4.46	3.11	3.22	4.05	4.00	4.70	4.71	3.47	3.36
35	W36X302	3.61	3.81	4.17	4.44	3.11	3.24	3.63	3.81	4.21	4.46	3.11	3.22	4.05	4.00	4.70	4.71	3.47	3.36
36	W36X282	3.61	3.81	4.17	4.44	3.11	3.24	3.63	3.81	4.21	4.46	3.11	3.22	4.05	4.00	4.70	4.71	3.47	3.36
37	W36X262	3.61	3.81	4.17	4.44	3.11	3.24	3.63	3.81	4.21	4.46	3.11	3.22	4.05	4.00	4.70	4.70	3.47	3.36
38	W36X247	3.61	3.81	4.17	4.44	3.11	3.24	3.63	3.81	4.21	4.46	3.11	3.22	4.06	4.00	4.70	4.71	3.47	3.36
39	W36X231	3.61	3.81	4.17	4.44	3.11	3.24	3.63	3.81	4.21	4.46	3.11	3.22	4.06	4.00	4.70	4.71	3.47	3.36
40	W36X256	3.62	3.82	4.18	4.45	3.11	3.25	3.64	3.81	4.22	4.47	3.12	3.23	4.06	4.01	4.71	4.71	3.47	3.37
41	W36X232	3.62	3.82	4.18	4.45	3.11	3.25	3.64	3.82	4.22	4.47	3.12	3.23	4.06	4.01	4.71	4.71	3.48	3.37
42	W36X210	3.62	3.82	4.18	4.45	3.12	3.25	3.64	3.82	4.22	4.47	3.12	3.23	4.06	4.01	4.71	4.71	3.48	3.37
43	W36X194	3.62	3.82	4.18	4.45	3.12	3.25	3.64	3.82	4.22	4.47	3.12	3.23	4.06	4.01	4.71	4.71	3.48	3.37
44	W36X182	3.62	3.82	4.18	4.45	3.12	3.25	3.64	3.82	4.22	4.47	3.12	3.23	4.06	4.01	4.71	4.71	3.48	3.37
45	W36X170	3.62	3.82	4.18	4.45	3.12	3.25	3.64	3.82	4.22	4.47	3.12	3.23	4.07	4.01	4.71	4.71	3.48	3.38
46	W36X160	3.62	3.82	4.18	4.45	3.12	3.25	3.64	3.82	4.22	4.47	3.12	3.23	4.06	4.01	4.71	4.71	3.48	3.37
47	W36X150	3.63	3.82	4.18	4.45	3.12	3.26	3.65	3.82	4.22	4.47	3.12	3.23	4.07	4.01	4.71	4.72	3.48	3.38
48	W36X135	3.63	3.83	4.19	4.46	3.13	3.26	3.65	3.83	4.23	4.48	3.13	3.24	4.07	4.02	4.72	4.72	3.49	3.38
49	W33X387	3.61	3.81	4.17	4.44	3.10	3.24	3.63	3.81	4.21	4.46	3.11	3.22	4.05	4.00	4.70	4.71	3.47	3.36
50	W33X354	3.61	3.81	4.17	4.44	3.10	3.24	3.63	3.81	4.21	4.46	3.10	3.21	4.05	4.00	4.70	4.70	3.46	3.36
51	W33X318	3.61	3.81	4.17	4.44	3.10	3.24	3.63	3.81	4.21	4.46	3.11	3.22	4.05	4.00	4.70	4.71	3.47	3.36
52	W33X291	3.61	3.81	4.17	4.44	3.10	3.24	3.63	3.81	4.21	4.46	3.11	3.22	4.05	4.00	4.70	4.70	3.47	3.36
53	W33X263	3.61	3.81	4.17	4.44	3.10	3.24	3.63	3.81	4.21	4.46	3.11	3.22	4.05	4.00	4.70	4.70	3.47	3.36
54	W33X241	3.61	3.81	4.17	4.44	3.11	3.24	3.63	3.81	4.21	4.46	3.11	3.22	4.05	4.00	4.70	4.71	3.47	3.36
55	W33X221	3.61	3.81	4.17	4.44	3.11	3.24	3.63	3.81	4.21	4.46	3.11	3.22	4.06	4.00	4.70	4.71	3.47	3.36
56	W33X201	3.61	3.81	4.17	4.44	3.11	3.24	3.63	3.81	4.21	4.46	3.11	3.22	4.06	4.00	4.70	4.71	3.47	3.36
57	W33X169	3.62	3.82	4.18	4.45	3.11	3.25	3.64	3.82	4.22	4.47	3.12	3.23	4.06	4.01	4.71	4.71	3.48	3.37
58	W33X152	3.62	3.82	4.18	4.45	3.12	3.25	3.64	3.82	4.22	4.47	3.12	3.23	4.06	4.01	4.71	4.71	3.48	3.37
59	W33X141	3.62	3.82	4.18	4.45	3.12	3.25	3.64	3.82	4.22	4.47	3.12	3.23	4.06	4.01	4.71	4.71	3.48	3.37
60	W33X130	3.63	3.82	4.18	4.45	3.12	3.25	3.64	3.82	4.22	4.47	3.12	3.23	4.07	4.01	4.71	4.71	3.48	3.38
61	W33X118	3.63	3.83	4.18	4.45	3.12	3.26	3.65	3.82	4.22	4.47	3.13	3.24	4.07	4.01	4.71	4.72	3.48	3.38
62	W30X391	3.61	3.81	4.17	4.44	3.10	3.23	3.63	3.80	4.21	4.46	3.10	3.21	4.05	4.00	4.70	4.70	3.46	3.36
63	W30X357	3.61	3.81	4.17	4.44	3.10	3.23	3.63	3.80	4.21	4.46	3.10	3.21	4.05	4.00	4.70	4.70	3.46	3.36
64	W30X326	3.61	3.81	4.17	4.44	3.10	3.23	3.63	3.81	4.21	4.46	3.10	3.21	4.05	4.00	4.70	4.70	3.46	3.36
65	W30X292	3.61	3.81	4.17	4.44	3.10	3.24	3.63	3.81	4.21	4.46	3.10	3.21	4.05	4.00	4.70	4.70	3.46	3.36
66	W30X261	3.61	3.81	4.17	4.44	3.10	3.24	3.63	3.81	4.21	4.46	3.10	3.21	4.05	4.00	4.70	4.70	3.46	3.36
67	W30X235	3.61	3.81	4.17	4.44	3.10	3.23	3.63	3.80	4.20	4.46	3.10	3.21	4.05	3.99	4.70	4.70	3.46	3.36
68	W30X211	3.61	3.81	4.17	4.44	3.10	3.24	3.63	3.81	4.21	4.46	3.11	3.22	4.05	4.00	4.70	4.70	3.47	3.36
69	W30X191	3.61	3.81	4.17	4.44	3.10	3.24	3.63	3.81	4.21	4.46	3.11	3.22	4.05	4.00	4.70	4.70	3.47	3.36
70	W30X173	3.61	3.81	4.17	4.44	3.11	3.24	3.63	3.81	4.21	4.46	3.11	3.22	4.06	4.00	4.70	4.71	3.47	3.36
71	W30X148	3.62	3.82	4.17	4.45	3.11	3.24	3.64	3.81	4.21	4.47	3.11	3.22	4.06	4.00	4.71	4.71	3.47	3.37
72	W30X132	3.62	3.82	4.18	4.45	3.12	3.25	3.64	3.82	4.22	4.47	3.12	3.23	4.06	4.01	4.71	4.71	3.48	3.37
73	W30X124	3.62	3.82	4.18	4.45	3.12	3.25	3.64	3.82	4.22	4.47	3.12	3.23	4.06	4.01	4.71	4.71	3.48	3.37
74	W30X116	3.62	3.82	4.18	4.45	3.12	3.25	3.65	3.82	4.22	4.47	3.12	3.23	4.07	4.01	4.71	4.71	3.48	3.38
75	W30X108	3.63	3.83	4.18	4.45	3.12	3.26	3.65	3.82	4.22	4.48	3.12	3.23	4.07	4.01	4.71	4.72	3.48	3.38
76	W30X99	3.63	3.83	4.18	4.46	3.13	3.26	3.65	3.83	4.23	4.48	3.13	3.24	4.07	4.02	4.72	4.72	3.49	3.38
77	W30X90	3.63	3.83	4.18	4.46	3.12	3.26	3.65	3.82	4.22	4.48	3.13	3.24	4.07	4.01	4.71	4.72	3.48	3.38

78	W27X539	3.60	3.80	4.16	4.44	3.10	3.23	3.62	3.80	4.20	4.46	3.10	3.21	4.05	3.99	4.70	4.70	3.46	3.35
79	W27X368	3.61	3.81	4.17	4.44	3.10	3.23	3.63	3.80	4.21	4.46	3.10	3.21	4.05	3.99	4.70	4.70	3.46	3.36
80	W27X336	3.61	3.81	4.17	4.44	3.10	3.23	3.63	3.80	4.21	4.46	3.10	3.21	4.05	4.00	4.70	4.70	3.46	3.36
81	W27X307	3.61	3.80	4.16	4.44	3.10	3.23	3.62	3.80	4.20	4.46	3.10	3.21	4.05	3.99	4.70	4.70	3.46	3.35
82	W27X281	3.61	3.81	4.17	4.44	3.10	3.23	3.63	3.80	4.21	4.46	3.10	3.21	4.05	4.00	4.70	4.70	3.46	3.36
83	W27X258	3.61	3.81	4.17	4.44	3.10	3.23	3.63	3.80	4.21	4.46	3.10	3.21	4.05	3.99	4.70	4.70	3.46	3.36
84	W27X235	3.61	3.81	4.17	4.44	3.10	3.23	3.63	3.80	4.21	4.46	3.10	3.21	4.05	4.00	4.70	4.70	3.46	3.36
85	W27X217	3.61	3.81	4.17	4.44	3.10	3.24	3.63	3.81	4.21	4.46	3.10	3.21	4.05	4.00	4.70	4.70	3.46	3.36
86	W27X194	3.61	3.81	4.17	4.44	3.10	3.23	3.63	3.80	4.21	4.46	3.10	3.21	4.05	4.00	4.70	4.70	3.46	3.36
87	W27X178	3.61	3.81	4.17	4.44	3.10	3.24	3.63	3.81	4.21	4.46	3.11	3.22	4.05	4.00	4.70	4.70	3.47	3.36
88	W27X161	3.61	3.81	4.17	4.44	3.10	3.24	3.63	3.81	4.21	4.46	3.11	3.22	4.05	4.00	4.70	4.71	3.47	3.36
89	W27X146	3.61	3.81	4.17	4.44	3.11	3.24	3.63	3.81	4.21	4.46	3.11	3.22	4.05	4.00	4.70	4.71	3.47	3.36
90	W27X129	3.62	3.82	4.17	4.45	3.11	3.24	3.64	3.81	4.21	4.47	3.11	3.22	4.06	4.00	4.71	4.71	3.47	3.37
91	W27X114	3.62	3.82	4.18	4.45	3.11	3.25	3.64	3.82	4.22	4.47	3.12	3.23	4.06	4.00	4.71	4.71	3.48	3.37
92	W27X102	3.62	3.82	4.18	4.45	3.12	3.25	3.64	3.82	4.22	4.47	3.12	3.23	4.06	4.01	4.71	4.71	3.48	3.37
93	W27X94	3.62	3.82	4.18	4.45	3.12	3.25	3.64	3.82	4.22	4.47	3.12	3.23	4.06	4.01	4.71	4.71	3.48	3.37
94	W27X84	3.62	3.82	4.18	4.45	3.12	3.25	3.65	3.82	4.22	4.47	3.12	3.23	4.07	4.01	4.71	4.72	3.48	3.38
95	W24X370	3.61	3.80	4.16	4.44	3.10	3.23	3.63	3.80	4.20	4.46	3.10	3.21	4.05	3.99	4.70	4.70	3.46	3.35
96	W24X335	3.61	3.80	4.16	4.44	3.10	3.23	3.63	3.80	4.20	4.46	3.10	3.21	4.05	3.99	4.70	4.70	3.46	3.35
97	W24X306	3.61	3.80	4.16	4.44	3.10	3.23	3.63	3.80	4.20	4.46	3.10	3.21	4.05	3.99	4.70	4.70	3.46	3.35
98	W24X279	3.61	3.81	4.17	4.44	3.10	3.23	3.63	3.80	4.21	4.46	3.10	3.21	4.05	4.00	4.70	4.70	3.46	3.36
99	W24X250	3.61	3.81	4.17	4.44	3.10	3.23	3.63	3.80	4.21	4.46	3.10	3.21	4.05	3.99	4.70	4.70	3.46	3.36
100	W24X229	3.61	3.81	4.17	4.44	3.10	3.23	3.63	3.80	4.21	4.46	3.10	3.21	4.05	4.00	4.70	4.70	3.46	3.36
101	W24X207	3.61	3.81	4.17	4.44	3.10	3.23	3.63	3.81	4.21	4.46	3.10	3.21	4.05	4.00	4.70	4.70	3.46	3.36
102	W24X192	3.61	3.81	4.17	4.44	3.10	3.23	3.63	3.80	4.21	4.46	3.10	3.21	4.05	4.00	4.70	4.70	3.46	3.36
103	W24X176	3.61	3.81	4.17	4.44	3.10	3.23	3.63	3.80	4.21	4.46	3.10	3.21	4.05	4.00	4.70	4.70	3.46	3.36
104	W24X162	3.61	3.81	4.17	4.44	3.10	3.23	3.63	3.80	4.21	4.46	3.10	3.21	4.05	4.00	4.70	4.70	3.46	3.36
105	W24X146	3.61	3.81	4.17	4.44	3.10	3.24	3.63	3.81	4.21	4.46	3.10	3.21	4.05	4.00	4.70	4.70	3.46	3.36
106	W24X131	3.61	3.81	4.17	4.44	3.10	3.24	3.63	3.81	4.21	4.46	3.11	3.22	4.05	4.00	4.70	4.70	3.47	3.36
107	W24X117	3.61	3.81	4.17	4.44	3.11	3.24	3.63	3.81	4.21	4.46	3.11	3.22	4.05	4.00	4.70	4.70	3.47	3.36
108	W24X104	3.61	3.81	4.17	4.44	3.11	3.24	3.63	3.81	4.21	4.46	3.11	3.22	4.06	4.00	4.70	4.70	3.47	3.36
109	W24X103	3.62	3.82	4.18	4.45	3.11	3.25	3.64	3.81	4.22	4.47	3.11	3.22	4.06	4.00	4.71	4.71	3.47	3.37
110	W24X94	3.62	3.82	4.18	4.45	3.11	3.25	3.64	3.82	4.22	4.47	3.12	3.23	4.06	4.01	4.71	4.71	3.47	3.37
111	W24X84	3.62	3.82	4.18	4.45	3.11	3.25	3.64	3.82	4.22	4.47	3.12	3.23	4.06	4.01	4.71	4.71	3.47	3.37
112	W24X76	3.62	3.82	4.18	4.45	3.12	3.25	3.64	3.82	4.22	4.47	3.12	3.23	4.06	4.01	4.71	4.71	3.48	3.37
113	W24X68	3.62	3.82	4.18	4.45	3.12	3.25	3.64	3.82	4.22	4.47	3.12	3.23	4.07	4.01	4.71	4.71	3.48	3.37
114	W24X62	3.63	3.83	4.19	4.46	3.13	3.26	3.65	3.83	4.23	4.48	3.13	3.24	4.08	4.02	4.72	4.72	3.49	3.38
115	W24X55	3.63	3.83	4.19	4.46	3.13	3.26	3.65	3.83	4.23	4.48	3.13	3.24	4.07	4.02	4.72	4.72	3.49	3.39
116	W21X201	3.60	3.80	4.16	4.44	3.10	3.23	3.63	3.80	4.20	4.46	3.10	3.21	4.05	3.99	4.70	4.70	3.46	3.35
117	W21X182	3.61	3.80	4.16	4.44	3.10	3.23	3.63	3.80	4.20	4.46	3.10	3.21	4.05	3.99	4.70	4.70	3.46	3.35
118	W21X166	3.61	3.81	4.17	4.44	3.10	3.23	3.62	3.80	4.20	4.46	3.10	3.21	4.05	3.99	4.70	4.70	3.46	3.35
119	W21X147	3.61	3.81	4.17	4.44	3.10	3.24	3.63	3.81	4.21	4.46	3.10	3.21	4.05	4.00	4.70	4.71	3.46	3.36
120	W21X132	3.61	3.81	4.17	4.44	3.10	3.23	3.63	3.80	4.21	4.46	3.10	3.21	4.05	3.99	4.70	4.70	3.46	3.36
121	W21X122	3.61	3.81	4.17	4.44	3.10	3.23	3.63	3.81	4.21	4.46	3.10	3.21	4.05	4.00	4.70	4.70	3.46	3.36
122	W21X111	3.61	3.81	4.17	4.44	3.10	3.24	3.63	3.81	4.21	4.46	3.11	3.22	4.05	4.00	4.70	4.71	3.47	3.36
123	W21X101	3.61	3.81	4.17	4.44	3.10	3.24	3.63	3.81	4.21	4.46	3.10	3.21	4.05	4.00	4.70	4.70	3.47	3.36
124	W21X93	3.62	3.82	4.18	4.45	3.11	3.25	3.64	3.81	4.22	4.47	3.12	3.22	4.06	4.00	4.71	4.71	3.48	3.37
125	W21X83	3.62	3.82	4.17	4.45	3.11	3.24	3.64	3.81	4.21	4.47	3.12	3.23	4.06	4.00	4.71	4.71	3.48	3.37

126	W21X73	3.62	3.82	4.18	4.44	3.11	3.25	3.64	3.82	4.21	4.46	3.11	3.23	4.06	4.01	4.71	4.71	3.48	3.37
127	W21X68	3.62	3.82	4.18	4.45	3.11	3.25	3.64	3.81	4.22	4.47	3.12	3.22	4.06	4.00	4.71	4.71	3.48	3.37
128	W21X62	3.62	3.82	4.18	4.45	3.11	3.25	3.64	3.82	4.22	4.47	3.12	3.23	4.06	4.01	4.71	4.71	3.48	3.37
129	W21X55	3.62	3.82	4.18	4.45	3.12	3.25	3.64	3.82	4.22	4.47	3.12	3.23	4.06	4.01	4.71	4.72	3.48	3.37
130	W21X48*	3.62	3.82	4.18	4.45	3.12	3.25	3.64	3.82	4.22	4.47	3.12	3.23	4.06	4.01	4.71	4.71	3.48	3.37
131	W21X57	3.62	3.82	4.18	4.45	3.12	3.25	3.64	3.82	4.22	4.47	3.12	3.23	4.06	4.01	4.71	4.71	3.48	3.38
132	W21X50	3.63	3.83	4.19	4.45	3.12	3.26	3.65	3.83	4.22	4.48	3.13	3.24	4.07	4.01	4.71	4.71	3.48	3.38
133	W21X44	3.63	3.84	4.19	4.46	3.13	3.26	3.65	3.83	4.23	4.48	3.13	3.24	4.07	4.01	4.71	4.72	3.49	3.39
134	W18X311	3.60	3.80	4.16	4.43	3.09	3.23	3.62	3.80	4.20	4.45	3.09	3.20	4.05	3.99	4.70	4.70	3.46	3.35
135	W18X283	3.60	3.80	4.16	4.44	3.10	3.23	3.62	3.80	4.20	4.46	3.10	3.21	4.05	3.99	4.70	4.70	3.46	3.35
136	W18X258	3.60	3.80	4.16	4.44	3.09	3.23	3.62	3.80	4.20	4.45	3.10	3.21	4.05	3.99	4.70	4.70	3.46	3.35
137	W18X234	3.60	3.80	4.16	4.44	3.09	3.23	3.62	3.80	4.20	4.46	3.10	3.21	4.05	3.99	4.70	4.70	3.46	3.35
138	W18X211	3.60	3.80	4.16	4.44	3.10	3.23	3.62	3.80	4.20	4.45	3.10	3.21	4.05	3.99	4.70	4.70	3.46	3.35
139	W18X192	3.60	3.80	4.16	4.44	3.10	3.23	3.62	3.80	4.20	4.46	3.10	3.21	4.05	3.99	4.70	4.70	3.46	3.35
140	W18X175	3.60	3.80	4.16	4.44	3.10	3.23	3.62	3.80	4.20	4.46	3.10	3.21	4.05	3.99	4.70	4.70	3.46	3.35
141	W18X158	3.60	3.80	4.16	4.44	3.10	3.23	3.62	3.80	4.20	4.46	3.10	3.21	4.05	3.99	4.70	4.70	3.46	3.35
142	W18X143	3.60	3.80	4.16	4.44	3.10	3.23	3.62	3.80	4.20	4.45	3.10	3.21	4.05	3.99	4.70	4.70	3.46	3.35
143	W18X130	3.60	3.80	4.16	4.44	3.10	3.23	3.62	3.80	4.20	4.46	3.10	3.21	4.05	3.99	4.70	4.70	3.46	3.35
144	W18X119	3.61	3.81	4.17	4.44	3.10	3.23	3.63	3.80	4.21	4.46	3.10	3.21	4.05	3.99	4.70	4.70	3.46	3.36
145	W18X106	3.61	3.81	4.16	4.44	3.10	3.23	3.63	3.81	4.21	4.46	3.10	3.21	4.05	4.00	4.70	4.70	3.46	3.35
146	W18X97	3.61	3.80	4.17	4.44	3.10	3.23	3.63	3.80	4.21	4.46	3.10	3.21	4.05	4.00	4.70	4.70	3.46	3.36
147	W18X86	3.61	3.81	4.17	4.44	3.10	3.23	3.63	3.80	4.21	4.46	3.10	3.21	4.05	3.99	4.70	4.70	3.46	3.36
148	W18X76	3.61	3.81	4.17	4.44	3.10	3.24	3.63	3.80	4.21	4.46	3.10	3.21	4.05	3.99	4.70	4.70	3.46	3.36
149	W18X71	3.62	3.82	4.18	4.44	3.11	3.24	3.64	3.81	4.21	4.47	3.11	3.22	4.06	4.00	4.70	4.71	3.47	3.36
150	W18X65	3.61	3.82	4.18	4.44	3.11	3.24	3.64	3.81	4.21	4.47	3.11	3.22	4.06	4.00	4.71	4.71	3.47	3.37
151	W18X60	3.61	3.81	4.17	4.44	3.11	3.24	3.64	3.81	4.21	4.46	3.11	3.22	4.05	4.00	4.71	4.71	3.47	3.36
152	W18X55	3.62	3.82	4.17	4.45	3.11	3.25	3.64	3.82	4.22	4.46	3.12	3.22	4.06	4.01	4.71	4.70	3.47	3.37
153	W18X50	3.62	3.82	4.17	4.45	3.11	3.25	3.64	3.81	4.21	4.46	3.11	3.22	4.06	4.00	4.70	4.71	3.47	3.36
154	W18X46	3.62	3.82	4.18	4.45	3.12	3.25	3.64	3.82	4.22	4.47	3.12	3.23	4.06	4.01	4.71	4.71	3.48	3.38
155	W18X40	3.62	3.82	4.18	4.46	3.12	3.25	3.64	3.81	4.22	4.47	3.12	3.23	4.06	4.01	4.71	4.72	3.48	3.37
156	W18X35	3.63	3.82	4.18	4.44	3.12	3.26	3.65	3.82	4.22	4.47	3.12	3.23	4.07	4.01	4.72	4.72	3.49	3.37
157	W16X100	3.61	3.80	4.17	4.44	3.10	3.23	3.63	3.80	4.21	4.46	3.10	3.21	4.05	3.99	4.70	4.70	3.46	3.36
158	W16X89	3.61	3.81	4.17	4.44	3.10	3.23	3.63	3.80	4.21	4.46	3.10	3.21	4.05	4.00	4.70	4.70	3.46	3.36
159	W16X77	3.60	3.80	4.16	4.44	3.10	3.23	3.63	3.80	4.20	4.46	3.10	3.21	4.05	3.99	4.70	4.70	3.46	3.35
160	W16X67	3.60	3.80	4.17	4.44	3.10	3.23	3.63	3.80	4.21	4.46	3.10	3.21	4.05	3.99	4.70	4.70	3.46	3.35
161	W16X57	3.61	3.81	4.17	4.44	3.11	3.24	3.63	3.81	4.21	4.46	3.11	3.22	4.06	4.01	4.71	4.71	3.47	3.36
162	W16X50	3.62	3.81	4.17	4.45	3.11	3.24	3.63	3.81	4.21	4.47	3.11	3.22	4.06	4.00	4.71	4.71	3.47	3.37
163	W16X45	3.61	3.82	4.17	4.45	3.11	3.24	3.63	3.81	4.21	4.47	3.11	3.22	4.06	4.00	4.72	4.71	3.47	3.37
164	W16X40	3.61	3.81	4.17	4.45	3.11	3.24	3.63	3.82	4.21	4.47	3.11	3.22	4.05	4.00	4.71	4.70	3.47	3.37
165	W16X36	3.61	3.82	4.18	4.44	3.11	3.25	3.64	3.81	4.22	4.46	3.11	3.22	4.06	4.00	4.71	4.70	3.48	3.36
166	W16X31	3.62	3.82	4.18	4.45	3.12	3.25	3.64	3.81	4.22	4.46	3.12	3.23	4.06	4.00	4.71	4.70	3.48	3.37
167	W16X26	3.62	3.83	4.19	4.45	3.12	3.26	3.65	3.81	4.23	4.48	3.12	3.23	4.06	4.01	4.72	4.70	3.48	3.37
168	W14X730	3.59	3.79	4.15	4.43	3.08	3.22	3.61	3.79	4.19	4.45	3.08	3.19	4.04	3.98	4.69	4.69	3.45	3.34
169	W14X665	3.59	3.79	4.15	4.43	3.08	3.22	3.61	3.79	4.19	4.45	3.08	3.19	4.04	3.98	4.69	4.69	3.45	3.34
170	W14X605	3.59	3.79	4.15	4.43	3.08	3.22	3.61	3.79	4.19	4.45	3.08	3.20	4.04	3.98	4.69	4.69	3.45	3.34
171	W14X550	3.59	3.79	4.15	4.43	3.08	3.22	3.61	3.79	4.19	4.45	3.08	3.19	4.04	3.98	4.69	4.69	3.45	3.34
172	W14X500	3.59	3.79	4.15	4.43	3.08	3.22	3.61	3.79	4.19	4.45	3.09	3.20	4.04	3.98	4.69	4.69	3.45	3.34
173	W14X455	3.59	3.79	4.15	4.43	3.08	3.22	3.61	3.79	4.19	4.45	3.09	3.20	4.04	3.98	4.69	4.69	3.45	3.34

174	W14X426	3.59	3.79	4.15	4.43	3.08	3.22	3.61	3.79	4.19	4.45	3.09	3.20	4.04	3.98	4.69	4.69	3.45	3.34
175	W14X398	3.59	3.79	4.15	4.43	3.08	3.22	3.61	3.79	4.19	4.45	3.09	3.20	4.04	3.98	4.69	4.69	3.45	3.34
176	W14X370	3.59	3.79	4.16	4.43	3.08	3.22	3.61	3.79	4.19	4.45	3.09	3.20	4.04	3.98	4.69	4.69	3.45	3.34
177	W14X342	3.59	3.79	4.15	4.43	3.08	3.22	3.61	3.79	4.19	4.45	3.09	3.20	4.04	3.98	4.69	4.69	3.45	3.34
178	W14X311	3.59	3.79	4.16	4.43	3.09	3.22	3.61	3.79	4.20	4.45	3.09	3.20	4.04	3.98	4.69	4.69	3.45	3.34
179	W14X283	3.59	3.79	4.15	4.43	3.08	3.22	3.61	3.79	4.19	4.45	3.09	3.20	4.04	3.98	4.69	4.69	3.45	3.34
180	W14X257	3.59	3.79	4.16	4.43	3.09	3.22	3.62	3.79	4.19	4.45	3.09	3.20	4.04	3.98	4.69	4.69	3.45	3.34
181	W14X233	3.59	3.79	4.15	4.43	3.08	3.22	3.61	3.79	4.19	4.45	3.09	3.20	4.04	3.98	4.69	4.69	3.45	3.34
182	W14X211	3.60	3.80	4.16	4.43	3.09	3.22	3.62	3.79	4.20	4.45	3.09	3.20	4.04	3.98	4.69	4.69	3.45	3.34
183	W14X193	3.60	3.80	4.16	4.43	3.09	3.22	3.62	3.79	4.20	4.45	3.09	3.20	4.04	3.98	4.69	4.69	3.45	3.34
184	W14X176	3.60	3.80	4.15	4.43	3.09	3.22	3.62	3.79	4.20	4.45	3.09	3.20	4.04	3.99	4.69	4.70	3.45	3.34
185	W14X159	3.60	3.80	4.16	4.43	3.09	3.22	3.62	3.79	4.20	4.45	3.09	3.20	4.04	3.99	4.69	4.69	3.45	3.35
186	W14X145	3.60	3.79	4.15	4.43	3.09	3.22	3.62	3.79	4.20	4.45	3.09	3.20	4.04	3.98	4.69	4.69	3.45	3.34
187	W14X132	3.60	3.80	4.16	4.43	3.09	3.22	3.62	3.79	4.20	4.45	3.09	3.20	4.04	3.99	4.69	4.70	3.45	3.35
188	W14X120	3.60	3.80	4.16	4.43	3.09	3.22	3.62	3.80	4.20	4.45	3.09	3.20	4.04	3.99	4.69	4.70	3.45	3.35
189	W14X109	3.59	3.79	4.16	4.43	3.09	3.22	3.62	3.79	4.20	4.45	3.09	3.20	4.04	3.98	4.69	4.69	3.45	3.34
190	W14X99	3.60	3.79	4.16	4.43	3.09	3.22	3.62	3.79	4.19	4.45	3.09	3.20	4.04	3.98	4.69	4.69	3.45	3.34
191	W14X90	3.58	3.78	4.14	4.42	3.07	3.21	3.60	3.78	4.19	4.44	3.07	3.18	4.03	3.98	4.68	4.69	3.44	3.33
192	W14X82	3.60	3.80	4.16	4.44	3.09	3.23	3.62	3.80	4.20	4.46	3.10	3.21	4.05	3.99	4.70	4.70	3.46	3.35
193	W14X74	3.60	3.80	4.16	4.43	3.09	3.23	3.62	3.80	4.20	4.45	3.09	3.21	4.05	3.99	4.70	4.69	3.46	3.35
194	W14X68	3.60	3.80	4.16	4.43	3.09	3.23	3.62	3.80	4.20	4.46	3.10	3.20	4.05	3.99	4.70	4.69	3.46	3.35
195	W14X61	3.60	3.81	4.16	4.43	3.09	3.23	3.62	3.80	4.20	4.45	3.10	3.21	4.04	3.99	4.69	4.70	3.45	3.35
196	W14X53	3.61	3.81	4.16	4.44	3.10	3.23	3.63	3.80	4.21	4.46	3.10	3.21	4.05	3.99	4.70	4.70	3.46	3.35
197	W14X48	3.61	3.80	4.17	4.44	3.10	3.23	3.62	3.80	4.21	4.46	3.10	3.21	4.05	3.99	4.70	4.69	3.46	3.36
198	W14X43	3.61	3.81	4.17	4.45	3.10	3.23	3.63	3.80	4.21	4.46	3.10	3.21	4.05	4.00	4.70	4.69	3.46	3.36
199	W14X38	3.61	3.81	4.17	4.45	3.11	3.24	3.63	3.80	4.21	4.47	3.11	3.21	4.06	3.99	4.71	4.71	3.46	3.36
200	W14X34	3.61	3.81	4.17	4.44	3.11	3.24	3.64	3.81	4.21	4.47	3.11	3.22	4.05	4.01	4.71	4.71	3.48	3.36
201	W14X30	3.62	3.82	4.18	4.45	3.11	3.24	3.64	3.81	4.21	4.46	3.11	3.23	4.05	4.00	4.69	4.71	3.46	3.37
202	W14X26	3.62	3.82	4.18	4.46	3.11	3.24	3.65	3.83	4.21	4.47	3.12	3.23	4.07	4.01	4.71	4.72	3.48	3.38
203	W14X22	3.62	3.82	4.18	4.46	3.12	3.26	3.65	3.82	4.21	4.48	3.12	3.24	4.07	4.02	4.74	4.72	3.48	3.36
204	W12X336	3.59	3.79	4.15	4.43	3.08	3.22	3.61	3.79	4.19	4.45	3.09	3.20	4.04	3.98	4.69	4.69	3.45	3.34
205	W12X305	3.59	3.79	4.15	4.43	3.08	3.22	3.61	3.79	4.19	4.45	3.09	3.20	4.04	3.98	4.69	4.69	3.45	3.34
206	W12X279	3.59	3.79	4.15	4.43	3.09	3.22	3.61	3.79	4.19	4.45	3.09	3.20	4.04	3.98	4.69	4.69	3.45	3.34
207	W12X252	3.59	3.80	4.16	4.43	3.09	3.22	3.61	3.79	4.20	4.45	3.09	3.20	4.04	3.98	4.69	4.69	3.45	3.34
208	W12X230	3.59	3.80	4.16	4.43	3.09	3.22	3.62	3.79	4.20	4.45	3.09	3.20	4.04	3.99	4.69	4.69	3.45	3.34
209	W12X210	3.60	3.80	4.16	4.43	3.09	3.22	3.61	3.79	4.20	4.45	3.09	3.20	4.04	3.98	4.69	4.69	3.45	3.34
210	W12X190	3.59	3.80	4.15	4.43	3.09	3.22	3.61	3.79	4.19	4.45	3.09	3.20	4.04	3.98	4.69	4.69	3.45	3.34
211	W12X170	3.60	3.79	4.16	4.43	3.09	3.22	3.62	3.79	4.20	4.45	3.09	3.20	4.04	3.98	4.69	4.69	3.45	3.34
212	W12X152	3.60	3.79	4.16	4.43	3.09	3.22	3.62	3.79	4.20	4.45	3.09	3.20	4.04	3.98	4.69	4.69	3.45	3.34
213	W12X136	3.60	3.80	4.16	4.43	3.09	3.22	3.62	3.79	4.20	4.45	3.09	3.20	4.04	3.99	4.69	4.69	3.45	3.35
214	W12X120	3.60	3.80	4.16	4.43	3.09	3.22	3.62	3.80	4.20	4.45	3.09	3.20	4.04	3.98	4.69	4.70	3.45	3.35
215	W12X106	3.60	3.80	4.16	4.43	3.09	3.22	3.62	3.79	4.20	4.45	3.09	3.20	4.04	3.98	4.69	4.69	3.45	3.35
216	W12X96	3.60	3.80	4.16	4.43	3.09	3.22	3.62	3.79	4.20	4.45	3.09	3.20	4.04	3.99	4.69	4.69	3.45	3.35
217	W12X87	3.60	3.79	4.16	4.43	3.09	3.22	3.61	3.79	4.19	4.45	3.09	3.20	4.04	3.99	4.69	4.70	3.45	3.34
218	W12X79	3.59	3.80	4.16	4.43	3.09	3.22	3.62	3.80	4.20	4.45	3.09	3.20	4.04	3.98	4.69	4.70	3.45	3.34
219	W12X72	3.60	3.80	4.16	4.43	3.09	3.22	3.62	3.79	4.20	4.45	3.09	3.20	4.04	3.99	4.70	4.69	3.45	3.35
220	W12X65	3.59	3.79	4.15	4.43	3.08	3.21	3.61	3.78	4.19	4.45	3.08	3.19	4.03	3.98	4.68	4.69	3.44	3.34
221	W12X58	3.60	3.80	4.16	4.44	3.09	3.22	3.62	3.80	4.20	4.45	3.09	3.20	4.04	3.99	4.69	4.69	3.46	3.35

222	W12X53	3.60	3.80	4.16	4.44	3.09	3.22	3.62	3.80	4.20	4.45	3.09	3.21	4.04	3.98	4.69	4.70	3.46	3.35
223	W12X50	3.60	3.81	4.16	4.44	3.10	3.22	3.62	3.80	4.20	4.46	3.10	3.21	4.04	3.99	4.69	4.70	3.46	3.35
224	W12X45	3.60	3.80	4.17	4.44	3.09	3.23	3.63	3.80	4.20	4.45	3.10	3.21	4.04	3.99	4.70	4.71	3.46	3.35
225	W12X40	3.61	3.80	4.17	4.43	3.09	3.23	3.62	3.80	4.20	4.45	3.10	3.21	4.05	4.00	4.70	4.70	3.47	3.35
226	W12X35	3.60	3.81	4.17	4.44	3.11	3.24	3.63	3.80	4.21	4.46	3.11	3.21	4.05	3.99	4.70	4.69	3.46	3.36
227	W12X30	3.61	3.81	4.16	4.44	3.10	3.24	3.63	3.80	4.21	4.46	3.10	3.22	4.06	4.01	4.70	4.69	3.46	3.36
228	W12X26	3.61	3.81	4.17	4.44	3.11	3.23	3.63	3.80	4.22	4.46	3.11	3.22	4.04	4.01	4.70	4.70	3.46	3.36
229	W12X22	3.63	3.84	4.19	4.45	3.12	3.25	3.63	3.81	4.23	4.48	3.12	3.24	4.06	4.00	4.70	4.71	3.48	3.37
230	W12X19	3.63	3.83	4.18	4.46	3.12	3.26	3.65	3.83	4.21	4.45	3.13	3.24	4.08	4.01	4.71	4.72	3.49	3.38
231	W12X16	3.64	3.83	4.17	4.48	3.13	3.25	3.65	3.84	4.23	4.48	3.14	3.24	4.06	4.02	4.74	4.72	3.50	3.37
232	W12X14	3.64	3.83	4.20	4.45	3.13	3.27	3.64	3.81	4.22	4.47	3.12	3.26	4.06	4.03	4.70	4.73	3.49	3.39
233	W10X112	3.59	3.80	4.16	4.43	3.09	3.22	3.61	3.79	4.19	4.45	3.09	3.20	4.04	3.98	4.69	4.69	3.45	3.34
234	W10X100	3.60	3.80	4.15	4.43	3.09	3.22	3.61	3.79	4.19	4.45	3.09	3.20	4.04	3.98	4.69	4.70	3.45	3.34
235	W10X88	3.59	3.80	4.15	4.43	3.09	3.22	3.61	3.79	4.20	4.45	3.09	3.20	4.04	3.98	4.69	4.69	3.45	3.34
236	W10X77	3.60	3.79	4.16	4.43	3.09	3.22	3.62	3.79	4.19	4.45	3.09	3.20	4.04	3.99	4.70	4.70	3.45	3.35
237	W10X68	3.59	3.79	4.16	4.43	3.09	3.22	3.62	3.79	4.20	4.45	3.09	3.20	4.04	3.98	4.69	4.69	3.45	3.35
238	W10X60	3.60	3.80	4.16	4.42	3.09	3.22	3.62	3.79	4.19	4.45	3.09	3.20	4.04	3.98	4.69	4.69	3.45	3.35
239	W10X54	3.59	3.79	4.15	4.43	3.09	3.22	3.61	3.79	4.19	4.45	3.09	3.20	4.04	3.99	4.69	4.70	3.45	3.35
240	W10X49	3.60	3.79	4.16	4.43	3.09	3.22	3.62	3.80	4.19	4.44	3.09	3.20	4.04	3.99	4.69	4.68	3.45	3.35
241	W10X45	3.59	3.79	4.16	4.44	3.09	3.23	3.62	3.80	4.20	4.45	3.09	3.20	4.04	3.99	4.69	4.70	3.46	3.35
242	W10X39	3.61	3.80	4.17	4.44	3.09	3.23	3.62	3.81	4.19	4.46	3.09	3.21	4.04	3.99	4.69	4.70	3.46	3.35
243	W10X33	3.59	3.81	4.15	4.44	3.10	3.23	3.62	3.79	4.20	4.45	3.09	3.21	4.06	3.99	4.71	4.70	3.45	3.35
244	W10X30	3.61	3.80	4.17	4.45	3.10	3.24	3.63	3.80	4.21	4.45	3.10	3.20	4.05	4.00	4.71	4.69	3.46	3.35
245	W10X26	3.61	3.80	4.16	4.43	3.10	3.23	3.63	3.81	4.20	4.45	3.10	3.21	4.05	4.00	4.71	4.70	3.47	3.35
246	W10X22	3.61	3.81	4.17	4.45	3.11	3.23	3.63	3.80	4.20	4.46	3.11	3.22	4.04	3.98	4.69	4.71	3.46	3.35
247	W10X19	3.62	3.83	4.18	4.45	3.11	3.24	3.63	3.81	4.21	4.48	3.11	3.22	4.06	3.99	4.68	4.73	3.47	3.39
248	W10X17	3.62	3.82	4.17	4.44	3.12	3.25	3.64	3.81	4.22	4.45	3.12	3.24	4.07	4.01	4.73	4.73	3.49	3.37
249	W10X15	3.62	3.83	4.20	4.47	3.11	3.27	3.66	3.82	4.21	4.47	3.14	3.23	4.05	4.00	4.72	4.71	3.47	3.38
250	W10X12	3.61	3.82	4.15	4.50	3.13	3.25	3.67	3.82	4.22	4.47	3.13	3.27	4.05	4.02	4.74	4.70	3.47	3.39
	MIN	**3.58**	**3.78**	**4.14**	**4.42**	**3.07**	**3.21**	**3.60**	**3.78**	**4.19**	**4.44**	**3.07**	**3.18**	**4.03**	**3.98**	**4.68**	**4.68**	**3.44**	**3.33**
	MAX	**3.64**	**3.84**	**4.20**	**4.50**	**3.13**	**3.27**	**3.67**	**3.84**	**4.23**	**4.48**	**3.14**	**3.27**	**4.08**	**4.03**	**4.74**	**4.73**	**3.50**	**3.39**
	AVE	**3.61**	**3.81**	**4.17**	**4.44**	**3.10**	**3.24**	**3.63**	**3.81**	**4.21**	**4.46**	**3.11**	**3.22**	**4.05**	**4.00**	**4.70**	**4.70**	**3.47**	**3.36**

Table C- 9. Reliability Indices for Noncomposite Rolled I-shaped Girdes for ADTT 10'000 and L=30, 60ft.

		L=30 ft						**L=60 ft**					
	Φ	**1.00**		**0.95**		**1.05**		**1.00**		**0.95**		**1.05**	
#	**Shape \ D/(D+L)**	**0.25**	**0.40**	**0.25**	**0.40**	**0.25**	**0.40**	**0.35**	**0.55**	**0.35**	**0.55**	**0.35**	**0.55**
1	W44X335	3.58	3.77	4.07	4.32	3.13	3.27	3.43	3.71	3.94	4.31	2.96	3.16
2	W44X290	3.58	3.77	4.07	4.32	3.13	3.27	3.42	3.71	3.94	4.31	2.96	3.16
3	W44X262	3.58	3.77	4.07	4.32	3.13	3.27	3.42	3.71	3.94	4.31	2.96	3.16
4	W44X230	3.58	3.77	4.07	4.32	3.13	3.27	3.42	3.71	3.94	4.31	2.96	3.16
5	W40X593	3.57	3.76	4.06	4.31	3.12	3.26	3.42	3.70	3.93	4.30	2.95	3.15
6	W40X503	3.57	3.76	4.06	4.31	3.12	3.26	3.42	3.70	3.93	4.31	2.95	3.16
7	W40X431	3.57	3.76	4.07	4.31	3.12	3.27	3.42	3.70	3.93	4.31	2.95	3.16
8	W40X397	3.57	3.76	4.07	4.31	3.12	3.27	3.42	3.70	3.93	4.31	2.95	3.16

9	W40X372	3.57	3.76	4.07	4.31	3.12	3.27	3.42	3.70	3.93	4.31	2.95	3.16
10	W40X362	3.57	3.76	4.07	4.31	3.12	3.27	3.42	3.70	3.93	4.31	2.95	3.16
11	W40X324	3.57	3.76	4.07	4.31	3.12	3.27	3.42	3.70	3.93	4.31	2.95	3.16
12	W40X297	3.57	3.77	4.07	4.32	3.12	3.27	3.42	3.70	3.93	4.31	2.95	3.16
13	W40X277	3.57	3.76	4.06	4.31	3.12	3.26	3.42	3.70	3.93	4.31	2.95	3.16
14	W40X249	3.57	3.76	4.07	4.31	3.12	3.27	3.42	3.70	3.93	4.31	2.95	3.16
15	W40X215	3.57	3.76	4.07	4.31	3.12	3.27	3.42	3.70	3.93	4.31	2.95	3.16
16	W40X199	3.58	3.77	4.07	4.32	3.13	3.27	3.42	3.71	3.94	4.31	2.96	3.16
17	W40X392	3.58	3.77	4.07	4.32	3.13	3.27	3.43	3.71	3.94	4.31	2.96	3.17
18	W40X331	3.58	3.77	4.07	4.32	3.13	3.27	3.43	3.71	3.94	4.31	2.96	3.17
19	W40X327	3.58	3.77	4.07	4.32	3.13	3.27	3.43	3.71	3.94	4.31	2.96	3.16
20	W40X294	3.58	3.77	4.07	4.32	3.13	3.27	3.43	3.71	3.94	4.31	2.96	3.17
21	W40X278	3.58	3.77	4.07	4.32	3.13	3.28	3.43	3.71	3.94	4.31	2.96	3.17
22	W40X264	3.58	3.77	4.07	4.32	3.13	3.28	3.43	3.71	3.94	4.31	2.96	3.17
23	W40X235	3.58	3.77	4.07	4.32	3.13	3.27	3.42	3.71	3.94	4.31	2.96	3.16
24	W40X211	3.58	3.77	4.07	4.32	3.13	3.27	3.43	3.71	3.94	4.31	2.96	3.17
25	W40X183	3.58	3.77	4.07	4.32	3.13	3.27	3.43	3.71	3.94	4.31	2.96	3.17
26	W40X167	3.58	3.78	4.08	4.32	3.14	3.28	3.43	3.71	3.94	4.32	2.97	3.17
27	W40X149	3.59	3.78	4.08	4.33	3.14	3.28	3.44	3.72	3.95	4.32	2.97	3.18
28	W36X652	3.57	3.76	4.06	4.31	3.12	3.26	3.41	3.70	3.93	4.30	2.95	3.15
29	W36X529	3.57	3.76	4.06	4.31	3.12	3.26	3.41	3.70	3.93	4.30	2.95	3.15
30	W36X487	3.57	3.76	4.06	4.31	3.12	3.26	3.42	3.70	3.93	4.30	2.95	3.15
31	W36X441	3.57	3.76	4.06	4.31	3.12	3.26	3.41	3.70	3.93	4.30	2.95	3.15
32	W36X395	3.57	3.76	4.06	4.31	3.12	3.26	3.42	3.70	3.93	4.30	2.95	3.15
33	W36X361	3.57	3.76	4.06	4.31	3.12	3.26	3.42	3.70	3.93	4.30	2.95	3.15
34	W36X330	3.57	3.76	4.06	4.31	3.12	3.26	3.42	3.70	3.93	4.30	2.95	3.15
35	W36X302	3.57	3.76	4.06	4.31	3.12	3.26	3.42	3.70	3.93	4.30	2.95	3.16
36	W36X282	3.57	3.76	4.06	4.31	3.12	3.26	3.42	3.70	3.93	4.31	2.95	3.16
37	W36X262	3.57	3.76	4.06	4.31	3.12	3.26	3.42	3.70	3.93	4.30	2.95	3.16
38	W36X247	3.57	3.76	4.07	4.31	3.12	3.27	3.42	3.70	3.93	4.31	2.95	3.16
39	W36X231	3.57	3.76	4.07	4.31	3.12	3.27	3.42	3.70	3.93	4.31	2.95	3.16
40	W36X256	3.58	3.77	4.07	4.32	3.13	3.27	3.42	3.71	3.94	4.31	2.96	3.16
41	W36X232	3.58	3.77	4.07	4.32	3.13	3.27	3.42	3.71	3.94	4.31	2.96	3.16
42	W36X210	3.58	3.77	4.07	4.32	3.13	3.28	3.43	3.71	3.94	4.31	2.96	3.17
43	W36X194	3.58	3.77	4.07	4.32	3.13	3.27	3.43	3.71	3.94	4.31	2.96	3.17
44	W36X182	3.58	3.77	4.07	4.32	3.13	3.28	3.43	3.71	3.94	4.31	2.96	3.17
45	W36X170	3.58	3.77	4.07	4.32	3.13	3.28	3.43	3.71	3.94	4.32	2.96	3.17
46	W36X160	3.58	3.77	4.07	4.32	3.13	3.28	3.43	3.71	3.94	4.31	2.96	3.17
47	W36X150	3.58	3.78	4.08	4.32	3.14	3.28	3.43	3.72	3.94	4.32	2.97	3.17
48	W36X135	3.59	3.78	4.08	4.33	3.14	3.28	3.44	3.72	3.95	4.32	2.97	3.18
49	W33X387	3.57	3.76	4.06	4.31	3.12	3.26	3.42	3.70	3.93	4.30	2.95	3.15
50	W33X354	3.57	3.76	4.06	4.31	3.12	3.26	3.41	3.70	3.93	4.30	2.95	3.15
51	W33X318	3.57	3.76	4.06	4.31	3.12	3.26	3.42	3.70	3.93	4.30	2.95	3.15
52	W33X291	3.57	3.76	4.06	4.31	3.12	3.26	3.42	3.70	3.93	4.30	2.95	3.15
53	W33X263	3.57	3.76	4.06	4.31	3.12	3.26	3.42	3.70	3.93	4.30	2.95	3.15
54	W33X241	3.57	3.76	4.06	4.31	3.12	3.26	3.42	3.70	3.93	4.30	2.95	3.16
55	W33X221	3.57	3.76	4.07	4.31	3.12	3.27	3.42	3.70	3.93	4.31	2.95	3.16
56	W33X201	3.57	3.76	4.07	4.31	3.12	3.27	3.42	3.70	3.93	4.31	2.95	3.16

57	W33X169	3.58	3.77	4.07	4.32	3.13	3.27	3.43	3.71	3.94	4.31	2.96	3.16
58	W33X152	3.58	3.77	4.07	4.32	3.13	3.27	3.43	3.71	3.94	4.31	2.96	3.16
59	W33X141	3.58	3.77	4.07	4.32	3.13	3.27	3.43	3.71	3.94	4.31	2.96	3.17
60	W33X130	3.58	3.77	4.08	4.32	3.14	3.28	3.43	3.71	3.94	4.32	2.97	3.17
61	W33X118	3.59	3.78	4.08	4.33	3.14	3.28	3.43	3.72	3.94	4.32	2.97	3.17
62	W30X391	3.57	3.76	4.06	4.31	3.12	3.26	3.41	3.70	3.93	4.30	2.95	3.15
63	W30X357	3.57	3.76	4.06	4.31	3.12	3.26	3.41	3.70	3.93	4.30	2.95	3.15
64	W30X326	3.57	3.76	4.06	4.31	3.12	3.26	3.41	3.70	3.93	4.30	2.95	3.15
65	W30X292	3.57	3.76	4.06	4.31	3.12	3.26	3.41	3.70	3.93	4.30	2.95	3.15
66	W30X261	3.57	3.76	4.06	4.31	3.12	3.26	3.41	3.70	3.93	4.30	2.95	3.15
67	W30X235	3.57	3.76	4.06	4.31	3.12	3.26	3.41	3.70	3.93	4.30	2.95	3.15
68	W30X211	3.57	3.76	4.06	4.31	3.12	3.26	3.42	3.70	3.93	4.30	2.95	3.15
69	W30X191	3.57	3.76	4.06	4.31	3.12	3.26	3.42	3.70	3.93	4.30	2.95	3.15
70	W30X173	3.57	3.76	4.06	4.31	3.12	3.26	3.42	3.70	3.93	4.30	2.95	3.16
71	W30X148	3.58	3.77	4.07	4.32	3.13	3.27	3.42	3.71	3.94	4.31	2.96	3.16
72	W30X132	3.58	3.77	4.07	4.32	3.13	3.27	3.43	3.71	3.94	4.31	2.96	3.17
73	W30X124	3.58	3.77	4.07	4.32	3.13	3.27	3.43	3.71	3.94	4.31	2.96	3.17
74	W30X116	3.58	3.78	4.08	4.32	3.14	3.28	3.43	3.71	3.94	4.32	2.97	3.17
75	W30X108	3.58	3.78	4.08	4.33	3.14	3.28	3.43	3.72	3.94	4.32	2.97	3.17
76	W30X99	3.59	3.78	4.08	4.33	3.14	3.28	3.43	3.72	3.95	4.32	2.97	3.17
77	W30X90	3.59	3.78	4.08	4.33	3.14	3.28	3.43	3.72	3.95	4.32	2.97	3.17
78	W27X539	3.56	3.75	4.06	4.31	3.11	3.26	3.41	3.69	3.92	4.30	2.94	3.15
79	W27X368	3.56	3.76	4.06	4.31	3.11	3.26	3.41	3.70	3.93	4.30	2.94	3.15
80	W27X336	3.57	3.76	4.06	4.31	3.12	3.26	3.41	3.70	3.93	4.30	2.95	3.15
81	W27X307	3.56	3.76	4.06	4.31	3.11	3.26	3.41	3.70	3.92	4.30	2.94	3.15
82	W27X281	3.57	3.76	4.06	4.31	3.12	3.26	3.41	3.70	3.93	4.30	2.95	3.15
83	W27X258	3.57	3.76	4.06	4.31	3.12	3.26	3.41	3.70	3.93	4.30	2.95	3.15
84	W27X235	3.57	3.76	4.06	4.31	3.12	3.26	3.41	3.70	3.93	4.30	2.95	3.15
85	W27X217	3.57	3.76	4.06	4.31	3.12	3.26	3.41	3.70	3.93	4.30	2.95	3.15
86	W27X194	3.57	3.76	4.06	4.31	3.12	3.26	3.41	3.70	3.93	4.30	2.95	3.15
87	W27X178	3.57	3.76	4.06	4.31	3.12	3.26	3.42	3.70	3.93	4.30	2.95	3.15
88	W27X161	3.57	3.76	4.06	4.31	3.12	3.26	3.42	3.70	3.93	4.30	2.95	3.15
89	W27X146	3.57	3.76	4.07	4.31	3.12	3.26	3.42	3.70	3.93	4.30	2.95	3.16
90	W27X129	3.58	3.77	4.07	4.32	3.13	3.27	3.42	3.71	3.94	4.31	2.96	3.16
91	W27X114	3.58	3.77	4.07	4.32	3.13	3.27	3.42	3.71	3.94	4.31	2.96	3.16
92	W27X102	3.58	3.77	4.07	4.32	3.13	3.27	3.43	3.71	3.94	4.31	2.96	3.16
93	W27X94	3.58	3.77	4.07	4.32	3.13	3.27	3.43	3.71	3.94	4.31	2.96	3.17
94	W27X84	3.58	3.77	4.07	4.32	3.14	3.28	3.43	3.71	3.94	4.32	2.97	3.17
95	W24X370	3.56	3.76	4.06	4.31	3.11	3.26	3.41	3.70	3.92	4.30	2.94	3.15
96	W24X335	3.56	3.76	4.06	4.31	3.11	3.26	3.41	3.69	3.92	4.30	2.94	3.15
97	W24X306	3.56	3.76	4.06	4.31	3.11	3.26	3.41	3.70	3.92	4.30	2.94	3.15
98	W24X279	3.56	3.76	4.06	4.31	3.11	3.26	3.41	3.70	3.93	4.30	2.94	3.15
99	W24X250	3.56	3.76	4.06	4.31	3.11	3.26	3.41	3.70	3.92	4.30	2.94	3.15
100	W24X229	3.56	3.76	4.06	4.31	3.12	3.26	3.41	3.70	3.93	4.30	2.94	3.15
101	W24X207	3.57	3.76	4.06	4.31	3.12	3.26	3.41	3.70	3.93	4.30	2.95	3.15
102	W24X192	3.57	3.76	4.06	4.31	3.12	3.26	3.41	3.70	3.93	4.30	2.95	3.15
103	W24X176	3.57	3.76	4.06	4.31	3.12	3.26	3.41	3.70	3.93	4.30	2.95	3.15
104	W24X162	3.57	3.76	4.06	4.31	3.12	3.26	3.41	3.70	3.93	4.30	2.95	3.15

105	W24X146	3.57	3.76	4.06	4.31	3.12	3.26	3.41	3.70	3.93	4.30	2.95	3.15
106	W24X131	3.57	3.76	4.06	4.31	3.12	3.26	3.42	3.70	3.93	4.30	2.95	3.15
107	W24X117	3.57	3.76	4.07	4.31	3.12	3.26	3.42	3.70	3.93	4.31	2.95	3.16
108	W24X104	3.57	3.76	4.07	4.31	3.12	3.26	3.42	3.70	3.93	4.31	2.95	3.16
109	W24X103	3.57	3.77	4.07	4.32	3.13	3.27	3.42	3.71	3.94	4.31	2.96	3.16
110	W24X94	3.58	3.77	4.07	4.32	3.13	3.27	3.42	3.71	3.94	4.31	2.96	3.16
111	W24X84	3.58	3.77	4.07	4.32	3.13	3.27	3.42	3.71	3.94	4.31	2.96	3.16
112	W24X76	3.58	3.77	4.07	4.32	3.13	3.27	3.43	3.71	3.94	4.31	2.96	3.17
113	W24X68	3.58	3.77	4.08	4.32	3.13	3.28	3.43	3.71	3.94	4.31	2.96	3.17
114	W24X62	3.59	3.78	4.08	4.33	3.14	3.29	3.44	3.72	3.95	4.32	2.98	3.18
115	W24X55	3.59	3.78	4.08	4.33	3.15	3.29	3.44	3.72	3.95	4.33	2.98	3.18
116	W21X201	3.56	3.76	4.06	4.31	3.11	3.26	3.41	3.69	3.92	4.30	2.94	3.15
117	W21X182	3.56	3.76	4.06	4.31	3.11	3.26	3.41	3.70	3.92	4.30	2.94	3.15
118	W21X166	3.56	3.76	4.06	4.31	3.11	3.26	3.41	3.70	3.92	4.30	2.94	3.15
119	W21X147	3.57	3.76	4.06	4.31	3.12	3.26	3.41	3.70	3.93	4.30	2.95	3.15
120	W21X132	3.57	3.76	4.06	4.31	3.12	3.26	3.41	3.70	3.93	4.30	2.95	3.15
121	W21X122	3.57	3.76	4.06	4.31	3.12	3.26	3.41	3.70	3.93	4.30	2.95	3.15
122	W21X111	3.57	3.76	4.06	4.31	3.12	3.26	3.41	3.70	3.93	4.30	2.95	3.15
123	W21X101	3.57	3.76	4.06	4.31	3.12	3.26	3.41	3.70	3.93	4.30	2.95	3.15
124	W21X93	3.58	3.77	4.07	4.32	3.13	3.27	3.42	3.71	3.94	4.31	2.96	3.16
125	W21X83	3.58	3.77	4.07	4.32	3.13	3.27	3.42	3.71	3.94	4.31	2.96	3.16
126	W21X73	3.58	3.77	4.07	4.32	3.13	3.27	3.42	3.71	3.94	4.31	2.96	3.16
127	W21X68	3.58	3.77	4.07	4.32	3.13	3.27	3.42	3.71	3.94	4.31	2.96	3.16
128	W21X62	3.58	3.77	4.07	4.32	3.13	3.27	3.43	3.71	3.94	4.31	2.96	3.17
129	W21X55	3.58	3.77	4.07	4.33	3.13	3.28	3.43	3.71	3.94	4.31	2.96	3.17
130	W21X48*	3.58	3.77	4.07	4.32	3.13	3.27	3.43	3.71	3.94	4.31	2.96	3.17
131	W21X57	3.58	3.77	4.07	4.32	3.13	3.27	3.43	3.71	3.94	4.31	2.96	3.17
132	W21X50	3.59	3.78	4.08	4.33	3.14	3.28	3.43	3.72	3.95	4.32	2.97	3.18
133	W21X44	3.59	3.78	4.08	4.32	3.14	3.28	3.44	3.72	3.95	4.32	2.98	3.18
134	W18X311	3.56	3.75	4.05	4.30	3.11	3.25	3.41	3.69	3.92	4.30	2.94	3.14
135	W18X283	3.56	3.75	4.06	4.31	3.11	3.25	3.41	3.69	3.92	4.30	2.94	3.15
136	W18X258	3.56	3.75	4.06	4.30	3.11	3.25	3.41	3.69	3.92	4.30	2.94	3.14
137	W18X234	3.56	3.75	4.06	4.31	3.11	3.25	3.41	3.69	3.92	4.30	2.94	3.15
138	W18X211	3.56	3.75	4.06	4.30	3.11	3.25	3.41	3.69	3.92	4.30	2.94	3.14
139	W18X192	3.56	3.75	4.06	4.30	3.11	3.25	3.41	3.69	3.92	4.30	2.94	3.14
140	W18X175	3.56	3.75	4.06	4.31	3.11	3.25	3.41	3.69	3.92	4.30	2.94	3.15
141	W18X158	3.56	3.76	4.06	4.31	3.11	3.26	3.41	3.69	3.92	4.30	2.94	3.15
142	W18X143	3.56	3.76	4.06	4.31	3.11	3.25	3.41	3.69	3.92	4.30	2.94	3.15
143	W18X130	3.56	3.75	4.06	4.31	3.11	3.26	3.41	3.69	3.92	4.30	2.94	3.15
144	W18X119	3.57	3.76	4.06	4.31	3.12	3.26	3.41	3.70	3.93	4.30	2.95	3.15
145	W18X106	3.57	3.76	4.06	4.31	3.11	3.26	3.41	3.70	3.92	4.30	2.94	3.15
146	W18X97	3.56	3.76	4.06	4.31	3.12	3.26	3.41	3.70	3.92	4.30	2.95	3.15
147	W18X86	3.57	3.76	4.06	4.31	3.12	3.26	3.41	3.70	3.93	4.30	2.95	3.15
148	W18X76	3.57	3.76	4.06	4.31	3.12	3.26	3.41	3.70	3.93	4.30	2.95	3.15
149	W18X71	3.57	3.77	4.07	4.32	3.12	3.27	3.42	3.71	3.93	4.31	2.95	3.16
150	W18X65	3.57	3.77	4.07	4.32	3.13	3.27	3.42	3.71	3.93	4.31	2.96	3.16
151	W18X60	3.57	3.76	4.07	4.31	3.12	3.27	3.42	3.70	3.93	4.31	2.95	3.16
152	W18X55	3.58	3.77	4.07	4.32	3.13	3.27	3.42	3.70	3.93	4.31	2.96	3.16

153	W18X50	3.57	3.77	4.07	4.32	3.13	3.27	3.42	3.70	3.93	4.30	2.96	3.16
154	W18X46	3.58	3.77	4.07	4.32	3.13	3.28	3.43	3.71	3.93	4.31	2.96	3.16
155	W18X40	3.58	3.78	4.08	4.32	3.13	3.27	3.43	3.71	3.94	4.31	2.96	3.17
156	W18X35	3.58	3.78	4.08	4.33	3.14	3.28	3.43	3.71	3.94	4.32	2.97	3.17
157	W16X100	3.56	3.76	4.06	4.31	3.11	3.26	3.41	3.70	3.92	4.30	2.94	3.15
158	W16X89	3.56	3.76	4.06	4.31	3.11	3.26	3.41	3.70	3.93	4.30	2.94	3.15
159	W16X77	3.56	3.76	4.06	4.31	3.11	3.26	3.41	3.70	3.92	4.30	2.94	3.15
160	W16X67	3.56	3.75	4.06	4.30	3.11	3.25	3.41	3.70	3.93	4.30	2.94	3.15
161	W16X57	3.57	3.77	4.07	4.32	3.12	3.27	3.42	3.70	3.93	4.31	2.95	3.16
162	W16X50	3.57	3.76	4.07	4.31	3.13	3.27	3.42	3.70	3.93	4.31	2.95	3.16
163	W16X45	3.57	3.77	4.07	4.31	3.12	3.27	3.42	3.71	3.93	4.31	2.95	3.16
164	W16X40	3.58	3.77	4.06	4.32	3.12	3.27	3.42	3.71	3.93	4.31	2.95	3.16
165	W16X36	3.58	3.77	4.07	4.32	3.13	3.27	3.43	3.71	3.94	4.31	2.96	3.16
166	W16X31	3.58	3.77	4.08	4.32	3.13	3.28	3.42	3.72	3.94	4.32	2.96	3.17
167	W16X26	3.58	3.78	4.07	4.33	3.14	3.28	3.43	3.71	3.95	4.31	2.97	3.17
168	W14X730	3.55	3.74	4.05	4.30	3.10	3.24	3.40	3.68	3.91	4.29	2.93	3.13
169	W14X665	3.55	3.74	4.05	4.30	3.10	3.24	3.40	3.68	3.91	4.29	2.93	3.13
170	W14X605	3.55	3.74	4.05	4.30	3.10	3.24	3.40	3.68	3.91	4.29	2.93	3.13
171	W14X550	3.55	3.74	4.05	4.30	3.10	3.24	3.40	3.68	3.91	4.29	2.93	3.13
172	W14X500	3.55	3.74	4.05	4.30	3.10	3.24	3.40	3.68	3.91	4.29	2.93	3.13
173	W14X455	3.55	3.74	4.05	4.30	3.10	3.24	3.40	3.68	3.91	4.29	2.93	3.13
174	W14X426	3.55	3.74	4.05	4.30	3.10	3.24	3.40	3.68	3.91	4.29	2.93	3.13
175	W14X398	3.55	3.74	4.05	4.30	3.10	3.24	3.40	3.68	3.91	4.29	2.93	3.13
176	W14X370	3.55	3.75	4.05	4.30	3.10	3.24	3.40	3.68	3.91	4.29	2.93	3.13
177	W14X342	3.55	3.74	4.05	4.30	3.10	3.24	3.40	3.68	3.91	4.29	2.93	3.13
178	W14X311	3.55	3.75	4.05	4.30	3.10	3.24	3.40	3.69	3.91	4.29	2.93	3.14
179	W14X283	3.55	3.75	4.05	4.30	3.10	3.24	3.40	3.68	3.91	4.29	2.93	3.13
180	W14X257	3.55	3.75	4.05	4.30	3.10	3.25	3.40	3.68	3.91	4.29	2.93	3.13
181	W14X233	3.55	3.75	4.05	4.30	3.10	3.24	3.40	3.68	3.91	4.29	2.93	3.14
182	W14X211	3.55	3.75	4.05	4.30	3.10	3.25	3.40	3.69	3.92	4.29	2.93	3.14
183	W14X193	3.55	3.75	4.05	4.30	3.10	3.25	3.40	3.69	3.92	4.29	2.93	3.14
184	W14X176	3.55	3.75	4.05	4.30	3.10	3.24	3.40	3.69	3.91	4.29	2.93	3.14
185	W14X159	3.55	3.75	4.05	4.30	3.10	3.25	3.40	3.69	3.92	4.29	2.93	3.14
186	W14X145	3.55	3.75	4.05	4.30	3.10	3.25	3.40	3.69	3.92	4.29	2.93	3.14
187	W14X132	3.56	3.75	4.05	4.30	3.10	3.25	3.40	3.69	3.92	4.29	2.93	3.14
188	W14X120	3.56	3.75	4.05	4.30	3.10	3.25	3.40	3.69	3.92	4.29	2.93	3.14
189	W14X109	3.55	3.75	4.05	4.30	3.10	3.25	3.40	3.69	3.92	4.29	2.93	3.14
190	W14X99	3.55	3.75	4.05	4.30	3.10	3.24	3.40	3.69	3.91	4.29	2.93	3.14
191	W14X90	3.54	3.73	4.04	4.29	3.09	3.23	3.39	3.67	3.90	4.28	2.92	3.12
192	W14X82	3.56	3.75	4.06	4.31	3.11	3.25	3.41	3.69	3.92	4.30	2.94	3.14
193	W14X74	3.56	3.75	4.05	4.30	3.11	3.25	3.41	3.69	3.92	4.29	2.94	3.14
194	W14X68	3.56	3.75	4.06	4.30	3.11	3.25	3.41	3.69	3.92	4.30	2.94	3.14
195	W14X61	3.56	3.75	4.06	4.31	3.11	3.25	3.40	3.69	3.92	4.30	2.94	3.14
196	W14X53	3.56	3.75	4.06	4.31	3.11	3.25	3.41	3.69	3.93	4.30	2.94	3.15
197	W14X48	3.57	3.76	4.06	4.31	3.11	3.26	3.41	3.70	3.93	4.30	2.94	3.15
198	W14X43	3.56	3.76	4.06	4.31	3.11	3.25	3.41	3.70	3.92	4.29	2.94	3.15
199	W14X38	3.57	3.76	4.06	4.32	3.12	3.26	3.41	3.70	3.93	4.31	2.95	3.16
200	W14X34	3.57	3.77	4.07	4.32	3.12	3.26	3.42	3.70	3.93	4.31	2.95	3.16

201	W14X30	3.57	3.76	4.07	4.32	3.13	3.27	3.42	3.71	3.93	4.30	2.95	3.16
202	W14X26	3.58	3.77	4.07	4.31	3.13	3.27	3.43	3.72	3.93	4.31	2.96	3.16
203	W14X22	3.58	3.78	4.08	4.33	3.13	3.27	3.44	3.70	3.94	4.30	2.96	3.17
204	W12X336	3.55	3.75	4.05	4.30	3.10	3.24	3.40	3.68	3.91	4.29	2.93	3.13
205	W12X305	3.55	3.75	4.05	4.30	3.10	3.24	3.40	3.68	3.91	4.29	2.93	3.13
206	W12X279	3.55	3.74	4.05	4.30	3.10	3.24	3.40	3.68	3.91	4.29	2.93	3.13
207	W12X252	3.55	3.75	4.05	4.30	3.10	3.25	3.40	3.68	3.91	4.29	2.93	3.14
208	W12X230	3.55	3.75	4.05	4.30	3.10	3.25	3.40	3.69	3.92	4.29	2.93	3.14
209	W12X210	3.55	3.75	4.05	4.30	3.10	3.25	3.40	3.69	3.92	4.29	2.93	3.14
210	W12X190	3.55	3.75	4.05	4.30	3.10	3.25	3.40	3.68	3.92	4.29	2.93	3.14
211	W12X170	3.55	3.75	4.05	4.30	3.10	3.25	3.40	3.69	3.92	4.29	2.93	3.14
212	W12X152	3.55	3.75	4.05	4.30	3.10	3.25	3.40	3.69	3.92	4.29	2.93	3.14
213	W12X136	3.55	3.75	4.05	4.30	3.10	3.25	3.40	3.69	3.92	4.29	2.93	3.14
214	W12X120	3.55	3.75	4.05	4.30	3.10	3.25	3.40	3.69	3.91	4.29	2.93	3.14
215	W12X106	3.55	3.75	4.05	4.30	3.10	3.25	3.40	3.69	3.92	4.29	2.93	3.14
216	W12X96	3.56	3.75	4.05	4.30	3.11	3.25	3.40	3.69	3.92	4.29	2.93	3.14
217	W12X87	3.56	3.75	4.05	4.30	3.10	3.25	3.40	3.69	3.92	4.29	2.93	3.14
218	W12X79	3.55	3.75	4.05	4.30	3.11	3.25	3.40	3.69	3.92	4.29	2.93	3.14
219	W12X72	3.56	3.75	4.05	4.30	3.11	3.25	3.40	3.68	3.91	4.30	2.93	3.14
220	W12X65	3.55	3.74	4.04	4.29	3.09	3.24	3.39	3.68	3.91	4.29	2.92	3.13
221	W12X58	3.56	3.75	4.05	4.30	3.11	3.25	3.40	3.69	3.92	4.30	2.94	3.14
222	W12X53	3.56	3.75	4.05	4.30	3.11	3.25	3.41	3.69	3.92	4.30	2.94	3.14
223	W12X50	3.57	3.76	4.05	4.31	3.11	3.25	3.40	3.69	3.92	4.29	2.94	3.14
224	W12X45	3.56	3.75	4.06	4.31	3.11	3.25	3.41	3.69	3.92	4.30	2.94	3.14
225	W12X40	3.56	3.75	4.06	4.30	3.11	3.25	3.41	3.70	3.92	4.30	2.94	3.15
226	W12X35	3.57	3.76	4.06	4.31	3.12	3.26	3.41	3.70	3.93	4.30	2.95	3.16
227	W12X30	3.56	3.76	4.06	4.31	3.11	3.25	3.41	3.70	3.92	4.31	2.94	3.15
228	W12X26	3.56	3.76	4.06	4.31	3.12	3.26	3.42	3.69	3.93	4.31	2.94	3.15
229	W12X22	3.59	3.77	4.08	4.33	3.13	3.27	3.42	3.71	3.95	4.32	2.96	3.18
230	W12X19	3.58	3.76	4.08	4.32	3.13	3.29	3.43	3.72	3.93	4.32	2.97	3.17
231	W12X16	3.59	3.79	4.07	4.32	3.15	3.29	3.44	3.71	3.93	4.32	2.99	3.18
232	W12X14	3.60	3.78	4.07	4.34	3.15	3.27	3.44	3.72	3.95	4.32	2.98	3.18
233	W10X112	3.55	3.75	4.05	4.30	3.10	3.25	3.40	3.68	3.92	4.29	2.93	3.14
234	W10X100	3.55	3.74	4.05	4.30	3.10	3.25	3.40	3.68	3.91	4.29	2.93	3.14
235	W10X88	3.55	3.75	4.05	4.30	3.10	3.25	3.40	3.69	3.92	4.29	2.93	3.14
236	W10X77	3.56	3.75	4.05	4.30	3.10	3.25	3.40	3.69	3.91	4.29	2.93	3.14
237	W10X68	3.55	3.75	4.05	4.30	3.10	3.25	3.40	3.68	3.92	4.29	2.93	3.14
238	W10X60	3.55	3.75	4.05	4.30	3.11	3.25	3.40	3.68	3.92	4.29	2.93	3.14
239	W10X54	3.55	3.75	4.05	4.30	3.11	3.25	3.40	3.69	3.91	4.29	2.93	3.14
240	W10X49	3.55	3.75	4.05	4.30	3.10	3.24	3.39	3.69	3.91	4.29	2.93	3.13
241	W10X45	3.56	3.76	4.05	4.31	3.11	3.25	3.41	3.68	3.91	4.29	2.93	3.14
242	W10X39	3.56	3.75	4.05	4.31	3.11	3.25	3.40	3.69	3.93	4.29	2.94	3.14
243	W10X33	3.57	3.76	4.06	4.31	3.11	3.25	3.40	3.69	3.92	4.30	2.94	3.14
244	W10X30	3.56	3.75	4.06	4.30	3.11	3.26	3.42	3.70	3.92	4.30	2.95	3.15
245	W10X26	3.57	3.77	4.07	4.32	3.12	3.26	3.41	3.70	3.92	4.29	2.95	3.16
246	W10X22	3.57	3.75	4.06	4.30	3.13	3.26	3.42	3.71	3.94	4.32	2.95	3.16
247	W10X19	3.59	3.76	4.05	4.31	3.13	3.28	3.42	3.71	3.93	4.32	2.96	3.16
248	W10X17	3.58	3.77	4.07	4.32	3.13	3.28	3.42	3.72	3.94	4.29	2.96	3.16

249	W10X15	3.58	3.79	4.07	4.34	3.12	3.29	3.43	3.72	3.96	4.31	2.96	3.16
250	W10X12	3.59	3.77	4.05	4.33	3.12	3.27	3.43	3.72	3.94	4.33	2.97	3.18
	MIN	**3.54**	**3.73**	**4.04**	**4.29**	**3.09**	**3.23**	**3.39**	**3.67**	**3.90**	**4.28**	**2.92**	**3.12**
	MAX	**3.60**	**3.79**	**4.08**	**4.34**	**3.15**	**3.29**	**3.44**	**3.72**	**3.96**	**4.33**	**2.99**	**3.18**
	AVE	**3.57**	**3.76**	**4.06**	**4.31**	**3.12**	**3.26**	**3.41**	**3.70**	**3.93**	**4.30**	**2.95**	**3.15**

Table C- 10. Reliability Indices for Noncomposite Rolled I-shaped Girdes for ADTT 10'000 and L=90, 120, 200ft.

		L=90 ft						**L=120 ft**						**L=200 ft**					
	Φ	**1.00**		**0.95**		**1.05**		**1.00**		**0.95**		**1.05**		**1.00**		**0.95**		**1.05**	
#	**Shape \ D/(D+L)**	**0.45**	**0.60**	**0.45**	**0.60**	**0.45**	**0.60**	**0.50**	**0.65**	**0.50**	**0.65**	**0.50**	**0.65**	**0.60**	**0.75**	**0.60**	**0.75**	**0.60**	**0.75**
1	W44X335	3.51	3.72	4.07	4.35	3.01	3.16	3.59	3.77	4.16	4.42	3.07	3.19	4.06	4.01	4.71	4.71	3.48	3.37
2	W44X290	3.51	3.72	4.06	4.35	3.01	3.16	3.59	3.77	4.16	4.42	3.07	3.18	4.06	4.00	4.71	4.71	3.47	3.37
3	W44X262	3.51	3.72	4.06	4.35	3.01	3.16	3.59	3.77	4.16	4.42	3.07	3.18	4.06	4.00	4.71	4.71	3.47	3.37
4	W44X230	3.51	3.72	4.06	4.35	3.01	3.16	3.59	3.77	4.16	4.42	3.07	3.18	4.06	4.01	4.71	4.71	3.47	3.37
5	W40X593	3.51	3.72	4.06	4.34	3.01	3.15	3.58	3.76	4.15	4.41	3.06	3.18	4.05	4.00	4.70	4.70	3.47	3.36
6	W40X503	3.51	3.72	4.06	4.34	3.01	3.15	3.58	3.77	4.16	4.42	3.06	3.18	4.06	4.00	4.70	4.71	3.47	3.36
7	W40X431	3.51	3.72	4.06	4.34	3.01	3.15	3.58	3.77	4.16	4.42	3.06	3.18	4.06	4.00	4.70	4.71	3.47	3.36
8	W40X397	3.51	3.72	4.06	4.34	3.01	3.15	3.58	3.77	4.16	4.42	3.06	3.18	4.06	4.00	4.71	4.71	3.47	3.36
9	W40X372	3.51	3.72	4.06	4.34	3.01	3.15	3.58	3.77	4.16	4.42	3.06	3.18	4.06	4.00	4.70	4.71	3.47	3.36
10	W40X362	3.51	3.72	4.06	4.34	3.01	3.15	3.58	3.77	4.16	4.42	3.06	3.18	4.06	4.00	4.70	4.71	3.47	3.36
11	W40X324	3.51	3.72	4.06	4.34	3.01	3.15	3.58	3.77	4.16	4.42	3.06	3.18	4.06	4.00	4.70	4.71	3.47	3.36
12	W40X297	3.51	3.72	4.06	4.34	3.01	3.15	3.58	3.77	4.16	4.42	3.06	3.18	4.06	4.00	4.71	4.71	3.47	3.36
13	W40X277	3.51	3.72	4.06	4.34	3.01	3.15	3.58	3.77	4.16	4.42	3.06	3.18	4.06	4.00	4.70	4.71	3.47	3.36
14	W40X249	3.51	3.72	4.06	4.34	3.01	3.15	3.58	3.77	4.16	4.42	3.06	3.18	4.06	4.00	4.70	4.71	3.47	3.36
15	W40X215	3.51	3.72	4.06	4.34	3.01	3.15	3.58	3.77	4.16	4.42	3.06	3.18	4.06	4.00	4.70	4.71	3.47	3.36
16	W40X199	3.51	3.72	4.06	4.35	3.01	3.16	3.59	3.77	4.16	4.42	3.07	3.18	4.06	4.00	4.71	4.71	3.47	3.37
17	W40X392	3.52	3.72	4.07	4.35	3.02	3.16	3.59	3.77	4.16	4.42	3.07	3.19	4.06	4.01	4.71	4.71	3.48	3.37
18	W40X331	3.52	3.73	4.07	4.35	3.02	3.16	3.59	3.77	4.16	4.42	3.07	3.19	4.06	4.01	4.71	4.71	3.48	3.37
19	W40X327	3.52	3.72	4.07	4.35	3.02	3.16	3.59	3.77	4.16	4.42	3.07	3.19	4.06	4.01	4.71	4.71	3.48	3.37
20	W40X294	3.52	3.73	4.07	4.35	3.02	3.16	3.59	3.77	4.16	4.42	3.07	3.19	4.06	4.01	4.71	4.71	3.48	3.37
21	W40X278	3.52	3.73	4.07	4.35	3.02	3.16	3.59	3.78	4.17	4.42	3.07	3.19	4.06	4.01	4.71	4.71	3.48	3.37
22	W40X264	3.52	3.73	4.07	4.35	3.02	3.16	3.59	3.78	4.17	4.42	3.07	3.19	4.06	4.01	4.71	4.71	3.48	3.37
23	W40X235	3.51	3.72	4.07	4.35	3.02	3.16	3.59	3.77	4.16	4.42	3.07	3.19	4.06	4.01	4.71	4.71	3.48	3.37
24	W40X211	3.52	3.73	4.07	4.35	3.02	3.16	3.59	3.77	4.16	4.42	3.07	3.19	4.06	4.01	4.71	4.71	3.48	3.37
25	W40X183	3.52	3.72	4.07	4.35	3.02	3.16	3.59	3.77	4.16	4.42	3.07	3.19	4.06	4.01	4.71	4.71	3.48	3.37
26	W40X167	3.52	3.73	4.07	4.35	3.02	3.17	3.59	3.78	4.17	4.43	3.07	3.19	4.07	4.01	4.71	4.71	3.48	3.38
27	W40X149	3.53	3.73	4.07	4.36	3.03	3.17	3.60	3.78	4.17	4.43	3.08	3.20	4.07	4.01	4.71	4.72	3.49	3.38
28	W36X652	3.50	3.71	4.06	4.34	3.00	3.15	3.58	3.76	4.15	4.41	3.06	3.17	4.05	4.00	4.70	4.70	3.46	3.36
29	W36X529	3.50	3.71	4.06	4.34	3.00	3.15	3.58	3.76	4.15	4.41	3.06	3.17	4.05	4.00	4.70	4.70	3.47	3.36
30	W36X487	3.50	3.71	4.06	4.34	3.00	3.15	3.58	3.76	4.15	4.41	3.06	3.17	4.05	4.00	4.70	4.70	3.47	3.36
31	W36X441	3.50	3.71	4.06	4.34	3.00	3.15	3.58	3.76	4.15	4.41	3.06	3.17	4.05	4.00	4.70	4.70	3.46	3.36
32	W36X395	3.50	3.71	4.06	4.34	3.00	3.15	3.58	3.76	4.15	4.41	3.06	3.17	4.05	4.00	4.70	4.70	3.47	3.36
33	W36X361	3.51	3.72	4.06	4.34	3.01	3.15	3.58	3.76	4.15	4.42	3.06	3.18	4.05	4.00	4.70	4.70	3.47	3.36
34	W36X330	3.51	3.72	4.06	4.34	3.01	3.15	3.58	3.76	4.16	4.42	3.06	3.18	4.05	4.00	4.70	4.71	3.47	3.36

35	W36X302	3.51	3.72	4.06	4.34	3.01	3.15	3.58	3.77	4.16	4.42	3.06	3.18	4.05	4.00	4.70	4.71	3.47	3.36
36	W36X282	3.51	3.72	4.06	4.34	3.01	3.15	3.58	3.77	4.16	4.42	3.06	3.18	4.05	4.00	4.70	4.71	3.47	3.36
37	W36X262	3.51	3.72	4.06	4.34	3.01	3.15	3.58	3.77	4.16	4.42	3.06	3.18	4.05	4.00	4.70	4.70	3.47	3.36
38	W36X247	3.51	3.72	4.06	4.34	3.01	3.15	3.58	3.77	4.16	4.42	3.06	3.18	4.06	4.00	4.70	4.71	3.47	3.36
39	W36X231	3.51	3.72	4.06	4.34	3.01	3.15	3.58	3.77	4.16	4.42	3.06	3.18	4.06	4.00	4.70	4.71	3.47	3.36
40	W36X256	3.51	3.72	4.06	4.35	3.01	3.16	3.59	3.77	4.16	4.42	3.07	3.18	4.06	4.01	4.71	4.71	3.47	3.37
41	W36X232	3.51	3.72	4.06	4.35	3.01	3.16	3.59	3.77	4.16	4.42	3.07	3.18	4.06	4.01	4.71	4.71	3.48	3.37
42	W36X210	3.52	3.73	4.07	4.35	3.02	3.16	3.59	3.78	4.16	4.42	3.07	3.19	4.06	4.01	4.71	4.71	3.48	3.37
43	W36X194	3.52	3.73	4.07	4.35	3.02	3.16	3.59	3.77	4.16	4.42	3.07	3.19	4.06	4.01	4.71	4.71	3.48	3.37
44	W36X182	3.52	3.73	4.07	4.35	3.02	3.16	3.59	3.78	4.16	4.42	3.07	3.19	4.06	4.01	4.71	4.71	3.48	3.37
45	W36X170	3.52	3.73	4.07	4.35	3.02	3.16	3.59	3.78	4.17	4.43	3.07	3.19	4.07	4.01	4.71	4.71	3.48	3.38
46	W36X160	3.52	3.73	4.07	4.35	3.02	3.16	3.59	3.77	4.16	4.42	3.07	3.19	4.06	4.01	4.71	4.71	3.48	3.37
47	W36X150	3.52	3.73	4.07	4.35	3.02	3.17	3.60	3.78	4.17	4.43	3.08	3.19	4.07	4.01	4.71	4.72	3.48	3.38
48	W36X135	3.53	3.73	4.08	4.36	3.03	3.17	3.60	3.78	4.17	4.43	3.08	3.20	4.07	4.02	4.72	4.72	3.49	3.38
49	W33X387	3.51	3.72	4.06	4.34	3.01	3.15	3.58	3.77	4.16	4.42	3.06	3.18	4.05	4.00	4.70	4.71	3.47	3.36
50	W33X354	3.50	3.71	4.06	4.34	3.00	3.15	3.58	3.76	4.15	4.41	3.06	3.17	4.05	4.00	4.70	4.70	3.46	3.36
51	W33X318	3.51	3.72	4.06	4.34	3.00	3.15	3.58	3.76	4.15	4.42	3.06	3.18	4.05	4.00	4.70	4.71	3.47	3.36
52	W33X291	3.50	3.71	4.06	4.34	3.00	3.15	3.58	3.76	4.15	4.41	3.06	3.17	4.05	4.00	4.70	4.70	3.47	3.36
53	W33X263	3.51	3.72	4.06	4.34	3.00	3.15	3.58	3.76	4.15	4.42	3.06	3.17	4.05	4.00	4.70	4.70	3.47	3.36
54	W33X241	3.51	3.72	4.06	4.34	3.01	3.15	3.58	3.77	4.16	4.42	3.06	3.18	4.05	4.00	4.70	4.71	3.47	3.36
55	W33X221	3.51	3.72	4.06	4.34	3.01	3.15	3.58	3.77	4.16	4.42	3.06	3.18	4.06	4.00	4.70	4.71	3.47	3.36
56	W33X201	3.51	3.72	4.06	4.34	3.01	3.15	3.58	3.77	4.16	4.42	3.06	3.18	4.06	4.00	4.70	4.71	3.47	3.36
57	W33X169	3.51	3.72	4.07	4.35	3.02	3.16	3.59	3.77	4.16	4.42	3.07	3.19	4.06	4.01	4.71	4.71	3.48	3.37
58	W33X152	3.51	3.73	4.07	4.35	3.02	3.16	3.59	3.77	4.16	4.42	3.07	3.19	4.06	4.01	4.71	4.71	3.48	3.37
59	W33X141	3.52	3.72	4.07	4.35	3.02	3.16	3.59	3.77	4.16	4.42	3.07	3.19	4.06	4.01	4.71	4.71	3.48	3.37
60	W33X130	3.52	3.73	4.07	4.35	3.02	3.17	3.59	3.78	4.17	4.43	3.07	3.19	4.07	4.01	4.71	4.71	3.48	3.38
61	W33X118	3.52	3.73	4.07	4.35	3.03	3.17	3.60	3.78	4.17	4.43	3.08	3.19	4.07	4.01	4.71	4.72	3.48	3.38
62	W30X391	3.50	3.71	4.05	4.34	3.00	3.15	3.58	3.76	4.15	4.41	3.05	3.17	4.05	4.00	4.70	4.70	3.46	3.36
63	W30X357	3.50	3.71	4.05	4.34	3.00	3.15	3.58	3.76	4.15	4.41	3.06	3.17	4.05	4.00	4.70	4.70	3.46	3.36
64	W30X326	3.50	3.71	4.06	4.34	3.00	3.15	3.58	3.76	4.15	4.41	3.06	3.17	4.05	4.00	4.70	4.70	3.46	3.36
65	W30X292	3.50	3.71	4.06	4.34	3.00	3.15	3.58	3.76	4.15	4.41	3.06	3.17	4.05	4.00	4.70	4.70	3.46	3.36
66	W30X261	3.50	3.71	4.06	4.34	3.00	3.15	3.58	3.76	4.15	4.41	3.06	3.17	4.05	4.00	4.70	4.70	3.46	3.36
67	W30X235	3.50	3.71	4.05	4.34	3.00	3.14	3.58	3.76	4.15	4.41	3.05	3.17	4.05	3.99	4.70	4.70	3.46	3.36
68	W30X211	3.51	3.72	4.06	4.34	3.01	3.15	3.58	3.76	4.15	4.41	3.06	3.18	4.05	4.00	4.70	4.70	3.47	3.36
69	W30X191	3.51	3.71	4.06	4.34	3.00	3.15	3.58	3.76	4.15	4.42	3.06	3.18	4.05	4.00	4.70	4.70	3.47	3.36
70	W30X173	3.51	3.72	4.06	4.34	3.01	3.15	3.58	3.77	4.16	4.42	3.06	3.18	4.06	4.00	4.70	4.71	3.47	3.36
71	W30X148	3.51	3.72	4.06	4.35	3.01	3.16	3.59	3.77	4.16	4.42	3.07	3.18	4.06	4.00	4.71	4.71	3.47	3.37
72	W30X132	3.52	3.73	4.07	4.35	3.02	3.16	3.59	3.77	4.16	4.42	3.07	3.19	4.06	4.01	4.71	4.71	3.48	3.37
73	W30X124	3.52	3.73	4.07	4.35	3.02	3.16	3.59	3.78	4.16	4.42	3.07	3.19	4.06	4.01	4.71	4.71	3.48	3.37
74	W30X116	3.52	3.73	4.07	4.35	3.02	3.17	3.59	3.78	4.17	4.43	3.07	3.19	4.07	4.01	4.71	4.71	3.48	3.38
75	W30X108	3.52	3.73	4.07	4.35	3.02	3.17	3.60	3.78	4.17	4.43	3.08	3.19	4.07	4.01	4.71	4.72	3.48	3.38
76	W30X99	3.52	3.73	4.07	4.36	3.03	3.17	3.60	3.78	4.17	4.43	3.08	3.20	4.07	4.02	4.72	4.72	3.49	3.38
77	W30X90	3.52	3.73	4.07	4.35	3.03	3.17	3.60	3.78	4.17	4.43	3.08	3.20	4.07	4.01	4.71	4.72	3.48	3.38
78	W27X539	3.50	3.71	4.05	4.33	3.00	3.14	3.57	3.76	4.15	4.41	3.05	3.17	4.05	3.99	4.70	4.70	3.46	3.35
79	W27X368	3.50	3.71	4.05	4.34	3.00	3.14	3.57	3.76	4.15	4.41	3.05	3.17	4.05	3.99	4.70	4.70	3.46	3.36
80	W27X336	3.50	3.71	4.05	4.34	3.00	3.15	3.58	3.76	4.15	4.41	3.05	3.17	4.05	4.00	4.70	4.70	3.46	3.36
81	W27X307	3.50	3.71	4.05	4.34	3.00	3.14	3.57	3.76	4.15	4.41	3.05	3.17	4.05	3.99	4.70	4.70	3.46	3.35
82	W27X281	3.50	3.71	4.05	4.34	3.00	3.15	3.58	3.76	4.15	4.41	3.05	3.17	4.05	4.00	4.70	4.70	3.46	3.36

83	W27X258	3.50	3.71	4.05	4.34	3.00	3.15	3.58	3.76	4.15	4.41	3.05	3.17	4.05	3.99	4.70	4.70	3.46	3.36
84	W27X235	3.50	3.71	4.06	4.34	3.00	3.15	3.58	3.76	4.15	4.41	3.05	3.17	4.05	4.00	4.70	4.70	3.46	3.36
85	W27X217	3.50	3.71	4.06	4.34	3.00	3.15	3.58	3.76	4.15	4.41	3.06	3.17	4.05	4.00	4.70	4.70	3.46	3.36
86	W27X194	3.50	3.71	4.06	4.34	3.00	3.15	3.58	3.76	4.15	4.41	3.06	3.17	4.05	4.00	4.70	4.70	3.46	3.36
87	W27X178	3.51	3.72	4.06	4.34	3.00	3.15	3.58	3.76	4.15	4.41	3.06	3.17	4.05	4.00	4.70	4.70	3.47	3.36
88	W27X161	3.51	3.72	4.06	4.34	3.00	3.15	3.58	3.77	4.16	4.42	3.06	3.18	4.05	4.00	4.70	4.71	3.47	3.36
89	W27X146	3.51	3.72	4.06	4.34	3.01	3.15	3.58	3.77	4.16	4.42	3.06	3.18	4.05	4.00	4.70	4.71	3.47	3.36
90	W27X129	3.51	3.72	4.06	4.35	3.01	3.16	3.59	3.77	4.16	4.42	3.07	3.18	4.06	4.00	4.71	4.71	3.47	3.37
91	W27X114	3.51	3.72	4.07	4.35	3.01	3.16	3.59	3.77	4.16	4.42	3.07	3.18	4.06	4.00	4.71	4.71	3.48	3.37
92	W27X102	3.51	3.72	4.07	4.35	3.02	3.16	3.59	3.77	4.16	4.42	3.07	3.19	4.06	4.01	4.71	4.71	3.48	3.37
93	W27X94	3.51	3.73	4.07	4.35	3.02	3.16	3.59	3.77	4.16	4.42	3.07	3.19	4.06	4.01	4.71	4.71	3.48	3.37
94	W27X84	3.52	3.73	4.07	4.35	3.02	3.16	3.59	3.78	4.17	4.43	3.07	3.19	4.07	4.01	4.71	4.72	3.48	3.38
95	W24X370	3.50	3.71	4.05	4.34	3.00	3.14	3.57	3.76	4.15	4.41	3.05	3.17	4.05	3.99	4.70	4.70	3.46	3.35
96	W24X335	3.50	3.71	4.05	4.34	3.00	3.14	3.57	3.76	4.15	4.41	3.05	3.17	4.05	3.99	4.70	4.70	3.46	3.35
97	W24X306	3.50	3.71	4.05	4.34	3.00	3.14	3.57	3.76	4.15	4.41	3.05	3.17	4.05	3.99	4.70	4.70	3.46	3.35
98	W24X279	3.50	3.71	4.05	4.34	3.00	3.14	3.58	3.76	4.15	4.41	3.05	3.17	4.05	4.00	4.70	4.70	3.46	3.36
99	W24X250	3.50	3.71	4.05	4.34	3.00	3.14	3.57	3.76	4.15	4.41	3.05	3.17	4.05	3.99	4.70	4.70	3.46	3.36
100	W24X229	3.50	3.71	4.05	4.34	3.00	3.14	3.58	3.76	4.15	4.41	3.05	3.17	4.05	4.00	4.70	4.70	3.46	3.36
101	W24X207	3.50	3.71	4.05	4.34	3.00	3.15	3.58	3.76	4.15	4.41	3.05	3.17	4.05	4.00	4.70	4.70	3.46	3.36
102	W24X192	3.50	3.71	4.05	4.34	3.00	3.15	3.58	3.76	4.15	4.41	3.05	3.17	4.05	4.00	4.70	4.70	3.46	3.36
103	W24X176	3.50	3.71	4.05	4.34	3.00	3.15	3.58	3.76	4.15	4.41	3.05	3.17	4.05	4.00	4.70	4.70	3.46	3.36
104	W24X162	3.50	3.71	4.06	4.34	3.00	3.15	3.58	3.76	4.15	4.41	3.06	3.17	4.05	4.00	4.70	4.70	3.46	3.36
105	W24X146	3.50	3.71	4.06	4.34	3.00	3.15	3.58	3.76	4.15	4.41	3.06	3.17	4.05	4.00	4.70	4.70	3.46	3.36
106	W24X131	3.51	3.72	4.06	4.34	3.01	3.15	3.58	3.77	4.15	4.41	3.06	3.18	4.05	4.00	4.70	4.70	3.47	3.36
107	W24X117	3.51	3.72	4.06	4.34	3.01	3.15	3.58	3.76	4.15	4.42	3.06	3.18	4.05	4.00	4.70	4.70	3.47	3.36
108	W24X104	3.51	3.72	4.06	4.34	3.01	3.15	3.58	3.77	4.16	4.42	3.06	3.18	4.06	4.00	4.70	4.70	3.47	3.36
109	W24X103	3.51	3.72	4.06	4.35	3.01	3.16	3.59	3.77	4.16	4.42	3.07	3.18	4.06	4.00	4.71	4.71	3.47	3.37
110	W24X94	3.51	3.72	4.06	4.35	3.01	3.16	3.59	3.77	4.16	4.42	3.07	3.18	4.06	4.01	4.71	4.71	3.47	3.37
111	W24X84	3.51	3.72	4.07	4.35	3.02	3.16	3.59	3.77	4.16	4.42	3.07	3.19	4.06	4.01	4.71	4.71	3.47	3.37
112	W24X76	3.52	3.72	4.07	4.35	3.02	3.16	3.59	3.78	4.16	4.42	3.07	3.19	4.06	4.01	4.71	4.71	3.48	3.37
113	W24X68	3.52	3.73	4.07	4.35	3.02	3.16	3.59	3.77	4.16	4.42	3.07	3.19	4.07	4.01	4.71	4.71	3.48	3.37
114	W24X62	3.53	3.74	4.08	4.36	3.03	3.17	3.60	3.79	4.18	4.44	3.08	3.20	4.08	4.02	4.72	4.72	3.49	3.38
115	W24X55	3.53	3.74	4.08	4.36	3.03	3.18	3.60	3.79	4.18	4.44	3.09	3.20	4.07	4.02	4.72	4.72	3.49	3.39
116	W21X201	3.50	3.71	4.05	4.34	3.00	3.14	3.57	3.76	4.15	4.41	3.05	3.17	4.05	3.99	4.70	4.70	3.46	3.35
117	W21X182	3.50	3.71	4.05	4.34	3.00	3.14	3.57	3.76	4.15	4.41	3.05	3.17	4.05	3.99	4.70	4.70	3.46	3.35
118	W21X166	3.50	3.71	4.05	4.34	3.00	3.14	3.57	3.76	4.15	4.41	3.05	3.17	4.05	3.99	4.70	4.70	3.46	3.35
119	W21X147	3.50	3.71	4.06	4.34	3.00	3.15	3.58	3.76	4.15	4.41	3.05	3.17	4.05	4.00	4.70	4.71	3.46	3.36
120	W21X132	3.50	3.71	4.05	4.34	3.00	3.15	3.58	3.76	4.15	4.41	3.05	3.17	4.05	3.99	4.70	4.70	3.46	3.36
121	W21X122	3.50	3.71	4.06	4.34	3.00	3.15	3.58	3.76	4.15	4.42	3.06	3.17	4.05	4.00	4.70	4.70	3.46	3.36
122	W21X111	3.51	3.72	4.06	4.34	3.00	3.15	3.58	3.76	4.15	4.42	3.06	3.17	4.05	4.00	4.70	4.71	3.47	3.36
123	W21X101	3.50	3.71	4.06	4.34	3.00	3.15	3.58	3.76	4.15	4.42	3.06	3.17	4.05	4.00	4.70	4.70	3.47	3.36
124	W21X93	3.52	3.72	4.06	4.35	3.01	3.16	3.59	3.77	4.16	4.42	3.07	3.18	4.06	4.00	4.71	4.71	3.48	3.37
125	W21X83	3.51	3.72	4.06	4.35	3.01	3.16	3.59	3.77	4.16	4.42	3.07	3.18	4.06	4.00	4.71	4.71	3.48	3.37
126	W21X73	3.51	3.72	4.06	4.35	3.01	3.16	3.59	3.77	4.16	4.42	3.07	3.18	4.06	4.01	4.71	4.71	3.48	3.37
127	W21X68	3.51	3.72	4.07	4.35	3.01	3.16	3.59	3.77	4.16	4.42	3.06	3.18	4.06	4.00	4.71	4.71	3.48	3.37
128	W21X62	3.51	3.72	4.06	4.35	3.01	3.16	3.59	3.77	4.16	4.42	3.07	3.18	4.06	4.01	4.71	4.71	3.48	3.37
129	W21X55	3.52	3.72	4.07	4.35	3.02	3.16	3.59	3.77	4.16	4.43	3.07	3.19	4.06	4.01	4.71	4.72	3.48	3.37
130	W21X48*	3.52	3.73	4.07	4.35	3.02	3.16	3.59	3.78	4.17	4.42	3.07	3.19	4.06	4.01	4.71	4.71	3.48	3.37

131	W21X57	3.52	3.72	4.07	4.35	3.02	3.16	3.59	3.77	4.16	4.42	3.07	3.19	4.06	4.01	4.71	4.71	3.48	3.38
132	W21X50	3.52	3.73	4.07	4.35	3.03	3.17	3.60	3.78	4.17	4.43	3.08	3.19	4.07	4.01	4.71	4.71	3.48	3.38
133	W21X44	3.53	3.73	4.08	4.36	3.03	3.17	3.60	3.78	4.18	4.43	3.08	3.20	4.07	4.01	4.71	4.72	3.49	3.39
134	W18X311	3.50	3.71	4.05	4.33	2.99	3.14	3.57	3.76	4.15	4.41	3.05	3.16	4.05	3.99	4.70	4.70	3.46	3.35
135	W18X283	3.50	3.71	4.05	4.34	3.00	3.14	3.57	3.76	4.15	4.41	3.05	3.17	4.05	3.99	4.70	4.70	3.46	3.35
136	W18X258	3.50	3.71	4.05	4.33	2.99	3.14	3.57	3.76	4.15	4.41	3.05	3.17	4.05	3.99	4.70	4.70	3.46	3.35
137	W18X234	3.50	3.71	4.05	4.33	3.00	3.14	3.57	3.76	4.15	4.41	3.05	3.17	4.05	3.99	4.70	4.70	3.46	3.35
138	W18X211	3.50	3.71	4.05	4.33	2.99	3.14	3.57	3.76	4.15	4.41	3.05	3.17	4.05	3.99	4.70	4.70	3.46	3.35
139	W18X192	3.50	3.71	4.05	4.33	3.00	3.14	3.57	3.76	4.15	4.41	3.05	3.17	4.05	3.99	4.70	4.70	3.46	3.35
140	W18X175	3.50	3.71	4.05	4.34	3.00	3.14	3.57	3.76	4.15	4.41	3.05	3.17	4.05	3.99	4.70	4.70	3.46	3.35
141	W18X158	3.50	3.71	4.05	4.34	3.00	3.14	3.57	3.76	4.15	4.41	3.05	3.17	4.05	3.99	4.70	4.70	3.46	3.35
142	W18X143	3.50	3.71	4.05	4.34	3.00	3.14	3.57	3.76	4.15	4.41	3.05	3.17	4.05	3.99	4.70	4.70	3.46	3.35
143	W18X130	3.50	3.71	4.05	4.34	3.00	3.14	3.57	3.76	4.15	4.41	3.05	3.17	4.05	3.99	4.70	4.70	3.46	3.35
144	W18X119	3.50	3.71	4.06	4.34	3.00	3.14	3.58	3.76	4.15	4.41	3.05	3.17	4.05	3.99	4.70	4.70	3.46	3.36
145	W18X106	3.50	3.71	4.05	4.34	3.00	3.14	3.57	3.76	4.15	4.41	3.05	3.17	4.05	4.00	4.70	4.70	3.46	3.35
146	W18X97	3.50	3.71	4.05	4.34	3.00	3.15	3.58	3.76	4.15	4.41	3.05	3.17	4.05	4.00	4.70	4.70	3.46	3.36
147	W18X86	3.50	3.71	4.06	4.34	3.00	3.15	3.58	3.76	4.15	4.41	3.05	3.17	4.05	3.99	4.70	4.70	3.46	3.36
148	W18X76	3.50	3.71	4.05	4.34	3.00	3.15	3.58	3.76	4.15	4.41	3.06	3.17	4.05	3.99	4.70	4.70	3.46	3.36
149	W18X71	3.51	3.72	4.06	4.34	3.01	3.15	3.58	3.77	4.16	4.42	3.06	3.18	4.06	4.00	4.70	4.71	3.47	3.36
150	W18X65	3.51	3.72	4.06	4.35	3.01	3.16	3.59	3.77	4.16	4.42	3.06	3.18	4.06	4.00	4.71	4.71	3.47	3.37
151	W18X60	3.51	3.72	4.06	4.34	3.01	3.15	3.58	3.76	4.16	4.41	3.06	3.18	4.05	4.00	4.71	4.71	3.47	3.36
152	W18X55	3.51	3.72	4.06	4.35	3.01	3.16	3.59	3.77	4.16	4.42	3.07	3.18	4.06	4.01	4.71	4.70	3.47	3.37
153	W18X50	3.51	3.72	4.06	4.34	3.01	3.15	3.59	3.77	4.16	4.42	3.06	3.18	4.06	4.00	4.70	4.71	3.47	3.36
154	W18X46	3.51	3.72	4.07	4.35	3.02	3.16	3.59	3.77	4.16	4.42	3.07	3.19	4.06	4.01	4.71	4.71	3.48	3.38
155	W18X40	3.52	3.73	4.07	4.35	3.02	3.16	3.59	3.78	4.16	4.43	3.07	3.19	4.06	4.01	4.71	4.72	3.48	3.37
156	W18X35	3.52	3.73	4.08	4.36	3.02	3.17	3.59	3.77	4.16	4.43	3.08	3.19	4.07	4.01	4.72	4.72	3.49	3.37
157	W16X100	3.50	3.71	4.05	4.34	3.00	3.14	3.57	3.76	4.15	4.41	3.05	3.17	4.05	3.99	4.70	4.70	3.46	3.36
158	W16X89	3.50	3.71	4.05	4.34	3.00	3.14	3.57	3.76	4.15	4.41	3.05	3.17	4.05	4.00	4.70	4.70	3.46	3.36
159	W16X77	3.50	3.71	4.05	4.34	3.00	3.14	3.57	3.76	4.15	4.41	3.05	3.17	4.05	3.99	4.70	4.70	3.46	3.35
160	W16X67	3.50	3.71	4.05	4.33	3.00	3.14	3.57	3.76	4.15	4.41	3.05	3.17	4.05	3.99	4.70	4.70	3.46	3.35
161	W16X57	3.51	3.72	4.06	4.34	3.01	3.15	3.58	3.76	4.16	4.42	3.06	3.18	4.06	4.01	4.71	4.71	3.47	3.36
162	W16X50	3.51	3.72	4.06	4.34	3.01	3.15	3.58	3.77	4.16	4.42	3.06	3.18	4.06	4.00	4.71	4.71	3.47	3.37
163	W16X45	3.51	3.72	4.06	4.34	3.01	3.15	3.59	3.76	4.16	4.42	3.06	3.18	4.06	4.00	4.72	4.71	3.47	3.37
164	W16X40	3.51	3.72	4.06	4.34	3.01	3.16	3.58	3.77	4.16	4.41	3.06	3.18	4.05	4.00	4.71	4.70	3.47	3.37
165	W16X36	3.51	3.72	4.06	4.35	3.01	3.16	3.58	3.77	4.15	4.42	3.07	3.18	4.06	4.00	4.71	4.70	3.48	3.36
166	W16X31	3.52	3.73	4.07	4.35	3.02	3.16	3.59	3.78	4.17	4.43	3.07	3.19	4.06	4.00	4.71	4.70	3.48	3.37
167	W16X26	3.53	3.73	4.07	4.35	3.02	3.17	3.60	3.77	4.17	4.43	3.08	3.19	4.06	4.01	4.72	4.70	3.48	3.37
168	W14X730	3.49	3.70	4.04	4.33	2.98	3.13	3.56	3.75	4.14	4.40	3.04	3.15	4.04	3.98	4.69	4.69	3.45	3.34
169	W14X665	3.49	3.70	4.04	4.33	2.98	3.13	3.56	3.75	4.14	4.40	3.04	3.15	4.04	3.98	4.69	4.69	3.45	3.34
170	W14X605	3.49	3.70	4.04	4.33	2.98	3.13	3.56	3.75	4.14	4.40	3.04	3.15	4.04	3.98	4.69	4.69	3.45	3.34
171	W14X550	3.49	3.70	4.04	4.33	2.98	3.13	3.56	3.75	4.14	4.40	3.04	3.15	4.04	3.98	4.69	4.69	3.45	3.34
172	W14X500	3.49	3.70	4.04	4.33	2.98	3.13	3.56	3.75	4.14	4.40	3.04	3.15	4.04	3.98	4.69	4.69	3.45	3.34
173	W14X455	3.49	3.70	4.04	4.33	2.98	3.13	3.56	3.75	4.14	4.40	3.04	3.16	4.04	3.98	4.69	4.69	3.45	3.34
174	W14X426	3.49	3.70	4.04	4.33	2.98	3.13	3.56	3.75	4.14	4.40	3.04	3.15	4.04	3.98	4.69	4.69	3.45	3.34
175	W14X398	3.49	3.70	4.04	4.33	2.98	3.13	3.56	3.75	4.14	4.40	3.04	3.16	4.04	3.98	4.69	4.69	3.45	3.34
176	W14X370	3.49	3.70	4.04	4.33	2.98	3.13	3.56	3.75	4.14	4.40	3.04	3.16	4.04	3.98	4.69	4.69	3.45	3.34
177	W14X342	3.49	3.70	4.04	4.33	2.98	3.13	3.56	3.75	4.14	4.40	3.04	3.15	4.04	3.98	4.69	4.69	3.45	3.34
178	W14X311	3.49	3.70	4.04	4.33	2.99	3.13	3.56	3.75	4.14	4.40	3.04	3.16	4.04	3.98	4.69	4.69	3.45	3.34

179	W14X283	3.49	3.70	4.04	4.33	2.98	3.13	3.56	3.75	4.14	4.40	3.04	3.16	4.04	3.98	4.69	4.69	3.45	3.34
180	W14X257	3.49	3.70	4.04	4.33	2.99	3.13	3.56	3.75	4.14	4.40	3.04	3.16	4.04	3.98	4.69	4.69	3.45	3.34
181	W14X233	3.49	3.70	4.04	4.33	2.98	3.13	3.56	3.75	4.14	4.40	3.04	3.16	4.04	3.98	4.69	4.69	3.45	3.34
182	W14X211	3.49	3.70	4.04	4.33	2.99	3.13	3.56	3.75	4.14	4.40	3.04	3.16	4.04	3.98	4.69	4.69	3.45	3.34
183	W14X193	3.49	3.70	4.04	4.33	2.99	3.13	3.56	3.75	4.14	4.40	3.04	3.16	4.04	3.98	4.69	4.69	3.45	3.34
184	W14X176	3.49	3.70	4.04	4.33	2.99	3.13	3.56	3.75	4.14	4.40	3.04	3.16	4.04	3.99	4.69	4.70	3.45	3.34
185	W14X159	3.49	3.70	4.04	4.33	2.99	3.13	3.56	3.75	4.14	4.40	3.04	3.16	4.04	3.99	4.69	4.69	3.45	3.35
186	W14X145	3.49	3.70	4.05	4.33	2.99	3.13	3.56	3.75	4.14	4.40	3.04	3.16	4.04	3.98	4.69	4.69	3.45	3.34
187	W14X132	3.49	3.70	4.05	4.33	2.99	3.13	3.57	3.75	4.14	4.40	3.04	3.16	4.04	3.99	4.69	4.70	3.45	3.35
188	W14X120	3.49	3.70	4.05	4.33	2.99	3.13	3.56	3.75	4.14	4.40	3.04	3.16	4.04	3.99	4.69	4.70	3.45	3.35
189	W14X109	3.49	3.70	4.04	4.33	2.99	3.13	3.57	3.75	4.14	4.40	3.04	3.16	4.04	3.98	4.69	4.69	3.45	3.34
190	W14X99	3.49	3.70	4.04	4.33	2.99	3.13	3.57	3.75	4.14	4.40	3.04	3.16	4.04	3.98	4.69	4.69	3.45	3.34
191	W14X90	3.48	3.69	4.03	4.32	2.97	3.12	3.55	3.74	4.13	4.40	3.03	3.14	4.03	3.98	4.68	4.69	3.44	3.33
192	W14X82	3.50	3.71	4.05	4.34	2.99	3.14	3.57	3.76	4.15	4.41	3.05	3.16	4.05	3.99	4.70	4.70	3.46	3.35
193	W14X74	3.50	3.71	4.05	4.33	2.99	3.14	3.57	3.75	4.15	4.40	3.05	3.17	4.05	3.99	4.70	4.69	3.46	3.35
194	W14X68	3.50	3.71	4.05	4.34	2.99	3.14	3.57	3.76	4.15	4.41	3.05	3.17	4.05	3.99	4.70	4.69	3.46	3.35
195	W14X61	3.49	3.71	4.05	4.33	2.99	3.14	3.57	3.76	4.15	4.41	3.05	3.17	4.04	3.99	4.69	4.70	3.45	3.35
196	W14X53	3.50	3.71	4.05	4.34	3.00	3.14	3.57	3.76	4.15	4.40	3.05	3.17	4.05	3.99	4.70	4.70	3.46	3.35
197	W14X48	3.50	3.71	4.05	4.34	3.00	3.14	3.57	3.76	4.15	4.41	3.05	3.17	4.05	3.99	4.70	4.69	3.46	3.36
198	W14X43	3.50	3.72	4.06	4.33	3.00	3.15	3.58	3.76	4.15	4.41	3.05	3.17	4.05	4.00	4.70	4.69	3.46	3.36
199	W14X38	3.51	3.72	4.06	4.35	3.01	3.15	3.58	3.78	4.15	4.41	3.06	3.18	4.06	3.99	4.71	4.71	3.46	3.36
200	W14X34	3.50	3.72	4.06	4.34	3.01	3.15	3.58	3.77	4.16	4.42	3.06	3.18	4.05	4.01	4.71	4.71	3.48	3.36
201	W14X30	3.50	3.73	4.06	4.35	3.01	3.15	3.59	3.77	4.17	4.42	3.06	3.18	4.05	4.00	4.69	4.71	3.46	3.37
202	W14X26	3.51	3.72	4.06	4.35	3.01	3.16	3.59	3.78	4.17	4.43	3.06	3.17	4.07	4.01	4.71	4.72	3.48	3.38
203	W14X22	3.53	3.73	4.06	4.36	3.02	3.17	3.59	3.77	4.17	4.43	3.07	3.20	4.07	4.02	4.74	4.72	3.48	3.36
204	W12X336	3.49	3.70	4.04	4.33	2.99	3.13	3.56	3.75	4.14	4.40	3.04	3.16	4.04	3.98	4.69	4.69	3.45	3.34
205	W12X305	3.49	3.70	4.04	4.33	2.99	3.13	3.56	3.75	4.14	4.40	3.04	3.16	4.04	3.98	4.69	4.69	3.45	3.34
206	W12X279	3.49	3.70	4.04	4.33	2.99	3.13	3.56	3.75	4.14	4.40	3.04	3.16	4.04	3.98	4.69	4.69	3.45	3.34
207	W12X252	3.49	3.70	4.04	4.33	2.99	3.13	3.56	3.75	4.14	4.40	3.04	3.16	4.04	3.98	4.69	4.69	3.45	3.34
208	W12X230	3.49	3.70	4.04	4.33	2.99	3.13	3.56	3.75	4.14	4.40	3.04	3.16	4.04	3.99	4.69	4.69	3.45	3.34
209	W12X210	3.49	3.70	4.04	4.33	2.99	3.13	3.56	3.75	4.14	4.40	3.04	3.16	4.04	3.98	4.69	4.69	3.45	3.34
210	W12X190	3.49	3.70	4.04	4.33	2.99	3.13	3.56	3.75	4.14	4.40	3.04	3.16	4.04	3.98	4.69	4.69	3.45	3.34
211	W12X170	3.49	3.70	4.04	4.33	2.99	3.13	3.56	3.75	4.14	4.40	3.04	3.16	4.04	3.98	4.69	4.69	3.45	3.34
212	W12X152	3.49	3.70	4.04	4.33	2.99	3.13	3.56	3.75	4.14	4.41	3.04	3.16	4.04	3.98	4.69	4.69	3.45	3.34
213	W12X136	3.49	3.70	4.04	4.33	2.99	3.13	3.57	3.75	4.14	4.40	3.04	3.16	4.04	3.99	4.69	4.69	3.45	3.35
214	W12X120	3.49	3.70	4.04	4.33	2.99	3.13	3.56	3.75	4.14	4.40	3.04	3.16	4.04	3.98	4.69	4.70	3.45	3.35
215	W12X106	3.49	3.70	4.04	4.33	2.99	3.13	3.56	3.75	4.14	4.40	3.04	3.16	4.04	3.98	4.69	4.69	3.45	3.35
216	W12X96	3.49	3.70	4.05	4.33	2.99	3.14	3.57	3.75	4.14	4.41	3.04	3.16	4.04	3.99	4.69	4.69	3.45	3.35
217	W12X87	3.49	3.70	4.05	4.33	2.99	3.13	3.56	3.75	4.14	4.40	3.04	3.16	4.04	3.99	4.69	4.70	3.45	3.34
218	W12X79	3.49	3.70	4.04	4.33	2.99	3.13	3.56	3.75	4.14	4.40	3.05	3.16	4.04	3.98	4.69	4.70	3.45	3.34
219	W12X72	3.50	3.70	4.04	4.33	2.99	3.13	3.57	3.75	4.14	4.40	3.04	3.16	4.04	3.99	4.70	4.69	3.45	3.35
220	W12X65	3.48	3.69	4.04	4.32	2.98	3.12	3.56	3.74	4.14	4.40	3.03	3.15	4.03	3.98	4.68	4.69	3.44	3.34
221	W12X58	3.49	3.70	4.04	4.33	2.99	3.13	3.57	3.75	4.14	4.41	3.04	3.16	4.04	3.99	4.69	4.69	3.46	3.35
222	W12X53	3.49	3.70	4.04	4.33	2.99	3.14	3.57	3.75	4.15	4.41	3.04	3.16	4.04	3.98	4.69	4.70	3.46	3.35
223	W12X50	3.50	3.70	4.05	4.33	3.00	3.14	3.57	3.76	4.15	4.42	3.05	3.17	4.04	3.99	4.69	4.70	3.46	3.35
224	W12X45	3.50	3.71	4.05	4.34	2.99	3.14	3.57	3.76	4.15	4.41	3.05	3.16	4.04	3.99	4.70	4.71	3.46	3.35
225	W12X40	3.50	3.71	4.05	4.33	3.00	3.14	3.58	3.76	4.15	4.41	3.05	3.17	4.05	4.00	4.70	4.70	3.47	3.35
226	W12X35	3.50	3.71	4.05	4.34	3.01	3.15	3.58	3.76	4.16	4.41	3.05	3.18	4.05	3.99	4.70	4.69	3.46	3.36

227	W12X30	3.50	3.71	4.05	4.34	3.01	3.15	3.58	3.76	4.15	4.42	3.05	3.17	4.06	4.01	4.70	4.69	3.46	3.36
228	W12X26	3.50	3.70	4.06	4.33	3.00	3.15	3.58	3.76	4.16	4.41	3.06	3.18	4.04	4.01	4.70	4.70	3.46	3.36
229	W12X22	3.52	3.73	4.06	4.36	3.02	3.16	3.59	3.78	4.17	4.42	3.07	3.20	4.06	4.00	4.70	4.71	3.48	3.37
230	W12X19	3.52	3.73	4.06	4.35	3.03	3.17	3.61	3.78	4.16	4.43	3.07	3.19	4.08	4.01	4.71	4.72	3.49	3.38
231	W12X16	3.53	3.73	4.07	4.35	3.03	3.17	3.59	3.78	4.19	4.43	3.08	3.18	4.06	4.02	4.74	4.72	3.50	3.37
232	W12X14	3.51	3.73	4.10	4.37	3.03	3.18	3.59	3.77	4.17	4.42	3.10	3.19	4.06	4.03	4.70	4.73	3.49	3.39
233	W10X112	3.49	3.70	4.04	4.33	2.99	3.13	3.56	3.75	4.14	4.40	3.04	3.16	4.04	3.98	4.69	4.69	3.45	3.34
234	W10X100	3.49	3.70	4.04	4.33	2.99	3.13	3.56	3.75	4.14	4.40	3.04	3.16	4.04	3.98	4.69	4.70	3.45	3.34
235	W10X88	3.49	3.70	4.04	4.33	2.99	3.13	3.56	3.75	4.14	4.40	3.04	3.16	4.04	3.98	4.69	4.69	3.45	3.34
236	W10X77	3.49	3.70	4.04	4.33	2.99	3.13	3.56	3.75	4.14	4.40	3.04	3.16	4.04	3.99	4.70	4.70	3.45	3.35
237	W10X68	3.49	3.71	4.04	4.33	2.99	3.14	3.57	3.75	4.14	4.40	3.04	3.16	4.04	3.98	4.69	4.69	3.45	3.35
238	W10X60	3.49	3.70	4.04	4.32	2.99	3.13	3.57	3.75	4.14	4.41	3.04	3.16	4.04	3.98	4.69	4.69	3.45	3.35
239	W10X54	3.49	3.70	4.05	4.33	2.99	3.13	3.56	3.75	4.14	4.40	3.04	3.16	4.04	3.99	4.69	4.70	3.45	3.35
240	W10X49	3.49	3.70	4.05	4.32	2.98	3.13	3.56	3.74	4.14	4.40	3.04	3.16	4.04	3.99	4.69	4.68	3.45	3.35
241	W10X45	3.49	3.70	4.04	4.33	2.99	3.14	3.56	3.74	4.14	4.41	3.04	3.16	4.04	3.99	4.69	4.70	3.46	3.35
242	W10X39	3.50	3.70	4.05	4.34	2.99	3.13	3.57	3.76	4.15	4.40	3.05	3.16	4.04	3.99	4.69	4.70	3.46	3.35
243	W10X33	3.51	3.71	4.05	4.32	2.99	3.14	3.57	3.75	4.16	4.43	3.05	3.16	4.06	3.99	4.71	4.70	3.45	3.35
244	W10X30	3.50	3.72	4.05	4.33	3.00	3.15	3.58	3.76	4.16	4.41	3.05	3.16	4.05	4.00	4.71	4.69	3.46	3.35
245	W10X26	3.50	3.71	4.04	4.33	3.00	3.14	3.57	3.76	4.15	4.42	3.05	3.17	4.05	4.00	4.71	4.70	3.47	3.35
246	W10X22	3.50	3.70	4.07	4.33	3.00	3.15	3.59	3.75	4.17	4.43	3.05	3.17	4.04	3.98	4.69	4.71	3.46	3.35
247	W10X19	3.51	3.73	4.06	4.36	3.01	3.15	3.57	3.77	4.16	4.42	3.08	3.19	4.06	3.99	4.68	4.73	3.47	3.39
248	W10X17	3.52	3.71	4.07	4.37	3.03	3.16	3.60	3.77	4.18	4.40	3.07	3.19	4.07	4.01	4.73	4.73	3.49	3.37
249	W10X15	3.51	3.73	4.07	4.38	3.03	3.17	3.59	3.76	4.16	4.45	3.09	3.19	4.05	4.00	4.72	4.71	3.47	3.38
250	W10X12	3.51	3.72	4.09	4.36	3.01	3.16	3.58	3.80	4.18	4.39	3.09	3.20	4.05	4.02	4.74	4.70	3.47	3.39
	MIN	**3.48**	**3.69**	**4.03**	**4.32**	**2.97**	**3.12**	**3.55**	**3.74**	**4.13**	**4.39**	**3.03**	**3.14**	**4.03**	**3.98**	**4.68**	**4.68**	**3.44**	**3.33**
	MAX	**3.53**	**3.74**	**4.10**	**4.38**	**3.03**	**3.18**	**3.61**	**3.80**	**4.19**	**4.45**	**3.10**	**3.20**	**4.08**	**4.03**	**4.74**	**4.73**	**3.50**	**3.39**
	AVE	**3.50**	**3.71**	**4.06**	**4.34**	**3.00**	**3.15**	**3.58**	**3.76**	**4.15**	**4.41**	**3.06**	**3.17**	**4.05**	**4.00**	**4.70**	**4.70**	**3.47**	**3.36**

C.1.2 Flexural resistance of noncomposite I-shaped plate girders

Table C- 11. Reliability Indices for Noncomposite I-shaped Plate Girdes, A709-50 steel.

				ADTT=250			ADTT=1'000			ADTT=2'500			ADTT=5'000			ADTT=10'000		
				Φ			Φ			Φ			Φ			Φ		
#	**S (ft)**	**L (ft)**	**D/(D+L)**	**1.00**	**0.95**	**1.05**	**1.00**	**0.95**	**1.05**	**1.00**	**0.95**	**1.05**	**1.00**	**0.95**	**1.05**	**1.00**	**0.95**	**1.05**
1	6	60	0.46	4.21	4.82	3.65	4.09	4.69	3.54	4.03	4.63	3.48	3.92	4.51	3.37	3.86	4.45	3.32
2	6	70	0.49	4.24	4.87	3.67	4.15	4.77	3.58	4.09	4.71	3.53	3.98	4.59	3.42	3.90	4.51	3.35
3	6	80	0.51	4.21	4.85	3.63	4.14	4.77	3.56	4.08	4.71	3.51	3.97	4.59	3.40	3.88	4.49	3.31
4	6	90	0.53	4.23	4.87	3.64	4.17	4.81	3.59	4.11	4.75	3.53	4.00	4.64	3.43	3.90	4.52	3.32
5	6	100	0.56	4.29	4.95	3.69	4.22	4.88	3.62	4.13	4.78	3.54	4.02	4.67	3.44	3.93	4.57	3.35
6	6	110	0.57	4.39	5.06	3.79	4.30	4.96	3.70	4.18	4.83	3.58	4.07	4.72	3.48	4.00	4.65	3.41
7	6	120	0.59	4.47	5.15	3.85	4.36	5.03	3.74	4.20	4.87	3.59	4.10	4.76	3.50	4.05	4.70	3.45
8	6	130	0.61	4.53	5.22	3.90	4.42	5.11	3.80	4.28	4.96	3.66	4.17	4.85	3.56	4.13	4.80	3.52
9	6	140	0.63	4.48	5.19	3.83	4.38	5.08	3.73	4.25	4.95	3.61	4.14	4.83	3.51	4.10	4.79	3.47
10	6	150	0.64	4.52	5.23	3.86	4.41	5.13	3.77	4.30	5.01	3.66	4.18	4.88	3.55	4.15	4.85	3.52
11	6	160	0.65	4.55	5.27	3.89	4.45	5.16	3.79	4.35	5.06	3.70	4.23	4.93	3.58	4.20	4.90	3.56
12	6	170	0.67	4.58	5.31	3.91	4.48	5.21	3.82	4.40	5.12	3.74	4.27	4.99	3.62	4.26	4.97	3.60
13	6	180	0.68	4.60	5.34	3.93	4.51	5.24	3.84	4.44	5.17	3.77	4.31	5.03	3.65	4.30	5.02	3.64
14	6	190	0.69	4.63	5.37	3.95	4.53	5.27	3.86	4.48	5.21	3.80	4.35	5.08	3.68	4.34	5.07	3.68
15	6	200	0.70	4.49	5.23	3.81	4.40	5.13	3.73	4.35	5.09	3.69	4.23	4.95	3.56	4.23	4.95	3.56
16	6	210	0.71	4.50	5.24	3.82	4.41	5.15	3.74	4.37	5.11	3.70	4.25	4.98	3.58	4.25	4.98	3.58
17	8	60	0.46	4.21	4.82	3.65	4.09	4.69	3.54	4.03	4.63	3.48	3.92	4.51	3.37	3.86	4.45	3.32
18	8	70	0.48	4.23	4.85	3.67	4.13	4.75	3.57	4.08	4.69	3.52	3.96	4.57	3.41	3.89	4.49	3.34
19	8	80	0.51	4.17	4.81	3.59	4.09	4.73	3.52	4.04	4.67	3.46	3.92	4.55	3.36	3.83	4.45	3.27
20	8	90	0.53	4.19	4.83	3.60	4.13	4.77	3.54	4.07	4.71	3.49	3.96	4.59	3.38	3.85	4.48	3.28
21	8	100	0.55	4.25	4.92	3.65	4.18	4.84	3.58	4.09	4.74	3.49	3.98	4.62	3.39	3.89	4.53	3.30
22	8	110	0.57	4.32	4.99	3.70	4.23	4.90	3.62	4.10	4.76	3.50	3.99	4.65	3.39	3.92	4.57	3.33
23	8	120	0.59	4.23	4.90	3.61	4.12	4.79	3.51	3.96	4.62	3.36	3.86	4.52	3.26	3.81	4.46	3.22
24	8	130	0.61	4.43	5.12	3.79	4.32	5.01	3.69	4.18	4.86	3.56	4.07	4.75	3.46	4.03	4.70	3.41
25	8	140	0.62	4.47	5.17	3.83	4.36	5.06	3.73	4.24	4.93	3.61	4.12	4.80	3.50	4.08	4.77	3.46
26	8	150	0.64	4.51	5.23	3.86	4.41	5.12	3.76	4.30	5.00	3.66	4.18	4.88	3.55	4.15	4.85	3.52
27	8	160	0.65	4.55	5.28	3.89	4.45	5.17	3.80	4.35	5.06	3.70	4.23	4.93	3.59	4.21	4.91	3.56
28	8	170	0.66	4.43	5.15	3.78	4.34	5.05	3.68	4.25	4.96	3.61	4.13	4.83	3.49	4.11	4.81	3.47
29	8	180	0.67	4.45	5.18	3.79	4.36	5.08	3.70	4.29	5.00	3.63	4.16	4.87	3.51	4.15	4.86	3.50
30	8	190	0.68	4.47	5.20	3.80	4.38	5.10	3.71	4.32	5.04	3.66	4.19	4.90	3.54	4.18	4.90	3.53
31	8	200	0.69	4.48	5.22	3.81	4.39	5.12	3.72	4.34	5.07	3.68	4.21	4.93	3.55	4.21	4.93	3.55
32	8	210	0.71	4.83	5.55	4.16	4.74	5.47	4.08	4.70	5.43	4.04	4.58	5.30	3.93	4.58	5.29	3.92
33	10	60	0.45	4.19	4.80	3.64	4.07	4.67	3.53	4.01	4.61	3.47	3.90	4.49	3.36	3.84	4.43	3.31
34	10	70	0.48	4.23	4.85	3.67	4.13	4.75	3.57	4.08	4.69	3.52	3.96	4.57	3.41	3.89	4.49	3.34
35	10	80	0.51	4.17	4.81	3.59	4.10	4.73	3.52	4.04	4.67	3.47	3.93	4.55	3.36	3.84	4.45	3.27
36	10	90	0.53	4.17	4.82	3.59	4.12	4.76	3.53	4.06	4.70	3.48	3.95	4.58	3.38	3.84	4.47	3.27
37	10	100	0.55	4.24	4.90	3.65	4.17	4.82	3.57	4.08	4.72	3.49	3.97	4.61	3.39	3.88	4.52	3.30
38	10	110	0.57	4.31	4.99	3.70	4.22	4.89	3.62	4.10	4.75	3.50	3.99	4.64	3.40	3.92	4.57	3.33
39	10	120	0.59	4.38	5.06	3.75	4.27	4.95	3.65	4.11	4.78	3.50	4.01	4.67	3.40	3.96	4.62	3.35
40	10	130	0.61	4.30	4.98	3.67	4.19	4.87	3.57	4.05	4.72	3.44	3.94	4.61	3.34	3.90	4.57	3.29
41	10	140	0.62	4.33	5.03	3.70	4.23	4.92	3.60	4.10	4.78	3.48	3.99	4.67	3.38	3.95	4.63	3.34
42	10	150	0.64	4.37	5.07	3.72	4.26	4.97	3.63	4.15	4.85	3.52	4.04	4.73	3.41	4.01	4.69	3.38

43	10	160	0.65	4.56	5.27	3.91	4.46	5.16	3.82	4.36	5.06	3.73	4.24	4.93	3.61	4.22	4.91	3.59
44	10	170	0.66	4.75	5.46	4.11	4.66	5.36	4.02	4.58	5.27	3.94	4.45	5.14	3.82	4.44	5.13	3.81
45	10	180	0.67	4.78	5.49	4.13	4.69	5.39	4.04	4.62	5.32	3.97	4.49	5.19	3.85	4.48	5.17	3.84
46	10	190	0.69	4.79	5.51	4.13	4.70	5.42	4.05	4.65	5.36	4.00	4.52	5.23	3.88	4.52	5.22	3.87
47	10	200	0.69	4.82	5.54	4.16	4.73	5.44	4.07	4.68	5.39	4.03	4.55	5.26	3.91	4.55	5.26	3.91
48	10	210	0.70	4.83	5.55	4.17	4.74	5.46	4.09	4.70	5.42	4.05	4.58	5.29	3.93	4.58	5.29	3.93
49	12	60	0.46	4.22	4.83	3.66	4.10	4.70	3.55	4.04	4.64	3.49	3.92	4.52	3.38	3.87	4.46	3.33
50	12	70	0.48	4.24	4.86	3.67	4.14	4.76	3.58	4.08	4.69	3.52	3.97	4.57	3.41	3.89	4.50	3.34
51	12	80	0.51	4.17	4.81	3.59	4.10	4.73	3.52	4.04	4.67	3.46	3.93	4.55	3.36	3.83	4.45	3.27
52	12	90	0.53	4.18	4.82	3.59	4.12	4.76	3.54	4.07	4.70	3.48	3.96	4.59	3.38	3.85	4.47	3.28
53	12	100	0.55	4.25	4.91	3.65	4.18	4.83	3.58	4.08	4.73	3.49	3.97	4.62	3.39	3.89	4.52	3.31
54	12	110	0.57	4.32	4.99	3.71	4.23	4.89	3.62	4.10	4.76	3.50	3.99	4.65	3.40	3.92	4.57	3.33
55	12	120	0.59	4.38	5.07	3.75	4.27	4.95	3.65	4.11	4.78	3.50	4.01	4.67	3.40	3.96	4.62	3.35
56	12	130	0.61	4.29	4.98	3.66	4.18	4.86	3.56	4.04	4.72	3.43	3.93	4.60	3.33	3.89	4.56	3.29
57	12	140	0.62	4.32	5.01	3.68	4.21	4.90	3.58	4.09	4.77	3.46	3.97	4.65	3.36	3.94	4.61	3.32
58	12	150	0.64	4.35	5.06	3.70	4.25	4.95	3.61	4.14	4.83	3.50	4.02	4.71	3.40	3.99	4.68	3.37
59	12	160	0.65	4.37	5.08	3.72	4.27	4.98	3.63	4.17	4.88	3.53	4.05	4.75	3.42	4.03	4.72	3.40
60	12	170	0.66	4.75	5.45	4.10	4.65	5.35	4.01	4.57	5.27	3.93	4.45	5.14	3.82	4.43	5.12	3.80
61	12	180	0.67	4.77	5.48	4.12	4.68	5.38	4.03	4.61	5.31	3.97	4.48	5.18	3.85	4.47	5.17	3.84
62	12	190	0.68	4.79	5.50	4.14	4.70	5.41	4.05	4.64	5.35	4.00	4.51	5.21	3.88	4.51	5.21	3.87
63	12	200	0.69	4.81	5.52	4.15	4.72	5.43	4.06	4.67	5.38	4.02	4.54	5.25	3.90	4.54	5.25	3.90
64	12	210	0.70	4.63	5.37	3.96	4.54	5.28	3.88	4.50	5.23	3.84	4.38	5.10	3.72	4.37	5.10	3.72
			MIN	**4.17**	**4.80**	**3.59**	**4.07**	**4.67**	**3.51**	**3.96**	**4.61**	**3.36**	**3.86**	**4.49**	**3.26**	**3.81**	**4.43**	**3.22**
			MAX	**4.83**	**5.55**	**4.17**	**4.74**	**5.47**	**4.09**	**4.70**	**5.43**	**4.05**	**4.58**	**5.30**	**3.93**	**4.58**	**5.29**	**3.93**
			AVE	**4.42**	**5.11**	**3.80**	**4.33**	**5.01**	**3.71**	**4.25**	**4.92**	**3.63**	**4.13**	**4.80**	**3.52**	**4.08**	**4.75**	**3.48**

Table C- 12. Reliability Indices for Noncomposite I-shaped Plate Girdes, A709-50W steel.

#	S (ft)	L (ft)	D/(D+L)	ADTT=250			ADTT=1'000			ADTT=2'500			ADTT=5'000			ADTT=10'000		
				Φ			Φ			Φ			Φ			Φ		
				1.00	0.95	1.05	1.00	0.95	1.05	1.00	0.95	1.05	1.00	0.95	1.05	1.00	0.95	1.05
1	6	60	0.46	4.50	5.13	3.93	4.38	5.00	3.81	4.32	4.94	3.75	4.20	4.81	3.64	4.14	4.75	3.59
2	6	70	0.49	4.55	5.19	3.96	4.45	5.08	3.86	4.39	5.02	3.81	4.27	4.90	3.70	4.19	4.82	3.62
3	6	80	0.51	4.40	5.04	3.81	4.32	4.96	3.73	4.26	4.90	3.68	4.14	4.78	3.57	4.05	4.68	3.48
4	6	90	0.53	4.41	5.06	3.81	4.35	5.00	3.76	4.29	4.94	3.70	4.18	4.82	3.59	4.07	4.70	3.49
5	6	100	0.56	4.50	5.17	3.89	4.42	5.09	3.82	4.33	4.99	3.73	4.22	4.88	3.62	4.13	4.78	3.54
6	6	110	0.57	4.72	5.41	4.09	4.62	5.31	4.00	4.49	5.17	3.88	4.38	5.05	3.77	4.31	4.98	3.71
7	6	120	0.59	4.80	5.50	4.16	4.69	5.39	4.05	4.52	5.21	3.90	4.42	5.10	3.80	4.36	5.04	3.75
8	6	130	0.61	4.87	5.59	4.22	4.76	5.47	4.11	4.61	5.31	3.97	4.50	5.20	3.87	4.46	5.15	3.82
9	6	140	0.63	4.53	5.24	3.88	4.42	5.13	3.78	4.30	4.99	3.66	4.18	4.87	3.56	4.15	4.83	3.52
10	6	150	0.64	4.56	5.28	3.91	4.46	5.17	3.81	4.35	5.05	3.70	4.23	4.93	3.59	4.20	4.89	3.56
11	6	160	0.65	4.61	5.33	3.95	4.51	5.23	3.86	4.41	5.12	3.76	4.29	4.99	3.65	4.27	4.97	3.63
12	6	170	0.67	4.62	5.36	3.96	4.53	5.26	3.87	4.44	5.17	3.79	4.32	5.04	3.67	4.30	5.02	3.65
13	6	180	0.68	4.65	5.39	3.98	4.56	5.29	3.89	4.49	5.21	3.82	4.36	5.08	3.70	4.35	5.07	3.69
14	6	190	0.69	4.66	5.41	3.98	4.57	5.31	3.89	4.51	5.25	3.84	4.38	5.11	3.72	4.38	5.10	3.71
15	6	200	0.70	4.70	5.46	4.01	4.61	5.36	3.92	4.56	5.32	3.88	4.43	5.17	3.75	4.43	5.17	3.75
16	6	210	0.71	4.71	5.48	4.01	4.62	5.38	3.93	4.58	5.34	3.89	4.45	5.21	3.77	4.45	5.20	3.76
17	8	60	0.46	4.50	5.13	3.93	4.38	5.00	3.81	4.32	4.94	3.75	4.20	4.81	3.64	4.14	4.75	3.59
18	8	70	0.48	4.53	5.17	3.95	4.43	5.06	3.85	4.37	5.00	3.79	4.25	4.87	3.68	4.17	4.79	3.61
19	8	80	0.51	4.24	4.87	3.66	4.16	4.79	3.58	4.10	4.73	3.53	3.99	4.61	3.42	3.90	4.52	3.33
20	8	90	0.53	4.24	4.89	3.65	4.18	4.83	3.60	4.13	4.77	3.54	4.02	4.65	3.44	3.91	4.54	3.34
21	8	100	0.55	4.27	4.93	3.67	4.20	4.85	3.60	4.10	4.75	3.51	4.00	4.64	3.41	3.91	4.55	3.32
22	8	110	0.57	4.33	5.01	3.72	4.24	4.91	3.63	4.11	4.77	3.51	4.01	4.66	3.41	3.94	4.59	3.35
23	8	120	0.59	4.40	5.10	3.77	4.29	4.98	3.67	4.13	4.81	3.51	4.03	4.70	3.41	3.97	4.65	3.36
24	8	130	0.61	4.50	5.20	3.87	4.40	5.09	3.77	4.25	4.93	3.63	4.14	4.82	3.53	4.10	4.77	3.49
25	8	140	0.62	4.54	5.24	3.90	4.43	5.13	3.80	4.30	5.00	3.68	4.19	4.87	3.57	4.15	4.83	3.53
26	8	150	0.64	4.57	5.29	3.92	4.47	5.18	3.82	4.35	5.06	3.71	4.24	4.93	3.60	4.21	4.90	3.57
27	8	160	0.65	4.59	5.31	3.93	4.49	5.21	3.83	4.39	5.10	3.74	4.27	4.97	3.63	4.24	4.95	3.60
28	8	170	0.66	4.64	5.38	3.96	4.54	5.27	3.87	4.45	5.18	3.78	4.32	5.04	3.66	4.30	5.02	3.65
29	8	180	0.67	4.66	5.40	3.97	4.56	5.30	3.88	4.48	5.22	3.81	4.35	5.08	3.69	4.34	5.07	3.68
30	8	190	0.68	4.67	5.42	3.98	4.57	5.32	3.89	4.51	5.26	3.84	4.38	5.12	3.71	4.37	5.11	3.70
31	8	200	0.69	4.68	5.44	3.99	4.59	5.34	3.90	4.54	5.29	3.86	4.40	5.15	3.72	4.40	5.15	3.72
32	8	210	0.71	4.84	5.61	4.15	4.75	5.51	4.06	4.71	5.47	4.02	4.59	5.34	3.90	4.58	5.33	3.90
33	10	60	0.45	4.48	5.11	3.91	4.36	4.98	3.80	4.30	4.91	3.74	4.18	4.79	3.63	4.12	4.73	3.57
34	10	70	0.48	4.53	5.17	3.95	4.43	5.06	3.85	4.37	5.00	3.79	4.25	4.88	3.68	4.17	4.79	3.61
35	10	80	0.51	4.22	4.85	3.63	4.14	4.77	3.56	4.08	4.71	3.51	3.97	4.59	3.40	3.88	4.50	3.31
36	10	90	0.53	4.27	4.92	3.69	4.22	4.86	3.63	4.16	4.80	3.58	4.05	4.68	3.47	3.94	4.57	3.37
37	10	100	0.55	4.34	5.00	3.74	4.26	4.92	3.67	4.17	4.82	3.58	4.06	4.70	3.48	3.97	4.61	3.39
38	10	110	0.57	4.38	5.06	3.77	4.29	4.96	3.68	4.17	4.82	3.56	4.06	4.71	3.46	3.99	4.64	3.40
39	10	120	0.59	4.43	5.11	3.80	4.32	5.00	3.70	4.16	4.83	3.55	4.06	4.72	3.45	4.00	4.66	3.40
40	10	130	0.61	4.49	5.20	3.84	4.38	5.08	3.74	4.24	4.93	3.60	4.13	4.81	3.50	4.08	4.77	3.46
41	10	140	0.62	4.53	5.24	3.88	4.42	5.13	3.78	4.29	4.99	3.65	4.18	4.87	3.54	4.14	4.83	3.51
42	10	150	0.64	4.56	5.29	3.90	4.46	5.18	3.80	4.34	5.06	3.69	4.22	4.93	3.58	4.19	4.90	3.55
43	10	160	0.65	4.66	5.39	3.99	4.55	5.28	3.89	4.45	5.18	3.80	4.33	5.04	3.68	4.31	5.02	3.66
44	10	170	0.66	4.76	5.50	4.09	4.66	5.40	4.00	4.58	5.30	3.91	4.45	5.17	3.79	4.43	5.15	3.78

45	10	180	0.67	4.78	5.53	4.11	4.69	5.42	4.01	4.61	5.35	3.94	4.48	5.21	3.82	4.47	5.19	3.81
46	10	190	0.69	4.79	5.55	4.11	4.70	5.45	4.02	4.64	5.39	3.96	4.51	5.25	3.84	4.51	5.24	3.83
47	10	200	0.69	4.82	5.57	4.13	4.72	5.47	4.04	4.68	5.42	4.00	4.54	5.28	3.87	4.54	5.28	3.87
48	10	210	0.70	4.83	5.59	4.14	4.74	5.49	4.05	4.70	5.45	4.01	4.57	5.31	3.89	4.56	5.31	3.88
49	12	60	0.46	4.51	5.14	3.94	4.39	5.01	3.82	4.33	4.95	3.76	4.21	4.82	3.65	4.15	4.76	3.59
50	12	70	0.48	4.54	5.18	3.95	4.44	5.07	3.86	4.38	5.01	3.80	4.26	4.88	3.69	4.18	4.80	3.61
51	12	80	0.51	4.20	4.84	3.62	4.13	4.76	3.55	4.07	4.70	3.49	3.96	4.58	3.39	3.86	4.48	3.30
52	12	90	0.53	4.26	4.91	3.67	4.20	4.85	3.62	4.15	4.79	3.57	4.04	4.67	3.46	3.93	4.56	3.36
53	12	100	0.55	4.32	4.98	3.72	4.25	4.90	3.65	4.16	4.80	3.56	4.05	4.69	3.46	3.96	4.60	3.38
54	12	110	0.57	4.37	5.04	3.76	4.28	4.94	3.67	4.15	4.81	3.55	4.04	4.70	3.45	3.97	4.62	3.38
55	12	120	0.59	4.41	5.10	3.79	4.30	4.98	3.68	4.14	4.81	3.53	4.04	4.70	3.43	3.99	4.65	3.39
56	12	130	0.61	4.47	5.18	3.83	4.37	5.07	3.73	4.22	4.91	3.59	4.11	4.80	3.48	4.07	4.75	3.44
57	12	140	0.62	4.50	5.22	3.85	4.39	5.10	3.75	4.26	4.96	3.62	4.15	4.84	3.51	4.11	4.80	3.48
58	12	150	0.64	4.53	5.26	3.87	4.43	5.15	3.77	4.31	5.03	3.66	4.19	4.90	3.55	4.16	4.87	3.52
59	12	160	0.65	4.56	5.29	3.88	4.45	5.18	3.79	4.35	5.08	3.69	4.23	4.95	3.58	4.20	4.92	3.55
60	12	170	0.66	4.75	5.49	4.08	4.65	5.38	3.98	4.56	5.29	3.90	4.44	5.16	3.78	4.42	5.14	3.76
61	12	180	0.67	4.77	5.51	4.09	4.67	5.41	4.00	4.60	5.33	3.93	4.47	5.19	3.81	4.45	5.18	3.79
62	12	190	0.68	4.79	5.54	4.11	4.69	5.44	4.01	4.63	5.37	3.96	4.50	5.23	3.83	4.49	5.22	3.82
63	12	200	0.69	4.80	5.56	4.11	4.71	5.46	4.02	4.66	5.41	3.98	4.52	5.26	3.85	4.52	5.26	3.85
64	12	210	0.70	4.49	5.24	3.80	4.40	5.14	3.72	4.36	5.10	3.68	4.23	4.96	3.56	4.22	4.96	3.55
			MIN	**4.20**	**4.84**	**3.62**	**4.13**	**4.76**	**3.55**	**4.07**	**4.70**	**3.49**	**3.96**	**4.58**	**3.39**	**3.86**	**4.48**	**3.30**
			MAX	**4.87**	**5.61**	**4.22**	**4.76**	**5.51**	**4.11**	**4.71**	**5.47**	**4.02**	**4.59**	**5.34**	**3.90**	**4.58**	**5.33**	**3.90**
			AVE	**4.55**	**5.25**	**3.91**	**4.45**	**5.15**	**3.82**	**4.37**	**5.06**	**3.74**	**4.25**	**4.93**	**3.62**	**4.20**	**4.88**	**3.58**

C.1.3 Flexural resistance of composite rolled I-shaped girders

Table C- 13. Reliability Indices for Composite Rolled I-shaped Girdes for ADTT 250 and L=30, 60, 90ft.

	L=30 ft						L=60 ft						L=90 ft					
Φ	**1.00**		**0.95**		**1.05**		**1.00**		**0.95**		**1.05**		**1.00**		**0.95**		**1.05**	
# \ D/(D+L)	**0.25**	**0.35**	**0.25**	**0.35**	**0.25**	**0.35**	**0.40**	**0.50**	**0.40**	**0.50**	**0.40**	**0.50**	**0.50**	**0.55**	**0.50**	**0.55**	**0.50**	**0.55**
1	3.92	4.05	4.42	4.59	3.46	3.56	4.00	4.14	4.55	4.74	3.50	3.60	4.09	4.15	4.68	4.77	3.55	3.59
2	3.91	4.04	4.42	4.58	3.45	3.55	3.99	4.13	4.55	4.73	3.49	3.59	4.08	4.14	4.67	4.76	3.54	3.58
3	3.91	4.04	4.41	4.58	3.45	3.55	3.99	4.13	4.54	4.72	3.49	3.59	4.07	4.14	4.67	4.75	3.54	3.58
4	3.92	4.05	4.43	4.59	3.46	3.56	4.01	4.15	4.56	4.74	3.50	3.60	4.09	4.15	4.68	4.77	3.55	3.60
5	3.92	4.05	4.42	4.59	3.46	3.56	4.00	4.14	4.55	4.73	3.50	3.60	4.08	4.15	4.67	4.76	3.55	3.59
6	3.91	4.04	4.41	4.58	3.45	3.55	3.99	4.13	4.54	4.73	3.49	3.59	4.07	4.14	4.67	4.76	3.53	3.58
7	3.91	4.04	4.41	4.58	3.45	3.55	3.99	4.13	4.54	4.73	3.49	3.59	4.08	4.14	4.67	4.76	3.54	3.58
8	3.92	4.05	4.42	4.59	3.46	3.56	4.00	4.14	4.55	4.74	3.50	3.60	4.08	4.15	4.68	4.77	3.55	3.59
9	3.91	4.04	4.41	4.57	3.45	3.55	3.99	4.13	4.54	4.72	3.49	3.59	4.07	4.14	4.66	4.75	3.54	3.58
10	3.92	4.05	4.43	4.59	3.46	3.56	4.01	4.14	4.56	4.74	3.50	3.60	4.09	4.15	4.68	4.77	3.55	3.60
11	3.90	4.03	4.40	4.56	3.44	3.54	3.98	4.12	4.53	4.71	3.48	3.58	4.06	4.12	4.65	4.73	3.53	3.57
12	3.93	4.06	4.43	4.60	3.47	3.57	4.01	4.15	4.56	4.75	3.51	3.61	4.10	4.16	4.69	4.78	3.56	3.60
13	3.92	4.05	4.43	4.59	3.46	3.56	4.00	4.14	4.56	4.74	3.50	3.60	4.09	4.15	4.68	4.77	3.55	3.60
14	3.91	4.04	4.42	4.58	3.46	3.56	4.00	4.14	4.55	4.73	3.49	3.59	4.08	4.15	4.67	4.76	3.54	3.59
15	3.91	4.04	4.42	4.58	3.45	3.55	3.99	4.13	4.55	4.73	3.49	3.59	4.08	4.14	4.67	4.76	3.54	3.58
16	3.91	4.04	4.42	4.58	3.45	3.55	3.99	4.13	4.55	4.73	3.49	3.59	4.08	4.14	4.67	4.76	3.54	3.58
17	3.91	4.04	4.41	4.58	3.45	3.55	3.99	4.13	4.54	4.73	3.49	3.59	4.08	4.14	4.67	4.76	3.54	3.58
18	3.92	4.05	4.42	4.59	3.46	3.56	4.00	4.14	4.55	4.73	3.50	3.60	4.08	4.15	4.67	4.76	3.55	3.59
19	3.92	4.05	4.42	4.59	3.46	3.56	4.00	4.14	4.55	4.74	3.50	3.60	4.08	4.15	4.68	4.77	3.54	3.59
20	3.91	4.04	4.42	4.58	3.45	3.55	4.00	4.13	4.55	4.73	3.49	3.59	4.08	4.14	4.67	4.76	3.54	3.58
21	3.91	4.04	4.41	4.58	3.45	3.55	3.99	4.13	4.55	4.73	3.49	3.59	4.08	4.14	4.67	4.76	3.54	3.58
22	3.91	4.04	4.41	4.58	3.45	3.55	3.99	4.13	4.54	4.73	3.49	3.59	4.08	4.14	4.67	4.76	3.53	3.58
23	3.91	4.04	4.42	4.58	3.45	3.55	4.00	4.14	4.55	4.73	3.49	3.59	4.08	4.15	4.67	4.76	3.54	3.59
24	3.91	4.04	4.42	4.58	3.45	3.55	4.00	4.14	4.55	4.73	3.49	3.59	4.08	4.15	4.68	4.76	3.54	3.58
25	3.91	4.04	4.41	4.58	3.45	3.55	3.99	4.13	4.55	4.73	3.49	3.59	4.08	4.14	4.67	4.76	3.54	3.58
26	3.92	4.05	4.42	4.59	3.46	3.56	4.00	4.14	4.55	4.73	3.50	3.60	4.08	4.15	4.67	4.76	3.55	3.59
27	3.91	4.04	4.41	4.58	3.45	3.55	3.99	4.13	4.54	4.72	3.49	3.59	4.08	4.14	4.67	4.75	3.54	3.58
28	3.91	4.04	4.41	4.58	3.45	3.55	3.99	4.13	4.54	4.73	3.49	3.59	4.07	4.14	4.67	4.75	3.54	3.58
29	3.92	4.05	4.42	4.58	3.46	3.56	4.00	4.14	4.55	4.73	3.50	3.60	4.08	4.15	4.67	4.76	3.55	3.59
30	3.91	4.05	4.42	4.59	3.45	3.55	4.00	4.14	4.55	4.73	3.49	3.59	4.08	4.15	4.68	4.76	3.54	3.59
31	3.91	4.04	4.42	4.58	3.45	3.55	3.99	4.14	4.55	4.73	3.49	3.59	4.08	4.15	4.68	4.76	3.54	3.58
32	3.91	4.04	4.41	4.58	3.45	3.55	3.99	4.13	4.55	4.73	3.49	3.59	4.08	4.14	4.67	4.76	3.54	3.58
33	3.90	4.03	4.41	4.57	3.44	3.54	3.98	4.12	4.54	4.72	3.48	3.58	4.07	4.13	4.66	4.75	3.53	3.57
34	3.92	4.05	4.42	4.59	3.46	3.56	4.00	4.14	4.56	4.74	3.50	3.60	4.09	4.15	4.68	4.77	3.55	3.59
35	3.91	4.04	4.41	4.58	3.45	3.55	3.99	4.13	4.54	4.73	3.49	3.59	4.08	4.14	4.67	4.76	3.54	3.58
36	3.91	4.04	4.41	4.58	3.45	3.55	3.99	4.13	4.54	4.72	3.49	3.59	4.08	4.14	4.66	4.75	3.54	3.58
37	3.91	4.04	4.41	4.58	3.45	3.55	3.99	4.13	4.54	4.72	3.49	3.59	4.08	4.14	4.67	4.75	3.54	3.58
38	3.91	4.04	4.42	4.58	3.45	3.55	3.99	4.13	4.55	4.73	3.49	3.59	4.08	4.14	4.67	4.76	3.54	3.58
39	3.91	4.04	4.42	4.58	3.45	3.55	3.99	4.13	4.55	4.73	3.49	3.59	4.08	4.14	4.67	4.76	3.54	3.58
40	3.91	4.04	4.42	4.58	3.45	3.55	4.00	4.14	4.55	4.73	3.49	3.59	4.08	4.15	4.67	4.76	3.54	3.59
41	3.91	4.04	4.41	4.58	3.44	3.55	3.99	4.13	4.54	4.73	3.49	3.59	4.08	4.14	4.67	4.76	3.53	3.58
42	3.90	4.03	4.41	4.58	3.44	3.54	3.98	4.13	4.54	4.73	3.48	3.58	4.07	4.14	4.67	4.76	3.53	3.57

43	3.91	4.04	4.42	4.58	3.45	3.55	4.00	4.14	4.55	4.73	3.49	3.59	4.08	4.15	4.68	4.77	3.54	3.58
44	3.90	4.03	4.41	4.57	3.44	3.54	3.98	4.12	4.54	4.72	3.48	3.58	4.07	4.13	4.66	4.75	3.53	3.57
45	3.91	4.04	4.41	4.58	3.45	3.55	3.99	4.13	4.54	4.72	3.49	3.59	4.08	4.14	4.67	4.75	3.54	3.58
46	3.91	4.04	4.42	4.58	3.45	3.55	3.99	4.13	4.55	4.73	3.49	3.59	4.08	4.14	4.67	4.76	3.54	3.58
47	3.91	4.04	4.42	4.58	3.46	3.56	4.00	4.13	4.55	4.72	3.50	3.59	4.08	4.14	4.67	4.75	3.54	3.59
48	3.91	4.05	4.42	4.58	3.45	3.55	4.00	4.14	4.55	4.73	3.49	3.59	4.08	4.15	4.67	4.76	3.54	3.59
49	3.91	4.04	4.41	4.58	3.44	3.55	3.99	4.13	4.55	4.73	3.49	3.59	4.08	4.14	4.67	4.76	3.53	3.58
50	3.90	4.03	4.40	4.57	3.43	3.53	3.98	4.12	4.54	4.72	3.47	3.57	4.06	4.13	4.66	4.75	3.52	3.57
51	3.90	4.03	4.41	4.58	3.44	3.54	3.99	4.13	4.54	4.73	3.48	3.58	4.07	4.14	4.67	4.76	3.53	3.57
52	3.91	4.05	4.42	4.59	3.45	3.55	4.00	4.14	4.55	4.73	3.49	3.59	4.08	4.15	4.68	4.77	3.54	3.59
53	3.90	4.03	4.41	4.57	3.44	3.54	3.98	4.12	4.54	4.72	3.48	3.58	4.07	4.13	4.66	4.75	3.53	3.57
54	3.92	4.05	4.43	4.60	3.46	3.56	4.00	4.15	4.56	4.75	3.50	3.60	4.09	4.16	4.69	4.78	3.55	3.59
55	3.93	4.06	4.44	4.61	3.47	3.57	4.01	4.16	4.57	4.76	3.51	3.61	4.10	4.17	4.70	4.79	3.56	3.61
56	3.94	4.07	4.44	4.61	3.47	3.58	4.02	4.17	4.58	4.77	3.52	3.62	4.11	4.18	4.71	4.80	3.57	3.61
57	3.94	4.07	4.44	4.61	3.48	3.58	4.02	4.17	4.58	4.77	3.52	3.62	4.11	4.18	4.71	4.80	3.57	3.61
58	3.92	4.04	4.42	4.58	3.46	3.56	4.00	4.13	4.54	4.71	3.50	3.60	4.08	4.14	4.66	4.74	3.55	3.59
59	3.91	4.04	4.41	4.58	3.46	3.56	3.99	4.13	4.54	4.72	3.50	3.59	4.08	4.14	4.66	4.74	3.54	3.58
60	3.91	4.04	4.42	4.58	3.45	3.55	3.99	4.13	4.54	4.72	3.49	3.59	4.08	4.14	4.67	4.75	3.54	3.58
61	3.92	4.05	4.42	4.58	3.46	3.56	4.00	4.13	4.54	4.72	3.50	3.60	4.08	4.14	4.66	4.75	3.55	3.59
62	3.92	4.05	4.42	4.58	3.46	3.56	4.00	4.14	4.55	4.73	3.50	3.60	4.08	4.15	4.67	4.76	3.55	3.59
63	3.91	4.04	4.42	4.58	3.45	3.55	3.99	4.14	4.55	4.73	3.49	3.59	4.08	4.14	4.67	4.76	3.54	3.58
64	3.90	4.03	4.41	4.58	3.44	3.54	3.99	4.13	4.54	4.73	3.48	3.58	4.07	4.14	4.67	4.76	3.53	3.57
65	3.90	4.03	4.41	4.58	3.44	3.54	3.99	4.13	4.54	4.73	3.48	3.58	4.07	4.14	4.67	4.76	3.53	3.57
66	3.92	4.05	4.42	4.59	3.46	3.56	4.00	4.14	4.56	4.74	3.50	3.60	4.09	4.15	4.68	4.77	3.55	3.59
67	3.91	4.04	4.41	4.58	3.45	3.55	3.99	4.13	4.55	4.73	3.49	3.59	4.08	4.14	4.67	4.76	3.54	3.58
68	3.93	4.06	4.43	4.61	3.46	3.57	4.01	4.16	4.57	4.76	3.51	3.61	4.10	4.17	4.70	4.79	3.56	3.60
69	3.93	4.07	4.44	4.61	3.47	3.57	4.02	4.16	4.58	4.77	3.51	3.62	4.11	4.18	4.71	4.80	3.56	3.61
70	3.93	4.07	4.44	4.61	3.47	3.57	4.02	4.16	4.58	4.77	3.51	3.62	4.11	4.18	4.71	4.80	3.56	3.61
71	3.94	4.07	4.44	4.61	3.47	3.58	4.02	4.17	4.58	4.76	3.52	3.62	4.11	4.18	4.71	4.80	3.57	3.61
72	3.94	4.08	4.45	4.62	3.48	3.58	4.03	4.17	4.59	4.78	3.52	3.63	4.12	4.18	4.71	4.81	3.58	3.62
73	3.93	4.07	4.44	4.61	3.47	3.57	4.02	4.16	4.57	4.76	3.51	3.62	4.10	4.17	4.70	4.79	3.56	3.61
74	3.94	4.08	4.45	4.62	3.48	3.58	4.03	4.17	4.59	4.78	3.53	3.63	4.12	4.19	4.72	4.81	3.58	3.62
75	3.94	4.08	4.45	4.62	3.48	3.59	4.03	4.18	4.59	4.78	3.53	3.63	4.12	4.19	4.72	4.81	3.58	3.62
76	3.91	4.04	4.41	4.58	3.46	3.56	3.99	4.13	4.54	4.72	3.50	3.59	4.08	4.14	4.66	4.74	3.54	3.59
77	3.91	4.04	4.42	4.58	3.45	3.55	4.00	4.13	4.54	4.72	3.49	3.59	4.08	4.14	4.67	4.75	3.54	3.59
78	3.91	4.04	4.41	4.58	3.46	3.56	3.99	4.13	4.54	4.71	3.50	3.59	4.08	4.14	4.66	4.74	3.54	3.58
79	3.91	4.04	4.42	4.58	3.45	3.55	4.00	4.13	4.55	4.73	3.49	3.59	4.08	4.14	4.67	4.75	3.54	3.59
80	3.91	4.04	4.42	4.58	3.45	3.55	4.00	4.14	4.55	4.73	3.49	3.59	4.08	4.14	4.67	4.76	3.54	3.58
81	3.90	4.03	4.41	4.57	3.44	3.54	3.98	4.12	4.54	4.72	3.48	3.58	4.07	4.13	4.66	4.75	3.53	3.57
82	3.92	4.05	4.42	4.59	3.46	3.56	4.00	4.14	4.55	4.73	3.50	3.60	4.08	4.15	4.67	4.76	3.54	3.59
83	3.90	4.03	4.41	4.58	3.44	3.54	3.99	4.13	4.54	4.73	3.48	3.58	4.07	4.14	4.67	4.76	3.53	3.57
84	3.92	4.05	4.43	4.60	3.46	3.56	4.00	4.15	4.56	4.75	3.50	3.60	4.09	4.16	4.69	4.78	3.55	3.59
85	3.93	4.07	4.44	4.61	3.47	3.57	4.02	4.16	4.58	4.77	3.51	3.62	4.11	4.18	4.71	4.80	3.57	3.61
86	3.94	4.07	4.44	4.62	3.47	3.58	4.02	4.17	4.58	4.77	3.52	3.62	4.11	4.18	4.71	4.80	3.57	3.61
87	3.92	4.06	4.43	4.60	3.46	3.56	4.01	4.15	4.56	4.75	3.50	3.60	4.09	4.16	4.69	4.78	3.55	3.60
88	3.93	4.07	4.44	4.61	3.47	3.57	4.02	4.17	4.58	4.77	3.52	3.62	4.11	4.18	4.71	4.80	3.57	3.61
89	3.94	4.08	4.45	4.62	3.48	3.58	4.03	4.17	4.59	4.77	3.52	3.62	4.12	4.18	4.71	4.81	3.57	3.62
90	3.94	4.08	4.45	4.62	3.48	3.58	4.03	4.18	4.59	4.78	3.53	3.63	4.12	4.19	4.72	4.81	3.58	3.62

91	3.94	4.08	4.45	4.62	3.48	3.58	4.03	4.18	4.59	4.78	3.53	3.63	4.12	4.19	4.72	4.81	3.58	3.62
92	3.95	4.09	4.46	4.64	3.49	3.60	4.05	4.19	4.61	4.80	3.54	3.64	4.14	4.20	4.74	4.83	3.59	3.63
93	3.92	4.05	4.42	4.59	3.46	3.56	4.00	4.14	4.55	4.73	3.50	3.60	4.08	4.15	4.67	4.76	3.55	3.59
94	3.91	4.04	4.41	4.58	3.45	3.55	3.99	4.13	4.55	4.73	3.49	3.59	4.08	4.14	4.67	4.76	3.54	3.58
95	3.92	4.05	4.43	4.60	3.46	3.56	4.01	4.15	4.57	4.75	3.50	3.60	4.09	4.16	4.69	4.78	3.55	3.60
96	3.93	4.07	4.44	4.61	3.47	3.57	4.02	4.16	4.58	4.77	3.51	3.62	4.11	4.17	4.71	4.80	3.56	3.61
97	3.93	4.07	4.44	4.61	3.47	3.57	4.02	4.16	4.58	4.76	3.51	3.62	4.11	4.17	4.70	4.79	3.56	3.61
98	3.94	4.08	4.45	4.62	3.48	3.58	4.03	4.18	4.59	4.78	3.52	3.63	4.12	4.19	4.72	4.81	3.58	3.62
99	3.94	4.08	4.45	4.62	3.48	3.58	4.03	4.18	4.59	4.78	3.52	3.63	4.12	4.18	4.72	4.81	3.57	3.62
100	3.94	4.08	4.45	4.63	3.48	3.58	4.03	4.18	4.59	4.78	3.52	3.63	4.12	4.19	4.72	4.81	3.58	3.62
101	3.95	4.09	4.46	4.63	3.49	3.59	4.04	4.19	4.60	4.79	3.53	3.64	4.13	4.20	4.73	4.83	3.58	3.63
102	3.96	4.10	4.48	4.65	3.50	3.60	4.05	4.20	4.62	4.81	3.55	3.65	4.15	4.22	4.75	4.84	3.60	3.65
103	3.98	4.12	4.50	4.67	3.51	3.62	4.08	4.23	4.64	4.84	3.56	3.67	4.17	4.24	4.77	4.87	3.62	3.67
104	3.90	4.03	4.40	4.57	3.44	3.54	3.98	4.12	4.53	4.72	3.48	3.58	4.06	4.13	4.66	4.75	3.52	3.57
105	3.91	4.04	4.41	4.58	3.45	3.55	3.99	4.13	4.54	4.72	3.49	3.59	4.07	4.14	4.66	4.74	3.54	3.58
106	3.90	4.03	4.41	4.57	3.44	3.54	3.99	4.13	4.54	4.72	3.48	3.58	4.07	4.14	4.66	4.75	3.53	3.57
107	3.91	4.04	4.42	4.58	3.45	3.55	3.99	4.14	4.55	4.73	3.49	3.59	4.08	4.15	4.68	4.76	3.54	3.58
108	3.93	4.06	4.44	4.61	3.46	3.57	4.01	4.16	4.57	4.76	3.51	3.61	4.10	4.17	4.70	4.79	3.56	3.60
109	3.93	4.07	4.44	4.61	3.47	3.57	4.02	4.17	4.58	4.77	3.51	3.62	4.11	4.18	4.71	4.80	3.56	3.61
110	3.93	4.07	4.44	4.61	3.47	3.57	4.02	4.16	4.58	4.77	3.51	3.62	4.11	4.18	4.71	4.80	3.56	3.61
111	3.94	4.07	4.45	4.62	3.47	3.58	4.03	4.17	4.58	4.77	3.52	3.62	4.11	4.18	4.71	4.80	3.57	3.62
112	3.94	4.08	4.45	4.62	3.48	3.58	4.03	4.17	4.59	4.78	3.52	3.63	4.12	4.18	4.72	4.81	3.57	3.62
113	3.94	4.08	4.45	4.62	3.47	3.58	4.03	4.17	4.59	4.78	3.52	3.62	4.12	4.19	4.72	4.81	3.57	3.62
114	3.95	4.09	4.46	4.63	3.48	3.59	4.04	4.19	4.60	4.79	3.53	3.63	4.13	4.20	4.73	4.82	3.58	3.63
115	3.95	4.09	4.47	4.64	3.49	3.59	4.04	4.19	4.61	4.80	3.53	3.64	4.14	4.20	4.74	4.83	3.59	3.64
116	3.97	4.11	4.48	4.66	3.50	3.61	4.06	4.21	4.62	4.82	3.55	3.66	4.15	4.22	4.76	4.85	3.61	3.65
117	3.98	4.12	4.50	4.67	3.51	3.62	4.08	4.23	4.64	4.84	3.56	3.67	4.18	4.24	4.78	4.88	3.62	3.67
118	4.00	4.15	4.52	4.70	3.53	3.64	4.10	4.26	4.67	4.87	3.59	3.70	4.20	4.27	4.81	4.91	3.64	3.70
119	3.92	4.05	4.42	4.58	3.47	3.57	4.00	4.13	4.54	4.71	3.51	3.60	4.08	4.14	4.66	4.74	3.55	3.59
120	3.91	4.04	4.41	4.57	3.46	3.56	3.99	4.12	4.53	4.70	3.50	3.59	4.07	4.13	4.65	4.73	3.54	3.58
MIN	**3.90**	**4.03**	**4.40**	**4.56**	**3.43**	**3.53**	**3.98**	**4.12**	**4.53**	**4.70**	**3.47**	**3.57**	**4.06**	**4.12**	**4.65**	**4.73**	**3.52**	**3.57**
MAX	**4.00**	**4.15**	**4.52**	**4.70**	**3.53**	**3.64**	**4.10**	**4.26**	**4.67**	**4.87**	**3.59**	**3.70**	**4.20**	**4.27**	**4.81**	**4.91**	**3.64**	**3.70**
AVE	**3.92**	**4.05**	**4.43**	**4.59**	**3.46**	**3.56**	**4.01**	**4.15**	**4.56**	**4.74**	**3.50**	**3.60**	**4.09**	**4.16**	**4.69**	**4.78**	**3.55**	**3.60**

Table C- 14. Reliability Indices for Composite Rolled I-shaped Girdes for ADTT 250 and L=120, 200, 300ft.

	L=120 ft						**L=200 ft**						**L=300 ft**					
Φ	**1.00**		**0.95**		**1.05**		**1.00**		**0.95**		**1.05**		**1.00**		**0.95**		**1.05**	
# \ D/(D+L)	**0.55**	**0.60**	**0.55**	**0.60**	**0.55**	**0.60**	**0.65**	**0.70**	**0.65**	**0.70**	**0.65**	**0.70**	**0.45**	**0.55**	**0.45**	**0.55**	**0.45**	**0.55**
1	4.26	4.30	4.88	4.95	3.69	3.72	4.56	4.52	5.24	5.22	3.94	3.88	4.87	4.94	5.49	5.61	4.31	4.34
2	4.25	4.30	4.87	4.94	3.68	3.71	4.55	4.51	5.24	5.21	3.93	3.87	4.86	4.93	5.48	5.60	4.30	4.33
3	4.24	4.29	4.87	4.94	3.68	3.70	4.55	4.50	5.23	5.20	3.93	3.87	4.86	4.93	5.48	5.59	4.29	4.32
4	4.26	4.31	4.88	4.95	3.70	3.72	4.56	4.52	5.24	5.22	3.94	3.89	4.87	4.94	5.49	5.61	4.31	4.34
5	4.25	4.30	4.87	4.94	3.69	3.71	4.55	4.51	5.24	5.21	3.94	3.88	4.87	4.94	5.49	5.60	4.30	4.33
6	4.24	4.29	4.87	4.94	3.68	3.70	4.55	4.51	5.23	5.21	3.93	3.87	4.86	4.93	5.48	5.60	4.29	4.32
7	4.25	4.29	4.87	4.94	3.68	3.70	4.55	4.51	5.24	5.21	3.93	3.87	4.86	4.93	5.49	5.60	4.30	4.33

8	4.25	4.30	4.88	4.95	3.69	3.71	4.56	4.51	5.24	5.22	3.94	3.88	4.87	4.94	5.49	5.61	4.30	4.33
9	4.24	4.29	4.86	4.93	3.68	3.70	4.54	4.50	5.22	5.19	3.92	3.86	4.85	4.92	5.47	5.58	4.29	4.32
10	4.26	4.31	4.88	4.95	3.70	3.72	4.56	4.52	5.24	5.21	3.94	3.88	4.87	4.94	5.49	5.60	4.31	4.34
11	4.23	4.27	4.84	4.91	3.67	3.69	4.52	4.48	5.20	5.17	3.91	3.85	4.84	4.90	5.45	5.56	4.28	4.31
12	4.27	4.31	4.89	4.96	3.70	3.73	4.57	4.52	5.25	5.22	3.95	3.89	4.88	4.95	5.50	5.61	4.32	4.35
13	4.26	4.30	4.88	4.95	3.69	3.72	4.56	4.52	5.24	5.21	3.94	3.88	4.87	4.94	5.49	5.60	4.31	4.34
14	4.25	4.30	4.87	4.94	3.69	3.71	4.55	4.51	5.23	5.21	3.93	3.87	4.86	4.93	5.48	5.60	4.30	4.33
15	4.25	4.29	4.87	4.94	3.68	3.71	4.55	4.51	5.23	5.21	3.93	3.87	4.86	4.93	5.48	5.60	4.30	4.33
16	4.25	4.30	4.87	4.94	3.68	3.71	4.55	4.51	5.24	5.21	3.93	3.87	4.86	4.93	5.49	5.60	4.30	4.33
17	4.25	4.29	4.87	4.94	3.68	3.70	4.55	4.51	5.24	5.22	3.93	3.87	4.86	4.93	5.49	5.60	4.30	4.33
18	4.25	4.30	4.87	4.94	3.69	3.71	4.56	4.51	5.24	5.21	3.94	3.88	4.87	4.94	5.49	5.60	4.30	4.33
19	4.25	4.30	4.88	4.95	3.69	3.71	4.56	4.52	5.24	5.22	3.94	3.88	4.87	4.94	5.49	5.61	4.30	4.33
20	4.25	4.29	4.87	4.94	3.68	3.71	4.55	4.50	5.23	5.20	3.93	3.87	4.86	4.93	5.48	5.59	4.30	4.33
21	4.25	4.29	4.87	4.94	3.68	3.71	4.55	4.51	5.24	5.21	3.93	3.87	4.86	4.93	5.49	5.60	4.30	4.33
22	4.25	4.29	4.87	4.94	3.68	3.70	4.55	4.51	5.24	5.21	3.93	3.87	4.86	4.93	5.49	5.61	4.30	4.33
23	4.25	4.30	4.87	4.94	3.69	3.71	4.55	4.51	5.24	5.21	3.93	3.88	4.87	4.94	5.49	5.60	4.30	4.33
24	4.25	4.30	4.88	4.95	3.69	3.71	4.56	4.51	5.25	5.22	3.94	3.88	4.87	4.94	5.49	5.61	4.30	4.33
25	4.25	4.30	4.88	4.95	3.68	3.70	4.56	4.51	5.25	5.22	3.93	3.87	4.87	4.94	5.49	5.61	4.30	4.33
26	4.25	4.30	4.87	4.94	3.69	3.72	4.55	4.51	5.22	5.20	3.94	3.88	4.86	4.93	5.48	5.59	4.30	4.33
27	4.25	4.29	4.86	4.93	3.68	3.71	4.54	4.50	5.22	5.19	3.93	3.87	4.86	4.92	5.47	5.58	4.30	4.32
28	4.24	4.29	4.87	4.94	3.68	3.70	4.55	4.50	5.23	5.20	3.93	3.87	4.86	4.93	5.48	5.59	4.30	4.32
29	4.25	4.30	4.87	4.94	3.69	3.71	4.55	4.51	5.23	5.20	3.93	3.88	4.86	4.93	5.48	5.59	4.30	4.33
30	4.25	4.30	4.88	4.95	3.69	3.71	4.56	4.51	5.24	5.22	3.94	3.88	4.87	4.94	5.49	5.61	4.30	4.33
31	4.25	4.30	4.88	4.95	3.68	3.71	4.56	4.51	5.24	5.22	3.93	3.88	4.87	4.94	5.49	5.61	4.30	4.33
32	4.25	4.29	4.87	4.95	3.68	3.70	4.55	4.51	5.24	5.22	3.93	3.87	4.86	4.94	5.49	5.61	4.30	4.33
33	4.24	4.29	4.87	4.94	3.67	3.70	4.55	4.50	5.24	5.21	3.92	3.86	4.86	4.93	5.48	5.60	4.29	4.32
34	4.26	4.31	4.88	4.95	3.69	3.72	4.56	4.52	5.25	5.22	3.94	3.88	4.87	4.95	5.50	5.61	4.31	4.34
35	4.25	4.29	4.87	4.94	3.68	3.70	4.55	4.51	5.24	5.22	3.93	3.87	4.86	4.93	5.49	5.60	4.30	4.33
36	4.24	4.29	4.86	4.93	3.68	3.71	4.54	4.50	5.21	5.18	3.93	3.87	4.85	4.92	5.47	5.57	4.30	4.32
37	4.24	4.29	4.86	4.93	3.68	3.71	4.54	4.50	5.22	5.19	3.93	3.87	4.86	4.92	5.47	5.58	4.30	4.32
38	4.25	4.30	4.87	4.94	3.68	3.71	4.55	4.51	5.24	5.21	3.93	3.87	4.86	4.93	5.48	5.60	4.30	4.33
39	4.25	4.29	4.87	4.94	3.68	3.71	4.55	4.50	5.23	5.20	3.93	3.87	4.86	4.93	5.48	5.59	4.30	4.33
40	4.25	4.30	4.88	4.95	3.69	3.71	4.56	4.51	5.24	5.21	3.93	3.88	4.87	4.94	5.49	5.60	4.30	4.33
41	4.25	4.29	4.87	4.94	3.68	3.70	4.55	4.51	5.24	5.22	3.93	3.87	4.86	4.94	5.49	5.61	4.30	4.33
42	4.24	4.29	4.87	4.94	3.67	3.70	4.55	4.51	5.24	5.22	3.92	3.87	4.86	4.93	5.49	5.61	4.29	4.32
43	4.25	4.30	4.88	4.95	3.68	3.71	4.56	4.52	5.25	5.22	3.93	3.88	4.87	4.94	5.49	5.61	4.30	4.33
44	4.24	4.29	4.87	4.94	3.67	3.70	4.55	4.50	5.24	5.21	3.92	3.86	4.86	4.93	5.48	5.60	4.29	4.32
45	4.24	4.29	4.86	4.93	3.68	3.71	4.54	4.50	5.22	5.19	3.93	3.87	4.86	4.92	5.47	5.58	4.30	4.32
46	4.25	4.29	4.87	4.94	3.68	3.71	4.55	4.51	5.23	5.20	3.93	3.87	4.86	4.93	5.48	5.59	4.30	4.33
47	4.25	4.29	4.86	4.93	3.69	3.71	4.54	4.50	5.22	5.19	3.93	3.87	4.86	4.92	5.47	5.58	4.30	4.33
48	4.25	4.30	4.87	4.94	3.69	3.71	4.55	4.51	5.24	5.21	3.93	3.88	4.87	4.93	5.48	5.60	4.30	4.33
49	4.25	4.29	4.87	4.95	3.68	3.70	4.55	4.51	5.24	5.22	3.93	3.87	4.86	4.94	5.49	5.61	4.30	4.33
50	4.24	4.28	4.87	4.94	3.67	3.69	4.54	4.50	5.24	5.21	3.92	3.86	4.86	4.93	5.48	5.60	4.29	4.32
51	4.24	4.29	4.87	4.94	3.67	3.70	4.55	4.51	5.24	5.22	3.92	3.87	4.86	4.93	5.49	5.61	4.29	4.32
52	4.25	4.30	4.88	4.95	3.69	3.71	4.56	4.52	5.24	5.22	3.94	3.88	4.87	4.94	5.49	5.61	4.30	4.33
53	4.24	4.29	4.87	4.94	3.67	3.70	4.55	4.50	5.24	5.21	3.92	3.86	4.86	4.93	5.48	5.60	4.29	4.32
54	4.27	4.31	4.89	4.97	3.69	3.72	4.57	4.53	5.27	5.24	3.95	3.89	4.88	4.96	5.51	5.63	4.31	4.35
55	4.28	4.32	4.91	4.98	3.71	3.73	4.59	4.55	5.28	5.25	3.96	3.90	4.89	4.97	5.52	5.65	4.32	4.36

56	4.28	4.33	4.91	4.99	3.71	3.74	4.59	4.55	5.29	5.26	3.97	3.91	4.90	4.98	5.53	5.65	4.33	4.37
57	4.28	4.33	4.91	4.98	3.71	3.74	4.59	4.55	5.28	5.26	3.97	3.91	4.90	4.97	5.53	5.65	4.33	4.37
58	4.24	4.28	4.85	4.91	3.69	3.71	4.53	4.49	5.19	5.16	3.92	3.87	4.85	4.91	5.45	5.55	4.29	4.32
59	4.24	4.28	4.85	4.92	3.68	3.71	4.53	4.49	5.20	5.17	3.93	3.87	4.85	4.91	5.46	5.56	4.29	4.32
60	4.25	4.29	4.86	4.93	3.68	3.71	4.54	4.50	5.22	5.19	3.93	3.87	4.86	4.92	5.47	5.58	4.30	4.32
61	4.25	4.29	4.86	4.92	3.69	3.71	4.54	4.49	5.20	5.18	3.93	3.87	4.85	4.92	5.46	5.56	4.30	4.32
62	4.25	4.30	4.87	4.94	3.69	3.71	4.55	4.51	5.23	5.20	3.93	3.88	4.86	4.93	5.48	5.59	4.30	4.33
63	4.25	4.30	4.87	4.94	3.68	3.71	4.55	4.51	5.24	5.21	3.93	3.87	4.86	4.94	5.48	5.60	4.30	4.33
64	4.24	4.29	4.87	4.94	3.67	3.70	4.55	4.51	5.24	5.21	3.93	3.87	4.86	4.93	5.48	5.60	4.29	4.32
65	4.24	4.29	4.87	4.94	3.67	3.70	4.55	4.51	5.24	5.22	3.93	3.87	4.86	4.94	5.49	5.61	4.29	4.32
66	4.26	4.31	4.88	4.95	3.69	3.72	4.56	4.52	5.25	5.22	3.94	3.88	4.87	4.95	5.50	5.61	4.31	4.34
67	4.25	4.30	4.88	4.95	3.68	3.70	4.56	4.51	5.25	5.22	3.93	3.87	4.87	4.94	5.49	5.61	4.30	4.33
68	4.27	4.32	4.90	4.98	3.70	3.73	4.58	4.54	5.28	5.25	3.96	3.90	4.89	4.97	5.52	5.64	4.32	4.35
69	4.28	4.33	4.91	4.98	3.71	3.74	4.59	4.55	5.28	5.26	3.96	3.91	4.90	4.97	5.53	5.65	4.33	4.36
70	4.28	4.33	4.91	4.99	3.71	3.74	4.59	4.55	5.29	5.26	3.97	3.91	4.90	4.98	5.53	5.65	4.33	4.36
71	4.28	4.33	4.91	4.98	3.71	3.74	4.59	4.55	5.28	5.26	3.97	3.91	4.90	4.98	5.53	5.65	4.33	4.37
72	4.29	4.34	4.92	4.99	3.72	3.75	4.60	4.56	5.29	5.27	3.97	3.92	4.91	4.98	5.53	5.65	4.34	4.37
73	4.28	4.33	4.91	4.98	3.71	3.73	4.59	4.55	5.28	5.25	3.96	3.91	4.89	4.97	5.52	5.64	4.33	4.36
74	4.29	4.34	4.92	4.99	3.72	3.75	4.60	4.56	5.30	5.27	3.98	3.92	4.91	4.98	5.54	5.66	4.34	4.37
75	4.29	4.34	4.92	5.00	3.72	3.75	4.60	4.56	5.30	5.27	3.98	3.92	4.91	4.98	5.54	5.66	4.34	4.38
76	4.24	4.28	4.85	4.91	3.68	3.71	4.53	4.49	5.19	5.16	3.93	3.87	4.85	4.91	5.45	5.55	4.29	4.32
77	4.25	4.29	4.86	4.93	3.68	3.71	4.54	4.50	5.22	5.19	3.93	3.87	4.86	4.92	5.47	5.58	4.30	4.33
78	4.24	4.28	4.85	4.92	3.68	3.71	4.53	4.49	5.20	5.17	3.92	3.87	4.85	4.91	5.45	5.55	4.29	4.32
79	4.25	4.29	4.86	4.93	3.68	3.71	4.55	4.50	5.22	5.19	3.93	3.87	4.86	4.92	5.47	5.58	4.30	4.33
80	4.25	4.30	4.87	4.94	3.68	3.71	4.55	4.51	5.23	5.20	3.93	3.87	4.86	4.93	5.48	5.59	4.30	4.33
81	4.24	4.29	4.87	4.94	3.67	3.70	4.55	4.50	5.23	5.20	3.92	3.86	4.86	4.93	5.48	5.59	4.29	4.32
82	4.25	4.30	4.87	4.94	3.69	3.71	4.55	4.51	5.23	5.20	3.94	3.88	4.86	4.93	5.48	5.59	4.30	4.33
83	4.24	4.29	4.87	4.94	3.67	3.70	4.55	4.50	5.24	5.21	3.92	3.87	4.86	4.93	5.48	5.60	4.29	4.32
84	4.27	4.31	4.90	4.97	3.69	3.72	4.57	4.53	5.27	5.24	3.95	3.89	4.88	4.96	5.51	5.63	4.31	4.35
85	4.28	4.33	4.91	4.99	3.71	3.74	4.59	4.55	5.29	5.26	3.97	3.91	4.90	4.98	5.53	5.65	4.33	4.36
86	4.29	4.34	4.91	4.99	3.71	3.74	4.60	4.56	5.29	5.26	3.97	3.91	4.90	4.98	5.53	5.65	4.33	4.37
87	4.26	4.31	4.89	4.96	3.70	3.72	4.57	4.53	5.26	5.24	3.95	3.89	4.88	4.96	5.51	5.63	4.31	4.35
88	4.28	4.33	4.91	4.98	3.71	3.74	4.59	4.55	5.28	5.26	3.97	3.91	4.90	4.97	5.52	5.64	4.33	4.36
89	4.29	4.34	4.92	4.99	3.72	3.75	4.60	4.56	5.29	5.27	3.97	3.92	4.91	4.98	5.54	5.65	4.34	4.37
90	4.30	4.34	4.92	5.00	3.72	3.75	4.61	4.57	5.30	5.28	3.98	3.92	4.91	4.99	5.54	5.66	4.34	4.38
91	4.30	4.35	4.93	5.00	3.72	3.75	4.61	4.57	5.30	5.28	3.98	3.92	4.91	4.99	5.54	5.66	4.34	4.38
92	4.31	4.36	4.94	5.02	3.74	3.77	4.63	4.59	5.32	5.30	4.00	3.94	4.93	5.01	5.56	5.69	4.36	4.39
93	4.25	4.30	4.87	4.93	3.69	3.71	4.55	4.50	5.22	5.19	3.93	3.88	4.86	4.93	5.47	5.58	4.30	4.33
94	4.25	4.29	4.87	4.94	3.68	3.71	4.55	4.51	5.23	5.21	3.93	3.87	4.86	4.93	5.48	5.60	4.30	4.33
95	4.27	4.32	4.90	4.97	3.70	3.72	4.58	4.53	5.27	5.24	3.95	3.89	4.89	4.96	5.51	5.63	4.32	4.35
96	4.28	4.33	4.91	4.98	3.71	3.74	4.59	4.55	5.29	5.26	3.97	3.91	4.90	4.97	5.53	5.65	4.33	4.36
97	4.28	4.33	4.91	4.98	3.71	3.74	4.59	4.55	5.28	5.25	3.96	3.91	4.90	4.97	5.52	5.64	4.33	4.36
98	4.29	4.34	4.92	5.00	3.72	3.75	4.61	4.56	5.30	5.27	3.98	3.92	4.91	4.99	5.54	5.66	4.34	4.37
99	4.29	4.34	4.92	5.00	3.72	3.75	4.60	4.56	5.30	5.27	3.98	3.92	4.91	4.98	5.54	5.66	4.34	4.38
100	4.30	4.34	4.93	5.00	3.72	3.75	4.61	4.57	5.30	5.27	3.98	3.92	4.91	4.99	5.54	5.67	4.34	4.38
101	4.31	4.36	4.94	5.01	3.73	3.76	4.62	4.58	5.32	5.29	3.99	3.93	4.92	5.01	5.56	5.68	4.35	4.39
102	4.32	4.38	4.96	5.04	3.75	3.78	4.65	4.60	5.34	5.32	4.01	3.95	4.94	5.02	5.58	5.70	4.37	4.41
103	4.35	4.40	4.99	5.06	3.77	3.80	4.67	4.63	5.38	5.35	4.04	3.98	4.97	5.05	5.60	5.74	4.39	4.43

104	4.24	4.28	4.86	4.93	3.67	3.69	4.54	4.49	5.22	5.19	3.92	3.86	4.85	4.92	5.47	5.58	4.29	4.31
105	4.24	4.28	4.85	4.92	3.68	3.71	4.53	4.49	5.20	5.17	3.92	3.87	4.85	4.91	5.46	5.56	4.29	4.32
106	4.24	4.29	4.86	4.93	3.67	3.70	4.54	4.50	5.22	5.19	3.92	3.86	4.85	4.92	5.47	5.58	4.29	4.32
107	4.25	4.30	4.88	4.95	3.68	3.71	4.56	4.51	5.24	5.22	3.93	3.88	4.87	4.94	5.49	5.60	4.30	4.33
108	4.27	4.32	4.90	4.98	3.70	3.73	4.58	4.54	5.27	5.25	3.96	3.90	4.89	4.97	5.52	5.64	4.32	4.36
109	4.28	4.33	4.91	4.99	3.71	3.74	4.59	4.55	5.28	5.26	3.97	3.91	4.90	4.97	5.53	5.65	4.33	4.36
110	4.28	4.33	4.91	4.99	3.71	3.74	4.59	4.55	5.28	5.26	3.97	3.91	4.90	4.97	5.53	5.65	4.33	4.37
111	4.29	4.34	4.92	4.99	3.72	3.74	4.60	4.55	5.29	5.26	3.97	3.91	4.91	4.98	5.53	5.65	4.34	4.37
112	4.29	4.34	4.92	4.99	3.72	3.75	4.60	4.56	5.29	5.27	3.98	3.92	4.91	4.98	5.53	5.65	4.34	4.37
113	4.29	4.34	4.92	5.00	3.72	3.75	4.60	4.56	5.30	5.27	3.98	3.92	4.91	4.98	5.54	5.66	4.34	4.37
114	4.30	4.36	4.93	5.01	3.73	3.76	4.61	4.58	5.31	5.28	3.99	3.93	4.92	5.00	5.55	5.67	4.35	4.38
115	4.31	4.37	4.95	5.02	3.74	3.77	4.63	4.59	5.32	5.30	4.00	3.94	4.93	5.01	5.56	5.69	4.36	4.40
116	4.33	4.38	4.97	5.05	3.75	3.78	4.65	4.61	5.35	5.33	4.01	3.96	4.95	5.03	5.59	5.71	4.38	4.41
117	4.36	4.41	4.99	5.07	3.77	3.80	4.68	4.64	5.38	5.36	4.04	3.99	4.97	5.06	5.61	5.74	4.40	4.44
118	4.38	4.44	5.02	5.10	3.80	3.83	4.71	4.67	5.42	5.39	4.07	4.02	5.00	5.09	5.64	5.78	4.43	4.47
119	4.24	4.29	4.85	4.91	3.69	3.71	4.53	4.48	5.18	5.15	3.93	3.87	4.85	4.90	5.44	5.54	4.30	4.32
120	4.23	4.27	4.84	4.90	3.68	3.70	4.52	4.47	5.17	5.14	3.92	3.86	4.84	4.89	5.43	5.53	4.29	4.31
MIN	**4.23**	**4.27**	**4.84**	**4.90**	**3.67**	**3.69**	**4.52**	**4.47**	**5.17**	**5.14**	**3.91**	**3.85**	**4.84**	**4.89**	**5.43**	**5.53**	**4.28**	**4.31**
MAX	**4.38**	**4.44**	**5.02**	**5.10**	**3.80**	**3.83**	**4.71**	**4.67**	**5.42**	**5.39**	**4.07**	**4.02**	**5.00**	**5.09**	**5.64**	**5.78**	**4.43**	**4.47**
AVE	**4.26**	**4.31**	**4.89**	**4.96**	**3.70**	**3.72**	**4.57**	**4.53**	**5.25**	**5.23**	**3.95**	**3.89**	**4.88**	**4.95**	**5.50**	**5.62**	**4.31**	**4.34**

Table C- 15. Reliability Indices for Composite Rolled I-shaped Girdes for ADTT 1’000 and L=30, 60, 90ft.

	L=30 ft						**L=60 ft**						**L=90 ft**					
Φ	**1.00**		**0.95**		**1.05**		**1.00**		**0.95**		**1.05**		**1.00**		**0.95**		**1.05**	
# \ D/(D+L)	**0.25**	**0.35**	**0.25**	**0.35**	**0.25**	**0.35**	**0.40**	**0.50**	**0.40**	**0.50**	**0.40**	**0.50**	**0.50**	**0.55**	**0.50**	**0.55**	**0.50**	**0.55**
1	3.80	3.93	4.30	4.46	3.34	3.45	3.89	4.03	4.43	4.62	3.39	3.50	4.03	4.10	4.62	4.71	3.50	3.54
2	3.79	3.92	4.29	4.46	3.34	3.44	3.88	4.03	4.43	4.61	3.38	3.49	4.03	4.09	4.61	4.70	3.49	3.53
3	3.79	3.92	4.29	4.45	3.33	3.44	3.88	4.02	4.42	4.61	3.38	3.48	4.02	4.09	4.61	4.70	3.48	3.53
4	3.80	3.94	4.30	4.47	3.35	3.45	3.89	4.04	4.44	4.62	3.40	3.50	4.04	4.10	4.62	4.71	3.50	3.55
5	3.80	3.93	4.29	4.46	3.34	3.45	3.89	4.03	4.43	4.62	3.39	3.49	4.03	4.10	4.62	4.71	3.49	3.54
6	3.79	3.92	4.29	4.45	3.33	3.43	3.88	4.02	4.42	4.61	3.38	3.48	4.02	4.09	4.61	4.70	3.48	3.53
7	3.79	3.92	4.29	4.45	3.33	3.44	3.88	4.02	4.42	4.61	3.38	3.49	4.02	4.09	4.61	4.70	3.49	3.53
8	3.80	3.93	4.30	4.46	3.35	3.45	3.89	4.03	4.43	4.62	3.39	3.50	4.03	4.10	4.62	4.71	3.50	3.54
9	3.79	3.92	4.28	4.45	3.33	3.44	3.88	4.02	4.42	4.61	3.38	3.48	4.02	4.08	4.61	4.69	3.48	3.53
10	3.80	3.94	4.30	4.47	3.35	3.45	3.89	4.04	4.44	4.62	3.40	3.50	4.04	4.10	4.62	4.71	3.50	3.55
11	3.78	3.91	4.28	4.44	3.33	3.43	3.87	4.01	4.41	4.59	3.37	3.48	4.01	4.07	4.59	4.68	3.48	3.52
12	3.81	3.94	4.31	4.47	3.36	3.46	3.90	4.04	4.44	4.63	3.40	3.51	4.04	4.11	4.63	4.72	3.51	3.55
13	3.80	3.94	4.30	4.47	3.35	3.45	3.89	4.04	4.44	4.62	3.40	3.50	4.04	4.10	4.62	4.71	3.50	3.55
14	3.79	3.93	4.29	4.46	3.34	3.44	3.88	4.03	4.43	4.62	3.39	3.49	4.03	4.09	4.62	4.71	3.49	3.54
15	3.79	3.92	4.29	4.46	3.34	3.44	3.88	4.02	4.43	4.61	3.38	3.49	4.02	4.09	4.61	4.70	3.49	3.53
16	3.79	3.92	4.29	4.46	3.34	3.44	3.88	4.02	4.43	4.61	3.38	3.49	4.02	4.09	4.61	4.71	3.49	3.53
17	3.79	3.92	4.29	4.45	3.33	3.43	3.88	4.02	4.42	4.61	3.38	3.48	4.02	4.09	4.61	4.70	3.48	3.53
18	3.80	3.93	4.29	4.46	3.34	3.45	3.89	4.03	4.43	4.62	3.39	3.49	4.03	4.10	4.62	4.71	3.49	3.54
19	3.80	3.93	4.29	4.46	3.34	3.44	3.88	4.03	4.43	4.62	3.39	3.49	4.03	4.10	4.62	4.71	3.49	3.54
20	3.79	3.93	4.29	4.46	3.34	3.44	3.88	4.03	4.43	4.61	3.39	3.49	4.03	4.09	4.61	4.70	3.49	3.54

21	3.79	3.92	4.29	4.46	3.33	3.44	3.88	4.02	4.42	4.61	3.38	3.49	4.02	4.09	4.61	4.70	3.49	3.53
22	3.79	3.92	4.29	4.45	3.33	3.43	3.87	4.02	4.42	4.61	3.38	3.48	4.02	4.09	4.61	4.70	3.48	3.53
23	3.79	3.93	4.29	4.46	3.34	3.44	3.88	4.03	4.43	4.62	3.39	3.49	4.03	4.09	4.62	4.71	3.49	3.54
24	3.79	3.93	4.29	4.46	3.34	3.44	3.88	4.03	4.43	4.62	3.38	3.49	4.03	4.09	4.62	4.71	3.49	3.54
25	3.79	3.92	4.29	4.46	3.33	3.43	3.88	4.02	4.42	4.62	3.38	3.48	4.02	4.09	4.62	4.71	3.48	3.53
26	3.80	3.93	4.30	4.46	3.35	3.45	3.89	4.03	4.43	4.62	3.39	3.50	4.03	4.10	4.62	4.70	3.50	3.54
27	3.79	3.92	4.29	4.45	3.34	3.44	3.88	4.02	4.42	4.61	3.38	3.49	4.02	4.09	4.61	4.70	3.49	3.53
28	3.79	3.92	4.29	4.45	3.33	3.44	3.88	4.02	4.42	4.61	3.38	3.48	4.02	4.09	4.61	4.70	3.48	3.53
29	3.80	3.93	4.29	4.46	3.34	3.44	3.88	4.03	4.43	4.62	3.39	3.49	4.03	4.09	4.62	4.71	3.49	3.54
30	3.79	3.93	4.29	4.46	3.34	3.44	3.88	4.03	4.43	4.62	3.39	3.49	4.03	4.09	4.62	4.71	3.49	3.54
31	3.79	3.92	4.29	4.46	3.34	3.44	3.88	4.03	4.43	4.62	3.38	3.49	4.03	4.09	4.62	4.71	3.49	3.53
32	3.79	3.92	4.29	4.45	3.33	3.43	3.88	4.02	4.42	4.61	3.38	3.48	4.02	4.09	4.61	4.71	3.48	3.53
33	3.78	3.91	4.28	4.45	3.32	3.43	3.87	4.01	4.42	4.61	3.37	3.48	4.01	4.08	4.61	4.70	3.48	3.52
34	3.80	3.93	4.30	4.46	3.34	3.45	3.89	4.03	4.43	4.62	3.39	3.50	4.03	4.10	4.62	4.72	3.50	3.54
35	3.79	3.92	4.29	4.45	3.33	3.43	3.88	4.02	4.42	4.61	3.38	3.48	4.02	4.09	4.61	4.70	3.48	3.53
36	3.79	3.92	4.29	4.45	3.34	3.44	3.88	4.02	4.42	4.61	3.39	3.49	4.02	4.09	4.61	4.69	3.49	3.53
37	3.79	3.92	4.29	4.45	3.34	3.44	3.88	4.02	4.42	4.61	3.38	3.49	4.02	4.09	4.61	4.70	3.49	3.53
38	3.79	3.92	4.29	4.46	3.34	3.44	3.88	4.02	4.43	4.61	3.38	3.49	4.02	4.09	4.61	4.70	3.49	3.53
39	3.79	3.93	4.29	4.46	3.34	3.44	3.88	4.03	4.43	4.61	3.38	3.49	4.03	4.09	4.61	4.70	3.49	3.54
40	3.79	3.93	4.29	4.46	3.34	3.44	3.88	4.03	4.43	4.62	3.38	3.49	4.03	4.09	4.62	4.71	3.49	3.54
41	3.79	3.92	4.29	4.45	3.33	3.43	3.87	4.02	4.42	4.61	3.38	3.48	4.02	4.09	4.61	4.70	3.48	3.53
42	3.78	3.91	4.28	4.45	3.32	3.43	3.87	4.02	4.42	4.61	3.37	3.48	4.02	4.08	4.61	4.70	3.48	3.52
43	3.79	3.93	4.29	4.46	3.34	3.44	3.88	4.03	4.43	4.62	3.38	3.49	4.03	4.09	4.62	4.71	3.49	3.54
44	3.78	3.91	4.28	4.45	3.33	3.43	3.87	4.01	4.42	4.61	3.37	3.48	4.01	4.08	4.61	4.70	3.48	3.52
45	3.79	3.92	4.29	4.45	3.34	3.44	3.88	4.02	4.42	4.61	3.38	3.49	4.02	4.09	4.61	4.70	3.49	3.53
46	3.79	3.92	4.29	4.46	3.34	3.44	3.88	4.02	4.43	4.61	3.38	3.49	4.02	4.09	4.61	4.70	3.49	3.53
47	3.79	3.93	4.29	4.46	3.34	3.44	3.88	4.03	4.43	4.61	3.39	3.49	4.03	4.09	4.61	4.70	3.49	3.54
48	3.79	3.93	4.29	4.46	3.34	3.44	3.88	4.03	4.43	4.62	3.39	3.49	4.03	4.09	4.62	4.71	3.49	3.54
49	3.79	3.92	4.29	4.45	3.33	3.43	3.88	4.02	4.42	4.61	3.38	3.48	4.02	4.09	4.61	4.71	3.48	3.53
50	3.77	3.91	4.28	4.44	3.32	3.42	3.86	4.01	4.41	4.61	3.36	3.47	4.01	4.08	4.61	4.70	3.47	3.52
51	3.78	3.91	4.28	4.45	3.33	3.43	3.87	4.02	4.42	4.61	3.37	3.48	4.02	4.08	4.61	4.70	3.48	3.52
52	3.79	3.93	4.29	4.46	3.34	3.44	3.88	4.03	4.43	4.62	3.38	3.49	4.03	4.10	4.62	4.71	3.49	3.54
53	3.78	3.91	4.28	4.45	3.32	3.43	3.87	4.01	4.42	4.61	3.37	3.48	4.01	4.08	4.61	4.70	3.48	3.52
54	3.80	3.93	4.30	4.47	3.34	3.44	3.89	4.04	4.44	4.63	3.39	3.50	4.04	4.10	4.63	4.72	3.50	3.54
55	3.81	3.94	4.31	4.48	3.35	3.46	3.90	4.05	4.45	4.64	3.40	3.51	4.05	4.12	4.64	4.74	3.51	3.55
56	3.81	3.95	4.32	4.49	3.36	3.46	3.91	4.06	4.46	4.65	3.41	3.52	4.06	4.12	4.65	4.74	3.52	3.56
57	3.82	3.95	4.32	4.49	3.36	3.47	3.91	4.06	4.46	4.65	3.41	3.52	4.06	4.13	4.65	4.74	3.52	3.56
58	3.80	3.93	4.29	4.45	3.35	3.45	3.88	4.02	4.42	4.60	3.39	3.49	4.02	4.09	4.60	4.69	3.49	3.54
59	3.79	3.93	4.29	4.45	3.34	3.44	3.88	4.02	4.42	4.60	3.39	3.49	4.02	4.09	4.60	4.69	3.49	3.54
60	3.79	3.92	4.29	4.46	3.34	3.44	3.88	4.02	4.42	4.61	3.38	3.49	4.02	4.09	4.61	4.70	3.49	3.53
61	3.80	3.93	4.29	4.46	3.35	3.45	3.88	4.03	4.42	4.61	3.39	3.49	4.03	4.09	4.61	4.69	3.49	3.54
62	3.80	3.93	4.29	4.46	3.34	3.44	3.88	4.03	4.43	4.62	3.39	3.49	4.03	4.09	4.62	4.70	3.49	3.54
63	3.79	3.92	4.29	4.46	3.34	3.44	3.88	4.03	4.43	4.62	3.38	3.49	4.03	4.09	4.62	4.71	3.49	3.53
64	3.78	3.92	4.28	4.45	3.33	3.43	3.87	4.02	4.42	4.61	3.37	3.48	4.02	4.09	4.61	4.70	3.48	3.52
65	3.78	3.91	4.28	4.45	3.32	3.43	3.87	4.02	4.42	4.61	3.37	3.48	4.02	4.08	4.61	4.70	3.48	3.52
66	3.80	3.93	4.30	4.47	3.34	3.45	3.89	4.03	4.43	4.62	3.39	3.50	4.03	4.10	4.62	4.72	3.50	3.54
67	3.79	3.92	4.29	4.46	3.33	3.43	3.88	4.02	4.43	4.62	3.38	3.48	4.02	4.09	4.62	4.71	3.48	3.53
68	3.81	3.94	4.31	4.48	3.35	3.45	3.90	4.05	4.45	4.64	3.40	3.51	4.05	4.11	4.64	4.73	3.51	3.55

69	3.81	3.95	4.31	4.49	3.35	3.46	3.91	4.05	4.45	4.65	3.40	3.51	4.05	4.12	4.65	4.74	3.51	3.56
70	3.81	3.95	4.31	4.49	3.35	3.46	3.90	4.05	4.46	4.65	3.40	3.51	4.05	4.12	4.65	4.74	3.51	3.56
71	3.81	3.95	4.32	4.49	3.36	3.46	3.91	4.05	4.46	4.65	3.41	3.52	4.05	4.12	4.65	4.74	3.52	3.56
72	3.82	3.96	4.32	4.49	3.37	3.47	3.91	4.06	4.46	4.66	3.41	3.52	4.06	4.13	4.66	4.75	3.52	3.57
73	3.81	3.95	4.31	4.48	3.36	3.46	3.90	4.05	4.45	4.64	3.40	3.51	4.05	4.12	4.64	4.74	3.51	3.56
74	3.82	3.96	4.32	4.50	3.37	3.47	3.92	4.06	4.47	4.66	3.42	3.53	4.06	4.13	4.66	4.75	3.53	3.57
75	3.82	3.96	4.32	4.50	3.37	3.47	3.92	4.07	4.47	4.66	3.42	3.53	4.07	4.14	4.66	4.76	3.53	3.57
76	3.80	3.93	4.29	4.45	3.34	3.44	3.88	4.02	4.42	4.60	3.39	3.49	4.02	4.09	4.60	4.69	3.49	3.54
77	3.79	3.93	4.29	4.46	3.34	3.44	3.88	4.03	4.43	4.61	3.39	3.49	4.03	4.09	4.61	4.70	3.49	3.54
78	3.79	3.93	4.29	4.45	3.34	3.44	3.88	4.02	4.42	4.60	3.39	3.49	4.02	4.09	4.60	4.69	3.49	3.54
79	3.79	3.93	4.29	4.46	3.34	3.44	3.88	4.03	4.43	4.61	3.39	3.49	4.03	4.09	4.61	4.70	3.49	3.54
80	3.79	3.93	4.29	4.46	3.34	3.44	3.88	4.03	4.43	4.62	3.38	3.49	4.03	4.09	4.62	4.70	3.49	3.54
81	3.78	3.91	4.28	4.45	3.32	3.42	3.87	4.01	4.42	4.61	3.37	3.48	4.01	4.08	4.61	4.70	3.48	3.52
82	3.79	3.93	4.29	4.46	3.34	3.44	3.88	4.03	4.43	4.62	3.39	3.49	4.03	4.09	4.62	4.71	3.49	3.54
83	3.78	3.91	4.28	4.45	3.33	3.43	3.87	4.02	4.42	4.61	3.37	3.48	4.02	4.08	4.61	4.70	3.48	3.52
84	3.80	3.93	4.30	4.47	3.34	3.44	3.89	4.04	4.44	4.63	3.39	3.50	4.04	4.11	4.63	4.72	3.50	3.54
85	3.81	3.95	4.32	4.49	3.36	3.46	3.90	4.06	4.46	4.65	3.40	3.51	4.06	4.12	4.65	4.74	3.51	3.56
86	3.82	3.95	4.32	4.49	3.36	3.46	3.91	4.06	4.46	4.65	3.41	3.52	4.06	4.13	4.65	4.74	3.52	3.56
87	3.80	3.93	4.30	4.47	3.34	3.45	3.89	4.04	4.44	4.63	3.39	3.50	4.04	4.11	4.63	4.72	3.50	3.55
88	3.81	3.95	4.31	4.48	3.36	3.46	3.91	4.05	4.46	4.65	3.41	3.51	4.05	4.12	4.65	4.74	3.51	3.56
89	3.82	3.96	4.32	4.49	3.36	3.47	3.91	4.06	4.46	4.66	3.41	3.52	4.06	4.13	4.66	4.75	3.52	3.57
90	3.82	3.96	4.33	4.50	3.37	3.47	3.92	4.06	4.47	4.66	3.42	3.53	4.06	4.14	4.66	4.75	3.53	3.57
91	3.82	3.96	4.33	4.50	3.37	3.47	3.92	4.07	4.47	4.66	3.42	3.52	4.07	4.13	4.66	4.76	3.52	3.57
92	3.83	3.97	4.34	4.51	3.37	3.48	3.93	4.08	4.48	4.68	3.42	3.54	4.08	4.15	4.68	4.77	3.54	3.59
93	3.80	3.93	4.30	4.46	3.35	3.45	3.89	4.03	4.43	4.62	3.39	3.50	4.03	4.10	4.62	4.70	3.50	3.54
94	3.79	3.92	4.29	4.45	3.33	3.43	3.88	4.02	4.42	4.61	3.38	3.49	4.02	4.09	4.61	4.70	3.49	3.53
95	3.80	3.94	4.30	4.47	3.34	3.45	3.89	4.04	4.44	4.63	3.39	3.50	4.04	4.11	4.63	4.73	3.50	3.55
96	3.81	3.95	4.31	4.49	3.35	3.46	3.90	4.05	4.46	4.65	3.40	3.51	4.05	4.12	4.65	4.74	3.51	3.56
97	3.81	3.95	4.31	4.48	3.36	3.46	3.91	4.05	4.45	4.65	3.40	3.51	4.05	4.12	4.65	4.74	3.51	3.56
98	3.82	3.96	4.33	4.50	3.36	3.47	3.92	4.07	4.47	4.66	3.42	3.52	4.07	4.14	4.66	4.75	3.52	3.57
99	3.82	3.96	4.32	4.50	3.36	3.47	3.91	4.07	4.47	4.66	3.41	3.52	4.07	4.13	4.66	4.75	3.52	3.57
100	3.82	3.96	4.33	4.50	3.36	3.47	3.92	4.07	4.47	4.66	3.41	3.52	4.07	4.14	4.66	4.76	3.52	3.57
101	3.83	3.96	4.33	4.51	3.37	3.48	3.92	4.08	4.48	4.67	3.42	3.53	4.08	4.15	4.67	4.77	3.53	3.58
102	3.84	3.98	4.35	4.52	3.38	3.49	3.94	4.09	4.49	4.69	3.43	3.55	4.09	4.16	4.69	4.79	3.55	3.60
103	3.86	4.00	4.37	4.54	3.40	3.51	3.96	4.11	4.51	4.72	3.45	3.57	4.11	4.19	4.72	4.82	3.57	3.62
104	3.78	3.91	4.28	4.44	3.32	3.42	3.87	4.01	4.41	4.60	3.37	3.47	4.01	4.08	4.60	4.69	3.47	3.52
105	3.79	3.92	4.29	4.45	3.34	3.44	3.88	4.02	4.42	4.60	3.38	3.49	4.02	4.09	4.60	4.69	3.49	3.53
106	3.78	3.92	4.28	4.45	3.33	3.43	3.87	4.02	4.42	4.61	3.37	3.48	4.02	4.08	4.61	4.69	3.48	3.52
107	3.79	3.92	4.29	4.46	3.33	3.44	3.88	4.03	4.43	4.62	3.38	3.49	4.03	4.09	4.62	4.71	3.49	3.53
108	3.81	3.94	4.31	4.48	3.35	3.45	3.90	4.05	4.45	4.64	3.40	3.51	4.05	4.12	4.64	4.74	3.51	3.55
109	3.81	3.95	4.31	4.49	3.35	3.46	3.90	4.05	4.46	4.65	3.40	3.51	4.05	4.12	4.65	4.74	3.51	3.56
110	3.81	3.95	4.32	4.49	3.35	3.46	3.91	4.06	4.46	4.65	3.40	3.51	4.06	4.13	4.65	4.74	3.51	3.56
111	3.82	3.95	4.32	4.49	3.36	3.46	3.91	4.06	4.46	4.65	3.41	3.52	4.06	4.13	4.65	4.75	3.52	3.57
112	3.82	3.96	4.32	4.50	3.36	3.47	3.91	4.06	4.46	4.66	3.41	3.52	4.06	4.13	4.66	4.75	3.52	3.57
113	3.82	3.96	4.32	4.50	3.36	3.46	3.91	4.06	4.46	4.66	3.41	3.52	4.06	4.13	4.66	4.75	3.52	3.57
114	3.83	3.97	4.33	4.50	3.37	3.47	3.92	4.07	4.47	4.67	3.42	3.53	4.07	4.14	4.67	4.77	3.53	3.58
115	3.83	3.97	4.34	4.51	3.37	3.48	3.93	4.08	4.48	4.68	3.43	3.54	4.08	4.15	4.68	4.78	3.54	3.59
116	3.84	3.99	4.35	4.53	3.38	3.49	3.94	4.10	4.50	4.70	3.44	3.55	4.10	4.17	4.70	4.80	3.55	3.60

117	3.86	4.00	4.37	4.55	3.40	3.51	3.96	4.12	4.52	4.72	3.45	3.57	4.12	4.19	4.72	4.82	3.57	3.62
118	3.88	4.02	4.39	4.57	3.41	3.53	3.98	4.14	4.54	4.75	3.47	3.59	4.14	4.22	4.75	4.85	3.59	3.64
119	3.81	3.93	4.30	4.46	3.36	3.46	3.89	4.03	4.42	4.60	3.40	3.50	4.03	4.09	4.60	4.69	3.50	3.55
120	3.80	3.92	4.29	4.45	3.35	3.45	3.88	4.02	4.42	4.59	3.39	3.49	4.02	4.08	4.59	4.68	3.49	3.53
MIN	**3.77**	**3.91**	**4.28**	**4.44**	**3.32**	**3.42**	**3.86**	**4.01**	**4.41**	**4.59**	**3.36**	**3.47**	**4.01**	**4.07**	**4.59**	**4.68**	**3.47**	**3.52**
MAX	**3.88**	**4.02**	**4.39**	**4.57**	**3.41**	**3.53**	**3.98**	**4.14**	**4.54**	**4.75**	**3.47**	**3.59**	**4.14**	**4.22**	**4.75**	**4.85**	**3.59**	**3.64**
AVE	**3.80**	**3.94**	**4.30**	**4.47**	**3.35**	**3.45**	**3.89**	**4.04**	**4.44**	**4.63**	**3.39**	**3.50**	**4.04**	**4.11**	**4.63**	**4.72**	**3.50**	**3.55**

Table C- 16. Reliability Indices for Composite Rolled I-shaped Girdes for ADTT 1’000 and L=120, 200, 300ft.

	L=120 ft						**L=200 ft**						**L=300 ft**					
Φ	**1.00**		**0.95**		**1.05**		**1.00**		**0.95**		**1.05**		**1.00**		**0.95**		**1.05**	
# \ D/(D+L)	**0.55**	**0.60**	**0.55**	**0.60**	**0.55**	**0.60**	**0.65**	**0.70**	**0.65**	**0.70**	**0.65**	**0.70**	**0.45**	**0.55**	**0.45**	**0.55**	**0.45**	**0.55**
1	4.15	4.20	4.77	4.84	3.59	3.62	4.47	4.43	5.14	5.13	3.85	3.80	4.74	4.82	5.35	5.48	4.18	4.22
2	4.14	4.20	4.76	4.84	3.58	3.62	4.46	4.43	5.13	5.12	3.84	3.80	4.73	4.81	5.34	5.47	4.18	4.22
3	4.14	4.19	4.75	4.83	3.58	3.61	4.45	4.42	5.13	5.11	3.84	3.79	4.73	4.81	5.34	5.46	4.17	4.21
4	4.15	4.21	4.77	4.85	3.60	3.63	4.47	4.44	5.14	5.13	3.85	3.81	4.74	4.82	5.35	5.48	4.19	4.23
5	4.15	4.20	4.76	4.84	3.59	3.62	4.46	4.43	5.14	5.12	3.85	3.80	4.74	4.82	5.35	5.47	4.18	4.22
6	4.14	4.19	4.76	4.83	3.58	3.61	4.45	4.42	5.13	5.12	3.84	3.79	4.73	4.81	5.34	5.47	4.17	4.21
7	4.14	4.19	4.76	4.84	3.58	3.61	4.46	4.42	5.14	5.12	3.84	3.79	4.73	4.81	5.35	5.47	4.17	4.21
8	4.15	4.20	4.77	4.84	3.59	3.62	4.46	4.43	5.14	5.13	3.85	3.80	4.74	4.82	5.35	5.48	4.18	4.22
9	4.14	4.19	4.75	4.82	3.58	3.61	4.45	4.41	5.12	5.10	3.83	3.79	4.72	4.80	5.33	5.46	4.17	4.21
10	4.15	4.21	4.77	4.84	3.60	3.63	4.47	4.43	5.14	5.13	3.85	3.81	4.74	4.82	5.35	5.48	4.19	4.23
11	4.12	4.17	4.73	4.81	3.57	3.60	4.43	4.40	5.10	5.08	3.82	3.77	4.71	4.79	5.32	5.44	4.16	4.19
12	4.16	4.21	4.78	4.85	3.60	3.63	4.47	4.44	5.15	5.13	3.86	3.81	4.75	4.83	5.36	5.48	4.19	4.23
13	4.15	4.20	4.77	4.84	3.60	3.63	4.46	4.43	5.14	5.12	3.85	3.81	4.74	4.82	5.35	5.47	4.18	4.22
14	4.15	4.20	4.76	4.84	3.59	3.62	4.46	4.43	5.13	5.12	3.84	3.80	4.73	4.81	5.34	5.47	4.18	4.22
15	4.14	4.19	4.76	4.83	3.58	3.61	4.46	4.42	5.13	5.12	3.84	3.79	4.73	4.81	5.34	5.47	4.17	4.21
16	4.14	4.20	4.76	4.84	3.58	3.61	4.46	4.43	5.14	5.12	3.84	3.79	4.73	4.81	5.35	5.48	4.17	4.22
17	4.14	4.19	4.76	4.84	3.58	3.61	4.46	4.43	5.14	5.13	3.84	3.79	4.73	4.81	5.35	5.48	4.17	4.21
18	4.15	4.20	4.76	4.84	3.59	3.62	4.46	4.43	5.14	5.12	3.85	3.80	4.73	4.82	5.35	5.47	4.18	4.22
19	4.15	4.20	4.77	4.84	3.59	3.62	4.46	4.43	5.14	5.13	3.85	3.80	4.74	4.82	5.35	5.48	4.18	4.22
20	4.14	4.19	4.76	4.83	3.58	3.62	4.45	4.42	5.13	5.11	3.84	3.79	4.73	4.81	5.34	5.46	4.17	4.21
21	4.14	4.19	4.76	4.84	3.58	3.61	4.46	4.43	5.14	5.12	3.84	3.79	4.73	4.81	5.35	5.47	4.17	4.21
22	4.14	4.19	4.76	4.84	3.58	3.61	4.46	4.43	5.14	5.13	3.84	3.79	4.73	4.81	5.35	5.48	4.17	4.21
23	4.15	4.20	4.76	4.84	3.59	3.62	4.46	4.43	5.14	5.12	3.84	3.80	4.73	4.82	5.35	5.47	4.18	4.22
24	4.15	4.20	4.76	4.84	3.58	3.62	4.46	4.43	5.14	5.13	3.84	3.80	4.74	4.82	5.35	5.48	4.18	4.22
25	4.14	4.20	4.76	4.84	3.58	3.61	4.46	4.43	5.14	5.13	3.84	3.79	4.73	4.82	5.35	5.48	4.17	4.21
26	4.15	4.20	4.76	4.83	3.59	3.62	4.46	4.42	5.13	5.11	3.85	3.80	4.73	4.81	5.34	5.46	4.18	4.22
27	4.14	4.19	4.75	4.83	3.58	3.61	4.45	4.42	5.12	5.11	3.84	3.79	4.73	4.81	5.34	5.46	4.17	4.21
28	4.14	4.19	4.75	4.83	3.58	3.61	4.45	4.42	5.13	5.11	3.84	3.79	4.73	4.81	5.34	5.46	4.17	4.21
29	4.15	4.20	4.76	4.83	3.59	3.62	4.46	4.43	5.13	5.12	3.85	3.80	4.73	4.81	5.34	5.47	4.18	4.22
30	4.15	4.20	4.76	4.84	3.59	3.62	4.46	4.43	5.14	5.13	3.85	3.80	4.74	4.82	5.35	5.48	4.18	4.22
31	4.15	4.20	4.76	4.84	3.58	3.62	4.46	4.43	5.14	5.13	3.84	3.80	4.74	4.82	5.35	5.48	4.18	4.22
32	4.14	4.19	4.76	4.84	3.58	3.61	4.46	4.43	5.14	5.13	3.84	3.79	4.73	4.81	5.35	5.48	4.17	4.21
33	4.13	4.19	4.75	4.83	3.57	3.60	4.45	4.42	5.14	5.12	3.83	3.78	4.73	4.81	5.34	5.47	4.16	4.21

34	4.15	4.21	4.77	4.85	3.59	3.62	4.47	4.44	5.15	5.14	3.85	3.80	4.74	4.82	5.36	5.49	4.18	4.22
35	4.14	4.19	4.76	4.84	3.58	3.61	4.46	4.43	5.14	5.13	3.84	3.79	4.73	4.81	5.35	5.48	4.17	4.21
36	4.14	4.19	4.75	4.82	3.58	3.61	4.45	4.41	5.11	5.10	3.84	3.79	4.72	4.80	5.33	5.45	4.17	4.21
37	4.14	4.19	4.75	4.83	3.58	3.61	4.45	4.42	5.12	5.11	3.84	3.79	4.73	4.80	5.33	5.46	4.17	4.21
38	4.14	4.20	4.76	4.84	3.58	3.61	4.46	4.43	5.14	5.12	3.84	3.79	4.73	4.81	5.35	5.47	4.17	4.22
39	4.14	4.19	4.76	4.83	3.58	3.61	4.45	4.42	5.13	5.11	3.84	3.79	4.73	4.81	5.34	5.46	4.17	4.21
40	4.15	4.20	4.76	4.84	3.59	3.62	4.46	4.43	5.14	5.13	3.84	3.80	4.74	4.82	5.35	5.47	4.18	4.22
41	4.14	4.19	4.76	4.84	3.58	3.61	4.46	4.43	5.14	5.13	3.84	3.79	4.73	4.82	5.35	5.48	4.17	4.21
42	4.14	4.19	4.76	4.84	3.57	3.60	4.45	4.42	5.14	5.13	3.83	3.79	4.73	4.81	5.35	5.48	4.17	4.21
43	4.15	4.20	4.77	4.84	3.58	3.62	4.46	4.43	5.14	5.13	3.84	3.80	4.74	4.82	5.35	5.48	4.18	4.22
44	4.13	4.19	4.75	4.83	3.57	3.60	4.45	4.42	5.13	5.12	3.83	3.78	4.73	4.81	5.34	5.47	4.16	4.21
45	4.14	4.19	4.75	4.83	3.58	3.61	4.45	4.42	5.12	5.10	3.84	3.79	4.73	4.80	5.33	5.45	4.17	4.21
46	4.14	4.19	4.76	4.83	3.58	3.61	4.45	4.42	5.13	5.11	3.84	3.79	4.73	4.81	5.34	5.46	4.17	4.21
47	4.14	4.19	4.75	4.83	3.59	3.62	4.45	4.42	5.12	5.10	3.84	3.79	4.73	4.81	5.33	5.45	4.18	4.21
48	4.15	4.20	4.76	4.84	3.59	3.62	4.46	4.43	5.14	5.12	3.85	3.80	4.73	4.81	5.35	5.47	4.18	4.22
49	4.14	4.19	4.76	4.84	3.58	3.61	4.46	4.43	5.14	5.13	3.84	3.79	4.73	4.81	5.35	5.48	4.17	4.21
50	4.13	4.18	4.75	4.83	3.57	3.60	4.45	4.42	5.13	5.12	3.83	3.78	4.72	4.81	5.34	5.47	4.16	4.20
51	4.14	4.19	4.76	4.84	3.57	3.60	4.46	4.42	5.14	5.13	3.83	3.79	4.73	4.81	5.35	5.48	4.17	4.21
52	4.15	4.20	4.77	4.84	3.59	3.62	4.46	4.43	5.14	5.13	3.85	3.80	4.74	4.82	5.35	5.48	4.18	4.22
53	4.13	4.19	4.75	4.83	3.57	3.60	4.45	4.42	5.13	5.12	3.83	3.78	4.73	4.81	5.34	5.47	4.17	4.21
54	4.16	4.21	4.78	4.86	3.59	3.63	4.48	4.45	5.17	5.15	3.86	3.81	4.75	4.84	5.37	5.50	4.19	4.23
55	4.17	4.22	4.79	4.87	3.61	3.64	4.49	4.46	5.18	5.17	3.87	3.82	4.76	4.85	5.38	5.51	4.20	4.24
56	4.18	4.23	4.80	4.88	3.61	3.64	4.50	4.47	5.18	5.17	3.88	3.83	4.77	4.85	5.39	5.52	4.21	4.25
57	4.18	4.23	4.80	4.88	3.61	3.65	4.50	4.47	5.18	5.17	3.88	3.83	4.77	4.85	5.39	5.52	4.21	4.25
58	4.14	4.19	4.74	4.81	3.59	3.62	4.44	4.40	5.09	5.08	3.84	3.79	4.72	4.79	5.31	5.43	4.17	4.21
59	4.14	4.19	4.74	4.81	3.58	3.61	4.44	4.41	5.10	5.08	3.84	3.79	4.72	4.79	5.32	5.43	4.17	4.21
60	4.14	4.19	4.75	4.83	3.58	3.61	4.45	4.42	5.12	5.10	3.84	3.79	4.73	4.80	5.33	5.45	4.17	4.21
61	4.14	4.19	4.75	4.82	3.59	3.62	4.45	4.41	5.11	5.09	3.84	3.79	4.72	4.80	5.32	5.44	4.17	4.21
62	4.15	4.20	4.76	4.83	3.59	3.62	4.46	4.42	5.13	5.11	3.85	3.80	4.73	4.81	5.34	5.46	4.18	4.22
63	4.14	4.20	4.76	4.84	3.58	3.61	4.46	4.43	5.13	5.12	3.84	3.80	4.73	4.81	5.35	5.47	4.18	4.22
64	4.14	4.19	4.76	4.83	3.57	3.61	4.45	4.42	5.14	5.12	3.84	3.79	4.73	4.81	5.35	5.47	4.17	4.21
65	4.14	4.19	4.76	4.84	3.57	3.60	4.46	4.43	5.14	5.13	3.84	3.79	4.73	4.81	5.35	5.48	4.17	4.21
66	4.15	4.21	4.77	4.85	3.59	3.62	4.47	4.44	5.15	5.13	3.85	3.80	4.74	4.83	5.36	5.48	4.18	4.22
67	4.14	4.19	4.76	4.84	3.58	3.61	4.46	4.43	5.14	5.13	3.84	3.79	4.73	4.82	5.35	5.48	4.17	4.21
68	4.17	4.22	4.79	4.87	3.60	3.64	4.49	4.46	5.17	5.16	3.87	3.82	4.76	4.84	5.38	5.51	4.20	4.24
69	4.18	4.23	4.80	4.88	3.61	3.64	4.50	4.47	5.18	5.17	3.87	3.83	4.77	4.85	5.39	5.52	4.20	4.25
70	4.18	4.23	4.80	4.88	3.61	3.64	4.50	4.47	5.18	5.17	3.87	3.83	4.77	4.85	5.39	5.52	4.20	4.25
71	4.18	4.23	4.80	4.88	3.61	3.65	4.50	4.47	5.18	5.17	3.88	3.83	4.77	4.85	5.39	5.52	4.21	4.25
72	4.18	4.24	4.81	4.89	3.62	3.65	4.51	4.47	5.19	5.18	3.89	3.84	4.78	4.86	5.39	5.53	4.21	4.26
73	4.17	4.23	4.79	4.87	3.61	3.64	4.49	4.46	5.18	5.16	3.87	3.82	4.76	4.85	5.38	5.51	4.20	4.24
74	4.19	4.24	4.81	4.89	3.62	3.66	4.51	4.48	5.19	5.18	3.89	3.84	4.78	4.86	5.40	5.53	4.21	4.26
75	4.19	4.24	4.81	4.89	3.62	3.66	4.51	4.48	5.20	5.18	3.89	3.84	4.78	4.86	5.40	5.53	4.22	4.26
76	4.14	4.19	4.74	4.81	3.59	3.61	4.44	4.41	5.10	5.08	3.84	3.79	4.72	4.79	5.32	5.43	4.17	4.21
77	4.14	4.19	4.75	4.83	3.59	3.62	4.45	4.42	5.12	5.10	3.84	3.79	4.73	4.81	5.33	5.45	4.17	4.21
78	4.14	4.19	4.74	4.81	3.58	3.61	4.44	4.41	5.10	5.08	3.84	3.79	4.72	4.79	5.32	5.43	4.17	4.21
79	4.14	4.19	4.75	4.83	3.59	3.62	4.45	4.42	5.12	5.10	3.84	3.79	4.73	4.81	5.33	5.45	4.17	4.21
80	4.14	4.20	4.76	4.84	3.58	3.62	4.46	4.43	5.13	5.12	3.84	3.80	4.73	4.81	5.34	5.47	4.18	4.22
81	4.13	4.19	4.75	4.83	3.57	3.60	4.45	4.42	5.13	5.12	3.83	3.78	4.72	4.81	5.34	5.47	4.17	4.21

82	4.15	4.20	4.76	4.84	3.59	3.62	4.46	4.43	5.13	5.12	3.85	3.80	4.73	4.81	5.34	5.47	4.18	4.22
83	4.14	4.19	4.76	4.83	3.57	3.61	4.45	4.42	5.13	5.12	3.83	3.79	4.73	4.81	5.34	5.47	4.17	4.21
84	4.16	4.21	4.78	4.86	3.59	3.63	4.48	4.45	5.16	5.15	3.86	3.81	4.75	4.84	5.37	5.50	4.19	4.23
85	4.18	4.23	4.80	4.88	3.61	3.64	4.50	4.47	5.18	5.17	3.88	3.83	4.77	4.85	5.39	5.52	4.21	4.25
86	4.18	4.23	4.80	4.88	3.61	3.65	4.50	4.47	5.19	5.17	3.88	3.83	4.77	4.86	5.39	5.52	4.21	4.25
87	4.16	4.21	4.78	4.86	3.60	3.63	4.48	4.45	5.16	5.15	3.86	3.81	4.75	4.83	5.37	5.50	4.19	4.23
88	4.18	4.23	4.80	4.87	3.61	3.64	4.50	4.47	5.18	5.17	3.88	3.83	4.77	4.85	5.39	5.52	4.20	4.25
89	4.18	4.24	4.81	4.88	3.62	3.65	4.50	4.47	5.19	5.18	3.88	3.84	4.78	4.86	5.39	5.53	4.21	4.26
90	4.19	4.24	4.81	4.89	3.62	3.65	4.51	4.48	5.20	5.18	3.89	3.84	4.78	4.87	5.40	5.53	4.22	4.26
91	4.19	4.25	4.81	4.89	3.62	3.66	4.51	4.48	5.20	5.19	3.89	3.84	4.78	4.87	5.40	5.54	4.22	4.26
92	4.20	4.26	4.83	4.91	3.63	3.67	4.53	4.50	5.22	5.21	3.90	3.86	4.79	4.89	5.42	5.55	4.23	4.28
93	4.15	4.20	4.76	4.83	3.59	3.62	4.46	4.42	5.12	5.10	3.85	3.80	4.73	4.81	5.34	5.45	4.18	4.22
94	4.14	4.19	4.76	4.84	3.58	3.61	4.46	4.42	5.13	5.12	3.84	3.79	4.73	4.81	5.34	5.47	4.17	4.21
95	4.16	4.22	4.78	4.86	3.60	3.63	4.48	4.45	5.17	5.15	3.86	3.81	4.75	4.84	5.37	5.50	4.19	4.23
96	4.17	4.23	4.80	4.88	3.61	3.64	4.50	4.47	5.18	5.17	3.87	3.83	4.77	4.85	5.39	5.52	4.20	4.25
97	4.17	4.23	4.79	4.87	3.61	3.64	4.49	4.46	5.18	5.17	3.87	3.83	4.77	4.85	5.38	5.52	4.20	4.25
98	4.19	4.24	4.81	4.89	3.62	3.65	4.51	4.48	5.19	5.18	3.89	3.84	4.78	4.86	5.40	5.53	4.22	4.26
99	4.18	4.24	4.81	4.89	3.62	3.65	4.51	4.48	5.19	5.18	3.89	3.84	4.78	4.86	5.40	5.53	4.22	4.26
100	4.19	4.24	4.81	4.90	3.62	3.65	4.51	4.48	5.20	5.19	3.89	3.84	4.78	4.87	5.40	5.53	4.22	4.26
101	4.20	4.26	4.83	4.91	3.63	3.66	4.53	4.50	5.22	5.20	3.90	3.85	4.79	4.88	5.41	5.55	4.22	4.27
102	4.22	4.27	4.84	4.93	3.65	3.68	4.54	4.52	5.24	5.23	3.92	3.87	4.81	4.90	5.44	5.58	4.24	4.29
103	4.24	4.30	4.87	4.96	3.67	3.70	4.57	4.54	5.27	5.26	3.94	3.90	4.84	4.93	5.46	5.60	4.27	4.32
104	4.13	4.18	4.75	4.82	3.57	3.60	4.44	4.41	5.12	5.10	3.83	3.78	4.72	4.80	5.33	5.45	4.16	4.20
105	4.14	4.19	4.74	4.82	3.58	3.61	4.44	4.41	5.10	5.08	3.84	3.79	4.72	4.79	5.32	5.43	4.17	4.21
106	4.14	4.19	4.75	4.82	3.57	3.61	4.45	4.41	5.12	5.10	3.83	3.78	4.72	4.80	5.33	5.45	4.17	4.21
107	4.15	4.20	4.76	4.84	3.58	3.61	4.46	4.43	5.14	5.13	3.84	3.80	4.74	4.82	5.35	5.48	4.18	4.22
108	4.17	4.22	4.79	4.87	3.60	3.64	4.49	4.46	5.17	5.16	3.87	3.82	4.76	4.85	5.38	5.51	4.20	4.24
109	4.18	4.23	4.80	4.88	3.61	3.64	4.50	4.47	5.18	5.17	3.88	3.83	4.77	4.85	5.39	5.52	4.20	4.25
110	4.18	4.23	4.80	4.88	3.61	3.64	4.50	4.47	5.18	5.17	3.88	3.83	4.77	4.85	5.38	5.52	4.21	4.25
111	4.18	4.24	4.80	4.88	3.62	3.65	4.50	4.47	5.19	5.17	3.88	3.84	4.77	4.86	5.39	5.52	4.21	4.25
112	4.18	4.24	4.81	4.89	3.62	3.65	4.51	4.48	5.19	5.17	3.89	3.84	4.78	4.86	5.40	5.53	4.21	4.26
113	4.19	4.24	4.81	4.89	3.62	3.65	4.51	4.48	5.19	5.18	3.89	3.84	4.78	4.87	5.40	5.53	4.21	4.26
114	4.20	4.25	4.82	4.90	3.63	3.66	4.52	4.49	5.21	5.20	3.90	3.85	4.79	4.88	5.41	5.54	4.23	4.27
115	4.20	4.26	4.83	4.91	3.64	3.67	4.54	4.50	5.22	5.21	3.91	3.86	4.80	4.89	5.42	5.56	4.23	4.28
116	4.22	4.28	4.85	4.93	3.65	3.69	4.55	4.52	5.25	5.24	3.92	3.88	4.82	4.91	5.44	5.58	4.25	4.30
117	4.24	4.30	4.88	4.96	3.67	3.71	4.58	4.55	5.28	5.27	3.95	3.90	4.84	4.93	5.46	5.61	4.27	4.32
118	4.27	4.33	4.91	4.99	3.70	3.73	4.61	4.59	5.32	5.31	3.98	3.93	4.87	4.97	5.50	5.64	4.30	4.35
119	4.14	4.19	4.74	4.81	3.59	3.62	4.44	4.40	5.09	5.07	3.84	3.79	4.72	4.79	5.31	5.42	4.18	4.21
120	4.13	4.18	4.73	4.80	3.58	3.61	4.43	4.39	5.08	5.06	3.83	3.78	4.71	4.78	5.30	5.41	4.17	4.20
MIN	**4.12**	**4.17**	**4.73**	**4.80**	**3.57**	**3.60**	**4.43**	**4.39**	**5.08**	**5.06**	**3.82**	**3.77**	**4.71**	**4.78**	**5.30**	**5.41**	**4.16**	**4.19**
MAX	**4.27**	**4.33**	**4.91**	**4.99**	**3.70**	**3.73**	**4.61**	**4.59**	**5.32**	**5.31**	**3.98**	**3.93**	**4.87**	**4.97**	**5.50**	**5.64**	**4.30**	**4.35**
AVE	**4.16**	**4.21**	**4.78**	**4.85**	**3.60**	**3.63**	**4.47**	**4.44**	**5.15**	**5.14**	**3.86**	**3.81**	**4.75**	**4.83**	**5.36**	**5.49**	**4.19**	**4.23**

Table C- 17. Reliability Indices for Composite Rolled I-shaped Girdes for ADTT 2'500 and L=30, 60, 90ft.

	L=30 ft						L=60 ft						L=90 ft					
Φ	1.00		0.95		1.05		1.00		0.95		1.05		1.00		0.95		1.05	
# \ D/(D+L)	0.25	0.35	0.25	0.35	0.25	0.35	0.40	0.50	0.40	0.50	0.40	0.50	0.50	0.55	0.50	0.55	0.50	0.55
1	3.80	3.93	4.30	4.46	3.34	3.45	3.83	3.98	4.37	4.57	3.34	3.45	3.98	4.05	4.57	4.66	3.45	3.49
2	3.79	3.92	4.29	4.46	3.34	3.44	3.82	3.97	4.37	4.56	3.33	3.44	3.97	4.04	4.56	4.65	3.44	3.49
3	3.79	3.92	4.29	4.45	3.33	3.44	3.82	3.97	4.36	4.55	3.33	3.43	3.97	4.03	4.55	4.64	3.43	3.48
4	3.80	3.94	4.30	4.47	3.35	3.45	3.84	3.98	4.38	4.57	3.34	3.45	3.98	4.05	4.57	4.66	3.45	3.50
5	3.80	3.93	4.29	4.46	3.34	3.45	3.83	3.98	4.37	4.56	3.34	3.44	3.98	4.04	4.56	4.65	3.44	3.49
6	3.79	3.92	4.29	4.45	3.33	3.43	3.82	3.97	4.36	4.55	3.33	3.43	3.97	4.04	4.55	4.65	3.43	3.48
7	3.79	3.92	4.29	4.45	3.33	3.44	3.82	3.97	4.36	4.56	3.33	3.44	3.97	4.04	4.56	4.65	3.44	3.48
8	3.80	3.93	4.30	4.46	3.35	3.45	3.83	3.98	4.37	4.56	3.34	3.44	3.98	4.05	4.56	4.66	3.44	3.49
9	3.79	3.92	4.28	4.45	3.33	3.44	3.82	3.97	4.36	4.55	3.33	3.43	3.97	4.03	4.55	4.64	3.43	3.48
10	3.80	3.94	4.30	4.47	3.35	3.45	3.84	3.98	4.38	4.57	3.34	3.45	3.98	4.05	4.57	4.66	3.45	3.50
11	3.78	3.91	4.28	4.44	3.33	3.43	3.81	3.95	4.35	4.54	3.32	3.43	3.95	4.02	4.54	4.63	3.43	3.47
12	3.81	3.94	4.31	4.47	3.36	3.46	3.84	3.99	4.38	4.57	3.35	3.46	3.99	4.06	4.57	4.67	3.46	3.51
13	3.80	3.94	4.30	4.47	3.35	3.45	3.84	3.98	4.38	4.57	3.34	3.45	3.98	4.05	4.57	4.66	3.45	3.50
14	3.79	3.93	4.29	4.46	3.34	3.44	3.83	3.97	4.37	4.56	3.33	3.44	3.97	4.04	4.56	4.65	3.44	3.49
15	3.79	3.92	4.29	4.46	3.34	3.44	3.82	3.97	4.37	4.56	3.33	3.44	3.97	4.04	4.56	4.65	3.44	3.49
16	3.79	3.92	4.29	4.46	3.34	3.44	3.82	3.97	4.37	4.56	3.33	3.44	3.97	4.04	4.56	4.65	3.44	3.48
17	3.79	3.92	4.29	4.45	3.33	3.43	3.82	3.97	4.36	4.56	3.33	3.43	3.97	4.04	4.56	4.65	3.43	3.48
18	3.80	3.93	4.29	4.46	3.34	3.45	3.83	3.98	4.37	4.56	3.34	3.44	3.98	4.04	4.56	4.65	3.44	3.49
19	3.80	3.93	4.29	4.46	3.34	3.44	3.83	3.98	4.37	4.56	3.33	3.44	3.98	4.04	4.56	4.66	3.44	3.49
20	3.79	3.93	4.29	4.46	3.34	3.44	3.83	3.97	4.37	4.56	3.33	3.44	3.97	4.04	4.56	4.65	3.44	3.49
21	3.79	3.92	4.29	4.46	3.33	3.44	3.82	3.97	4.37	4.56	3.33	3.44	3.97	4.04	4.56	4.65	3.44	3.48
22	3.79	3.92	4.29	4.45	3.33	3.43	3.82	3.97	4.36	4.56	3.32	3.43	3.97	4.04	4.56	4.65	3.43	3.48
23	3.79	3.93	4.29	4.46	3.34	3.44	3.83	3.97	4.37	4.56	3.33	3.44	3.97	4.04	4.56	4.65	3.44	3.49
24	3.79	3.93	4.29	4.46	3.34	3.44	3.83	3.97	4.37	4.56	3.33	3.44	3.97	4.04	4.56	4.65	3.44	3.49
25	3.79	3.92	4.29	4.46	3.33	3.43	3.82	3.97	4.36	4.56	3.33	3.43	3.97	4.04	4.56	4.65	3.43	3.48
26	3.80	3.93	4.30	4.46	3.35	3.45	3.83	3.98	4.37	4.56	3.34	3.45	3.98	4.05	4.56	4.65	3.45	3.49
27	3.79	3.92	4.29	4.45	3.34	3.44	3.82	3.97	4.36	4.55	3.33	3.44	3.97	4.04	4.55	4.64	3.44	3.48
28	3.79	3.92	4.29	4.45	3.33	3.44	3.82	3.97	4.36	4.55	3.33	3.43	3.97	4.04	4.55	4.64	3.43	3.48
29	3.80	3.93	4.29	4.46	3.34	3.44	3.83	3.98	4.37	4.56	3.34	3.44	3.98	4.04	4.56	4.65	3.44	3.49
30	3.79	3.93	4.29	4.46	3.34	3.44	3.83	3.97	4.37	4.56	3.33	3.44	3.97	4.04	4.56	4.65	3.44	3.49
31	3.79	3.92	4.29	4.46	3.34	3.44	3.82	3.97	4.37	4.56	3.33	3.44	3.97	4.04	4.56	4.65	3.44	3.49
32	3.79	3.92	4.29	4.45	3.33	3.43	3.82	3.97	4.36	4.56	3.32	3.43	3.97	4.04	4.56	4.65	3.43	3.48
33	3.78	3.91	4.28	4.45	3.32	3.43	3.81	3.96	4.36	4.55	3.32	3.42	3.96	4.03	4.55	4.64	3.42	3.47
34	3.80	3.93	4.30	4.46	3.34	3.45	3.83	3.98	4.38	4.57	3.34	3.45	3.98	4.05	4.57	4.66	3.45	3.49
35	3.79	3.92	4.29	4.45	3.33	3.43	3.82	3.97	4.36	4.56	3.33	3.43	3.97	4.04	4.56	4.65	3.43	3.48
36	3.79	3.92	4.29	4.45	3.34	3.44	3.82	3.97	4.36	4.55	3.33	3.44	3.97	4.04	4.55	4.64	3.44	3.49

37	3.79	3.92	4.29	4.45	3.34	3.44	3.82	3.97	4.36	4.55	3.33	3.44	3.97	4.04	4.55	4.64	3.44	3.48
38	3.79	3.92	4.29	4.46	3.34	3.44	3.82	3.97	4.37	4.56	3.33	3.44	3.97	4.04	4.56	4.65	3.44	3.48
39	3.79	3.93	4.29	4.46	3.34	3.44	3.83	3.97	4.37	4.56	3.33	3.44	3.97	4.04	4.56	4.65	3.44	3.49
40	3.79	3.93	4.29	4.46	3.34	3.44	3.83	3.97	4.37	4.56	3.33	3.44	3.97	4.04	4.56	4.65	3.44	3.49
41	3.79	3.92	4.29	4.45	3.33	3.43	3.82	3.97	4.36	4.56	3.32	3.43	3.97	4.04	4.56	4.65	3.43	3.48
42	3.78	3.91	4.28	4.45	3.32	3.43	3.81	3.96	4.36	4.55	3.32	3.43	3.96	4.03	4.55	4.65	3.43	3.47
43	3.79	3.93	4.29	4.46	3.34	3.44	3.82	3.97	4.37	4.56	3.33	3.44	3.97	4.04	4.56	4.66	3.44	3.49
44	3.78	3.91	4.28	4.45	3.33	3.43	3.81	3.96	4.36	4.55	3.32	3.43	3.96	4.03	4.55	4.64	3.43	3.47
45	3.79	3.92	4.29	4.45	3.34	3.44	3.82	3.97	4.36	4.55	3.33	3.44	3.97	4.04	4.55	4.64	3.44	3.49
46	3.79	3.92	4.29	4.46	3.34	3.44	3.82	3.97	4.37	4.56	3.33	3.44	3.97	4.04	4.56	4.65	3.44	3.49
47	3.79	3.93	4.29	4.46	3.34	3.44	3.83	3.97	4.37	4.55	3.33	3.44	3.97	4.04	4.55	4.64	3.44	3.49
48	3.79	3.93	4.29	4.46	3.34	3.44	3.83	3.97	4.37	4.56	3.33	3.44	3.97	4.04	4.56	4.65	3.44	3.49
49	3.79	3.92	4.29	4.45	3.33	3.43	3.82	3.97	4.36	4.56	3.32	3.43	3.97	4.04	4.56	4.65	3.43	3.48
50	3.77	3.91	4.28	4.44	3.32	3.42	3.81	3.96	4.35	4.55	3.31	3.42	3.96	4.03	4.55	4.64	3.42	3.47
51	3.78	3.91	4.28	4.45	3.33	3.43	3.81	3.96	4.36	4.55	3.32	3.43	3.96	4.03	4.55	4.65	3.43	3.47
52	3.79	3.93	4.29	4.46	3.34	3.44	3.83	3.97	4.37	4.56	3.33	3.44	3.97	4.04	4.56	4.66	3.44	3.49
53	3.78	3.91	4.28	4.45	3.32	3.43	3.81	3.96	4.36	4.55	3.32	3.43	3.96	4.03	4.55	4.64	3.43	3.47
54	3.80	3.93	4.30	4.47	3.34	3.44	3.83	3.98	4.38	4.57	3.34	3.45	3.98	4.05	4.57	4.67	3.45	3.49
55	3.81	3.94	4.31	4.48	3.35	3.46	3.84	3.99	4.39	4.59	3.35	3.46	3.99	4.06	4.59	4.68	3.46	3.51
56	3.81	3.95	4.32	4.49	3.36	3.46	3.85	4.00	4.40	4.59	3.35	3.47	4.00	4.07	4.59	4.69	3.47	3.51
57	3.82	3.95	4.32	4.49	3.36	3.47	3.85	4.00	4.40	4.59	3.36	3.47	4.00	4.07	4.59	4.69	3.47	3.52
58	3.80	3.93	4.29	4.45	3.35	3.45	3.83	3.97	4.36	4.55	3.34	3.45	3.97	4.04	4.55	4.63	3.45	3.49
59	3.79	3.93	4.29	4.45	3.34	3.44	3.83	3.97	4.36	4.55	3.34	3.44	3.97	4.04	4.55	4.64	3.44	3.49
60	3.79	3.92	4.29	4.46	3.34	3.44	3.82	3.97	4.36	4.55	3.33	3.44	3.97	4.04	4.55	4.64	3.44	3.49
61	3.80	3.93	4.29	4.46	3.35	3.45	3.83	3.97	4.37	4.55	3.34	3.45	3.97	4.04	4.55	4.64	3.45	3.49
62	3.80	3.93	4.29	4.46	3.34	3.44	3.83	3.98	4.37	4.56	3.34	3.44	3.98	4.04	4.56	4.65	3.44	3.49
63	3.79	3.92	4.29	4.46	3.34	3.44	3.82	3.97	4.37	4.56	3.33	3.44	3.97	4.04	4.56	4.65	3.44	3.49
64	3.78	3.92	4.28	4.45	3.33	3.43	3.82	3.96	4.36	4.55	3.32	3.43	3.96	4.03	4.55	4.65	3.43	3.48
65	3.78	3.91	4.28	4.45	3.32	3.43	3.81	3.96	4.36	4.55	3.32	3.43	3.96	4.03	4.55	4.65	3.43	3.47
66	3.80	3.93	4.30	4.47	3.34	3.45	3.83	3.98	4.38	4.57	3.34	3.45	3.98	4.05	4.57	4.66	3.45	3.49
67	3.79	3.92	4.29	4.46	3.33	3.43	3.82	3.97	4.37	4.56	3.32	3.43	3.97	4.04	4.56	4.65	3.43	3.48
68	3.81	3.94	4.31	4.48	3.35	3.45	3.84	3.99	4.39	4.58	3.34	3.45	3.99	4.06	4.58	4.68	3.45	3.50
69	3.81	3.95	4.31	4.49	3.35	3.46	3.85	4.00	4.39	4.59	3.35	3.46	4.00	4.07	4.59	4.69	3.46	3.51
70	3.81	3.95	4.31	4.49	3.35	3.46	3.85	4.00	4.40	4.59	3.35	3.46	4.00	4.07	4.59	4.69	3.46	3.51
71	3.81	3.95	4.32	4.49	3.36	3.46	3.85	4.00	4.40	4.59	3.35	3.47	4.00	4.07	4.59	4.69	3.47	3.51
72	3.82	3.96	4.32	4.49	3.37	3.47	3.86	4.01	4.40	4.60	3.36	3.47	4.01	4.08	4.60	4.69	3.47	3.52
73	3.81	3.95	4.31	4.48	3.36	3.46	3.85	4.00	4.39	4.59	3.35	3.46	4.00	4.07	4.59	4.68	3.46	3.51
74	3.82	3.96	4.32	4.50	3.37	3.47	3.86	4.01	4.41	4.60	3.36	3.47	4.01	4.08	4.60	4.70	3.47	3.52
75	3.82	3.96	4.32	4.50	3.37	3.47	3.86	4.01	4.41	4.60	3.36	3.47	4.01	4.08	4.60	4.70	3.47	3.52

76	3.80	3.93	4.29	4.45	3.34	3.44	3.83	3.97	4.36	4.55	3.34	3.44	3.97	4.04	4.55	4.63	3.44	3.49
77	3.79	3.93	4.29	4.46	3.34	3.44	3.83	3.97	4.37	4.55	3.33	3.44	3.97	4.04	4.55	4.64	3.44	3.49
78	3.79	3.93	4.29	4.45	3.34	3.44	3.83	3.97	4.36	4.55	3.34	3.44	3.97	4.04	4.55	4.63	3.44	3.49
79	3.79	3.93	4.29	4.46	3.34	3.44	3.83	3.97	4.37	4.55	3.33	3.44	3.97	4.04	4.55	4.65	3.44	3.49
80	3.79	3.93	4.29	4.46	3.34	3.44	3.83	3.97	4.37	4.56	3.33	3.44	3.97	4.04	4.56	4.65	3.44	3.49
81	3.78	3.91	4.28	4.45	3.32	3.42	3.81	3.96	4.36	4.55	3.32	3.42	3.96	4.03	4.55	4.64	3.42	3.47
82	3.79	3.93	4.29	4.46	3.34	3.44	3.83	3.98	4.37	4.56	3.33	3.44	3.98	4.04	4.56	4.65	3.44	3.49
83	3.78	3.91	4.28	4.45	3.33	3.43	3.82	3.96	4.36	4.55	3.32	3.43	3.96	4.03	4.55	4.65	3.43	3.48
84	3.80	3.93	4.30	4.47	3.34	3.44	3.83	3.98	4.38	4.58	3.33	3.45	3.98	4.05	4.58	4.67	3.45	3.49
85	3.81	3.95	4.32	4.49	3.36	3.46	3.85	4.00	4.40	4.59	3.35	3.46	4.00	4.07	4.59	4.69	3.46	3.51
86	3.82	3.95	4.32	4.49	3.36	3.46	3.85	4.00	4.40	4.60	3.35	3.47	4.00	4.07	4.60	4.69	3.47	3.52
87	3.80	3.93	4.30	4.47	3.34	3.45	3.84	3.98	4.38	4.58	3.34	3.45	3.98	4.05	4.58	4.67	3.45	3.50
88	3.81	3.95	4.31	4.48	3.36	3.46	3.85	4.00	4.39	4.59	3.35	3.46	4.00	4.07	4.59	4.69	3.46	3.51
89	3.82	3.96	4.32	4.49	3.36	3.47	3.86	4.01	4.40	4.60	3.36	3.47	4.01	4.08	4.60	4.69	3.47	3.52
90	3.82	3.96	4.33	4.50	3.37	3.47	3.86	4.01	4.41	4.60	3.36	3.47	4.01	4.09	4.60	4.70	3.47	3.52
91	3.82	3.96	4.33	4.50	3.37	3.47	3.86	4.01	4.41	4.60	3.36	3.47	4.01	4.09	4.60	4.70	3.47	3.52
92	3.83	3.97	4.34	4.51	3.37	3.48	3.87	4.03	4.42	4.62	3.37	3.49	4.03	4.10	4.62	4.72	3.49	3.54
93	3.80	3.93	4.30	4.46	3.35	3.45	3.83	3.98	4.37	4.56	3.34	3.45	3.98	4.04	4.56	4.65	3.45	3.49
94	3.79	3.92	4.29	4.45	3.33	3.43	3.82	3.97	4.36	4.56	3.33	3.43	3.97	4.04	4.56	4.65	3.43	3.48
95	3.80	3.94	4.30	4.47	3.34	3.45	3.84	3.99	4.38	4.58	3.34	3.45	3.99	4.06	4.58	4.67	3.45	3.50
96	3.81	3.95	4.31	4.49	3.35	3.46	3.85	4.00	4.40	4.59	3.35	3.46	4.00	4.07	4.59	4.69	3.46	3.51
97	3.81	3.95	4.31	4.48	3.36	3.46	3.85	4.00	4.40	4.59	3.35	3.46	4.00	4.07	4.59	4.68	3.46	3.51
98	3.82	3.96	4.33	4.50	3.36	3.47	3.86	4.01	4.41	4.60	3.36	3.47	4.01	4.08	4.60	4.70	3.47	3.52
99	3.82	3.96	4.32	4.50	3.36	3.47	3.86	4.01	4.41	4.60	3.36	3.47	4.01	4.08	4.60	4.70	3.47	3.52
100	3.82	3.96	4.33	4.50	3.36	3.47	3.86	4.01	4.41	4.61	3.36	3.47	4.01	4.08	4.61	4.70	3.47	3.52
101	3.83	3.96	4.33	4.51	3.37	3.48	3.87	4.02	4.42	4.62	3.37	3.48	4.02	4.09	4.62	4.71	3.48	3.53
102	3.84	3.98	4.35	4.52	3.38	3.49	3.88	4.04	4.43	4.63	3.38	3.50	4.04	4.11	4.63	4.73	3.50	3.55
103	3.86	4.00	4.37	4.54	3.40	3.51	3.90	4.06	4.45	4.66	3.40	3.52	4.06	4.13	4.66	4.76	3.52	3.57
104	3.78	3.91	4.28	4.44	3.32	3.42	3.81	3.96	4.35	4.54	3.31	3.42	3.96	4.03	4.54	4.63	3.42	3.47
105	3.79	3.92	4.29	4.45	3.34	3.44	3.82	3.97	4.36	4.55	3.33	3.44	3.97	4.03	4.55	4.64	3.44	3.48
106	3.78	3.92	4.28	4.45	3.33	3.43	3.82	3.96	4.36	4.55	3.32	3.43	3.96	4.03	4.55	4.64	3.43	3.48
107	3.79	3.92	4.29	4.46	3.33	3.44	3.82	3.97	4.37	4.56	3.33	3.44	3.97	4.04	4.56	4.65	3.44	3.48
108	3.81	3.94	4.31	4.48	3.35	3.45	3.84	3.99	4.39	4.59	3.34	3.45	3.99	4.06	4.59	4.68	3.45	3.50
109	3.81	3.95	4.31	4.49	3.35	3.46	3.85	4.00	4.40	4.59	3.35	3.46	4.00	4.07	4.59	4.69	3.46	3.51
110	3.81	3.95	4.32	4.49	3.35	3.46	3.85	4.00	4.40	4.59	3.35	3.46	4.00	4.07	4.59	4.69	3.46	3.51
111	3.82	3.95	4.32	4.49	3.36	3.46	3.85	4.01	4.40	4.60	3.36	3.47	4.01	4.08	4.60	4.69	3.47	3.52
112	3.82	3.96	4.32	4.50	3.36	3.47	3.86	4.01	4.41	4.60	3.36	3.47	4.01	4.08	4.60	4.70	3.47	3.52
113	3.82	3.96	4.32	4.50	3.36	3.46	3.86	4.01	4.41	4.60	3.36	3.47	4.01	4.08	4.60	4.70	3.47	3.52
114	3.83	3.97	4.33	4.50	3.37	3.47	3.87	4.02	4.41	4.61	3.36	3.48	4.02	4.09	4.61	4.71	3.48	3.53

115	3.83	3.97	4.34	4.51	3.37	3.48	3.87	4.03	4.42	4.62	3.37	3.48	4.03	4.10	4.62	4.72	3.48	3.54
116	3.84	3.99	4.35	4.53	3.38	3.49	3.89	4.04	4.44	4.64	3.38	3.50	4.04	4.12	4.64	4.74	3.50	3.55
117	3.86	4.00	4.37	4.55	3.40	3.51	3.90	4.06	4.46	4.66	3.40	3.52	4.06	4.14	4.66	4.76	3.52	3.57
118	3.88	4.02	4.39	4.57	3.41	3.53	3.93	4.09	4.49	4.69	3.42	3.54	4.09	4.16	4.69	4.79	3.54	3.59
119	3.81	3.93	4.30	4.46	3.36	3.46	3.83	3.98	4.37	4.55	3.35	3.45	3.98	4.04	4.55	4.63	3.45	3.50
120	3.80	3.92	4.29	4.45	3.35	3.45	3.82	3.97	4.36	4.54	3.34	3.44	3.97	4.03	4.54	4.62	3.44	3.49
MIN	**3.77**	**3.91**	**4.28**	**4.44**	**3.32**	**3.42**	**3.81**	**3.95**	**4.35**	**4.54**	**3.31**	**3.42**	**3.95**	**4.02**	**4.54**	**4.62**	**3.42**	**3.47**
MAX	**3.88**	**4.02**	**4.39**	**4.57**	**3.41**	**3.53**	**3.93**	**4.09**	**4.49**	**4.69**	**3.42**	**3.54**	**4.09**	**4.16**	**4.69**	**4.79**	**3.54**	**3.59**
AVE	**3.80**	**3.94**	**4.30**	**4.47**	**3.35**	**3.45**	**3.84**	**3.98**	**4.38**	**4.57**	**3.34**	**3.45**	**3.98**	**4.05**	**4.57**	**4.67**	**3.45**	**3.50**

Table C- 18. Reliability Indices for Composite Rolled I-shaped Girdes for ADTT 2'500 and L=120, 200, 300ft.

	L=120 ft						**L=200 ft**						**L=300 ft**					
Φ	**1.00**		**0.95**		**1.05**		**1.00**		**0.95**		**1.05**		**1.00**		**0.95**		**1.05**	
# \ D/(D+L)	**0.55**	**0.60**	**0.55**	**0.60**	**0.55**	**0.60**	**0.65**	**0.70**	**0.65**	**0.70**	**0.65**	**0.70**	**0.45**	**0.55**	**0.45**	**0.55**	**0.45**	**0.55**
1	4.00	4.06	4.60	4.69	3.45	3.48	4.42	4.39	5.09	5.09	3.81	3.76	4.74	4.82	5.35	5.48	4.18	4.22
2	3.99	4.05	4.60	4.68	3.44	3.48	4.41	4.38	5.08	5.08	3.80	3.76	4.73	4.81	5.34	5.47	4.18	4.22
3	3.98	4.04	4.59	4.67	3.43	3.47	4.40	4.38	5.08	5.07	3.79	3.75	4.73	4.81	5.34	5.46	4.17	4.21
4	4.00	4.06	4.61	4.69	3.45	3.49	4.42	4.39	5.09	5.09	3.81	3.77	4.74	4.82	5.35	5.48	4.19	4.23
5	3.99	4.05	4.60	4.68	3.44	3.48	4.41	4.39	5.09	5.08	3.80	3.76	4.74	4.82	5.35	5.47	4.18	4.22
6	3.98	4.04	4.59	4.68	3.43	3.47	4.41	4.38	5.08	5.07	3.79	3.75	4.73	4.81	5.34	5.47	4.17	4.21
7	3.99	4.05	4.59	4.68	3.43	3.47	4.41	4.38	5.09	5.08	3.80	3.75	4.73	4.81	5.35	5.47	4.17	4.21
8	3.99	4.06	4.60	4.69	3.44	3.48	4.42	4.39	5.09	5.08	3.80	3.76	4.74	4.82	5.35	5.48	4.18	4.22
9	3.98	4.04	4.59	4.67	3.43	3.47	4.40	4.37	5.07	5.06	3.79	3.75	4.72	4.80	5.33	5.46	4.17	4.21
10	4.00	4.06	4.61	4.69	3.45	3.49	4.42	4.39	5.09	5.08	3.81	3.77	4.74	4.82	5.35	5.48	4.19	4.23
11	3.97	4.03	4.57	4.65	3.42	3.46	4.38	4.36	5.05	5.04	3.78	3.74	4.71	4.79	5.32	5.44	4.16	4.19
12	4.01	4.07	4.61	4.70	3.46	3.50	4.43	4.40	5.10	5.09	3.82	3.77	4.75	4.83	5.36	5.48	4.19	4.23
13	4.00	4.06	4.60	4.69	3.45	3.49	4.42	4.39	5.09	5.08	3.81	3.77	4.74	4.82	5.35	5.47	4.18	4.22
14	3.99	4.05	4.60	4.68	3.44	3.48	4.41	4.38	5.08	5.08	3.80	3.76	4.73	4.81	5.34	5.47	4.18	4.22
15	3.99	4.05	4.59	4.68	3.44	3.48	4.41	4.38	5.08	5.07	3.80	3.75	4.73	4.81	5.34	5.47	4.17	4.21
16	3.99	4.05	4.60	4.68	3.44	3.48	4.41	4.39	5.09	5.08	3.80	3.76	4.73	4.81	5.35	5.48	4.17	4.22
17	3.99	4.05	4.59	4.68	3.43	3.47	4.41	4.38	5.09	5.08	3.79	3.75	4.73	4.81	5.35	5.48	4.17	4.21
18	3.99	4.05	4.60	4.68	3.44	3.48	4.41	4.39	5.09	5.08	3.80	3.76	4.73	4.82	5.35	5.47	4.18	4.22
19	3.99	4.06	4.60	4.69	3.44	3.48	4.42	4.39	5.09	5.09	3.80	3.76	4.74	4.82	5.35	5.48	4.18	4.22
20	3.99	4.05	4.59	4.68	3.44	3.48	4.41	4.38	5.08	5.07	3.80	3.76	4.73	4.81	5.34	5.46	4.17	4.21
21	3.99	4.05	4.60	4.68	3.43	3.47	4.41	4.38	5.09	5.08	3.80	3.75	4.73	4.81	5.35	5.47	4.17	4.21
22	3.98	4.05	4.59	4.68	3.43	3.47	4.41	4.38	5.09	5.08	3.79	3.75	4.73	4.81	5.35	5.48	4.17	4.21
23	3.99	4.05	4.60	4.68	3.44	3.48	4.41	4.39	5.09	5.08	3.80	3.76	4.73	4.82	5.35	5.47	4.18	4.22
24	3.99	4.05	4.60	4.69	3.44	3.48	4.41	4.39	5.09	5.08	3.80	3.76	4.74	4.82	5.35	5.48	4.18	4.22
25	3.99	4.05	4.60	4.68	3.43	3.47	4.41	4.39	5.09	5.09	3.80	3.75	4.73	4.82	5.35	5.48	4.17	4.21

26	3.99	4.05	4.60	4.68	3.45	3.49	4.41	4.38	5.08	5.07	3.80	3.76	4.73	4.81	5.34	5.46	4.18	4.22
27	3.99	4.05	4.59	4.67	3.44	3.48	4.40	4.38	5.07	5.06	3.79	3.75	4.73	4.81	5.34	5.46	4.17	4.21
28	3.98	4.05	4.59	4.67	3.43	3.47	4.40	4.38	5.08	5.07	3.79	3.75	4.73	4.81	5.34	5.46	4.17	4.21
29	3.99	4.05	4.60	4.68	3.44	3.48	4.41	4.38	5.08	5.07	3.80	3.76	4.73	4.81	5.34	5.47	4.18	4.22
30	3.99	4.05	4.60	4.69	3.44	3.48	4.42	4.39	5.09	5.08	3.80	3.76	4.74	4.82	5.35	5.48	4.18	4.22
31	3.99	4.05	4.60	4.69	3.44	3.48	4.41	4.39	5.09	5.08	3.80	3.76	4.74	4.82	5.35	5.48	4.18	4.22
32	3.99	4.05	4.60	4.68	3.43	3.47	4.41	4.39	5.09	5.08	3.79	3.75	4.73	4.81	5.35	5.48	4.17	4.21
33	3.98	4.04	4.59	4.68	3.42	3.46	4.40	4.38	5.09	5.08	3.79	3.74	4.73	4.81	5.34	5.47	4.16	4.21
34	4.00	4.06	4.61	4.69	3.45	3.49	4.42	4.40	5.10	5.09	3.81	3.77	4.74	4.82	5.36	5.49	4.18	4.22
35	3.99	4.05	4.59	4.68	3.43	3.47	4.41	4.38	5.09	5.08	3.79	3.75	4.73	4.81	5.35	5.48	4.17	4.21
36	3.99	4.05	4.59	4.67	3.44	3.48	4.40	4.37	5.06	5.05	3.79	3.75	4.72	4.80	5.33	5.45	4.17	4.21
37	3.99	4.05	4.59	4.67	3.44	3.48	4.40	4.38	5.07	5.06	3.79	3.75	4.73	4.80	5.33	5.46	4.17	4.21
38	3.99	4.05	4.60	4.68	3.44	3.48	4.41	4.39	5.09	5.08	3.80	3.76	4.73	4.81	5.35	5.47	4.17	4.22
39	3.99	4.05	4.59	4.68	3.44	3.48	4.41	4.38	5.08	5.07	3.80	3.76	4.73	4.81	5.34	5.46	4.17	4.21
40	3.99	4.05	4.60	4.68	3.44	3.48	4.41	4.39	5.09	5.08	3.80	3.76	4.74	4.82	5.35	5.47	4.18	4.22
41	3.99	4.05	4.60	4.68	3.43	3.47	4.41	4.38	5.09	5.08	3.79	3.75	4.73	4.82	5.35	5.48	4.17	4.21
42	3.98	4.04	4.59	4.68	3.43	3.47	4.41	4.38	5.09	5.08	3.79	3.75	4.73	4.81	5.35	5.48	4.17	4.21
43	3.99	4.05	4.60	4.69	3.44	3.48	4.42	4.39	5.09	5.09	3.80	3.76	4.74	4.82	5.35	5.48	4.18	4.22
44	3.98	4.04	4.59	4.67	3.42	3.46	4.40	4.38	5.08	5.08	3.79	3.74	4.73	4.81	5.34	5.47	4.16	4.21
45	3.99	4.05	4.59	4.67	3.44	3.48	4.40	4.38	5.07	5.06	3.80	3.75	4.73	4.80	5.33	5.45	4.17	4.21
46	3.99	4.05	4.59	4.68	3.44	3.48	4.41	4.38	5.08	5.07	3.80	3.76	4.73	4.81	5.34	5.46	4.17	4.21
47	3.99	4.05	4.59	4.67	3.44	3.48	4.40	4.38	5.07	5.06	3.80	3.76	4.73	4.81	5.33	5.45	4.18	4.21
48	3.99	4.05	4.60	4.68	3.44	3.48	4.41	4.39	5.09	5.08	3.80	3.76	4.73	4.81	5.35	5.47	4.18	4.22
49	3.99	4.05	4.60	4.68	3.43	3.47	4.41	4.39	5.09	5.08	3.79	3.75	4.73	4.81	5.35	5.48	4.17	4.21
50	3.97	4.04	4.59	4.67	3.42	3.46	4.40	4.38	5.08	5.08	3.78	3.74	4.72	4.81	5.34	5.47	4.16	4.20
51	3.98	4.04	4.59	4.68	3.43	3.47	4.41	4.38	5.09	5.08	3.79	3.75	4.73	4.81	5.35	5.48	4.17	4.21
52	3.99	4.05	4.60	4.69	3.44	3.48	4.42	4.39	5.09	5.09	3.80	3.76	4.74	4.82	5.35	5.48	4.18	4.22
53	3.98	4.04	4.59	4.68	3.42	3.46	4.40	4.38	5.08	5.08	3.79	3.75	4.73	4.81	5.34	5.47	4.17	4.21
54	4.00	4.06	4.61	4.70	3.45	3.49	4.43	4.41	5.11	5.11	3.81	3.77	4.75	4.84	5.37	5.50	4.19	4.23
55	4.01	4.08	4.63	4.71	3.46	3.50	4.44	4.42	5.13	5.12	3.82	3.78	4.76	4.85	5.38	5.51	4.20	4.24
56	4.02	4.08	4.63	4.72	3.47	3.51	4.45	4.43	5.13	5.13	3.83	3.79	4.77	4.85	5.39	5.52	4.21	4.25
57	4.02	4.08	4.63	4.72	3.47	3.51	4.45	4.42	5.13	5.12	3.83	3.79	4.77	4.85	5.39	5.52	4.21	4.25
58	3.99	4.04	4.58	4.66	3.44	3.48	4.39	4.36	5.05	5.03	3.79	3.75	4.72	4.79	5.31	5.43	4.17	4.21
59	3.99	4.04	4.58	4.66	3.44	3.48	4.40	4.37	5.05	5.04	3.79	3.75	4.72	4.79	5.32	5.43	4.17	4.21
60	3.99	4.05	4.59	4.67	3.44	3.48	4.40	4.38	5.07	5.06	3.80	3.75	4.73	4.80	5.33	5.45	4.17	4.21
61	3.99	4.05	4.59	4.67	3.44	3.48	4.40	4.37	5.06	5.05	3.80	3.76	4.72	4.80	5.32	5.44	4.17	4.21
62	3.99	4.05	4.60	4.68	3.44	3.48	4.41	4.38	5.08	5.07	3.80	3.76	4.73	4.81	5.34	5.46	4.18	4.22
63	3.99	4.05	4.60	4.68	3.44	3.48	4.41	4.39	5.09	5.08	3.80	3.76	4.73	4.81	5.35	5.47	4.18	4.22
64	3.98	4.04	4.59	4.68	3.43	3.47	4.41	4.38	5.09	5.08	3.79	3.75	4.73	4.81	5.35	5.47	4.17	4.21

65	3.98	4.04	4.59	4.68	3.43	3.47	4.41	4.38	5.09	5.08	3.79	3.75	4.73	4.81	5.35	5.48	4.17	4.21
66	4.00	4.06	4.61	4.69	3.44	3.49	4.42	4.40	5.10	5.09	3.81	3.77	4.74	4.83	5.36	5.48	4.18	4.22
67	3.99	4.05	4.60	4.68	3.43	3.47	4.41	4.39	5.09	5.09	3.80	3.75	4.73	4.82	5.35	5.48	4.17	4.21
68	4.01	4.07	4.62	4.71	3.46	3.50	4.44	4.42	5.12	5.12	3.82	3.78	4.76	4.84	5.38	5.51	4.20	4.24
69	4.02	4.08	4.63	4.72	3.46	3.50	4.45	4.43	5.13	5.13	3.83	3.79	4.77	4.85	5.39	5.52	4.20	4.25
70	4.02	4.08	4.63	4.72	3.46	3.50	4.45	4.43	5.13	5.13	3.83	3.79	4.77	4.85	5.39	5.52	4.20	4.25
71	4.02	4.08	4.63	4.72	3.47	3.51	4.45	4.43	5.13	5.12	3.83	3.79	4.77	4.85	5.39	5.52	4.21	4.25
72	4.03	4.09	4.64	4.73	3.47	3.51	4.46	4.43	5.14	5.13	3.84	3.80	4.78	4.86	5.39	5.53	4.21	4.26
73	4.02	4.08	4.63	4.71	3.46	3.50	4.44	4.42	5.13	5.12	3.83	3.79	4.76	4.85	5.38	5.51	4.20	4.24
74	4.03	4.09	4.64	4.73	3.48	3.52	4.46	4.44	5.14	5.14	3.84	3.80	4.78	4.86	5.40	5.53	4.21	4.26
75	4.03	4.09	4.65	4.73	3.48	3.52	4.46	4.44	5.15	5.14	3.84	3.80	4.78	4.86	5.40	5.53	4.22	4.26
76	3.99	4.04	4.58	4.66	3.44	3.48	4.39	4.37	5.05	5.04	3.79	3.75	4.72	4.79	5.32	5.43	4.17	4.21
77	3.99	4.05	4.59	4.67	3.44	3.48	4.40	4.38	5.07	5.06	3.80	3.76	4.73	4.81	5.33	5.45	4.17	4.21
78	3.98	4.04	4.58	4.66	3.44	3.48	4.39	4.37	5.05	5.04	3.79	3.75	4.72	4.79	5.32	5.43	4.17	4.21
79	3.99	4.05	4.59	4.67	3.44	3.48	4.40	4.38	5.07	5.06	3.80	3.76	4.73	4.81	5.33	5.45	4.17	4.21
80	3.99	4.05	4.60	4.68	3.44	3.48	4.41	4.38	5.08	5.07	3.80	3.76	4.73	4.81	5.34	5.47	4.18	4.22
81	3.98	4.04	4.59	4.67	3.42	3.46	4.40	4.38	5.08	5.07	3.79	3.75	4.72	4.81	5.34	5.47	4.17	4.21
82	3.99	4.05	4.60	4.68	3.44	3.48	4.41	4.39	5.08	5.07	3.80	3.76	4.73	4.81	5.34	5.47	4.18	4.22
83	3.98	4.04	4.59	4.68	3.43	3.47	4.41	4.38	5.08	5.08	3.79	3.75	4.73	4.81	5.34	5.47	4.17	4.21
84	4.00	4.07	4.62	4.70	3.45	3.49	4.43	4.41	5.11	5.11	3.81	3.77	4.75	4.84	5.37	5.50	4.19	4.23
85	4.02	4.08	4.63	4.72	3.46	3.50	4.45	4.43	5.13	5.13	3.83	3.79	4.77	4.85	5.39	5.52	4.21	4.25
86	4.02	4.09	4.64	4.72	3.47	3.51	4.45	4.43	5.14	5.13	3.83	3.79	4.77	4.86	5.39	5.52	4.21	4.25
87	4.00	4.07	4.61	4.70	3.45	3.49	4.43	4.41	5.11	5.11	3.81	3.77	4.75	4.83	5.37	5.50	4.19	4.23
88	4.02	4.08	4.63	4.72	3.46	3.50	4.45	4.43	5.13	5.12	3.83	3.79	4.77	4.85	5.39	5.52	4.20	4.25
89	4.03	4.09	4.64	4.73	3.47	3.51	4.46	4.43	5.14	5.13	3.84	3.80	4.78	4.86	5.39	5.53	4.21	4.26
90	4.03	4.10	4.65	4.73	3.48	3.52	4.46	4.44	5.15	5.14	3.84	3.80	4.78	4.87	5.40	5.53	4.22	4.26
91	4.03	4.10	4.65	4.74	3.48	3.52	4.46	4.44	5.15	5.14	3.84	3.81	4.78	4.87	5.40	5.54	4.22	4.26
92	4.05	4.11	4.66	4.75	3.49	3.53	4.48	4.46	5.17	5.16	3.86	3.82	4.79	4.89	5.42	5.55	4.23	4.28
93	3.99	4.05	4.60	4.68	3.45	3.48	4.41	4.38	5.07	5.06	3.80	3.76	4.73	4.81	5.34	5.45	4.18	4.22
94	3.99	4.05	4.60	4.68	3.43	3.47	4.41	4.38	5.08	5.07	3.80	3.75	4.73	4.81	5.34	5.47	4.17	4.21
95	4.01	4.07	4.62	4.70	3.45	3.49	4.43	4.41	5.11	5.11	3.82	3.77	4.75	4.84	5.37	5.50	4.19	4.23
96	4.02	4.08	4.63	4.72	3.46	3.50	4.45	4.43	5.13	5.13	3.83	3.79	4.77	4.85	5.39	5.52	4.20	4.25
97	4.02	4.08	4.63	4.72	3.46	3.50	4.45	4.42	5.13	5.12	3.83	3.79	4.77	4.85	5.38	5.52	4.20	4.25
98	4.03	4.09	4.64	4.73	3.47	3.52	4.46	4.44	5.14	5.14	3.84	3.80	4.78	4.86	5.40	5.53	4.22	4.26
99	4.03	4.09	4.64	4.73	3.47	3.51	4.46	4.44	5.14	5.14	3.84	3.80	4.78	4.86	5.40	5.53	4.22	4.26
100	4.03	4.10	4.65	4.73	3.47	3.52	4.46	4.44	5.15	5.14	3.84	3.80	4.78	4.87	5.40	5.53	4.22	4.26
101	4.04	4.11	4.66	4.75	3.48	3.53	4.48	4.45	5.16	5.16	3.86	3.82	4.79	4.88	5.41	5.55	4.22	4.27
102	4.06	4.13	4.68	4.77	3.50	3.54	4.50	4.48	5.19	5.18	3.87	3.83	4.81	4.90	5.44	5.58	4.24	4.29
103	4.08	4.15	4.71	4.80	3.52	3.57	4.53	4.50	5.22	5.22	3.90	3.86	4.84	4.93	5.46	5.60	4.27	4.32

104	3.97	4.04	4.58	4.67	3.42	3.46	4.40	4.37	5.07	5.06	3.78	3.74	4.72	4.80	5.33	5.45	4.16	4.20
105	3.98	4.04	4.58	4.66	3.44	3.48	4.40	4.37	5.05	5.04	3.79	3.75	4.72	4.79	5.32	5.43	4.17	4.21
106	3.98	4.04	4.59	4.67	3.43	3.47	4.40	4.37	5.07	5.06	3.79	3.75	4.72	4.80	5.33	5.45	4.17	4.21
107	3.99	4.05	4.60	4.69	3.44	3.48	4.42	4.39	5.09	5.08	3.80	3.76	4.74	4.82	5.35	5.48	4.18	4.22
108	4.01	4.08	4.62	4.71	3.46	3.50	4.44	4.42	5.12	5.12	3.82	3.78	4.76	4.85	5.38	5.51	4.20	4.24
109	4.02	4.08	4.63	4.72	3.46	3.50	4.45	4.43	5.13	5.13	3.83	3.79	4.77	4.85	5.39	5.52	4.20	4.25
110	4.02	4.08	4.63	4.72	3.46	3.50	4.45	4.43	5.13	5.13	3.83	3.79	4.77	4.85	5.38	5.52	4.21	4.25
111	4.03	4.09	4.64	4.73	3.47	3.51	4.46	4.43	5.14	5.13	3.84	3.80	4.77	4.86	5.39	5.52	4.21	4.25
112	4.03	4.09	4.64	4.73	3.47	3.51	4.46	4.43	5.14	5.14	3.84	3.80	4.78	4.86	5.40	5.53	4.21	4.26
113	4.03	4.09	4.64	4.73	3.47	3.51	4.46	4.44	5.14	5.14	3.84	3.80	4.78	4.87	5.40	5.53	4.21	4.26
114	4.04	4.10	4.65	4.74	3.48	3.52	4.47	4.45	5.16	5.15	3.85	3.81	4.79	4.88	5.41	5.54	4.23	4.27
115	4.05	4.11	4.67	4.75	3.49	3.53	4.48	4.46	5.17	5.17	3.86	3.82	4.80	4.89	5.42	5.56	4.23	4.28
116	4.06	4.13	4.68	4.78	3.50	3.55	4.50	4.48	5.20	5.20	3.88	3.84	4.82	4.91	5.44	5.58	4.25	4.30
117	4.08	4.15	4.71	4.80	3.52	3.57	4.53	4.51	5.23	5.22	3.90	3.86	4.84	4.93	5.46	5.61	4.27	4.32
118	4.12	4.18	4.73	4.83	3.55	3.59	4.56	4.54	5.26	5.26	3.93	3.89	4.87	4.97	5.50	5.64	4.30	4.35
119	3.99	4.05	4.58	4.66	3.45	3.49	4.39	4.36	5.04	5.03	3.80	3.76	4.72	4.79	5.31	5.42	4.18	4.21
120	3.98	4.04	4.57	4.65	3.44	3.48	4.38	4.35	5.03	5.02	3.79	3.74	4.71	4.78	5.30	5.41	4.17	4.20
MIN	**3.97**	**4.03**	**4.57**	**4.65**	**3.42**	**3.46**	**4.38**	**4.35**	**5.03**	**5.02**	**3.78**	**3.74**	**4.71**	**4.78**	**5.30**	**5.41**	**4.16**	**4.19**
MAX	**4.12**	**4.18**	**4.73**	**4.83**	**3.55**	**3.59**	**4.56**	**4.54**	**5.26**	**5.26**	**3.93**	**3.89**	**4.87**	**4.97**	**5.50**	**5.64**	**4.30**	**4.35**
AVE	**4.00**	**4.06**	**4.61**	**4.70**	**3.45**	**3.49**	**4.43**	**4.40**	**5.10**	**5.10**	**3.81**	**3.77**	**4.75**	**4.83**	**5.36**	**5.49**	**4.19**	**4.23**

Table C- 19. Reliability Indices for Composite Rolled I-shaped Girdes for ADTT 5'000 and L=30, 60, 90ft.

	L=30 ft						**L=60 ft**						**L=90 ft**					
Φ	**1.00**		**0.95**		**1.05**		**1.00**		**0.95**		**1.05**		**1.00**		**0.95**		**1.05**	
# \ D/(D+L)	**0.25**	**0.35**	**0.25**	**0.35**	**0.25**	**0.35**	**0.40**	**0.50**	**0.40**	**0.50**	**0.40**	**0.50**	**0.50**	**0.55**	**0.50**	**0.55**	**0.50**	**0.55**
1	3.68	3.82	4.17	4.34	3.23	3.34	3.72	3.87	4.26	4.45	3.23	3.35	3.87	3.95	4.45	4.55	3.35	3.40
2	3.67	3.81	4.17	4.34	3.23	3.33	3.71	3.87	4.25	4.45	3.23	3.34	3.87	3.94	4.45	4.54	3.34	3.39
3	3.67	3.80	4.16	4.33	3.22	3.33	3.71	3.86	4.25	4.44	3.22	3.33	3.86	3.93	4.44	4.54	3.33	3.39
4	3.69	3.82	4.18	4.35	3.24	3.34	3.73	3.88	4.26	4.46	3.24	3.35	3.88	3.95	4.46	4.55	3.35	3.40
5	3.68	3.81	4.17	4.34	3.23	3.34	3.72	3.87	4.26	4.45	3.23	3.34	3.87	3.94	4.45	4.55	3.34	3.40
6	3.67	3.80	4.16	4.33	3.22	3.32	3.71	3.86	4.25	4.44	3.22	3.33	3.86	3.93	4.44	4.54	3.33	3.38
7	3.67	3.81	4.16	4.33	3.22	3.33	3.71	3.86	4.25	4.44	3.22	3.34	3.86	3.94	4.44	4.54	3.34	3.39
8	3.68	3.81	4.17	4.34	3.23	3.34	3.72	3.87	4.26	4.45	3.23	3.35	3.87	3.94	4.45	4.55	3.35	3.40
9	3.67	3.80	4.16	4.33	3.22	3.33	3.71	3.86	4.24	4.44	3.22	3.33	3.86	3.93	4.44	4.53	3.33	3.39
10	3.69	3.82	4.18	4.35	3.24	3.34	3.73	3.88	4.26	4.46	3.24	3.35	3.88	3.95	4.46	4.55	3.35	3.40
11	3.66	3.80	4.15	4.32	3.22	3.32	3.70	3.85	4.23	4.43	3.22	3.33	3.85	3.92	4.43	4.52	3.33	3.38
12	3.69	3.83	4.18	4.35	3.24	3.35	3.73	3.88	4.27	4.46	3.25	3.36	3.88	3.96	4.46	4.56	3.36	3.41

13	3.69	3.82	4.18	4.34	3.24	3.34	3.73	3.88	4.26	4.45	3.24	3.35	3.88	3.95	4.45	4.55	3.35	3.40
14	3.68	3.81	4.17	4.34	3.23	3.33	3.72	3.87	4.25	4.45	3.23	3.34	3.87	3.94	4.45	4.54	3.34	3.39
15	3.67	3.81	4.17	4.33	3.23	3.33	3.71	3.87	4.25	4.44	3.23	3.34	3.87	3.94	4.44	4.54	3.34	3.39
16	3.67	3.81	4.17	4.33	3.23	3.33	3.71	3.87	4.25	4.45	3.22	3.34	3.87	3.94	4.45	4.54	3.34	3.39
17	3.67	3.80	4.16	4.33	3.22	3.33	3.71	3.86	4.25	4.44	3.22	3.33	3.86	3.94	4.44	4.54	3.33	3.39
18	3.68	3.81	4.17	4.34	3.23	3.34	3.72	3.87	4.25	4.45	3.23	3.34	3.87	3.94	4.45	4.55	3.34	3.40
19	3.68	3.81	4.17	4.34	3.23	3.33	3.72	3.87	4.26	4.45	3.23	3.34	3.87	3.94	4.45	4.55	3.34	3.39
20	3.68	3.81	4.17	4.34	3.23	3.33	3.72	3.87	4.25	4.44	3.23	3.34	3.87	3.94	4.44	4.54	3.34	3.39
21	3.67	3.81	4.16	4.33	3.22	3.33	3.71	3.86	4.25	4.44	3.22	3.34	3.86	3.94	4.44	4.54	3.34	3.39
22	3.67	3.80	4.16	4.33	3.22	3.32	3.71	3.86	4.25	4.44	3.22	3.33	3.86	3.93	4.44	4.54	3.33	3.38
23	3.68	3.81	4.17	4.34	3.23	3.33	3.72	3.87	4.25	4.45	3.23	3.34	3.87	3.94	4.45	4.54	3.34	3.39
24	3.68	3.81	4.17	4.34	3.23	3.33	3.72	3.87	4.25	4.45	3.23	3.34	3.87	3.94	4.45	4.55	3.34	3.39
25	3.67	3.80	4.16	4.33	3.22	3.32	3.71	3.86	4.25	4.45	3.22	3.33	3.86	3.94	4.45	4.54	3.33	3.39
26	3.68	3.82	4.17	4.34	3.24	3.34	3.72	3.87	4.26	4.45	3.24	3.35	3.87	3.94	4.45	4.54	3.35	3.40
27	3.67	3.81	4.17	4.33	3.23	3.33	3.71	3.86	4.25	4.44	3.23	3.34	3.86	3.94	4.44	4.54	3.34	3.39
28	3.67	3.80	4.16	4.33	3.22	3.33	3.71	3.86	4.25	4.44	3.22	3.33	3.86	3.93	4.44	4.54	3.33	3.39
29	3.68	3.81	4.17	4.34	3.23	3.34	3.72	3.87	4.25	4.45	3.23	3.34	3.87	3.94	4.45	4.54	3.34	3.40
30	3.68	3.81	4.17	4.34	3.23	3.33	3.72	3.87	4.25	4.45	3.23	3.34	3.87	3.94	4.45	4.55	3.34	3.39
31	3.67	3.81	4.17	4.34	3.23	3.33	3.71	3.87	4.25	4.45	3.23	3.34	3.87	3.94	4.45	4.55	3.34	3.39
32	3.67	3.80	4.16	4.33	3.22	3.32	3.71	3.86	4.25	4.44	3.22	3.33	3.86	3.93	4.44	4.54	3.33	3.38
33	3.66	3.80	4.16	4.32	3.21	3.32	3.70	3.85	4.24	4.44	3.21	3.33	3.85	3.93	4.44	4.53	3.33	3.38
34	3.68	3.82	4.17	4.34	3.23	3.34	3.72	3.87	4.26	4.45	3.23	3.35	3.87	3.95	4.45	4.55	3.35	3.40
35	3.67	3.80	4.16	4.33	3.22	3.32	3.71	3.86	4.25	4.44	3.22	3.33	3.86	3.93	4.44	4.54	3.33	3.38
36	3.68	3.81	4.17	4.33	3.23	3.33	3.72	3.87	4.25	4.44	3.23	3.34	3.87	3.94	4.44	4.53	3.34	3.39
37	3.67	3.81	4.17	4.33	3.23	3.33	3.71	3.86	4.25	4.44	3.23	3.34	3.86	3.94	4.44	4.54	3.34	3.39
38	3.67	3.81	4.17	4.34	3.22	3.33	3.71	3.87	4.25	4.45	3.22	3.34	3.87	3.94	4.45	4.54	3.34	3.39
39	3.68	3.81	4.17	4.34	3.23	3.33	3.72	3.87	4.25	4.44	3.23	3.34	3.87	3.94	4.44	4.54	3.34	3.39
40	3.68	3.81	4.17	4.34	3.23	3.33	3.72	3.87	4.25	4.45	3.23	3.34	3.87	3.94	4.45	4.55	3.34	3.39
41	3.67	3.80	4.16	4.33	3.22	3.32	3.71	3.86	4.25	4.44	3.22	3.33	3.86	3.93	4.44	4.54	3.33	3.38
42	3.66	3.80	4.16	4.33	3.21	3.32	3.70	3.86	4.24	4.44	3.21	3.33	3.86	3.93	4.44	4.54	3.33	3.38
43	3.67	3.81	4.17	4.34	3.23	3.33	3.71	3.87	4.25	4.45	3.23	3.34	3.87	3.94	4.45	4.55	3.34	3.39
44	3.66	3.80	4.16	4.33	3.21	3.32	3.70	3.85	4.24	4.44	3.21	3.33	3.85	3.93	4.44	4.53	3.33	3.38
45	3.67	3.81	4.17	4.33	3.23	3.33	3.71	3.86	4.25	4.44	3.23	3.34	3.86	3.94	4.44	4.54	3.34	3.39
46	3.67	3.81	4.17	4.33	3.22	3.33	3.71	3.87	4.25	4.44	3.23	3.34	3.87	3.94	4.44	4.54	3.34	3.39
47	3.68	3.81	4.17	4.34	3.23	3.33	3.72	3.87	4.25	4.44	3.23	3.34	3.87	3.94	4.44	4.54	3.34	3.39
48	3.68	3.81	4.17	4.34	3.23	3.33	3.72	3.87	4.25	4.45	3.23	3.34	3.87	3.94	4.45	4.54	3.34	3.39
49	3.67	3.80	4.16	4.33	3.22	3.32	3.71	3.86	4.25	4.44	3.22	3.33	3.86	3.94	4.44	4.54	3.33	3.38
50	3.66	3.79	4.15	4.32	3.21	3.31	3.70	3.85	4.24	4.43	3.21	3.32	3.85	3.92	4.43	4.53	3.32	3.37
51	3.66	3.80	4.16	4.33	3.21	3.32	3.70	3.86	4.24	4.44	3.21	3.33	3.86	3.93	4.44	4.54	3.33	3.38

52	3.68	3.81	4.17	4.34	3.23	3.33	3.72	3.87	4.25	4.45	3.23	3.34	3.87	3.94	4.45	4.55	3.34	3.39
53	3.66	3.80	4.16	4.33	3.21	3.32	3.70	3.86	4.24	4.44	3.21	3.33	3.86	3.93	4.44	4.54	3.33	3.38
54	3.68	3.82	4.18	4.35	3.23	3.33	3.72	3.88	4.26	4.46	3.23	3.35	3.88	3.95	4.46	4.56	3.35	3.40
55	3.69	3.83	4.19	4.36	3.24	3.34	3.73	3.89	4.27	4.47	3.24	3.36	3.89	3.96	4.47	4.57	3.36	3.41
56	3.70	3.83	4.19	4.36	3.25	3.35	3.74	3.89	4.28	4.48	3.25	3.36	3.89	3.97	4.48	4.58	3.36	3.42
57	3.70	3.84	4.19	4.36	3.25	3.35	3.74	3.90	4.28	4.48	3.25	3.37	3.90	3.97	4.48	4.58	3.37	3.42
58	3.68	3.81	4.17	4.33	3.24	3.34	3.72	3.87	4.25	4.44	3.24	3.35	3.87	3.94	4.44	4.53	3.35	3.40
59	3.68	3.81	4.17	4.33	3.23	3.33	3.72	3.86	4.25	4.44	3.23	3.34	3.86	3.94	4.44	4.53	3.34	3.39
60	3.68	3.81	4.17	4.33	3.23	3.33	3.71	3.87	4.25	4.44	3.23	3.34	3.87	3.94	4.44	4.54	3.34	3.39
61	3.68	3.81	4.17	4.34	3.23	3.34	3.72	3.87	4.25	4.44	3.23	3.35	3.87	3.94	4.44	4.53	3.35	3.40
62	3.68	3.81	4.17	4.34	3.23	3.33	3.72	3.87	4.25	4.45	3.23	3.34	3.87	3.94	4.45	4.54	3.34	3.40
63	3.67	3.81	4.17	4.34	3.22	3.33	3.71	3.87	4.25	4.45	3.22	3.34	3.87	3.94	4.45	4.54	3.34	3.39
64	3.66	3.80	4.16	4.33	3.21	3.32	3.70	3.86	4.24	4.44	3.21	3.33	3.86	3.93	4.44	4.54	3.33	3.38
65	3.66	3.80	4.16	4.33	3.21	3.32	3.70	3.86	4.24	4.44	3.21	3.33	3.86	3.93	4.44	4.54	3.33	3.38
66	3.68	3.82	4.17	4.34	3.23	3.33	3.72	3.87	4.26	4.46	3.23	3.35	3.87	3.95	4.46	4.55	3.35	3.40
67	3.67	3.80	4.16	4.33	3.22	3.32	3.71	3.86	4.25	4.45	3.22	3.33	3.86	3.94	4.45	4.54	3.33	3.38
68	3.69	3.83	4.18	4.36	3.24	3.34	3.73	3.89	4.27	4.47	3.24	3.35	3.89	3.96	4.47	4.57	3.35	3.41
69	3.69	3.83	4.19	4.36	3.24	3.35	3.74	3.89	4.28	4.48	3.24	3.36	3.89	3.97	4.48	4.58	3.36	3.41
70	3.69	3.83	4.19	4.36	3.24	3.35	3.74	3.89	4.28	4.48	3.24	3.36	3.89	3.97	4.48	4.58	3.36	3.41
71	3.70	3.83	4.19	4.36	3.25	3.35	3.74	3.89	4.28	4.48	3.25	3.36	3.89	3.97	4.48	4.58	3.36	3.42
72	3.70	3.84	4.20	4.37	3.25	3.36	3.75	3.90	4.29	4.49	3.26	3.37	3.90	3.98	4.49	4.59	3.37	3.43
73	3.69	3.83	4.19	4.36	3.24	3.35	3.74	3.89	4.27	4.47	3.25	3.36	3.89	3.97	4.47	4.57	3.36	3.41
74	3.71	3.84	4.20	4.37	3.26	3.36	3.75	3.90	4.29	4.49	3.26	3.37	3.90	3.98	4.49	4.59	3.37	3.43
75	3.71	3.84	4.20	4.37	3.26	3.36	3.75	3.90	4.29	4.49	3.26	3.37	3.90	3.98	4.49	4.59	3.37	3.43
76	3.68	3.81	4.17	4.33	3.23	3.34	3.72	3.87	4.25	4.44	3.23	3.34	3.87	3.94	4.44	4.53	3.34	3.39
77	3.68	3.81	4.17	4.34	3.23	3.33	3.72	3.87	4.25	4.44	3.23	3.34	3.87	3.94	4.44	4.54	3.34	3.39
78	3.68	3.81	4.17	4.33	3.23	3.33	3.72	3.86	4.25	4.44	3.23	3.34	3.86	3.94	4.44	4.53	3.34	3.39
79	3.68	3.81	4.17	4.34	3.23	3.33	3.72	3.87	4.25	4.44	3.23	3.34	3.87	3.94	4.44	4.54	3.34	3.39
80	3.68	3.81	4.17	4.34	3.23	3.33	3.71	3.87	4.25	4.45	3.23	3.34	3.87	3.94	4.45	4.54	3.34	3.39
81	3.66	3.80	4.16	4.32	3.21	3.31	3.70	3.85	4.24	4.44	3.21	3.32	3.85	3.93	4.44	4.53	3.32	3.38
82	3.68	3.81	4.17	4.34	3.23	3.33	3.72	3.87	4.25	4.45	3.23	3.34	3.87	3.94	4.45	4.54	3.34	3.39
83	3.66	3.80	4.16	4.33	3.21	3.32	3.70	3.86	4.24	4.44	3.21	3.33	3.86	3.93	4.44	4.54	3.33	3.38
84	3.68	3.82	4.18	4.35	3.23	3.33	3.72	3.88	4.26	4.46	3.23	3.34	3.88	3.95	4.46	4.56	3.34	3.40
85	3.69	3.83	4.19	4.36	3.24	3.35	3.74	3.89	4.28	4.48	3.25	3.36	3.89	3.97	4.48	4.58	3.36	3.42
86	3.70	3.83	4.19	4.37	3.25	3.35	3.74	3.90	4.28	4.48	3.25	3.36	3.90	3.97	4.48	4.58	3.36	3.42
87	3.68	3.82	4.18	4.35	3.23	3.34	3.72	3.88	4.26	4.46	3.23	3.35	3.88	3.95	4.46	4.56	3.35	3.40
88	3.69	3.83	4.19	4.36	3.24	3.35	3.74	3.89	4.28	4.48	3.25	3.36	3.89	3.97	4.48	4.58	3.36	3.42
89	3.70	3.84	4.20	4.37	3.25	3.35	3.74	3.90	4.29	4.49	3.25	3.37	3.90	3.98	4.49	4.59	3.37	3.42
90	3.71	3.84	4.20	4.38	3.25	3.36	3.75	3.91	4.29	4.49	3.26	3.37	3.91	3.98	4.49	4.59	3.37	3.43

91	3.71	3.84	4.20	4.38	3.25	3.36	3.75	3.91	4.29	4.49	3.26	3.37	3.91	3.98	4.49	4.59	3.37	3.43
92	3.72	3.85	4.21	4.39	3.26	3.37	3.76	3.92	4.30	4.51	3.27	3.38	3.92	4.00	4.51	4.61	3.38	3.44
93	3.68	3.82	4.17	4.34	3.23	3.34	3.72	3.87	4.26	4.45	3.23	3.35	3.87	3.94	4.45	4.54	3.35	3.40
94	3.67	3.81	4.16	4.33	3.22	3.32	3.71	3.86	4.25	4.45	3.22	3.33	3.86	3.94	4.45	4.54	3.33	3.39
95	3.68	3.82	4.18	4.35	3.23	3.34	3.72	3.88	4.26	4.46	3.23	3.35	3.88	3.95	4.46	4.56	3.35	3.40
96	3.69	3.83	4.19	4.36	3.24	3.35	3.73	3.89	4.28	4.48	3.24	3.36	3.89	3.97	4.48	4.58	3.36	3.41
97	3.69	3.83	4.19	4.36	3.24	3.35	3.74	3.89	4.28	4.48	3.25	3.36	3.89	3.97	4.48	4.58	3.36	3.41
98	3.70	3.84	4.20	4.37	3.25	3.36	3.75	3.90	4.29	4.49	3.26	3.37	3.90	3.98	4.49	4.59	3.37	3.43
99	3.70	3.84	4.20	4.37	3.25	3.36	3.75	3.90	4.29	4.49	3.25	3.37	3.90	3.98	4.49	4.59	3.37	3.42
100	3.70	3.84	4.20	4.37	3.25	3.36	3.75	3.90	4.29	4.49	3.25	3.37	3.90	3.98	4.49	4.59	3.37	3.43
101	3.71	3.85	4.21	4.38	3.26	3.37	3.76	3.91	4.30	4.50	3.26	3.38	3.91	3.99	4.50	4.60	3.38	3.43
102	3.72	3.86	4.22	4.40	3.27	3.38	3.77	3.93	4.31	4.52	3.27	3.39	3.93	4.01	4.52	4.62	3.39	3.45
103	3.74	3.88	4.24	4.42	3.28	3.40	3.79	3.95	4.34	4.54	3.29	3.42	3.95	4.03	4.54	4.65	3.42	3.47
104	3.66	3.79	4.15	4.32	3.21	3.31	3.70	3.85	4.24	4.43	3.21	3.32	3.85	3.92	4.43	4.53	3.32	3.37
105	3.68	3.81	4.17	4.33	3.23	3.33	3.71	3.86	4.25	4.44	3.23	3.34	3.86	3.93	4.44	4.53	3.34	3.39
106	3.67	3.80	4.16	4.33	3.21	3.32	3.70	3.86	4.24	4.44	3.21	3.33	3.86	3.93	4.44	4.53	3.33	3.38
107	3.67	3.81	4.17	4.34	3.22	3.33	3.71	3.87	4.25	4.45	3.22	3.34	3.87	3.94	4.45	4.55	3.34	3.39
108	3.69	3.82	4.19	4.36	3.24	3.34	3.73	3.89	4.27	4.47	3.24	3.35	3.89	3.96	4.47	4.57	3.35	3.41
109	3.69	3.83	4.19	4.36	3.24	3.35	3.74	3.89	4.28	4.48	3.24	3.36	3.89	3.97	4.48	4.58	3.36	3.41
110	3.69	3.83	4.19	4.36	3.24	3.35	3.74	3.89	4.28	4.48	3.24	3.36	3.89	3.97	4.48	4.58	3.36	3.41
111	3.70	3.84	4.19	4.37	3.25	3.35	3.74	3.90	4.28	4.49	3.25	3.37	3.90	3.97	4.49	4.58	3.37	3.42
112	3.70	3.84	4.20	4.37	3.25	3.36	3.75	3.90	4.29	4.49	3.25	3.37	3.90	3.98	4.49	4.59	3.37	3.42
113	3.70	3.84	4.20	4.37	3.25	3.35	3.75	3.90	4.29	4.49	3.25	3.37	3.90	3.98	4.49	4.59	3.37	3.42
114	3.71	3.85	4.21	4.38	3.25	3.36	3.75	3.91	4.30	4.50	3.26	3.38	3.91	3.99	4.50	4.60	3.38	3.43
115	3.71	3.85	4.21	4.39	3.26	3.37	3.76	3.92	4.31	4.51	3.26	3.39	3.92	4.00	4.51	4.61	3.39	3.44
116	3.73	3.87	4.23	4.40	3.27	3.38	3.77	3.94	4.32	4.53	3.28	3.40	3.94	4.01	4.53	4.63	3.40	3.45
117	3.74	3.89	4.24	4.42	3.28	3.40	3.79	3.95	4.34	4.55	3.29	3.41	3.95	4.04	4.55	4.65	3.41	3.47
118	3.76	3.91	4.26	4.44	3.30	3.41	3.81	3.98	4.36	4.58	3.31	3.44	3.98	4.06	4.58	4.68	3.44	3.49
119	3.69	3.82	4.18	4.34	3.25	3.35	3.73	3.87	4.25	4.44	3.25	3.35	3.87	3.94	4.44	4.53	3.35	3.40
120	3.68	3.81	4.17	4.33	3.24	3.34	3.72	3.86	4.24	4.43	3.23	3.34	3.86	3.93	4.43	4.52	3.34	3.39
MIN	**3.66**	**3.79**	**4.15**	**4.32**	**3.21**	**3.31**	**3.70**	**3.85**	**4.23**	**4.43**	**3.21**	**3.32**	**3.85**	**3.92**	**4.43**	**4.52**	**3.32**	**3.37**
MAX	**3.76**	**3.91**	**4.26**	**4.44**	**3.30**	**3.41**	**3.81**	**3.98**	**4.36**	**4.58**	**3.31**	**3.44**	**3.98**	**4.06**	**4.58**	**4.68**	**3.44**	**3.49**
AVE	**3.68**	**3.82**	**4.18**	**4.35**	**3.23**	**3.34**	**3.72**	**3.88**	**4.26**	**4.46**	**3.24**	**3.35**	**3.88**	**3.95**	**4.46**	**4.56**	**3.35**	**3.40**

Table C- 20. Reliability Indices for Composite Rolled I-shaped Girdes for ADTT 5'000 and L=120, 200, 300ft.

	L=120 ft						L=200 ft						L=300 ft					
Φ	1.00		0.95		1.05		1.00		0.95		1.05		1.00		0.95		1.05	
# \ D/(D+L)	**0.55**	**0.60**	**0.55**	**0.60**	**0.55**	**0.60**	**0.65**	**0.70**	**0.65**	**0.70**	**0.65**	**0.70**	**0.45**	**0.55**	**0.45**	**0.55**	**0.45**	**0.55**
1	3.90	3.96	4.50	4.59	3.35	3.39	4.28	4.27	4.95	4.96	3.68	3.65	4.61	4.70	5.22	5.35	4.06	4.11
2	3.89	3.96	4.49	4.58	3.34	3.39	4.27	4.26	4.94	4.95	3.67	3.64	4.60	4.70	5.21	5.34	4.05	4.10
3	3.88	3.95	4.48	4.57	3.34	3.38	4.27	4.26	4.93	4.94	3.66	3.64	4.60	4.69	5.20	5.34	4.05	4.10
4	3.90	3.97	4.50	4.59	3.36	3.40	4.28	4.27	4.95	4.96	3.68	3.65	4.61	4.71	5.22	5.35	4.07	4.12
5	3.89	3.96	4.49	4.58	3.35	3.39	4.28	4.27	4.94	4.95	3.67	3.65	4.61	4.70	5.21	5.35	4.06	4.11
6	3.88	3.95	4.48	4.58	3.34	3.38	4.27	4.26	4.93	4.94	3.66	3.64	4.60	4.69	5.21	5.34	4.05	4.10
7	3.89	3.95	4.49	4.58	3.34	3.38	4.27	4.26	4.94	4.95	3.66	3.64	4.60	4.69	5.21	5.35	4.05	4.10
8	3.89	3.96	4.49	4.58	3.35	3.39	4.28	4.27	4.94	4.95	3.67	3.65	4.61	4.70	5.21	5.35	4.06	4.11
9	3.88	3.95	4.48	4.57	3.34	3.38	4.26	4.25	4.92	4.93	3.66	3.63	4.60	4.68	5.20	5.33	4.05	4.10
10	3.90	3.97	4.50	4.59	3.36	3.40	4.28	4.27	4.94	4.95	3.68	3.65	4.61	4.70	5.22	5.35	4.06	4.12
11	3.87	3.94	4.47	4.55	3.33	3.37	4.25	4.24	4.91	4.91	3.65	3.62	4.58	4.67	5.18	5.31	4.04	4.08
12	3.91	3.97	4.51	4.60	3.36	3.41	4.29	4.28	4.95	4.96	3.69	3.66	4.62	4.71	5.22	5.36	4.07	4.12
13	3.90	3.97	4.50	4.59	3.36	3.40	4.28	4.27	4.94	4.95	3.68	3.65	4.61	4.70	5.21	5.35	4.06	4.11
14	3.89	3.96	4.49	4.58	3.35	3.39	4.27	4.26	4.94	4.95	3.67	3.64	4.60	4.70	5.21	5.34	4.06	4.11
15	3.89	3.95	4.49	4.58	3.34	3.39	4.27	4.26	4.94	4.95	3.67	3.64	4.60	4.69	5.21	5.34	4.05	4.10
16	3.89	3.95	4.49	4.58	3.34	3.39	4.27	4.26	4.94	4.95	3.67	3.64	4.60	4.70	5.21	5.35	4.05	4.10
17	3.89	3.95	4.49	4.58	3.34	3.38	4.27	4.26	4.94	4.95	3.66	3.64	4.60	4.69	5.21	5.35	4.05	4.10
18	3.89	3.96	4.49	4.58	3.35	3.39	4.28	4.27	4.94	4.95	3.67	3.65	4.61	4.70	5.21	5.35	4.06	4.11
19	3.89	3.96	4.49	4.59	3.35	3.39	4.28	4.27	4.95	4.96	3.67	3.65	4.61	4.70	5.22	5.35	4.06	4.11
20	3.89	3.95	4.49	4.58	3.34	3.39	4.27	4.26	4.93	4.94	3.67	3.64	4.60	4.69	5.20	5.34	4.05	4.10
21	3.89	3.95	4.49	4.58	3.34	3.38	4.27	4.26	4.94	4.95	3.67	3.64	4.60	4.70	5.21	5.35	4.05	4.10
22	3.88	3.95	4.49	4.58	3.34	3.38	4.27	4.26	4.94	4.95	3.66	3.64	4.60	4.69	5.21	5.35	4.05	4.10
23	3.89	3.96	4.49	4.58	3.35	3.39	4.27	4.26	4.94	4.95	3.67	3.64	4.61	4.70	5.21	5.35	4.06	4.11
24	3.89	3.96	4.49	4.58	3.34	3.39	4.28	4.27	4.94	4.95	3.67	3.64	4.61	4.70	5.22	5.35	4.06	4.11
25	3.89	3.95	4.49	4.58	3.34	3.38	4.27	4.26	4.95	4.96	3.66	3.64	4.60	4.70	5.21	5.35	4.05	4.10
26	3.90	3.96	4.49	4.58	3.35	3.40	4.27	4.26	4.93	4.94	3.67	3.65	4.61	4.69	5.21	5.34	4.06	4.11
27	3.89	3.95	4.48	4.57	3.34	3.39	4.27	4.26	4.93	4.94	3.66	3.64	4.60	4.69	5.20	5.33	4.05	4.10
28	3.88	3.95	4.48	4.57	3.34	3.38	4.27	4.26	4.93	4.94	3.66	3.64	4.60	4.69	5.20	5.34	4.05	4.10
29	3.89	3.96	4.49	4.58	3.35	3.39	4.27	4.26	4.94	4.94	3.67	3.64	4.61	4.70	5.21	5.34	4.06	4.11
30	3.89	3.96	4.49	4.58	3.35	3.39	4.28	4.27	4.94	4.95	3.67	3.64	4.61	4.70	5.21	5.35	4.06	4.11
31	3.89	3.96	4.49	4.58	3.34	3.39	4.27	4.27	4.94	4.95	3.67	3.64	4.61	4.70	5.21	5.35	4.05	4.11
32	3.88	3.95	4.49	4.58	3.34	3.38	4.27	4.26	4.94	4.95	3.66	3.64	4.60	4.70	5.21	5.35	4.05	4.10
33	3.88	3.94	4.48	4.57	3.33	3.37	4.26	4.25	4.94	4.95	3.65	3.63	4.60	4.69	5.21	5.35	4.04	4.09
34	3.90	3.96	4.50	4.59	3.35	3.40	4.28	4.27	4.95	4.96	3.68	3.65	4.61	4.71	5.22	5.36	4.06	4.11
35	3.88	3.95	4.49	4.58	3.34	3.38	4.27	4.26	4.94	4.95	3.66	3.64	4.60	4.70	5.21	5.35	4.05	4.10
36	3.89	3.95	4.48	4.57	3.34	3.39	4.26	4.25	4.92	4.93	3.67	3.64	4.60	4.68	5.20	5.33	4.05	4.10

37	3.89	3.95	4.48	4.57	3.34	3.39	4.27	4.26	4.93	4.93	3.66	3.64	4.60	4.69	5.20	5.33	4.05	4.10
38	3.89	3.95	4.49	4.58	3.34	3.39	4.27	4.26	4.94	4.95	3.67	3.64	4.60	4.70	5.21	5.35	4.05	4.10
39	3.89	3.95	4.49	4.58	3.34	3.39	4.27	4.26	4.93	4.94	3.67	3.64	4.60	4.69	5.20	5.34	4.05	4.10
40	3.89	3.96	4.49	4.58	3.34	3.39	4.28	4.27	4.94	4.95	3.67	3.64	4.61	4.70	5.21	5.35	4.06	4.11
41	3.88	3.95	4.49	4.58	3.34	3.38	4.27	4.26	4.94	4.95	3.66	3.64	4.60	4.70	5.21	5.35	4.05	4.10
42	3.88	3.95	4.49	4.58	3.33	3.37	4.27	4.26	4.94	4.95	3.66	3.63	4.60	4.69	5.21	5.35	4.04	4.10
43	3.89	3.96	4.49	4.59	3.34	3.39	4.28	4.27	4.95	4.96	3.67	3.64	4.61	4.70	5.22	5.36	4.06	4.11
44	3.88	3.94	4.48	4.57	3.33	3.37	4.26	4.25	4.93	4.95	3.66	3.63	4.60	4.69	5.20	5.34	4.04	4.09
45	3.89	3.95	4.48	4.57	3.34	3.39	4.27	4.26	4.92	4.93	3.67	3.64	4.60	4.69	5.20	5.33	4.05	4.10
46	3.89	3.95	4.49	4.58	3.34	3.39	4.27	4.26	4.93	4.94	3.67	3.64	4.60	4.69	5.21	5.34	4.05	4.10
47	3.89	3.95	4.49	4.57	3.35	3.39	4.27	4.26	4.93	4.93	3.67	3.64	4.60	4.69	5.20	5.33	4.05	4.10
48	3.89	3.96	4.49	4.58	3.35	3.39	4.27	4.26	4.94	4.95	3.67	3.64	4.61	4.70	5.21	5.35	4.06	4.11
49	3.88	3.95	4.49	4.58	3.34	3.38	4.27	4.26	4.94	4.95	3.66	3.64	4.60	4.70	5.21	5.35	4.05	4.10
50	3.87	3.94	4.48	4.57	3.32	3.37	4.26	4.25	4.93	4.94	3.65	3.62	4.59	4.69	5.20	5.34	4.04	4.09
51	3.88	3.95	4.48	4.58	3.33	3.38	4.27	4.26	4.94	4.95	3.66	3.63	4.60	4.69	5.21	5.35	4.05	4.10
52	3.89	3.96	4.49	4.59	3.34	3.39	4.28	4.27	4.94	4.95	3.67	3.64	4.61	4.70	5.22	5.35	4.06	4.11
53	3.88	3.94	4.48	4.57	3.33	3.37	4.26	4.26	4.94	4.95	3.66	3.63	4.60	4.69	5.21	5.35	4.04	4.09
54	3.90	3.97	4.51	4.60	3.35	3.40	4.29	4.28	4.96	4.98	3.68	3.65	4.62	4.72	5.23	5.38	4.07	4.12
55	3.91	3.98	4.52	4.61	3.36	3.41	4.30	4.30	4.98	4.99	3.69	3.67	4.63	4.73	5.24	5.39	4.08	4.13
56	3.92	3.99	4.53	4.62	3.37	3.42	4.31	4.30	4.99	5.00	3.70	3.67	4.64	4.74	5.25	5.39	4.08	4.14
57	3.92	3.99	4.53	4.62	3.37	3.42	4.31	4.30	4.98	4.99	3.70	3.68	4.64	4.73	5.25	5.39	4.08	4.14
58	3.89	3.95	4.48	4.56	3.35	3.39	4.26	4.25	4.90	4.91	3.67	3.64	4.59	4.68	5.18	5.31	4.05	4.10
59	3.89	3.95	4.48	4.56	3.35	3.39	4.26	4.25	4.91	4.92	3.66	3.64	4.59	4.68	5.19	5.31	4.05	4.10
60	3.89	3.95	4.48	4.57	3.34	3.39	4.27	4.26	4.93	4.93	3.67	3.64	4.60	4.69	5.20	5.33	4.05	4.10
61	3.89	3.95	4.48	4.57	3.35	3.39	4.26	4.25	4.92	4.92	3.67	3.64	4.60	4.68	5.19	5.32	4.06	4.10
62	3.89	3.96	4.49	4.58	3.35	3.39	4.27	4.26	4.93	4.94	3.67	3.64	4.61	4.69	5.21	5.34	4.06	4.11
63	3.89	3.96	4.49	4.58	3.34	3.39	4.27	4.26	4.94	4.95	3.67	3.64	4.61	4.70	5.21	5.35	4.05	4.11
64	3.88	3.95	4.48	4.58	3.33	3.38	4.27	4.26	4.94	4.95	3.66	3.63	4.60	4.69	5.21	5.35	4.05	4.10
65	3.88	3.95	4.49	4.58	3.33	3.38	4.27	4.26	4.94	4.95	3.66	3.63	4.60	4.70	5.21	5.35	4.05	4.10
66	3.90	3.96	4.50	4.59	3.35	3.39	4.28	4.27	4.95	4.96	3.68	3.65	4.61	4.71	5.22	5.36	4.06	4.11
67	3.89	3.95	4.49	4.58	3.34	3.38	4.27	4.26	4.94	4.95	3.66	3.64	4.60	4.70	5.21	5.35	4.05	4.10
68	3.91	3.98	4.52	4.61	3.36	3.41	4.30	4.29	4.97	4.99	3.69	3.66	4.63	4.73	5.24	5.38	4.07	4.13
69	3.92	3.99	4.52	4.62	3.37	3.41	4.31	4.30	4.98	4.99	3.70	3.67	4.64	4.73	5.25	5.39	4.08	4.14
70	3.92	3.99	4.52	4.62	3.37	3.41	4.31	4.30	4.98	5.00	3.70	3.67	4.64	4.74	5.25	5.39	4.08	4.13
71	3.92	3.99	4.52	4.62	3.37	3.42	4.31	4.30	4.98	4.99	3.70	3.67	4.64	4.74	5.25	5.39	4.08	4.14
72	3.93	4.00	4.53	4.63	3.38	3.42	4.32	4.31	4.99	5.00	3.71	3.68	4.65	4.74	5.26	5.40	4.09	4.15
73	3.91	3.98	4.52	4.61	3.37	3.41	4.30	4.30	4.97	4.99	3.69	3.67	4.63	4.73	5.24	5.38	4.08	4.13
74	3.93	4.00	4.53	4.63	3.38	3.42	4.32	4.31	4.99	5.00	3.71	3.68	4.65	4.74	5.26	5.40	4.09	4.15
75	3.93	4.00	4.54	4.63	3.38	3.43	4.32	4.31	4.99	5.01	3.71	3.69	4.65	4.74	5.26	5.40	4.09	4.15

76	3.89	3.95	4.48	4.56	3.35	3.39	4.26	4.25	4.91	4.91	3.67	3.64	4.59	4.68	5.18	5.31	4.05	4.10
77	3.89	3.95	4.49	4.57	3.35	3.39	4.27	4.26	4.92	4.93	3.67	3.64	4.60	4.69	5.20	5.33	4.05	4.10
78	3.89	3.95	4.48	4.56	3.35	3.39	4.26	4.25	4.91	4.91	3.66	3.64	4.59	4.68	5.19	5.31	4.05	4.10
79	3.89	3.96	4.49	4.57	3.35	3.39	4.27	4.26	4.93	4.93	3.67	3.64	4.60	4.69	5.20	5.33	4.05	4.10
80	3.89	3.96	4.49	4.58	3.34	3.39	4.27	4.26	4.94	4.95	3.67	3.64	4.61	4.69	5.21	5.34	4.06	4.11
81	3.88	3.94	4.48	4.57	3.33	3.37	4.26	4.25	4.93	4.94	3.66	3.63	4.60	4.69	5.20	5.34	4.04	4.09
82	3.89	3.96	4.49	4.58	3.35	3.39	4.27	4.27	4.94	4.94	3.67	3.65	4.61	4.70	5.21	5.34	4.06	4.11
83	3.88	3.95	4.48	4.57	3.33	3.38	4.27	4.26	4.93	4.95	3.66	3.63	4.60	4.69	5.21	5.34	4.05	4.10
84	3.90	3.97	4.51	4.60	3.35	3.40	4.29	4.28	4.96	4.98	3.68	3.66	4.62	4.72	5.23	5.37	4.07	4.12
85	3.92	3.99	4.52	4.62	3.37	3.41	4.31	4.30	4.98	5.00	3.70	3.67	4.64	4.73	5.25	5.39	4.08	4.14
86	3.92	3.99	4.53	4.62	3.37	3.42	4.31	4.31	4.99	5.00	3.70	3.68	4.64	4.74	5.25	5.40	4.09	4.14
87	3.90	3.97	4.51	4.60	3.35	3.40	4.29	4.28	4.96	4.97	3.68	3.66	4.62	4.71	5.23	5.37	4.07	4.12
88	3.92	3.99	4.52	4.62	3.37	3.42	4.31	4.30	4.98	4.99	3.70	3.67	4.64	4.73	5.25	5.39	4.08	4.14
89	3.92	3.99	4.53	4.63	3.37	3.42	4.32	4.31	4.99	5.00	3.71	3.68	4.65	4.74	5.26	5.40	4.09	4.14
90	3.93	4.00	4.54	4.63	3.38	3.43	4.32	4.32	5.00	5.01	3.71	3.69	4.65	4.75	5.26	5.40	4.10	4.15
91	3.93	4.00	4.54	4.63	3.38	3.43	4.32	4.32	5.00	5.01	3.71	3.69	4.65	4.75	5.26	5.41	4.09	4.15
92	3.95	4.02	4.56	4.65	3.39	3.44	4.34	4.33	5.02	5.03	3.73	3.70	4.67	4.77	5.28	5.43	4.11	4.16
93	3.89	3.96	4.49	4.58	3.35	3.40	4.27	4.26	4.93	4.93	3.67	3.65	4.61	4.69	5.20	5.33	4.06	4.11
94	3.89	3.95	4.49	4.58	3.34	3.38	4.27	4.26	4.94	4.95	3.66	3.64	4.60	4.69	5.21	5.34	4.05	4.10
95	3.90	3.97	4.51	4.60	3.35	3.40	4.29	4.29	4.96	4.98	3.68	3.66	4.62	4.72	5.23	5.37	4.07	4.12
96	3.92	3.99	4.52	4.62	3.36	3.41	4.31	4.30	4.98	5.00	3.70	3.67	4.64	4.73	5.25	5.39	4.08	4.14
97	3.92	3.99	4.52	4.62	3.37	3.41	4.31	4.30	4.98	4.99	3.70	3.67	4.64	4.73	5.25	5.39	4.08	4.14
98	3.93	4.00	4.54	4.63	3.38	3.43	4.32	4.31	4.99	5.00	3.71	3.69	4.65	4.74	5.26	5.40	4.09	4.15
99	3.93	4.00	4.54	4.63	3.38	3.42	4.32	4.31	4.99	5.01	3.71	3.68	4.65	4.75	5.26	5.40	4.09	4.15
100	3.93	4.00	4.54	4.64	3.38	3.43	4.32	4.32	5.00	5.01	3.71	3.69	4.65	4.75	5.26	5.41	4.09	4.15
101	3.94	4.01	4.55	4.64	3.39	3.43	4.34	4.33	5.01	5.03	3.72	3.70	4.66	4.76	5.28	5.42	4.10	4.16
102	3.96	4.03	4.57	4.67	3.40	3.45	4.36	4.35	5.03	5.05	3.74	3.72	4.68	4.78	5.30	5.45	4.12	4.18
103	3.98	4.05	4.59	4.70	3.42	3.47	4.38	4.38	5.07	5.08	3.76	3.74	4.71	4.81	5.33	5.48	4.14	4.20
104	3.87	3.94	4.48	4.56	3.33	3.37	4.26	4.25	4.92	4.93	3.65	3.62	4.59	4.68	5.19	5.33	4.04	4.09
105	3.89	3.95	4.48	4.56	3.34	3.39	4.26	4.25	4.91	4.92	3.66	3.64	4.59	4.68	5.19	5.31	4.05	4.10
106	3.88	3.95	4.48	4.57	3.33	3.38	4.26	4.25	4.92	4.93	3.66	3.63	4.60	4.68	5.20	5.33	4.04	4.10
107	3.89	3.96	4.49	4.58	3.34	3.39	4.28	4.27	4.94	4.95	3.67	3.64	4.61	4.70	5.21	5.35	4.05	4.11
108	3.91	3.98	4.52	4.61	3.36	3.41	4.30	4.29	4.97	4.98	3.69	3.67	4.63	4.73	5.24	5.38	4.08	4.13
109	3.92	3.99	4.53	4.62	3.37	3.41	4.31	4.30	4.98	5.00	3.70	3.67	4.64	4.73	5.25	5.39	4.08	4.14
110	3.92	3.99	4.53	4.62	3.37	3.41	4.31	4.30	4.98	4.99	3.70	3.67	4.64	4.74	5.25	5.39	4.08	4.14
111	3.92	3.99	4.53	4.62	3.37	3.42	4.32	4.31	4.99	5.00	3.70	3.68	4.64	4.74	5.25	5.40	4.09	4.14
112	3.93	4.00	4.53	4.63	3.38	3.42	4.32	4.31	4.99	5.00	3.71	3.68	4.65	4.74	5.25	5.40	4.09	4.15
113	3.93	4.00	4.53	4.63	3.38	3.42	4.32	4.31	4.99	5.01	3.71	3.68	4.65	4.75	5.26	5.40	4.09	4.15
114	3.94	4.01	4.55	4.64	3.38	3.43	4.33	4.33	5.01	5.02	3.72	3.70	4.66	4.76	5.27	5.42	4.10	4.16

115	3.95	4.02	4.56	4.66	3.39	3.44	4.35	4.34	5.02	5.03	3.73	3.70	4.67	4.77	5.28	5.43	4.11	4.17
116	3.96	4.03	4.58	4.67	3.41	3.46	4.36	4.36	5.05	5.06	3.75	3.72	4.69	4.79	5.31	5.45	4.13	4.19
117	3.98	4.05	4.60	4.70	3.43	3.47	4.39	4.38	5.07	5.08	3.77	3.74	4.71	4.81	5.33	5.48	4.14	4.20
118	4.01	4.08	4.62	4.72	3.45	3.50	4.42	4.41	5.11	5.12	3.79	3.77	4.73	4.84	5.36	5.52	4.17	4.24
119	3.89	3.96	4.48	4.56	3.36	3.40	4.26	4.25	4.90	4.90	3.67	3.64	4.59	4.68	5.18	5.30	4.06	4.10
120	3.88	3.94	4.47	4.55	3.35	3.39	4.25	4.24	4.89	4.89	3.66	3.63	4.58	4.67	5.17	5.29	4.05	4.09
MIN	**3.87**	**3.94**	**4.47**	**4.55**	**3.32**	**3.37**	**4.25**	**4.24**	**4.89**	**4.89**	**3.65**	**3.62**	**4.58**	**4.67**	**5.17**	**5.29**	**4.04**	**4.08**
MAX	**4.01**	**4.08**	**4.62**	**4.72**	**3.45**	**3.50**	**4.42**	**4.41**	**5.11**	**5.12**	**3.79**	**3.77**	**4.73**	**4.84**	**5.36**	**5.52**	**4.17**	**4.24**
AVE	**3.90**	**3.97**	**4.50**	**4.60**	**3.35**	**3.40**	**4.29**	**4.28**	**4.95**	**4.97**	**3.68**	**3.66**	**4.62**	**4.71**	**5.23**	**5.36**	**4.07**	**4.12**

Table C- 21. Reliability Indices for Composite Rolled I-shaped Girdes for ADTT 10'000 and L=30, 60, 90ft.

	L=30 ft						**L=60 ft**						**L=90 ft**					
Φ	**1.00**		**0.95**		**1.05**		**1.00**		**0.95**		**1.05**		**1.00**		**0.95**		**1.05**	
# \ D/(D+L)	**0.25**	**0.35**	**0.25**	**0.35**	**0.25**	**0.35**	**0.40**	**0.50**	**0.40**	**0.50**	**0.40**	**0.50**	**0.50**	**0.55**	**0.50**	**0.55**	**0.50**	**0.55**
1	3.74	3.87	4.23	4.40	3.29	3.39	3.67	3.82	4.20	4.40	3.18	3.30	3.77	3.85	4.34	4.44	3.25	3.30
2	3.73	3.87	4.23	4.40	3.28	3.38	3.66	3.81	4.19	4.39	3.18	3.29	3.76	3.84	4.34	4.44	3.24	3.30
3	3.73	3.86	4.22	4.39	3.28	3.38	3.66	3.81	4.19	4.39	3.17	3.29	3.76	3.83	4.33	4.43	3.24	3.29
4	3.74	3.88	4.24	4.41	3.29	3.40	3.67	3.83	4.20	4.40	3.19	3.30	3.78	3.85	4.35	4.45	3.25	3.31
5	3.74	3.87	4.23	4.40	3.29	3.39	3.67	3.82	4.20	4.39	3.18	3.30	3.77	3.84	4.34	4.44	3.25	3.30
6	3.73	3.86	4.22	4.39	3.28	3.38	3.65	3.81	4.19	4.39	3.17	3.28	3.76	3.83	4.33	4.43	3.24	3.29
7	3.73	3.86	4.23	4.39	3.28	3.38	3.66	3.81	4.19	4.39	3.17	3.29	3.76	3.84	4.33	4.43	3.24	3.29
8	3.74	3.87	4.23	4.40	3.29	3.39	3.67	3.82	4.20	4.40	3.18	3.30	3.77	3.85	4.34	4.44	3.25	3.30
9	3.73	3.86	4.22	4.39	3.28	3.38	3.66	3.81	4.19	4.38	3.17	3.29	3.76	3.83	4.33	4.43	3.24	3.29
10	3.74	3.88	4.24	4.41	3.29	3.40	3.67	3.83	4.20	4.40	3.19	3.30	3.77	3.85	4.35	4.45	3.25	3.31
11	3.72	3.85	4.21	4.38	3.27	3.37	3.65	3.80	4.18	4.37	3.17	3.28	3.75	3.82	4.32	4.41	3.23	3.28
12	3.75	3.88	4.24	4.41	3.30	3.40	3.68	3.83	4.21	4.41	3.19	3.31	3.78	3.86	4.35	4.45	3.26	3.32
13	3.74	3.88	4.24	4.41	3.29	3.40	3.67	3.83	4.20	4.40	3.19	3.30	3.77	3.85	4.35	4.44	3.25	3.31
14	3.74	3.87	4.23	4.40	3.29	3.39	3.66	3.82	4.20	4.39	3.18	3.29	3.77	3.84	4.34	4.44	3.25	3.30
15	3.73	3.87	4.23	4.39	3.28	3.38	3.66	3.81	4.19	4.39	3.18	3.29	3.76	3.84	4.33	4.44	3.24	3.30
16	3.73	3.87	4.23	4.40	3.28	3.38	3.66	3.81	4.19	4.39	3.17	3.29	3.76	3.84	4.34	4.44	3.24	3.29
17	3.73	3.86	4.22	4.39	3.28	3.38	3.66	3.81	4.19	4.39	3.17	3.29	3.76	3.84	4.33	4.43	3.24	3.29
18	3.74	3.87	4.23	4.40	3.29	3.39	3.67	3.82	4.20	4.39	3.18	3.30	3.77	3.84	4.34	4.44	3.25	3.30
19	3.74	3.87	4.23	4.40	3.29	3.39	3.66	3.82	4.20	4.40	3.18	3.29	3.77	3.84	4.34	4.44	3.25	3.30
20	3.73	3.87	4.23	4.40	3.28	3.39	3.66	3.82	4.19	4.39	3.18	3.29	3.76	3.84	4.34	4.44	3.24	3.30
21	3.73	3.86	4.23	4.39	3.28	3.38	3.66	3.81	4.19	4.39	3.17	3.29	3.76	3.84	4.34	4.44	3.24	3.29
22	3.73	3.86	4.22	4.39	3.27	3.38	3.65	3.81	4.19	4.39	3.17	3.28	3.76	3.83	4.33	4.43	3.23	3.29
23	3.73	3.87	4.23	4.40	3.28	3.39	3.66	3.82	4.20	4.39	3.18	3.29	3.77	3.84	4.34	4.44	3.24	3.30

24	3.73	3.87	4.23	4.40	3.28	3.39	3.66	3.82	4.20	4.39	3.18	3.29	3.76	3.84	4.34	4.44	3.24	3.30
25	3.73	3.86	4.22	4.39	3.28	3.38	3.66	3.81	4.19	4.39	3.17	3.28	3.76	3.84	4.34	4.44	3.24	3.29
26	3.74	3.87	4.23	4.40	3.29	3.39	3.67	3.82	4.20	4.39	3.18	3.30	3.77	3.85	4.34	4.44	3.25	3.31
27	3.73	3.87	4.23	4.39	3.28	3.38	3.66	3.81	4.19	4.39	3.17	3.29	3.76	3.84	4.33	4.43	3.24	3.30
28	3.73	3.86	4.22	4.39	3.28	3.38	3.66	3.81	4.19	4.39	3.17	3.29	3.76	3.84	4.33	4.43	3.24	3.29
29	3.74	3.87	4.23	4.40	3.29	3.39	3.67	3.82	4.20	4.39	3.18	3.30	3.77	3.84	4.34	4.44	3.25	3.30
30	3.74	3.87	4.23	4.40	3.28	3.39	3.66	3.82	4.20	4.39	3.18	3.29	3.77	3.84	4.34	4.44	3.24	3.30
31	3.73	3.87	4.23	4.40	3.28	3.38	3.66	3.81	4.19	4.39	3.17	3.29	3.76	3.84	4.34	4.44	3.24	3.30
32	3.73	3.86	4.22	4.39	3.28	3.38	3.66	3.81	4.19	4.39	3.17	3.28	3.76	3.84	4.33	4.44	3.24	3.29
33	3.72	3.85	4.22	4.39	3.27	3.37	3.65	3.80	4.18	4.38	3.16	3.28	3.75	3.83	4.33	4.43	3.23	3.28
34	3.74	3.87	4.24	4.40	3.29	3.39	3.67	3.82	4.20	4.40	3.18	3.30	3.77	3.85	4.35	4.45	3.25	3.30
35	3.73	3.86	4.22	4.39	3.28	3.38	3.66	3.81	4.19	4.39	3.17	3.28	3.76	3.84	4.33	4.43	3.24	3.29
36	3.73	3.87	4.23	4.39	3.28	3.39	3.66	3.81	4.19	4.39	3.18	3.29	3.76	3.84	4.33	4.43	3.24	3.30
37	3.73	3.86	4.23	4.39	3.28	3.38	3.66	3.81	4.19	4.39	3.17	3.29	3.76	3.84	4.33	4.43	3.24	3.30
38	3.73	3.87	4.23	4.40	3.28	3.38	3.66	3.81	4.19	4.39	3.17	3.29	3.76	3.84	4.34	4.44	3.24	3.29
39	3.73	3.87	4.23	4.40	3.28	3.39	3.66	3.81	4.19	4.39	3.18	3.29	3.76	3.84	4.34	4.43	3.24	3.30
40	3.73	3.87	4.23	4.40	3.28	3.38	3.66	3.82	4.20	4.39	3.18	3.29	3.76	3.84	4.34	4.44	3.24	3.30
41	3.73	3.86	4.22	4.39	3.27	3.38	3.65	3.81	4.19	4.39	3.17	3.28	3.76	3.83	4.33	4.44	3.23	3.29
42	3.72	3.86	4.22	4.39	3.27	3.37	3.65	3.80	4.19	4.39	3.16	3.28	3.75	3.83	4.33	4.43	3.23	3.28
43	3.73	3.87	4.23	4.40	3.28	3.38	3.66	3.82	4.19	4.39	3.17	3.29	3.76	3.84	4.34	4.44	3.24	3.30
44	3.72	3.85	4.22	4.39	3.27	3.37	3.65	3.80	4.18	4.38	3.16	3.28	3.75	3.83	4.33	4.43	3.23	3.28
45	3.73	3.87	4.23	4.39	3.28	3.38	3.66	3.81	4.19	4.39	3.18	3.29	3.76	3.84	4.33	4.43	3.24	3.30
46	3.73	3.87	4.23	4.40	3.28	3.38	3.66	3.81	4.19	4.39	3.17	3.29	3.76	3.84	4.34	4.44	3.24	3.30
47	3.74	3.87	4.23	4.40	3.29	3.39	3.66	3.82	4.19	4.39	3.18	3.29	3.77	3.84	4.34	4.43	3.25	3.30
48	3.73	3.87	4.23	4.40	3.28	3.39	3.66	3.82	4.20	4.39	3.18	3.29	3.77	3.84	4.34	4.44	3.24	3.30
49	3.73	3.86	4.22	4.39	3.27	3.38	3.65	3.81	4.19	4.39	3.17	3.28	3.76	3.84	4.33	4.44	3.23	3.29
50	3.71	3.85	4.21	4.38	3.26	3.36	3.64	3.80	4.18	4.38	3.15	3.27	3.75	3.82	4.32	4.43	3.22	3.28
51	3.72	3.86	4.22	4.39	3.27	3.37	3.65	3.80	4.19	4.39	3.16	3.28	3.75	3.83	4.33	4.43	3.23	3.28
52	3.73	3.87	4.23	4.40	3.28	3.38	3.66	3.82	4.20	4.39	3.18	3.29	3.76	3.84	4.34	4.44	3.24	3.30
53	3.72	3.85	4.22	4.39	3.27	3.37	3.65	3.80	4.18	4.38	3.16	3.28	3.75	3.83	4.33	4.43	3.23	3.28
54	3.74	3.87	4.24	4.41	3.29	3.39	3.67	3.82	4.20	4.41	3.18	3.30	3.77	3.85	4.35	4.45	3.25	3.30
55	3.75	3.88	4.25	4.42	3.29	3.40	3.68	3.84	4.22	4.42	3.19	3.31	3.78	3.86	4.36	4.47	3.26	3.31
56	3.76	3.89	4.25	4.42	3.30	3.41	3.68	3.84	4.22	4.42	3.20	3.32	3.79	3.87	4.37	4.47	3.27	3.32
57	3.76	3.89	4.26	4.43	3.31	3.41	3.69	3.84	4.22	4.42	3.20	3.32	3.79	3.87	4.37	4.47	3.27	3.32
58	3.74	3.87	4.23	4.39	3.29	3.39	3.67	3.82	4.19	4.38	3.19	3.30	3.77	3.84	4.33	4.43	3.25	3.30
59	3.74	3.87	4.23	4.39	3.29	3.39	3.66	3.81	4.19	4.38	3.18	3.29	3.76	3.84	4.33	4.43	3.25	3.30
60	3.73	3.87	4.23	4.39	3.28	3.39	3.66	3.81	4.19	4.39	3.18	3.29	3.76	3.84	4.33	4.43	3.24	3.30
61	3.74	3.87	4.23	4.40	3.29	3.39	3.67	3.82	4.20	4.39	3.18	3.30	3.77	3.84	4.33	4.43	3.25	3.30
62	3.74	3.87	4.23	4.40	3.29	3.39	3.66	3.82	4.20	4.39	3.18	3.29	3.77	3.84	4.34	4.44	3.25	3.30

63	3.73	3.87	4.23	4.40	3.28	3.38	3.66	3.81	4.19	4.39	3.17	3.29	3.76	3.84	4.34	4.44	3.24	3.30
64	3.72	3.86	4.22	4.39	3.27	3.37	3.65	3.81	4.19	4.39	3.16	3.28	3.75	3.83	4.33	4.43	3.23	3.29
65	3.72	3.86	4.22	4.39	3.27	3.37	3.65	3.80	4.19	4.39	3.16	3.28	3.75	3.83	4.33	4.43	3.23	3.28
66	3.74	3.87	4.23	4.40	3.29	3.39	3.67	3.82	4.20	4.40	3.18	3.30	3.77	3.85	4.35	4.45	3.25	3.30
67	3.73	3.86	4.22	4.39	3.27	3.38	3.66	3.81	4.19	4.39	3.17	3.28	3.76	3.84	4.34	4.44	3.24	3.29
68	3.75	3.88	4.25	4.42	3.29	3.40	3.68	3.83	4.21	4.42	3.19	3.30	3.78	3.86	4.36	4.46	3.26	3.31
69	3.75	3.89	4.25	4.42	3.30	3.40	3.68	3.84	4.22	4.42	3.19	3.31	3.79	3.87	4.37	4.47	3.26	3.32
70	3.75	3.89	4.25	4.42	3.30	3.40	3.68	3.84	4.22	4.42	3.19	3.31	3.79	3.87	4.37	4.47	3.26	3.32
71	3.76	3.89	4.25	4.43	3.30	3.41	3.68	3.84	4.22	4.42	3.20	3.32	3.79	3.87	4.37	4.47	3.27	3.32
72	3.76	3.90	4.26	4.43	3.31	3.41	3.69	3.85	4.23	4.43	3.20	3.32	3.80	3.88	4.38	4.48	3.27	3.33
73	3.75	3.89	4.25	4.42	3.30	3.40	3.68	3.84	4.22	4.42	3.19	3.31	3.79	3.86	4.36	4.47	3.26	3.32
74	3.76	3.90	4.26	4.43	3.31	3.42	3.69	3.85	4.23	4.43	3.21	3.32	3.80	3.88	4.38	4.48	3.28	3.33
75	3.77	3.90	4.26	4.43	3.31	3.42	3.70	3.85	4.23	4.43	3.21	3.32	3.80	3.88	4.38	4.48	3.28	3.33
76	3.74	3.87	4.23	4.39	3.29	3.39	3.66	3.81	4.19	4.38	3.18	3.30	3.76	3.84	4.33	4.43	3.25	3.30
77	3.74	3.87	4.23	4.40	3.28	3.39	3.66	3.82	4.19	4.39	3.18	3.29	3.76	3.84	4.33	4.43	3.24	3.30
78	3.74	3.87	4.23	4.39	3.29	3.39	3.66	3.81	4.19	4.38	3.18	3.29	3.76	3.84	4.33	4.43	3.25	3.30
79	3.73	3.87	4.23	4.40	3.28	3.39	3.66	3.82	4.19	4.39	3.18	3.29	3.76	3.84	4.34	4.43	3.24	3.30
80	3.73	3.87	4.23	4.40	3.28	3.38	3.66	3.82	4.19	4.39	3.17	3.29	3.76	3.84	4.34	4.44	3.24	3.30
81	3.72	3.85	4.22	4.39	3.27	3.37	3.65	3.80	4.18	4.38	3.16	3.27	3.75	3.83	4.33	4.43	3.23	3.28
82	3.74	3.87	4.23	4.40	3.28	3.39	3.66	3.82	4.20	4.39	3.18	3.29	3.77	3.84	4.34	4.44	3.25	3.30
83	3.72	3.86	4.22	4.39	3.27	3.37	3.65	3.81	4.19	4.38	3.16	3.28	3.75	3.83	4.33	4.43	3.23	3.29
84	3.74	3.87	4.24	4.41	3.28	3.39	3.67	3.82	4.21	4.41	3.18	3.30	3.77	3.85	4.35	4.46	3.25	3.30
85	3.75	3.89	4.25	4.42	3.30	3.40	3.68	3.84	4.22	4.42	3.19	3.31	3.79	3.87	4.37	4.47	3.26	3.32
86	3.75	3.89	4.25	4.43	3.30	3.41	3.69	3.84	4.22	4.43	3.20	3.31	3.79	3.87	4.37	4.47	3.27	3.32
87	3.74	3.88	4.24	4.41	3.29	3.39	3.67	3.83	4.21	4.41	3.18	3.30	3.77	3.85	4.35	4.45	3.25	3.31
88	3.75	3.89	4.25	4.42	3.30	3.40	3.68	3.84	4.22	4.42	3.20	3.31	3.79	3.87	4.37	4.47	3.26	3.32
89	3.76	3.90	4.26	4.43	3.31	3.41	3.69	3.85	4.23	4.43	3.20	3.32	3.80	3.88	4.38	4.48	3.27	3.33
90	3.76	3.90	4.26	4.43	3.31	3.42	3.70	3.85	4.23	4.44	3.21	3.33	3.80	3.88	4.38	4.48	3.28	3.33
91	3.76	3.90	4.26	4.43	3.31	3.41	3.69	3.85	4.23	4.44	3.20	3.32	3.80	3.88	4.38	4.48	3.28	3.33
92	3.77	3.91	4.27	4.45	3.32	3.42	3.71	3.87	4.25	4.45	3.22	3.34	3.82	3.89	4.40	4.50	3.29	3.34
93	3.74	3.87	4.23	4.40	3.29	3.39	3.67	3.82	4.20	4.39	3.18	3.30	3.77	3.85	4.34	4.44	3.25	3.30
94	3.73	3.86	4.23	4.39	3.28	3.38	3.66	3.81	4.19	4.39	3.17	3.29	3.76	3.84	4.33	4.44	3.24	3.29
95	3.74	3.88	4.24	4.41	3.29	3.39	3.67	3.83	4.21	4.41	3.18	3.30	3.78	3.85	4.35	4.46	3.25	3.30
96	3.75	3.89	4.25	4.42	3.29	3.40	3.68	3.84	4.22	4.42	3.19	3.31	3.79	3.87	4.37	4.47	3.26	3.32
97	3.75	3.89	4.25	4.42	3.30	3.40	3.68	3.84	4.22	4.42	3.19	3.31	3.79	3.87	4.37	4.47	3.26	3.32
98	3.76	3.90	4.26	4.43	3.31	3.41	3.69	3.85	4.23	4.43	3.20	3.32	3.80	3.88	4.38	4.48	3.27	3.33
99	3.76	3.90	4.26	4.43	3.31	3.41	3.69	3.85	4.23	4.43	3.20	3.32	3.80	3.88	4.38	4.48	3.27	3.33
100	3.76	3.90	4.26	4.44	3.31	3.41	3.69	3.85	4.23	4.44	3.20	3.32	3.80	3.88	4.38	4.49	3.27	3.33
101	3.77	3.91	4.27	4.45	3.31	3.42	3.70	3.86	4.24	4.45	3.21	3.33	3.81	3.89	4.39	4.50	3.28	3.34

102	3.78	3.92	4.28	4.46	3.32	3.43	3.71	3.88	4.26	4.46	3.22	3.35	3.83	3.91	4.41	4.52	3.29	3.35
103	3.80	3.94	4.30	4.48	3.34	3.45	3.73	3.90	4.28	4.49	3.24	3.36	3.85	3.93	4.44	4.54	3.31	3.37
104	3.72	3.85	4.21	4.38	3.26	3.37	3.64	3.80	4.18	4.38	3.16	3.27	3.75	3.82	4.32	4.42	3.22	3.28
105	3.73	3.87	4.23	4.39	3.28	3.38	3.66	3.81	4.19	4.38	3.18	3.29	3.76	3.84	4.33	4.43	3.24	3.30
106	3.72	3.86	4.22	4.39	3.27	3.37	3.65	3.81	4.19	4.38	3.16	3.28	3.75	3.83	4.33	4.43	3.23	3.29
107	3.73	3.87	4.23	4.40	3.28	3.38	3.66	3.81	4.19	4.39	3.17	3.29	3.76	3.84	4.34	4.44	3.24	3.29
108	3.75	3.88	4.25	4.42	3.29	3.40	3.68	3.83	4.21	4.42	3.19	3.31	3.78	3.86	4.36	4.46	3.26	3.31
109	3.75	3.89	4.25	4.42	3.30	3.40	3.68	3.84	4.22	4.43	3.19	3.31	3.79	3.87	4.37	4.47	3.26	3.32
110	3.75	3.89	4.25	4.43	3.29	3.40	3.68	3.84	4.22	4.42	3.19	3.31	3.79	3.87	4.37	4.47	3.26	3.32
111	3.76	3.90	4.26	4.43	3.30	3.41	3.69	3.85	4.23	4.43	3.20	3.32	3.80	3.87	4.37	4.48	3.27	3.33
112	3.76	3.90	4.26	4.43	3.31	3.41	3.69	3.85	4.23	4.43	3.20	3.32	3.80	3.88	4.38	4.48	3.27	3.33
113	3.76	3.90	4.26	4.43	3.30	3.41	3.69	3.85	4.23	4.43	3.20	3.32	3.80	3.88	4.38	4.48	3.27	3.33
114	3.77	3.90	4.27	4.44	3.31	3.42	3.70	3.86	4.24	4.45	3.21	3.33	3.81	3.89	4.39	4.49	3.28	3.34
115	3.77	3.91	4.28	4.45	3.32	3.42	3.70	3.87	4.25	4.45	3.21	3.33	3.82	3.90	4.40	4.50	3.29	3.34
116	3.78	3.93	4.29	4.46	3.33	3.44	3.72	3.88	4.26	4.47	3.22	3.35	3.83	3.91	4.41	4.52	3.30	3.36
117	3.80	3.94	4.31	4.48	3.34	3.45	3.73	3.90	4.28	4.49	3.24	3.37	3.85	3.93	4.44	4.55	3.32	3.38
118	3.82	3.97	4.33	4.51	3.36	3.47	3.76	3.92	4.31	4.52	3.26	3.38	3.87	3.96	4.46	4.57	3.34	3.40
119	3.75	3.88	4.24	4.40	3.30	3.40	3.67	3.82	4.20	4.39	3.19	3.31	3.77	3.84	4.33	4.43	3.26	3.31
120	3.74	3.87	4.23	4.39	3.29	3.39	3.66	3.81	4.19	4.38	3.18	3.30	3.76	3.83	4.32	4.42	3.25	3.30
MIN	**3.71**	**3.85**	**4.21**	**4.38**	**3.26**	**3.36**	**3.64**	**3.80**	**4.18**	**4.37**	**3.15**	**3.27**	**3.75**	**3.82**	**4.32**	**4.41**	**3.22**	**3.28**
MAX	**3.82**	**3.97**	**4.33**	**4.51**	**3.36**	**3.47**	**3.76**	**3.92**	**4.31**	**4.52**	**3.26**	**3.38**	**3.87**	**3.96**	**4.46**	**4.57**	**3.34**	**3.40**
AVE	**3.74**	**3.88**	**4.24**	**4.41**	**3.29**	**3.39**	**3.67**	**3.83**	**4.21**	**4.40**	**3.18**	**3.30**	**3.77**	**3.85**	**4.35**	**4.45**	**3.25**	**3.31**

Table C- 22. Reliability Indices for Composite Rolled I-shaped Girdes for ADTT 10'000 and L=120, 200, 300ft.

	L=120 ft						**L=200 ft**						**L=300 ft**					
Φ	**1.00**		**0.95**		**1.05**		**1.00**		**0.95**		**1.05**		**1.00**		**0.95**		**1.05**	
# \ D/(D+L)	**0.55**	**0.60**	**0.55**	**0.60**	**0.55**	**0.60**	**0.65**	**0.70**	**0.65**	**0.70**	**0.65**	**0.70**	**0.45**	**0.55**	**0.45**	**0.55**	**0.45**	**0.55**
1	3.85	3.92	4.44	4.54	3.30	3.35	4.28	4.27	4.95	4.96	3.68	3.65	4.55	4.65	5.15	5.29	4.00	4.06
2	3.84	3.91	4.44	4.53	3.30	3.34	4.27	4.26	4.94	4.95	3.67	3.64	4.54	4.64	5.14	5.28	3.99	4.05
3	3.83	3.90	4.43	4.52	3.29	3.34	4.27	4.26	4.93	4.94	3.66	3.64	4.54	4.63	5.14	5.28	3.99	4.04
4	3.85	3.92	4.45	4.54	3.31	3.36	4.28	4.27	4.95	4.96	3.68	3.65	4.55	4.65	5.15	5.29	4.01	4.06
5	3.84	3.91	4.44	4.53	3.30	3.35	4.28	4.27	4.94	4.95	3.67	3.65	4.54	4.64	5.14	5.29	4.00	4.05
6	3.83	3.90	4.43	4.53	3.29	3.34	4.27	4.26	4.93	4.94	3.66	3.64	4.54	4.63	5.14	5.28	3.99	4.04
7	3.84	3.91	4.43	4.53	3.29	3.34	4.27	4.26	4.94	4.95	3.66	3.64	4.54	4.64	5.14	5.29	3.99	4.05
8	3.85	3.91	4.44	4.54	3.30	3.35	4.28	4.27	4.94	4.95	3.67	3.65	4.55	4.64	5.15	5.29	4.00	4.06
9	3.83	3.90	4.43	4.52	3.29	3.34	4.26	4.25	4.92	4.93	3.66	3.63	4.53	4.63	5.13	5.27	3.99	4.04
10	3.85	3.92	4.45	4.54	3.31	3.36	4.28	4.27	4.94	4.95	3.68	3.65	4.55	4.65	5.15	5.29	4.01	4.06

11	3.82	3.89	4.41	4.51	3.28	3.33	4.25	4.24	4.91	4.91	3.65	3.62	4.52	4.61	5.12	5.25	3.98	4.03
12	3.86	3.93	4.45	4.55	3.32	3.36	4.29	4.28	4.95	4.96	3.69	3.66	4.56	4.65	5.16	5.30	4.01	4.07
13	3.85	3.92	4.44	4.54	3.31	3.36	4.28	4.27	4.94	4.95	3.68	3.65	4.55	4.64	5.15	5.29	4.00	4.06
14	3.84	3.91	4.44	4.53	3.30	3.35	4.27	4.26	4.94	4.95	3.67	3.64	4.54	4.64	5.14	5.28	4.00	4.05
15	3.84	3.91	4.44	4.53	3.30	3.34	4.27	4.26	4.94	4.95	3.67	3.64	4.54	4.64	5.14	5.28	3.99	4.05
16	3.84	3.91	4.44	4.53	3.29	3.34	4.27	4.26	4.94	4.95	3.67	3.64	4.54	4.64	5.14	5.29	3.99	4.05
17	3.84	3.91	4.43	4.53	3.29	3.34	4.27	4.26	4.94	4.95	3.66	3.64	4.54	4.64	5.14	5.29	3.99	4.05
18	3.84	3.91	4.44	4.53	3.30	3.35	4.28	4.27	4.94	4.95	3.67	3.65	4.54	4.64	5.14	5.29	4.00	4.05
19	3.84	3.91	4.44	4.54	3.30	3.35	4.28	4.27	4.95	4.96	3.67	3.65	4.55	4.64	5.15	5.29	4.00	4.05
20	3.84	3.91	4.44	4.53	3.30	3.34	4.27	4.26	4.93	4.94	3.67	3.64	4.54	4.63	5.14	5.28	3.99	4.05
21	3.84	3.91	4.44	4.53	3.29	3.34	4.27	4.26	4.94	4.95	3.67	3.64	4.54	4.64	5.14	5.29	3.99	4.05
22	3.83	3.90	4.43	4.53	3.29	3.34	4.27	4.26	4.94	4.95	3.66	3.64	4.54	4.64	5.14	5.29	3.99	4.05
23	3.84	3.91	4.44	4.53	3.30	3.35	4.27	4.26	4.94	4.95	3.67	3.64	4.54	4.64	5.15	5.29	4.00	4.05
24	3.84	3.91	4.44	4.53	3.30	3.34	4.28	4.27	4.94	4.95	3.67	3.64	4.54	4.64	5.15	5.29	4.00	4.05
25	3.84	3.91	4.44	4.53	3.29	3.34	4.27	4.26	4.95	4.96	3.66	3.64	4.54	4.64	5.15	5.29	3.99	4.05
26	3.85	3.91	4.44	4.53	3.31	3.35	4.27	4.26	4.93	4.94	3.67	3.65	4.54	4.64	5.14	5.28	4.00	4.05
27	3.84	3.91	4.43	4.52	3.30	3.34	4.27	4.26	4.93	4.94	3.66	3.64	4.54	4.63	5.14	5.27	3.99	4.05
28	3.84	3.90	4.43	4.52	3.29	3.34	4.27	4.26	4.93	4.94	3.66	3.64	4.54	4.63	5.14	5.28	3.99	4.05
29	3.84	3.91	4.44	4.53	3.30	3.35	4.27	4.26	4.94	4.94	3.67	3.64	4.54	4.64	5.14	5.28	4.00	4.05
30	3.84	3.91	4.44	4.53	3.30	3.35	4.28	4.27	4.94	4.95	3.67	3.64	4.55	4.64	5.15	5.29	4.00	4.05
31	3.84	3.91	4.44	4.53	3.30	3.34	4.27	4.27	4.94	4.95	3.67	3.64	4.54	4.64	5.15	5.29	4.00	4.05
32	3.84	3.90	4.44	4.53	3.29	3.34	4.27	4.26	4.94	4.95	3.66	3.64	4.54	4.64	5.15	5.29	3.99	4.05
33	3.83	3.90	4.43	4.52	3.28	3.33	4.26	4.25	4.94	4.95	3.65	3.63	4.53	4.63	5.14	5.28	3.98	4.04
34	3.85	3.92	4.45	4.54	3.30	3.35	4.28	4.27	4.95	4.96	3.68	3.65	4.55	4.65	5.15	5.30	4.00	4.06
35	3.84	3.90	4.43	4.53	3.29	3.34	4.27	4.26	4.94	4.95	3.66	3.64	4.54	4.64	5.14	5.29	3.99	4.05
36	3.84	3.91	4.43	4.52	3.30	3.34	4.26	4.25	4.92	4.93	3.67	3.64	4.54	4.63	5.13	5.27	3.99	4.05
37	3.84	3.90	4.43	4.52	3.30	3.34	4.27	4.26	4.93	4.93	3.66	3.64	4.54	4.63	5.13	5.27	3.99	4.05
38	3.84	3.91	4.44	4.53	3.29	3.34	4.27	4.26	4.94	4.95	3.67	3.64	4.54	4.64	5.14	5.29	3.99	4.05
39	3.84	3.91	4.43	4.53	3.30	3.34	4.27	4.26	4.93	4.94	3.67	3.64	4.54	4.63	5.14	5.28	3.99	4.05
40	3.84	3.91	4.44	4.53	3.30	3.34	4.28	4.27	4.94	4.95	3.67	3.64	4.54	4.64	5.15	5.29	4.00	4.05
41	3.83	3.90	4.44	4.53	3.29	3.34	4.27	4.26	4.94	4.95	3.66	3.64	4.54	4.64	5.15	5.29	3.99	4.05
42	3.83	3.90	4.43	4.53	3.28	3.33	4.27	4.26	4.94	4.95	3.66	3.63	4.54	4.64	5.14	5.29	3.98	4.04
43	3.84	3.91	4.44	4.54	3.30	3.34	4.28	4.27	4.95	4.96	3.67	3.64	4.55	4.64	5.15	5.29	4.00	4.05
44	3.83	3.90	4.43	4.52	3.28	3.33	4.26	4.25	4.93	4.95	3.66	3.63	4.53	4.63	5.14	5.28	3.98	4.04
45	3.84	3.91	4.43	4.52	3.30	3.34	4.27	4.26	4.92	4.93	3.67	3.64	4.54	4.63	5.13	5.27	3.99	4.05
46	3.84	3.91	4.44	4.53	3.30	3.34	4.27	4.26	4.93	4.94	3.67	3.64	4.54	4.64	5.14	5.28	3.99	4.05
47	3.84	3.91	4.43	4.52	3.30	3.35	4.27	4.26	4.93	4.93	3.67	3.64	4.54	4.63	5.13	5.27	4.00	4.05
48	3.84	3.91	4.44	4.53	3.30	3.35	4.27	4.26	4.94	4.95	3.67	3.64	4.54	4.64	5.14	5.29	4.00	4.05
49	3.84	3.90	4.44	4.53	3.29	3.34	4.27	4.26	4.94	4.95	3.66	3.64	4.54	4.64	5.15	5.29	3.99	4.05

50	3.82	3.89	4.43	4.52	3.28	3.32	4.26	4.25	4.93	4.94	3.65	3.62	4.53	4.63	5.14	5.28	3.98	4.04
51	3.83	3.90	4.43	4.53	3.28	3.33	4.27	4.26	4.94	4.95	3.66	3.63	4.54	4.64	5.14	5.29	3.99	4.04
52	3.84	3.91	4.44	4.54	3.30	3.35	4.28	4.27	4.94	4.95	3.67	3.64	4.54	4.64	5.15	5.29	4.00	4.05
53	3.83	3.90	4.43	4.52	3.28	3.33	4.26	4.26	4.94	4.95	3.66	3.63	4.53	4.63	5.14	5.28	3.98	4.04
54	3.85	3.92	4.45	4.55	3.30	3.35	4.29	4.28	4.96	4.98	3.68	3.65	4.56	4.66	5.16	5.31	4.01	4.06
55	3.86	3.93	4.47	4.56	3.31	3.36	4.30	4.30	4.98	4.99	3.69	3.67	4.57	4.67	5.18	5.33	4.02	4.08
56	3.87	3.94	4.47	4.57	3.32	3.37	4.31	4.30	4.99	5.00	3.70	3.67	4.57	4.68	5.18	5.33	4.02	4.08
57	3.87	3.94	4.47	4.57	3.32	3.37	4.31	4.30	4.98	4.99	3.70	3.68	4.58	4.68	5.18	5.33	4.02	4.08
58	3.84	3.90	4.43	4.51	3.30	3.35	4.26	4.25	4.90	4.91	3.67	3.64	4.53	4.62	5.12	5.25	3.99	4.04
59	3.84	3.90	4.43	4.52	3.30	3.35	4.26	4.25	4.91	4.92	3.66	3.64	4.53	4.62	5.12	5.25	3.99	4.05
60	3.84	3.91	4.43	4.52	3.30	3.34	4.27	4.26	4.93	4.93	3.67	3.64	4.54	4.63	5.13	5.27	3.99	4.05
61	3.84	3.91	4.43	4.52	3.30	3.35	4.26	4.25	4.92	4.92	3.67	3.64	4.54	4.63	5.13	5.26	4.00	4.05
62	3.84	3.91	4.44	4.53	3.30	3.35	4.27	4.26	4.93	4.94	3.67	3.64	4.54	4.64	5.14	5.28	4.00	4.05
63	3.84	3.91	4.44	4.53	3.30	3.34	4.27	4.26	4.94	4.95	3.67	3.64	4.54	4.64	5.14	5.29	4.00	4.05
64	3.83	3.90	4.43	4.53	3.29	3.33	4.27	4.26	4.94	4.95	3.66	3.63	4.54	4.63	5.14	5.29	3.99	4.04
65	3.83	3.90	4.43	4.53	3.28	3.33	4.27	4.26	4.94	4.95	3.66	3.63	4.54	4.64	5.14	5.29	3.99	4.04
66	3.85	3.92	4.45	4.54	3.30	3.35	4.28	4.27	4.95	4.96	3.68	3.65	4.55	4.65	5.15	5.30	4.00	4.06
67	3.84	3.91	4.44	4.53	3.29	3.34	4.27	4.26	4.94	4.95	3.66	3.64	4.54	4.64	5.15	5.29	3.99	4.05
68	3.86	3.93	4.46	4.56	3.31	3.36	4.30	4.29	4.97	4.99	3.69	3.66	4.57	4.67	5.17	5.32	4.01	4.07
69	3.87	3.94	4.47	4.57	3.32	3.37	4.31	4.30	4.98	4.99	3.70	3.67	4.57	4.67	5.18	5.33	4.02	4.08
70	3.87	3.94	4.47	4.57	3.32	3.37	4.31	4.30	4.98	5.00	3.70	3.67	4.57	4.68	5.18	5.33	4.02	4.08
71	3.87	3.94	4.47	4.57	3.32	3.37	4.31	4.30	4.98	4.99	3.70	3.67	4.57	4.68	5.18	5.33	4.02	4.08
72	3.88	3.95	4.48	4.58	3.33	3.38	4.32	4.31	4.99	5.00	3.71	3.68	4.58	4.68	5.19	5.34	4.03	4.09
73	3.86	3.93	4.47	4.56	3.32	3.37	4.30	4.30	4.97	4.99	3.69	3.67	4.57	4.67	5.18	5.32	4.02	4.08
74	3.88	3.95	4.48	4.58	3.33	3.38	4.32	4.31	4.99	5.00	3.71	3.68	4.58	4.69	5.19	5.34	4.03	4.09
75	3.88	3.95	4.48	4.58	3.33	3.38	4.32	4.31	4.99	5.01	3.71	3.69	4.58	4.69	5.19	5.34	4.03	4.09
76	3.84	3.90	4.43	4.51	3.30	3.35	4.26	4.25	4.91	4.91	3.67	3.64	4.53	4.62	5.12	5.25	3.99	4.04
77	3.84	3.91	4.43	4.52	3.30	3.35	4.27	4.26	4.92	4.93	3.67	3.64	4.54	4.63	5.13	5.27	3.99	4.05
78	3.84	3.90	4.43	4.51	3.30	3.35	4.26	4.25	4.91	4.91	3.66	3.64	4.53	4.62	5.12	5.25	3.99	4.04
79	3.84	3.91	4.43	4.53	3.30	3.35	4.27	4.26	4.93	4.93	3.67	3.64	4.54	4.63	5.13	5.27	3.99	4.05
80	3.84	3.91	4.44	4.53	3.30	3.34	4.27	4.26	4.94	4.95	3.67	3.64	4.54	4.64	5.14	5.28	4.00	4.05
81	3.83	3.90	4.43	4.52	3.28	3.33	4.26	4.25	4.93	4.94	3.66	3.63	4.53	4.63	5.14	5.28	3.98	4.04
82	3.84	3.91	4.44	4.53	3.30	3.35	4.27	4.27	4.94	4.94	3.67	3.65	4.54	4.64	5.14	5.28	4.00	4.05
83	3.83	3.90	4.43	4.53	3.29	3.33	4.27	4.26	4.93	4.95	3.66	3.63	4.53	4.63	5.14	5.28	3.99	4.04
84	3.85	3.92	4.46	4.55	3.30	3.35	4.29	4.28	4.96	4.98	3.68	3.66	4.56	4.66	5.17	5.31	4.01	4.06
85	3.87	3.94	4.47	4.57	3.32	3.37	4.31	4.30	4.98	5.00	3.70	3.67	4.57	4.68	5.18	5.33	4.02	4.08
86	3.87	3.94	4.47	4.57	3.32	3.37	4.31	4.31	4.99	5.00	3.70	3.68	4.58	4.68	5.19	5.33	4.02	4.08
87	3.85	3.92	4.45	4.55	3.31	3.35	4.29	4.28	4.96	4.97	3.68	3.66	4.56	4.66	5.16	5.31	4.01	4.07
88	3.87	3.94	4.47	4.57	3.32	3.37	4.31	4.30	4.98	4.99	3.70	3.67	4.57	4.67	5.18	5.33	4.02	4.08

89	3.88	3.95	4.48	4.58	3.33	3.38	4.32	4.31	4.99	5.00	3.71	3.68	4.58	4.68	5.19	5.34	4.03	4.09
90	3.88	3.95	4.48	4.58	3.33	3.38	4.32	4.32	5.00	5.01	3.71	3.69	4.59	4.69	5.19	5.34	4.03	4.09
91	3.88	3.95	4.48	4.58	3.33	3.38	4.32	4.32	5.00	5.01	3.71	3.69	4.59	4.69	5.19	5.35	4.03	4.10
92	3.89	3.97	4.50	4.60	3.34	3.40	4.34	4.33	5.02	5.03	3.73	3.70	4.60	4.71	5.21	5.37	4.05	4.11
93	3.85	3.91	4.44	4.53	3.30	3.35	4.27	4.26	4.93	4.93	3.67	3.65	4.54	4.64	5.14	5.27	4.00	4.05
94	3.84	3.91	4.44	4.53	3.29	3.34	4.27	4.26	4.94	4.95	3.66	3.64	4.54	4.64	5.14	5.28	3.99	4.05
95	3.85	3.92	4.46	4.55	3.30	3.35	4.29	4.29	4.96	4.98	3.68	3.66	4.56	4.66	5.17	5.31	4.01	4.07
96	3.87	3.94	4.47	4.57	3.32	3.37	4.31	4.30	4.98	5.00	3.70	3.67	4.57	4.67	5.18	5.33	4.02	4.08
97	3.87	3.94	4.47	4.56	3.32	3.37	4.31	4.30	4.98	4.99	3.70	3.67	4.57	4.67	5.18	5.33	4.02	4.08
98	3.88	3.95	4.48	4.58	3.33	3.38	4.32	4.31	4.99	5.00	3.71	3.69	4.58	4.69	5.19	5.34	4.03	4.09
99	3.88	3.95	4.48	4.58	3.33	3.38	4.32	4.31	4.99	5.01	3.71	3.68	4.58	4.69	5.19	5.34	4.03	4.09
100	3.88	3.95	4.49	4.58	3.33	3.38	4.32	4.32	5.00	5.01	3.71	3.69	4.59	4.69	5.20	5.34	4.03	4.09
101	3.89	3.96	4.50	4.59	3.34	3.39	4.34	4.33	5.01	5.03	3.72	3.70	4.60	4.70	5.21	5.36	4.04	4.11
102	3.91	3.98	4.52	4.61	3.35	3.40	4.36	4.35	5.03	5.05	3.74	3.72	4.61	4.72	5.23	5.38	4.06	4.12
103	3.93	4.00	4.54	4.64	3.37	3.43	4.38	4.38	5.07	5.08	3.76	3.74	4.64	4.75	5.26	5.41	4.08	4.15
104	3.82	3.89	4.42	4.52	3.28	3.33	4.26	4.25	4.92	4.93	3.65	3.62	4.53	4.62	5.13	5.27	3.98	4.04
105	3.84	3.90	4.43	4.52	3.30	3.34	4.26	4.25	4.91	4.92	3.66	3.64	4.53	4.62	5.12	5.25	3.99	4.04
106	3.83	3.90	4.43	4.52	3.29	3.33	4.26	4.25	4.92	4.93	3.66	3.63	4.53	4.63	5.13	5.27	3.98	4.04
107	3.84	3.91	4.44	4.53	3.29	3.34	4.28	4.27	4.94	4.95	3.67	3.64	4.54	4.64	5.15	5.29	3.99	4.05
108	3.86	3.93	4.46	4.56	3.31	3.36	4.30	4.29	4.97	4.98	3.69	3.67	4.57	4.67	5.17	5.32	4.02	4.08
109	3.87	3.94	4.47	4.57	3.32	3.37	4.31	4.30	4.98	5.00	3.70	3.67	4.57	4.68	5.18	5.33	4.02	4.08
110	3.87	3.94	4.47	4.57	3.32	3.37	4.31	4.30	4.98	4.99	3.70	3.67	4.57	4.68	5.18	5.33	4.02	4.08
111	3.87	3.95	4.48	4.57	3.33	3.37	4.32	4.31	4.99	5.00	3.70	3.68	4.58	4.68	5.19	5.33	4.03	4.09
112	3.88	3.95	4.48	4.58	3.33	3.38	4.32	4.31	4.99	5.00	3.71	3.68	4.58	4.69	5.19	5.34	4.03	4.09
113	3.88	3.95	4.48	4.58	3.33	3.38	4.32	4.31	4.99	5.01	3.71	3.68	4.58	4.68	5.19	5.34	4.03	4.09
114	3.89	3.96	4.49	4.59	3.34	3.39	4.33	4.33	5.01	5.02	3.72	3.70	4.59	4.70	5.20	5.35	4.04	4.10
115	3.90	3.97	4.50	4.60	3.34	3.40	4.35	4.34	5.02	5.03	3.73	3.70	4.61	4.71	5.22	5.37	4.05	4.11
116	3.91	3.99	4.52	4.62	3.36	3.41	4.36	4.36	5.05	5.06	3.75	3.72	4.62	4.73	5.24	5.39	4.07	4.13
117	3.93	4.01	4.55	4.65	3.38	3.43	4.39	4.38	5.07	5.08	3.77	3.74	4.64	4.75	5.26	5.42	4.08	4.15
118	3.96	4.03	4.57	4.67	3.40	3.45	4.42	4.41	5.11	5.12	3.79	3.77	4.67	4.78	5.29	5.45	4.11	4.18
119	3.84	3.91	4.43	4.51	3.31	3.36	4.26	4.25	4.90	4.90	3.67	3.64	4.53	4.62	5.12	5.24	4.00	4.05
120	3.83	3.90	4.42	4.50	3.30	3.35	4.25	4.24	4.89	4.89	3.66	3.63	4.52	4.61	5.11	5.23	3.99	4.04
MIN	**3.82**	**3.89**	**4.41**	**4.50**	**3.28**	**3.32**	**4.25**	**4.24**	**4.89**	**4.89**	**3.65**	**3.62**	**4.52**	**4.61**	**5.11**	**5.23**	**3.98**	**4.03**
MAX	**3.96**	**4.03**	**4.57**	**4.67**	**3.40**	**3.45**	**4.42**	**4.41**	**5.11**	**5.12**	**3.79**	**3.77**	**4.67**	**4.78**	**5.29**	**5.45**	**4.11**	**4.18**
AVE	**3.85**	**3.92**	**4.45**	**4.55**	**3.31**	**3.35**	**4.29**	**4.28**	**4.95**	**4.97**	**3.68**	**3.66**	**4.56**	**4.65**	**5.16**	**5.30**	**4.01**	**4.06**

C.1.4 Flexural resistance of composite I-shaped plate girders

Table C- 23. Reliability Indices for Composite I-shaped Plate Girdes, A709-50 steel.

#	S (ft)	L (ft)	D/(D+L)	ADTT=250			ADTT=1'000			ADTT=2'500			ADTT=5'000			ADTT=10'000		
				Φ			Φ			Φ			Φ			Φ		
				1.00	0.95	1.05	1.00	0.95	1.05	1.00	0.95	1.05	1.00	0.95	1.05	1.00	0.95	1.05
1-3	Empty place holders																	
4	6	70	0.49	4.66	5.25	4.11	4.56	5.16	4.02	4.51	5.10	3.97	4.40	4.98	3.86	4.33	4.91	3.79
5	6	80	0.51	4.65	5.25	4.10	4.57	5.17	4.03	4.52	5.11	3.97	4.41	5.00	3.87	4.32	4.91	3.79
6	6	90	0.53	4.53	5.14	3.97	4.47	5.08	3.91	4.42	5.02	3.86	4.31	4.91	3.76	4.21	4.80	3.66
7	6	100	0.55	4.74	5.36	4.17	4.67	5.28	4.10	4.58	5.19	4.02	4.48	5.09	3.92	4.39	5.00	3.84
8	6	110	0.57	4.77	5.39	4.19	4.68	5.30	4.11	4.56	5.18	4.00	4.46	5.07	3.90	4.40	5.00	3.84
9	6	120	0.58	4.69	5.32	4.10	4.58	5.21	4.00	4.43	5.05	3.86	4.33	4.95	3.76	4.28	4.90	3.72
10	6	130	0.59	4.76	5.40	4.17	4.66	5.30	4.07	4.52	5.15	3.94	4.41	5.04	3.84	4.37	5.00	3.80
11	6	140	0.61	4.66	5.31	4.06	4.56	5.20	3.96	4.43	5.07	3.85	4.33	4.96	3.74	4.29	4.92	3.71
12	6	150	0.62	4.76	5.43	4.16	4.66	5.32	4.06	4.55	5.20	3.96	4.44	5.09	3.85	4.41	5.05	3.82
13	6	160	0.63	4.85	5.52	4.23	4.75	5.42	4.13	4.65	5.31	4.04	4.53	5.19	3.93	4.51	5.16	3.90
14	6	170	0.64	4.89	5.58	4.27	4.80	5.47	4.18	4.71	5.38	4.10	4.59	5.25	3.98	4.57	5.23	3.96
15	6	180	0.65	4.90	5.58	4.28	4.81	5.48	4.19	4.73	5.40	4.12	4.61	5.27	4.00	4.60	5.26	3.99
16	6	190	0.66	4.92	5.61	4.30	4.83	5.51	4.21	4.77	5.45	4.15	4.64	5.31	4.03	4.64	5.31	4.03
17	6	200	0.67	4.95	5.64	4.32	4.86	5.54	4.23	4.81	5.49	4.19	4.68	5.35	4.06	4.68	5.35	4.06
18	6	210	0.68	4.98	5.67	4.35	4.89	5.57	4.26	4.85	5.53	4.22	4.72	5.40	4.10	4.72	5.40	4.10
19	6	220	0.69	4.91	5.61	4.28	4.83	5.52	4.19	4.79	5.48	4.16	4.67	5.36	4.05	4.67	5.35	4.04
20	6	230	0.70	4.81	5.51	4.16	4.72	5.42	4.08	4.69	5.39	4.05	4.58	5.27	3.95	4.57	5.26	3.94
21	6	240	0.71	4.85	5.56	4.19	4.76	5.47	4.11	4.74	5.44	4.09	4.63	5.33	3.99	4.61	5.32	3.97
22	6	250	0.60	4.85	5.54	4.22	4.74	5.42	4.11	4.71	5.40	4.09	4.58	5.25	3.96	4.55	5.22	3.93
23	6	260	0.61	4.87	5.57	4.23	4.76	5.45	4.12	4.73	5.43	4.10	4.60	5.29	3.98	4.57	5.26	3.95
24	6	270	0.62	4.89	5.60	4.24	4.78	5.49	4.14	4.76	5.47	4.12	4.64	5.34	4.00	4.60	5.30	3.97
25	6	280	0.64	5.18	5.89	4.53	5.07	5.78	4.43	5.06	5.77	4.42	4.95	5.65	4.31	4.91	5.60	4.27
26	6	290	0.65	5.20	5.92	4.54	5.10	5.81	4.45	5.09	5.80	4.44	4.98	5.69	4.34	4.94	5.64	4.30
27	6	300	0.65	5.20	5.91	4.54	5.09	5.80	4.44	5.09	5.80	4.44	4.99	5.70	4.35	4.94	5.64	4.30
28	6	310	0.66	5.15	5.87	4.50	5.05	5.77	4.40	5.06	5.77	4.40	4.96	5.67	4.31	4.91	5.61	4.26
29	6	320	0.67	5.15	5.87	4.49	5.05	5.77	4.40	5.06	5.78	4.41	4.97	5.69	4.32	4.92	5.63	4.27
30	6	330	0.69	5.24	5.98	4.56	5.14	5.88	4.47	5.16	5.89	4.48	5.08	5.81	4.41	5.02	5.75	4.35
31	8	60	0.47	4.68	5.28	4.13	4.56	5.15	4.02	4.50	5.09	3.96	4.39	4.98	3.86	4.34	4.92	3.80
32	8	70	0.49	4.65	5.25	4.10	4.56	5.15	4.01	4.50	5.09	3.96	4.39	4.98	3.85	4.32	4.90	3.79
33	8	80	0.51	4.66	5.26	4.10	4.58	5.18	4.03	4.53	5.13	3.98	4.42	5.01	3.88	4.33	4.92	3.79
34	8	90	0.53	4.66	5.27	4.10	4.60	5.21	4.04	4.55	5.15	3.99	4.44	5.04	3.89	4.34	4.93	3.79
35	8	100	0.55	4.74	5.36	4.17	4.67	5.28	4.10	4.58	5.19	4.02	4.47	5.08	3.92	4.39	4.99	3.84
36	8	110	0.57	4.82	5.45	4.24	4.73	5.36	4.15	4.61	5.23	4.04	4.51	5.13	3.94	4.44	5.06	3.88
37	8	120	0.58	4.85	5.49	4.27	4.75	5.38	4.17	4.60	5.22	4.02	4.50	5.12	3.93	4.45	5.07	3.88
38	8	130	0.59	4.85	5.49	4.26	4.74	5.38	4.16	4.61	5.23	4.03	4.50	5.12	3.93	4.46	5.08	3.89
39	8	140	0.61	4.89	5.54	4.30	4.79	5.43	4.20	4.67	5.30	4.08	4.56	5.19	3.98	4.52	5.15	3.95

40	8	150	0.62	4.82	5.49	4.21	4.72	5.38	4.12	4.61	5.26	4.01	4.50	5.14	3.90	4.47	5.11	3.87
41	8	160	0.63	4.89	5.57	4.27	4.79	5.46	4.17	4.69	5.36	4.08	4.57	5.23	3.97	4.55	5.21	3.94
42	8	170	0.64	4.82	5.48	4.21	4.72	5.38	4.12	4.64	5.30	4.04	4.52	5.17	3.92	4.50	5.15	3.91
43	8	180	0.65	4.88	5.56	4.26	4.79	5.46	4.17	4.72	5.38	4.11	4.59	5.25	3.99	4.58	5.24	3.98
44	8	190	0.66	4.93	5.61	4.30	4.84	5.51	4.21	4.78	5.45	4.16	4.65	5.32	4.04	4.64	5.31	4.03
45	8	200	0.67	4.96	5.66	4.33	4.87	5.56	4.24	4.83	5.51	4.20	4.69	5.37	4.07	4.69	5.37	4.07
46	8	210	0.68	4.92	5.63	4.28	4.83	5.53	4.19	4.79	5.49	4.15	4.66	5.35	4.03	4.66	5.35	4.02
47	8	220	0.69	4.77	5.49	4.12	4.68	5.39	4.03	4.65	5.35	4.00	4.52	5.23	3.88	4.51	5.22	3.87
48	8	230	0.69	4.81	5.52	4.16	4.72	5.43	4.07	4.69	5.40	4.04	4.57	5.27	3.93	4.56	5.26	3.92
49	8	240	0.70	4.84	5.56	4.19	4.76	5.47	4.11	4.73	5.44	4.08	4.62	5.32	3.98	4.61	5.31	3.96
50	8	250	0.59	4.98	5.66	4.36	4.87	5.54	4.25	4.84	5.51	4.23	4.70	5.37	4.10	4.68	5.34	4.07
51	8	260	0.60	5.04	5.72	4.41	4.93	5.60	4.31	4.91	5.58	4.29	4.78	5.44	4.17	4.74	5.41	4.13
52	8	270	0.61	5.14	5.83	4.51	5.03	5.72	4.41	5.02	5.70	4.39	4.89	5.57	4.27	4.86	5.53	4.24
53	8	280	0.62	5.18	5.88	4.54	5.08	5.77	4.44	5.06	5.76	4.43	4.95	5.63	4.32	4.91	5.59	4.28
54	8	290	0.64	5.14	5.86	4.48	5.04	5.75	4.38	5.03	5.75	4.38	4.92	5.63	4.27	4.87	5.58	4.23
55	8	300	0.65	5.12	5.85	4.45	5.01	5.74	4.35	5.01	5.74	4.35	4.91	5.63	4.25	4.86	5.57	4.21
56	10	100	0.55	4.75	5.37	4.18	4.68	5.30	4.11	4.59	5.21	4.02	4.48	5.10	3.92	4.40	5.01	3.84
57	10	110	0.56	4.79	5.42	4.21	4.70	5.32	4.13	4.58	5.20	4.01	4.48	5.09	3.91	4.41	5.02	3.85
58	10	120	0.58	4.68	5.32	4.09	4.58	5.21	3.99	4.42	5.05	3.85	4.32	4.95	3.75	4.28	4.90	3.71
59	10	130	0.59	4.73	5.38	4.13	4.63	5.27	4.04	4.49	5.12	3.90	4.38	5.01	3.80	4.34	4.97	3.76
60	10	140	0.61	4.77	5.44	4.17	4.67	5.33	4.07	4.55	5.20	3.95	4.44	5.08	3.85	4.40	5.04	3.81
61	10	150	0.62	4.80	5.46	4.19	4.70	5.35	4.10	4.59	5.24	3.99	4.47	5.12	3.88	4.45	5.09	3.86
62	10	160	0.63	4.85	5.52	4.24	4.76	5.42	4.15	4.66	5.32	4.06	4.54	5.19	3.94	4.52	5.17	3.92
63	10	170	0.64	4.91	5.59	4.29	4.82	5.49	4.20	4.73	5.40	4.12	4.61	5.27	4.01	4.59	5.25	3.99
64	10	180	0.65	4.81	5.49	4.19	4.72	5.39	4.10	4.65	5.31	4.04	4.52	5.18	3.92	4.51	5.17	3.91
65	10	190	0.66	4.89	5.57	4.26	4.79	5.47	4.17	4.73	5.41	4.11	4.60	5.27	3.99	4.60	5.27	3.98
66	10	200	0.67	4.71	5.42	4.06	4.61	5.32	3.97	4.57	5.27	3.93	4.43	5.12	3.80	4.43	5.12	3.80
67	10	210	0.68	4.74	5.45	4.08	4.65	5.36	4.00	4.61	5.31	3.96	4.47	5.18	3.83	4.47	5.17	3.83
68	10	220	0.69	4.75	5.47	4.09	4.66	5.37	4.00	4.62	5.33	3.97	4.50	5.20	3.85	4.49	5.20	3.84
69	10	230	0.69	4.77	5.49	4.11	4.68	5.40	4.03	4.65	5.36	4.00	4.53	5.24	3.88	4.52	5.22	3.87
70	10	240	0.70	4.77	5.50	4.10	4.68	5.41	4.02	4.66	5.38	4.00	4.55	5.26	3.89	4.53	5.25	3.87
71	10	250	0.58	4.93	5.60	4.32	4.82	5.48	4.21	4.79	5.45	4.18	4.65	5.31	4.05	4.62	5.28	4.02
72	10	260	0.59	4.99	5.67	4.37	4.88	5.55	4.26	4.86	5.53	4.24	4.72	5.39	4.12	4.69	5.35	4.09
73	10	270	0.61	5.13	5.83	4.50	5.02	5.71	4.40	5.01	5.69	4.38	4.88	5.56	4.26	4.85	5.52	4.23
74	10	280	0.62	5.08	5.79	4.43	4.97	5.68	4.33	4.96	5.66	4.32	4.84	5.54	4.20	4.80	5.49	4.16
75	10	290	0.63	5.07	5.79	4.41	4.96	5.67	4.30	4.95	5.67	4.30	4.84	5.55	4.19	4.79	5.50	4.15
76	10	300	0.64	5.08	5.81	4.42	4.98	5.70	4.32	4.98	5.70	4.32	4.87	5.59	4.22	4.82	5.53	4.17
77	12	60	0.46	4.66	5.25	4.11	4.54	5.13	4.00	4.48	5.07	3.94	4.37	4.95	3.84	4.31	4.89	3.78
78	12	70	0.49	4.67	5.28	4.12	4.58	5.18	4.03	4.52	5.12	3.98	4.41	5.00	3.87	4.34	4.93	3.80
79	12	80	0.51	4.65	5.26	4.09	4.58	5.18	4.02	4.52	5.12	3.97	4.41	5.01	3.87	4.32	4.92	3.78
80	12	90	0.53	4.51	5.12	3.94	4.45	5.07	3.89	4.40	5.01	3.84	4.29	4.90	3.74	4.19	4.79	3.64
81	12	100	0.55	4.73	5.36	4.16	4.66	5.28	4.09	4.57	5.19	4.01	4.47	5.08	3.91	4.38	4.99	3.83
82	12	110	0.56	4.76	5.39	4.18	4.67	5.29	4.10	4.55	5.17	3.98	4.45	5.06	3.89	4.38	4.99	3.82

83	12	120	0.58	4.67	5.31	4.08	4.57	5.20	3.99	4.42	5.04	3.84	4.32	4.94	3.74	4.27	4.89	3.70
84	12	130	0.59	4.72	5.37	4.12	4.62	5.26	4.02	4.48	5.12	3.89	4.37	5.00	3.79	4.33	4.96	3.75
85	12	140	0.61	4.76	5.42	4.16	4.66	5.31	4.06	4.54	5.18	3.94	4.43	5.07	3.84	4.39	5.03	3.81
86	12	150	0.62	4.77	5.43	4.17	4.67	5.33	4.07	4.56	5.21	3.97	4.45	5.09	3.86	4.42	5.06	3.83
87	12	160	0.63	4.81	5.47	4.20	4.71	5.37	4.11	4.61	5.27	4.02	4.50	5.14	3.90	4.47	5.12	3.88
88	12	170	0.64	4.86	5.53	4.24	4.76	5.43	4.15	4.68	5.34	4.07	4.56	5.21	3.96	4.54	5.19	3.94
89	12	180	0.65	4.87	5.56	4.24	4.77	5.45	4.15	4.70	5.38	4.08	4.57	5.24	3.96	4.56	5.23	3.95
90	12	190	0.66	4.65	5.35	4.00	4.55	5.25	3.91	4.49	5.19	3.86	4.36	5.05	3.73	4.35	5.04	3.72
91	12	200	0.67	4.69	5.41	4.04	4.60	5.31	3.95	4.55	5.26	3.91	4.41	5.11	3.78	4.41	5.11	3.78
92	12	210	0.53	4.56	5.22	3.97	4.44	5.09	3.85	4.39	5.04	3.80	4.23	4.86	3.65	4.22	4.85	3.64
93	12	220	0.54	4.61	5.27	4.01	4.50	5.15	3.90	4.45	5.10	3.86	4.29	4.93	3.71	4.28	4.92	3.70
94	12	230	0.56	4.64	5.32	4.03	4.53	5.19	3.92	4.49	5.15	3.88	4.33	4.99	3.74	4.32	4.97	3.72
95	12	240	0.57	4.88	5.55	4.28	4.77	5.43	4.17	4.74	5.39	4.14	4.59	5.24	4.00	4.57	5.22	3.98
96	12	250	0.58	4.90	5.57	4.29	4.79	5.45	4.19	4.76	5.42	4.16	4.63	5.28	4.03	4.60	5.25	4.00
97	12	260	0.59	5.02	5.70	4.40	4.91	5.58	4.29	4.89	5.56	4.27	4.75	5.42	4.15	4.72	5.38	4.11
98	12	270	0.60	5.08	5.77	4.45	4.97	5.66	4.35	4.96	5.64	4.33	4.83	5.50	4.21	4.79	5.46	4.17
99	12	280	0.61	5.04	5.75	4.39	4.93	5.63	4.29	4.92	5.62	4.28	4.79	5.49	4.16	4.75	5.44	4.12
100	12	290	0.62	5.06	5.77	4.40	4.95	5.66	4.30	4.94	5.65	4.29	4.83	5.53	4.18	4.78	5.48	4.14
101	12	300	0.63	5.03	5.75	4.37	4.92	5.63	4.27	4.92	5.63	4.27	4.81	5.52	4.17	4.76	5.46	4.11
102	14	80	0.51	4.65	5.26	4.10	4.58	5.18	4.03	4.52	5.13	3.97	4.42	5.01	3.87	4.33	4.92	3.79
103	14	90	0.53	4.50	5.12	3.94	4.45	5.06	3.88	4.39	5.00	3.83	4.29	4.89	3.73	4.18	4.78	3.63
104	14	100	0.55	4.57	5.19	3.99	4.49	5.12	3.92	4.41	5.02	3.84	4.30	4.92	3.74	4.22	4.83	3.66
105	14	110	0.57	4.63	5.27	4.04	4.54	5.18	3.96	4.42	5.05	3.84	4.32	4.94	3.75	4.25	4.87	3.68
106	14	120	0.58	4.61	5.27	4.01	4.50	5.15	3.90	4.34	4.99	3.76	4.24	4.88	3.66	4.19	4.83	3.61
107	14	130	0.59	4.65	5.31	4.04	4.54	5.20	3.94	4.40	5.05	3.81	4.29	4.94	3.70	4.25	4.89	3.66
108	14	140	0.61	4.68	5.36	4.06	4.58	5.25	3.97	4.45	5.12	3.84	4.34	5.00	3.74	4.30	4.96	3.70
109	14	150	0.62	4.57	5.25	3.95	4.47	5.14	3.85	4.36	5.02	3.75	4.24	4.90	3.64	4.21	4.87	3.61
110	14	160	0.63	4.76	5.44	4.14	4.67	5.34	4.05	4.57	5.24	3.95	4.45	5.11	3.84	4.42	5.08	3.82
111	14	170	0.64	4.80	5.48	4.17	4.70	5.38	4.08	4.61	5.29	4.00	4.49	5.16	3.88	4.47	5.14	3.86
112	14	180	0.65	4.66	5.36	4.02	4.56	5.25	3.92	4.49	5.18	3.86	4.36	5.04	3.73	4.34	5.03	3.72
113	14	190	0.66	4.71	5.42	4.07	4.62	5.32	3.97	4.56	5.26	3.92	4.42	5.11	3.79	4.42	5.11	3.78
114	14	200	0.67	4.61	5.32	3.97	4.52	5.22	3.88	4.47	5.17	3.83	4.34	5.03	3.70	4.34	5.03	3.70
115	14	210	0.68	4.69	5.41	4.04	4.60	5.31	3.95	4.56	5.27	3.91	4.43	5.13	3.79	4.42	5.13	3.78
116	14	220	0.68	4.71	5.44	4.05	4.62	5.34	3.96	4.58	5.30	3.92	4.45	5.16	3.80	4.44	5.15	3.79
117	14	230	0.55	4.81	5.46	4.21	4.69	5.33	4.11	4.65	5.29	4.07	4.50	5.13	3.92	4.49	5.12	3.91
118	14	240	0.57	4.74	5.42	4.12	4.62	5.29	4.01	4.59	5.26	3.97	4.44	5.10	3.84	4.42	5.08	3.81
119	14	250	0.58	4.76	5.45	4.14	4.65	5.33	4.03	4.62	5.30	4.00	4.48	5.15	3.87	4.45	5.12	3.84
120	14	260	0.59	4.99	5.67	4.37	4.88	5.55	4.26	4.86	5.53	4.24	4.72	5.39	4.12	4.69	5.35	4.09
121	14	270	0.60	5.03	5.71	4.40	4.91	5.59	4.29	4.90	5.58	4.28	4.77	5.44	4.16	4.74	5.40	4.12
122	14	280	0.61	5.05	5.74	4.42	4.94	5.62	4.31	4.92	5.61	4.30	4.81	5.48	4.19	4.76	5.44	4.15
123	14	290	0.62	4.99	5.70	4.34	4.88	5.58	4.23	4.87	5.58	4.23	4.76	5.46	4.12	4.71	5.41	4.07
124	14	300	0.63	5.02	5.74	4.36	4.91	5.62	4.26	4.91	5.62	4.26	4.80	5.51	4.16	4.75	5.45	4.11
125	16	60	0.47	4.50	5.10	3.95	4.38	4.98	3.84	4.33	4.92	3.79	4.22	4.80	3.68	4.16	4.74	3.63

126	16	70	0.49	4.65	5.26	4.10	4.56	5.16	4.01	4.50	5.10	3.96	4.39	4.98	3.85	4.32	4.91	3.78
127	16	80	0.51	4.65	5.26	4.09	4.58	5.18	4.02	4.52	5.12	3.97	4.41	5.01	3.87	4.33	4.92	3.78
128	16	90	0.53	4.64	5.25	4.08	4.58	5.19	4.03	4.53	5.14	3.97	4.42	5.03	3.87	4.32	4.92	3.77
129	16	100	0.55	4.71	5.33	4.14	4.64	5.26	4.07	4.55	5.16	3.99	4.44	5.05	3.89	4.36	4.96	3.81
130	16	110	0.57	4.62	5.26	4.04	4.53	5.17	3.95	4.41	5.04	3.84	4.31	4.93	3.74	4.25	4.86	3.68
131	16	120	0.58	4.64	5.28	4.06	4.54	5.17	3.96	4.39	5.01	3.82	4.29	4.91	3.72	4.24	4.85	3.68
132	16	130	0.60	4.69	5.34	4.10	4.59	5.24	4.01	4.46	5.09	3.88	4.35	4.98	3.78	4.31	4.94	3.74
133	16	140	0.61	4.74	5.39	4.14	4.64	5.28	4.04	4.51	5.16	3.93	4.41	5.04	3.82	4.37	5.00	3.79
134	16	150	0.62	4.79	5.46	4.19	4.69	5.35	4.09	4.58	5.23	3.99	4.47	5.11	3.88	4.44	5.08	3.85
135	16	160	0.63	4.78	5.45	4.16	4.68	5.35	4.06	4.58	5.25	3.97	4.46	5.12	3.85	4.44	5.09	3.83
136	16	170	0.64	4.59	5.28	3.96	4.49	5.18	3.86	4.41	5.09	3.78	4.28	4.96	3.66	4.26	4.94	3.65
137	16	180	0.65	4.63	5.33	3.99	4.53	5.22	3.90	4.46	5.15	3.83	4.33	5.01	3.71	4.32	5.00	3.69
138	16	190	0.66	4.67	5.37	4.02	4.57	5.27	3.93	4.51	5.21	3.88	4.38	5.07	3.75	4.37	5.06	3.74
139	16	200	0.52	4.59	5.25	4.00	4.47	5.12	3.89	4.42	5.06	3.83	4.24	4.87	3.67	4.24	4.87	3.67
140	16	210	0.53	4.56	5.22	3.97	4.45	5.09	3.85	4.39	5.04	3.80	4.23	4.86	3.65	4.22	4.85	3.64
141	16	220	0.54	4.60	5.26	3.99	4.48	5.13	3.88	4.43	5.08	3.84	4.27	4.91	3.69	4.26	4.90	3.67
142	16	230	0.55	4.84	5.49	4.24	4.72	5.37	4.13	4.68	5.33	4.09	4.53	5.17	3.94	4.51	5.15	3.93
143	16	240	0.56	4.88	5.54	4.27	4.76	5.41	4.16	4.73	5.38	4.13	4.58	5.22	3.99	4.56	5.20	3.97
144	16	250	0.57	4.91	5.57	4.30	4.79	5.45	4.19	4.76	5.42	4.16	4.63	5.27	4.03	4.60	5.25	4.01
145	16	260	0.58	4.86	5.55	4.24	4.75	5.43	4.13	4.72	5.40	4.11	4.59	5.26	3.98	4.56	5.22	3.95
146	16	270	0.59	4.88	5.57	4.24	4.76	5.45	4.14	4.74	5.43	4.12	4.62	5.29	4.00	4.58	5.25	3.96
147	16	280	0.60	4.97	5.67	4.33	4.86	5.55	4.22	4.84	5.54	4.21	4.72	5.41	4.10	4.68	5.36	4.05
148	16	290	0.61	4.96	5.67	4.32	4.85	5.55	4.21	4.84	5.54	4.20	4.73	5.42	4.09	4.68	5.37	4.05
149	16	300	0.62	4.96	5.68	4.32	4.85	5.56	4.21	4.85	5.56	4.21	4.74	5.44	4.11	4.69	5.39	4.06
			MIN	**4.50**	**5.10**	**3.94**	**4.38**	**4.98**	**3.84**	**4.33**	**4.92**	**3.75**	**4.22**	**4.80**	**3.64**	**4.16**	**4.74**	**3.61**
			MAX	**5.24**	**5.98**	**4.56**	**5.14**	**5.88**	**4.47**	**5.16**	**5.89**	**4.48**	**5.08**	**5.81**	**4.41**	**5.02**	**5.75**	**4.35**
			AVE	**4.82**	**5.49**	**4.20**	**4.72**	**5.38**	**4.11**	**4.66**	**5.32**	**4.05**	**4.54**	**5.19**	**3.94**	**4.50**	**5.15**	**3.90**

Table C- 24. Reliability Indices for Composite I-shaped Plate Girdes, A709-50W steel.

				ADTT=250			**ADTT=1'000**			**ADTT=2'500**			**ADTT=5'000**			**ADTT=10'000**		
				Φ			**Φ**			**Φ**			**Φ**			**Φ**		
#	**S (ft)**	**L (ft)**	**D/(D+L)**	**1.00**	**0.95**	**1.05**	**1.00**	**0.95**	**1.05**	**1.00**	**0.95**	**1.05**	**1.00**	**0.95**	**1.05**	**1.00**	**0.95**	**1.05**
1-3	Empty place holder																	
4	6	70	0.49	5.02	5.65	4.44	4.92	5.54	4.35	4.86	5.48	4.29	4.75	5.36	4.18	4.67	5.28	4.11
5	6	80	0.51	5.03	5.66	4.45	4.95	5.58	4.37	4.89	5.52	4.32	4.78	5.40	4.21	4.68	5.30	4.12
6	6	90	0.53	4.88	5.53	4.30	4.83	5.47	4.24	4.77	5.41	4.19	4.66	5.29	4.08	4.55	5.17	3.98
7	6	100	0.55	5.15	5.81	4.55	5.07	5.72	4.47	4.98	5.63	4.39	4.87	5.51	4.28	4.78	5.42	4.19
8	6	110	0.57	5.18	5.85	4.57	5.09	5.75	4.48	4.96	5.62	4.36	4.86	5.50	4.26	4.78	5.43	4.19
9	6	120	0.58	5.08	5.75	4.46	4.97	5.64	4.36	4.81	5.46	4.21	4.70	5.35	4.11	4.65	5.30	4.06
10	6	130	0.59	5.18	5.86	4.55	5.07	5.74	4.45	4.92	5.59	4.31	4.81	5.47	4.20	4.76	5.42	4.16
11	6	140	0.61	5.08	5.77	4.44	4.97	5.65	4.34	4.84	5.52	4.22	4.72	5.39	4.11	4.68	5.35	4.07
12	6	150	0.62	5.18	5.88	4.54	5.08	5.77	4.44	4.96	5.65	4.33	4.84	5.52	4.21	4.81	5.49	4.18

13	6	160	0.63	5.26	5.97	4.61	5.15	5.85	4.51	5.05	5.74	4.41	4.92	5.61	4.29	4.89	5.58	4.26
14	6	170	0.64	5.30	6.02	4.65	5.20	5.91	4.55	5.11	5.81	4.46	4.98	5.68	4.34	4.96	5.66	4.32
15	6	180	0.65	5.32	6.04	4.67	5.22	5.93	4.57	5.15	5.85	4.50	5.01	5.71	4.37	5.00	5.70	4.36
16	6	190	0.66	5.33	6.05	4.67	5.23	5.94	4.58	5.17	5.88	4.52	5.03	5.73	4.39	5.02	5.73	4.38
17	6	200	0.67	5.34	6.06	4.68	5.24	5.95	4.59	5.19	5.90	4.54	5.05	5.76	4.41	5.05	5.76	4.41
18	6	210	0.68	5.34	6.06	4.68	5.25	5.96	4.60	5.21	5.92	4.56	5.08	5.78	4.43	5.07	5.78	4.42
19	6	220	0.69	5.03	5.73	4.39	4.94	5.64	4.30	4.91	5.61	4.27	4.79	5.48	4.15	4.78	5.47	4.15
20	6	230	0.70	5.08	5.80	4.42	4.99	5.71	4.33	4.96	5.68	4.30	4.84	5.55	4.19	4.83	5.54	4.18
21	6	240	0.71	5.12	5.85	4.45	5.03	5.76	4.37	5.01	5.74	4.34	4.90	5.62	4.24	4.88	5.60	4.22
22	6	250	0.60	4.99	5.69	4.35	4.88	5.58	4.24	4.85	5.55	4.22	4.71	5.40	4.09	4.69	5.37	4.06
23	6	260	0.61	5.04	5.75	4.38	4.92	5.63	4.27	4.90	5.61	4.25	4.77	5.47	4.12	4.73	5.43	4.09
24	6	270	0.62	5.06	5.79	4.40	4.95	5.67	4.29	4.93	5.65	4.28	4.81	5.52	4.16	4.77	5.48	4.12
25	6	280	0.64	5.21	5.95	4.54	5.11	5.84	4.44	5.09	5.83	4.43	4.98	5.70	4.31	4.93	5.66	4.27
26	6	290	0.65	5.23	5.98	4.55	5.12	5.86	4.45	5.12	5.86	4.44	5.01	5.74	4.34	4.96	5.69	4.30
27	6	300	0.65	5.26	6.02	4.57	5.15	5.90	4.47	5.15	5.90	4.47	5.05	5.79	4.37	4.99	5.73	4.32
28	6	310	0.66	5.22	5.98	4.52	5.11	5.87	4.42	5.12	5.87	4.43	5.02	5.76	4.33	4.96	5.70	4.28
29	6	320	0.67	5.22	5.99	4.52	5.11	5.88	4.42	5.12	5.89	4.43	5.03	5.79	4.34	4.97	5.72	4.29
30	6	330	0.69	5.28	6.05	4.57	5.18	5.95	4.48	5.20	5.97	4.49	5.11	5.88	4.41	5.05	5.81	4.35
31	8	60	0.47	5.06	5.69	4.48	4.93	5.56	4.36	4.87	5.49	4.30	4.75	5.37	4.19	4.69	5.31	4.13
32	8	70	0.49	5.04	5.67	4.46	4.94	5.57	4.36	4.88	5.51	4.31	4.76	5.38	4.20	4.69	5.30	4.12
33	8	80	0.51	5.05	5.69	4.47	4.97	5.61	4.39	4.91	5.55	4.33	4.80	5.43	4.23	4.71	5.33	4.14
34	8	90	0.53	5.06	5.71	4.47	5.00	5.65	4.41	4.95	5.59	4.36	4.83	5.47	4.25	4.72	5.35	4.15
35	8	100	0.55	5.16	5.82	4.55	5.08	5.74	4.48	4.99	5.64	4.39	4.87	5.52	4.29	4.78	5.42	4.20
36	8	110	0.57	5.25	5.92	4.63	5.16	5.82	4.55	5.03	5.69	4.42	4.92	5.57	4.32	4.85	5.50	4.25
37	8	120	0.58	5.30	5.98	4.67	5.19	5.86	4.57	5.02	5.69	4.41	4.91	5.57	4.31	4.86	5.52	4.26
38	8	130	0.59	5.30	5.99	4.68	5.19	5.87	4.57	5.04	5.71	4.43	4.93	5.59	4.32	4.88	5.55	4.28
39	8	140	0.61	5.36	6.06	4.73	5.25	5.94	4.62	5.12	5.80	4.50	5.00	5.68	4.39	4.97	5.64	4.35
40	8	150	0.62	5.25	5.95	4.61	5.14	5.84	4.51	5.03	5.72	4.39	4.90	5.59	4.28	4.87	5.55	4.25
41	8	160	0.63	5.32	6.03	4.66	5.21	5.92	4.56	5.11	5.81	4.46	4.98	5.67	4.34	4.95	5.65	4.32
42	8	170	0.64	5.28	5.99	4.63	5.18	5.88	4.53	5.09	5.79	4.45	4.96	5.65	4.32	4.94	5.63	4.31
43	8	180	0.65	5.34	6.06	4.68	5.24	5.95	4.59	5.16	5.87	4.52	5.03	5.73	4.39	5.02	5.72	4.38
44	8	190	0.66	5.38	6.11	4.72	5.28	6.01	4.63	5.22	5.94	4.57	5.08	5.79	4.43	5.08	5.79	4.43
45	8	200	0.67	5.41	6.14	4.74	5.31	6.04	4.64	5.26	5.99	4.60	5.12	5.83	4.46	5.12	5.83	4.46
46	8	210	0.68	5.13	5.86	4.47	5.04	5.76	4.38	4.99	5.71	4.34	4.86	5.57	4.21	4.86	5.57	4.21
47	8	220	0.69	5.08	5.81	4.41	4.98	5.71	4.32	4.95	5.67	4.28	4.82	5.54	4.16	4.81	5.53	4.16
48	8	230	0.69	5.11	5.84	4.44	5.02	5.74	4.35	4.99	5.71	4.32	4.86	5.58	4.21	4.85	5.57	4.19
49	8	240	0.70	5.13	5.86	4.46	5.04	5.76	4.37	5.01	5.73	4.35	4.90	5.62	4.24	4.88	5.60	4.22
50	8	250	0.59	5.05	5.75	4.41	4.94	5.63	4.30	4.91	5.60	4.27	4.77	5.45	4.14	4.74	5.42	4.11
51	8	260	0.60	5.11	5.81	4.47	4.99	5.69	4.36	4.97	5.66	4.34	4.84	5.52	4.21	4.81	5.49	4.18
52	8	270	0.61	5.18	5.89	4.53	5.07	5.77	4.42	5.05	5.76	4.41	4.92	5.62	4.29	4.89	5.58	4.25
53	8	280	0.62	5.22	5.94	4.56	5.11	5.82	4.45	5.09	5.81	4.44	4.97	5.68	4.33	4.93	5.64	4.28
54	8	290	0.64	5.10	5.84	4.43	4.99	5.72	4.33	4.99	5.72	4.32	4.88	5.60	4.22	4.83	5.55	4.17
55	8	300	0.65	5.06	5.80	4.38	4.95	5.69	4.28	4.95	5.69	4.28	4.85	5.58	4.18	4.80	5.52	4.13
56	10	100	0.55	5.17	5.84	4.56	5.09	5.76	4.49	5.00	5.66	4.40	4.89	5.54	4.30	4.80	5.44	4.21
57	10	110	0.56	5.23	5.90	4.61	5.13	5.80	4.52	5.00	5.66	4.40	4.89	5.54	4.29	4.82	5.47	4.22
58	10	120	0.58	5.09	5.77	4.47	4.98	5.66	4.37	4.82	5.48	4.21	4.71	5.37	4.11	4.66	5.32	4.06
59	10	130	0.59	5.14	5.83	4.52	5.03	5.71	4.41	4.88	5.56	4.27	4.77	5.44	4.16	4.72	5.39	4.12
60	10	140	0.61	5.19	5.89	4.55	5.08	5.77	4.45	4.95	5.63	4.32	4.83	5.51	4.21	4.79	5.47	4.17

61	10	150	0.62	5.23	5.93	4.59	5.12	5.82	4.49	5.01	5.69	4.38	4.88	5.57	4.26	4.85	5.53	4.23
62	10	160	0.63	5.30	6.01	4.65	5.20	5.90	4.55	5.09	5.79	4.45	4.96	5.66	4.33	4.94	5.63	4.31
63	10	170	0.64	5.37	6.09	4.72	5.27	5.98	4.62	5.18	5.89	4.53	5.05	5.75	4.41	5.03	5.73	4.39
64	10	180	0.65	5.27	6.00	4.62	5.17	5.89	4.52	5.10	5.81	4.45	4.96	5.66	4.32	4.95	5.65	4.31
65	10	190	0.66	5.34	6.07	4.68	5.24	5.96	4.58	5.18	5.90	4.52	5.04	5.75	4.39	5.03	5.74	4.38
66	10	200	0.67	5.04	5.77	4.37	4.94	5.67	4.28	4.89	5.62	4.23	4.75	5.46	4.10	4.75	5.46	4.10
67	10	210	0.68	5.07	5.81	4.40	4.97	5.71	4.31	4.93	5.66	4.27	4.80	5.52	4.14	4.79	5.51	4.13
68	10	220	0.69	5.08	5.82	4.40	4.99	5.72	4.32	4.95	5.68	4.28	4.82	5.55	4.16	4.81	5.54	4.15
69	10	230	0.69	5.10	5.84	4.43	5.01	5.75	4.34	4.98	5.71	4.31	4.85	5.58	4.19	4.84	5.57	4.18
70	10	240	0.70	4.91	5.65	4.24	4.82	5.56	4.16	4.80	5.53	4.13	4.68	5.41	4.02	4.67	5.39	4.01
71	10	250	0.58	5.03	5.74	4.39	4.91	5.61	4.28	4.88	5.58	4.25	4.74	5.43	4.11	4.71	5.40	4.08
72	10	260	0.59	5.08	5.79	4.43	4.96	5.67	4.31	4.93	5.64	4.29	4.80	5.49	4.16	4.76	5.46	4.13
73	10	270	0.61	5.18	5.89	4.53	5.06	5.77	4.42	5.05	5.75	4.40	4.92	5.62	4.28	4.88	5.58	4.24
74	10	280	0.62	5.04	5.77	4.39	4.93	5.65	4.28	4.92	5.64	4.27	4.80	5.51	4.15	4.76	5.46	4.11
75	10	290	0.63	5.03	5.76	4.36	4.92	5.64	4.25	4.91	5.64	4.25	4.80	5.52	4.14	4.75	5.46	4.09
76	10	300	0.64	5.03	5.77	4.36	4.92	5.66	4.25	4.92	5.66	4.25	4.81	5.54	4.15	4.76	5.49	4.10
77	12	60	0.46	5.04	5.67	4.47	4.92	5.54	4.35	4.86	5.48	4.29	4.74	5.35	4.18	4.68	5.29	4.12
78	12	70	0.49	5.08	5.72	4.50	4.98	5.62	4.40	4.92	5.55	4.34	4.80	5.43	4.23	4.73	5.35	4.16
79	12	80	0.51	5.07	5.71	4.48	4.99	5.63	4.40	4.93	5.57	4.34	4.81	5.45	4.23	4.72	5.35	4.14
80	12	90	0.53	4.90	5.55	4.30	4.84	5.49	4.25	4.78	5.42	4.19	4.67	5.31	4.09	4.56	5.19	3.98
81	12	100	0.55	5.17	5.83	4.56	5.09	5.75	4.49	5.00	5.65	4.40	4.88	5.53	4.29	4.79	5.44	4.20
82	12	110	0.56	5.21	5.88	4.59	5.11	5.78	4.50	4.98	5.64	4.38	4.87	5.52	4.27	4.80	5.45	4.21
83	12	120	0.58	5.09	5.77	4.47	4.98	5.65	4.36	4.81	5.48	4.21	4.71	5.37	4.11	4.66	5.31	4.06
84	12	130	0.59	5.13	5.82	4.50	5.02	5.70	4.40	4.87	5.55	4.25	4.76	5.43	4.15	4.71	5.38	4.10
85	12	140	0.61	5.19	5.88	4.55	5.08	5.77	4.45	4.95	5.63	4.32	4.83	5.51	4.21	4.79	5.47	4.18
86	12	150	0.62	5.22	5.92	4.57	5.11	5.81	4.47	4.99	5.68	4.36	4.87	5.55	4.25	4.84	5.52	4.22
87	12	160	0.63	5.26	5.97	4.62	5.16	5.86	4.52	5.05	5.75	4.42	4.93	5.62	4.30	4.90	5.59	4.27
88	12	170	0.64	5.32	6.04	4.67	5.22	5.93	4.57	5.13	5.83	4.48	4.99	5.69	4.36	4.98	5.67	4.34
89	12	180	0.65	5.12	5.84	4.47	5.02	5.73	4.37	4.95	5.65	4.30	4.81	5.51	4.18	4.80	5.50	4.16
90	12	190	0.66	4.99	5.71	4.32	4.89	5.61	4.23	4.83	5.54	4.17	4.69	5.40	4.04	4.68	5.39	4.03
91	12	200	0.67	5.03	5.77	4.36	4.94	5.66	4.27	4.89	5.61	4.23	4.74	5.46	4.09	4.74	5.46	4.09
92	12	210	0.53	4.77	5.44	4.16	4.65	5.31	4.04	4.59	5.26	3.99	4.42	5.07	3.83	4.42	5.07	3.82
93	12	220	0.54	4.80	5.47	4.18	4.68	5.34	4.07	4.63	5.29	4.02	4.47	5.12	3.87	4.45	5.10	3.86
94	12	230	0.56	4.86	5.55	4.22	4.73	5.42	4.11	4.69	5.38	4.07	4.53	5.21	3.92	4.52	5.19	3.90
95	12	240	0.57	4.99	5.69	4.35	4.87	5.56	4.24	4.84	5.53	4.21	4.68	5.37	4.06	4.66	5.34	4.04
96	12	250	0.58	5.01	5.72	4.37	4.89	5.59	4.25	4.86	5.56	4.23	4.72	5.41	4.09	4.69	5.38	4.06
97	12	260	0.59	5.11	5.81	4.46	4.99	5.69	4.35	4.97	5.66	4.33	4.83	5.52	4.20	4.80	5.48	4.17
98	12	270	0.60	5.17	5.89	4.51	5.05	5.76	4.40	5.03	5.75	4.38	4.90	5.61	4.26	4.86	5.56	4.22
99	12	280	0.61	5.01	5.73	4.35	4.89	5.61	4.24	4.88	5.60	4.23	4.76	5.47	4.11	4.71	5.42	4.07
100	12	290	0.62	5.02	5.76	4.36	4.91	5.64	4.25	4.90	5.63	4.24	4.79	5.51	4.13	4.74	5.45	4.08
101	12	300	0.63	4.99	5.73	4.32	4.88	5.62	4.21	4.88	5.62	4.21	4.77	5.50	4.11	4.72	5.44	4.06
102	14	80	0.51	5.08	5.73	4.49	5.00	5.64	4.41	4.94	5.58	4.35	4.82	5.46	4.24	4.73	5.36	4.15
103	14	90	0.53	4.89	5.54	4.30	4.83	5.48	4.24	4.77	5.42	4.19	4.66	5.30	4.08	4.55	5.18	3.97
104	14	100	0.55	4.97	5.63	4.36	4.89	5.55	4.29	4.80	5.45	4.20	4.69	5.33	4.09	4.59	5.24	4.01
105	14	110	0.57	5.03	5.71	4.41	4.93	5.61	4.32	4.80	5.47	4.20	4.70	5.35	4.09	4.62	5.28	4.03
106	14	120	0.58	4.76	5.43	4.14	4.65	5.31	4.04	4.48	5.14	3.88	4.38	5.03	3.78	4.33	4.98	3.74
107	14	130	0.59	4.80	5.48	4.18	4.69	5.37	4.08	4.55	5.21	3.94	4.44	5.10	3.84	4.39	5.05	3.79
108	14	140	0.61	4.81	5.50	4.18	4.70	5.39	4.08	4.57	5.25	3.96	4.46	5.13	3.85	4.42	5.09	3.81

109	14	150	0.62	4.84	5.55	4.19	4.73	5.44	4.09	4.62	5.31	3.98	4.49	5.18	3.87	4.46	5.15	3.84
110	14	160	0.63	4.98	5.68	4.34	4.87	5.57	4.24	4.77	5.46	4.14	4.65	5.33	4.02	4.62	5.30	4.00
111	14	170	0.64	5.04	5.75	4.39	4.94	5.64	4.29	4.85	5.55	4.21	4.72	5.41	4.09	4.70	5.39	4.07
112	14	180	0.65	4.99	5.71	4.33	4.89	5.60	4.24	4.81	5.52	4.17	4.68	5.38	4.04	4.67	5.37	4.03
113	14	190	0.66	5.06	5.79	4.39	4.96	5.68	4.30	4.90	5.62	4.24	4.76	5.47	4.10	4.75	5.46	4.10
114	14	200	0.67	4.96	5.69	4.29	4.86	5.59	4.20	4.81	5.54	4.15	4.67	5.38	4.02	4.67	5.38	4.02
115	14	210	0.68	5.04	5.78	4.37	4.95	5.68	4.28	4.90	5.63	4.24	4.77	5.49	4.11	4.76	5.49	4.10
116	14	220	0.68	4.86	5.59	4.19	4.76	5.49	4.10	4.73	5.45	4.07	4.60	5.32	3.94	4.59	5.31	3.93
117	14	230	0.55	4.88	5.56	4.26	4.76	5.44	4.15	4.72	5.39	4.11	4.56	5.23	3.96	4.55	5.21	3.94
118	14	240	0.57	4.94	5.63	4.30	4.82	5.50	4.19	4.78	5.47	4.15	4.63	5.31	4.01	4.61	5.28	3.99
119	14	250	0.58	4.97	5.67	4.32	4.85	5.55	4.21	4.82	5.51	4.18	4.67	5.36	4.04	4.64	5.33	4.02
120	14	260	0.59	5.09	5.81	4.45	4.98	5.68	4.33	4.95	5.66	4.31	4.81	5.51	4.18	4.78	5.47	4.15
121	14	270	0.60	5.13	5.86	4.47	5.02	5.73	4.36	5.00	5.71	4.35	4.87	5.57	4.22	4.83	5.53	4.18
122	14	280	0.61	5.15	5.89	4.49	5.04	5.76	4.38	5.03	5.75	4.37	4.90	5.62	4.25	4.86	5.57	4.21
123	14	290	0.62	4.96	5.69	4.29	4.85	5.57	4.18	4.84	5.57	4.18	4.72	5.44	4.07	4.67	5.39	4.02
124	14	300	0.63	4.96	5.70	4.29	4.85	5.58	4.18	4.85	5.58	4.18	4.74	5.46	4.08	4.68	5.40	4.03
125	16	60	0.47	4.86	5.49	4.29	4.74	5.36	4.17	4.68	5.30	4.11	4.56	5.18	4.00	4.50	5.11	3.95
126	16	70	0.49	5.06	5.70	4.48	4.96	5.60	4.38	4.90	5.53	4.32	4.78	5.41	4.21	4.71	5.33	4.14
127	16	80	0.51	5.07	5.72	4.48	4.99	5.64	4.41	4.93	5.57	4.35	4.82	5.45	4.24	4.72	5.35	4.15
128	16	90	0.53	5.08	5.73	4.48	5.02	5.67	4.42	4.96	5.61	4.37	4.85	5.49	4.26	4.73	5.37	4.15
129	16	100	0.55	5.15	5.82	4.55	5.08	5.74	4.47	4.98	5.64	4.38	4.87	5.52	4.28	4.78	5.43	4.19
130	16	110	0.57	5.04	5.71	4.42	4.94	5.61	4.33	4.81	5.48	4.21	4.70	5.36	4.10	4.63	5.29	4.04
131	16	120	0.58	5.07	5.75	4.45	4.96	5.63	4.35	4.80	5.46	4.20	4.69	5.35	4.09	4.64	5.29	4.05
132	16	130	0.60	5.14	5.83	4.51	5.03	5.71	4.41	4.88	5.56	4.27	4.77	5.44	4.16	4.73	5.39	4.12
133	16	140	0.61	5.18	5.88	4.55	5.08	5.77	4.45	4.95	5.63	4.32	4.83	5.51	4.21	4.79	5.46	4.18
134	16	150	0.62	5.24	5.94	4.59	5.13	5.83	4.49	5.01	5.70	4.38	4.89	5.58	4.26	4.86	5.54	4.23
135	16	160	0.63	5.02	5.72	4.38	4.92	5.61	4.28	4.81	5.51	4.18	4.69	5.37	4.06	4.66	5.35	4.04
136	16	170	0.64	4.92	5.63	4.27	4.82	5.53	4.17	4.73	5.43	4.09	4.60	5.29	3.96	4.58	5.27	3.95
137	16	180	0.65	4.96	5.68	4.31	4.86	5.57	4.21	4.79	5.50	4.14	4.65	5.35	4.01	4.64	5.34	4.00
138	16	190	0.66	5.01	5.73	4.34	4.91	5.63	4.25	4.85	5.56	4.19	4.71	5.42	4.06	4.70	5.41	4.05
139	16	200	0.52	4.73	5.38	4.13	4.61	5.26	4.01	4.55	5.19	3.96	4.37	5.01	3.79	4.37	5.01	3.79
140	16	210	0.53	4.78	5.45	4.17	4.66	5.32	4.05	4.61	5.27	4.00	4.43	5.09	3.84	4.43	5.08	3.83
141	16	220	0.54	4.81	5.48	4.19	4.68	5.36	4.07	4.64	5.30	4.03	4.47	5.13	3.87	4.46	5.12	3.86
142	16	230	0.55	4.94	5.62	4.31	4.82	5.49	4.20	4.77	5.45	4.16	4.62	5.28	4.01	4.60	5.26	3.99
143	16	240	0.56	4.98	5.68	4.35	4.86	5.55	4.23	4.82	5.51	4.20	4.67	5.35	4.06	4.65	5.32	4.03
144	16	250	0.57	5.00	5.69	4.36	4.88	5.57	4.25	4.85	5.54	4.22	4.70	5.38	4.08	4.67	5.35	4.05
145	16	260	0.58	4.83	5.53	4.19	4.71	5.41	4.08	4.69	5.38	4.06	4.55	5.24	3.93	4.52	5.20	3.89
146	16	270	0.59	4.84	5.56	4.19	4.72	5.43	4.08	4.71	5.41	4.07	4.57	5.27	3.94	4.53	5.23	3.90
147	16	280	0.60	4.92	5.64	4.27	4.80	5.52	4.16	4.79	5.50	4.15	4.67	5.37	4.03	4.62	5.32	3.98
148	16	290	0.61	4.92	5.65	4.26	4.80	5.52	4.15	4.80	5.52	4.14	4.68	5.39	4.03	4.63	5.34	3.98
149	16	300	0.62	4.91	5.65	4.25	4.80	5.53	4.14	4.80	5.53	4.14	4.69	5.41	4.03	4.63	5.35	3.98
			MIN	**4.73**	**5.38**	**4.13**	**4.61**	**5.26**	**4.01**	**4.48**	**5.14**	**3.88**	**4.37**	**5.01**	**3.78**	**4.33**	**4.98**	**3.74**
			MAX	**5.41**	**6.14**	**4.74**	**5.31**	**6.04**	**4.64**	**5.26**	**5.99**	**4.60**	**5.12**	**5.88**	**4.46**	**5.12**	**5.83**	**4.46**
			AVE	**5.08**	**5.79**	**4.44**	**4.98**	**5.68**	**4.35**	**4.92**	**5.61**	**4.28**	**4.79**	**5.48**	**4.17**	**4.75**	**5.43**	**4.13**

C.1.5 Flexural resistance of composite box girders

Table C- 25. Reliability Indices for A709-50 Composite Box Girdes for ADTT 250 and L=60, 90ft.

	L=60 ft						L=90 ft					
Φ	1.00		0.95		1.05		1.00		0.95		1.05	
# / D/(D+L)	0.45	0.50	0.45	0.50	0.45	0.50	0.50	0.65	0.50	0.65	0.50	0.65
1	4.47	4.55	5.04	5.13	3.95	4.01	4.49	4.66	5.08	5.31	3.95	4.07
2	4.46	4.54	5.03	5.13	3.94	4.00	4.48	4.65	5.07	5.30	3.94	4.06
3	4.18	4.26	4.77	4.87	3.64	3.70	4.20	4.37	4.81	5.05	3.65	3.75
4	4.44	4.51	5.00	5.10	3.92	3.97	4.46	4.62	5.04	5.27	3.92	4.03
5	4.42	4.50	4.99	5.08	3.91	3.96	4.44	4.61	5.03	5.25	3.91	4.02
6	4.15	4.23	4.74	4.84	3.62	3.67	4.17	4.34	4.78	5.02	3.62	3.72
7	4.42	4.49	4.98	5.07	3.90	3.96	4.44	4.60	5.02	5.24	3.90	4.01
8	4.40	4.48	4.96	5.06	3.89	3.94	4.42	4.58	5.00	5.22	3.89	4.00
9	4.13	4.21	4.72	4.82	3.60	3.65	4.15	4.31	4.76	4.99	3.60	3.70
10	4.60	4.69	5.19	5.29	4.07	4.14	4.63	4.83	5.23	5.49	4.08	4.22
11	4.60	4.69	5.18	5.29	4.07	4.13	4.63	4.83	5.23	5.49	4.08	4.22
12	4.32	4.40	4.92	5.02	3.77	3.84	4.34	4.53	4.96	5.22	3.78	3.91
13	4.28	4.36	4.87	4.98	3.73	3.80	4.30	4.49	4.92	5.17	3.74	3.86
14	4.17	4.25	4.78	4.88	3.62	3.68	4.19	4.38	4.82	5.08	3.62	3.74
15	4.58	4.66	5.16	5.26	4.05	4.11	4.61	4.80	5.20	5.46	4.06	4.19
16	4.57	4.65	5.15	5.26	4.04	4.10	4.60	4.79	5.20	5.45	4.05	4.18
17	4.28	4.36	4.87	4.98	3.73	3.79	4.30	4.49	4.92	5.17	3.74	3.86
18	4.24	4.32	4.83	4.93	3.70	3.76	4.26	4.44	4.87	5.12	3.70	3.81
19	4.13	4.21	4.73	4.84	3.58	3.64	4.15	4.33	4.78	5.03	3.58	3.70
20	4.56	4.64	5.14	5.24	4.03	4.09	4.58	4.77	5.18	5.43	4.04	4.17
21	4.54	4.62	5.12	5.22	4.01	4.07	4.57	4.75	5.16	5.41	4.02	4.15
22	4.24	4.32	4.83	4.94	3.70	3.76	4.26	4.44	4.88	5.13	3.70	3.82
23	4.21	4.28	4.80	4.90	3.67	3.72	4.23	4.40	4.84	5.08	3.67	3.78
24	4.10	4.18	4.70	4.80	3.56	3.61	4.12	4.30	4.74	4.99	3.56	3.66
25	4.61	4.69	5.19	5.30	4.08	4.14	4.64	4.83	5.24	5.49	4.09	4.23
26	4.63	4.71	5.21	5.32	4.09	4.16	4.66	4.86	5.26	5.52	4.10	4.24
27	4.40	4.48	5.00	5.10	3.85	3.92	4.43	4.62	5.04	5.31	3.86	3.99
28	4.36	4.45	4.96	5.07	3.82	3.88	4.39	4.59	5.01	5.27	3.83	3.96
29	4.27	4.36	4.88	4.99	3.72	3.78	4.30	4.49	4.93	5.20	3.73	3.85
30	4.59	4.68	5.18	5.28	4.06	4.13	4.62	4.82	5.22	5.48	4.07	4.21
31	4.60	4.69	5.19	5.29	4.07	4.14	4.63	4.83	5.23	5.49	4.08	4.22
32	4.36	4.44	4.95	5.06	3.81	3.88	4.38	4.57	5.00	5.26	3.82	3.95
33	4.33	4.41	4.93	5.03	3.79	3.85	4.36	4.54	4.97	5.23	3.79	3.92
34	4.23	4.31	4.83	4.94	3.67	3.74	4.25	4.44	4.88	5.14	3.68	3.80

35	4.61	4.69	5.19	5.29	4.07	4.14	4.63	4.83	5.24	5.49	4.08	4.22
36	4.61	4.69	5.19	5.30	4.07	4.14	4.64	4.83	5.24	5.50	4.08	4.22
37	4.34	4.42	4.93	5.04	3.79	3.85	4.36	4.55	4.98	5.24	3.80	3.92
38	4.28	4.36	4.88	4.98	3.74	3.80	4.30	4.49	4.92	5.17	3.74	3.86
39	4.19	4.27	4.79	4.90	3.64	3.70	4.21	4.40	4.84	5.10	3.64	3.76
40	4.54	4.62	5.12	5.22	4.01	4.07	4.57	4.75	5.16	5.41	4.02	4.15
41	4.64	4.73	5.23	5.33	4.11	4.17	4.67	4.87	5.27	5.54	4.12	4.26
42	4.45	4.53	5.04	5.15	3.90	3.97	4.47	4.67	5.09	5.36	3.91	4.05
43	4.43	4.51	5.02	5.13	3.88	3.94	4.45	4.65	5.07	5.34	3.89	4.02
44	4.26	4.34	4.86	4.97	3.71	3.77	4.28	4.47	4.90	5.17	3.72	3.84
45	4.66	4.75	5.25	5.35	4.13	4.20	4.69	4.89	5.29	5.56	4.14	4.28
46	4.63	4.72	5.21	5.32	4.09	4.16	4.66	4.86	5.26	5.53	4.10	4.25
47	4.41	4.50	5.01	5.12	3.87	3.93	4.44	4.63	5.05	5.32	3.88	4.01
48	4.39	4.47	4.99	5.09	3.84	3.91	4.42	4.61	5.03	5.30	3.85	3.98
49	4.21	4.29	4.81	4.92	3.67	3.72	4.24	4.42	4.86	5.12	3.67	3.79
50	4.63	4.71	5.21	5.31	4.09	4.16	4.65	4.85	5.25	5.51	4.10	4.24
51	4.62	4.70	5.20	5.31	4.08	4.15	4.65	4.84	5.25	5.51	4.09	4.23
52	4.38	4.46	4.98	5.08	3.83	3.90	4.41	4.60	5.02	5.28	3.84	3.97
53	4.35	4.44	4.95	5.06	3.81	3.87	4.38	4.57	5.00	5.26	3.82	3.94
54	4.26	4.34	4.86	4.97	3.71	3.77	4.28	4.48	4.91	5.18	3.71	3.84
55	4.25	4.33	4.84	4.94	3.71	3.77	4.27	4.45	4.88	5.12	3.72	3.83
56	4.34	4.42	4.94	5.04	3.80	3.86	4.37	4.55	4.98	5.24	3.80	3.93
57	4.17	4.25	4.77	4.87	3.62	3.68	4.19	4.37	4.81	5.06	3.63	3.74
58	4.20	4.28	4.80	4.90	3.65	3.71	4.22	4.40	4.84	5.10	3.66	3.77
59	4.14	4.22	4.75	4.85	3.59	3.65	4.17	4.35	4.79	5.05	3.60	3.71
60	4.31	4.39	4.90	5.01	3.77	3.83	4.34	4.52	4.95	5.20	3.78	3.90
61	4.33	4.41	4.92	5.03	3.79	3.85	4.36	4.54	4.97	5.22	3.80	3.92
62	4.24	4.32	4.84	4.95	3.69	3.75	4.27	4.45	4.89	5.15	3.70	3.82
63	4.17	4.24	4.76	4.87	3.62	3.68	4.19	4.36	4.80	5.05	3.62	3.73
64	4.12	4.20	4.72	4.83	3.57	3.63	4.14	4.32	4.76	5.02	3.57	3.68
65	4.32	4.40	4.92	5.02	3.78	3.84	4.35	4.53	4.96	5.21	3.79	3.91
66	4.43	4.51	5.02	5.13	3.88	3.95	4.45	4.65	5.07	5.33	3.89	4.02
67	4.23	4.31	4.83	4.94	3.68	3.74	4.25	4.44	4.87	5.13	3.68	3.80
68	4.14	4.22	4.74	4.84	3.60	3.66	4.17	4.34	4.78	5.03	3.60	3.71
69	4.09	4.16	4.69	4.79	3.54	3.59	4.11	4.28	4.73	4.98	3.54	3.65
70	4.50	4.59	5.11	5.22	3.95	4.02	4.54	4.75	5.16	5.44	3.96	4.11
71	4.20	4.28	4.80	4.90	3.65	3.71	4.22	4.40	4.84	5.09	3.66	3.77
72	4.39	4.47	5.00	5.11	3.83	3.90	4.42	4.62	5.05	5.33	3.84	3.98
73	4.33	4.42	4.93	5.03	3.79	3.85	4.36	4.55	4.97	5.23	3.80	3.92

74	4.19	4.27	4.79	4.89	3.64	3.70	4.21	4.39	4.83	5.08	3.65	3.76
75	4.21	4.29	4.81	4.91	3.66	3.72	4.23	4.41	4.85	5.11	3.66	3.78
76	4.28	4.36	4.89	5.00	3.72	3.78	4.30	4.51	4.94	5.22	3.73	3.86
77	4.34	4.43	4.94	5.04	3.80	3.86	4.37	4.56	4.98	5.24	3.81	3.93
78	4.16	4.24	4.76	4.86	3.62	3.68	4.18	4.36	4.80	5.05	3.62	3.73
79	4.19	4.27	4.79	4.89	3.64	3.70	4.21	4.39	4.83	5.09	3.65	3.76
80	4.26	4.34	4.87	4.98	3.70	3.76	4.29	4.48	4.92	5.19	3.71	3.84
MIN	**4.09**	**4.16**	**4.69**	**4.79**	**3.54**	**3.59**	**4.11**	**4.28**	**4.73**	**4.98**	**3.54**	**3.65**
MAX	**4.66**	**4.75**	**5.25**	**5.35**	**4.13**	**4.20**	**4.69**	**4.89**	**5.29**	**5.56**	**4.14**	**4.28**
AVE	**4.35**	**4.44**	**4.95**	**5.05**	**3.81**	**3.87**	**4.38**	**4.56**	**4.99**	**5.25**	**3.82**	**3.94**

Table C- 26. Reliability Indices for A709-50 Composite Box Girdes for ADTT 250 and L=120, 200, 300ft.

	L=120 ft						L=200 ft						L=300 ft					
Φ	1.00		0.95		1.05		1.00		0.95		1.05		1.00		0.95		1.05	
# / D/(D+L)	**0.55**	**0.70**	**0.55**	**0.70**	**0.55**	**0.70**	**0.60**	**0.75**	**0.60**	**0.75**	**0.60**	**0.75**	**0.65**	**0.80**	**0.65**	**0.80**	**0.65**	**0.80**
1	4.67	4.75	5.28	5.41	4.11	4.13	4.98	4.85	5.62	5.54	4.38	4.22	5.32	4.87	6.00	5.57	4.70	4.23
2	4.66	4.74	5.27	5.41	4.10	4.12	4.97	4.84	5.62	5.53	4.37	4.21	5.31	4.86	6.00	5.56	4.69	4.22
3	4.38	4.46	5.02	5.16	3.80	3.81	4.70	4.57	5.38	5.30	4.08	3.91	5.06	4.59	5.78	5.33	4.41	3.92
4	4.63	4.70	5.24	5.37	4.07	4.09	4.94	4.81	5.58	5.49	4.35	4.18	5.28	4.83	5.96	5.52	4.66	4.19
5	4.62	4.69	5.23	5.35	4.06	4.08	4.92	4.79	5.56	5.48	4.33	4.17	5.26	4.81	5.94	5.51	4.64	4.18
6	4.35	4.42	4.99	5.12	3.77	3.78	4.67	4.53	5.34	5.26	4.05	3.87	5.03	4.55	5.74	5.29	4.37	3.88
7	4.61	4.68	5.22	5.34	4.05	4.07	4.91	4.78	5.55	5.46	4.33	4.16	5.25	4.80	5.93	5.49	4.63	4.17
8	4.59	4.66	5.20	5.32	4.04	4.06	4.89	4.76	5.53	5.44	4.31	4.14	5.23	4.78	5.90	5.47	4.61	4.15
9	4.33	4.40	4.96	5.09	3.75	3.76	4.64	4.51	5.32	5.23	4.03	3.85	5.00	4.53	5.71	5.25	4.35	3.86
10	4.82	4.92	5.45	5.60	4.25	4.29	5.14	5.03	5.80	5.74	4.54	4.39	5.50	5.05	6.20	5.77	4.86	4.40
11	4.82	4.92	5.45	5.61	4.24	4.29	5.14	5.03	5.81	5.74	4.54	4.38	5.51	5.06	6.21	5.77	4.86	4.40
12	4.54	4.63	5.18	5.34	3.94	3.97	4.87	4.74	5.55	5.48	4.24	4.07	5.24	4.77	5.97	5.51	4.57	4.09
13	4.49	4.58	5.14	5.29	3.90	3.93	4.82	4.69	5.50	5.43	4.19	4.02	5.19	4.72	5.91	5.46	4.52	4.04
14	4.38	4.47	5.04	5.20	3.79	3.81	4.72	4.59	5.42	5.34	4.08	3.90	5.09	4.61	5.84	5.37	4.42	3.92
15	4.79	4.89	5.42	5.57	4.22	4.26	5.11	5.00	5.77	5.70	4.51	4.36	5.47	5.02	6.16	5.73	4.83	4.37
16	4.78	4.88	5.41	5.56	4.21	4.25	5.11	4.99	5.77	5.70	4.50	4.35	5.47	5.02	6.16	5.73	4.83	4.36
17	4.49	4.58	5.14	5.29	3.90	3.93	4.82	4.69	5.50	5.43	4.19	4.02	5.19	4.72	5.91	5.46	4.52	4.04
18	4.45	4.53	5.09	5.24	3.86	3.88	4.77	4.64	5.45	5.37	4.15	3.97	5.14	4.66	5.86	5.40	4.47	3.99
19	4.34	4.42	4.99	5.15	3.74	3.76	4.67	4.54	5.37	5.29	4.03	3.86	5.04	4.56	5.79	5.32	4.37	3.87
20	4.77	4.86	5.39	5.54	4.20	4.24	5.09	4.97	5.74	5.67	4.49	4.33	5.44	4.99	6.13	5.70	4.81	4.35
21	4.75	4.84	5.38	5.52	4.18	4.22	5.07	4.96	5.73	5.66	4.47	4.31	5.43	4.98	6.12	5.69	4.79	4.33
22	4.45	4.53	5.09	5.24	3.86	3.88	4.77	4.65	5.46	5.38	4.15	3.98	5.14	4.67	5.87	5.41	4.48	3.99
23	4.41	4.49	5.05	5.19	3.83	3.84	4.73	4.60	5.41	5.33	4.11	3.94	5.09	4.62	5.81	5.36	4.44	3.95
24	4.31	4.39	4.96	5.11	3.71	3.73	4.63	4.50	5.33	5.25	4.00	3.82	5.01	4.52	5.75	5.28	4.33	3.83
25	4.83	4.92	5.45	5.61	4.25	4.30	5.15	5.04	5.81	5.74	4.54	4.39	5.51	5.06	6.20	5.77	4.87	4.41
26	4.85	4.95	5.48	5.64	4.27	4.32	5.17	5.07	5.84	5.78	4.56	4.41	5.54	5.09	6.24	5.81	4.89	4.43
27	4.62	4.72	5.27	5.43	4.03	4.06	4.95	4.83	5.64	5.57	4.32	4.16	5.32	4.86	6.05	5.60	4.66	4.18
28	4.58	4.68	5.23	5.39	3.99	4.03	4.91	4.80	5.60	5.53	4.29	4.12	5.29	4.82	6.01	5.56	4.62	4.14
29	4.49	4.59	5.15	5.32	3.89	3.92	4.83	4.71	5.53	5.46	4.19	4.02	5.21	4.73	5.95	5.50	4.53	4.04
30	4.81	4.91	5.44	5.59	4.24	4.28	5.13	5.02	5.80	5.73	4.53	4.38	5.49	5.04	6.19	5.76	4.85	4.39
31	4.82	4.92	5.45	5.60	4.25	4.29	5.14	5.03	5.80	5.73	4.54	4.39	5.50	5.05	6.20	5.76	4.86	4.40
32	4.57	4.67	5.22	5.38	3.98	4.02	4.90	4.78	5.59	5.51	4.28	4.12	5.27	4.81	6.00	5.55	4.61	4.13
33	4.54	4.63	5.19	5.34	3.96	3.99	4.87	4.75	5.55	5.48	4.25	4.08	5.24	4.77	5.96	5.51	4.58	4.10
34	4.44	4.54	5.10	5.26	3.84	3.87	4.78	4.66	5.48	5.41	4.14	3.97	5.16	4.68	5.90	5.44	4.48	3.98
35	4.82	4.92	5.45	5.61	4.25	4.29	5.15	5.04	5.81	5.74	4.54	4.39	5.51	5.06	6.20	5.77	4.87	4.40
36	4.83	4.93	5.46	5.62	4.25	4.29	5.15	5.04	5.82	5.75	4.54	4.39	5.52	5.07	6.22	5.78	4.87	4.41

37	4.55	4.64	5.20	5.35	3.96	3.99	4.88	4.76	5.57	5.49	4.26	4.09	5.25	4.78	5.98	5.53	4.59	4.11
38	4.49	4.58	5.14	5.29	3.90	3.93	4.82	4.69	5.50	5.43	4.19	4.03	5.19	4.72	5.91	5.46	4.52	4.04
39	4.40	4.49	5.06	5.22	3.81	3.83	4.74	4.61	5.43	5.36	4.10	3.93	5.11	4.63	5.86	5.39	4.44	3.94
40	4.75	4.84	5.37	5.52	4.18	4.21	5.07	4.95	5.73	5.65	4.47	4.31	5.42	4.97	6.12	5.68	4.79	4.32
41	4.86	4.96	5.49	5.65	4.29	4.33	5.19	5.08	5.85	5.79	4.58	4.43	5.55	5.10	6.25	5.82	4.91	4.45
42	4.67	4.77	5.31	5.47	4.08	4.12	5.00	4.88	5.68	5.61	4.37	4.22	5.37	4.91	6.09	5.65	4.71	4.23
43	4.65	4.75	5.29	5.46	4.05	4.09	4.98	4.87	5.67	5.60	4.35	4.19	5.36	4.89	6.08	5.63	4.69	4.21
44	4.47	4.56	5.13	5.28	3.88	3.91	4.81	4.68	5.50	5.42	4.17	4.01	5.18	4.70	5.91	5.46	4.51	4.02
45	4.88	4.98	5.51	5.67	4.31	4.36	5.21	5.10	5.87	5.81	4.60	4.45	5.57	5.12	6.27	5.84	4.93	4.47
46	4.85	4.95	5.48	5.64	4.27	4.32	5.18	5.07	5.85	5.78	4.57	4.42	5.54	5.09	6.25	5.81	4.90	4.43
47	4.63	4.73	5.28	5.44	4.04	4.08	4.96	4.85	5.65	5.58	4.34	4.18	5.33	4.87	6.06	5.61	4.67	4.19
48	4.61	4.70	5.26	5.42	4.02	4.05	4.94	4.82	5.63	5.56	4.31	4.15	5.31	4.85	6.04	5.59	4.65	4.17
49	4.43	4.51	5.08	5.23	3.83	3.85	4.76	4.63	5.45	5.38	4.12	3.95	5.13	4.65	5.87	5.41	4.46	3.97
50	4.84	4.94	5.47	5.63	4.27	4.31	5.17	5.06	5.83	5.76	4.56	4.41	5.53	5.08	6.22	5.79	4.89	4.43
51	4.84	4.94	5.47	5.62	4.26	4.30	5.16	5.05	5.83	5.76	4.55	4.40	5.52	5.08	6.23	5.79	4.88	4.42
52	4.60	4.69	5.24	5.40	4.01	4.04	4.93	4.81	5.61	5.54	4.30	4.14	5.30	4.83	6.02	5.57	4.64	4.15
53	4.57	4.66	5.22	5.37	3.98	4.01	4.90	4.78	5.58	5.51	4.27	4.11	5.27	4.80	6.00	5.54	4.61	4.12
54	4.48	4.57	5.14	5.30	3.88	3.91	4.81	4.69	5.51	5.44	4.18	4.01	5.19	4.72	5.94	5.48	4.52	4.02
55	4.46	4.53	5.09	5.23	3.87	3.89	4.77	4.64	5.45	5.36	4.16	3.99	5.13	4.67	5.84	5.39	4.48	4.00
56	4.56	4.65	5.20	5.35	3.97	4.00	4.88	4.76	5.57	5.49	4.26	4.09	5.25	4.78	5.97	5.52	4.59	4.11
57	4.38	4.46	5.03	5.17	3.78	3.80	4.70	4.57	5.39	5.31	4.07	3.90	5.07	4.59	5.80	5.34	4.40	3.91
58	4.41	4.49	5.06	5.21	3.82	3.84	4.74	4.61	5.43	5.35	4.11	3.94	5.11	4.63	5.84	5.38	4.44	3.95
59	4.36	4.44	5.01	5.17	3.76	3.78	4.69	4.56	5.39	5.31	4.05	3.87	5.07	4.58	5.81	5.35	4.39	3.89
60	4.52	4.61	5.16	5.31	3.94	3.96	4.85	4.72	5.53	5.45	4.23	4.06	5.21	4.75	5.93	5.48	4.56	4.07
61	4.54	4.63	5.19	5.34	3.96	3.99	4.87	4.75	5.55	5.47	4.25	4.08	5.24	4.77	5.95	5.50	4.58	4.10
62	4.46	4.55	5.11	5.27	3.86	3.89	4.79	4.67	5.48	5.41	4.16	3.99	5.17	4.69	5.90	5.45	4.49	4.00
63	4.37	4.45	5.02	5.17	3.78	3.80	4.70	4.57	5.39	5.31	4.07	3.89	5.07	4.59	5.80	5.34	4.40	3.91
64	4.33	4.41	4.99	5.14	3.73	3.75	4.66	4.53	5.36	5.28	4.02	3.84	5.03	4.55	5.78	5.31	4.36	3.86
65	4.54	4.62	5.18	5.32	3.95	3.98	4.86	4.74	5.54	5.46	4.24	4.07	5.22	4.76	5.94	5.49	4.57	4.09
66	4.65	4.74	5.29	5.45	4.06	4.09	4.98	4.86	5.66	5.59	4.35	4.19	5.35	4.88	6.07	5.62	4.69	4.21
67	4.44	4.53	5.10	5.25	3.85	3.87	4.77	4.65	5.47	5.39	4.14	3.97	5.15	4.67	5.88	5.42	4.48	3.98
68	4.35	4.43	5.00	5.14	3.76	3.78	4.68	4.54	5.36	5.28	4.05	3.87	5.04	4.56	5.78	5.31	4.38	3.88
69	4.29	4.37	4.95	5.10	3.70	3.71	4.62	4.49	5.32	5.24	3.99	3.81	4.99	4.51	5.74	5.27	4.32	3.82
70	4.73	4.84	5.39	5.56	4.14	4.19	5.07	4.97	5.77	5.71	4.44	4.29	5.46	4.99	6.19	5.74	4.79	4.31
71	4.41	4.49	5.06	5.21	3.81	3.84	4.74	4.61	5.43	5.35	4.11	3.93	5.11	4.63	5.84	5.38	4.44	3.95
72	4.61	4.72	5.28	5.45	4.01	4.05	4.96	4.85	5.66	5.60	4.32	4.16	5.34	4.87	6.09	5.63	4.66	4.17
73	4.55	4.64	5.19	5.35	3.96	3.99	4.88	4.76	5.56	5.49	4.25	4.09	5.25	4.78	5.97	5.52	4.58	4.10
74	4.40	4.48	5.05	5.19	3.80	3.82	4.72	4.59	5.41	5.33	4.09	3.92	5.09	4.62	5.82	5.36	4.43	3.93
75	4.42	4.50	5.07	5.22	3.82	3.85	4.75	4.62	5.44	5.36	4.12	3.94	5.12	4.64	5.86	5.40	4.45	3.96

76	4.50	4.60	5.17	5.34	3.89	3.93	4.84	4.73	5.55	5.49	4.20	4.03	5.23	4.75	5.99	5.53	4.55	4.05
77	4.56	4.65	5.20	5.35	3.97	4.00	4.88	4.76	5.57	5.49	4.26	4.10	5.25	4.79	5.97	5.52	4.59	4.11
78	4.37	4.45	5.02	5.17	3.78	3.80	4.70	4.57	5.38	5.30	4.07	3.89	5.06	4.59	5.80	5.34	4.40	3.90
79	4.40	4.48	5.05	5.20	3.81	3.83	4.73	4.60	5.42	5.34	4.10	3.92	5.10	4.62	5.83	5.37	4.43	3.94
80	4.48	4.58	5.15	5.32	3.88	3.91	4.82	4.71	5.53	5.47	4.18	4.01	5.21	4.73	5.96	5.50	4.52	4.03
MIN	**4.29**	**4.37**	**4.95**	**5.09**	**3.70**	**3.71**	**4.62**	**4.49**	**5.32**	**5.23**	**3.99**	**3.81**	**4.99**	**4.51**	**5.71**	**5.25**	**4.32**	**3.82**
MAX	**4.88**	**4.98**	**5.51**	**5.67**	**4.31**	**4.36**	**5.21**	**5.10**	**5.87**	**5.81**	**4.60**	**4.45**	**5.57**	**5.12**	**6.27**	**5.84**	**4.93**	**4.47**
AVE	**4.57**	**4.65**	**5.21**	**5.36**	**3.98**	**4.01**	**4.89**	**4.77**	**5.57**	**5.50**	**4.27**	**4.11**	**5.26**	**4.79**	**5.98**	**5.53**	**4.60**	**4.12**

Table C- 27. Reliability Indices for A709-50 Composite Box Girdes for ADTT 1'000 and L=60, 90ft.

	L=60 ft						L=90 ft					
Φ	1.00		0.95		1.05		1.00		0.95		1.05	
# / D/(D+L)	0.45	0.50	0.45	0.50	0.45	0.50	0.50	0.65	0.50	0.65	0.50	0.65
1	4.36	4.44	4.92	5.02	3.84	3.90	4.44	4.62	5.02	5.26	3.90	4.03
2	4.35	4.43	4.91	5.01	3.83	3.89	4.43	4.61	5.01	5.25	3.89	4.02
3	4.07	4.15	4.65	4.75	3.53	3.59	4.15	4.33	4.75	5.00	3.59	3.71
4	4.32	4.40	4.88	4.98	3.81	3.87	4.40	4.58	4.98	5.22	3.87	3.99
5	4.31	4.39	4.87	4.97	3.80	3.86	4.39	4.56	4.97	5.21	3.86	3.98
6	4.04	4.12	4.62	4.72	3.51	3.57	4.12	4.29	4.72	4.97	3.57	3.68
7	4.30	4.38	4.86	4.96	3.79	3.85	4.38	4.55	4.96	5.19	3.85	3.97
8	4.29	4.37	4.85	4.94	3.78	3.84	4.37	4.54	4.94	5.17	3.84	3.96
9	4.02	4.10	4.60	4.70	3.49	3.55	4.10	4.27	4.70	4.94	3.55	3.66
10	4.49	4.58	5.06	5.17	3.96	4.03	4.58	4.78	5.17	5.44	4.03	4.17
11	4.49	4.57	5.06	5.17	3.96	4.02	4.57	4.78	5.17	5.44	4.02	4.17
12	4.20	4.29	4.79	4.90	3.66	3.73	4.29	4.49	4.90	5.17	3.73	3.86
13	4.16	4.25	4.75	4.86	3.62	3.69	4.25	4.44	4.86	5.12	3.69	3.82
14	4.05	4.14	4.65	4.76	3.51	3.57	4.14	4.33	4.76	5.03	3.57	3.69
15	4.46	4.55	5.04	5.15	3.94	4.01	4.55	4.75	5.15	5.41	4.01	4.15
16	4.45	4.54	5.03	5.14	3.93	4.00	4.54	4.74	5.14	5.40	4.00	4.14
17	4.16	4.24	4.75	4.86	3.62	3.69	4.24	4.44	4.86	5.12	3.69	3.81
18	4.12	4.20	4.71	4.81	3.59	3.65	4.20	4.39	4.81	5.07	3.65	3.77
19	4.01	4.10	4.61	4.71	3.47	3.53	4.10	4.28	4.71	4.98	3.53	3.65
20	4.44	4.53	5.02	5.12	3.92	3.99	4.53	4.73	5.12	5.38	3.99	4.12
21	4.43	4.51	5.00	5.11	3.90	3.97	4.51	4.71	5.11	5.37	3.97	4.11
22	4.12	4.21	4.71	4.82	3.59	3.65	4.21	4.40	4.82	5.08	3.65	3.77
23	4.09	4.17	4.67	4.78	3.56	3.62	4.17	4.36	4.78	5.03	3.62	3.74
24	3.98	4.07	4.58	4.68	3.44	3.50	4.07	4.25	4.68	4.94	3.50	3.62
25	4.49	4.58	5.07	5.18	3.97	4.04	4.58	4.79	5.18	5.45	4.04	4.18
26	4.51	4.60	5.09	5.20	3.98	4.05	4.60	4.81	5.20	5.48	4.05	4.20
27	4.28	4.37	4.87	4.98	3.74	3.81	4.37	4.57	4.98	5.26	3.81	3.95
28	4.25	4.33	4.84	4.95	3.71	3.77	4.33	4.54	4.95	5.22	3.77	3.91
29	4.15	4.24	4.75	4.86	3.61	3.67	4.24	4.45	4.86	5.15	3.67	3.81
30	4.48	4.57	5.06	5.16	3.95	4.02	4.57	4.77	5.16	5.43	4.02	4.16
31	4.49	4.58	5.06	5.17	3.96	4.03	4.58	4.78	5.17	5.44	4.03	4.18
32	4.24	4.33	4.83	4.94	3.70	3.77	4.33	4.53	4.94	5.21	3.77	3.90
33	4.21	4.30	4.80	4.91	3.68	3.74	4.30	4.50	4.91	5.18	3.74	3.87
34	4.11	4.19	4.71	4.82	3.56	3.63	4.19	4.39	4.82	5.09	3.63	3.76
35	4.49	4.58	5.07	5.18	3.96	4.03	4.58	4.78	5.18	5.45	4.03	4.18
36	4.49	4.58	5.07	5.18	3.96	4.03	4.58	4.79	5.18	5.45	4.03	4.18

37	4.22	4.30	4.81	4.92	3.68	3.74	4.30	4.50	4.92	5.19	3.74	3.88
38	4.16	4.25	4.75	4.86	3.63	3.69	4.25	4.44	4.86	5.12	3.69	3.82
39	4.07	4.16	4.67	4.78	3.53	3.59	4.16	4.35	4.78	5.05	3.59	3.72
40	4.42	4.51	5.00	5.10	3.90	3.97	4.51	4.71	5.10	5.36	3.97	4.10
41	4.53	4.62	5.10	5.22	3.99	4.07	4.62	4.83	5.22	5.49	4.07	4.22
42	4.33	4.42	4.92	5.03	3.79	3.86	4.42	4.62	5.03	5.31	3.86	4.00
43	4.31	4.40	4.90	5.01	3.77	3.83	4.40	4.60	5.01	5.29	3.83	3.98
44	4.14	4.23	4.74	4.84	3.60	3.66	4.23	4.42	4.84	5.11	3.66	3.79
45	4.55	4.64	5.12	5.23	4.02	4.09	4.64	4.85	5.23	5.51	4.09	4.24
46	4.51	4.60	5.09	5.20	3.98	4.05	4.60	4.81	5.20	5.48	4.05	4.20
47	4.29	4.38	4.88	4.99	3.75	3.82	4.38	4.59	4.99	5.27	3.82	3.96
48	4.27	4.36	4.86	4.97	3.73	3.80	4.36	4.56	4.97	5.25	3.80	3.94
49	4.10	4.18	4.69	4.80	3.55	3.62	4.18	4.37	4.80	5.07	3.62	3.74
50	4.51	4.60	5.09	5.20	3.98	4.05	4.60	4.80	5.20	5.46	4.05	4.20
51	4.50	4.59	5.08	5.19	3.97	4.04	4.59	4.80	5.19	5.46	4.04	4.19
52	4.26	4.35	4.85	4.96	3.72	3.79	4.35	4.55	4.96	5.23	3.79	3.93
53	4.23	4.32	4.83	4.94	3.70	3.76	4.32	4.52	4.94	5.21	3.76	3.90
54	4.14	4.23	4.74	4.85	3.59	3.66	4.23	4.43	4.85	5.13	3.66	3.79
55	4.13	4.22	4.72	4.82	3.60	3.66	4.22	4.40	4.82	5.07	3.66	3.78
56	4.22	4.31	4.81	4.92	3.69	3.75	4.31	4.51	4.92	5.19	3.75	3.88
57	4.05	4.13	4.64	4.75	3.51	3.57	4.13	4.32	4.75	5.01	3.57	3.69
58	4.08	4.17	4.67	4.78	3.54	3.60	4.17	4.36	4.78	5.05	3.60	3.73
59	4.03	4.11	4.62	4.73	3.48	3.54	4.11	4.30	4.73	5.00	3.54	3.66
60	4.20	4.28	4.78	4.89	3.66	3.72	4.28	4.47	4.89	5.15	3.72	3.85
61	4.22	4.30	4.80	4.91	3.68	3.74	4.30	4.50	4.91	5.17	3.74	3.87
62	4.12	4.21	4.72	4.83	3.58	3.64	4.21	4.41	4.83	5.10	3.64	3.77
63	4.05	4.13	4.64	4.74	3.51	3.57	4.13	4.32	4.74	5.00	3.57	3.69
64	4.00	4.08	4.60	4.70	3.46	3.52	4.08	4.27	4.70	4.97	3.52	3.64
65	4.21	4.29	4.79	4.90	3.67	3.74	4.29	4.49	4.90	5.16	3.74	3.87
66	4.31	4.40	4.90	5.01	3.77	3.84	4.40	4.60	5.01	5.28	3.84	3.98
67	4.11	4.19	4.70	4.81	3.57	3.63	4.19	4.39	4.81	5.08	3.63	3.76
68	4.03	4.11	4.62	4.72	3.49	3.55	4.11	4.29	4.72	4.98	3.55	3.67
69	3.97	4.05	4.56	4.67	3.43	3.48	4.05	4.24	4.67	4.93	3.48	3.60
70	4.38	4.48	4.98	5.10	3.84	3.91	4.48	4.70	5.10	5.39	3.91	4.06
71	4.08	4.16	4.67	4.78	3.54	3.60	4.16	4.35	4.78	5.04	3.60	3.72
72	4.27	4.36	4.87	4.98	3.72	3.79	4.36	4.57	4.98	5.28	3.79	3.93
73	4.22	4.30	4.81	4.91	3.68	3.74	4.30	4.50	4.91	5.18	3.74	3.88
74	4.07	4.15	4.66	4.77	3.53	3.59	4.15	4.34	4.77	5.03	3.59	3.71
75	4.09	4.17	4.68	4.79	3.55	3.61	4.17	4.37	4.79	5.06	3.61	3.74

76	4.16	4.24	4.76	4.88	3.60	3.67	4.24	4.46	4.88	5.17	3.67	3.81
77	4.23	4.31	4.81	4.92	3.69	3.75	4.31	4.51	4.92	5.19	3.75	3.89
78	4.05	4.13	4.64	4.74	3.51	3.57	4.13	4.31	4.74	5.00	3.57	3.69
79	4.07	4.16	4.66	4.77	3.53	3.59	4.16	4.35	4.77	5.03	3.59	3.72
80	4.14	4.23	4.74	4.86	3.59	3.65	4.23	4.44	4.86	5.14	3.65	3.79
MIN	**3.97**	**4.05**	**4.56**	**4.67**	**3.43**	**3.48**	**4.05**	**4.24**	**4.67**	**4.93**	**3.48**	**3.60**
MAX	**4.55**	**4.64**	**5.12**	**5.23**	**4.02**	**4.09**	**4.64**	**4.85**	**5.23**	**5.51**	**4.09**	**4.24**
AVE	**4.24**	**4.32**	**4.82**	**4.93**	**3.70**	**3.77**	**4.32**	**4.52**	**4.93**	**5.20**	**3.77**	**3.90**

Table C- 28. Reliability Indices for A709-50 Composite Box Girdes for ADTT 1'000 and L=120, 200, 300ft.

	L=120 ft						L=200 ft						L=300 ft					
Φ	**1.00**		**0.95**		**1.05**		**1.00**		**0.95**		**1.05**		**1.00**		**0.95**		**1.05**	
# / D/(D+L)	**0.55**	**0.70**	**0.55**	**0.70**	**0.55**	**0.70**	**0.60**	**0.75**	**0.60**	**0.75**	**0.60**	**0.75**	**0.65**	**0.80**	**0.65**	**0.80**	**0.65**	**0.80**
1	4.56	4.67	5.17	5.33	4.01	4.06	4.87	4.79	5.52	5.47	4.29	4.16	5.22	4.82	5.90	5.51	4.60	4.18
2	4.55	4.66	5.16	5.32	4.00	4.05	4.86	4.78	5.51	5.46	4.28	4.15	5.21	4.81	5.89	5.51	4.59	4.17
3	4.27	4.37	4.91	5.07	3.70	3.74	4.59	4.50	5.27	5.22	3.98	3.84	4.96	4.53	5.67	5.27	4.31	3.86
4	4.53	4.63	5.13	5.29	3.97	4.02	4.83	4.74	5.47	5.42	4.25	4.12	5.18	4.78	5.85	5.47	4.56	4.14
5	4.52	4.61	5.12	5.27	3.96	4.01	4.82	4.73	5.46	5.41	4.24	4.11	5.16	4.76	5.84	5.45	4.55	4.13
6	4.24	4.34	4.87	5.04	3.67	3.70	4.56	4.46	5.23	5.18	3.95	3.81	4.92	4.50	5.63	5.23	4.27	3.83
7	4.51	4.60	5.11	5.26	3.96	4.00	4.81	4.72	5.44	5.39	4.23	4.09	5.15	4.75	5.82	5.43	4.54	4.12
8	4.49	4.58	5.09	5.24	3.94	3.98	4.79	4.70	5.43	5.37	4.21	4.08	5.13	4.73	5.80	5.41	4.52	4.10
9	4.22	4.31	4.85	5.01	3.65	3.68	4.54	4.44	5.20	5.15	3.93	3.78	4.90	4.47	5.60	5.20	4.25	3.81
10	4.71	4.83	5.33	5.52	4.14	4.21	5.04	4.96	5.69	5.66	4.44	4.32	5.40	5.00	6.09	5.71	4.77	4.35
11	4.71	4.84	5.33	5.52	4.14	4.21	5.04	4.96	5.70	5.67	4.43	4.32	5.40	5.00	6.10	5.72	4.77	4.35
12	4.42	4.54	5.07	5.25	3.84	3.89	4.76	4.67	5.44	5.40	4.13	4.00	5.13	4.71	5.85	5.45	4.47	4.03
13	4.38	4.49	5.02	5.20	3.80	3.85	4.71	4.62	5.39	5.35	4.09	3.95	5.08	4.66	5.80	5.40	4.42	3.98
14	4.27	4.38	4.92	5.11	3.68	3.73	4.61	4.52	5.30	5.26	3.97	3.83	4.99	4.55	5.72	5.31	4.32	3.86
15	4.69	4.81	5.31	5.48	4.12	4.18	5.01	4.93	5.66	5.63	4.41	4.29	5.37	4.97	6.06	5.67	4.74	4.32
16	4.68	4.80	5.30	5.48	4.11	4.17	5.00	4.92	5.66	5.63	4.40	4.28	5.36	4.96	6.06	5.67	4.73	4.31
17	4.38	4.49	5.02	5.20	3.79	3.85	4.71	4.62	5.39	5.35	4.09	3.95	5.08	4.66	5.80	5.40	4.42	3.98
18	4.34	4.44	4.97	5.15	3.75	3.80	4.66	4.57	5.34	5.30	4.04	3.91	5.03	4.61	5.75	5.34	4.38	3.93
19	4.23	4.34	4.88	5.06	3.64	3.68	4.56	4.47	5.25	5.21	3.93	3.79	4.94	4.50	5.67	5.26	4.27	3.81
20	4.66	4.78	5.28	5.45	4.10	4.16	4.98	4.90	5.63	5.60	4.39	4.27	5.34	4.94	6.03	5.64	4.71	4.29
21	4.65	4.76	5.26	5.44	4.08	4.14	4.97	4.89	5.62	5.59	4.37	4.25	5.33	4.92	6.02	5.63	4.69	4.27
22	4.34	4.45	4.98	5.15	3.76	3.80	4.67	4.57	5.34	5.30	4.05	3.91	5.04	4.61	5.76	5.35	4.38	3.94
23	4.30	4.40	4.94	5.11	3.72	3.76	4.62	4.53	5.30	5.25	4.01	3.87	4.99	4.57	5.71	5.30	4.34	3.90
24	4.20	4.30	4.84	5.02	3.61	3.65	4.52	4.43	5.21	5.17	3.90	3.75	4.90	4.46	5.63	5.22	4.23	3.78
25	4.72	4.84	5.34	5.52	4.15	4.22	5.04	4.97	5.70	5.67	4.44	4.33	5.41	5.01	6.10	5.71	4.77	4.36
26	4.74	4.87	5.36	5.55	4.16	4.24	5.07	5.00	5.73	5.70	4.46	4.35	5.44	5.03	6.13	5.75	4.80	4.38
27	4.51	4.63	5.15	5.34	3.92	3.98	4.84	4.76	5.52	5.49	4.22	4.10	5.22	4.80	5.94	5.54	4.56	4.12
28	4.47	4.59	5.11	5.30	3.89	3.95	4.81	4.72	5.48	5.45	4.18	4.06	5.18	4.76	5.90	5.50	4.52	4.08
29	4.38	4.50	5.03	5.23	3.78	3.84	4.72	4.64	5.41	5.38	4.09	3.95	5.10	4.68	5.84	5.43	4.43	3.98
30	4.70	4.83	5.33	5.51	4.13	4.20	5.03	4.95	5.68	5.65	4.43	4.31	5.39	4.99	6.09	5.70	4.76	4.34
31	4.71	4.83	5.33	5.51	4.14	4.21	5.04	4.96	5.69	5.66	4.44	4.32	5.40	5.00	6.09	5.71	4.77	4.35
32	4.46	4.58	5.10	5.29	3.88	3.94	4.79	4.71	5.47	5.44	4.17	4.05	5.17	4.75	5.89	5.49	4.51	4.08
33	4.43	4.55	5.07	5.25	3.85	3.91	4.76	4.68	5.44	5.40	4.14	4.01	5.14	4.72	5.85	5.45	4.48	4.04
34	4.33	4.45	4.98	5.17	3.74	3.79	4.67	4.58	5.36	5.33	4.04	3.90	5.05	4.62	5.79	5.38	4.38	3.93
35	4.72	4.84	5.34	5.52	4.15	4.21	5.04	4.97	5.70	5.67	4.44	4.32	5.41	5.00	6.10	5.71	4.77	4.35
36	4.72	4.84	5.34	5.53	4.15	4.22	5.05	4.97	5.71	5.68	4.44	4.33	5.41	5.01	6.11	5.73	4.78	4.36

37	4.44	4.56	5.08	5.27	3.86	3.91	4.77	4.69	5.45	5.42	4.15	4.02	5.15	4.73	5.87	5.47	4.49	4.05
38	4.38	4.49	5.02	5.20	3.80	3.85	4.71	4.62	5.39	5.35	4.09	3.96	5.08	4.66	5.80	5.40	4.43	3.98
39	4.29	4.41	4.94	5.13	3.70	3.75	4.63	4.54	5.32	5.28	4.00	3.86	5.01	4.58	5.74	5.33	4.34	3.88
40	4.64	4.76	5.26	5.44	4.08	4.14	4.96	4.88	5.62	5.58	4.37	4.24	5.32	4.92	6.01	5.63	4.69	4.27
41	4.75	4.88	5.38	5.57	4.18	4.25	5.08	5.01	5.74	5.72	4.48	4.36	5.45	5.05	6.15	5.76	4.81	4.39
42	4.56	4.68	5.19	5.38	3.97	4.04	4.89	4.81	5.57	5.54	4.27	4.15	5.27	4.85	5.98	5.59	4.61	4.18
43	4.54	4.66	5.18	5.37	3.95	4.01	4.87	4.79	5.55	5.52	4.25	4.13	5.25	4.83	5.97	5.57	4.59	4.16
44	4.36	4.48	5.01	5.19	3.77	3.83	4.70	4.61	5.38	5.35	4.07	3.94	5.07	4.65	5.80	5.40	4.41	3.96
45	4.77	4.90	5.40	5.58	4.20	4.28	5.10	5.03	5.76	5.73	4.50	4.39	5.47	5.07	6.16	5.78	4.83	4.42
46	4.74	4.87	5.37	5.56	4.17	4.24	5.07	5.00	5.73	5.71	4.46	4.35	5.44	5.04	6.14	5.76	4.80	4.38
47	4.52	4.64	5.16	5.35	3.93	4.00	4.85	4.77	5.53	5.50	4.23	4.11	5.23	4.81	5.95	5.55	4.57	4.14
48	4.50	4.62	5.14	5.33	3.91	3.97	4.83	4.75	5.51	5.48	4.21	4.08	5.21	4.79	5.93	5.53	4.55	4.11
49	4.31	4.43	4.96	5.14	3.72	3.77	4.65	4.56	5.33	5.30	4.02	3.88	5.03	4.60	5.76	5.35	4.36	3.91
50	4.74	4.86	5.36	5.54	4.17	4.24	5.06	4.99	5.72	5.69	4.46	4.34	5.43	5.02	6.12	5.73	4.79	4.37
51	4.73	4.85	5.35	5.54	4.15	4.23	5.06	4.98	5.71	5.69	4.45	4.34	5.42	5.02	6.12	5.74	4.79	4.37
52	4.49	4.61	5.13	5.31	3.90	3.96	4.82	4.74	5.50	5.47	4.20	4.07	5.19	4.78	5.91	5.51	4.54	4.10
53	4.46	4.58	5.10	5.28	3.87	3.93	4.79	4.71	5.47	5.44	4.17	4.04	5.17	4.75	5.89	5.49	4.51	4.07
54	4.36	4.49	5.02	5.21	3.77	3.83	4.70	4.62	5.39	5.37	4.07	3.94	5.09	4.66	5.82	5.42	4.41	3.97
55	4.35	4.45	4.98	5.14	3.77	3.81	4.67	4.57	5.33	5.29	4.06	3.92	5.03	4.61	5.74	5.33	4.38	3.94
56	4.44	4.56	5.08	5.26	3.86	3.92	4.77	4.69	5.45	5.42	4.16	4.03	5.15	4.73	5.86	5.46	4.49	4.05
57	4.27	4.37	4.91	5.08	3.68	3.72	4.59	4.50	5.28	5.23	3.97	3.83	4.97	4.54	5.69	5.28	4.30	3.86
58	4.30	4.41	4.94	5.12	3.71	3.76	4.63	4.54	5.31	5.27	4.00	3.87	5.00	4.58	5.73	5.32	4.34	3.89
59	4.24	4.36	4.90	5.08	3.65	3.70	4.58	4.49	5.27	5.23	3.95	3.80	4.96	4.52	5.70	5.28	4.29	3.83
60	4.41	4.53	5.05	5.23	3.83	3.88	4.74	4.65	5.41	5.38	4.12	3.99	5.11	4.69	5.82	5.42	4.46	4.02
61	4.43	4.55	5.07	5.25	3.85	3.91	4.76	4.68	5.43	5.40	4.15	4.01	5.13	4.71	5.84	5.45	4.48	4.04
62	4.34	4.46	4.99	5.18	3.75	3.81	4.68	4.59	5.37	5.34	4.05	3.92	5.06	4.63	5.79	5.38	4.39	3.94
63	4.26	4.37	4.90	5.08	3.68	3.72	4.59	4.50	5.27	5.23	3.97	3.83	4.96	4.53	5.69	5.28	4.30	3.85
64	4.22	4.32	4.87	5.05	3.62	3.67	4.55	4.45	5.24	5.20	3.92	3.77	4.93	4.49	5.66	5.25	4.26	3.80
65	4.43	4.54	5.06	5.24	3.84	3.90	4.75	4.67	5.42	5.39	4.14	4.00	5.12	4.70	5.83	5.43	4.47	4.03
66	4.53	4.66	5.17	5.36	3.95	4.01	4.87	4.79	5.54	5.51	4.25	4.12	5.24	4.83	5.96	5.56	4.59	4.15
67	4.33	4.44	4.98	5.16	3.74	3.79	4.66	4.58	5.35	5.32	4.04	3.90	5.04	4.61	5.77	5.36	4.38	3.93
68	4.24	4.34	4.88	5.06	3.65	3.70	4.57	4.47	5.25	5.21	3.94	3.80	4.94	4.51	5.66	5.25	4.28	3.83
69	4.18	4.29	4.83	5.01	3.59	3.63	4.51	4.41	5.20	5.16	3.88	3.74	4.89	4.45	5.62	5.21	4.22	3.76
70	4.62	4.76	5.27	5.47	4.03	4.10	4.96	4.89	5.65	5.63	4.34	4.22	5.35	4.94	6.08	5.68	4.69	4.25
71	4.30	4.41	4.94	5.12	3.71	3.76	4.63	4.54	5.31	5.27	4.00	3.86	5.00	4.57	5.73	5.32	4.34	3.89
72	4.50	4.63	5.16	5.36	3.90	3.97	4.85	4.77	5.54	5.52	4.21	4.09	5.24	4.81	5.97	5.57	4.56	4.12
73	4.44	4.55	5.08	5.26	3.85	3.91	4.77	4.68	5.45	5.41	4.15	4.02	5.14	4.72	5.86	5.46	4.49	4.05
74	4.29	4.39	4.93	5.10	3.70	3.74	4.61	4.52	5.30	5.26	3.99	3.85	4.99	4.56	5.71	5.31	4.33	3.88
75	4.31	4.42	4.95	5.13	3.72	3.77	4.64	4.55	5.32	5.29	4.01	3.88	5.02	4.59	5.74	5.34	4.35	3.90

76	4.39	4.52	5.05	5.25	3.78	3.85	4.73	4.65	5.43	5.41	4.09	3.96	5.12	4.69	5.87	5.46	4.44	3.99
77	4.45	4.56	5.08	5.27	3.87	3.92	4.78	4.69	5.45	5.42	4.16	4.03	5.15	4.73	5.86	5.46	4.49	4.06
78	4.26	4.37	4.90	5.08	3.67	3.72	4.59	4.49	5.27	5.23	3.96	3.82	4.96	4.53	5.68	5.28	4.30	3.85
79	4.29	4.40	4.93	5.11	3.70	3.75	4.62	4.53	5.30	5.26	3.99	3.85	4.99	4.56	5.72	5.31	4.33	3.88
80	4.37	4.49	5.03	5.23	3.77	3.83	4.71	4.63	5.41	5.39	4.07	3.94	5.10	4.67	5.85	5.44	4.42	3.97
MIN	**4.18**	**4.29**	**4.83**	**5.01**	**3.59**	**3.63**	**4.51**	**4.41**	**5.20**	**5.15**	**3.88**	**3.74**	**4.89**	**4.45**	**5.60**	**5.20**	**4.22**	**3.76**
MAX	**4.77**	**4.90**	**5.40**	**5.58**	**4.20**	**4.28**	**5.10**	**5.03**	**5.76**	**5.73**	**4.50**	**4.39**	**5.47**	**5.07**	**6.16**	**5.78**	**4.83**	**4.42**
AVE	**4.46**	**4.57**	**5.09**	**5.27**	**3.88**	**3.93**	**4.78**	**4.70**	**5.46**	**5.42**	**4.17**	**4.04**	**5.16**	**4.74**	**5.87**	**5.47**	**4.50**	**4.07**

Table C- 29. Reliability Indices for A709-50 Composite Box Girdes for ADTT 2'500 and L=60, 90ft.

	L=60 ft						L=90 ft					
Φ	**1.00**		**0.95**		**1.05**		**1.00**		**0.95**		**1.05**	
# / D/(D+L)	**0.45**	**0.50**	**0.45**	**0.50**	**0.45**	**0.50**	**0.50**	**0.65**	**0.50**	**0.65**	**0.50**	**0.65**
1	4.30	4.38	4.86	4.96	3.79	3.85	4.38	4.57	4.96	5.22	3.85	3.98
2	4.29	4.37	4.85	4.95	3.78	3.84	4.37	4.56	4.95	5.21	3.84	3.97
3	4.01	4.09	4.59	4.69	3.48	3.54	4.09	4.28	4.69	4.95	3.54	3.66
4	4.27	4.35	4.83	4.93	3.76	3.82	4.35	4.54	4.93	5.18	3.82	3.95
5	4.26	4.34	4.81	4.91	3.75	3.81	4.34	4.52	4.91	5.16	3.81	3.94
6	3.98	4.06	4.56	4.66	3.46	3.51	4.06	4.25	4.66	4.92	3.51	3.63
7	4.25	4.33	4.80	4.90	3.74	3.80	4.33	4.51	4.90	5.15	3.80	3.93
8	4.24	4.32	4.79	4.89	3.73	3.79	4.32	4.49	4.89	5.13	3.79	3.91
9	3.96	4.04	4.54	4.64	3.44	3.50	4.04	4.22	4.64	4.89	3.50	3.61
10	4.43	4.52	5.01	5.12	3.91	3.98	4.52	4.73	5.12	5.39	3.98	4.13
11	4.43	4.52	5.00	5.12	3.90	3.97	4.52	4.73	5.12	5.40	3.97	4.13
12	4.14	4.23	4.73	4.84	3.61	3.67	4.23	4.44	4.84	5.12	3.67	3.82
13	4.10	4.19	4.69	4.80	3.57	3.63	4.19	4.39	4.80	5.07	3.63	3.77
14	3.99	4.08	4.59	4.70	3.45	3.52	4.08	4.28	4.70	4.98	3.52	3.65
15	4.41	4.50	4.98	5.09	3.88	3.95	4.50	4.71	5.09	5.36	3.95	4.11
16	4.40	4.49	4.97	5.08	3.87	3.94	4.49	4.70	5.08	5.36	3.94	4.09
17	4.10	4.19	4.69	4.80	3.57	3.63	4.19	4.39	4.80	5.07	3.63	3.77
18	4.06	4.15	4.65	4.75	3.53	3.59	4.15	4.35	4.75	5.02	3.59	3.73
19	3.95	4.04	4.55	4.65	3.42	3.48	4.04	4.24	4.65	4.93	3.48	3.61
20	4.39	4.47	4.96	5.06	3.86	3.93	4.47	4.68	5.06	5.33	3.93	4.08
21	4.37	4.46	4.94	5.05	3.85	3.92	4.46	4.66	5.05	5.32	3.92	4.06
22	4.07	4.15	4.65	4.76	3.53	3.60	4.15	4.35	4.76	5.03	3.60	3.73
23	4.03	4.12	4.61	4.72	3.50	3.56	4.12	4.31	4.72	4.98	3.56	3.69
24	3.93	4.01	4.52	4.62	3.39	3.45	4.01	4.20	4.62	4.89	3.45	3.57
25	4.44	4.53	5.01	5.12	3.91	3.98	4.53	4.74	5.12	5.40	3.98	4.14
26	4.45	4.54	5.03	5.14	3.92	3.99	4.54	4.76	5.14	5.43	3.99	4.15
27	4.22	4.31	4.81	4.92	3.69	3.75	4.31	4.53	4.92	5.21	3.75	3.90
28	4.19	4.28	4.78	4.89	3.65	3.72	4.28	4.49	4.89	5.17	3.72	3.87
29	4.09	4.18	4.69	4.80	3.55	3.62	4.18	4.40	4.80	5.09	3.62	3.76
30	4.42	4.51	5.00	5.11	3.90	3.97	4.51	4.73	5.11	5.38	3.97	4.12
31	4.43	4.52	5.01	5.12	3.91	3.98	4.52	4.73	5.12	5.39	3.98	4.13
32	4.18	4.27	4.77	4.88	3.65	3.71	4.27	4.48	4.88	5.16	3.71	3.86
33	4.16	4.24	4.74	4.85	3.62	3.69	4.24	4.45	4.85	5.13	3.69	3.83
34	4.05	4.14	4.64	4.76	3.51	3.57	4.14	4.35	4.76	5.04	3.57	3.71
35	4.43	4.52	5.01	5.12	3.91	3.98	4.52	4.74	5.12	5.40	3.98	4.13
36	4.43	4.53	5.01	5.12	3.91	3.98	4.53	4.74	5.12	5.40	3.98	4.13

37	4.16	4.25	4.75	4.86	3.62	3.69	4.25	4.46	4.86	5.14	3.69	3.83
38	4.11	4.19	4.69	4.80	3.57	3.64	4.19	4.39	4.80	5.07	3.64	3.77
39	4.01	4.10	4.61	4.72	3.47	3.54	4.10	4.30	4.72	5.00	3.54	3.67
40	4.37	4.46	4.94	5.05	3.85	3.91	4.46	4.66	5.05	5.32	3.91	4.06
41	4.47	4.56	5.05	5.16	3.94	4.01	4.56	4.78	5.16	5.44	4.01	4.17
42	4.27	4.36	4.86	4.97	3.73	3.80	4.36	4.58	4.97	5.26	3.80	3.96
43	4.25	4.34	4.84	4.95	3.71	3.78	4.34	4.56	4.95	5.24	3.78	3.93
44	4.08	4.17	4.67	4.78	3.55	3.61	4.17	4.38	4.78	5.06	3.61	3.75
45	4.49	4.58	5.06	5.18	3.96	4.04	4.58	4.80	5.18	5.46	4.04	4.20
46	4.45	4.55	5.03	5.15	3.93	4.00	4.55	4.77	5.15	5.43	4.00	4.16
47	4.24	4.33	4.82	4.94	3.70	3.77	4.33	4.54	4.94	5.22	3.77	3.92
48	4.21	4.30	4.80	4.91	3.67	3.74	4.30	4.52	4.91	5.20	3.74	3.89
49	4.04	4.12	4.63	4.74	3.50	3.56	4.12	4.33	4.74	5.02	3.56	3.70
50	4.45	4.54	5.03	5.14	3.93	4.00	4.54	4.76	5.14	5.42	4.00	4.15
51	4.44	4.53	5.02	5.13	3.91	3.99	4.53	4.75	5.13	5.41	3.99	4.14
52	4.20	4.29	4.79	4.90	3.67	3.74	4.29	4.50	4.90	5.19	3.74	3.88
53	4.18	4.27	4.76	4.88	3.64	3.71	4.27	4.48	4.88	5.16	3.71	3.85
54	4.08	4.17	4.68	4.79	3.54	3.60	4.17	4.38	4.79	5.08	3.60	3.75
55	4.08	4.16	4.66	4.76	3.55	3.61	4.16	4.35	4.76	5.02	3.61	3.74
56	4.17	4.25	4.75	4.86	3.63	3.70	4.25	4.46	4.86	5.14	3.70	3.84
57	3.99	4.08	4.58	4.69	3.46	3.52	4.08	4.27	4.69	4.96	3.52	3.65
58	4.02	4.11	4.61	4.72	3.49	3.55	4.11	4.31	4.72	5.00	3.55	3.68
59	3.97	4.05	4.56	4.67	3.42	3.49	4.05	4.25	4.67	4.95	3.49	3.62
60	4.14	4.22	4.72	4.83	3.60	3.67	4.22	4.43	4.83	5.10	3.67	3.81
61	4.16	4.24	4.74	4.85	3.62	3.69	4.24	4.45	4.85	5.12	3.69	3.83
62	4.06	4.15	4.66	4.77	3.52	3.59	4.15	4.36	4.77	5.05	3.59	3.73
63	3.99	4.07	4.58	4.69	3.45	3.52	4.07	4.27	4.69	4.96	3.52	3.65
64	3.94	4.03	4.54	4.64	3.40	3.46	4.03	4.22	4.64	4.92	3.46	3.59
65	4.15	4.24	4.73	4.84	3.62	3.68	4.24	4.44	4.84	5.11	3.68	3.82
66	4.25	4.34	4.84	4.95	3.72	3.78	4.34	4.55	4.95	5.23	3.78	3.93
67	4.05	4.14	4.64	4.75	3.51	3.58	4.14	4.34	4.75	5.03	3.58	3.71
68	3.97	4.05	4.56	4.66	3.43	3.50	4.05	4.25	4.66	4.93	3.50	3.62
69	3.91	3.99	4.50	4.61	3.37	3.43	3.99	4.19	4.61	4.88	3.43	3.56
70	4.33	4.42	4.92	5.04	3.78	3.86	4.42	4.65	5.04	5.34	3.86	4.02
71	4.02	4.11	4.61	4.72	3.48	3.55	4.11	4.31	4.72	4.99	3.55	3.68
72	4.21	4.30	4.81	4.92	3.66	3.73	4.30	4.53	4.92	5.22	3.73	3.89
73	4.16	4.25	4.74	4.85	3.62	3.69	4.25	4.45	4.85	5.13	3.69	3.83
74	4.01	4.10	4.60	4.71	3.48	3.54	4.10	4.30	4.71	4.98	3.54	3.67
75	4.03	4.12	4.62	4.73	3.49	3.56	4.12	4.32	4.73	5.01	3.56	3.69

76	4.10	4.19	4.70	4.81	3.55	3.61	4.19	4.41	4.81	5.11	3.61	3.76
77	4.17	4.26	4.75	4.86	3.63	3.70	4.26	4.46	4.86	5.14	3.70	3.84
78	3.99	4.07	4.58	4.68	3.45	3.51	4.07	4.27	4.68	4.95	3.51	3.64
79	4.02	4.10	4.60	4.71	3.48	3.54	4.10	4.30	4.71	4.99	3.54	3.67
80	4.08	4.17	4.68	4.80	3.53	3.60	4.17	4.39	4.80	5.09	3.60	3.75
MIN	**3.91**	**3.99**	**4.50**	**4.61**	**3.37**	**3.43**	**3.99**	**4.19**	**4.61**	**4.88**	**3.43**	**3.56**
MAX	**4.49**	**4.58**	**5.06**	**5.18**	**3.96**	**4.04**	**4.58**	**4.80**	**5.18**	**5.46**	**4.04**	**4.20**
AVE	**4.18**	**4.27**	**4.76**	**4.87**	**3.65**	**3.71**	**4.27**	**4.47**	**4.87**	**5.15**	**3.71**	**3.85**

Table C- 30. Reliability Indices for A709-50 Composite Box Girdes for ADTT 2'500 and L=120, 200, 300ft.

	L=120 ft						L=200 ft						L=300 ft					
Φ	**1.00**		**0.95**		**1.05**		**1.00**		**0.95**		**1.05**		**1.00**		**0.95**		**1.05**	
# / D/(D+L)	**0.55**	**0.70**	**0.55**	**0.70**	**0.55**	**0.70**	**0.60**	**0.75**	**0.60**	**0.75**	**0.60**	**0.75**	**0.65**	**0.80**	**0.65**	**0.80**	**0.65**	**0.80**
1	4.41	4.55	5.01	5.21	3.86	3.94	4.82	4.75	5.46	5.44	4.24	4.13	5.22	4.82	5.90	5.51	4.60	4.18
2	4.40	4.54	5.00	5.20	3.85	3.93	4.81	4.74	5.45	5.43	4.23	4.12	5.21	4.81	5.89	5.51	4.59	4.17
3	4.11	4.25	4.74	4.94	3.55	3.62	4.54	4.46	5.21	5.18	3.93	3.81	4.96	4.53	5.67	5.27	4.31	3.86
4	4.38	4.51	4.97	5.16	3.83	3.91	4.78	4.71	5.42	5.39	4.20	4.09	5.18	4.78	5.85	5.47	4.56	4.14
5	4.36	4.49	4.96	5.15	3.82	3.90	4.77	4.69	5.40	5.37	4.19	4.07	5.16	4.76	5.84	5.45	4.55	4.13
6	4.08	4.22	4.71	4.91	3.52	3.59	4.51	4.43	5.17	5.14	3.90	3.77	4.92	4.50	5.63	5.23	4.27	3.83
7	4.35	4.48	4.95	5.14	3.81	3.89	4.76	4.68	5.39	5.36	4.18	4.06	5.15	4.75	5.82	5.43	4.54	4.12
8	4.34	4.47	4.93	5.12	3.80	3.87	4.74	4.66	5.37	5.34	4.17	4.05	5.13	4.73	5.80	5.41	4.52	4.10
9	4.06	4.19	4.68	4.88	3.50	3.57	4.48	4.40	5.15	5.11	3.88	3.75	4.90	4.47	5.60	5.20	4.25	3.81
10	4.55	4.71	5.17	5.39	3.99	4.10	4.99	4.93	5.64	5.63	4.39	4.29	5.40	5.00	6.09	5.71	4.77	4.35
11	4.55	4.71	5.17	5.39	3.99	4.09	4.99	4.93	5.64	5.63	4.38	4.28	5.40	5.00	6.10	5.72	4.77	4.35
12	4.26	4.42	4.89	5.12	3.68	3.78	4.70	4.64	5.38	5.37	4.08	3.97	5.13	4.71	5.85	5.45	4.47	4.03
13	4.22	4.37	4.85	5.07	3.64	3.73	4.66	4.59	5.33	5.31	4.04	3.92	5.08	4.66	5.80	5.40	4.42	3.98
14	4.11	4.26	4.75	4.97	3.52	3.61	4.55	4.48	5.24	5.22	3.92	3.80	4.99	4.55	5.72	5.31	4.32	3.86
15	4.53	4.69	5.14	5.36	3.97	4.07	4.96	4.90	5.61	5.59	4.36	4.26	5.37	4.97	6.06	5.67	4.74	4.32
16	4.52	4.68	5.13	5.35	3.96	4.06	4.95	4.89	5.60	5.59	4.35	4.25	5.36	4.96	6.06	5.67	4.73	4.31
17	4.22	4.37	4.85	5.07	3.64	3.73	4.65	4.59	5.33	5.31	4.04	3.92	5.08	4.66	5.80	5.40	4.42	3.98
18	4.17	4.32	4.80	5.02	3.60	3.68	4.61	4.53	5.28	5.26	3.99	3.87	5.03	4.61	5.75	5.34	4.38	3.93
19	4.06	4.21	4.70	4.92	3.48	3.56	4.50	4.43	5.19	5.17	3.88	3.75	4.94	4.50	5.67	5.26	4.27	3.81
20	4.51	4.66	5.11	5.33	3.95	4.04	4.93	4.87	5.58	5.56	4.34	4.23	5.34	4.94	6.03	5.64	4.71	4.29
21	4.49	4.64	5.10	5.31	3.93	4.03	4.91	4.85	5.57	5.55	4.32	4.21	5.33	4.92	6.02	5.63	4.69	4.27
22	4.18	4.32	4.81	5.02	3.60	3.69	4.61	4.54	5.29	5.27	4.00	3.88	5.04	4.61	5.76	5.35	4.38	3.94
23	4.14	4.28	4.77	4.98	3.57	3.65	4.57	4.49	5.24	5.22	3.96	3.84	4.99	4.57	5.71	5.30	4.34	3.90
24	4.03	4.17	4.67	4.88	3.45	3.53	4.47	4.39	5.16	5.13	3.85	3.72	4.90	4.46	5.63	5.22	4.23	3.78
25	4.56	4.72	5.17	5.39	4.00	4.10	4.99	4.93	5.64	5.63	4.39	4.29	5.41	5.01	6.10	5.71	4.77	4.36
26	4.58	4.74	5.20	5.42	4.01	4.12	5.01	4.96	5.67	5.67	4.41	4.31	5.44	5.03	6.13	5.75	4.80	4.38
27	4.35	4.51	4.98	5.21	3.77	3.87	4.79	4.73	5.46	5.45	4.17	4.06	5.22	4.80	5.94	5.54	4.56	4.12
28	4.31	4.47	4.94	5.17	3.73	3.83	4.75	4.69	5.43	5.42	4.13	4.02	5.18	4.76	5.90	5.50	4.52	4.08
29	4.21	4.37	4.86	5.09	3.63	3.72	4.66	4.60	5.35	5.34	4.03	3.92	5.10	4.68	5.84	5.43	4.43	3.98
30	4.55	4.70	5.16	5.38	3.98	4.09	4.98	4.92	5.63	5.62	4.38	4.28	5.39	4.99	6.09	5.70	4.76	4.34
31	4.56	4.71	5.17	5.39	3.99	4.10	4.98	4.93	5.64	5.62	4.39	4.29	5.40	5.00	6.09	5.71	4.77	4.35
32	4.30	4.46	4.93	5.16	3.72	3.82	4.74	4.68	5.41	5.40	4.12	4.01	5.17	4.75	5.89	5.49	4.51	4.08
33	4.27	4.42	4.90	5.12	3.70	3.79	4.71	4.64	5.38	5.37	4.09	3.98	5.14	4.72	5.85	5.45	4.48	4.04
34	4.17	4.32	4.81	5.04	3.58	3.67	4.61	4.55	5.30	5.29	3.98	3.87	5.05	4.62	5.79	5.38	4.38	3.93
35	4.56	4.72	5.17	5.39	3.99	4.10	4.99	4.93	5.64	5.63	4.39	4.29	5.41	5.00	6.10	5.71	4.77	4.35
36	4.56	4.72	5.18	5.40	3.99	4.10	4.99	4.94	5.65	5.64	4.39	4.29	5.41	5.01	6.11	5.73	4.78	4.36

37	4.28	4.43	4.91	5.13	3.70	3.79	4.72	4.65	5.39	5.38	4.10	3.99	5.15	4.73	5.87	5.47	4.49	4.05
38	4.22	4.37	4.85	5.07	3.65	3.73	4.66	4.59	5.33	5.31	4.04	3.92	5.08	4.66	5.80	5.40	4.43	3.98
39	4.13	4.28	4.77	4.99	3.54	3.63	4.57	4.50	5.26	5.24	3.94	3.82	5.01	4.58	5.74	5.33	4.34	3.88
40	4.49	4.64	5.10	5.31	3.93	4.02	4.91	4.85	5.56	5.55	4.32	4.21	5.32	4.92	6.01	5.63	4.69	4.27
41	4.59	4.76	5.21	5.44	4.03	4.14	5.03	4.98	5.69	5.68	4.43	4.33	5.45	5.05	6.15	5.76	4.81	4.39
42	4.39	4.56	5.02	5.25	3.82	3.92	4.84	4.78	5.51	5.50	4.22	4.11	5.27	4.85	5.98	5.59	4.61	4.18
43	4.37	4.54	5.01	5.24	3.79	3.89	4.82	4.76	5.49	5.49	4.20	4.09	5.25	4.83	5.97	5.57	4.59	4.16
44	4.20	4.35	4.84	5.06	3.62	3.71	4.64	4.57	5.32	5.31	4.02	3.90	5.07	4.65	5.80	5.40	4.41	3.96
45	4.62	4.78	5.23	5.46	4.05	4.16	5.05	5.00	5.70	5.70	4.45	4.35	5.47	5.07	6.16	5.78	4.83	4.42
46	4.58	4.75	5.20	5.43	4.01	4.12	5.02	4.96	5.68	5.67	4.41	4.32	5.44	5.04	6.14	5.76	4.80	4.38
47	4.36	4.52	4.99	5.22	3.78	3.88	4.80	4.74	5.47	5.47	4.18	4.07	5.23	4.81	5.95	5.55	4.57	4.14
48	4.33	4.49	4.97	5.20	3.76	3.85	4.78	4.72	5.45	5.44	4.16	4.05	5.21	4.79	5.93	5.53	4.55	4.11
49	4.15	4.30	4.79	5.01	3.57	3.65	4.59	4.52	5.28	5.26	3.97	3.85	5.03	4.60	5.76	5.35	4.36	3.91
50	4.58	4.74	5.19	5.41	4.01	4.12	5.01	4.95	5.66	5.65	4.41	4.31	5.43	5.02	6.12	5.73	4.79	4.37
51	4.57	4.73	5.19	5.41	4.00	4.11	5.00	4.95	5.66	5.65	4.40	4.30	5.42	5.02	6.12	5.74	4.79	4.37
52	4.32	4.48	4.95	5.18	3.75	3.84	4.76	4.70	5.44	5.43	4.15	4.04	5.19	4.78	5.91	5.51	4.54	4.10
53	4.30	4.45	4.93	5.15	3.72	3.81	4.74	4.67	5.41	5.40	4.12	4.01	5.17	4.75	5.89	5.49	4.51	4.07
54	4.20	4.36	4.84	5.07	3.61	3.71	4.65	4.58	5.34	5.33	4.02	3.90	5.09	4.66	5.82	5.42	4.41	3.97
55	4.19	4.33	4.81	5.02	3.62	3.70	4.61	4.54	5.28	5.25	4.01	3.89	5.03	4.61	5.74	5.33	4.38	3.94
56	4.28	4.44	4.91	5.13	3.71	3.80	4.72	4.65	5.39	5.38	4.11	3.99	5.15	4.73	5.86	5.46	4.49	4.05
57	4.10	4.25	4.74	4.95	3.53	3.60	4.54	4.46	5.22	5.20	3.92	3.79	4.97	4.54	5.69	5.28	4.30	3.86
58	4.14	4.28	4.77	4.99	3.56	3.64	4.57	4.50	5.26	5.24	3.95	3.83	5.00	4.58	5.73	5.32	4.34	3.89
59	4.08	4.23	4.72	4.94	3.49	3.57	4.52	4.45	5.21	5.20	3.89	3.77	4.96	4.52	5.70	5.28	4.29	3.83
60	4.25	4.40	4.88	5.10	3.68	3.77	4.69	4.62	5.36	5.34	4.07	3.96	5.11	4.69	5.82	5.42	4.46	4.02
61	4.27	4.42	4.90	5.12	3.70	3.79	4.71	4.64	5.38	5.36	4.10	3.98	5.13	4.71	5.84	5.45	4.48	4.04
62	4.18	4.33	4.82	5.05	3.60	3.69	4.62	4.56	5.31	5.30	4.00	3.88	5.06	4.63	5.79	5.38	4.39	3.94
63	4.10	4.24	4.73	4.95	3.52	3.60	4.54	4.46	5.21	5.19	3.92	3.79	4.96	4.53	5.69	5.28	4.30	3.85
64	4.05	4.20	4.69	4.91	3.47	3.55	4.49	4.42	5.18	5.16	3.87	3.74	4.93	4.49	5.66	5.25	4.26	3.80
65	4.26	4.41	4.89	5.11	3.69	3.78	4.70	4.63	5.37	5.35	4.09	3.97	5.12	4.70	5.83	5.43	4.47	4.03
66	4.37	4.53	5.00	5.23	3.80	3.90	4.81	4.75	5.49	5.48	4.20	4.09	5.24	4.83	5.96	5.56	4.59	4.15
67	4.17	4.32	4.80	5.03	3.58	3.67	4.61	4.54	5.29	5.28	3.98	3.87	5.04	4.61	5.77	5.36	4.38	3.93
68	4.08	4.22	4.71	4.92	3.50	3.58	4.51	4.44	5.19	5.17	3.89	3.77	4.94	4.51	5.66	5.25	4.28	3.83
69	4.02	4.16	4.66	4.87	3.44	3.51	4.46	4.38	5.14	5.12	3.83	3.70	4.89	4.45	5.62	5.21	4.22	3.76
70	4.46	4.63	5.10	5.34	3.87	3.98	4.91	4.86	5.59	5.59	4.28	4.19	5.35	4.94	6.08	5.68	4.69	4.25
71	4.13	4.28	4.77	4.99	3.55	3.64	4.57	4.50	5.25	5.24	3.95	3.83	5.00	4.57	5.73	5.32	4.34	3.89
72	4.33	4.51	4.98	5.22	3.74	3.85	4.79	4.74	5.48	5.48	4.16	4.05	5.24	4.81	5.97	5.57	4.56	4.12
73	4.28	4.43	4.91	5.13	3.70	3.79	4.71	4.65	5.39	5.37	4.10	3.98	5.14	4.72	5.86	5.46	4.49	4.05
74	4.12	4.27	4.76	4.97	3.55	3.63	4.56	4.49	5.24	5.22	3.94	3.82	4.99	4.56	5.71	5.31	4.33	3.88
75	4.14	4.29	4.78	5.00	3.56	3.65	4.58	4.51	5.27	5.25	3.96	3.84	5.02	4.59	5.74	5.34	4.35	3.90

76	4.22	4.39	4.87	5.11	3.63	3.72	4.68	4.62	5.37	5.37	4.04	3.93	5.12	4.69	5.87	5.46	4.44	3.99
77	4.29	4.44	4.91	5.13	3.71	3.80	4.72	4.66	5.39	5.38	4.11	4.00	5.15	4.73	5.86	5.46	4.49	4.06
78	4.10	4.24	4.73	4.94	3.52	3.60	4.53	4.46	5.21	5.19	3.91	3.79	4.96	4.53	5.68	5.28	4.30	3.85
79	4.13	4.27	4.76	4.98	3.55	3.63	4.56	4.49	5.24	5.22	3.94	3.82	4.99	4.56	5.72	5.31	4.33	3.88
80	4.20	4.36	4.85	5.09	3.61	3.71	4.66	4.59	5.35	5.35	4.02	3.91	5.10	4.67	5.85	5.44	4.42	3.97
MIN	**4.02**	**4.16**	**4.66**	**4.87**	**3.44**	**3.51**	**4.46**	**4.38**	**5.14**	**5.11**	**3.83**	**3.70**	**4.89**	**4.45**	**5.60**	**5.20**	**4.22**	**3.76**
MAX	**4.62**	**4.78**	**5.23**	**5.46**	**4.05**	**4.16**	**5.05**	**5.00**	**5.70**	**5.70**	**4.45**	**4.35**	**5.47**	**5.07**	**6.16**	**5.78**	**4.83**	**4.42**
AVE	**4.30**	**4.45**	**4.92**	**5.14**	**3.72**	**3.81**	**4.73**	**4.66**	**5.40**	**5.38**	**4.12**	**4.00**	**5.16**	**4.74**	**5.87**	**5.47**	**4.50**	**4.07**

Table C- 31. Reliability Indices for A709-50 Composite Box Girdes for ADTT 5’000 and L=60, 90ft.

	L=60 ft						L=90 ft					
Φ	1.00		0.95		1.05		1.00		0.95		1.05	
# / D/(D+L)	0.45	0.50	0.45	0.50	0.45	0.50	0.50	0.65	0.50	0.65	0.50	0.65
1	4.19	4.28	4.75	4.85	3.68	3.75	4.28	4.49	4.85	5.13	3.75	3.90
2	4.18	4.27	4.74	4.84	3.68	3.74	4.27	4.48	4.84	5.12	3.74	3.89
3	3.90	3.98	4.47	4.58	3.37	3.44	3.98	4.19	4.58	4.86	3.44	3.58
4	4.16	4.25	4.71	4.82	3.66	3.72	4.25	4.45	4.82	5.08	3.72	3.87
5	4.15	4.23	4.70	4.80	3.65	3.71	4.23	4.43	4.80	5.07	3.71	3.86
6	3.87	3.95	4.44	4.55	3.35	3.41	3.95	4.16	4.55	4.82	3.41	3.55
7	4.14	4.22	4.69	4.79	3.64	3.70	4.22	4.42	4.79	5.06	3.70	3.85
8	4.13	4.21	4.68	4.78	3.63	3.69	4.21	4.41	4.78	5.04	3.69	3.83
9	3.85	3.93	4.42	4.53	3.33	3.39	3.93	4.13	4.53	4.80	3.39	3.53
10	4.32	4.41	4.89	5.00	3.80	3.87	4.41	4.64	5.00	5.30	3.87	4.04
11	4.32	4.41	4.89	5.00	3.79	3.87	4.41	4.64	5.00	5.30	3.87	4.04
12	4.03	4.12	4.61	4.73	3.50	3.57	4.12	4.35	4.73	5.03	3.57	3.73
13	3.99	4.08	4.57	4.68	3.46	3.53	4.08	4.30	4.68	4.98	3.53	3.68
14	3.88	3.97	4.47	4.58	3.34	3.41	3.97	4.19	4.58	4.88	3.41	3.56
15	4.30	4.39	4.86	4.98	3.78	3.85	4.39	4.62	4.98	5.27	3.85	4.02
16	4.29	4.38	4.85	4.97	3.77	3.84	4.38	4.61	4.97	5.26	3.84	4.01
17	3.99	4.08	4.57	4.68	3.46	3.53	4.08	4.30	4.68	4.98	3.53	3.68
18	3.95	4.04	4.53	4.64	3.42	3.49	4.04	4.25	4.64	4.93	3.49	3.64
19	3.84	3.93	4.43	4.54	3.31	3.37	3.93	4.14	4.54	4.83	3.37	3.52
20	4.28	4.37	4.84	4.95	3.76	3.83	4.37	4.59	4.95	5.24	3.83	4.00
21	4.26	4.35	4.82	4.94	3.74	3.81	4.35	4.57	4.94	5.23	3.81	3.98
22	3.95	4.04	4.53	4.64	3.43	3.49	4.04	4.26	4.64	4.93	3.49	3.64
23	3.92	4.01	4.50	4.60	3.40	3.46	4.01	4.22	4.60	4.89	3.46	3.61
24	3.81	3.90	4.40	4.51	3.28	3.34	3.90	4.11	4.51	4.79	3.34	3.49
25	4.33	4.42	4.89	5.01	3.81	3.88	4.42	4.65	5.01	5.30	3.88	4.05
26	4.34	4.43	4.91	5.03	3.81	3.89	4.43	4.67	5.03	5.33	3.89	4.07
27	4.11	4.20	4.69	4.81	3.58	3.65	4.20	4.43	4.81	5.11	3.65	3.82
28	4.07	4.17	4.66	4.77	3.54	3.61	4.17	4.40	4.77	5.08	3.61	3.78
29	3.98	4.07	4.57	4.69	3.44	3.51	4.07	4.30	4.69	4.99	3.51	3.67
30	4.31	4.40	4.88	4.99	3.79	3.86	4.40	4.64	4.99	5.29	3.86	4.03
31	4.32	4.41	4.89	5.00	3.80	3.87	4.41	4.65	5.00	5.30	3.87	4.05
32	4.07	4.16	4.65	4.76	3.54	3.61	4.16	4.39	4.76	5.06	3.61	3.77
33	4.04	4.13	4.62	4.73	3.51	3.58	4.13	4.36	4.73	5.03	3.58	3.74
34	3.93	4.02	4.52	4.64	3.40	3.47	4.02	4.25	4.64	4.94	3.47	3.62
35	4.32	4.42	4.89	5.00	3.80	3.87	4.42	4.65	5.00	5.30	3.87	4.05
36	4.32	4.42	4.89	5.01	3.80	3.87	4.42	4.65	5.01	5.31	3.87	4.05

37	4.05	4.14	4.63	4.74	3.52	3.59	4.14	4.36	4.74	5.04	3.59	3.75
38	3.99	4.08	4.57	4.68	3.46	3.53	4.08	4.30	4.68	4.98	3.53	3.69
39	3.90	3.99	4.49	4.60	3.36	3.43	3.99	4.21	4.60	4.90	3.43	3.58
40	4.26	4.35	4.82	4.93	3.74	3.81	4.35	4.57	4.93	5.22	3.81	3.98
41	4.36	4.45	4.93	5.04	3.83	3.91	4.45	4.69	5.04	5.35	3.91	4.09
42	4.16	4.25	4.74	4.85	3.62	3.70	4.25	4.48	4.85	5.16	3.70	3.87
43	4.13	4.23	4.72	4.83	3.60	3.67	4.23	4.46	4.83	5.14	3.67	3.84
44	3.97	4.06	4.55	4.67	3.44	3.51	4.06	4.28	4.67	4.97	3.51	3.66
45	4.38	4.47	4.95	5.06	3.86	3.93	4.47	4.71	5.06	5.37	3.93	4.11
46	4.34	4.44	4.91	5.03	3.82	3.89	4.44	4.68	5.03	5.34	3.89	4.07
47	4.12	4.21	4.70	4.82	3.59	3.66	4.21	4.45	4.82	5.12	3.66	3.83
48	4.10	4.19	4.68	4.80	3.57	3.64	4.19	4.42	4.80	5.10	3.64	3.80
49	3.92	4.01	4.51	4.62	3.39	3.46	4.01	4.23	4.62	4.92	3.46	3.61
50	4.34	4.43	4.91	5.02	3.82	3.89	4.43	4.67	5.02	5.32	3.89	4.07
51	4.33	4.43	4.90	5.02	3.81	3.88	4.43	4.66	5.02	5.32	3.88	4.06
52	4.09	4.18	4.67	4.79	3.56	3.63	4.18	4.41	4.79	5.09	3.63	3.79
53	4.06	4.15	4.64	4.76	3.53	3.60	4.15	4.38	4.76	5.06	3.60	3.76
54	3.97	4.06	4.56	4.67	3.43	3.50	4.06	4.29	4.67	4.98	3.50	3.66
55	3.97	4.05	4.54	4.65	3.44	3.51	4.05	4.26	4.65	4.93	3.51	3.65
56	4.05	4.14	4.63	4.75	3.52	3.59	4.14	4.37	4.75	5.04	3.59	3.75
57	3.88	3.97	4.46	4.57	3.35	3.41	3.97	4.18	4.57	4.86	3.41	3.56
58	3.91	4.00	4.49	4.60	3.38	3.44	4.00	4.22	4.60	4.90	3.44	3.59
59	3.85	3.94	4.44	4.55	3.31	3.38	3.94	4.16	4.55	4.85	3.38	3.53
60	4.02	4.11	4.60	4.71	3.50	3.57	4.11	4.33	4.71	5.01	3.57	3.72
61	4.05	4.13	4.62	4.73	3.52	3.59	4.13	4.36	4.73	5.03	3.59	3.74
62	3.95	4.04	4.54	4.65	3.41	3.48	4.04	4.27	4.65	4.95	3.48	3.64
63	3.88	3.96	4.46	4.57	3.35	3.41	3.96	4.18	4.57	4.86	3.41	3.56
64	3.83	3.91	4.41	4.53	3.29	3.36	3.91	4.13	4.53	4.82	3.36	3.50
65	4.04	4.13	4.61	4.73	3.51	3.58	4.13	4.35	4.73	5.02	3.58	3.73
66	4.14	4.23	4.72	4.83	3.61	3.68	4.23	4.46	4.83	5.14	3.68	3.85
67	3.94	4.03	4.52	4.64	3.40	3.47	4.03	4.25	4.64	4.93	3.47	3.62
68	3.86	3.94	4.44	4.55	3.33	3.39	3.94	4.15	4.55	4.83	3.39	3.53
69	3.80	3.88	4.38	4.49	3.26	3.33	3.88	4.09	4.49	4.78	3.33	3.47
70	4.21	4.31	4.80	4.92	3.67	3.75	4.31	4.56	4.92	5.24	3.75	3.93
71	3.91	4.00	4.49	4.60	3.38	3.44	4.00	4.21	4.60	4.90	3.44	3.59
72	4.09	4.19	4.68	4.80	3.55	3.62	4.19	4.43	4.80	5.12	3.62	3.80
73	4.04	4.13	4.62	4.74	3.51	3.58	4.13	4.36	4.74	5.04	3.58	3.74
74	3.90	3.99	4.48	4.59	3.37	3.43	3.99	4.20	4.59	4.88	3.43	3.58
75	3.92	4.01	4.50	4.61	3.38	3.45	4.01	4.23	4.61	4.91	3.45	3.60

76	3.98	4.07	4.58	4.69	3.44	3.51	4.07	4.31	4.69	5.01	3.51	3.67
77	4.06	4.15	4.63	4.75	3.53	3.60	4.15	4.37	4.75	5.04	3.60	3.76
78	3.88	3.96	4.46	4.57	3.34	3.41	3.96	4.18	4.57	4.85	3.41	3.55
79	3.90	3.99	4.48	4.59	3.37	3.44	3.99	4.21	4.59	4.89	3.44	3.58
80	3.96	4.06	4.56	4.68	3.42	3.49	4.06	4.29	4.68	4.99	3.49	3.66
MIN	**3.80**	**3.88**	**4.38**	**4.49**	**3.26**	**3.33**	**3.88**	**4.09**	**4.49**	**4.78**	**3.33**	**3.47**
MAX	**4.38**	**4.47**	**4.95**	**5.06**	**3.86**	**3.93**	**4.47**	**4.71**	**5.06**	**5.37**	**3.93**	**4.11**
AVE	**4.07**	**4.16**	**4.64**	**4.76**	**3.54**	**3.61**	**4.16**	**4.38**	**4.76**	**5.05**	**3.61**	**3.77**

Table C- 32. Reliability Indices for A709-50 Composite Box Girdes for ADTT 5'000 and L=120, 200, 300ft.

	L=120 ft						L=200 ft						L=300 ft					
Φ	1.00		0.95		1.05		1.00		0.95		1.05		1.00		0.95		1.05	
# / D/(D+L)	0.55	0.70	0.55	0.70	0.55	0.70	0.60	0.75	0.60	0.75	0.60	0.75	0.65	0.80	0.65	0.80	0.65	0.80
1	4.31	4.47	4.90	5.13	3.77	3.87	4.67	4.65	5.30	5.33	4.10	4.03	5.13	4.77	5.80	5.46	4.51	4.13
2	4.30	4.46	4.89	5.12	3.76	3.86	4.66	4.64	5.30	5.32	4.09	4.02	5.12	4.76	5.79	5.45	4.50	4.12
3	4.01	4.17	4.63	4.86	3.45	3.54	4.39	4.36	5.05	5.07	3.78	3.71	4.86	4.48	5.57	5.21	4.21	3.81
4	4.28	4.43	4.87	5.08	3.73	3.84	4.64	4.61	5.26	5.28	4.06	3.99	5.08	4.72	5.75	5.41	4.47	4.09
5	4.26	4.42	4.85	5.07	3.72	3.82	4.62	4.59	5.25	5.27	4.05	3.98	5.07	4.71	5.74	5.39	4.46	4.08
6	3.98	4.14	4.60	4.82	3.42	3.51	4.35	4.32	5.01	5.03	3.75	3.67	4.82	4.44	5.53	5.17	4.18	3.78
7	4.25	4.41	4.84	5.06	3.72	3.81	4.61	4.58	5.24	5.25	4.04	3.97	5.06	4.69	5.72	5.38	4.45	4.07
8	4.24	4.39	4.83	5.04	3.71	3.80	4.60	4.57	5.22	5.23	4.03	3.95	5.04	4.68	5.70	5.36	4.43	4.05
9	3.96	4.11	4.57	4.79	3.40	3.49	4.33	4.30	4.98	5.00	3.73	3.65	4.80	4.41	5.50	5.14	4.16	3.75
10	4.45	4.64	5.06	5.31	3.89	4.02	4.83	4.82	5.48	5.52	4.24	4.19	5.30	4.95	5.99	5.65	4.67	4.30
11	4.45	4.63	5.06	5.31	3.89	4.02	4.83	4.83	5.48	5.52	4.24	4.19	5.30	4.95	6.00	5.66	4.67	4.29
12	4.16	4.33	4.78	5.03	3.58	3.70	4.54	4.53	5.21	5.25	3.93	3.87	5.03	4.65	5.75	5.39	4.37	3.98
13	4.11	4.29	4.74	4.98	3.54	3.65	4.50	4.48	5.16	5.20	3.89	3.82	4.98	4.60	5.69	5.34	4.33	3.93
14	4.00	4.17	4.63	4.88	3.42	3.53	4.39	4.37	5.07	5.11	3.77	3.70	4.88	4.50	5.61	5.25	4.22	3.81
15	4.43	4.61	5.03	5.27	3.87	3.99	4.80	4.79	5.45	5.49	4.21	4.16	5.27	4.91	5.96	5.62	4.64	4.27
16	4.42	4.60	5.02	5.27	3.86	3.98	4.79	4.79	5.44	5.48	4.20	4.15	5.27	4.91	5.95	5.62	4.63	4.26
17	4.11	4.29	4.74	4.98	3.54	3.65	4.50	4.48	5.16	5.20	3.89	3.82	4.98	4.60	5.69	5.34	4.33	3.93
18	4.07	4.24	4.69	4.93	3.50	3.61	4.45	4.43	5.11	5.15	3.84	3.77	4.93	4.55	5.64	5.29	4.28	3.88
19	3.96	4.13	4.59	4.83	3.38	3.48	4.34	4.32	5.02	5.06	3.73	3.65	4.83	4.45	5.56	5.20	4.17	3.76
20	4.40	4.58	5.01	5.25	3.85	3.97	4.78	4.77	5.42	5.46	4.19	4.13	5.24	4.89	5.93	5.59	4.62	4.24
21	4.39	4.56	4.99	5.23	3.83	3.95	4.76	4.75	5.40	5.44	4.17	4.12	5.23	4.87	5.91	5.58	4.60	4.22
22	4.07	4.24	4.70	4.94	3.50	3.61	4.45	4.43	5.12	5.15	3.85	3.77	4.93	4.56	5.65	5.29	4.28	3.88
23	4.04	4.20	4.66	4.89	3.47	3.57	4.41	4.39	5.08	5.11	3.81	3.73	4.89	4.51	5.60	5.24	4.24	3.84
24	3.93	4.09	4.56	4.80	3.35	3.45	4.31	4.28	4.99	5.02	3.70	3.62	4.80	4.41	5.52	5.16	4.13	3.72
25	4.46	4.64	5.07	5.31	3.90	4.03	4.84	4.83	5.48	5.52	4.25	4.20	5.31	4.95	5.99	5.66	4.68	4.30
26	4.47	4.66	5.09	5.34	3.91	4.04	4.86	4.86	5.51	5.56	4.26	4.21	5.34	4.98	6.03	5.69	4.70	4.32
27	4.24	4.42	4.87	5.12	3.67	3.79	4.63	4.62	5.30	5.34	4.02	3.96	5.12	4.74	5.83	5.48	4.46	4.07
28	4.20	4.39	4.83	5.08	3.63	3.75	4.59	4.58	5.26	5.30	3.98	3.92	5.08	4.71	5.79	5.44	4.43	4.03
29	4.11	4.29	4.74	5.00	3.53	3.64	4.50	4.49	5.18	5.23	3.88	3.82	5.00	4.62	5.73	5.37	4.33	3.93
30	4.44	4.63	5.05	5.30	3.88	4.01	4.82	4.82	5.47	5.51	4.23	4.18	5.29	4.94	5.98	5.64	4.66	4.29
31	4.45	4.64	5.06	5.30	3.90	4.02	4.83	4.82	5.47	5.52	4.24	4.19	5.30	4.94	5.99	5.65	4.67	4.30
32	4.20	4.38	4.82	5.07	3.62	3.74	4.58	4.57	5.25	5.29	3.97	3.91	5.07	4.69	5.78	5.43	4.42	4.02
33	4.17	4.34	4.79	5.04	3.60	3.71	4.55	4.54	5.22	5.26	3.94	3.88	5.03	4.66	5.74	5.39	4.38	3.99
34	4.06	4.24	4.69	4.95	3.48	3.59	4.45	4.44	5.13	5.18	3.83	3.76	4.95	4.56	5.68	5.32	4.28	3.87
35	4.45	4.64	5.06	5.31	3.90	4.02	4.83	4.83	5.48	5.52	4.24	4.19	5.31	4.95	5.99	5.66	4.68	4.30
36	4.46	4.64	5.07	5.32	3.90	4.02	4.84	4.83	5.49	5.53	4.24	4.19	5.31	4.96	6.01	5.67	4.68	4.30

37	4.17	4.35	4.80	5.05	3.60	3.72	4.56	4.55	5.23	5.27	3.95	3.89	5.05	4.67	5.76	5.41	4.39	4.00
38	4.12	4.29	4.74	4.98	3.55	3.65	4.50	4.48	5.16	5.20	3.89	3.82	4.98	4.60	5.69	5.34	4.33	3.93
39	4.02	4.20	4.65	4.90	3.44	3.55	4.41	4.39	5.09	5.13	3.79	3.72	4.90	4.52	5.63	5.27	4.24	3.83
40	4.38	4.56	4.99	5.23	3.83	3.95	4.76	4.75	5.40	5.44	4.17	4.11	5.23	4.87	5.91	5.57	4.60	4.22
41	4.49	4.68	5.10	5.36	3.93	4.06	4.87	4.87	5.52	5.57	4.28	4.23	5.35	4.99	6.04	5.71	4.72	4.34
42	4.29	4.47	4.91	5.17	3.72	3.84	4.68	4.67	5.34	5.39	4.07	4.01	5.16	4.80	5.87	5.53	4.51	4.12
43	4.27	4.45	4.89	5.15	3.69	3.82	4.66	4.65	5.33	5.37	4.05	3.99	5.15	4.78	5.86	5.52	4.49	4.10
44	4.09	4.27	4.72	4.97	3.52	3.63	4.48	4.47	5.15	5.19	3.87	3.80	4.97	4.59	5.69	5.34	4.31	3.91
45	4.51	4.70	5.12	5.37	3.95	4.09	4.90	4.89	5.54	5.59	4.30	4.26	5.37	5.01	6.06	5.72	4.74	4.36
46	4.48	4.67	5.09	5.35	3.92	4.05	4.86	4.86	5.51	5.56	4.27	4.22	5.34	4.98	6.04	5.70	4.70	4.33
47	4.25	4.44	4.88	5.13	3.68	3.80	4.64	4.63	5.31	5.35	4.03	3.97	5.13	4.76	5.84	5.49	4.47	4.08
48	4.23	4.41	4.85	5.11	3.65	3.78	4.62	4.61	5.29	5.33	4.01	3.95	5.11	4.73	5.82	5.47	4.45	4.06
49	4.04	4.22	4.68	4.92	3.47	3.58	4.43	4.41	5.11	5.15	3.82	3.75	4.92	4.54	5.65	5.29	4.26	3.86
50	4.47	4.66	5.08	5.33	3.92	4.04	4.85	4.85	5.50	5.54	4.26	4.21	5.33	4.97	6.01	5.68	4.70	4.32
51	4.46	4.65	5.08	5.33	3.90	4.03	4.85	4.84	5.50	5.54	4.25	4.20	5.32	4.97	6.01	5.68	4.69	4.31
52	4.22	4.40	4.84	5.09	3.65	3.77	4.61	4.59	5.27	5.32	4.00	3.94	5.09	4.72	5.80	5.46	4.44	4.05
53	4.19	4.37	4.82	5.07	3.62	3.73	4.58	4.57	5.24	5.29	3.97	3.91	5.06	4.69	5.78	5.43	4.41	4.02
54	4.09	4.27	4.73	4.98	3.51	3.63	4.49	4.47	5.17	5.21	3.87	3.80	4.98	4.60	5.71	5.36	4.31	3.91
55	4.08	4.25	4.70	4.93	3.52	3.62	4.46	4.43	5.11	5.14	3.86	3.79	4.93	4.55	5.63	5.28	4.29	3.89
56	4.18	4.36	4.80	5.05	3.61	3.72	4.56	4.55	5.23	5.27	3.96	3.89	5.05	4.67	5.76	5.41	4.40	4.00
57	4.00	4.16	4.62	4.86	3.43	3.53	4.38	4.36	5.05	5.08	3.77	3.69	4.86	4.48	5.58	5.22	4.21	3.80
58	4.03	4.20	4.66	4.90	3.46	3.56	4.42	4.39	5.09	5.12	3.80	3.73	4.90	4.52	5.62	5.26	4.24	3.84
59	3.97	4.14	4.61	4.86	3.39	3.50	4.36	4.34	5.04	5.08	3.74	3.67	4.85	4.47	5.59	5.22	4.19	3.78
60	4.15	4.32	4.77	5.01	3.58	3.69	4.53	4.51	5.19	5.23	3.92	3.86	5.01	4.63	5.72	5.36	4.36	3.97
61	4.17	4.34	4.79	5.03	3.60	3.71	4.55	4.53	5.21	5.25	3.95	3.88	5.03	4.66	5.74	5.39	4.38	3.99
62	4.07	4.25	4.71	4.96	3.50	3.61	4.46	4.45	5.14	5.18	3.85	3.78	4.95	4.57	5.68	5.32	4.29	3.89
63	3.99	4.16	4.62	4.86	3.42	3.52	4.38	4.35	5.05	5.08	3.77	3.69	4.86	4.48	5.58	5.22	4.20	3.80
64	3.95	4.11	4.58	4.82	3.37	3.47	4.33	4.31	5.01	5.05	3.71	3.64	4.82	4.43	5.55	5.19	4.16	3.75
65	4.16	4.33	4.78	5.02	3.59	3.70	4.54	4.52	5.20	5.24	3.94	3.87	5.02	4.65	5.73	5.38	4.37	3.98
66	4.27	4.45	4.89	5.14	3.70	3.82	4.65	4.65	5.32	5.36	4.05	3.99	5.14	4.77	5.85	5.50	4.49	4.10
67	4.06	4.24	4.69	4.94	3.48	3.59	4.45	4.43	5.12	5.16	3.83	3.76	4.94	4.56	5.66	5.30	4.28	3.87
68	3.97	4.14	4.60	4.84	3.40	3.50	4.35	4.33	5.02	5.06	3.74	3.66	4.84	4.45	5.55	5.19	4.18	3.77
69	3.91	4.08	4.54	4.78	3.34	3.43	4.30	4.27	4.97	5.01	3.68	3.60	4.78	4.39	5.51	5.15	4.12	3.71
70	4.35	4.55	4.98	5.25	3.77	3.90	4.75	4.75	5.42	5.48	4.13	4.08	5.25	4.88	5.97	5.62	4.59	4.20
71	4.03	4.20	4.66	4.90	3.45	3.56	4.41	4.39	5.08	5.12	3.80	3.73	4.90	4.52	5.62	5.26	4.24	3.84
72	4.23	4.42	4.87	5.14	3.64	3.77	4.63	4.63	5.31	5.37	4.00	3.95	5.13	4.75	5.86	5.51	4.46	4.06
73	4.17	4.35	4.79	5.04	3.60	3.71	4.56	4.54	5.22	5.26	3.95	3.88	5.04	4.67	5.75	5.40	4.39	3.99
74	4.02	4.19	4.64	4.89	3.45	3.55	4.40	4.38	5.07	5.11	3.79	3.71	4.88	4.50	5.60	5.25	4.23	3.82
75	4.04	4.21	4.67	4.91	3.46	3.57	4.42	4.41	5.10	5.14	3.81	3.74	4.91	4.53	5.63	5.28	4.25	3.85

76	4.11	4.30	4.75	5.02	3.52	3.64	4.51	4.51	5.20	5.26	3.88	3.82	5.02	4.64	5.76	5.40	4.34	3.94
77	4.18	4.36	4.80	5.05	3.61	3.73	4.56	4.55	5.23	5.27	3.96	3.89	5.05	4.67	5.76	5.41	4.40	4.00
78	3.99	4.16	4.62	4.86	3.42	3.52	4.37	4.35	5.04	5.08	3.76	3.69	4.86	4.47	5.58	5.22	4.20	3.79
79	4.02	4.19	4.65	4.89	3.45	3.55	4.40	4.38	5.08	5.11	3.79	3.72	4.89	4.51	5.61	5.25	4.23	3.83
80	4.09	4.28	4.73	5.00	3.51	3.62	4.49	4.48	5.18	5.23	3.86	3.80	4.99	4.61	5.73	5.38	4.32	3.91
MIN	**3.91**	**4.08**	**4.54**	**4.78**	**3.34**	**3.43**	**4.30**	**4.27**	**4.97**	**5.00**	**3.68**	**3.60**	**4.78**	**4.39**	**5.50**	**5.14**	**4.12**	**3.71**
MAX	**4.51**	**4.70**	**5.12**	**5.37**	**3.95**	**4.09**	**4.90**	**4.89**	**5.54**	**5.59**	**4.30**	**4.26**	**5.37**	**5.01**	**6.06**	**5.72**	**4.74**	**4.36**
AVE	**4.19**	**4.37**	**4.81**	**5.06**	**3.62**	**3.74**	**4.57**	**4.56**	**5.23**	**5.27**	**3.97**	**3.90**	**5.05**	**4.68**	**5.76**	**5.41**	**4.41**	**4.01**

Table C- 33. Reliability Indices for A709-50 Composite Box Girdes for ADTT 10'000 and L=60, 90ft.

	L=60 ft						L=90 ft					
Φ	1.00		0.95		1.05		1.00		0.95		1.05	
# / D/(D+L)	0.45	0.50	0.45	0.50	0.45	0.50	0.50	0.65	0.50	0.65	0.50	0.65
1	4.14	4.23	4.69	4.80	3.63	3.70	4.17	4.40	4.74	5.03	3.65	3.82
2	4.13	4.22	4.68	4.79	3.62	3.69	4.16	4.39	4.73	5.03	3.64	3.81
3	3.84	3.93	4.41	4.52	3.32	3.39	3.87	4.10	4.46	4.76	3.34	3.49
4	4.11	4.19	4.66	4.76	3.61	3.67	4.14	4.36	4.71	4.99	3.62	3.79
5	4.10	4.18	4.65	4.75	3.60	3.66	4.13	4.35	4.70	4.98	3.61	3.77
6	3.82	3.90	4.38	4.49	3.30	3.36	3.85	4.07	4.43	4.73	3.31	3.46
7	4.09	4.17	4.64	4.74	3.59	3.66	4.12	4.34	4.69	4.97	3.61	3.76
8	4.08	4.16	4.62	4.73	3.58	3.64	4.11	4.32	4.67	4.95	3.60	3.75
9	3.80	3.88	4.36	4.47	3.28	3.34	3.83	4.04	4.41	4.70	3.29	3.44
10	4.26	4.36	4.83	4.95	3.75	3.82	4.31	4.56	4.89	5.21	3.77	3.96
11	4.26	4.36	4.83	4.94	3.74	3.82	4.30	4.55	4.89	5.21	3.77	3.96
12	3.97	4.07	4.55	4.67	3.45	3.52	4.01	4.26	4.61	4.93	3.46	3.64
13	3.93	4.02	4.51	4.62	3.41	3.48	3.97	4.21	4.57	4.88	3.43	3.60
14	3.82	3.91	4.41	4.52	3.29	3.36	3.86	4.10	4.46	4.78	3.31	3.47
15	4.24	4.34	4.81	4.92	3.73	3.80	4.28	4.53	4.86	5.18	3.75	3.94
16	4.23	4.33	4.80	4.91	3.71	3.79	4.27	4.52	4.86	5.17	3.74	3.92
17	3.93	4.02	4.51	4.62	3.41	3.48	3.97	4.21	4.57	4.88	3.42	3.60
18	3.90	3.98	4.47	4.58	3.37	3.44	3.93	4.16	4.52	4.83	3.39	3.55
19	3.78	3.87	4.37	4.48	3.25	3.32	3.82	4.05	4.42	4.73	3.27	3.43
20	4.22	4.31	4.78	4.90	3.71	3.78	4.26	4.50	4.84	5.15	3.73	3.91
21	4.21	4.30	4.77	4.88	3.69	3.76	4.24	4.49	4.82	5.13	3.71	3.89
22	3.90	3.99	4.47	4.58	3.37	3.44	3.93	4.17	4.53	4.84	3.39	3.56
23	3.87	3.95	4.44	4.55	3.34	3.41	3.90	4.13	4.49	4.79	3.36	3.52
24	3.76	3.84	4.34	4.45	3.23	3.29	3.79	4.02	4.39	4.70	3.24	3.40
25	4.27	4.37	4.84	4.95	3.75	3.83	4.31	4.56	4.90	5.21	3.78	3.97
26	4.28	4.38	4.85	4.97	3.76	3.84	4.33	4.58	4.92	5.24	3.79	3.98
27	4.05	4.15	4.63	4.75	3.52	3.60	4.09	4.34	4.69	5.01	3.55	3.73
28	4.02	4.11	4.60	4.71	3.49	3.56	4.06	4.31	4.66	4.98	3.51	3.69
29	3.92	4.02	4.51	4.63	3.39	3.46	3.96	4.21	4.57	4.90	3.41	3.58
30	4.26	4.35	4.82	4.94	3.74	3.81	4.30	4.55	4.88	5.20	3.76	3.95
31	4.27	4.36	4.83	4.95	3.75	3.82	4.31	4.56	4.89	5.20	3.77	3.96
32	4.01	4.11	4.59	4.71	3.48	3.56	4.05	4.30	4.65	4.97	3.50	3.68
33	3.99	4.08	4.56	4.68	3.46	3.53	4.02	4.27	4.62	4.93	3.48	3.65
34	3.88	3.97	4.46	4.58	3.34	3.41	3.91	4.16	4.52	4.84	3.36	3.53
35	4.27	4.36	4.83	4.95	3.75	3.82	4.31	4.56	4.89	5.21	3.77	3.96
36	4.27	4.36	4.84	4.95	3.75	3.82	4.31	4.56	4.90	5.22	3.77	3.96

37	3.99	4.08	4.57	4.68	3.46	3.53	4.03	4.27	4.63	4.95	3.48	3.66
38	3.94	4.03	4.51	4.63	3.41	3.48	3.97	4.21	4.57	4.88	3.43	3.60
39	3.84	3.93	4.43	4.54	3.31	3.38	3.88	4.12	4.48	4.80	3.33	3.49
40	4.20	4.29	4.76	4.88	3.69	3.76	4.24	4.48	4.82	5.13	3.71	3.89
41	4.30	4.40	4.87	4.99	3.78	3.86	4.34	4.60	4.93	5.25	3.81	4.00
42	4.10	4.20	4.68	4.80	3.57	3.65	4.14	4.39	4.74	5.06	3.59	3.78
43	4.08	4.17	4.66	4.78	3.55	3.62	4.12	4.37	4.72	5.05	3.57	3.76
44	3.91	4.01	4.50	4.61	3.38	3.45	3.95	4.19	4.55	4.87	3.40	3.57
45	4.32	4.42	4.89	5.01	3.80	3.88	4.37	4.62	4.95	5.27	3.83	4.02
46	4.29	4.38	4.86	4.97	3.76	3.84	4.33	4.59	4.92	5.24	3.79	3.99
47	4.07	4.16	4.64	4.76	3.54	3.61	4.11	4.36	4.70	5.03	3.56	3.74
48	4.04	4.14	4.62	4.74	3.51	3.58	4.08	4.33	4.68	5.00	3.53	3.72
49	3.87	3.96	4.45	4.56	3.34	3.40	3.90	4.14	4.51	4.82	3.35	3.52
50	4.29	4.38	4.85	4.97	3.77	3.84	4.33	4.58	4.91	5.23	3.79	3.98
51	4.28	4.37	4.84	4.96	3.75	3.83	4.32	4.57	4.91	5.23	3.78	3.97
52	4.03	4.13	4.61	4.73	3.51	3.58	4.07	4.32	4.67	4.99	3.53	3.71
53	4.01	4.10	4.59	4.70	3.48	3.55	4.05	4.29	4.64	4.96	3.50	3.68
54	3.91	4.00	4.50	4.61	3.38	3.45	3.95	4.19	4.55	4.88	3.39	3.57
55	3.91	4.00	4.48	4.59	3.39	3.46	3.94	4.17	4.53	4.83	3.40	3.57
56	4.00	4.09	4.57	4.69	3.47	3.54	4.03	4.28	4.63	4.95	3.49	3.67
57	3.82	3.91	4.40	4.51	3.30	3.36	3.86	4.09	4.46	4.76	3.31	3.47
58	3.85	3.94	4.43	4.55	3.33	3.39	3.89	4.12	4.49	4.80	3.34	3.51
59	3.80	3.88	4.38	4.49	3.26	3.33	3.83	4.07	4.44	4.75	3.28	3.44
60	3.97	4.06	4.54	4.66	3.44	3.51	4.01	4.24	4.60	4.91	3.46	3.63
61	3.99	4.08	4.56	4.68	3.46	3.53	4.03	4.27	4.62	4.93	3.48	3.66
62	3.89	3.98	4.48	4.59	3.36	3.43	3.93	4.17	4.53	4.85	3.38	3.55
63	3.82	3.91	4.40	4.51	3.29	3.36	3.86	4.09	4.45	4.76	3.31	3.47
64	3.77	3.86	4.35	4.47	3.24	3.30	3.80	4.04	4.41	4.72	3.25	3.41
65	3.98	4.07	4.56	4.67	3.46	3.53	4.02	4.26	4.61	4.92	3.48	3.65
66	4.08	4.18	4.66	4.77	3.55	3.63	4.12	4.37	4.72	5.04	3.58	3.76
67	3.88	3.97	4.46	4.58	3.35	3.42	3.92	4.16	4.52	4.84	3.37	3.54
68	3.80	3.89	4.38	4.49	3.27	3.34	3.83	4.06	4.43	4.74	3.29	3.45
69	3.74	3.83	4.32	4.43	3.21	3.27	3.77	4.00	4.38	4.68	3.22	3.38
70	4.15	4.25	4.74	4.86	3.62	3.70	4.20	4.46	4.80	5.14	3.64	3.84
71	3.85	3.94	4.43	4.54	3.32	3.39	3.89	4.12	4.49	4.80	3.34	3.51
72	4.03	4.13	4.62	4.74	3.49	3.57	4.08	4.34	4.69	5.03	3.52	3.71
73	3.99	4.08	4.57	4.68	3.46	3.53	4.03	4.27	4.62	4.94	3.48	3.66
74	3.84	3.93	4.42	4.53	3.31	3.38	3.88	4.11	4.48	4.79	3.33	3.49
75	3.86	3.95	4.44	4.56	3.33	3.40	3.90	4.13	4.50	4.81	3.35	3.52

76	3.92	4.02	4.51	4.63	3.38	3.45	3.96	4.22	4.58	4.91	3.40	3.58
77	4.00	4.09	4.58	4.69	3.47	3.54	4.04	4.28	4.63	4.95	3.49	3.67
78	3.82	3.91	4.40	4.51	3.29	3.36	3.85	4.08	4.45	4.76	3.31	3.47
79	3.85	3.93	4.42	4.54	3.32	3.38	3.88	4.11	4.48	4.79	3.33	3.50
80	3.91	4.00	4.50	4.62	3.37	3.44	3.94	4.20	4.56	4.89	3.39	3.57
MIN	**3.74**	**3.83**	**4.32**	**4.43**	**3.21**	**3.27**	**3.77**	**4.00**	**4.38**	**4.68**	**3.22**	**3.38**
MAX	**4.32**	**4.42**	**4.89**	**5.01**	**3.80**	**3.88**	**4.37**	**4.62**	**4.95**	**5.27**	**3.83**	**4.02**
AVE	**4.01**	**4.10**	**4.59**	**4.70**	**3.49**	**3.56**	**4.05**	**4.29**	**4.64**	**4.95**	**3.51**	**3.68**

Table C- 34. Reliability Indices for A709-50 Composite Box Girdes for ADTT 10'000 and L=120, 200, 300ft.

	L=120 ft						L=200 ft						L=300 ft					
Φ	**1.00**		**0.95**		**1.05**		**1.00**		**0.95**		**1.05**		**1.00**		**0.95**		**1.05**	
# / D/(D+L)	**0.55**	**0.70**	**0.55**	**0.70**	**0.55**	**0.70**	**0.60**	**0.75**	**0.60**	**0.75**	**0.60**	**0.75**	**0.65**	**0.80**	**0.65**	**0.80**	**0.65**	**0.80**
1	4.26	4.43	4.85	5.09	3.72	3.83	4.67	4.65	5.30	5.33	4.10	4.03	5.08	4.74	5.75	5.43	4.47	4.11
2	4.25	4.42	4.84	5.08	3.71	3.83	4.66	4.64	5.30	5.32	4.09	4.02	5.07	4.73	5.74	5.42	4.45	4.10
3	3.96	4.13	4.57	4.82	3.40	3.51	4.39	4.36	5.05	5.07	3.78	3.71	4.81	4.45	5.51	5.18	4.16	3.78
4	4.23	4.39	4.81	5.04	3.69	3.80	4.64	4.61	5.26	5.28	4.06	3.99	5.04	4.70	5.70	5.38	4.43	4.07
5	4.21	4.38	4.80	5.03	3.68	3.79	4.62	4.59	5.25	5.27	4.05	3.98	5.02	4.68	5.69	5.37	4.41	4.05
6	3.93	4.10	4.54	4.78	3.37	3.47	4.35	4.32	5.01	5.03	3.75	3.67	4.77	4.41	5.47	5.14	4.13	3.75
7	4.21	4.37	4.79	5.02	3.67	3.78	4.61	4.58	5.24	5.25	4.04	3.97	5.01	4.67	5.67	5.35	4.40	4.04
8	4.19	4.35	4.78	5.00	3.66	3.76	4.60	4.57	5.22	5.23	4.03	3.95	4.99	4.65	5.65	5.33	4.39	4.03
9	3.91	4.07	4.52	4.75	3.35	3.45	4.33	4.30	4.98	5.00	3.73	3.65	4.75	4.39	5.44	5.11	4.11	3.73
10	4.40	4.60	5.01	5.26	3.84	3.98	4.83	4.82	5.48	5.52	4.24	4.19	5.25	4.92	5.94	5.62	4.63	4.27
11	4.40	4.60	5.01	5.27	3.84	3.98	4.83	4.83	5.48	5.52	4.24	4.19	5.26	4.92	5.94	5.63	4.62	4.27
12	4.10	4.29	4.73	4.99	3.53	3.66	4.54	4.53	5.21	5.25	3.93	3.87	4.98	4.63	5.69	5.36	4.33	3.95
13	4.06	4.25	4.68	4.94	3.49	3.61	4.50	4.48	5.16	5.20	3.89	3.82	4.93	4.57	5.64	5.31	4.28	3.90
14	3.95	4.13	4.58	4.84	3.37	3.49	4.39	4.37	5.07	5.11	3.77	3.70	4.83	4.47	5.56	5.22	4.17	3.78
15	4.38	4.57	4.98	5.23	3.82	3.96	4.80	4.79	5.45	5.49	4.21	4.16	5.22	4.89	5.90	5.59	4.60	4.24
16	4.37	4.56	4.97	5.23	3.81	3.94	4.79	4.79	5.44	5.48	4.20	4.15	5.22	4.88	5.90	5.59	4.59	4.23
17	4.06	4.25	4.68	4.94	3.49	3.61	4.50	4.48	5.16	5.20	3.89	3.82	4.93	4.57	5.64	5.31	4.28	3.90
18	4.02	4.20	4.64	4.89	3.45	3.57	4.45	4.43	5.11	5.15	3.84	3.77	4.88	4.52	5.59	5.26	4.23	3.85
19	3.91	4.09	4.53	4.79	3.33	3.44	4.34	4.32	5.02	5.06	3.73	3.65	4.78	4.42	5.51	5.17	4.12	3.73
20	4.35	4.54	4.95	5.21	3.80	3.93	4.78	4.77	5.42	5.46	4.19	4.13	5.20	4.86	5.87	5.56	4.57	4.22
21	4.34	4.52	4.94	5.19	3.78	3.91	4.76	4.75	5.40	5.44	4.17	4.12	5.18	4.84	5.86	5.55	4.55	4.20
22	4.02	4.20	4.64	4.89	3.46	3.57	4.45	4.43	5.12	5.15	3.85	3.77	4.88	4.53	5.59	5.26	4.23	3.86
23	3.99	4.16	4.60	4.85	3.42	3.53	4.41	4.39	5.08	5.11	3.81	3.73	4.84	4.48	5.54	5.21	4.19	3.81
24	3.88	4.05	4.50	4.75	3.30	3.41	4.31	4.28	4.99	5.02	3.70	3.62	4.74	4.38	5.47	5.13	4.09	3.70
25	4.41	4.60	5.01	5.27	3.85	3.99	4.84	4.83	5.48	5.52	4.25	4.20	5.26	4.92	5.94	5.63	4.63	4.28
26	4.42	4.62	5.03	5.30	3.86	4.01	4.86	4.86	5.51	5.56	4.26	4.21	5.29	4.95	5.98	5.67	4.65	4.30
27	4.19	4.38	4.81	5.08	3.62	3.75	4.63	4.62	5.30	5.34	4.02	3.96	5.06	4.72	5.78	5.45	4.41	4.04
28	4.15	4.35	4.77	5.04	3.58	3.71	4.59	4.58	5.26	5.30	3.98	3.92	5.03	4.68	5.74	5.42	4.38	4.00
29	4.05	4.25	4.69	4.96	3.48	3.60	4.50	4.49	5.18	5.23	3.88	3.82	4.95	4.59	5.67	5.34	4.28	3.90
30	4.39	4.59	5.00	5.26	3.84	3.97	4.82	4.82	5.47	5.51	4.23	4.18	5.24	4.91	5.93	5.62	4.62	4.26
31	4.40	4.60	5.01	5.26	3.85	3.98	4.83	4.82	5.47	5.52	4.24	4.19	5.25	4.92	5.93	5.62	4.63	4.27
32	4.14	4.34	4.77	5.03	3.57	3.70	4.58	4.57	5.25	5.29	3.97	3.91	5.02	4.67	5.72	5.40	4.37	3.99
33	4.11	4.30	4.74	4.99	3.55	3.67	4.55	4.54	5.22	5.26	3.94	3.88	4.98	4.63	5.69	5.36	4.34	3.96
34	4.01	4.20	4.64	4.90	3.43	3.55	4.45	4.44	5.13	5.18	3.83	3.76	4.89	4.53	5.62	5.29	4.23	3.85
35	4.40	4.60	5.01	5.27	3.85	3.99	4.83	4.83	5.48	5.52	4.24	4.19	5.26	4.92	5.94	5.63	4.63	4.27
36	4.40	4.60	5.01	5.28	3.85	3.99	4.84	4.83	5.49	5.53	4.24	4.19	5.26	4.93	5.95	5.64	4.63	4.28

37	4.12	4.31	4.74	5.01	3.55	3.68	4.56	4.55	5.23	5.27	3.95	3.89	4.99	4.64	5.71	5.38	4.34	3.97
38	4.06	4.25	4.68	4.94	3.50	3.62	4.50	4.48	5.16	5.20	3.89	3.82	4.93	4.57	5.64	5.31	4.28	3.90
39	3.97	4.15	4.60	4.86	3.39	3.51	4.41	4.39	5.09	5.13	3.79	3.72	4.85	4.49	5.58	5.24	4.19	3.80
40	4.33	4.52	4.94	5.19	3.78	3.91	4.76	4.75	5.40	5.44	4.17	4.11	5.18	4.84	5.86	5.54	4.55	4.19
41	4.44	4.64	5.05	5.31	3.88	4.02	4.87	4.87	5.52	5.57	4.28	4.23	5.30	4.97	5.99	5.68	4.67	4.32
42	4.24	4.43	4.86	5.12	3.67	3.80	4.68	4.67	5.34	5.39	4.07	4.01	5.11	4.77	5.82	5.50	4.46	4.10
43	4.21	4.41	4.84	5.11	3.64	3.78	4.66	4.65	5.33	5.37	4.05	3.99	5.10	4.75	5.81	5.49	4.44	4.07
44	4.04	4.23	4.67	4.93	3.47	3.59	4.48	4.47	5.15	5.19	3.87	3.80	4.92	4.56	5.64	5.31	4.26	3.88
45	4.46	4.66	5.07	5.33	3.91	4.05	4.90	4.89	5.54	5.59	4.30	4.26	5.32	4.99	6.01	5.70	4.69	4.34
46	4.43	4.63	5.04	5.30	3.87	4.01	4.86	4.86	5.51	5.56	4.27	4.22	5.29	4.96	5.98	5.67	4.66	4.30
47	4.20	4.40	4.82	5.09	3.63	3.76	4.64	4.63	5.31	5.35	4.03	3.97	5.08	4.73	5.79	5.46	4.43	4.06
48	4.18	4.37	4.80	5.07	3.60	3.74	4.62	4.61	5.29	5.33	4.01	3.95	5.05	4.71	5.77	5.44	4.40	4.03
49	3.99	4.18	4.62	4.88	3.42	3.54	4.43	4.41	5.11	5.15	3.82	3.75	4.87	4.51	5.59	5.26	4.21	3.83
50	4.42	4.62	5.03	5.29	3.87	4.01	4.85	4.85	5.50	5.54	4.26	4.21	5.28	4.94	5.96	5.65	4.65	4.30
51	4.41	4.61	5.02	5.29	3.86	4.00	4.85	4.84	5.50	5.54	4.25	4.20	5.27	4.94	5.96	5.65	4.64	4.29
52	4.17	4.36	4.79	5.05	3.60	3.73	4.61	4.59	5.27	5.32	4.00	3.94	5.04	4.69	5.75	5.43	4.39	4.02
53	4.14	4.33	4.76	5.02	3.57	3.70	4.58	4.57	5.24	5.29	3.97	3.91	5.01	4.66	5.72	5.40	4.36	3.99
54	4.04	4.23	4.67	4.94	3.46	3.59	4.49	4.47	5.17	5.21	3.87	3.80	4.93	4.57	5.66	5.33	4.27	3.88
55	4.03	4.21	4.65	4.89	3.47	3.58	4.46	4.43	5.11	5.14	3.86	3.79	4.88	4.53	5.58	5.25	4.24	3.86
56	4.13	4.32	4.75	5.01	3.56	3.68	4.56	4.55	5.23	5.27	3.96	3.89	4.99	4.64	5.70	5.38	4.35	3.97
57	3.95	4.12	4.57	4.82	3.38	3.49	4.38	4.36	5.05	5.08	3.77	3.69	4.81	4.45	5.53	5.19	4.16	3.77
58	3.98	4.16	4.60	4.86	3.41	3.52	4.42	4.39	5.09	5.12	3.80	3.73	4.85	4.49	5.57	5.23	4.19	3.81
59	3.92	4.10	4.55	4.81	3.34	3.46	4.36	4.34	5.04	5.08	3.74	3.67	4.80	4.44	5.53	5.19	4.14	3.75
60	4.10	4.28	4.71	4.97	3.53	3.65	4.53	4.51	5.19	5.23	3.92	3.86	4.96	4.61	5.66	5.34	4.31	3.94
61	4.12	4.30	4.73	4.99	3.55	3.67	4.55	4.53	5.21	5.25	3.95	3.88	4.98	4.63	5.68	5.36	4.33	3.96
62	4.02	4.21	4.65	4.91	3.45	3.57	4.46	4.45	5.14	5.18	3.85	3.78	4.90	4.55	5.63	5.29	4.24	3.86
63	3.94	4.12	4.57	4.82	3.37	3.48	4.38	4.35	5.05	5.08	3.77	3.69	4.81	4.45	5.52	5.19	4.15	3.77
64	3.89	4.07	4.52	4.78	3.32	3.43	4.33	4.31	5.01	5.05	3.71	3.64	4.77	4.41	5.50	5.16	4.11	3.72
65	4.11	4.29	4.73	4.98	3.54	3.66	4.54	4.52	5.20	5.24	3.94	3.87	4.97	4.62	5.67	5.35	4.33	3.95
66	4.22	4.41	4.84	5.10	3.65	3.78	4.65	4.65	5.32	5.36	4.05	3.99	5.09	4.74	5.80	5.47	4.44	4.07
67	4.01	4.19	4.64	4.90	3.43	3.55	4.45	4.43	5.12	5.16	3.83	3.76	4.89	4.53	5.61	5.27	4.23	3.85
68	3.92	4.10	4.54	4.79	3.35	3.46	4.35	4.33	5.02	5.06	3.74	3.66	4.78	4.42	5.50	5.16	4.13	3.75
69	3.86	4.04	4.49	4.74	3.29	3.39	4.30	4.27	4.97	5.01	3.68	3.60	4.73	4.37	5.46	5.12	4.07	3.68
70	4.30	4.51	4.93	5.21	3.72	3.87	4.75	4.75	5.42	5.48	4.13	4.08	5.19	4.85	5.91	5.59	4.54	4.17
71	3.98	4.16	4.60	4.86	3.41	3.52	4.41	4.39	5.08	5.12	3.80	3.73	4.85	4.49	5.57	5.23	4.19	3.81
72	4.17	4.38	4.81	5.09	3.59	3.73	4.63	4.63	5.31	5.37	4.00	3.95	5.08	4.73	5.81	5.48	4.41	4.04
73	4.12	4.31	4.74	5.00	3.55	3.67	4.56	4.54	5.22	5.26	3.95	3.88	4.99	4.64	5.70	5.37	4.34	3.96
74	3.97	4.15	4.59	4.84	3.40	3.51	4.40	4.38	5.07	5.11	3.79	3.71	4.83	4.47	5.55	5.22	4.18	3.80
75	3.99	4.17	4.61	4.87	3.41	3.53	4.42	4.41	5.10	5.14	3.81	3.74	4.86	4.50	5.58	5.25	4.20	3.82

76	4.06	4.26	4.70	4.98	3.47	3.60	4.51	4.51	5.20	5.26	3.88	3.82	4.96	4.61	5.70	5.37	4.29	3.91
77	4.13	4.32	4.75	5.01	3.56	3.69	4.56	4.55	5.23	5.27	3.96	3.89	5.00	4.65	5.70	5.38	4.35	3.98
78	3.94	4.12	4.56	4.81	3.37	3.48	4.37	4.35	5.04	5.08	3.76	3.69	4.81	4.44	5.52	5.19	4.15	3.77
79	3.97	4.15	4.59	4.85	3.40	3.51	4.40	4.38	5.08	5.11	3.79	3.72	4.84	4.48	5.55	5.22	4.18	3.80
80	4.04	4.24	4.68	4.95	3.46	3.59	4.49	4.48	5.18	5.23	3.86	3.80	4.94	4.58	5.68	5.35	4.27	3.89
MIN	**3.86**	**4.04**	**4.49**	**4.74**	**3.29**	**3.39**	**4.30**	**4.27**	**4.97**	**5.00**	**3.68**	**3.60**	**4.73**	**4.37**	**5.44**	**5.11**	**4.07**	**3.68**
MAX	**4.46**	**4.66**	**5.07**	**5.33**	**3.91**	**4.05**	**4.90**	**4.89**	**5.54**	**5.59**	**4.30**	**4.26**	**5.32**	**4.99**	**6.01**	**5.70**	**4.69**	**4.34**
AVE	**4.14**	**4.33**	**4.76**	**5.01**	**3.57**	**3.70**	**4.57**	**4.56**	**5.23**	**5.27**	**3.97**	**3.90**	**5.00**	**4.65**	**5.71**	**5.38**	**4.36**	**3.99**

Table C- 35. Reliability Indices for A709-50W Composite Box Girdes for ADTT 250 and L=60, 90ft.

	L=60 ft						L=90 ft					
Φ	1.00		0.95		1.05		1.00		0.95		1.05	
# / D/(D+L)	0.45	0.50	0.45	0.50	0.45	0.50	0.50	0.65	0.50	0.65	0.50	0.65
1	4.86	4.95	5.46	5.58	4.30	4.38	4.89	5.13	5.52	5.83	4.32	4.50
2	4.87	4.97	5.48	5.60	4.31	4.39	4.91	5.15	5.54	5.86	4.34	4.51
3	4.46	4.55	5.06	5.18	3.91	3.98	4.49	4.70	5.12	5.40	3.92	4.06
4	4.83	4.93	5.44	5.56	4.28	4.36	4.87	5.11	5.49	5.80	4.30	4.47
5	4.84	4.94	5.45	5.57	4.29	4.37	4.88	5.12	5.51	5.82	4.31	4.48
6	4.43	4.52	5.03	5.15	3.88	3.95	4.46	4.67	5.08	5.36	3.89	4.03
7	4.82	4.92	5.42	5.54	4.27	4.35	4.86	5.09	5.48	5.78	4.29	4.46
8	4.82	4.92	5.43	5.55	4.28	4.35	4.86	5.10	5.49	5.79	4.30	4.46
9	4.41	4.50	5.01	5.12	3.87	3.93	4.44	4.64	5.06	5.34	3.88	4.01
10	4.98	5.09	5.60	5.72	4.42	4.50	5.03	5.28	5.66	5.99	4.45	4.64
11	5.00	5.11	5.62	5.75	4.43	4.52	5.05	5.31	5.69	6.03	4.46	4.66
12	4.62	4.72	5.24	5.36	4.05	4.13	4.66	4.89	5.29	5.60	4.07	4.24
13	4.57	4.66	5.18	5.30	4.01	4.08	4.60	4.83	5.24	5.54	4.02	4.18
14	4.08	4.16	4.68	4.78	3.53	3.59	4.10	4.27	4.72	4.97	3.54	3.64
15	4.97	5.07	5.58	5.71	4.40	4.49	5.01	5.27	5.65	5.97	4.43	4.62
16	4.97	5.08	5.59	5.72	4.41	4.49	5.02	5.28	5.66	5.99	4.43	4.63
17	4.57	4.67	5.19	5.31	4.01	4.08	4.61	4.83	5.24	5.55	4.03	4.19
18	4.53	4.62	5.14	5.25	3.97	4.04	4.56	4.78	5.19	5.49	3.98	4.13
19	4.02	4.10	4.62	4.72	3.48	3.54	4.04	4.21	4.66	4.91	3.48	3.58
20	4.95	5.06	5.57	5.69	4.39	4.47	5.00	5.25	5.63	5.96	4.42	4.60
21	4.95	5.05	5.57	5.69	4.39	4.47	4.99	5.25	5.63	5.96	4.41	4.60
22	4.53	4.63	5.14	5.26	3.98	4.05	4.57	4.79	5.20	5.50	3.99	4.14
23	4.49	4.58	5.10	5.22	3.94	4.01	4.53	4.74	5.15	5.44	3.95	4.10
24	3.98	4.06	4.58	4.68	3.44	3.49	4.00	4.16	4.62	4.85	3.44	3.53
25	5.00	5.11	5.62	5.75	4.44	4.52	5.05	5.31	5.68	6.01	4.47	4.66
26	5.02	5.13	5.65	5.78	4.45	4.54	5.07	5.34	5.71	6.06	4.48	4.69
27	4.72	4.82	5.34	5.47	4.15	4.23	4.76	5.01	5.41	5.73	4.18	4.35
28	4.68	4.78	5.30	5.42	4.11	4.19	4.71	4.96	5.36	5.67	4.13	4.30
29	4.25	4.33	4.86	4.97	3.70	3.76	4.28	4.47	4.91	5.18	3.70	3.83
30	4.98	5.09	5.60	5.73	4.42	4.50	5.03	5.29	5.66	5.99	4.45	4.64
31	5.00	5.11	5.62	5.75	4.44	4.52	5.05	5.31	5.68	6.02	4.46	4.66
32	4.67	4.77	5.29	5.41	4.10	4.18	4.71	4.94	5.34	5.66	4.12	4.29
33	4.64	4.73	5.25	5.37	4.07	4.15	4.67	4.90	5.31	5.62	4.09	4.26
34	4.18	4.26	4.78	4.89	3.63	3.69	4.20	4.39	4.83	5.09	3.63	3.75
35	5.00	5.11	5.62	5.75	4.44	4.52	5.05	5.31	5.69	6.02	4.46	4.66
36	5.01	5.12	5.63	5.76	4.44	4.53	5.06	5.32	5.70	6.04	4.47	4.67

37	4.65	4.74	5.26	5.39	4.08	4.16	4.68	4.92	5.32	5.64	4.10	4.27
38	4.58	4.68	5.20	5.32	4.02	4.10	4.62	4.85	5.25	5.56	4.04	4.20
39	4.12	4.20	4.73	4.83	3.58	3.63	4.14	4.32	4.77	5.03	3.58	3.69
40	4.94	5.05	5.56	5.68	4.38	4.46	4.99	5.24	5.62	5.95	4.40	4.59
41	5.05	5.16	5.67	5.80	4.48	4.57	5.10	5.37	5.74	6.08	4.51	4.71
42	4.78	4.88	5.40	5.53	4.21	4.29	4.82	5.07	5.47	5.79	4.23	4.42
43	4.75	4.86	5.38	5.50	4.19	4.26	4.79	5.04	5.44	5.76	4.21	4.39
44	4.30	4.39	4.91	5.02	3.75	3.81	4.33	4.52	4.95	5.23	3.76	3.88
45	5.08	5.19	5.70	5.83	4.51	4.60	5.13	5.40	5.77	6.11	4.54	4.74
46	5.03	5.14	5.65	5.78	4.46	4.55	5.08	5.34	5.72	6.06	4.49	4.69
47	4.74	4.84	5.36	5.49	4.17	4.25	4.78	5.03	5.43	5.75	4.20	4.37
48	4.70	4.80	5.32	5.45	4.14	4.21	4.74	4.99	5.38	5.70	4.16	4.33
49	4.22	4.30	4.82	4.93	3.67	3.73	4.24	4.43	4.87	5.13	3.67	3.79
50	5.03	5.14	5.65	5.78	4.46	4.55	5.08	5.34	5.72	6.05	4.49	4.69
51	5.02	5.13	5.64	5.77	4.45	4.54	5.07	5.33	5.71	6.05	4.48	4.68
52	4.70	4.80	5.32	5.45	4.14	4.22	4.74	4.99	5.38	5.70	4.16	4.33
53	4.67	4.76	5.29	5.41	4.10	4.18	4.70	4.94	5.34	5.66	4.12	4.29
54	4.24	4.32	4.84	4.95	3.68	3.74	4.26	4.45	4.89	5.16	3.69	3.81
55	4.52	4.62	5.13	5.24	3.97	4.04	4.56	4.77	5.18	5.46	3.99	4.13
56	4.66	4.76	5.28	5.40	4.09	4.17	4.70	4.93	5.33	5.64	4.11	4.28
57	4.46	4.55	5.07	5.19	3.89	3.96	4.49	4.71	5.12	5.42	3.91	4.06
58	4.49	4.58	5.11	5.22	3.93	4.00	4.52	4.75	5.16	5.46	3.94	4.10
59	4.18	4.26	4.79	4.89	3.63	3.69	4.20	4.39	4.83	5.10	3.63	3.75
60	4.61	4.71	5.23	5.34	4.05	4.13	4.65	4.88	5.28	5.58	4.07	4.23
61	4.66	4.76	5.28	5.40	4.10	4.17	4.70	4.93	5.33	5.64	4.12	4.28
62	4.52	4.62	5.14	5.26	3.96	4.03	4.56	4.79	5.20	5.50	3.97	4.13
63	4.46	4.55	5.07	5.19	3.89	3.96	4.49	4.71	5.12	5.42	3.91	4.06
64	4.13	4.21	4.73	4.84	3.58	3.63	4.15	4.33	4.77	5.03	3.58	3.69
65	4.64	4.74	5.26	5.38	4.08	4.15	4.68	4.91	5.31	5.62	4.10	4.26
66	4.76	4.86	5.38	5.51	4.20	4.27	4.80	5.05	5.44	5.77	4.22	4.40
67	4.51	4.60	5.13	5.25	3.94	4.02	4.54	4.77	5.18	5.49	3.96	4.12
68	4.43	4.52	5.04	5.16	3.87	3.94	4.46	4.68	5.10	5.39	3.88	4.03
69	4.07	4.15	4.67	4.78	3.53	3.58	4.09	4.27	4.72	4.97	3.53	3.63
70	4.79	4.89	5.41	5.54	4.22	4.30	4.83	5.09	5.48	5.80	4.24	4.43
71	4.48	4.58	5.10	5.22	3.92	3.99	4.52	4.74	5.15	5.45	3.93	4.09
72	4.67	4.77	5.29	5.42	4.09	4.17	4.71	4.95	5.36	5.68	4.11	4.29
73	4.64	4.74	5.26	5.38	4.08	4.15	4.68	4.91	5.32	5.63	4.10	4.26
74	4.48	4.57	5.10	5.21	3.92	3.99	4.51	4.73	5.15	5.45	3.93	4.08
75	4.49	4.59	5.11	5.23	3.93	4.00	4.53	4.75	5.17	5.47	3.94	4.10

76	4.32	4.40	4.93	5.04	3.76	3.82	4.34	4.55	4.98	5.27	3.76	3.90
77	4.67	4.77	5.29	5.41	4.10	4.18	4.71	4.94	5.34	5.66	4.12	4.29
78	4.45	4.55	5.07	5.19	3.89	3.96	4.49	4.70	5.12	5.42	3.91	4.06
79	4.48	4.57	5.10	5.22	3.92	3.99	4.51	4.74	5.15	5.45	3.93	4.09
80	4.28	4.37	4.89	5.00	3.72	3.79	4.31	4.51	4.94	5.22	3.73	3.86
MIN	**3.98**	**4.06**	**4.58**	**4.68**	**3.44**	**3.49**	**4.00**	**4.16**	**4.62**	**4.85**	**3.44**	**3.53**
MAX	**5.08**	**5.19**	**5.70**	**5.83**	**4.51**	**4.60**	**5.13**	**5.40**	**5.77**	**6.11**	**4.54**	**4.74**
AVE	**4.63**	**4.72**	**5.24**	**5.36**	**4.07**	**4.14**	**4.66**	**4.89**	**5.30**	**5.60**	**4.08**	**4.25**

Table C- 36. Reliability Indices for A709-50W Composite Box Girdes for ADTT 250 and L=120, 200, 300ft.

	L=120 ft						L=200 ft						L=300 ft					
Φ	1.00		0.95		1.05		1.00		0.95		1.05		1.00		0.95		1.05	
# / D/(D+L)	0.55	0.70	0.55	0.70	0.55	0.70	0.60	0.75	0.60	0.75	0.60	0.75	0.65	0.80	0.65	0.80	0.65	0.80
1	5.10	5.24	5.76	5.96	4.51	4.58	5.45	5.37	6.15	6.11	4.82	4.69	5.85	5.40	6.59	6.15	5.18	4.71
2	5.12	5.26	5.78	5.99	4.52	4.60	5.48	5.40	6.18	6.15	4.84	4.71	5.88	5.43	6.63	6.19	5.20	4.73
3	4.69	4.80	5.35	5.52	4.09	4.14	5.03	4.92	5.73	5.67	4.39	4.24	5.42	4.95	6.16	5.71	4.74	4.26
4	5.08	5.21	5.73	5.93	4.48	4.56	5.43	5.34	6.12	6.09	4.80	4.67	5.82	5.37	6.56	6.12	5.15	4.69
5	5.09	5.22	5.75	5.95	4.49	4.57	5.44	5.36	6.14	6.11	4.81	4.68	5.84	5.39	6.59	6.15	5.16	4.70
6	4.66	4.76	5.31	5.49	4.06	4.10	5.00	4.89	5.69	5.63	4.36	4.21	5.38	4.91	6.12	5.67	4.70	4.22
7	5.06	5.19	5.72	5.91	4.47	4.54	5.41	5.32	6.11	6.07	4.78	4.65	5.80	5.35	6.54	6.11	5.13	4.67
8	5.07	5.20	5.73	5.93	4.47	4.55	5.42	5.33	6.12	6.08	4.79	4.66	5.81	5.36	6.56	6.12	5.14	4.68
9	4.64	4.74	5.29	5.46	4.04	4.08	4.97	4.86	5.67	5.60	4.34	4.18	5.35	4.88	6.09	5.64	4.68	4.20
10	5.24	5.40	5.91	6.13	4.64	4.73	5.61	5.53	6.31	6.29	4.96	4.85	6.01	5.56	6.76	6.33	5.33	4.87
11	5.27	5.43	5.94	6.17	4.65	4.75	5.64	5.57	6.35	6.33	4.98	4.87	6.05	5.60	6.81	6.38	5.36	4.89
12	4.86	5.00	5.54	5.74	4.25	4.32	5.22	5.13	5.93	5.89	4.57	4.43	5.62	5.16	6.38	5.93	4.93	4.45
13	4.81	4.94	5.48	5.67	4.20	4.26	5.16	5.07	5.87	5.83	4.52	4.37	5.56	5.09	6.32	5.87	4.87	4.39
14	4.28	4.36	4.94	5.09	3.69	3.70	4.61	4.48	5.31	5.23	3.98	3.80	4.99	4.50	5.74	5.27	4.31	3.81
15	5.23	5.38	5.89	6.11	4.62	4.71	5.59	5.52	6.30	6.27	4.95	4.83	6.00	5.55	6.74	6.31	5.31	4.85
16	5.24	5.40	5.91	6.14	4.63	4.72	5.61	5.54	6.32	6.30	4.96	4.84	6.02	5.57	6.78	6.34	5.33	4.86
17	4.81	4.94	5.48	5.68	4.20	4.27	5.17	5.07	5.88	5.83	4.52	4.38	5.56	5.10	6.32	5.87	4.88	4.39
18	4.76	4.88	5.43	5.61	4.16	4.21	5.11	5.01	5.82	5.77	4.47	4.32	5.50	5.04	6.26	5.81	4.82	4.34
19	4.22	4.29	4.88	5.02	3.63	3.64	4.55	4.41	5.24	5.16	3.92	3.73	4.92	4.43	5.66	5.19	4.24	3.74
20	5.21	5.36	5.88	6.10	4.60	4.69	5.57	5.50	6.28	6.26	4.93	4.81	5.98	5.53	6.73	6.30	5.30	4.83
21	5.21	5.37	5.88	6.10	4.60	4.69	5.58	5.50	6.29	6.27	4.93	4.81	5.99	5.54	6.74	6.31	5.30	4.83
22	4.77	4.89	5.43	5.62	4.17	4.22	5.12	5.02	5.83	5.78	4.48	4.33	5.51	5.05	6.27	5.82	4.83	4.35
23	4.73	4.84	5.39	5.57	4.12	4.18	5.07	4.97	5.77	5.72	4.43	4.28	5.46	4.99	6.21	5.76	4.78	4.30
24	4.18	4.24	4.83	4.97	3.59	3.59	4.50	4.36	5.19	5.10	3.87	3.68	4.87	4.38	5.60	5.13	4.19	3.69
25	5.27	5.42	5.93	6.15	4.66	4.75	5.63	5.56	6.33	6.31	4.99	4.87	6.04	5.59	6.78	6.35	5.35	4.89
26	5.29	5.46	5.97	6.20	4.68	4.78	5.67	5.60	6.38	6.36	5.01	4.90	6.08	5.63	6.84	6.41	5.39	4.93
27	4.98	5.12	5.65	5.87	4.36	4.44	5.34	5.26	6.06	6.03	4.69	4.56	5.75	5.29	6.51	6.07	5.06	4.58
28	4.93	5.07	5.60	5.81	4.31	4.39	5.29	5.20	6.00	5.97	4.64	4.50	5.69	5.23	6.45	6.01	5.00	4.52
29	4.47	4.57	5.13	5.30	3.87	3.90	4.81	4.69	5.52	5.45	4.17	4.00	5.20	4.72	5.95	5.49	4.51	4.01
30	5.25	5.40	5.91	6.13	4.64	4.73	5.61	5.54	6.32	6.29	4.96	4.85	6.02	5.57	6.76	6.33	5.33	4.87
31	5.27	5.42	5.93	6.16	4.66	4.75	5.63	5.56	6.34	6.32	4.98	4.87	6.04	5.59	6.79	6.36	5.35	4.89
32	4.92	5.05	5.59	5.79	4.31	4.38	5.27	5.18	5.99	5.95	4.63	4.49	5.68	5.21	6.43	5.99	4.99	4.51
33	4.88	5.01	5.55	5.75	4.27	4.34	5.24	5.14	5.95	5.90	4.59	4.45	5.64	5.17	6.39	5.94	4.95	4.47
34	4.39	4.48	5.05	5.21	3.79	3.82	4.73	4.60	5.43	5.36	4.09	3.91	5.11	4.63	5.86	5.40	4.43	3.93
35	5.27	5.42	5.94	6.16	4.65	4.75	5.63	5.56	6.34	6.32	4.99	4.87	6.04	5.59	6.79	6.36	5.36	4.89
36	5.28	5.44	5.95	6.18	4.67	4.77	5.65	5.58	6.36	6.35	5.00	4.89	6.06	5.62	6.82	6.39	5.37	4.91

37	4.90	5.03	5.57	5.77	4.28	4.35	5.25	5.16	5.97	5.93	4.60	4.47	5.66	5.19	6.41	5.97	4.97	4.49
38	4.83	4.95	5.49	5.69	4.22	4.28	5.18	5.08	5.89	5.85	4.53	4.39	5.58	5.11	6.33	5.88	4.89	4.41
39	4.33	4.41	4.99	5.15	3.74	3.75	4.66	4.53	5.37	5.29	4.03	3.85	5.04	4.56	5.79	5.32	4.36	3.86
40	5.20	5.35	5.87	6.09	4.59	4.68	5.57	5.49	6.27	6.25	4.92	4.80	5.97	5.52	6.72	6.29	5.29	4.82
41	5.32	5.49	5.99	6.23	4.71	4.81	5.69	5.63	6.41	6.39	5.04	4.93	6.11	5.66	6.87	6.44	5.42	4.95
42	5.04	5.19	5.72	5.93	4.42	4.51	5.41	5.33	6.12	6.10	4.75	4.62	5.82	5.36	6.58	6.14	5.12	4.65
43	5.01	5.16	5.69	5.90	4.39	4.48	5.37	5.29	6.09	6.06	4.72	4.59	5.78	5.32	6.55	6.10	5.09	4.61
44	4.52	4.62	5.18	5.35	3.92	3.96	4.86	4.74	5.56	5.50	4.22	4.06	5.24	4.77	5.99	5.53	4.56	4.07
45	5.35	5.52	6.02	6.26	4.73	4.84	5.72	5.66	6.44	6.42	5.07	4.96	6.14	5.69	6.89	6.47	5.45	4.99
46	5.30	5.46	5.97	6.20	4.68	4.78	5.67	5.60	6.38	6.37	5.02	4.90	6.08	5.64	6.84	6.41	5.39	4.93
47	5.00	5.14	5.67	5.89	4.38	4.46	5.36	5.28	6.08	6.05	4.71	4.58	5.77	5.31	6.53	6.09	5.08	4.60
48	4.96	5.10	5.63	5.84	4.34	4.42	5.32	5.23	6.03	6.00	4.67	4.53	5.72	5.26	6.48	6.04	5.03	4.55
49	4.43	4.52	5.09	5.25	3.83	3.86	4.77	4.64	5.47	5.40	4.13	3.96	5.15	4.67	5.90	5.43	4.47	3.97
50	5.30	5.46	5.97	6.19	4.68	4.78	5.66	5.60	6.37	6.35	5.02	4.90	6.07	5.63	6.83	6.40	5.39	4.93
51	5.29	5.45	5.96	6.19	4.67	4.77	5.66	5.59	6.37	6.36	5.01	4.90	6.08	5.63	6.83	6.40	5.38	4.92
52	4.96	5.10	5.63	5.84	4.34	4.42	5.32	5.23	6.03	6.00	4.67	4.53	5.72	5.26	6.48	6.04	5.03	4.55
53	4.92	5.05	5.59	5.79	4.30	4.38	5.28	5.19	5.99	5.95	4.62	4.49	5.68	5.22	6.44	5.99	4.99	4.51
54	4.45	4.55	5.12	5.28	3.85	3.88	4.79	4.67	5.50	5.43	4.15	3.98	5.18	4.70	5.93	5.47	4.49	4.00
55	4.76	4.87	5.41	5.59	4.16	4.21	5.10	4.99	5.79	5.73	4.46	4.31	5.48	5.02	6.22	5.77	4.81	4.33
56	4.91	5.04	5.58	5.78	4.29	4.37	5.26	5.17	5.97	5.94	4.61	4.48	5.66	5.20	6.42	5.97	4.98	4.50
57	4.69	4.81	5.36	5.55	4.08	4.14	5.04	4.94	5.75	5.70	4.39	4.24	5.44	4.96	6.19	5.73	4.75	4.26
58	4.73	4.85	5.40	5.59	4.12	4.17	5.08	4.98	5.79	5.75	4.43	4.28	5.48	5.01	6.23	5.78	4.79	4.30
59	4.40	4.49	5.06	5.22	3.79	3.82	4.73	4.61	5.44	5.36	4.09	3.92	5.11	4.63	5.86	5.40	4.43	3.93
60	4.85	4.98	5.52	5.71	4.25	4.31	5.21	5.11	5.91	5.86	4.56	4.42	5.60	5.14	6.35	5.90	4.92	4.44
61	4.91	5.04	5.58	5.78	4.30	4.37	5.26	5.17	5.97	5.93	4.62	4.48	5.66	5.20	6.42	5.97	4.98	4.50
62	4.77	4.89	5.44	5.64	4.15	4.21	5.12	5.03	5.84	5.79	4.47	4.32	5.52	5.05	6.28	5.83	4.83	4.34
63	4.69	4.81	5.36	5.54	4.08	4.13	5.04	4.94	5.75	5.70	4.39	4.24	5.43	4.96	6.19	5.73	4.75	4.26
64	4.34	4.42	5.00	5.15	3.74	3.76	4.67	4.54	5.37	5.29	4.03	3.85	5.05	4.56	5.79	5.33	4.37	3.87
65	4.89	5.02	5.55	5.75	4.28	4.35	5.24	5.15	5.95	5.91	4.60	4.46	5.64	5.18	6.39	5.94	4.95	4.48
66	5.02	5.16	5.69	5.90	4.40	4.48	5.38	5.30	6.09	6.06	4.73	4.60	5.79	5.33	6.54	6.10	5.10	4.62
67	4.75	4.88	5.42	5.62	4.14	4.20	5.11	5.01	5.82	5.78	4.45	4.31	5.51	5.04	6.27	5.81	4.81	4.33
68	4.66	4.78	5.33	5.51	4.05	4.10	5.01	4.90	5.72	5.67	4.36	4.21	5.40	4.93	6.16	5.70	4.72	4.23
69	4.28	4.36	4.93	5.08	3.68	3.69	4.61	4.47	5.31	5.23	3.97	3.79	4.98	4.49	5.73	5.26	4.30	3.80
70	5.05	5.20	5.73	5.94	4.43	4.52	5.42	5.34	6.13	6.11	4.76	4.64	5.83	5.37	6.59	6.15	5.13	4.66
71	4.72	4.84	5.39	5.58	4.11	4.17	5.07	4.97	5.79	5.74	4.42	4.28	5.47	5.00	6.23	5.78	4.78	4.29
72	4.92	5.07	5.61	5.82	4.30	4.38	5.29	5.21	6.02	5.98	4.63	4.50	5.70	5.24	6.47	6.03	5.00	4.52
73	4.89	5.02	5.56	5.76	4.28	4.35	5.25	5.16	5.96	5.92	4.60	4.46	5.65	5.18	6.40	5.96	4.96	4.48
74	4.72	4.84	5.39	5.58	4.11	4.16	5.07	4.97	5.78	5.73	4.42	4.27	5.47	4.99	6.22	5.77	4.78	4.29
75	4.73	4.86	5.40	5.60	4.12	4.18	5.09	4.99	5.80	5.75	4.44	4.29	5.49	5.01	6.24	5.79	4.79	4.31

76	4.54	4.65	5.21	5.39	3.93	3.98	4.89	4.78	5.60	5.55	4.24	4.08	5.28	4.80	6.04	5.58	4.59	4.10
77	4.92	5.05	5.59	5.79	4.31	4.38	5.28	5.19	5.99	5.95	4.63	4.49	5.68	5.21	6.43	5.99	4.99	4.51
78	4.69	4.81	5.36	5.54	4.08	4.13	5.04	4.94	5.75	5.70	4.39	4.24	5.43	4.96	6.19	5.73	4.75	4.26
79	4.72	4.84	5.39	5.58	4.11	4.17	5.07	4.97	5.78	5.73	4.42	4.27	5.47	5.00	6.22	5.77	4.78	4.29
80	4.50	4.61	5.17	5.35	3.90	3.93	4.85	4.73	5.56	5.50	4.20	4.04	5.24	4.76	5.99	5.53	4.55	4.05
MIN	**4.18**	**4.24**	**4.83**	**4.97**	**3.59**	**3.59**	**4.50**	**4.36**	**5.19**	**5.10**	**3.87**	**3.68**	**4.87**	**4.38**	**5.60**	**5.13**	**4.19**	**3.69**
MAX	**5.35**	**5.52**	**6.02**	**6.26**	**4.73**	**4.84**	**5.72**	**5.66**	**6.44**	**6.42**	**5.07**	**4.96**	**6.14**	**5.69**	**6.89**	**6.47**	**5.45**	**4.99**
AVE	**4.87**	**5.00**	**5.54**	**5.73**	**4.26**	**4.33**	**5.22**	**5.13**	**5.93**	**5.89**	**4.58**	**4.44**	**5.62**	**5.16**	**6.37**	**5.93**	**4.94**	**4.46**

Table C- 37. Reliability Indices for A709-50W Composite Box Girdes for ADTT 1'000 and L=60, 90ft.

	L=60 ft						L=90 ft					
Φ	**1.00**		**0.95**		**1.05**		**1.00**		**0.95**		**1.05**	
# / D/(D+L)	**0.45**	**0.50**	**0.45**	**0.50**	**0.45**	**0.50**	**0.50**	**0.65**	**0.50**	**0.65**	**0.50**	**0.65**
1	4.74	4.84	5.33	5.46	4.19	4.27	4.84	5.08	5.46	5.78	4.27	4.45
2	4.75	4.85	5.35	5.48	4.20	4.28	4.85	5.10	5.48	5.80	4.28	4.47
3	4.34	4.43	4.94	5.05	3.79	3.86	4.43	4.65	5.05	5.35	3.86	4.01
4	4.71	4.81	5.31	5.43	4.17	4.25	4.81	5.06	5.43	5.75	4.25	4.43
5	4.72	4.82	5.32	5.45	4.18	4.26	4.82	5.07	5.45	5.77	4.26	4.44
6	4.31	4.40	4.91	5.02	3.77	3.84	4.40	4.62	5.02	5.31	3.84	3.98
7	4.70	4.80	5.30	5.42	4.16	4.24	4.80	5.04	5.42	5.73	4.24	4.41
8	4.71	4.80	5.30	5.43	4.16	4.24	4.80	5.05	5.43	5.74	4.24	4.42
9	4.29	4.38	4.89	5.00	3.75	3.82	4.38	4.59	5.00	5.29	3.82	3.96
10	4.86	4.97	5.47	5.60	4.30	4.39	4.97	5.23	5.60	5.94	4.39	4.59
11	4.87	4.99	5.49	5.62	4.31	4.40	4.99	5.26	5.62	5.97	4.40	4.61
12	4.50	4.60	5.11	5.23	3.94	4.02	4.60	4.84	5.23	5.55	4.02	4.19
13	4.45	4.55	5.06	5.18	3.89	3.97	4.55	4.78	5.18	5.49	3.97	4.14
14	3.96	4.04	4.56	4.66	3.42	3.48	4.04	4.23	4.66	4.92	3.48	3.59
15	4.84	4.95	5.45	5.58	4.29	4.37	4.95	5.22	5.58	5.92	4.37	4.57
16	4.85	4.96	5.46	5.60	4.29	4.38	4.96	5.23	5.60	5.94	4.38	4.58
17	4.45	4.55	5.06	5.18	3.90	3.97	4.55	4.78	5.18	5.49	3.97	4.14
18	4.41	4.50	5.01	5.13	3.85	3.93	4.50	4.73	5.13	5.43	3.93	4.09
19	3.91	3.99	4.50	4.60	3.37	3.43	3.99	4.16	4.60	4.86	3.43	3.53
20	4.83	4.94	5.44	5.57	4.27	4.36	4.94	5.20	5.57	5.91	4.36	4.56
21	4.83	4.93	5.44	5.57	4.27	4.36	4.93	5.20	5.57	5.91	4.36	4.56
22	4.41	4.51	5.02	5.14	3.86	3.94	4.51	4.74	5.14	5.44	3.94	4.10
23	4.37	4.47	4.98	5.09	3.83	3.90	4.47	4.69	5.09	5.39	3.90	4.05
24	3.87	3.94	4.45	4.56	3.33	3.39	3.94	4.11	4.56	4.80	3.39	3.49
25	4.88	4.99	5.49	5.62	4.32	4.41	4.99	5.26	5.62	5.96	4.41	4.61
26	4.90	5.01	5.52	5.65	4.34	4.43	5.01	5.29	5.65	6.00	4.43	4.64
27	4.60	4.70	5.21	5.34	4.04	4.12	4.70	4.96	5.34	5.68	4.12	4.31
28	4.55	4.66	5.17	5.29	3.99	4.07	4.66	4.91	5.29	5.62	4.07	4.25
29	4.13	4.22	4.73	4.84	3.58	3.65	4.22	4.42	4.84	5.13	3.65	3.78
30	4.86	4.97	5.47	5.60	4.30	4.39	4.97	5.24	5.60	5.94	4.39	4.59
31	4.88	4.99	5.49	5.62	4.32	4.41	4.99	5.26	5.62	5.96	4.41	4.61
32	4.55	4.65	5.16	5.28	3.99	4.07	4.65	4.89	5.28	5.60	4.07	4.25
33	4.51	4.61	5.12	5.25	3.96	4.04	4.61	4.86	5.25	5.56	4.04	4.21
34	4.06	4.14	4.66	4.77	3.52	3.58	4.14	4.34	4.77	5.04	3.58	3.70
35	4.88	4.99	5.49	5.62	4.32	4.41	4.99	5.26	5.62	5.97	4.41	4.61
36	4.89	5.00	5.50	5.64	4.33	4.41	5.00	5.27	5.64	5.99	4.41	4.62

37	4.52	4.62	5.14	5.26	3.97	4.04	4.62	4.87	5.26	5.58	4.04	4.22
38	4.46	4.56	5.07	5.19	3.91	3.98	4.56	4.80	5.19	5.51	3.98	4.15
39	4.00	4.09	4.60	4.71	3.46	3.52	4.09	4.28	4.71	4.98	3.52	3.64
40	4.82	4.93	5.43	5.56	4.26	4.35	4.93	5.19	5.56	5.90	4.35	4.55
41	4.93	5.04	5.54	5.68	4.36	4.45	5.04	5.32	5.68	6.03	4.45	4.67
42	4.66	4.76	5.27	5.40	4.09	4.18	4.76	5.02	5.40	5.74	4.18	4.37
43	4.63	4.73	5.25	5.37	4.07	4.15	4.73	4.99	5.37	5.71	4.15	4.34
44	4.18	4.27	4.78	4.89	3.64	3.70	4.27	4.48	4.89	5.18	3.70	3.84
45	4.95	5.07	5.57	5.70	4.39	4.48	5.07	5.35	5.70	6.06	4.48	4.70
46	4.90	5.02	5.52	5.65	4.34	4.43	5.02	5.29	5.65	6.01	4.43	4.64
47	4.62	4.72	5.23	5.36	4.06	4.14	4.72	4.98	5.36	5.70	4.14	4.33
48	4.58	4.68	5.19	5.32	4.02	4.10	4.68	4.94	5.32	5.65	4.10	4.28
49	4.10	4.18	4.69	4.80	3.55	3.62	4.18	4.38	4.80	5.08	3.62	3.74
50	4.91	5.02	5.52	5.65	4.35	4.44	5.02	5.29	5.65	6.00	4.44	4.64
51	4.89	5.01	5.51	5.65	4.33	4.42	5.01	5.28	5.65	6.00	4.42	4.63
52	4.58	4.68	5.19	5.32	4.02	4.10	4.68	4.94	5.32	5.65	4.10	4.29
53	4.54	4.64	5.16	5.28	3.98	4.06	4.64	4.89	5.28	5.61	4.06	4.24
54	4.12	4.20	4.72	4.83	3.57	3.63	4.20	4.41	4.83	5.11	3.63	3.77
55	4.41	4.50	5.00	5.12	3.86	3.93	4.50	4.72	5.12	5.41	3.93	4.09
56	4.54	4.64	5.15	5.27	3.98	4.06	4.64	4.88	5.27	5.59	4.06	4.23
57	4.33	4.43	4.94	5.06	3.78	3.85	4.43	4.66	5.06	5.37	3.85	4.01
58	4.37	4.46	4.98	5.10	3.81	3.88	4.46	4.70	5.10	5.41	3.88	4.05
59	4.06	4.15	4.66	4.77	3.51	3.58	4.15	4.34	4.77	5.05	3.58	3.70
60	4.49	4.59	5.10	5.22	3.94	4.01	4.59	4.83	5.22	5.53	4.01	4.18
61	4.54	4.64	5.15	5.27	3.98	4.06	4.64	4.88	5.27	5.59	4.06	4.24
62	4.40	4.50	5.01	5.14	3.84	3.92	4.50	4.74	5.14	5.45	3.92	4.08
63	4.33	4.43	4.94	5.06	3.78	3.85	4.43	4.66	5.06	5.36	3.85	4.01
64	4.01	4.09	4.61	4.71	3.46	3.52	4.09	4.28	4.71	4.98	3.52	3.65
65	4.52	4.62	5.13	5.25	3.96	4.04	4.62	4.86	5.25	5.57	4.04	4.22
66	4.64	4.74	5.25	5.38	4.08	4.16	4.74	5.00	5.38	5.71	4.16	4.35
67	4.39	4.48	5.00	5.12	3.83	3.90	4.48	4.72	5.12	5.44	3.90	4.07
68	4.31	4.40	4.91	5.03	3.75	3.83	4.40	4.63	5.03	5.33	3.83	3.98
69	3.96	4.04	4.55	4.66	3.41	3.47	4.04	4.22	4.66	4.92	3.47	3.59
70	4.67	4.77	5.28	5.41	4.10	4.19	4.77	5.04	5.41	5.75	4.19	4.38
71	4.36	4.46	4.97	5.09	3.80	3.88	4.46	4.69	5.09	5.40	3.88	4.04
72	4.54	4.65	5.16	5.29	3.97	4.06	4.65	4.90	5.29	5.63	4.06	4.24
73	4.52	4.62	5.13	5.26	3.96	4.04	4.62	4.86	5.26	5.58	4.04	4.22
74	4.36	4.45	4.97	5.09	3.80	3.87	4.45	4.68	5.09	5.39	3.87	4.04
75	4.37	4.47	4.98	5.10	3.81	3.89	4.47	4.70	5.10	5.41	3.89	4.05

76	4.19	4.29	4.80	4.92	3.64	3.71	4.29	4.50	4.92	5.22	3.71	3.85
77	4.55	4.65	5.16	5.28	3.99	4.07	4.65	4.89	5.28	5.60	4.07	4.25
78	4.33	4.43	4.94	5.06	3.78	3.85	4.43	4.66	5.06	5.36	3.85	4.01
79	4.36	4.46	4.97	5.09	3.80	3.88	4.46	4.69	5.09	5.40	3.88	4.04
80	4.16	4.25	4.76	4.88	3.61	3.67	4.25	4.46	4.88	5.17	3.67	3.81
MIN	**3.87**	**3.94**	**4.45**	**4.56**	**3.33**	**3.39**	**3.94**	**4.11**	**4.56**	**4.80**	**3.39**	**3.49**
MAX	**4.95**	**5.07**	**5.57**	**5.70**	**4.39**	**4.48**	**5.07**	**5.35**	**5.70**	**6.06**	**4.48**	**4.70**
AVE	**4.51**	**4.60**	**5.11**	**5.24**	**3.95**	**4.03**	**4.60**	**4.84**	**5.24**	**5.55**	**4.03**	**4.20**

Table C- 38. Reliability Indices for A709-50W Composite Box Girdes for ADTT 1'000 and L=120, 200, 300ft.

	L=120 ft						L=200 ft						L=300 ft					
Φ	1.00		0.95		1.05		1.00		0.95		1.05		1.00		0.95		1.05	
# / D/(D+L)	0.55	0.70	0.55	0.70	0.55	0.70	0.60	0.75	0.60	0.75	0.60	0.75	0.65	0.80	0.65	0.80	0.65	0.80
1	4.84	5.08	5.46	5.78	4.27	4.45	5.34	5.30	6.03	6.04	4.71	4.62	5.74	5.34	6.47	6.09	5.07	4.66
2	4.85	5.10	5.48	5.80	4.28	4.47	5.36	5.32	6.06	6.07	4.73	4.64	5.77	5.37	6.51	6.13	5.10	4.68
3	4.43	4.65	5.05	5.35	3.86	4.01	4.92	4.85	5.61	5.60	4.29	4.17	5.31	4.89	6.05	5.65	4.64	4.20
4	4.81	5.06	5.43	5.75	4.25	4.43	5.32	5.27	6.00	6.01	4.69	4.60	5.71	5.31	6.45	6.06	5.05	4.63
5	4.82	5.07	5.45	5.77	4.26	4.44	5.33	5.28	6.02	6.03	4.70	4.61	5.73	5.33	6.47	6.09	5.06	4.64
6	4.40	4.62	5.02	5.31	3.84	3.98	4.89	4.81	5.58	5.56	4.26	4.14	5.27	4.85	6.01	5.61	4.60	4.17
7	4.80	5.04	5.42	5.73	4.24	4.41	5.30	5.25	5.99	5.99	4.68	4.58	5.70	5.29	6.43	6.05	5.03	4.61
8	4.80	5.05	5.43	5.74	4.24	4.42	5.31	5.26	6.00	6.00	4.68	4.59	5.71	5.31	6.44	6.06	5.04	4.62
9	4.38	4.59	5.00	5.29	3.82	3.96	4.86	4.79	5.55	5.53	4.24	4.11	5.25	4.83	5.98	5.58	4.58	4.14
10	4.97	5.23	5.60	5.94	4.39	4.59	5.49	5.46	6.19	6.21	4.86	4.77	5.90	5.51	6.64	6.27	5.23	4.81
11	4.99	5.26	5.62	5.97	4.40	4.61	5.52	5.49	6.23	6.25	4.88	4.80	5.94	5.54	6.69	6.32	5.25	4.84
12	4.60	4.84	5.23	5.55	4.02	4.19	5.11	5.05	5.81	5.81	4.46	4.36	5.51	5.10	6.26	5.87	4.83	4.39
13	4.55	4.78	5.18	5.49	3.97	4.14	5.05	4.99	5.75	5.75	4.41	4.30	5.45	5.04	6.20	5.81	4.77	4.34
14	4.04	4.23	4.66	4.92	3.48	3.59	4.50	4.41	5.20	5.16	3.87	3.73	4.88	4.44	5.62	5.20	4.21	3.75
15	4.95	5.22	5.58	5.92	4.37	4.57	5.48	5.44	6.18	6.19	4.84	4.76	5.89	5.49	6.63	6.25	5.21	4.79
16	4.96	5.23	5.60	5.94	4.38	4.58	5.49	5.46	6.20	6.22	4.85	4.77	5.91	5.51	6.66	6.28	5.22	4.81
17	4.55	4.78	5.18	5.49	3.97	4.14	5.05	5.00	5.76	5.75	4.41	4.30	5.46	5.04	6.20	5.81	4.77	4.34
18	4.50	4.73	5.13	5.43	3.93	4.09	5.00	4.94	5.70	5.69	4.36	4.25	5.40	4.98	6.14	5.74	4.72	4.28
19	3.99	4.16	4.60	4.86	3.43	3.53	4.44	4.34	5.13	5.08	3.81	3.66	4.81	4.37	5.55	5.13	4.14	3.69
20	4.94	5.20	5.57	5.91	4.36	4.56	5.46	5.43	6.16	6.18	4.82	4.74	5.87	5.47	6.61	6.24	5.19	4.78
21	4.93	5.20	5.57	5.91	4.36	4.56	5.46	5.43	6.17	6.19	4.82	4.74	5.88	5.48	6.63	6.25	5.19	4.78
22	4.51	4.74	5.14	5.44	3.94	4.10	5.01	4.94	5.71	5.70	4.37	4.26	5.40	4.99	6.15	5.75	4.73	4.29
23	4.47	4.69	5.09	5.39	3.90	4.05	4.96	4.89	5.66	5.64	4.33	4.21	5.35	4.93	6.09	5.70	4.68	4.24
24	3.94	4.11	4.56	4.80	3.39	3.49	4.39	4.28	5.08	5.03	3.77	3.61	4.76	4.32	5.49	5.07	4.09	3.64
25	4.99	5.26	5.62	5.96	4.41	4.61	5.52	5.48	6.21	6.23	4.88	4.80	5.93	5.53	6.67	6.29	5.25	4.84
26	5.01	5.29	5.65	6.00	4.43	4.64	5.55	5.52	6.26	6.28	4.90	4.83	5.97	5.57	6.72	6.35	5.28	4.87
27	4.70	4.96	5.34	5.68	4.12	4.31	5.23	5.18	5.94	5.95	4.58	4.48	5.64	5.23	6.39	6.00	4.95	4.52
28	4.66	4.91	5.29	5.62	4.07	4.25	5.17	5.12	5.88	5.89	4.53	4.43	5.58	5.17	6.34	5.95	4.90	4.46
29	4.22	4.42	4.84	5.13	3.65	3.78	4.70	4.62	5.40	5.37	4.06	3.93	5.09	4.66	5.84	5.43	4.41	3.96
30	4.97	5.24	5.60	5.94	4.39	4.59	5.50	5.46	6.19	6.21	4.86	4.78	5.91	5.51	6.65	6.27	5.23	4.81
31	4.99	5.26	5.62	5.96	4.41	4.61	5.52	5.49	6.22	6.24	4.88	4.80	5.93	5.53	6.67	6.30	5.25	4.84
32	4.65	4.89	5.28	5.60	4.07	4.25	5.16	5.11	5.86	5.87	4.52	4.42	5.57	5.16	6.31	5.92	4.88	4.45
33	4.61	4.86	5.25	5.56	4.04	4.21	5.12	5.07	5.82	5.83	4.48	4.38	5.53	5.11	6.27	5.88	4.85	4.41
34	4.14	4.34	4.77	5.04	3.58	3.70	4.62	4.53	5.31	5.28	3.98	3.84	5.00	4.57	5.75	5.33	4.32	3.87
35	4.99	5.26	5.62	5.97	4.41	4.61	5.52	5.49	6.22	6.24	4.88	4.80	5.93	5.54	6.68	6.30	5.25	4.84
36	5.00	5.27	5.64	5.99	4.41	4.62	5.54	5.51	6.24	6.27	4.89	4.81	5.95	5.56	6.71	6.33	5.27	4.85

37	4.62	4.87	5.26	5.58	4.04	4.22	5.14	5.09	5.85	5.85	4.49	4.39	5.55	5.13	6.30	5.91	4.86	4.43
38	4.56	4.80	5.19	5.51	3.98	4.15	5.07	5.01	5.77	5.77	4.43	4.32	5.47	5.05	6.22	5.82	4.79	4.35
39	4.09	4.28	4.71	4.98	3.52	3.64	4.55	4.46	5.25	5.21	3.92	3.78	4.93	4.50	5.68	5.26	4.26	3.80
40	4.93	5.19	5.56	5.90	4.35	4.55	5.45	5.42	6.15	6.17	4.81	4.73	5.86	5.46	6.61	6.23	5.18	4.77
41	5.04	5.32	5.68	6.03	4.45	4.67	5.58	5.55	6.28	6.31	4.93	4.86	6.00	5.60	6.75	6.37	5.31	4.90
42	4.76	5.02	5.40	5.74	4.18	4.37	5.29	5.25	6.00	6.02	4.64	4.55	5.71	5.30	6.46	6.07	5.02	4.59
43	4.73	4.99	5.37	5.71	4.15	4.34	5.26	5.22	5.97	5.98	4.61	4.52	5.67	5.26	6.43	6.04	4.98	4.56
44	4.27	4.48	4.89	5.18	3.70	3.84	4.75	4.67	5.44	5.42	4.12	3.99	5.14	4.71	5.88	5.47	4.46	4.02
45	5.07	5.35	5.70	6.06	4.48	4.70	5.61	5.58	6.31	6.34	4.96	4.89	6.03	5.63	6.78	6.40	5.34	4.93
46	5.02	5.29	5.65	6.01	4.43	4.64	5.55	5.53	6.26	6.29	4.91	4.83	5.97	5.58	6.72	6.35	5.29	4.87
47	4.72	4.98	5.36	5.70	4.14	4.33	5.25	5.20	5.96	5.97	4.60	4.51	5.66	5.25	6.41	6.02	4.97	4.54
48	4.68	4.94	5.32	5.65	4.10	4.28	5.20	5.16	5.91	5.92	4.56	4.46	5.61	5.20	6.37	5.98	4.93	4.50
49	4.18	4.38	4.80	5.08	3.62	3.74	4.65	4.57	5.35	5.32	4.02	3.89	5.04	4.61	5.78	5.37	4.37	3.91
50	5.02	5.29	5.65	6.00	4.44	4.64	5.55	5.52	6.25	6.28	4.91	4.83	5.97	5.57	6.71	6.34	5.28	4.87
51	5.01	5.28	5.65	6.00	4.42	4.63	5.54	5.52	6.25	6.28	4.90	4.82	5.96	5.57	6.72	6.34	5.28	4.86
52	4.68	4.94	5.32	5.65	4.10	4.29	5.20	5.16	5.91	5.92	4.56	4.46	5.61	5.20	6.36	5.98	4.93	4.50
53	4.64	4.89	5.28	5.61	4.06	4.24	5.16	5.11	5.87	5.87	4.52	4.42	5.57	5.16	6.32	5.93	4.88	4.45
54	4.20	4.41	4.83	5.11	3.63	3.77	4.68	4.60	5.38	5.35	4.05	3.91	5.07	4.64	5.81	5.40	4.39	3.94
55	4.50	4.72	5.12	5.41	3.93	4.09	4.99	4.92	5.67	5.66	4.36	4.24	5.38	4.96	6.10	5.71	4.71	4.28
56	4.64	4.88	5.27	5.59	4.06	4.23	5.15	5.10	5.85	5.86	4.51	4.41	5.56	5.14	6.30	5.91	4.87	4.44
57	4.43	4.66	5.06	5.37	3.85	4.01	4.93	4.86	5.63	5.62	4.29	4.17	5.33	4.90	6.07	5.67	4.64	4.20
58	4.46	4.70	5.10	5.41	3.88	4.05	4.97	4.91	5.67	5.67	4.32	4.21	5.37	4.95	6.12	5.72	4.69	4.25
59	4.15	4.34	4.77	5.05	3.58	3.70	4.62	4.53	5.32	5.29	3.99	3.85	5.00	4.57	5.75	5.34	4.33	3.88
60	4.59	4.83	5.22	5.53	4.01	4.18	5.09	5.04	5.79	5.79	4.46	4.35	5.49	5.08	6.23	5.84	4.82	4.38
61	4.64	4.88	5.27	5.59	4.06	4.24	5.15	5.10	5.85	5.85	4.51	4.41	5.55	5.14	6.30	5.91	4.87	4.44
62	4.50	4.74	5.14	5.45	3.92	4.08	5.01	4.95	5.72	5.71	4.36	4.25	5.41	4.99	6.17	5.77	4.73	4.29
63	4.43	4.66	5.06	5.36	3.85	4.01	4.93	4.86	5.63	5.62	4.29	4.17	5.32	4.90	6.07	5.67	4.64	4.20
64	4.09	4.28	4.71	4.98	3.52	3.65	4.56	4.47	5.25	5.22	3.93	3.78	4.94	4.50	5.68	5.27	4.27	3.81
65	4.62	4.86	5.25	5.57	4.04	4.22	5.13	5.07	5.83	5.83	4.49	4.39	5.53	5.12	6.27	5.88	4.85	4.42
66	4.74	5.00	5.38	5.71	4.16	4.35	5.27	5.22	5.97	5.98	4.62	4.53	5.68	5.27	6.43	6.04	4.99	4.56
67	4.48	4.72	5.12	5.44	3.90	4.07	4.99	4.93	5.70	5.70	4.35	4.24	5.40	4.98	6.15	5.75	4.71	4.27
68	4.40	4.63	5.03	5.33	3.83	3.98	4.90	4.83	5.60	5.59	4.26	4.14	5.29	4.87	6.04	5.64	4.61	4.17
69	4.04	4.22	4.66	4.92	3.47	3.59	4.50	4.40	5.19	5.15	3.87	3.72	4.87	4.44	5.61	5.20	4.20	3.75
70	4.77	5.04	5.41	5.75	4.19	4.38	5.30	5.26	6.01	6.03	4.65	4.56	5.72	5.31	6.47	6.09	5.03	4.60
71	4.46	4.69	5.09	5.40	3.88	4.04	4.96	4.90	5.67	5.66	4.32	4.20	5.36	4.94	6.11	5.71	4.68	4.24
72	4.65	4.90	5.29	5.63	4.06	4.24	5.17	5.13	5.89	5.90	4.52	4.42	5.59	5.18	6.35	5.96	4.90	4.46
73	4.62	4.86	5.26	5.58	4.04	4.22	5.13	5.08	5.84	5.84	4.49	4.39	5.54	5.13	6.29	5.90	4.86	4.42
74	4.45	4.68	5.09	5.39	3.87	4.04	4.96	4.89	5.66	5.65	4.31	4.20	5.36	4.94	6.10	5.71	4.67	4.23
75	4.47	4.70	5.10	5.41	3.89	4.05	4.97	4.91	5.68	5.67	4.33	4.22	5.38	4.96	6.13	5.73	4.69	4.25

76	4.29	4.50	4.92	5.22	3.71	3.85	4.78	4.70	5.48	5.47	4.13	4.01	5.17	4.75	5.93	5.52	4.49	4.04
77	4.65	4.89	5.28	5.60	4.07	4.25	5.16	5.11	5.87	5.87	4.52	4.42	5.57	5.16	6.32	5.93	4.88	4.45
78	4.43	4.66	5.06	5.36	3.85	4.01	4.93	4.86	5.63	5.62	4.29	4.17	5.32	4.90	6.07	5.67	4.64	4.20
79	4.46	4.69	5.09	5.40	3.88	4.04	4.96	4.89	5.66	5.65	4.32	4.20	5.36	4.94	6.11	5.71	4.68	4.24
80	4.25	4.46	4.88	5.17	3.67	3.81	4.73	4.66	5.44	5.42	4.09	3.96	5.13	4.70	5.88	5.47	4.45	4.00
MIN	**3.94**	**4.11**	**4.56**	**4.80**	**3.39**	**3.49**	**4.39**	**4.28**	**5.08**	**5.03**	**3.77**	**3.61**	**4.76**	**4.32**	**5.49**	**5.07**	**4.09**	**3.64**
MAX	**5.07**	**5.35**	**5.70**	**6.06**	**4.48**	**4.70**	**5.61**	**5.58**	**6.31**	**6.34**	**4.96**	**4.89**	**6.03**	**5.63**	**6.78**	**6.40**	**5.34**	**4.93**
AVE	**4.60**	**4.84**	**5.24**	**5.55**	**4.03**	**4.20**	**5.11**	**5.06**	**5.81**	**5.81**	**4.47**	**4.37**	**5.51**	**5.10**	**6.26**	**5.87**	**4.83**	**4.40**

Table C- 39. Reliability Indices for A709-50W Composite Box Girdes for ADTT 2'500 and L=60, 90ft.

	L=60 ft						L=90 ft					
Φ	**1.00**		**0.95**		**1.05**		**1.00**		**0.95**		**1.05**	
# / D/(D+L)	**0.45**	**0.50**	**0.45**	**0.50**	**0.45**	**0.50**	**0.50**	**0.65**	**0.50**	**0.65**	**0.50**	**0.65**
1	4.68	4.78	5.27	5.40	4.13	4.22	4.78	5.03	5.40	5.73	4.22	4.41
2	4.69	4.79	5.29	5.42	4.14	4.23	4.79	5.06	5.42	5.75	4.23	4.42
3	4.28	4.37	4.88	4.99	3.74	3.81	4.37	4.60	4.99	5.30	3.81	3.97
4	4.65	4.76	5.25	5.37	4.11	4.19	4.76	5.01	5.37	5.70	4.19	4.38
5	4.66	4.76	5.26	5.38	4.12	4.20	4.76	5.02	5.38	5.72	4.20	4.39
6	4.25	4.35	4.85	4.96	3.71	3.78	4.35	4.57	4.96	5.26	3.78	3.94
7	4.64	4.74	5.23	5.36	4.10	4.18	4.74	4.99	5.36	5.68	4.18	4.37
8	4.65	4.75	5.24	5.37	4.11	4.19	4.75	5.00	5.37	5.69	4.19	4.37
9	4.24	4.33	4.83	4.94	3.70	3.77	4.33	4.55	4.94	5.24	3.77	3.92
10	4.80	4.91	5.40	5.54	4.24	4.33	4.91	5.18	5.54	5.89	4.33	4.54
11	4.81	4.93	5.43	5.56	4.26	4.35	4.93	5.21	5.56	5.92	4.35	4.56
12	4.44	4.54	5.04	5.17	3.88	3.96	4.54	4.79	5.17	5.50	3.96	4.14
13	4.39	4.49	4.99	5.12	3.84	3.91	4.49	4.73	5.12	5.44	3.91	4.09
14	3.90	3.99	4.49	4.60	3.37	3.43	3.99	4.18	4.60	4.87	3.43	3.55
15	4.78	4.89	5.39	5.52	4.23	4.32	4.89	5.17	5.52	5.87	4.32	4.53
16	4.79	4.90	5.40	5.53	4.23	4.32	4.90	5.18	5.53	5.89	4.32	4.53
17	4.39	4.49	4.99	5.12	3.84	3.92	4.49	4.74	5.12	5.44	3.92	4.09
18	4.35	4.44	4.95	5.07	3.80	3.87	4.44	4.68	5.07	5.38	3.87	4.04
19	3.85	3.93	4.44	4.54	3.32	3.38	3.93	4.11	4.54	4.81	3.38	3.49
20	4.77	4.88	5.37	5.51	4.22	4.30	4.88	5.15	5.51	5.85	4.30	4.51
21	4.77	4.88	5.37	5.51	4.21	4.30	4.88	5.15	5.51	5.86	4.30	4.51
22	4.35	4.45	4.95	5.08	3.80	3.88	4.45	4.69	5.08	5.39	3.88	4.05
23	4.31	4.41	4.91	5.03	3.77	3.84	4.41	4.64	5.03	5.34	3.84	4.01
24	3.81	3.89	4.39	4.50	3.28	3.34	3.89	4.07	4.50	4.75	3.34	3.44
25	4.82	4.93	5.43	5.56	4.26	4.35	4.93	5.21	5.56	5.91	4.35	4.57
26	4.84	4.95	5.45	5.59	4.28	4.37	4.95	5.24	5.59	5.95	4.37	4.59
27	4.54	4.64	5.15	5.28	3.98	4.06	4.64	4.91	5.28	5.62	4.06	4.26
28	4.49	4.60	5.10	5.23	3.94	4.02	4.60	4.86	5.23	5.57	4.02	4.21
29	4.07	4.16	4.67	4.78	3.53	3.59	4.16	4.38	4.78	5.08	3.59	3.74
30	4.80	4.91	5.41	5.54	4.24	4.33	4.91	5.19	5.54	5.89	4.33	4.54
31	4.82	4.93	5.43	5.56	4.26	4.35	4.93	5.21	5.56	5.91	4.35	4.57
32	4.49	4.59	5.09	5.22	3.93	4.01	4.59	4.84	5.22	5.55	4.01	4.20
33	4.45	4.55	5.06	5.18	3.90	3.98	4.55	4.81	5.18	5.51	3.98	4.16
34	4.00	4.09	4.60	4.71	3.46	3.52	4.09	4.29	4.71	4.99	3.52	3.66
35	4.82	4.93	5.43	5.56	4.26	4.35	4.93	5.21	5.56	5.91	4.35	4.56
36	4.83	4.94	5.44	5.57	4.27	4.36	4.94	5.22	5.57	5.94	4.36	4.58

37	4.46	4.57	5.07	5.20	3.91	3.99	4.57	4.82	5.20	5.53	3.99	4.17
38	4.40	4.50	5.01	5.13	3.85	3.93	4.50	4.75	5.13	5.45	3.93	4.11
39	3.95	4.03	4.54	4.65	3.41	3.47	4.03	4.23	4.65	4.93	3.47	3.60
40	4.76	4.87	5.37	5.50	4.20	4.29	4.87	5.14	5.50	5.85	4.29	4.50
41	4.86	4.98	5.48	5.61	4.30	4.40	4.98	5.27	5.61	5.98	4.40	4.62
42	4.60	4.70	5.21	5.34	4.04	4.12	4.70	4.98	5.34	5.69	4.12	4.32
43	4.57	4.68	5.18	5.31	4.01	4.09	4.68	4.94	5.31	5.66	4.09	4.29
44	4.12	4.21	4.72	4.83	3.58	3.65	4.21	4.43	4.83	5.13	3.65	3.79
45	4.89	5.01	5.50	5.64	4.33	4.43	5.01	5.30	5.64	6.01	4.43	4.65
46	4.84	4.96	5.46	5.59	4.28	4.37	4.96	5.24	5.59	5.95	4.37	4.59
47	4.56	4.66	5.17	5.30	4.00	4.08	4.66	4.93	5.30	5.64	4.08	4.28
48	4.52	4.62	5.13	5.26	3.96	4.04	4.62	4.89	5.26	5.60	4.04	4.24
49	4.04	4.13	4.63	4.74	3.50	3.56	4.13	4.33	4.74	5.03	3.56	3.70
50	4.85	4.96	5.45	5.59	4.29	4.38	4.96	5.24	5.59	5.95	4.38	4.60
51	4.83	4.95	5.45	5.58	4.27	4.36	4.95	5.23	5.58	5.95	4.36	4.58
52	4.52	4.63	5.13	5.26	3.96	4.05	4.63	4.89	5.26	5.60	4.05	4.24
53	4.48	4.59	5.09	5.22	3.93	4.01	4.59	4.84	5.22	5.55	4.01	4.20
54	4.06	4.15	4.65	4.77	3.52	3.58	4.15	4.36	4.77	5.06	3.58	3.72
55	4.35	4.44	4.94	5.06	3.80	3.88	4.44	4.67	5.06	5.36	3.88	4.04
56	4.48	4.58	5.08	5.21	3.92	4.00	4.58	4.83	5.21	5.54	4.00	4.19
57	4.27	4.37	4.88	5.00	3.72	3.80	4.37	4.61	5.00	5.31	3.80	3.96
58	4.31	4.41	4.92	5.04	3.75	3.83	4.41	4.65	5.04	5.36	3.83	4.00
59	4.00	4.09	4.60	4.71	3.46	3.52	4.09	4.30	4.71	5.00	3.52	3.66
60	4.43	4.53	5.03	5.16	3.88	3.96	4.53	4.78	5.16	5.48	3.96	4.14
61	4.48	4.58	5.08	5.21	3.92	4.00	4.58	4.83	5.21	5.54	4.00	4.19
62	4.34	4.44	4.95	5.07	3.78	3.86	4.44	4.69	5.07	5.40	3.86	4.04
63	4.27	4.37	4.88	5.00	3.72	3.80	4.37	4.61	5.00	5.31	3.80	3.96
64	3.95	4.03	4.54	4.65	3.41	3.47	4.03	4.23	4.65	4.93	3.47	3.60
65	4.46	4.56	5.06	5.19	3.91	3.99	4.56	4.81	5.19	5.52	3.99	4.17
66	4.58	4.68	5.19	5.32	4.02	4.10	4.68	4.95	5.32	5.66	4.10	4.30
67	4.33	4.43	4.94	5.06	3.77	3.85	4.43	4.67	5.06	5.38	3.85	4.02
68	4.25	4.34	4.85	4.97	3.70	3.77	4.34	4.58	4.97	5.28	3.77	3.93
69	3.90	3.98	4.49	4.60	3.36	3.42	3.98	4.17	4.60	4.87	3.42	3.54
70	4.61	4.71	5.22	5.35	4.05	4.13	4.71	4.99	5.35	5.70	4.13	4.33
71	4.30	4.40	4.91	5.03	3.75	3.82	4.40	4.64	5.03	5.35	3.82	3.99
72	4.48	4.59	5.10	5.23	3.92	4.00	4.59	4.85	5.23	5.58	4.00	4.20
73	4.46	4.56	5.07	5.19	3.90	3.98	4.56	4.82	5.19	5.52	3.98	4.17
74	4.30	4.39	4.90	5.03	3.74	3.82	4.39	4.64	5.03	5.34	3.82	3.99
75	4.31	4.41	4.92	5.04	3.75	3.83	4.41	4.65	5.04	5.36	3.83	4.00

76	4.13	4.23	4.74	4.86	3.58	3.65	4.23	4.45	4.86	5.16	3.65	3.81
77	4.49	4.59	5.09	5.22	3.93	4.01	4.59	4.85	5.22	5.55	4.01	4.20
78	4.27	4.37	4.88	5.00	3.72	3.80	4.37	4.61	5.00	5.31	3.80	3.96
79	4.30	4.40	4.91	5.03	3.75	3.82	4.40	4.64	5.03	5.35	3.82	3.99
80	4.10	4.19	4.70	4.82	3.55	3.62	4.19	4.41	4.82	5.12	3.62	3.77
MIN	**3.81**	**3.89**	**4.39**	**4.50**	**3.28**	**3.34**	**3.89**	**4.07**	**4.50**	**4.75**	**3.34**	**3.44**
MAX	**4.89**	**5.01**	**5.50**	**5.64**	**4.33**	**4.43**	**5.01**	**5.30**	**5.64**	**6.01**	**4.43**	**4.65**
AVE	**4.45**	**4.55**	**5.05**	**5.17**	**3.89**	**3.97**	**4.55**	**4.80**	**5.17**	**5.50**	**3.97**	**4.15**

Table C- 40. Reliability Indices for A709-50W Composite Box Girdes for ADTT 2'500 and L=120, 200, 300ft.

	L=120 ft						L=200 ft						L=300 ft					
Φ	1.00		0.95		1.05		1.00		0.95		1.05		1.00		0.95		1.05	
# / D/(D+L)	**0.55**	**0.70**	**0.55**	**0.70**	**0.55**	**0.70**	**0.60**	**0.75**	**0.60**	**0.75**	**0.60**	**0.75**	**0.65**	**0.80**	**0.65**	**0.80**	**0.65**	**0.80**
1	4.82	5.02	5.46	5.73	4.24	4.38	5.29	5.26	5.97	6.00	4.66	4.59	5.74	5.34	6.47	6.09	5.07	4.66
2	4.84	5.05	5.48	5.76	4.25	4.39	5.31	5.29	6.00	6.03	4.68	4.61	5.77	5.37	6.51	6.13	5.10	4.68
3	4.41	4.58	5.05	5.30	3.83	3.93	4.86	4.81	5.55	5.56	4.24	4.13	5.31	4.89	6.05	5.65	4.64	4.20
4	4.80	5.00	5.44	5.71	4.22	4.35	5.26	5.23	5.95	5.97	4.64	4.56	5.71	5.31	6.45	6.06	5.05	4.63
5	4.81	5.01	5.45	5.72	4.23	4.36	5.27	5.25	5.96	5.99	4.65	4.57	5.73	5.33	6.47	6.09	5.06	4.64
6	4.38	4.55	5.02	5.26	3.80	3.90	4.83	4.78	5.52	5.52	4.21	4.10	5.27	4.85	6.01	5.61	4.60	4.17
7	4.79	4.98	5.42	5.69	4.21	4.34	5.25	5.21	5.93	5.95	4.62	4.54	5.70	5.29	6.43	6.05	5.03	4.61
8	4.79	4.99	5.43	5.70	4.21	4.34	5.25	5.22	5.94	5.97	4.63	4.55	5.71	5.31	6.44	6.06	5.04	4.62
9	4.36	4.53	5.00	5.23	3.78	3.88	4.81	4.75	5.49	5.49	4.18	4.08	5.25	4.83	5.98	5.58	4.58	4.14
10	4.96	5.18	5.61	5.90	4.36	4.52	5.44	5.42	6.13	6.17	4.80	4.74	5.90	5.51	6.64	6.27	5.23	4.81
11	4.98	5.21	5.64	5.94	4.38	4.54	5.46	5.45	6.17	6.21	4.82	4.76	5.94	5.54	6.69	6.32	5.25	4.84
12	4.58	4.78	5.23	5.51	3.98	4.11	5.05	5.02	5.75	5.78	4.41	4.32	5.51	5.10	6.26	5.87	4.83	4.39
13	4.53	4.72	5.18	5.44	3.93	4.06	4.99	4.95	5.69	5.71	4.36	4.27	5.45	5.04	6.20	5.81	4.77	4.34
14	4.01	4.15	4.65	4.86	3.43	3.50	4.45	4.37	5.14	5.12	3.82	3.69	4.88	4.44	5.62	5.20	4.21	3.75
15	4.94	5.16	5.59	5.88	4.35	4.50	5.42	5.40	6.12	6.15	4.79	4.72	5.89	5.49	6.63	6.25	5.21	4.79
16	4.95	5.18	5.61	5.90	4.35	4.51	5.43	5.42	6.14	6.18	4.79	4.73	5.91	5.51	6.66	6.28	5.22	4.81
17	4.53	4.72	5.18	5.45	3.94	4.06	5.00	4.96	5.70	5.71	4.36	4.27	5.46	5.04	6.20	5.81	4.77	4.34
18	4.48	4.67	5.13	5.39	3.89	4.01	4.94	4.90	5.64	5.65	4.31	4.21	5.40	4.98	6.14	5.74	4.72	4.28
19	3.95	4.08	4.59	4.79	3.38	3.44	4.38	4.30	5.07	5.04	3.76	3.63	4.81	4.37	5.55	5.13	4.14	3.69
20	4.93	5.15	5.58	5.87	4.33	4.49	5.40	5.39	6.10	6.14	4.77	4.70	5.87	5.47	6.61	6.24	5.19	4.78
21	4.93	5.15	5.58	5.87	4.33	4.49	5.41	5.39	6.11	6.15	4.77	4.70	5.88	5.48	6.63	6.25	5.19	4.78
22	4.49	4.67	5.14	5.40	3.90	4.02	4.95	4.91	5.65	5.66	4.32	4.22	5.40	4.99	6.15	5.75	4.73	4.29
23	4.45	4.62	5.09	5.34	3.86	3.97	4.90	4.86	5.60	5.60	4.27	4.18	5.35	4.93	6.09	5.70	4.68	4.24
24	3.91	4.03	4.54	4.74	3.34	3.39	4.34	4.25	5.02	4.99	3.72	3.58	4.76	4.32	5.49	5.07	4.09	3.64
25	4.98	5.20	5.63	5.92	4.39	4.54	5.46	5.45	6.15	6.19	4.82	4.76	5.93	5.53	6.67	6.29	5.25	4.84
26	5.01	5.24	5.66	5.97	4.40	4.57	5.49	5.49	6.20	6.25	4.85	4.79	5.97	5.57	6.72	6.35	5.28	4.87
27	4.69	4.90	5.35	5.63	4.09	4.23	5.17	5.14	5.88	5.91	4.52	4.45	5.64	5.23	6.39	6.00	4.95	4.52
28	4.64	4.85	5.30	5.58	4.04	4.18	5.12	5.09	5.82	5.85	4.47	4.39	5.58	5.17	6.34	5.95	4.90	4.46
29	4.19	4.35	4.84	5.07	3.60	3.70	4.64	4.58	5.34	5.33	4.01	3.89	5.09	4.66	5.84	5.43	4.41	3.96
30	4.96	5.18	5.61	5.90	4.36	4.52	5.44	5.43	6.14	6.17	4.80	4.74	5.91	5.51	6.65	6.27	5.23	4.81
31	4.98	5.20	5.63	5.93	4.38	4.54	5.46	5.45	6.16	6.20	4.82	4.76	5.93	5.53	6.67	6.30	5.25	4.84
32	4.63	4.83	5.29	5.56	4.03	4.17	5.10	5.07	5.81	5.83	4.46	4.38	5.57	5.16	6.31	5.92	4.88	4.45
33	4.60	4.79	5.25	5.52	4.00	4.13	5.07	5.03	5.77	5.79	4.43	4.34	5.53	5.11	6.27	5.88	4.85	4.41
34	4.11	4.27	4.76	4.99	3.53	3.61	4.56	4.49	5.25	5.24	3.93	3.81	5.00	4.57	5.75	5.33	4.32	3.87
35	4.98	5.20	5.63	5.93	4.38	4.54	5.46	5.45	6.16	6.20	4.82	4.76	5.93	5.54	6.68	6.30	5.25	4.84
36	4.99	5.22	5.65	5.95	4.39	4.56	5.48	5.47	6.18	6.23	4.84	4.78	5.95	5.56	6.71	6.33	5.27	4.85

37	4.61	4.81	5.26	5.54	4.01	4.14	5.08	5.05	5.79	5.81	4.44	4.36	5.55	5.13	6.30	5.91	4.86	4.43
38	4.54	4.73	5.19	5.46	3.95	4.07	5.01	4.97	5.71	5.73	4.37	4.28	5.47	5.05	6.22	5.82	4.79	4.35
39	4.06	4.20	4.70	4.92	3.48	3.55	4.50	4.42	5.19	5.17	3.87	3.74	4.93	4.50	5.68	5.26	4.26	3.80
40	4.92	5.14	5.57	5.86	4.32	4.48	5.40	5.38	6.09	6.13	4.76	4.69	5.86	5.46	6.61	6.23	5.18	4.77
41	5.03	5.26	5.69	5.99	4.43	4.60	5.52	5.51	6.22	6.27	4.88	4.82	6.00	5.60	6.75	6.37	5.31	4.90
42	4.75	4.97	5.41	5.70	4.15	4.30	5.23	5.21	5.94	5.98	4.59	4.52	5.71	5.30	6.46	6.07	5.02	4.59
43	4.72	4.93	5.38	5.67	4.12	4.27	5.20	5.18	5.91	5.94	4.56	4.48	5.67	5.26	6.43	6.04	4.98	4.56
44	4.24	4.41	4.89	5.12	3.66	3.75	4.69	4.63	5.39	5.38	4.06	3.95	5.14	4.71	5.88	5.47	4.46	4.02
45	5.06	5.29	5.72	6.02	4.46	4.63	5.55	5.54	6.25	6.30	4.91	4.85	6.03	5.63	6.78	6.40	5.34	4.93
46	5.01	5.24	5.67	5.97	4.41	4.57	5.50	5.49	6.20	6.25	4.85	4.80	5.97	5.58	6.72	6.35	5.29	4.87
47	4.71	4.92	5.37	5.65	4.11	4.25	5.19	5.17	5.90	5.93	4.55	4.47	5.66	5.25	6.41	6.02	4.97	4.54
48	4.67	4.88	5.33	5.61	4.07	4.21	5.15	5.12	5.85	5.88	4.50	4.42	5.61	5.20	6.37	5.98	4.93	4.50
49	4.15	4.31	4.80	5.02	3.57	3.66	4.60	4.53	5.29	5.28	3.97	3.85	5.04	4.61	5.78	5.37	4.37	3.91
50	5.01	5.24	5.66	5.96	4.41	4.58	5.49	5.48	6.19	6.24	4.85	4.80	5.97	5.57	6.71	6.34	5.28	4.87
51	5.00	5.23	5.66	5.96	4.40	4.56	5.49	5.48	6.19	6.24	4.84	4.79	5.96	5.57	6.72	6.34	5.28	4.86
52	4.67	4.88	5.33	5.61	4.07	4.21	5.15	5.12	5.85	5.88	4.50	4.43	5.61	5.20	6.36	5.98	4.93	4.50
53	4.63	4.83	5.29	5.56	4.03	4.17	5.10	5.07	5.81	5.83	4.46	4.38	5.57	5.16	6.32	5.93	4.88	4.45
54	4.18	4.33	4.82	5.05	3.59	3.68	4.62	4.56	5.32	5.31	3.99	3.88	5.07	4.64	5.81	5.40	4.39	3.94
55	4.48	4.66	5.12	5.36	3.89	4.01	4.93	4.88	5.62	5.62	4.31	4.21	5.38	4.96	6.10	5.71	4.71	4.28
56	4.62	4.82	5.27	5.55	4.02	4.16	5.09	5.06	5.79	5.82	4.45	4.37	5.56	5.14	6.30	5.91	4.87	4.44
57	4.41	4.59	5.06	5.32	3.81	3.93	4.87	4.82	5.57	5.58	4.23	4.14	5.33	4.90	6.07	5.67	4.64	4.20
58	4.45	4.63	5.10	5.36	3.85	3.97	4.91	4.87	5.61	5.63	4.27	4.18	5.37	4.95	6.12	5.72	4.69	4.25
59	4.12	4.27	4.76	4.99	3.53	3.62	4.56	4.50	5.26	5.25	3.93	3.81	5.00	4.57	5.75	5.34	4.33	3.88
60	4.57	4.76	5.22	5.48	3.98	4.11	5.04	5.00	5.73	5.75	4.40	4.31	5.49	5.08	6.23	5.84	4.82	4.38
61	4.62	4.82	5.28	5.55	4.03	4.16	5.09	5.06	5.79	5.81	4.45	4.37	5.55	5.14	6.30	5.91	4.87	4.44
62	4.48	4.67	5.14	5.40	3.88	4.01	4.95	4.91	5.66	5.67	4.31	4.22	5.41	4.99	6.17	5.77	4.73	4.29
63	4.41	4.59	5.06	5.31	3.81	3.93	4.87	4.82	5.57	5.58	4.23	4.13	5.32	4.90	6.07	5.67	4.64	4.20
64	4.06	4.21	4.70	4.92	3.48	3.56	4.50	4.43	5.19	5.18	3.87	3.75	4.94	4.50	5.68	5.27	4.27	3.81
65	4.60	4.80	5.25	5.52	4.01	4.14	5.07	5.04	5.77	5.79	4.43	4.35	5.53	5.12	6.27	5.88	4.85	4.42
66	4.73	4.94	5.39	5.67	4.13	4.28	5.21	5.18	5.91	5.94	4.57	4.49	5.68	5.27	6.43	6.04	4.99	4.56
67	4.47	4.66	5.12	5.39	3.87	3.99	4.94	4.90	5.64	5.66	4.29	4.20	5.40	4.98	6.15	5.75	4.71	4.27
68	4.38	4.56	5.03	5.28	3.79	3.90	4.84	4.79	5.54	5.55	4.20	4.10	5.29	4.87	6.04	5.64	4.61	4.17
69	4.00	4.14	4.64	4.86	3.42	3.49	4.44	4.36	5.13	5.11	3.82	3.68	4.87	4.44	5.61	5.20	4.20	3.75
70	4.76	4.98	5.42	5.71	4.16	4.31	5.24	5.22	5.95	5.99	4.60	4.53	5.72	5.31	6.47	6.09	5.03	4.60
71	4.44	4.62	5.09	5.35	3.84	3.96	4.90	4.86	5.61	5.62	4.26	4.17	5.36	4.94	6.11	5.71	4.68	4.24
72	4.63	4.84	5.30	5.59	4.02	4.17	5.12	5.09	5.83	5.86	4.46	4.39	5.59	5.18	6.35	5.96	4.90	4.46
73	4.60	4.80	5.26	5.53	4.01	4.14	5.08	5.04	5.78	5.80	4.44	4.35	5.54	5.13	6.29	5.90	4.86	4.42
74	4.43	4.62	5.09	5.35	3.84	3.96	4.90	4.85	5.60	5.61	4.26	4.16	5.36	4.94	6.10	5.71	4.67	4.23
75	4.45	4.64	5.10	5.37	3.85	3.97	4.92	4.87	5.62	5.63	4.27	4.18	5.38	4.96	6.13	5.73	4.69	4.25

76	4.26	4.43	4.91	5.16	3.67	3.77	4.72	4.67	5.42	5.43	4.08	3.97	5.17	4.75	5.93	5.52	4.49	4.04
77	4.63	4.83	5.29	5.56	4.03	4.17	5.10	5.07	5.81	5.83	4.46	4.38	5.57	5.16	6.32	5.93	4.88	4.45
78	4.41	4.59	5.06	5.31	3.81	3.93	4.87	4.82	5.57	5.58	4.23	4.13	5.32	4.90	6.07	5.67	4.64	4.20
79	4.44	4.62	5.09	5.35	3.84	3.96	4.90	4.86	5.60	5.61	4.26	4.17	5.36	4.94	6.11	5.71	4.68	4.24
80	4.22	4.39	4.87	5.12	3.63	3.73	4.68	4.62	5.38	5.38	4.04	3.93	5.13	4.70	5.88	5.47	4.45	4.00
MIN	**3.91**	**4.03**	**4.54**	**4.74**	**3.34**	**3.39**	**4.34**	**4.25**	**5.02**	**4.99**	**3.72**	**3.58**	**4.76**	**4.32**	**5.49**	**5.07**	**4.09**	**3.64**
MAX	**5.06**	**5.29**	**5.72**	**6.02**	**4.46**	**4.63**	**5.55**	**5.54**	**6.25**	**6.30**	**4.91**	**4.85**	**6.03**	**5.63**	**6.78**	**6.40**	**5.34**	**4.93**
AVE	**4.59**	**4.78**	**5.24**	**5.50**	**3.99**	**4.12**	**5.05**	**5.02**	**5.75**	**5.77**	**4.42**	**4.33**	**5.51**	**5.10**	**6.26**	**5.87**	**4.83**	**4.40**

Table C- 41. Reliability Indices for A709-50W Composite Box Girdes for ADTT 5'000 and L=60, 90ft.

	L=60 ft						L=90 ft					
Φ	1.00		0.95		1.05		1.00		0.95		1.05	
# / D/(D+L)	0.45	0.50	0.45	0.50	0.45	0.50	0.50	0.65	0.50	0.65	0.50	0.65
1	4.56	4.67	5.15	5.28	4.02	4.11	4.67	4.94	5.28	5.63	4.11	4.32
2	4.57	4.68	5.16	5.30	4.03	4.12	4.68	4.96	5.30	5.65	4.12	4.33
3	4.17	4.26	4.76	4.87	3.63	3.70	4.26	4.51	4.87	5.20	3.70	3.88
4	4.54	4.64	5.13	5.25	4.00	4.09	4.64	4.91	5.25	5.60	4.09	4.29
5	4.55	4.65	5.14	5.26	4.01	4.09	4.65	4.93	5.26	5.61	4.09	4.30
6	4.14	4.23	4.73	4.84	3.61	3.68	4.23	4.48	4.84	5.16	3.68	3.85
7	4.53	4.63	5.11	5.24	3.99	4.07	4.63	4.90	5.24	5.58	4.07	4.28
8	4.53	4.64	5.12	5.25	4.00	4.08	4.64	4.91	5.25	5.59	4.08	4.28
9	4.12	4.22	4.71	4.82	3.59	3.66	4.22	4.45	4.82	5.14	3.66	3.83
10	4.68	4.79	5.28	5.42	4.13	4.22	4.79	5.09	5.42	5.78	4.22	4.45
11	4.69	4.81	5.30	5.44	4.14	4.23	4.81	5.11	5.44	5.82	4.23	4.47
12	4.32	4.42	4.92	5.05	3.77	3.85	4.42	4.69	5.05	5.40	3.85	4.05
13	4.27	4.37	4.87	4.99	3.73	3.80	4.37	4.64	4.99	5.34	3.80	4.00
14	3.79	3.88	4.37	4.48	3.26	3.32	3.88	4.09	4.48	4.77	3.32	3.46
15	4.67	4.78	5.27	5.40	4.12	4.21	4.78	5.07	5.40	5.77	4.21	4.44
16	4.67	4.78	5.27	5.41	4.12	4.21	4.78	5.08	5.41	5.79	4.21	4.44
17	4.27	4.37	4.87	5.00	3.73	3.81	4.37	4.64	5.00	5.34	3.81	4.00
18	4.23	4.33	4.82	4.95	3.69	3.76	4.33	4.59	4.95	5.28	3.76	3.95
19	3.74	3.82	4.32	4.42	3.21	3.27	3.82	4.02	4.42	4.71	3.27	3.40
20	4.65	4.76	5.25	5.38	4.10	4.19	4.76	5.06	5.38	5.75	4.19	4.42
21	4.65	4.76	5.25	5.38	4.10	4.19	4.76	5.06	5.38	5.76	4.19	4.42
22	4.24	4.34	4.83	4.96	3.69	3.77	4.34	4.59	4.96	5.29	3.77	3.96
23	4.20	4.30	4.79	4.91	3.66	3.74	4.30	4.55	4.91	5.24	3.74	3.92
24	3.70	3.78	4.28	4.38	3.17	3.23	3.78	3.97	4.38	4.66	3.23	3.36
25	4.70	4.81	5.30	5.44	4.15	4.24	4.81	5.11	5.44	5.81	4.24	4.47
26	4.72	4.83	5.33	5.47	4.16	4.26	4.83	5.14	5.47	5.85	4.26	4.50
27	4.42	4.53	5.02	5.16	3.87	3.95	4.53	4.81	5.16	5.52	3.95	4.17
28	4.37	4.48	4.98	5.11	3.82	3.91	4.48	4.76	5.11	5.46	3.91	4.11
29	3.96	4.05	4.55	4.66	3.42	3.49	4.05	4.28	4.66	4.98	3.49	3.65
30	4.68	4.79	5.28	5.42	4.13	4.22	4.79	5.09	5.42	5.79	4.22	4.45
31	4.70	4.81	5.30	5.44	4.15	4.24	4.81	5.11	5.44	5.81	4.24	4.47
32	4.37	4.47	4.97	5.10	3.82	3.90	4.47	4.75	5.10	5.45	3.90	4.11
33	4.34	4.44	4.93	5.06	3.79	3.87	4.44	4.71	5.06	5.41	3.87	4.07
34	3.89	3.97	4.47	4.59	3.35	3.42	3.97	4.20	4.59	4.89	3.42	3.57
35	4.70	4.81	5.30	5.44	4.15	4.24	4.81	5.11	5.44	5.81	4.24	4.47
36	4.71	4.82	5.31	5.45	4.15	4.25	4.82	5.13	5.45	5.83	4.25	4.48

37	4.35	4.45	4.95	5.08	3.80	3.88	4.45	4.72	5.08	5.43	3.88	4.08
38	4.28	4.39	4.88	5.01	3.74	3.82	4.39	4.65	5.01	5.35	3.82	4.01
39	3.83	3.92	4.42	4.53	3.30	3.37	3.92	4.13	4.53	4.82	3.37	3.51
40	4.64	4.75	5.24	5.38	4.09	4.18	4.75	5.05	5.38	5.74	4.18	4.41
41	4.74	4.86	5.35	5.49	4.19	4.28	4.86	5.17	5.49	5.87	4.28	4.53
42	4.48	4.59	5.08	5.22	3.92	4.01	4.59	4.88	5.22	5.58	4.01	4.23
43	4.45	4.56	5.06	5.19	3.90	3.98	4.56	4.85	5.19	5.55	3.98	4.20
44	4.01	4.10	4.60	4.71	3.47	3.54	4.10	4.33	4.71	5.03	3.54	3.70
45	4.77	4.89	5.38	5.52	4.22	4.31	4.89	5.20	5.52	5.90	4.31	4.56
46	4.72	4.84	5.33	5.47	4.17	4.26	4.84	5.15	5.47	5.85	4.26	4.50
47	4.44	4.55	5.04	5.18	3.88	3.97	4.55	4.83	5.18	5.54	3.97	4.19
48	4.40	4.51	5.00	5.14	3.85	3.93	4.51	4.79	5.14	5.49	3.93	4.14
49	3.92	4.01	4.51	4.63	3.39	3.46	4.01	4.24	4.63	4.93	3.46	3.61
50	4.73	4.84	5.33	5.47	4.17	4.27	4.84	5.14	5.47	5.84	4.27	4.50
51	4.71	4.83	5.32	5.46	4.16	4.25	4.83	5.14	5.46	5.84	4.25	4.49
52	4.40	4.51	5.01	5.14	3.85	3.94	4.51	4.79	5.14	5.49	3.94	4.15
53	4.36	4.47	4.97	5.10	3.81	3.90	4.47	4.75	5.10	5.45	3.90	4.10
54	3.94	4.03	4.53	4.65	3.41	3.47	4.03	4.26	4.65	4.96	3.47	3.63
55	4.23	4.33	4.82	4.94	3.69	3.77	4.33	4.58	4.94	5.26	3.77	3.95
56	4.36	4.46	4.96	5.09	3.81	3.89	4.46	4.74	5.09	5.44	3.89	4.10
57	4.16	4.26	4.76	4.88	3.61	3.69	4.26	4.51	4.88	5.21	3.69	3.87
58	4.19	4.29	4.79	4.92	3.64	3.72	4.29	4.55	4.92	5.25	3.72	3.91
59	3.89	3.98	4.48	4.59	3.35	3.42	3.98	4.20	4.59	4.90	3.42	3.57
60	4.31	4.42	4.91	5.04	3.77	3.85	4.42	4.68	5.04	5.38	3.85	4.05
61	4.36	4.46	4.96	5.09	3.81	3.89	4.46	4.74	5.09	5.44	3.89	4.10
62	4.22	4.32	4.82	4.95	3.67	3.75	4.32	4.59	4.95	5.30	3.75	3.95
63	4.16	4.26	4.75	4.88	3.61	3.69	4.26	4.51	4.88	5.21	3.69	3.87
64	3.84	3.92	4.42	4.53	3.30	3.37	3.92	4.14	4.53	4.83	3.37	3.51
65	4.34	4.45	4.94	5.07	3.79	3.88	4.45	4.72	5.07	5.41	3.88	4.08
66	4.46	4.57	5.06	5.20	3.91	3.99	4.57	4.85	5.20	5.56	3.99	4.21
67	4.21	4.31	4.81	4.94	3.66	3.74	4.31	4.57	4.94	5.28	3.74	3.93
68	4.13	4.23	4.73	4.85	3.59	3.66	4.23	4.48	4.85	5.18	3.66	3.84
69	3.78	3.87	4.37	4.48	3.25	3.31	3.87	4.08	4.48	4.77	3.31	3.45
70	4.49	4.60	5.09	5.23	3.93	4.02	4.60	4.89	5.23	5.60	4.02	4.24
71	4.18	4.28	4.78	4.91	3.64	3.71	4.28	4.54	4.91	5.25	3.71	3.90
72	4.36	4.47	4.97	5.10	3.80	3.89	4.47	4.76	5.10	5.47	3.89	4.10
73	4.34	4.45	4.94	5.07	3.79	3.87	4.45	4.72	5.07	5.42	3.87	4.08
74	4.18	4.28	4.78	4.90	3.63	3.71	4.28	4.54	4.90	5.24	3.71	3.90
75	4.19	4.29	4.79	4.92	3.64	3.72	4.29	4.56	4.92	5.26	3.72	3.91

76	4.02	4.11	4.62	4.74	3.47	3.55	4.11	4.36	4.74	5.06	3.55	3.72
77	4.37	4.47	4.97	5.10	3.82	3.90	4.47	4.75	5.10	5.45	3.90	4.11
78	4.16	4.25	4.75	4.88	3.61	3.69	4.25	4.51	4.88	5.21	3.69	3.87
79	4.18	4.28	4.78	4.91	3.63	3.71	4.28	4.54	4.91	5.24	3.71	3.90
80	3.98	4.08	4.58	4.70	3.44	3.51	4.08	4.32	4.70	5.02	3.51	3.68
MIN	**3.70**	**3.78**	**4.28**	**4.38**	**3.17**	**3.23**	**3.78**	**3.97**	**4.38**	**4.66**	**3.23**	**3.36**
MAX	**4.77**	**4.89**	**5.38**	**5.52**	**4.22**	**4.31**	**4.89**	**5.20**	**5.52**	**5.90**	**4.31**	**4.56**
AVE	**4.33**	**4.43**	**4.93**	**5.05**	**3.78**	**3.86**	**4.43**	**4.70**	**5.05**	**5.40**	**3.86**	**4.06**

Table C- 42. Reliability Indices for A709-50W Composite Box Girdes for ADTT 5'000 and L=120, 200, 300ft.

	L=120 ft						L=200 ft						L=300 ft					
Φ	**1.00**		**0.95**		**1.05**		**1.00**		**0.95**		**1.05**		**1.00**		**0.95**		**1.05**	
# / D/(D+L)	**0.55**	**0.70**	**0.55**	**0.70**	**0.55**	**0.70**	**0.60**	**0.75**	**0.60**	**0.75**	**0.60**	**0.75**	**0.65**	**0.80**	**0.65**	**0.80**	**0.65**	**0.80**
1	4.72	4.94	5.35	5.65	4.14	4.30	5.12	5.15	5.80	5.88	4.51	4.48	5.64	5.28	6.36	6.03	4.97	4.60
2	4.73	4.96	5.37	5.67	4.15	4.31	5.14	5.17	5.83	5.92	4.52	4.50	5.66	5.31	6.40	6.07	4.99	4.62
3	4.30	4.50	4.94	5.21	3.72	3.85	4.70	4.70	5.38	5.44	4.08	4.03	5.20	4.83	5.94	5.59	4.54	4.15
4	4.69	4.92	5.32	5.62	4.12	4.27	5.10	5.12	5.77	5.85	4.49	4.46	5.61	5.26	6.33	6.00	4.95	4.58
5	4.70	4.93	5.34	5.64	4.12	4.28	5.11	5.14	5.79	5.88	4.49	4.47	5.63	5.27	6.36	6.03	4.96	4.59
6	4.27	4.47	4.91	5.17	3.70	3.82	4.67	4.67	5.35	5.40	4.05	4.00	5.17	4.79	5.90	5.55	4.50	4.11
7	4.68	4.90	5.31	5.60	4.10	4.26	5.08	5.11	5.76	5.84	4.47	4.44	5.59	5.24	6.32	5.99	4.93	4.56
8	4.68	4.91	5.32	5.61	4.11	4.27	5.09	5.11	5.77	5.85	4.48	4.45	5.60	5.25	6.33	6.00	4.94	4.57
9	4.25	4.44	4.88	5.15	3.68	3.80	4.65	4.64	5.32	5.37	4.03	3.98	5.14	4.77	5.87	5.52	4.48	4.09
10	4.85	5.09	5.49	5.81	4.26	4.44	5.27	5.31	5.96	6.05	4.64	4.63	5.80	5.45	6.53	6.21	5.13	4.76
11	4.87	5.12	5.52	5.85	4.27	4.46	5.30	5.34	5.99	6.10	4.66	4.66	5.83	5.48	6.58	6.25	5.15	4.78
12	4.47	4.69	5.12	5.41	3.88	4.03	4.88	4.90	5.58	5.66	4.25	4.22	5.41	5.04	6.15	5.81	4.73	4.34
13	4.42	4.63	5.06	5.35	3.83	3.98	4.83	4.84	5.52	5.59	4.20	4.16	5.34	4.98	6.09	5.74	4.67	4.28
14	3.90	4.07	4.54	4.78	3.33	3.42	4.29	4.26	4.97	5.00	3.67	3.59	4.78	4.38	5.51	5.14	4.11	3.70
15	4.83	5.08	5.48	5.79	4.24	4.42	5.26	5.29	5.94	6.04	4.63	4.62	5.78	5.43	6.51	6.19	5.11	4.74
16	4.84	5.09	5.49	5.81	4.25	4.43	5.27	5.31	5.96	6.06	4.63	4.63	5.80	5.45	6.54	6.22	5.12	4.75
17	4.42	4.64	5.07	5.36	3.83	3.98	4.83	4.85	5.52	5.60	4.20	4.16	5.35	4.98	6.09	5.75	4.67	4.28
18	4.37	4.58	5.01	5.30	3.79	3.93	4.78	4.79	5.46	5.53	4.15	4.11	5.29	4.92	6.03	5.68	4.62	4.23
19	3.85	4.00	4.47	4.71	3.28	3.36	4.22	4.19	4.90	4.93	3.61	3.52	4.71	4.31	5.44	5.07	4.05	3.63
20	4.82	5.06	5.46	5.78	4.23	4.41	5.24	5.28	5.93	6.02	4.61	4.60	5.76	5.41	6.50	6.17	5.09	4.72
21	4.82	5.06	5.46	5.78	4.23	4.40	5.24	5.28	5.93	6.03	4.61	4.60	5.77	5.42	6.51	6.19	5.09	4.72
22	4.38	4.59	5.02	5.31	3.80	3.94	4.79	4.80	5.47	5.54	4.16	4.12	5.30	4.93	6.04	5.69	4.63	4.24
23	4.34	4.54	4.98	5.25	3.76	3.89	4.74	4.75	5.42	5.49	4.12	4.07	5.25	4.88	5.98	5.64	4.58	4.19
24	3.80	3.95	4.43	4.65	3.24	3.32	4.18	4.14	4.85	4.87	3.57	3.48	4.66	4.26	5.38	5.01	4.00	3.58
25	4.87	5.12	5.51	5.83	4.28	4.46	5.29	5.34	5.98	6.08	4.67	4.66	5.82	5.47	6.55	6.23	5.15	4.78
26	4.89	5.15	5.55	5.88	4.30	4.49	5.33	5.37	6.02	6.13	4.69	4.69	5.86	5.51	6.61	6.28	5.18	4.81
27	4.58	4.81	5.23	5.54	3.98	4.15	5.00	5.03	5.70	5.79	4.37	4.34	5.53	5.17	6.28	5.94	4.85	4.46
28	4.53	4.76	5.18	5.49	3.94	4.10	4.95	4.97	5.65	5.73	4.32	4.29	5.47	5.11	6.22	5.88	4.79	4.41
29	4.08	4.27	4.72	4.99	3.50	3.62	4.48	4.47	5.17	5.22	3.86	3.79	4.98	4.60	5.72	5.36	4.31	3.90
30	4.85	5.10	5.49	5.81	4.26	4.44	5.27	5.31	5.96	6.06	4.65	4.63	5.80	5.45	6.53	6.21	5.13	4.76
31	4.87	5.12	5.52	5.83	4.28	4.46	5.29	5.34	5.98	6.08	4.67	4.66	5.82	5.48	6.56	6.24	5.15	4.78
32	4.52	4.75	5.17	5.47	3.93	4.09	4.94	4.96	5.63	5.71	4.31	4.28	5.46	5.10	6.20	5.86	4.78	4.40
33	4.49	4.71	5.13	5.43	3.90	4.05	4.90	4.92	5.59	5.67	4.27	4.24	5.42	5.05	6.16	5.82	4.74	4.36
34	4.01	4.18	4.64	4.90	3.43	3.53	4.40	4.38	5.08	5.13	3.78	3.70	4.89	4.51	5.63	5.27	4.22	3.82
35	4.87	5.12	5.52	5.84	4.28	4.46	5.30	5.34	5.99	6.09	4.66	4.66	5.82	5.48	6.56	6.24	5.15	4.78
36	4.88	5.13	5.53	5.86	4.29	4.47	5.31	5.36	6.01	6.11	4.68	4.67	5.85	5.50	6.59	6.27	5.17	4.80

37	4.50	4.72	5.15	5.45	3.91	4.06	4.92	4.94	5.61	5.69	4.28	4.25	5.44	5.07	6.18	5.84	4.76	4.37
38	4.43	4.65	5.08	5.37	3.84	3.99	4.84	4.86	5.53	5.61	4.22	4.18	5.36	4.99	6.10	5.76	4.69	4.30
39	3.95	4.12	4.58	4.83	3.38	3.47	4.34	4.31	5.02	5.06	3.72	3.64	4.83	4.44	5.56	5.20	4.16	3.75
40	4.81	5.05	5.45	5.77	4.22	4.40	5.23	5.27	5.92	6.01	4.60	4.59	5.75	5.41	6.49	6.17	5.08	4.71
41	4.92	5.18	5.57	5.90	4.32	4.52	5.35	5.40	6.05	6.15	4.72	4.71	5.89	5.54	6.63	6.31	5.21	4.84
42	4.64	4.88	5.29	5.61	4.04	4.21	5.07	5.10	5.76	5.86	4.43	4.41	5.60	5.24	6.35	6.01	4.91	4.53
43	4.61	4.85	5.26	5.58	4.01	4.18	5.04	5.07	5.73	5.82	4.40	4.38	5.56	5.20	6.31	5.98	4.88	4.50
44	4.14	4.32	4.77	5.03	3.56	3.67	4.53	4.52	5.21	5.26	3.91	3.85	5.03	4.65	5.76	5.41	4.36	3.96
45	4.95	5.21	5.60	5.93	4.35	4.55	5.38	5.43	6.08	6.18	4.75	4.75	5.92	5.57	6.66	6.34	5.24	4.87
46	4.90	5.15	5.55	5.88	4.30	4.49	5.33	5.38	6.02	6.13	4.69	4.69	5.86	5.52	6.61	6.29	5.18	4.82
47	4.60	4.83	5.25	5.56	4.00	4.17	5.02	5.05	5.72	5.81	4.39	4.36	5.55	5.19	6.30	5.96	4.87	4.49
48	4.56	4.79	5.21	5.52	3.96	4.13	4.98	5.01	5.68	5.76	4.34	4.32	5.51	5.14	6.25	5.92	4.82	4.44
49	4.05	4.22	4.68	4.94	3.47	3.58	4.44	4.42	5.12	5.16	3.82	3.75	4.93	4.55	5.67	5.31	4.27	3.86
50	4.90	5.15	5.55	5.87	4.31	4.49	5.33	5.37	6.02	6.12	4.70	4.69	5.86	5.51	6.60	6.27	5.18	4.81
51	4.89	5.14	5.54	5.87	4.29	4.48	5.32	5.37	6.02	6.12	4.68	4.68	5.86	5.51	6.60	6.28	5.17	4.81
52	4.56	4.79	5.21	5.52	3.97	4.13	4.98	5.01	5.67	5.76	4.35	4.32	5.50	5.14	6.25	5.91	4.82	4.44
53	4.52	4.75	5.17	5.47	3.93	4.09	4.94	4.96	5.63	5.72	4.30	4.27	5.46	5.10	6.21	5.87	4.78	4.40
54	4.07	4.25	4.71	4.97	3.49	3.60	4.46	4.45	5.15	5.20	3.84	3.77	4.96	4.58	5.70	5.34	4.29	3.88
55	4.37	4.57	5.00	5.28	3.79	3.93	4.77	4.78	5.45	5.51	4.15	4.11	5.27	4.90	5.99	5.65	4.61	4.22
56	4.51	4.74	5.16	5.46	3.92	4.08	4.93	4.95	5.62	5.70	4.30	4.26	5.45	5.08	6.19	5.85	4.77	4.38
57	4.30	4.51	4.94	5.23	3.71	3.85	4.71	4.71	5.40	5.46	4.08	4.03	5.22	4.85	5.96	5.61	4.54	4.15
58	4.34	4.55	4.98	5.27	3.74	3.89	4.75	4.76	5.44	5.51	4.11	4.07	5.26	4.89	6.01	5.66	4.58	4.19
59	4.01	4.19	4.65	4.90	3.43	3.54	4.40	4.39	5.09	5.13	3.78	3.71	4.90	4.51	5.64	5.27	4.23	3.82
60	4.46	4.68	5.11	5.39	3.88	4.03	4.87	4.89	5.56	5.63	4.25	4.21	5.39	5.02	6.12	5.78	4.71	4.33
61	4.51	4.74	5.16	5.46	3.92	4.08	4.93	4.95	5.62	5.70	4.30	4.27	5.45	5.08	6.19	5.85	4.77	4.39
62	4.37	4.59	5.02	5.31	3.78	3.92	4.78	4.80	5.48	5.56	4.15	4.11	5.30	4.93	6.05	5.71	4.62	4.23
63	4.30	4.50	4.94	5.22	3.71	3.85	4.71	4.71	5.40	5.46	4.08	4.03	5.22	4.84	5.96	5.61	4.54	4.15
64	3.95	4.12	4.59	4.84	3.38	3.48	4.34	4.32	5.02	5.06	3.72	3.65	4.83	4.45	5.57	5.21	4.17	3.76
65	4.49	4.71	5.14	5.43	3.90	4.06	4.91	4.93	5.60	5.67	4.28	4.24	5.42	5.06	6.16	5.82	4.75	4.36
66	4.62	4.86	5.27	5.58	4.03	4.19	5.04	5.07	5.74	5.83	4.41	4.38	5.57	5.21	6.31	5.98	4.89	4.51
67	4.36	4.57	5.01	5.30	3.76	3.91	4.77	4.78	5.46	5.54	4.13	4.09	5.29	4.92	6.04	5.69	4.61	4.21
68	4.27	4.47	4.92	5.19	3.68	3.82	4.68	4.68	5.37	5.43	4.05	4.00	5.19	4.81	5.93	5.58	4.51	4.12
69	3.90	4.06	4.53	4.77	3.32	3.42	4.28	4.25	4.96	4.99	3.66	3.58	4.77	4.38	5.50	5.14	4.10	3.69
70	4.65	4.89	5.30	5.62	4.05	4.23	5.08	5.11	5.77	5.87	4.44	4.42	5.61	5.25	6.36	6.02	4.92	4.54
71	4.33	4.54	4.98	5.26	3.74	3.88	4.74	4.75	5.43	5.50	4.11	4.06	5.25	4.88	6.00	5.65	4.58	4.18
72	4.52	4.76	5.18	5.49	3.92	4.08	4.95	4.98	5.65	5.74	4.30	4.28	5.48	5.12	6.24	5.90	4.79	4.40
73	4.49	4.72	5.14	5.44	3.90	4.06	4.91	4.93	5.60	5.68	4.28	4.25	5.43	5.07	6.17	5.83	4.75	4.37
74	4.32	4.53	4.97	5.26	3.73	3.87	4.73	4.74	5.43	5.49	4.10	4.06	5.25	4.88	5.99	5.64	4.57	4.18
75	4.34	4.55	4.99	5.28	3.75	3.89	4.75	4.76	5.44	5.51	4.12	4.07	5.27	4.90	6.01	5.67	4.59	4.19

76	4.15	4.35	4.80	5.07	3.56	3.69	4.56	4.55	5.25	5.31	3.93	3.87	5.07	4.69	5.81	5.46	4.39	3.98
77	4.52	4.75	5.17	5.47	3.93	4.09	4.94	4.96	5.63	5.71	4.31	4.28	5.46	5.10	6.20	5.86	4.78	4.40
78	4.30	4.50	4.94	5.22	3.71	3.85	4.71	4.71	5.40	5.46	4.08	4.03	5.22	4.84	5.96	5.61	4.54	4.15
79	4.33	4.54	4.97	5.26	3.74	3.88	4.74	4.75	5.43	5.50	4.11	4.06	5.25	4.88	5.99	5.65	4.57	4.18
80	4.11	4.30	4.76	5.03	3.53	3.65	4.51	4.51	5.20	5.26	3.89	3.82	5.02	4.64	5.76	5.41	4.34	3.94
MIN	**3.80**	**3.95**	**4.43**	**4.65**	**3.24**	**3.32**	**4.18**	**4.14**	**4.85**	**4.87**	**3.57**	**3.48**	**4.66**	**4.26**	**5.38**	**5.01**	**4.00**	**3.58**
MAX	**4.95**	**5.21**	**5.60**	**5.93**	**4.35**	**4.55**	**5.38**	**5.43**	**6.08**	**6.18**	**4.75**	**4.75**	**5.92**	**5.57**	**6.66**	**6.34**	**5.24**	**4.87**
AVE	**4.48**	**4.70**	**5.12**	**5.41**	**3.89**	**4.04**	**4.89**	**4.91**	**5.58**	**5.65**	**4.26**	**4.23**	**5.41**	**5.04**	**6.15**	**5.81**	**4.73**	**4.35**

Table C- 43. Reliability Indices for A709-50W Composite Box Girdes for ADTT 10'000 and L=60, 90ft.

	L=60 ft						L=90 ft					
Φ	**1.00**		**0.95**		**1.05**		**1.00**		**0.95**		**1.05**	
# / D/(D+L)	**0.45**	**0.50**	**0.45**	**0.50**	**0.45**	**0.50**	**0.50**	**0.65**	**0.50**	**0.65**	**0.50**	**0.65**
1	4.50	4.61	5.09	5.22	3.97	4.05	4.56	4.85	5.16	5.53	4.00	4.23
2	4.51	4.62	5.10	5.24	3.98	4.06	4.57	4.86	5.18	5.55	4.01	4.24
3	4.11	4.21	4.70	4.82	3.58	3.65	4.15	4.41	4.76	5.10	3.60	3.79
4	4.48	4.59	5.07	5.20	3.95	4.03	4.53	4.82	5.14	5.50	3.98	4.20
5	4.49	4.60	5.08	5.21	3.95	4.04	4.54	4.83	5.15	5.52	3.99	4.21
6	4.08	4.18	4.67	4.79	3.55	3.63	4.13	4.38	4.73	5.06	3.57	3.76
7	4.47	4.57	5.05	5.18	3.94	4.02	4.52	4.81	5.12	5.48	3.97	4.19
8	4.47	4.58	5.06	5.19	3.94	4.03	4.52	4.81	5.13	5.49	3.97	4.19
9	4.07	4.16	4.65	4.77	3.54	3.61	4.11	4.36	4.71	5.04	3.56	3.74
10	4.62	4.74	5.22	5.36	4.08	4.17	4.68	4.99	5.30	5.68	4.12	4.36
11	4.64	4.75	5.24	5.38	4.09	4.18	4.69	5.02	5.32	5.72	4.13	4.38
12	4.26	4.37	4.86	4.99	3.71	3.80	4.31	4.60	4.93	5.29	3.74	3.96
13	4.21	4.32	4.81	4.93	3.67	3.75	4.26	4.54	4.88	5.24	3.70	3.91
14	3.74	3.82	4.32	4.43	3.21	3.27	3.77	3.99	4.37	4.68	3.22	3.37
15	4.61	4.72	5.20	5.34	4.06	4.15	4.66	4.98	5.28	5.67	4.10	4.35
16	4.61	4.73	5.21	5.35	4.06	4.16	4.67	4.99	5.29	5.68	4.10	4.35
17	4.22	4.32	4.81	4.94	3.67	3.75	4.26	4.54	4.88	5.24	3.70	3.91
18	4.17	4.27	4.76	4.89	3.63	3.71	4.22	4.49	4.83	5.18	3.66	3.86
19	3.68	3.77	4.26	4.37	3.16	3.22	3.71	3.93	4.31	4.61	3.17	3.32
20	4.59	4.71	5.19	5.33	4.05	4.14	4.65	4.96	5.27	5.65	4.09	4.33
21	4.59	4.70	5.19	5.32	4.04	4.14	4.65	4.96	5.26	5.65	4.08	4.33
22	4.18	4.28	4.77	4.90	3.64	3.72	4.22	4.50	4.84	5.19	3.67	3.87
23	4.14	4.24	4.73	4.85	3.60	3.68	4.19	4.45	4.79	5.14	3.63	3.83
24	3.64	3.72	4.22	4.32	3.12	3.18	3.67	3.88	4.27	4.56	3.13	3.27
25	4.64	4.76	5.24	5.38	4.10	4.19	4.70	5.02	5.32	5.71	4.14	4.38
26	4.66	4.78	5.26	5.40	4.11	4.20	4.72	5.05	5.34	5.75	4.15	4.41
27	4.36	4.47	4.96	5.10	3.81	3.90	4.41	4.72	5.04	5.42	3.84	4.07
28	4.31	4.42	4.92	5.05	3.77	3.85	4.37	4.66	4.99	5.36	3.80	4.02
29	3.90	3.99	4.49	4.61	3.37	3.44	3.94	4.19	4.55	4.88	3.38	3.56
30	4.62	4.74	5.22	5.36	4.07	4.17	4.68	4.99	5.30	5.69	4.11	4.36
31	4.64	4.76	5.24	5.38	4.09	4.19	4.70	5.02	5.32	5.71	4.13	4.38
32	4.31	4.42	4.91	5.04	3.76	3.85	4.36	4.65	4.98	5.35	3.79	4.02
33	4.28	4.38	4.87	5.00	3.73	3.82	4.33	4.61	4.94	5.31	3.76	3.98
34	3.83	3.92	4.41	4.53	3.30	3.37	3.87	4.10	4.47	4.79	3.31	3.48
35	4.64	4.75	5.24	5.38	4.09	4.18	4.70	5.02	5.32	5.71	4.13	4.38
36	4.65	4.76	5.25	5.39	4.10	4.19	4.71	5.03	5.33	5.73	4.14	4.39

37	4.29	4.39	4.89	5.02	3.74	3.82	4.34	4.63	4.96	5.33	3.77	3.99
38	4.23	4.33	4.82	4.95	3.68	3.77	4.27	4.56	4.89	5.25	3.71	3.92
39	3.78	3.86	4.36	4.47	3.25	3.31	3.81	4.04	4.41	4.73	3.26	3.42
40	4.58	4.69	5.18	5.32	4.04	4.13	4.64	4.95	5.26	5.64	4.07	4.32
41	4.69	4.80	5.29	5.43	4.13	4.23	4.75	5.07	5.37	5.77	4.18	4.43
42	4.42	4.53	5.02	5.16	3.87	3.96	4.47	4.78	5.10	5.48	3.90	4.14
43	4.39	4.50	4.99	5.13	3.84	3.93	4.44	4.75	5.07	5.45	3.87	4.11
44	3.95	4.04	4.54	4.65	3.42	3.49	3.99	4.24	4.60	4.93	3.44	3.62
45	4.71	4.83	5.32	5.46	4.16	4.26	4.77	5.10	5.40	5.80	4.21	4.46
46	4.66	4.78	5.27	5.41	4.11	4.21	4.72	5.05	5.35	5.75	4.15	4.41
47	4.38	4.49	4.98	5.12	3.83	3.92	4.43	4.74	5.06	5.44	3.86	4.10
48	4.34	4.45	4.94	5.08	3.79	3.88	4.39	4.69	5.02	5.39	3.83	4.05
49	3.87	3.96	4.45	4.57	3.34	3.40	3.90	4.15	4.51	4.83	3.35	3.52
50	4.67	4.78	5.27	5.41	4.12	4.21	4.73	5.05	5.35	5.74	4.16	4.41
51	4.65	4.77	5.26	5.40	4.10	4.20	4.71	5.04	5.34	5.74	4.14	4.40
52	4.34	4.45	4.94	5.08	3.79	3.88	4.40	4.69	5.02	5.39	3.83	4.05
53	4.31	4.41	4.91	5.04	3.76	3.84	4.36	4.65	4.98	5.35	3.79	4.01
54	3.89	3.98	4.47	4.59	3.35	3.42	3.92	4.17	4.53	4.86	3.37	3.54
55	4.17	4.27	4.76	4.88	3.64	3.71	4.22	4.49	4.82	5.17	3.66	3.86
56	4.30	4.41	4.90	5.03	3.75	3.84	4.35	4.64	4.97	5.34	3.78	4.00
57	4.10	4.20	4.69	4.82	3.56	3.63	4.14	4.42	4.76	5.11	3.58	3.78
58	4.13	4.23	4.73	4.86	3.59	3.67	4.18	4.46	4.80	5.15	3.61	3.82
59	3.83	3.92	4.42	4.53	3.30	3.36	3.87	4.11	4.48	4.80	3.31	3.48
60	4.26	4.36	4.85	4.98	3.71	3.80	4.30	4.59	4.92	5.28	3.74	3.96
61	4.30	4.41	4.90	5.03	3.76	3.84	4.35	4.64	4.97	5.34	3.79	4.01
62	4.16	4.27	4.76	4.89	3.62	3.70	4.21	4.49	4.83	5.20	3.64	3.85
63	4.10	4.20	4.69	4.82	3.56	3.63	4.14	4.42	4.76	5.11	3.58	3.78
64	3.78	3.87	4.36	4.48	3.25	3.31	3.81	4.05	4.42	4.73	3.26	3.42
65	4.28	4.39	4.88	5.01	3.74	3.82	4.33	4.62	4.95	5.31	3.77	3.99
66	4.40	4.51	5.00	5.14	3.85	3.94	4.45	4.76	5.08	5.46	3.89	4.12
67	4.15	4.25	4.75	4.88	3.60	3.68	4.20	4.48	4.82	5.18	3.63	3.84
68	4.07	4.17	4.67	4.79	3.53	3.61	4.12	4.39	4.73	5.08	3.56	3.75
69	3.73	3.81	4.31	4.42	3.20	3.26	3.76	3.99	4.36	4.67	3.21	3.37
70	4.43	4.54	5.03	5.17	3.88	3.97	4.48	4.79	5.11	5.49	3.91	4.15
71	4.13	4.23	4.72	4.85	3.58	3.66	4.17	4.45	4.79	5.15	3.61	3.81
72	4.30	4.41	4.91	5.04	3.74	3.83	4.35	4.66	4.98	5.37	3.78	4.01
73	4.28	4.39	4.88	5.01	3.74	3.82	4.33	4.62	4.95	5.32	3.77	3.99
74	4.12	4.22	4.72	4.84	3.58	3.66	4.17	4.44	4.79	5.14	3.60	3.81
75	4.13	4.24	4.73	4.86	3.59	3.67	4.18	4.46	4.80	5.16	3.61	3.82

76	3.96	4.06	4.56	4.68	3.42	3.49	4.00	4.26	4.62	4.96	3.44	3.63
77	4.31	4.42	4.91	5.04	3.76	3.85	4.36	4.65	4.98	5.35	3.79	4.02
78	4.10	4.20	4.69	4.82	3.55	3.63	4.14	4.42	4.76	5.11	3.58	3.78
79	4.12	4.23	4.72	4.85	3.58	3.66	4.17	4.45	4.79	5.14	3.61	3.81
80	3.93	4.02	4.52	4.64	3.39	3.46	3.97	4.22	4.58	4.92	3.41	3.59
MIN	**3.64**	**3.72**	**4.22**	**4.32**	**3.12**	**3.18**	**3.67**	**3.88**	**4.27**	**4.56**	**3.13**	**3.27**
MAX	**4.71**	**4.83**	**5.32**	**5.46**	**4.16**	**4.26**	**4.77**	**5.10**	**5.40**	**5.80**	**4.21**	**4.46**
AVE	**4.27**	**4.38**	**4.86**	**4.99**	**3.73**	**3.81**	**4.32**	**4.60**	**4.93**	**5.30**	**3.76**	**3.97**

Table C- 44. Reliability Indices for A709-50W Composite Box Girdes for ADTT 10’000 and L=120, 200, 300ft.

	L=120 ft						L=200 ft						L=300 ft					
Φ	**1.00**		**0.95**		**1.05**		**1.00**		**0.95**		**1.05**		**1.00**		**0.95**		**1.05**	
# / D/(D+L)	**0.55**	**0.70**	**0.55**	**0.70**	**0.55**	**0.70**	**0.60**	**0.75**	**0.60**	**0.75**	**0.60**	**0.75**	**0.65**	**0.80**	**0.65**	**0.80**	**0.65**	**0.80**
1	4.66	4.90	5.29	5.60	4.09	4.26	5.12	5.15	5.80	5.88	4.51	4.48	5.58	5.25	6.31	6.00	4.92	4.57
2	4.68	4.92	5.31	5.63	4.10	4.28	5.14	5.17	5.83	5.92	4.52	4.50	5.61	5.28	6.34	6.04	4.94	4.59
3	4.25	4.46	4.88	5.16	3.67	3.82	4.70	4.70	5.38	5.44	4.08	4.03	5.15	4.80	5.88	5.56	4.49	4.12
4	4.64	4.87	5.27	5.57	4.07	4.24	5.10	5.12	5.77	5.85	4.49	4.46	5.56	5.23	6.28	5.97	4.90	4.55
5	4.65	4.89	5.28	5.59	4.07	4.24	5.11	5.14	5.79	5.88	4.49	4.47	5.57	5.24	6.30	6.00	4.91	4.56
6	4.22	4.42	4.85	5.13	3.65	3.78	4.67	4.67	5.35	5.40	4.05	4.00	5.11	4.77	5.84	5.52	4.46	4.08
7	4.63	4.86	5.25	5.56	4.05	4.22	5.08	5.11	5.76	5.84	4.47	4.44	5.54	5.21	6.26	5.96	4.88	4.53
8	4.63	4.86	5.26	5.57	4.06	4.23	5.09	5.11	5.77	5.85	4.48	4.45	5.55	5.22	6.28	5.97	4.89	4.54
9	4.20	4.40	4.83	5.10	3.63	3.76	4.65	4.64	5.32	5.37	4.03	3.98	5.09	4.74	5.81	5.49	4.43	4.06
10	4.79	5.05	5.44	5.76	4.21	4.40	5.27	5.31	5.96	6.05	4.64	4.63	5.74	5.42	6.47	6.17	5.07	4.73
11	4.81	5.08	5.46	5.80	4.22	4.42	5.30	5.34	5.99	6.10	4.66	4.66	5.78	5.45	6.52	6.22	5.10	4.75
12	4.42	4.65	5.06	5.37	3.83	3.99	4.88	4.90	5.58	5.66	4.25	4.22	5.35	5.01	6.09	5.78	4.68	4.31
13	4.36	4.59	5.01	5.31	3.78	3.94	4.83	4.84	5.52	5.59	4.20	4.16	5.29	4.95	6.03	5.71	4.62	4.25
14	3.85	4.03	4.48	4.73	3.28	3.39	4.29	4.26	4.97	5.00	3.67	3.59	4.72	4.36	5.45	5.11	4.06	3.67
15	4.78	5.03	5.42	5.75	4.19	4.38	5.26	5.29	5.94	6.04	4.63	4.62	5.73	5.40	6.46	6.16	5.06	4.71
16	4.79	5.05	5.43	5.77	4.20	4.39	5.27	5.31	5.96	6.06	4.63	4.63	5.74	5.42	6.49	6.19	5.07	4.72
17	4.37	4.59	5.01	5.31	3.78	3.94	4.83	4.85	5.52	5.60	4.20	4.16	5.29	4.95	6.03	5.72	4.62	4.25
18	4.32	4.54	4.96	5.25	3.74	3.89	4.78	4.79	5.46	5.53	4.15	4.11	5.24	4.89	5.97	5.65	4.57	4.20
19	3.79	3.96	4.42	4.66	3.23	3.32	4.22	4.19	4.90	4.93	3.61	3.52	4.66	4.29	5.38	5.04	4.00	3.60
20	4.76	5.02	5.40	5.73	4.18	4.37	5.24	5.28	5.93	6.02	4.61	4.60	5.71	5.39	6.44	6.14	5.04	4.69
21	4.76	5.02	5.40	5.74	4.17	4.36	5.24	5.28	5.93	6.03	4.61	4.60	5.71	5.39	6.45	6.15	5.04	4.69
22	4.33	4.55	4.96	5.26	3.74	3.90	4.79	4.80	5.47	5.54	4.16	4.12	5.25	4.90	5.98	5.66	4.58	4.21
23	4.29	4.50	4.92	5.21	3.71	3.85	4.74	4.75	5.42	5.49	4.12	4.07	5.19	4.85	5.93	5.61	4.53	4.16
24	3.75	3.91	4.37	4.61	3.19	3.28	4.18	4.14	4.85	4.87	3.57	3.48	4.60	4.23	5.33	4.98	3.95	3.55
25	4.82	5.08	5.46	5.79	4.23	4.42	5.29	5.34	5.98	6.08	4.67	4.66	5.77	5.44	6.50	6.20	5.10	4.75
26	4.84	5.11	5.49	5.83	4.24	4.45	5.33	5.37	6.02	6.13	4.69	4.69	5.81	5.49	6.55	6.25	5.13	4.78
27	4.52	4.77	5.17	5.50	3.93	4.11	5.00	5.03	5.70	5.79	4.37	4.34	5.48	5.14	6.22	5.91	4.80	4.44
28	4.48	4.72	5.12	5.44	3.88	4.06	4.95	4.97	5.65	5.73	4.32	4.29	5.42	5.08	6.16	5.85	4.74	4.38
29	4.03	4.23	4.67	4.94	3.45	3.58	4.48	4.47	5.17	5.22	3.86	3.79	4.93	4.57	5.67	5.33	4.26	3.88
30	4.80	5.05	5.44	5.77	4.21	4.40	5.27	5.31	5.96	6.06	4.65	4.63	5.75	5.42	6.48	6.18	5.08	4.73
31	4.81	5.08	5.46	5.79	4.23	4.42	5.29	5.34	5.98	6.08	4.67	4.66	5.77	5.45	6.50	6.21	5.10	4.75
32	4.47	4.70	5.11	5.42	3.88	4.05	4.94	4.96	5.63	5.71	4.31	4.28	5.41	5.07	6.14	5.83	4.73	4.37
33	4.43	4.67	5.08	5.38	3.85	4.01	4.90	4.92	5.59	5.67	4.27	4.24	5.37	5.03	6.10	5.79	4.69	4.33
34	3.96	4.14	4.59	4.85	3.38	3.50	4.40	4.38	5.08	5.13	3.78	3.70	4.84	4.48	5.58	5.24	4.17	3.79
35	4.81	5.08	5.46	5.79	4.22	4.42	5.30	5.34	5.99	6.09	4.66	4.66	5.77	5.45	6.51	6.21	5.10	4.75
36	4.83	5.09	5.47	5.81	4.23	4.43	5.31	5.36	6.01	6.11	4.68	4.67	5.79	5.47	6.53	6.24	5.11	4.77

37	4.44	4.68	5.09	5.40	3.86	4.02	4.92	4.94	5.61	5.69	4.28	4.25	5.38	5.04	6.13	5.81	4.71	4.34
38	4.38	4.61	5.02	5.32	3.79	3.95	4.84	4.86	5.53	5.61	4.22	4.18	5.31	4.96	6.05	5.73	4.63	4.27
39	3.90	4.08	4.53	4.79	3.33	3.43	4.34	4.31	5.02	5.06	3.72	3.64	4.78	4.41	5.51	5.17	4.11	3.72
40	4.75	5.01	5.39	5.72	4.17	4.36	5.23	5.27	5.92	6.01	4.60	4.59	5.70	5.38	6.44	6.14	5.03	4.68
41	4.86	5.14	5.51	5.86	4.27	4.48	5.35	5.40	6.05	6.15	4.72	4.71	5.83	5.51	6.58	6.28	5.16	4.81
42	4.59	4.84	5.24	5.56	3.99	4.17	5.07	5.10	5.76	5.86	4.43	4.41	5.54	5.21	6.29	5.98	4.86	4.50
43	4.56	4.81	5.21	5.53	3.96	4.14	5.04	5.07	5.73	5.82	4.40	4.38	5.51	5.18	6.26	5.95	4.83	4.47
44	4.08	4.28	4.72	4.99	3.51	3.64	4.53	4.52	5.21	5.26	3.91	3.85	4.98	4.62	5.71	5.38	4.31	3.93
45	4.89	5.17	5.54	5.89	4.30	4.51	5.38	5.43	6.08	6.18	4.75	4.75	5.86	5.54	6.61	6.31	5.19	4.84
46	4.84	5.11	5.49	5.83	4.25	4.45	5.33	5.38	6.02	6.13	4.69	4.69	5.81	5.49	6.55	6.25	5.13	4.79
47	4.54	4.79	5.19	5.52	3.95	4.13	5.02	5.05	5.72	5.81	4.39	4.36	5.50	5.16	6.24	5.93	4.82	4.46
48	4.50	4.75	5.15	5.47	3.91	4.09	4.98	5.01	5.68	5.76	4.34	4.32	5.45	5.11	6.19	5.88	4.77	4.41
49	3.99	4.18	4.63	4.89	3.42	3.54	4.44	4.42	5.12	5.16	3.82	3.75	4.88	4.52	5.61	5.28	4.22	3.83
50	4.84	5.11	5.49	5.83	4.25	4.45	5.33	5.37	6.02	6.12	4.70	4.69	5.80	5.48	6.54	6.24	5.13	4.79
51	4.83	5.10	5.48	5.82	4.24	4.44	5.32	5.37	6.02	6.12	4.68	4.68	5.80	5.48	6.54	6.25	5.12	4.78
52	4.51	4.75	5.15	5.47	3.91	4.09	4.98	5.01	5.67	5.76	4.35	4.32	5.45	5.11	6.19	5.88	4.77	4.41
53	4.46	4.70	5.11	5.43	3.87	4.04	4.94	4.96	5.63	5.72	4.30	4.27	5.41	5.07	6.15	5.84	4.73	4.37
54	4.02	4.21	4.65	4.92	3.44	3.56	4.46	4.45	5.15	5.20	3.84	3.77	4.91	4.55	5.65	5.31	4.24	3.86
55	4.32	4.53	4.95	5.23	3.74	3.89	4.77	4.78	5.45	5.51	4.15	4.11	5.22	4.88	5.94	5.62	4.56	4.19
56	4.46	4.69	5.10	5.41	3.87	4.04	4.93	4.95	5.62	5.70	4.30	4.26	5.39	5.05	6.13	5.82	4.72	4.36
57	4.25	4.46	4.89	5.18	3.66	3.81	4.71	4.71	5.40	5.46	4.08	4.03	5.17	4.82	5.90	5.58	4.49	4.12
58	4.28	4.50	4.93	5.23	3.69	3.85	4.75	4.76	5.44	5.51	4.11	4.07	5.21	4.86	5.95	5.63	4.53	4.16
59	3.96	4.15	4.59	4.86	3.38	3.50	4.40	4.39	5.09	5.13	3.78	3.71	4.85	4.48	5.58	5.24	4.18	3.79
60	4.41	4.64	5.05	5.35	3.82	3.99	4.87	4.89	5.56	5.63	4.25	4.21	5.33	4.99	6.06	5.75	4.66	4.30
61	4.46	4.69	5.10	5.41	3.87	4.04	4.93	4.95	5.62	5.70	4.30	4.27	5.39	5.05	6.13	5.82	4.72	4.36
62	4.32	4.54	4.96	5.27	3.72	3.88	4.78	4.80	5.48	5.56	4.15	4.11	5.25	4.91	6.00	5.68	4.57	4.20
63	4.24	4.46	4.89	5.18	3.66	3.81	4.71	4.71	5.40	5.46	4.08	4.03	5.16	4.82	5.90	5.58	4.49	4.12
64	3.90	4.08	4.53	4.79	3.33	3.44	4.34	4.32	5.02	5.06	3.72	3.65	4.78	4.42	5.51	5.17	4.12	3.73
65	4.44	4.67	5.08	5.39	3.85	4.02	4.91	4.93	5.60	5.67	4.28	4.24	5.37	5.03	6.11	5.79	4.70	4.34
66	4.57	4.81	5.21	5.53	3.97	4.15	5.04	5.07	5.74	5.83	4.41	4.38	5.51	5.18	6.26	5.95	4.84	4.48
67	4.30	4.53	4.95	5.25	3.71	3.87	4.77	4.78	5.46	5.54	4.13	4.09	5.24	4.89	5.98	5.66	4.56	4.18
68	4.22	4.43	4.86	5.15	3.63	3.78	4.68	4.68	5.37	5.43	4.05	4.00	5.13	4.78	5.87	5.55	4.46	4.09
69	3.85	4.02	4.47	4.73	3.27	3.38	4.28	4.25	4.96	4.99	3.66	3.58	4.72	4.35	5.45	5.11	4.05	3.66
70	4.60	4.85	5.25	5.57	4.00	4.18	5.08	5.11	5.77	5.87	4.44	4.42	5.55	5.22	6.30	5.99	4.87	4.51
71	4.27	4.50	4.92	5.22	3.69	3.84	4.74	4.75	5.43	5.50	4.11	4.06	5.20	4.85	5.94	5.62	4.53	4.15
72	4.46	4.71	5.12	5.45	3.87	4.04	4.95	4.98	5.65	5.74	4.30	4.28	5.43	5.09	6.18	5.87	4.74	4.37
73	4.44	4.68	5.08	5.40	3.85	4.02	4.91	4.93	5.60	5.68	4.28	4.25	5.38	5.04	6.12	5.80	4.70	4.34
74	4.27	4.49	4.91	5.21	3.68	3.83	4.73	4.74	5.43	5.49	4.10	4.06	5.20	4.85	5.93	5.61	4.52	4.15
75	4.28	4.51	4.93	5.23	3.69	3.85	4.75	4.76	5.44	5.51	4.12	4.07	5.21	4.87	5.95	5.63	4.54	4.16

76	4.10	4.31	4.74	5.03	3.51	3.65	4.56	4.55	5.25	5.31	3.93	3.87	5.01	4.66	5.76	5.43	4.34	3.96
77	4.47	4.71	5.11	5.42	3.88	4.05	4.94	4.96	5.63	5.71	4.31	4.28	5.41	5.07	6.15	5.83	4.73	4.37
78	4.24	4.46	4.89	5.18	3.66	3.81	4.71	4.71	5.40	5.46	4.08	4.03	5.16	4.82	5.90	5.58	4.49	4.12
79	4.27	4.49	4.92	5.21	3.68	3.84	4.74	4.75	5.43	5.50	4.11	4.06	5.20	4.85	5.94	5.62	4.52	4.15
80	4.06	4.26	4.70	4.98	3.48	3.61	4.51	4.51	5.20	5.26	3.89	3.82	4.97	4.61	5.71	5.38	4.29	3.91
MIN	**3.75**	**3.91**	**4.37**	**4.61**	**3.19**	**3.28**	**4.18**	**4.14**	**4.85**	**4.87**	**3.57**	**3.48**	**4.60**	**4.23**	**5.33**	**4.98**	**3.95**	**3.55**
MAX	**4.89**	**5.17**	**5.54**	**5.89**	**4.30**	**4.51**	**5.38**	**5.43**	**6.08**	**6.18**	**4.75**	**4.75**	**5.86**	**5.54**	**6.61**	**6.31**	**5.19**	**4.84**
AVE	**4.42**	**4.65**	**5.06**	**5.37**	**3.84**	**4.00**	**4.89**	**4.91**	**5.58**	**5.65**	**4.26**	**4.23**	**5.35**	**5.01**	**6.09**	**5.77**	**4.68**	**4.32**

C.2 Design loads for plate girders

Tables in this section present calculated loads for all steel plate girder sections that are needed for reliability analysis.

C.2.1 Noncomposite I-shaped plate girders

Table C- 45. Moments due to design loads applied to noncomposite I-shaped plate girdes

#	S (ft)	L (ft)	M_D (kip-ft)	M_{DW} (kip-ft)	M_{lane} (kip-ft)	M_{veh} (kip-ft)	IM	GDF	M_{LLIL} (kip-ft)	M_u (kip-ft)	D/(D+L)
1	6	60	532	63	288	806	0.33	0.52	703	1,990	0.46
2	6	70	737	86	392	985	0.33	0.51	870	2,571	0.49
3	6	80	978	112	512	1165	0.33	0.51	1046	3,222	0.51
4	6	90	1258	142	648	1344	0.33	0.50	1227	3,933	0.53
5	6	100	1594	175	800	1524	0.33	0.50	1417	4,735	0.56
6	6	110	1958	212	968	1703	0.33	0.50	1606	5,576	0.57
7	6	120	2372	252	1152	1883	0.33	0.49	1801	6,495	0.59
8	6	130	2836	296	1352	2063	0.33	0.49	2002	7,492	0.61
9	6	140	3349	343	1568	2243	0.33	0.49	2213	8,574	0.63
10	6	150	3905	394	1800	2423	0.33	0.49	2437	9,737	0.64
11	6	160	4583	448	2048	2602	0.33	0.49	2676	11,083	0.65
12	6	170	5269	506	2312	2782	0.33	0.48	2899	12,418	0.67
13	6	180	6001	567	2592	2962	0.33	0.48	3144	13,854	0.68
14	6	190	6816	632	2888	3142	0.33	0.48	3390	15,401	0.69
15	6	200	7698	700	3200	3322	0.33	0.48	3644	17,049	0.70
16	6	210	8656	772	3528	3502	0.33	0.48	3906	18,813	0.71
17	8	60	655	84	288	806	0.33	0.65	883	2,489	0.46
18	8	70	905	114	392	985	0.33	0.64	1087	3,205	0.48
19	8	80	1200	149	512	1165	0.33	0.63	1304	4,006	0.51
20	8	90	1541	189	648	1344	0.33	0.63	1526	4,880	0.53
21	8	100	1939	233	800	1524	0.33	0.62	1748	5,833	0.55
22	8	110	2381	282	968	1703	0.33	0.62	1989	6,881	0.57
23	8	120	2882	336	1152	1883	0.33	0.61	2231	8,011	0.59
24	8	130	3488	394	1352	2063	0.33	0.61	2505	9,336	0.61
25	8	140	4108	457	1568	2243	0.33	0.61	2772	10,672	0.62
26	8	150	4801	525	1800	2423	0.33	0.61	3048	12,122	0.64
27	8	160	5559	597	2048	2602	0.33	0.60	3318	13,652	0.65

28	8	170	6392	674	2312	2782	0.33	0.60	3610	15,319	0.66
29	8	180	7299	756	2592	2962	0.33	0.60	3906	17,093	0.67
30	8	190	8280	842	2888	3142	0.33	0.60	4208	18,978	0.68
31	8	200	9346	933	3200	3322	0.33	0.59	4527	21,005	0.69
32	8	210	10548	1029	3528	3502	0.33	0.59	4843	23,204	0.71
33	10	60	776	105	288	806	0.33	0.78	1057	2,977	0.45
34	10	70	1071	143	392	985	0.33	0.77	1302	3,833	0.48
35	10	80	1422	187	512	1165	0.33	0.75	1555	4,779	0.51
36	10	90	1851	236	648	1344	0.33	0.75	1829	5,869	0.53
37	10	100	2319	292	800	1524	0.33	0.75	2108	7,026	0.55
38	10	110	2855	353	968	1703	0.33	0.74	2393	8,285	0.57
39	10	120	3453	420	1152	1883	0.33	0.73	2674	9,627	0.59
40	10	130	4120	493	1352	2063	0.33	0.73	2977	11,100	0.61
41	10	140	4849	572	1568	2243	0.33	0.72	3295	12,686	0.62
42	10	150	5666	656	1800	2423	0.33	0.72	3626	14,412	0.64
43	10	160	6580	747	2048	2602	0.33	0.72	3946	16,250	0.65
44	10	170	7564	843	2312	2782	0.33	0.71	4276	18,203	0.66
45	10	180	8635	945	2592	2962	0.33	0.71	4626	20,306	0.67
46	10	190	9797	1053	2888	3142	0.33	0.71	4986	22,551	0.69
47	10	200	11072	1167	3200	3322	0.33	0.71	5383	25,011	0.69
48	10	210	12425	1286	3528	3502	0.33	0.70	5747	27,517	0.70
49	12	60	897	126	288	806	0.33	0.90	1225	3,454	0.46
50	12	70	1238	172	392	985	0.33	0.89	1511	4,449	0.48
51	12	80	1642	224	512	1165	0.33	0.87	1802	5,542	0.51
52	12	90	2134	284	648	1344	0.33	0.87	2120	6,803	0.53
53	12	100	2672	350	800	1524	0.33	0.86	2441	8,137	0.55
54	12	110	3287	424	968	1703	0.33	0.86	2771	9,593	0.57
55	12	120	3973	504	1152	1883	0.33	0.85	3097	11,142	0.59
56	12	130	4741	592	1352	2063	0.33	0.84	3447	12,845	0.61
57	12	140	5591	686	1568	2243	0.33	0.84	3806	14,678	0.62
58	12	150	6526	788	1800	2423	0.33	0.83	4171	16,637	0.64
59	12	160	7558	896	2048	2602	0.33	0.83	4554	18,760	0.65
60	12	170	8680	1012	2312	2782	0.33	0.82	4953	21,034	0.66
61	12	180	9910	1134	2592	2962	0.33	0.82	5363	23,473	0.67
62	12	190	11230	1264	2888	3142	0.33	0.82	5777	26,044	0.68
63	12	200	12684	1400	3200	3322	0.33	0.82	6210	28,821	0.69
64	12	210	14310	1544	3528	3502	0.33	0.81	6638	31,820	0.70

C.2.2 Composite I-shaped plate girders

Table C- 46. Moments due to design loads applied to composite I-shaped plate girdes

#	S (ft)	L (ft)	M_D (kip-ft)	M_{DW} (kip-ft)	M_{lane} (kip-ft)	M_{veh} (kip-ft)	IM	GDF	M_{LLIL} (kip-ft)	D/(D+L)
1-3	*Empty place holders*									
4	6	70	684	86	392	985	0.33	0.47	799	0.49
5	6	80	902	112	512	1165	0.33	0.47	967	0.51
6	6	90	1154	142	648	1344	0.33	0.47	1141	0.53
7	6	100	1439	175	800	1524	0.33	0.47	1322	0.55
8	6	110	1758	212	968	1703	0.33	0.47	1508	0.57
9	6	120	2114	252	1152	1883	0.33	0.47	1703	0.58
10	6	130	2503	296	1352	2063	0.33	0.47	1907	0.59
11	6	140	2944	343	1568	2243	0.33	0.47	2119	0.61
12	6	150	3415	394	1800	2423	0.33	0.47	2336	0.62
13	6	160	3929	448	2048	2602	0.33	0.46	2557	0.63
14	6	170	4475	506	2312	2782	0.33	0.46	2788	0.64
15	6	180	5142	567	2592	2962	0.33	0.46	3017	0.65
16	6	190	5808	632	2888	3142	0.33	0.46	3272	0.66
17	6	200	6514	700	3200	3322	0.33	0.46	3539	0.67
18	6	210	7288	772	3528	3502	0.33	0.47	3814	0.68
19	6	220	8201	847	3872	3682	0.33	0.47	4118	0.69
20	6	230	9244	926	4232	3862	0.33	0.47	4394	0.70
21	6	240	10277	1008	4608	4042	0.33	0.47	4688	0.71
22	6	250	12314	1094	5000	4222	0.33	0.83	8846	0.60
23	6	260	13684	1183	5408	4401	0.33	0.83	9384	0.61
24	6	270	15214	1276	5832	4581	0.33	0.83	9937	0.62
25	6	280	16964	1372	6272	4761	0.33	0.83	10503	0.64
26	6	290	18819	1472	6728	4941	0.33	0.83	11083	0.65
27	6	300	20570	1575	7200	5121	0.33	0.83	11676	0.65
28	6	310	22608	1682	7688	5301	0.33	0.83	12282	0.66
29	6	320	24914	1792	8192	5481	0.33	0.83	12901	0.67
30	6	330	28096	1906	8712	5661	0.33	0.83	13534	0.69
31	8	60	616	84	288	806	0.33	0.59	799	0.47
32	8	70	845	114	392	985	0.33	0.59	999	0.49
33	8	80	1114	149	512	1165	0.33	0.59	1207	0.51
34	8	90	1422	189	648	1344	0.33	0.58	1423	0.53
35	8	100	1773	233	800	1524	0.33	0.58	1646	0.55
36	8	110	2164	282	968	1703	0.33	0.58	1879	0.57

37	8	120	2598	336	1152	1883	0.33	0.58	2122	0.58
38	8	130	3072	394	1352	2063	0.33	0.58	2377	0.59
39	8	140	3591	457	1568	2243	0.33	0.58	2639	0.61
40	8	150	4161	525	1800	2423	0.33	0.58	2903	0.62
41	8	160	4781	597	2048	2602	0.33	0.58	3173	0.63
42	8	170	5533	674	2312	2782	0.33	0.58	3461	0.64
43	8	180	6262	756	2592	2962	0.33	0.58	3756	0.65
44	8	190	7044	842	2888	3142	0.33	0.57	4060	0.66
45	8	200	7878	933	3200	3322	0.33	0.57	4371	0.67
46	8	210	8793	1029	3528	3502	0.33	0.57	4695	0.68
47	8	220	9972	1129	3872	3682	0.33	0.58	5046	0.69
48	8	230	11037	1234	4232	3862	0.33	0.58	5405	0.69
49	8	240	12195	1344	4608	4042	0.33	0.58	5785	0.70
50	8	250	14872	1458	5000	4222	0.33	1.06	11279	0.59
51	8	260	16581	1577	5408	4401	0.33	1.06	11965	0.60
52	8	270	18428	1701	5832	4581	0.33	1.06	12670	0.61
53	8	280	20420	1829	6272	4761	0.33	1.06	13392	0.62
54	8	290	23040	1962	6728	4941	0.33	1.06	14131	0.64
55	8	300	25344	2100	7200	5121	0.33	1.06	14887	0.65
56	10	100	2108	292	800	1524	0.33	0.70	1971	0.55
57	10	110	2569	353	968	1703	0.33	0.70	2250	0.56
58	10	120	3081	420	1152	1883	0.33	0.70	2541	0.58
59	10	130	3644	493	1352	2063	0.33	0.69	2840	0.59
60	10	140	4261	572	1568	2243	0.33	0.69	3150	0.61
61	10	150	4995	656	1800	2423	0.33	0.69	3447	0.62
62	10	160	5732	747	2048	2602	0.33	0.69	3775	0.63
63	10	170	6525	843	2312	2782	0.33	0.69	4119	0.64
64	10	180	7384	945	2592	2962	0.33	0.69	4478	0.65
65	10	190	8301	1053	2888	3142	0.33	0.68	4838	0.66
66	10	200	9428	1167	3200	3322	0.33	0.68	5197	0.67
67	10	210	10482	1286	3528	3502	0.33	0.68	5580	0.68
68	10	220	11605	1412	3872	3682	0.33	0.68	5976	0.69
69	10	230	12814	1543	4232	3862	0.33	0.68	6394	0.69
70	10	240	14165	1680	4608	4042	0.33	0.68	6834	0.70
71	10	250	17210	1823	5000	4222	0.33	1.30	13800	0.58
72	10	260	19152	1972	5408	4401	0.33	1.30	14640	0.59
73	10	270	21829	2126	5832	4581	0.33	1.30	15502	0.61
74	10	280	24149	2287	6272	4761	0.33	1.30	16385	0.62
75	10	290	26548	2453	6728	4941	0.33	1.30	17289	0.63

76	10	300	29302	2625	7200	5121	0.33	1.30	18214	0.64
77	12	60	848	126	288	806	0.33	0.83	1130	0.46
78	12	70	1162	172	392	985	0.33	0.83	1411	0.49
79	12	80	1538	224	512	1165	0.33	0.82	1683	0.51
80	12	90	1961	284	648	1344	0.33	0.81	1983	0.53
81	12	100	2439	350	800	1524	0.33	0.81	2295	0.55
82	12	110	2972	424	968	1703	0.33	0.81	2621	0.56
83	12	120	3563	504	1152	1883	0.33	0.81	2956	0.58
84	12	130	4214	592	1352	2063	0.33	0.81	3300	0.59
85	12	140	4980	686	1568	2243	0.33	0.80	3633	0.61
86	12	150	5759	788	1800	2423	0.33	0.80	4010	0.62
87	12	160	6604	896	2048	2602	0.33	0.80	4394	0.63
88	12	170	7517	1012	2312	2782	0.33	0.80	4788	0.64
89	12	180	8501	1134	2592	2962	0.33	0.79	5188	0.65
90	12	190	9723	1264	2888	3142	0.33	0.79	5590	0.66
91	12	200	10865	1400	3200	3322	0.33	0.79	6024	0.67
92	12	210	12535	1544	3528	3502	0.33	1.50	12278	0.53
93	12	220	14049	1694	3872	3682	0.33	1.50	13154	0.54
94	12	230	15775	1852	4232	3862	0.33	1.50	14053	0.56
95	12	240	17697	2016	4608	4042	0.33	1.50	14976	0.57
96	12	250	19550	2188	5000	4222	0.33	1.50	15923	0.58
97	12	260	22200	2366	5408	4401	0.33	1.50	16892	0.59
98	12	270	24566	2552	5832	4581	0.33	1.50	17887	0.60
99	12	280	27236	2744	6272	4761	0.33	1.50	18906	0.61
100	12	290	30037	2944	6728	4941	0.33	1.50	19949	0.62
101	12	300	32981	3150	7200	5121	0.33	1.50	21016	0.63
102	14	80	1748	261	512	1165	0.33	0.93	1919	0.51
103	14	90	2228	331	648	1344	0.33	0.93	2259	0.53
104	14	100	2770	408	800	1524	0.33	0.92	2614	0.55
105	14	110	3378	494	968	1703	0.33	0.92	2975	0.57
106	14	120	4053	588	1152	1883	0.33	0.91	3345	0.58
107	14	130	4789	690	1352	2063	0.33	0.91	3741	0.59
108	14	140	5598	800	1568	2243	0.33	0.91	4142	0.61
109	14	150	6485	919	1800	2423	0.33	0.91	4548	0.62
110	14	160	7492	1045	2048	2602	0.33	0.90	4980	0.63
111	14	170	8513	1180	2312	2782	0.33	0.90	5436	0.64
112	14	180	9728	1323	2592	2962	0.33	0.90	5879	0.65
113	14	190	10926	1474	2888	3142	0.33	0.90	6354	0.66
114	14	200	12209	1633	3200	3322	0.33	0.90	6853	0.67

115	14	210	13623	1801	3528	3502	0.33	0.90	7357	0.68
116	14	220	15084	1976	3872	3682	0.33	0.90	7867	0.68
117	14	230	17710	2160	4232	3862	0.33	1.71	16060	0.55
118	14	240	20083	2352	4608	4042	0.33	1.71	17115	0.57
119	14	250	22335	2552	5000	4222	0.33	1.71	18198	0.58
120	14	260	24780	2760	5408	4401	0.33	1.71	19305	0.59
121	14	270	27419	2977	5832	4581	0.33	1.71	20442	0.60
122	14	280	30269	3201	6272	4761	0.33	1.71	21607	0.61
123	14	290	33428	3434	6728	4941	0.33	1.71	22799	0.62
124	14	300	37096	3675	7200	5121	0.33	1.71	24019	0.63
125	16	60	1087	168	288	806	0.33	1.05	1427	0.47
126	16	70	1490	229	392	985	0.33	1.05	1781	0.49
127	16	80	1959	299	512	1165	0.33	1.04	2152	0.51
128	16	90	2495	378	648	1344	0.33	1.04	2536	0.53
129	16	100	3101	467	800	1524	0.33	1.04	2934	0.55
130	16	110	3778	565	968	1703	0.33	1.03	3343	0.57
131	16	120	4564	672	1152	1883	0.33	1.02	3742	0.58
132	16	130	5399	789	1352	2063	0.33	1.02	4187	0.60
133	16	140	6300	915	1568	2243	0.33	1.02	4641	0.61
134	16	150	7307	1050	1800	2423	0.33	1.02	5107	0.62
135	16	160	8375	1195	2048	2602	0.33	1.01	5586	0.63
136	16	170	9598	1349	2312	2782	0.33	1.01	6066	0.64
137	16	180	10841	1512	2592	2962	0.33	1.01	6585	0.65
138	16	190	12170	1685	2888	3142	0.33	1.01	7120	0.66
139	16	200	14224	1867	3200	3322	0.33	1.97	14998	0.52
140	16	210	15844	2058	3528	3502	0.33	1.97	16116	0.53
141	16	220	17613	2259	3872	3682	0.33	1.97	17264	0.54
142	16	230	19700	2469	4232	3862	0.33	1.97	18444	0.55
143	16	240	21967	2688	4608	4042	0.33	1.97	19656	0.56
144	16	250	24402	2917	5000	4222	0.33	1.97	20899	0.57
145	16	260	27101	3155	5408	4401	0.33	1.97	22171	0.58
146	16	270	29910	3402	5832	4581	0.33	1.97	23477	0.59
147	16	280	33810	3659	6272	4761	0.33	1.97	24814	0.60
148	16	290	37115	3925	6728	4941	0.33	1.97	26183	0.61
149	16	300	40873	4200	7200	5121	0.33	1.97	27584	0.62