AMERICAN UNIVERSITY OF BEIRUT

INFLUENCE OF RAILINGS STIFFNESS ON MULTI-SPAN MULTI-LANE WHEEL LOAD DISTRIBUTION IN CONCRETE SLAB BRIDGES

by
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AN ABSTRACT OF THE THESIS

Sarah Jaber for Master of Engineering
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Title: Influence of Railings Stiffness on Multi-Span Multi-Lane Wheel Load Distribution in Concrete Slab Bridges

The presence of railings or parapets acting integrally with the bridge deck have the effect of stiffening and attracting load to the slab edge and therefore altering the lateral wheel load distribution on highway bridges, which would result in increasing the load-carrying capacity of concrete slab bridges. The current research dwells on a previous research conducted on One-span bridges, and extends the analysis to study the influence of varying the railings size or stiffness on wheel load distribution, as well as on the load-carrying capacity of straight two-span concrete slab bridges.

Typical two-span, simply supported, multi-lane (One to four lanes), straight reinforced concrete slab bridges are considered. The finite-element method is used to investigate the effect of span length and slab width, and to calculate the wheel load distribution on the bridge slab at the critical section. AASHTO design trucks loads are placed transversally and longitudinally to produce maximum moments at the critical section of the slabs. Various configurations of railings sizes/stiffnesses on either or both edges of the slab are considered for straight bridges, where the cases with no railing will serve as reference cases. The wheel load distribution on the bridge slab at the critical section for the reference cases and for cases with railings are calculated and compared. The results are also assessed and evaluated with AASHTO current procedures which do not include railing stiffness as a criterion in design, and recommendations are made to assess the influence of railings on straight bridges.

This research will assist structural engineers in better designing new straight concrete slab bridges, or evaluating more precisely the load-carrying capacity of existing bridges in the presence of railings. In addition, the approach adopted in this research can also be considered as an adequate and practical method for strengthening and rehabilitating concrete slab bridges. Further, the findings from this and previous research in the same track will be used to recommend the inclusion of railings stiffness in AASTHO procedures when computing the wheel load distribution and load-carrying capacity of concrete slab bridges.

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CHAPTER 1

INTRODUCTION

1.1 Background

Since the early 1900s, bridges have been undergoing a steady evolution in design and construction. Bridge engineers have continuously attempted to improve and expand their methods of analysis, design, and construction, as new types of bridges were conceived. Often this was the result of new analysis or construction techniques. Many types of bridges are in use today, ranging from short-span slab bridges to suspension structures. The most common compOnent of all bridges is the bridge superstructure or bridge deck.

Reinforced concrete slab bridges offer economic alternatives for short-span bridges. The main advantage of cast-in-place concrete slab bridges is the ability to provide a smooth finishing surface by field adjustment of the roadway profile during construction. Typically, the design of highway bridges must conform to specifications such as in the American Association of State Highway and Transportation Officials (AASHTO). These include the AASHTO Standard Specifications for Highway Bridges (AASHTO Specs 2002) and the AASHTO Load Resistance Factor Design (AASHTO LRFD 2010). These specifications are based on a thorough understanding of the lateral wheel load distribution on the bridge slab, which is required to develop a realistic design for these highway bridges.

1.2 Design Procedures

The AASHTO design procedures were originally developed in the 1940s, based on the research work of Westergaard (1926, 1930), Newmark (1938), and Jensen (1938, 1939) on moments and stress distribution in reinforced concrete slabs. The analysis, which was based on the classic plate theory, assumed the slabs to be homogeneous and perfectly elastic material. Results for various loading and edge conditions were summarized in tables and charts, developing calculations of various coefficients.

1.3 Research Objectives

The presence of railings or parapets acting integrally with the bridge deck have the effect of stiffening and attracting load to the slab edge and therefore altering the lateral wheel load distribution on highway bridges, which would result in increasing the load-carrying capacity of bridges. The current research dwells on a previous study where One typical railing was investigated (*Fawaz et al. 2015*), and studies the influence of varying the railings size or stiffness on wheel load distribution as well as on the load-carrying capacity of straight concrete slab bridges.

Typical two-span, simply supported, multi-lane (One to four lanes), straight reinforced concrete slab bridges are considered. The finite-element method is used to investigate the effect of span length and slab width, and to calculate the wheel load distribution on the bridge slab at the critical section. AASHTO (HS20) design trucks loads are placed transversally and longitudinally to produce maximum moments at the critical section of the slabs. Various configurations of railings sizes/stiffnesses on either or both edges of the slab are considered for straight bridges, where the cases with no railings will serve as reference cases. The wheel load distribution on the bridge slab at the critical section for the reference cases and for cases with railings are

calculated and compared. The results are also assessed with the AASHTO Standard Specifications (2003) and AASHTO LRFD (2010) procedures which do not include railing stiffness as a criterion in design, and recommendations are made for bridge engineers to assess the influence of railings on straight bridges.

1.4 Scope and Methodology of Proposed Research

The current research will present the finite-element results of a parametric study to accurately evaluate the effect of railings stiffness on wheel load distribution in straight concrete slab highway bridges.

In the finite-element method, the bridge is discretized into a convenient number of elements, which are assumed to be interconnected at nodal points; each element has the properties corresponding to the original structure. In the present research, the finite-element modeling consists of shells for concrete slab, frames for railings and simple supports for the piers. The finite-element program SAP2000 (2017) is selected for the analysis.

The finite-element method is used to investigate the effect of span length and slab width on simply supported, two-span, One- to four-lane concrete slab bridges. Four typical span lengths are investigated: 24, 36, 46, and 54 ft (7.2, 10.8, 13.8, and 16.2 m). Given that the typical lane width is 12 ft (3.6 m) and that the case of One-lane bridges has an additional 1 ft width of slab on each side, the overall slab widths for bridges are: 14ft (4.2 m) for One lane, and 24 ft (7.2 m) for two lanes, 36 ft (10.8 m) for three lanes, and 48 ft (14.4 m) for four lanes. Four different railings sizes/stiffnesses will be analyzed in addition to the reference case without railings.

Design trucks are assumed to be traveling in the same direction. Transversally, Centered and Edge Loading conditions are considered. In the Centered loading condition, the design trucks are placed centered each in its own lane. In the Edge

loading, the design trucks are placed side-by-side close to One edge (left) of the slab, such that the center of the left wheel of the leftmost truck is positioned at One foot from the left edge of the slab. The distance between the adjacent trucks is selected to be 4 ft (1.2 m) produce the worst loading condition on the bridge. Various positions of the design trucks are assumed, longitudinally and transversally, in order to produce maximum bending moments. The cases of straight bridges without railings are first analyzed and considered as the reference cases. Railings are then placed integrally at either or both of the slab edges. The wheel load distribution on the bridge slab at the critical section for the reference cases and for bridges with railings with different stiffnesses is calculated and compared. The results are also assessed with the AASHTO Standard Specifications (2003) and AASHTO LRFD (2010) design procedures.

1.5 Thesis Organization

The thesis is divided into five chapters including this introduction. Chapter 2 is a general description of the research work including a description of AASHTO Standard Specifications and LRFD design procedures. Chapter 3 includes a description of the bridge cases considered and the finite element models used in the analyses. Chapter 4 discusses the effect of railings on the different bridge models considered with tables showing the different results and assessment with AASHTO design standards. Conclusions and recommendations are presented in Chapter 5.

CHAPTER 2

BACKGROUND AND AASHTO DESIGN PROCEDURES

2.1 Introduction

In this chapter, a background section is presented, and for later comparison between FEA results and conventional methods of bridge design, a summary of AASHTO Standard Specifications (2002) and AASHTO LRFD (2010) design procedures are provided.

2.2 Background Studies

A concrete slab bridge is designed according to the provisions for main reinforcement parallel to traffic. The AASHTO design procedures was originally developed in the 1940s, based on the research work of Westergaard (1926, 1930) and Jensen (1938, 1939) and is presented in AASHTO Standard Specifications for Highway Bridges (2002) (section 3.24 “Distribution of Loads and Design of Concrete Slabs”).

Shekar et al. (1993) performed extensive experimental and analytical investigation to evaluate the load-carrying capacity of existing reinforced concrete slab bridges. The experimental phase of the investigation consisted of field testing of six slab bridges. Test results were used to develop 3D FEA models to be applied by practicing engineers. The test data compared favorably with FEA results and verified that concrete slab bridges have the strength necessary to resist highway loading. Significant differences between maximum bending moments were also obtained for 2D and 3D analyses because of the participation of nonstructural members such as curbs. Therefore, 3D FEA was recommended in analyzing slab bridges.

Frederick (1997) presented the results of an experimental and finite-element analysis investigation of load distribution in a concrete slab bridge. A typical One-span, simply supported slab bridge with a three-lane width was considered. The design live load bending moments were calculated using AASHTO standard specifications (2003) provisions. The FEA was performed using rectangular plate bending element. A One fifteenth size scale concrete model was constructed and tested in the laboratory. The FEA results correlated well with the test data and were less than AASHTO empirical equation. The results for multiple-lane loading indicated that the slab behaved essentially as a wide beam with minor variations in the longitudinal bending moment across the width.

Mabsout et al. (2004) presented the results of an extensive investigation of reinforced concrete slab highway bridges using finite-element analysis. Simply supported One-span bridges were considered with various span lengths, numbers of lanes, and loading conditions (Edge and Centered loading) for cases with and without shoulders. A total of 112 case study bridges were analyzed. The maximum longitudinal bending moments, edge beam moments, and maximum deflections were compared with AASHTO design procedures and conclusions were made regarding the results. The effect of applying the AASHTO reduction factors for the FEA moments with three (10%) and four lanes (25%) was investigated.

A previous study by Mabsout et al. (1997) was conducted to investigate the influence of sidewalks and railings on wheel load distribution in steel girder highway bridges. A typical One-span, two-lane, simply supported, composite steel girder bridges were selected in order to investigate the influence of various parameters such as: span length, girder spacing, sidewalks, and railings. A total of 120 bridges were analyzed using three-dimensional finite-element analysis. AASHTO HS20 design

trucks were positioned in both lanes to produce maximum moments. The finite-element analysis results were used in calculating the maximum wheel-load distribution factors (DF), which were compared with the simple AASHTO standard specifications (2003) formula, DF=S/5.5, and the formula developed as part of NCHRP project 12-26 (1988), included in AASHTO LRFD (2010). The analysis of the steel girder bridges indicated that the AASHTO LRFD wheel load distribution formula correlated conservatively with the finite-element results and were all less than the typical empirical formula (S/5.5). The presence of sidewalks and railings were shown to increase the load-carrying capacity by as much as 30% if they were included in the strength and evaluation of highway bridges. Hajjar et al. (2016) and Nuwayhid et al. (2016) extended the previous study to multi-lane (three and four lanes) single-span and continuous two-span steel girder bridges.

Chung et al. (2006) conducted a study to investigate the influence of secondary elements and deck cracking on the lateral load distribution of steel girder bridges. It was found that the presence of secondary elements such as lateral bracing and parapets produces load distribution factors up to 40% lower than the AASHTO LRFD values. Conner and Huo (2006) investigated the effect of parapets and bridge aspect ratio on live-load moment distribution bridge girders. The finite element method was used to investigate 34 two-span continuous bridges with different skew angles and overhang lengths. The presence of parapets was shown to reduce distribution factors by as much as 36 and 13% for exterior and interior girders, respectively. Akinci et al. (2008) tested the parapet strength and contribution to live-load response for super-load passages. The results of this study showed that girder distribution factors (GDFs) can be decreased by as much as 30%, depending on the stiffness of the girders and the transverse truck position if the parapets are included in the analysis. Roddenberry et

al. (2011) examined the effect of secondary elements on load distribution in prestressed bridge girders. This research showed that including the effect of barriers changes the wheel load distribution and bending moments in girders.

A recent and extensive study by Fawaz et al. (2017) was conducted to investigate the influence of railings on wheel load distribution in One-span concrete slab highway bridges. Typical One-span, simply supported, multi-lane (One to four lanes), reinforced concrete slab bridges were modeled and analyzed using the finite element method and various configurations of railings on either or both edges of the slab were considered. The case of One-span bridges with no sidewalks and railings served as reference bridges. AASHTO design trucks (HS20) are assumed, longitudinally and transversally, in order to produce maximum bending moments. The wheel load distribution on the bridge slab at the critical section for the reference and continuous railing cases were calculated and compared. The results were also assessed with the AASHTO Standard Specifications and AASHTO LRFD Design Specifications procedures. The presence of railings was shown to decrease the longitudinal bending moments by about 15 to 25%.

A study by Nouh et al. (2017) presents a parametric investigation of the influence of railings stiffness on the wheel load distribution in simply-supported, One-span, One- and two-lane reinforced concrete slab bridges using the finite-element analysis. Various parameters were considered including the span length and slab width to investigate the influence of railings stiffness on wheel load distribution and bending moments. A total of 80 bridge cases were modeled and analyzed using FEM, and the results obtained were compared with reference bridge slabs without railings as well as to the AASHTO design procedures. The presence of railings was shown to

decrease the longitudinal bending moments by about 25% to 60% depending on the stiffness of the railings.

The studies above by Mabsout et al. (2004 and 1997), Hajjar et al. (2016), Fawaz et al. (2017), and Nouh et al. (2017) form the basis for the current research which will address the influence of railings stiffness on wheel load distribution in two span reinforced concrete highway bridges.

2.3 AASHTO Standard Specifications for Highway Bridge

2.3.1 Slab Design

A concrete slab bridge is designed with the provisions for main reinforcement parallel to traffic. AASHTO specifies a distribution width for highway loading or an empirical formula to reduce the two-way bending problem into a beam (One-way) bending problem. Therefore, reinforced concrete slab bridges are typically designed as a series of beam strips. AASHTO Standard Specifications (2002) suggest three approaches to determine the live load bending moment for HS20 loading. One approach, which will be adopted for the assessment in this study, is described below.

Section 3.24.3.2 of AASHTO (2002) provides empirical equations for the longitudinal bending moment M per foot width, for the case of main reinforcement parallel to traffic and is applicable only to simple spans.

- M_{AASHTO} (Kip-ft/ft) =0.9S for S <50 ft (1a)

  or

- M_{AASHTO} (Kip-ft/ft) =(1.30S-20) for 50 ft < S <100 ft (1b)

where S=span length in feet.

The analysis of bridges according to the AASHTO must consider both truck and lane loading, with the design being based on the governing of the two load cases. However, for short-span structures, the truck loading governs the design.

Also, AASHTO gives special provisions for transverse reinforcement placed perpendicular to the main steel reinforcement in bridge slabs. The amount of distribution reinforcement is given as a percentage of the main reinforcement equal to $100/(S)^{1/2}$, where S is in feet, and shall not exceed 50%. AASHTO does not include recommendations or specifications to account for the presence of integral railings on the slab edges.

2.3.2 Edge Beam

According to section 3.24.8, a longitudinal AASHTO edge beam moment of a simple span is provided for slabs having main reinforcement parallel to traffic as:

- $Medge\_{AASHTO}$ (Kip-ft/ft) =0.1xPxS (2)

where:

P=16 Kips for the AASHTO HS20 design truck;

S = the span length in feet.

AASHTO standard specification does not specify a width for the edge beam. However, some departments of transportation use an edge beam width of 1.5 ft, which leads to:

- M_{edge_AASHTO} (kip-ft/ft) = $0.1 \times P \times S/1.5$ (3)

2.3.3 Live Load Deflection

AASHTO maximum live load deflection D for simple or continuous spans (section 8.9.3.1) shall not exceed:

- $D\ (in) = \frac{S}{800}$ where S is the span length of the bridge in inches (4)

2.4 AASHTO Load Resistance Factor Design (LRFD)

2.4.1 Slab Design

According to AASHTO LRFD (2010) section 3.6.1.2.1, the vehicular live loading on the roadways of bridges shall consist of a combination of design truck HS20 (section 3.6.1.2.2) or tandem (section 3.6.1.2.3) with design lane load (section 3.6.1.2.4) similar to the AASHTO Standard Specifications lane load (AASHTO Specs fig 3.7.6B) and consists of a uniformly distributed load in the longitudinal direction of 0.64 Kip/ft and occupying 10ft transversally. For negative moment a special loading is used. The loading consists of two design trucks with the magnitude of 90% the axle weights in addition to the lane loading.

AASHTO LRFD section 4.6.2.3 provides an equivalent strip width to design slab bridges similar to the previous bridge specifications. This simplistic approach is to divide the total statical moment M_0 by the bridge equivalent width E to achieve a moment per unit width for design. The equivalent width E of longitudinal strips per lane for both shear and moment is determined using the following formulas:

The width for One lane (two lines of wheels) loaded is:

- $E=10+5(L_1 \times W_1)^{1/2}$ in inches (LRFD Equation 4.6.2.3-1) (5a)

The width for multilane loaded is:

- $E=84+1.44(L_1 \times W_1)^{1/2} \leq \frac{W}{N_L}$ in inches (LRFD Equation 4.6.2.3-2) (5b)

where:

E=equivalent width in inches;

L_1=span length in feet taken equal to the lesser of the actual span or (60 ft);

W_1=modified edge-to-edge width of bridge taken to be equal to the lesser of the actual width or (60ft) for multi-lane loading, or (30ft) for single-lane loading;

W=physical edge-to-edge width of bridge;

N_L= number of design lanes.

The live load longitudinal bending moment M is therefore obtained as:

- $M_{LRFD}\,(\text{Kip-ft/ft}) = \frac{M_0}{E}$

AASHTO LRFD does not include recommendations or specifications to account for the presence of integral railings on the slab edges.

2.4.2 Edge Beam

AASHTO LRFD edge beam moment (article 4.6.2.1.4b) shall be assumed to support One line of wheel load and a tributary portion of the design lane load. Where the effective width is the sum of the distance between the edge of the deck and the inside face of the barrier (assumed equal to 1 ft), plus 1 ft, plus One quarter of the strip width specified above, but shall not exceed either One-half the full strip width or 6 ft.

2.4.3 Live Load Deflection

AASHTO LRFD maximum deflection D for simple or continuous spans (article 2.5.2.6.2) shall not exceed:

- $D\,(\text{in}) = \frac{S}{800}$ where S is the span length of the bridge in inches (6)

CHAPTER 3

BRIDGE CASES DESCRIPTION, MODELING AND ANALYSIS

3.1 Introduction

This chapter presents the parametric study carried out on the analysis of reinforced concrete slab bridges in the presence of integral concrete railings at either or both edges of the slab, including the reference cases with no railings. The various geometric and physical characteristics of the bridges as well as the different railings configurations and loading patterns are presented. The chapter also outlines the three-dimensional (3D) finite element modeling technique adopted and summarizes all the bridge cases considered.

3.2 Bridge Cases Description

3.2.1 Geometry and Dimensions

A total number of six hundred forty geometrically distinct simply supported two-span reinforced concrete slab bridges cases are considered in the study, whereby the following geometrical properties are varied:

- Span length (4 cases)
- Number of lanes (4 cases)
- Presence of railings (4 cases)
- Railings stiffness factor (5 cases)

The four span lengths considered, with the corresponding slab thicknesses chosen to control deflection, are as follows:

- Span length of 24ft with slab thickness of 18 inches
- Span length of 36ft with slab thickness of 21 inches

- Span length of 46ft with slab thickness of 24 inches
- Span length of 54ft with slab thickness of 27 inches

A typical lane is considered to have a fixed width of 12 ft. Cases of One-lane bridges have an additional 1ft width of slab on each side. For the number of lane considered, from One to four, the corresponding slab widths are as follows:

- 14ft for One-lane bridges (1+1×12+1= 14ft)
- 24ft for two-lane bridges (2×12 = 24ft)
- 36ft for three-lane bridges (3×12 = 36ft)
- 48ft for four-lane bridges (4×12 = 48ft)

The base case for the railings size was adopted from previous work by Fawaz et al. (2015) to be in this study 8 in wide and 30 in deep above slab. These railings may be on either or both edges of the bridge. Another parameter of this study is the railings stiffness, which is represented by the moment of inertia of the railing (I) computed at the bottom of the railing section.

$$I(bottom) = I(center) + Ad^2 = bh^3/12 + bh(h/2)^2 = bh^3/3 = 4I(center) \text{ or } 4\ Ic.$$

Five stiffness factors are considered including x0, x1, x2, x3, x4, and x0.5, along with x0 (reference case with no railing).

Where:

x0 No Railing, Reference case =0

x1 Moment of inertia of base case = 4Ic

x2 Twice the base case moment of inertia =8Ic

x3 Triple the base case moment of inertia =12Ic

x4 Four times the base case moment of inertia =16Ic

x0.5 Half the base case moment of inertia =2Ic

Figure 3.1 illustrates typical cross-sections for One-lane, two-lane, three-lane and four-lane bridge cases with/without railings for the base case (x1).

Table 3.1 summarizes the geometrical characteristics and dimensions of all the bridge cases analyzed.

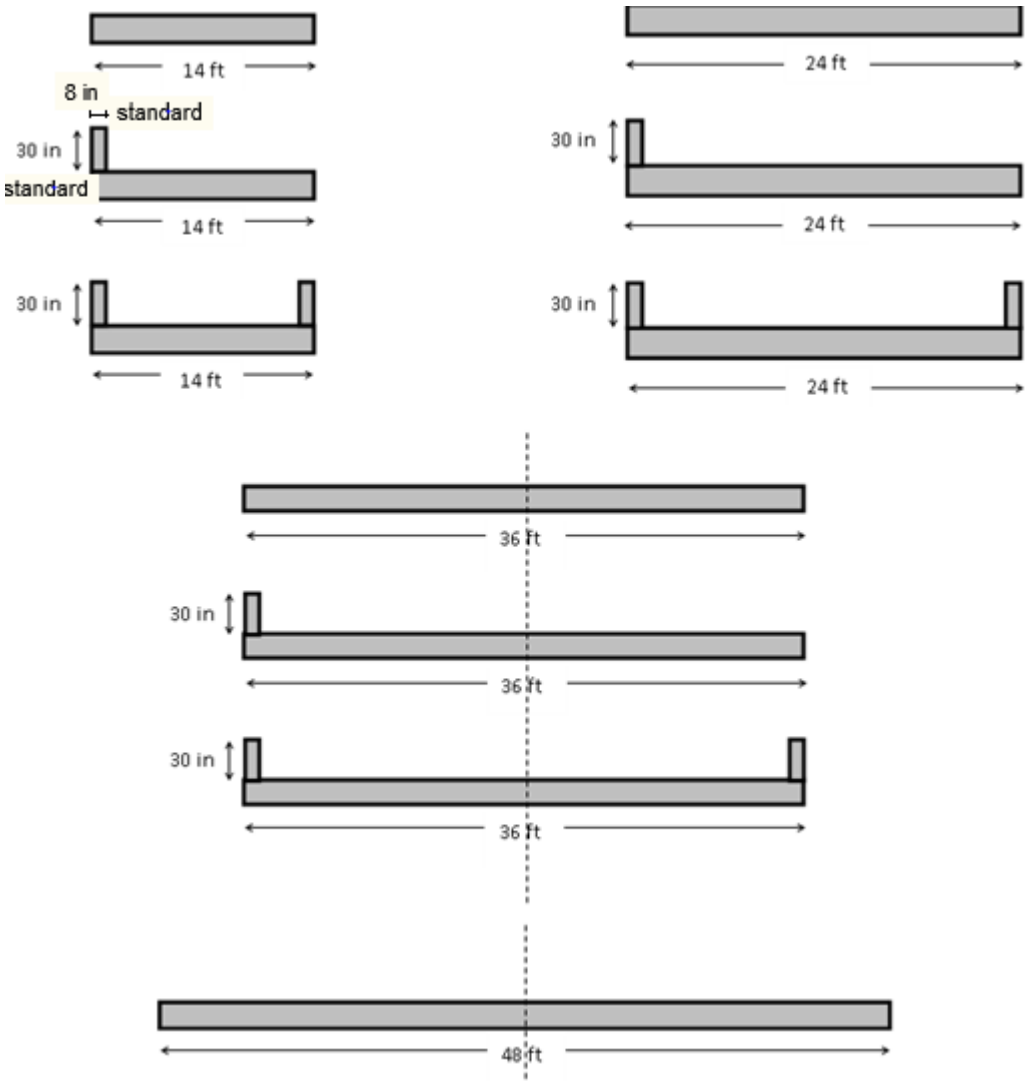


Figure 3.1: Typical Cross Sections for One-lane, Two-Lane, Three-Lane and Four-Lane Bridge Cases with/without Railings (Base case of railing 8in x 30in)

Table 3. 1: Geometrical Characteristics and Dimensions of Modeled Bridges

No. of Lanes n	Span Length S (ft)	Slab Thickness t (in)	Slab Width B (ft)	Railings Stiffness Factors
1	24	18	14	x0, x1, x2, x3, x4,x0.5
	36	21		
	46	24		
	54	27		
2	24	18	24	x0, x1, x2, x3, x4,x0.5
	36	21		
	46	24		
	54	27		
3	24	18	36	x0, x1, x2, x3, x4,x0.5
	36	21		
	46	24		
	54	27		
4	24	18	48	x0, x1, x2, x3, x4,x0.5
	36	21		
	46	24		
	54	27		

3.2.2 Physical Properties

The material properties of the normal-strength concrete adopted in the study are as follows:

- Compressive Strength: f'_c (28 days) = 4,000 psi
- Modulus of Elasticity: $E_c = 3.60 \times 10^6$ psi
- Poisson's Ratio: $\nu = 0.2$

3.2.3 AASHTO Design Truck

The analysis and design of any highway bridge must consider truck and lane loading. However, truck-loading provisions govern for short-span structures when considering AASHTO Standard Specifications (2002). Therefore, the bridges in this study are analyzed for HS20-44 Truck load as given in AASHTO (Figure 3.2). The maximum weight of this truck is 72 Kips distributed over two rear axles and One front axle as follows:

- 32 Kips for each of the rear axles
- 8 Kips for the front axle

The three axles are equally spaced at 14 ft.

3.2.4 Longitudinal Loading Position of Design Trucks

For the straight continues bridges, both positive and negative moments loading conditions are determined for the different four span using two different approach. In the first method, maximum moment is determined by moving One truck along the bridge in case of positive moment and two truck in the case of negative moment. In the second method loading position to produce maximum moment is determined using the moment envelope. Table 3.2a and Table 3.2b show the longitudinal truck position for the various span lengths considered for both positive and negative moments.

Table 3. 2a: Longitudinal Truck Position in Two-Span Bridges for Maximum Positive Moment at Critical Section

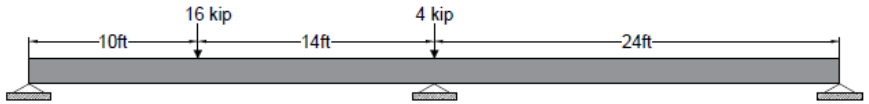
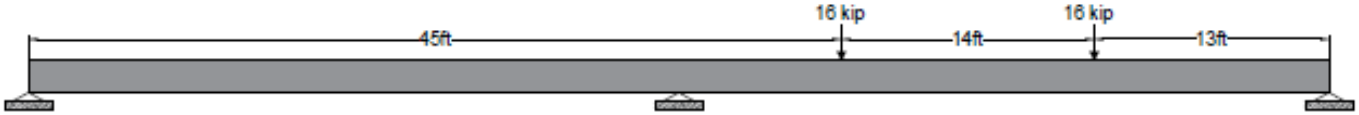
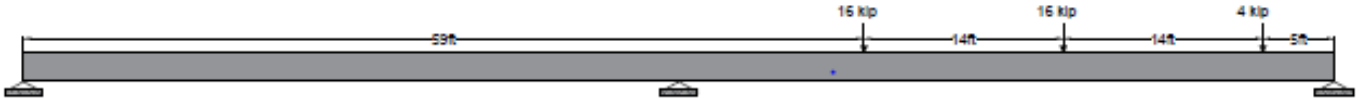
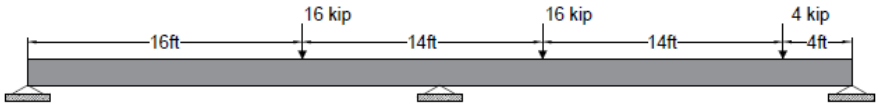
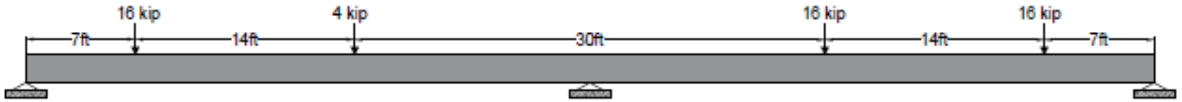
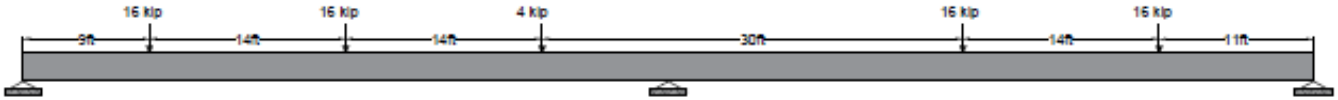
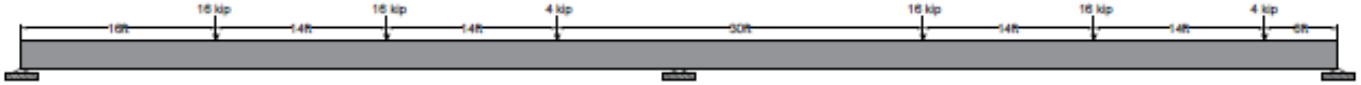
Span S (ft)	Thick t (in)	Truck Loading Position for Positive Moment
24	18	
36	21	
46	24	
54	27	

Table 3. 2b: Longitudinal Truck Position in Two-Span Bridges for Maximum Positive Moment at Critical Section

Span S (ft)	Thick t (in)	Truck Loading Position for Negative Moment
24	18	
36	21	
46	24	
54	27	

3.2.5 Transverse Loading Position of Design Trucks

AASHTO HS20 design trucks are assumed to be traveling in the same direction on the bridge. Transversally, three loading conditions are considered, Center Lane, Center-Center and Edge loading conditions. In the Center-Lane loading condition, the design trucks are placed centered each in its own lane (Refer to Figure 3.3a&b). While in the Center-Center loading condition, the design trucks are placed side-by-side at the middle of the bridge with a distance between adjacent trucks of 4ft (Refer to Figure 3.4a&b). In the Edge loading condition, the design trucks are placed side-by-side close to One edge (left) of the slab, such that the center of the left wheel of the leftmost truck is positioned at One foot from the left edge of the slab; the distance between the adjacent trucks is selected to be 4ft and produce worst loading condition on the bridge (Refer to Figure 3.5a&b). Fawaz et al. (2017) have shown that the Edge loading condition is always governing and thus only Edge loading conditions are considered for analysis in this study. Edge loading is considered to be at the left of the bridge slab, while three railing conditions are used. The three railing conditions are: rail on the left side, rail on the right side and rail on both sides.

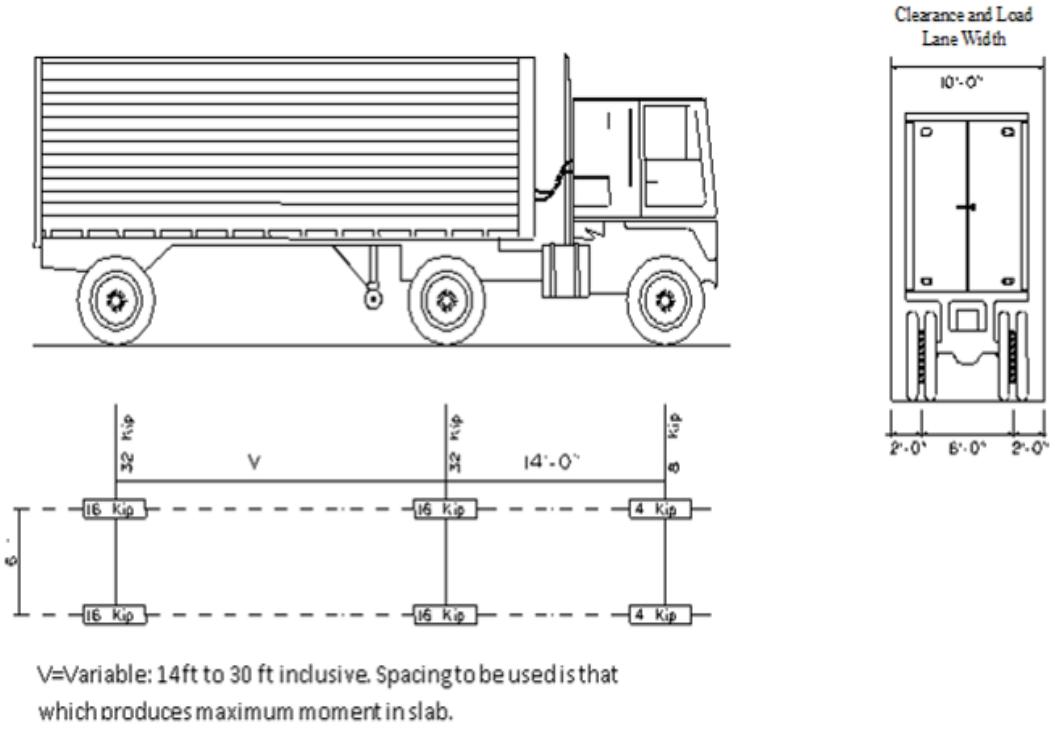


Figure 3.2: AASHTO HS-20 Design Truck (Source: AASHTO Standard Specifications for Highway Bridges, 2002).

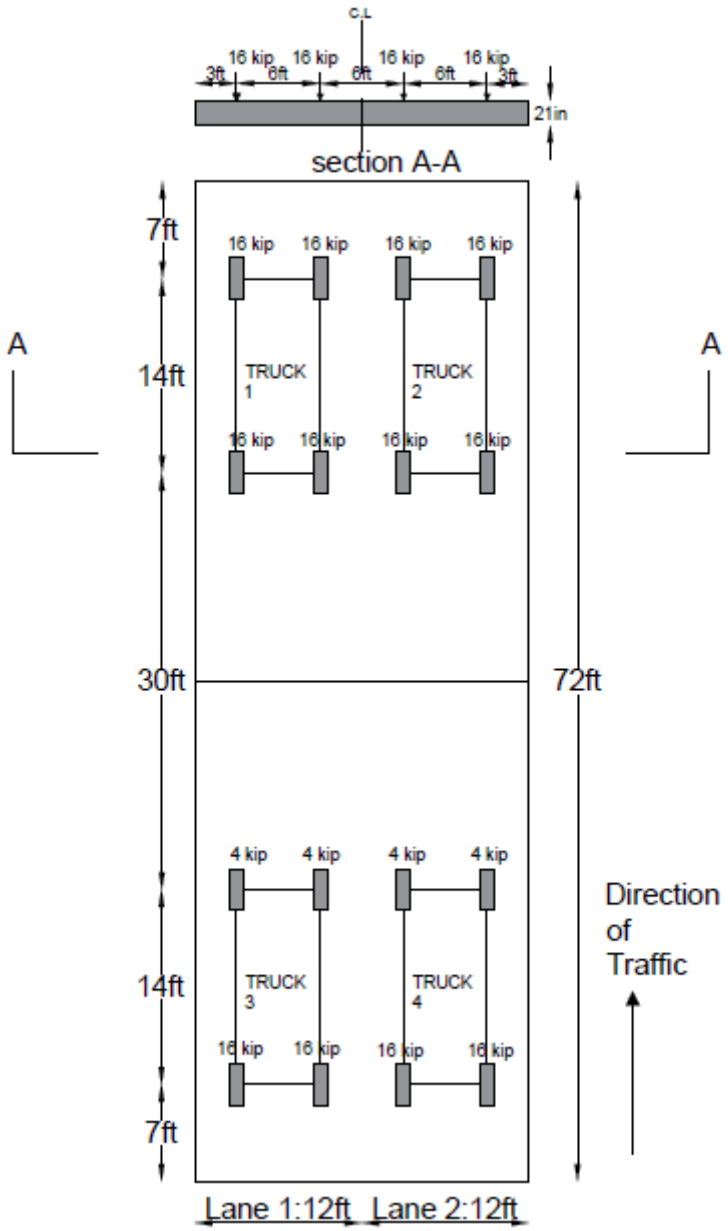


Figure 3.3a: Typical Cross-Section and Plan of Two-Lane 36ft Span Bridge under Center-Lane Loading Condition (Negative moment).

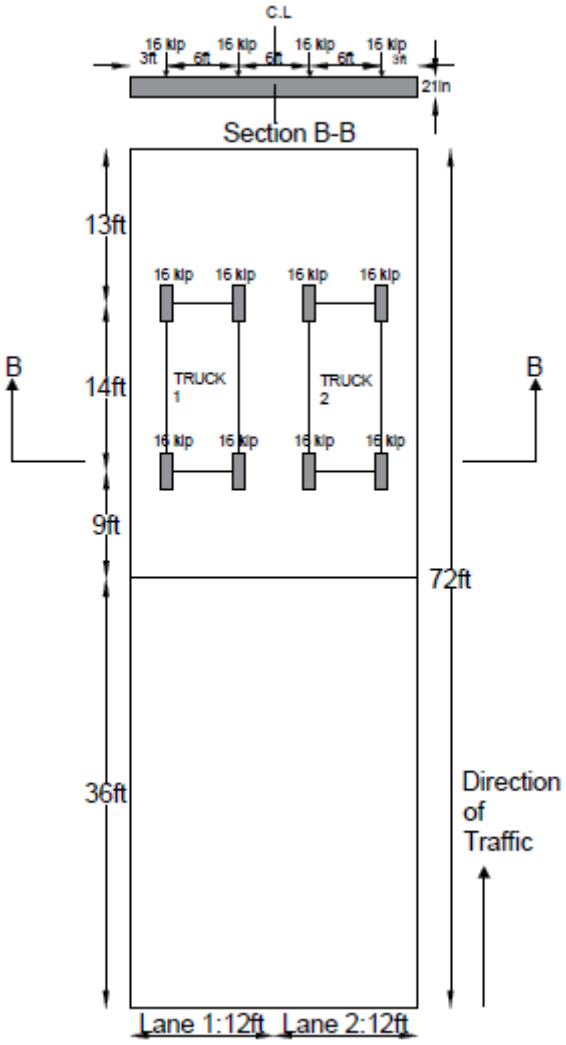


Figure 3.3b: Typical Cross-Section and Plan of Two-Lane 36ft Span Bridge under Center-Lane Loading Condition (Positive moment).

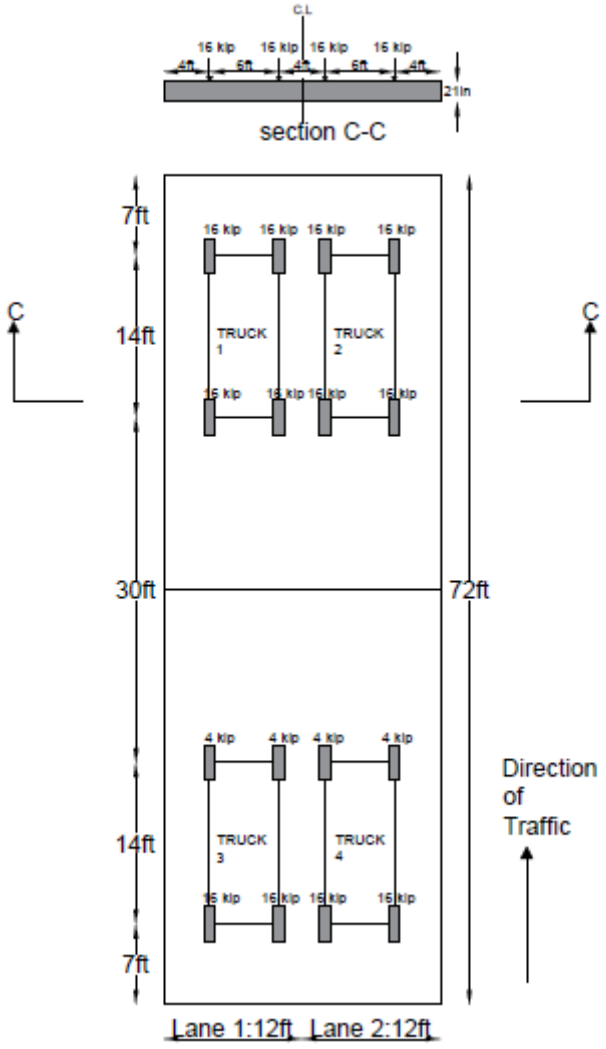


Figure 3.4a: Typical Cross-Section and Plan of Two-Lane 36ft Span Bridge under Center-Center Loading Condition with no railing (Negative moment).

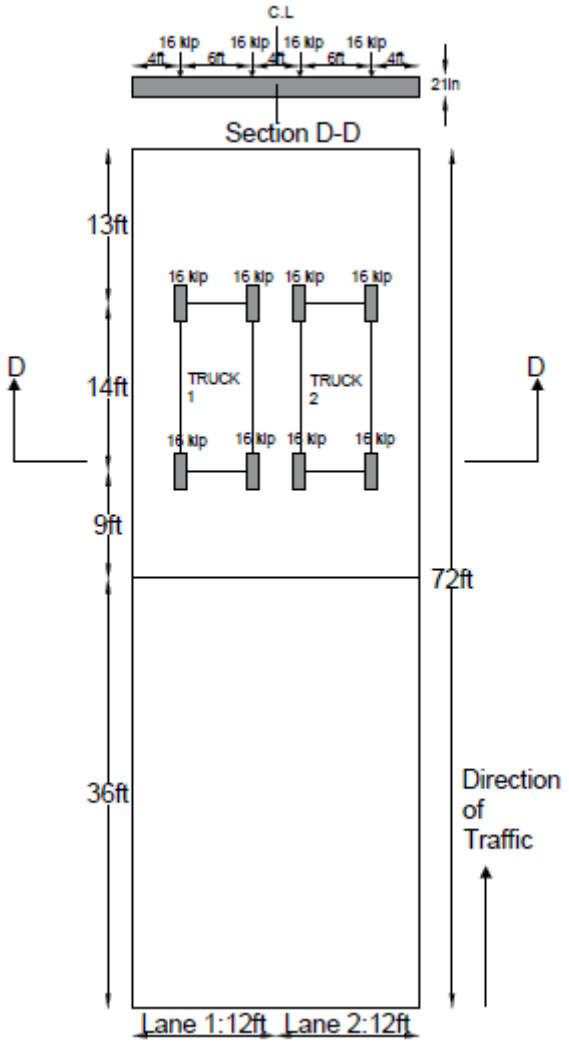


Figure 3.4b: Typical Cross-Section and Plan of Two-Lane 36ft Span Bridge under Center-Center Loading Condition with no railing (Positive moment).

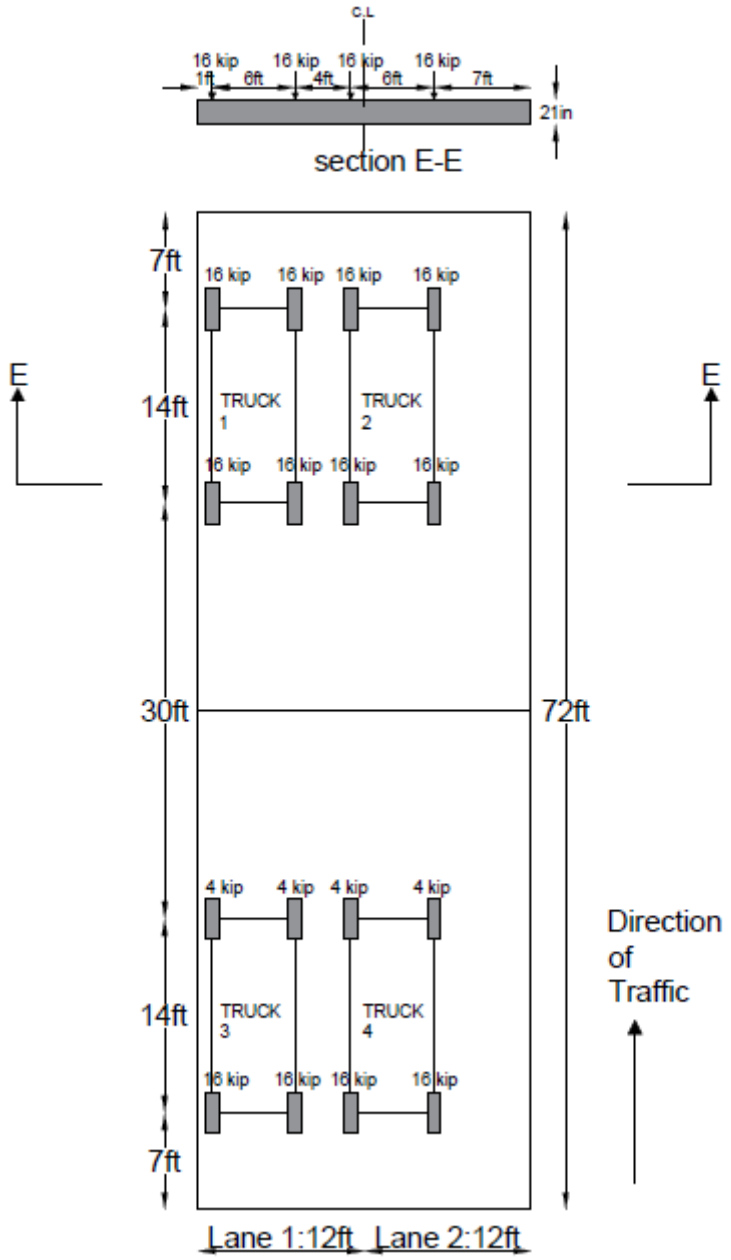


Figure 3.5a: Typical Cross-Section and Plan of Two-Lane 36ft Span Bridge under Edge Loading Condition with no railing (Negative moment).

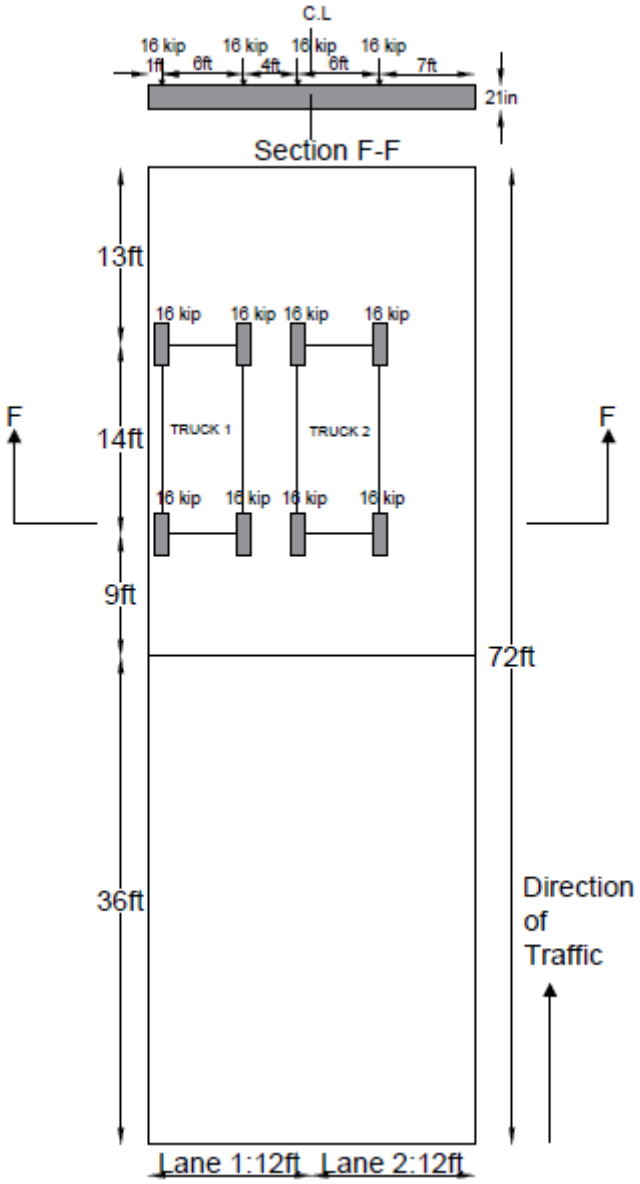


Figure 3.5b: Typical Cross-Section and Plan of Two-Lane 36ft Span Bridge under Edge Loading Condition with no railing (Positive moment).

3.2.6 Railings Implementation Methodology

Various positions of the design trucks are assumed, longitudinally and transversally, in order to produce maximum bending moments. The cases without railings are first analyzed and considered as the reference cases. Railings are then placed integrally at either or both ends of the slab edges. The wheel load distribution on the bridge slab at the critical section for the reference and railings cases are calculated and compared. The results are also assessed with the AASHTO Standard Specifications (2002) and AASHTO LRFD (2010) procedures. Figures 3.6 to 3.13 show typical cross sections and plans of straight bridges with edge loading and different combinations of transverse loading conditions and railings.

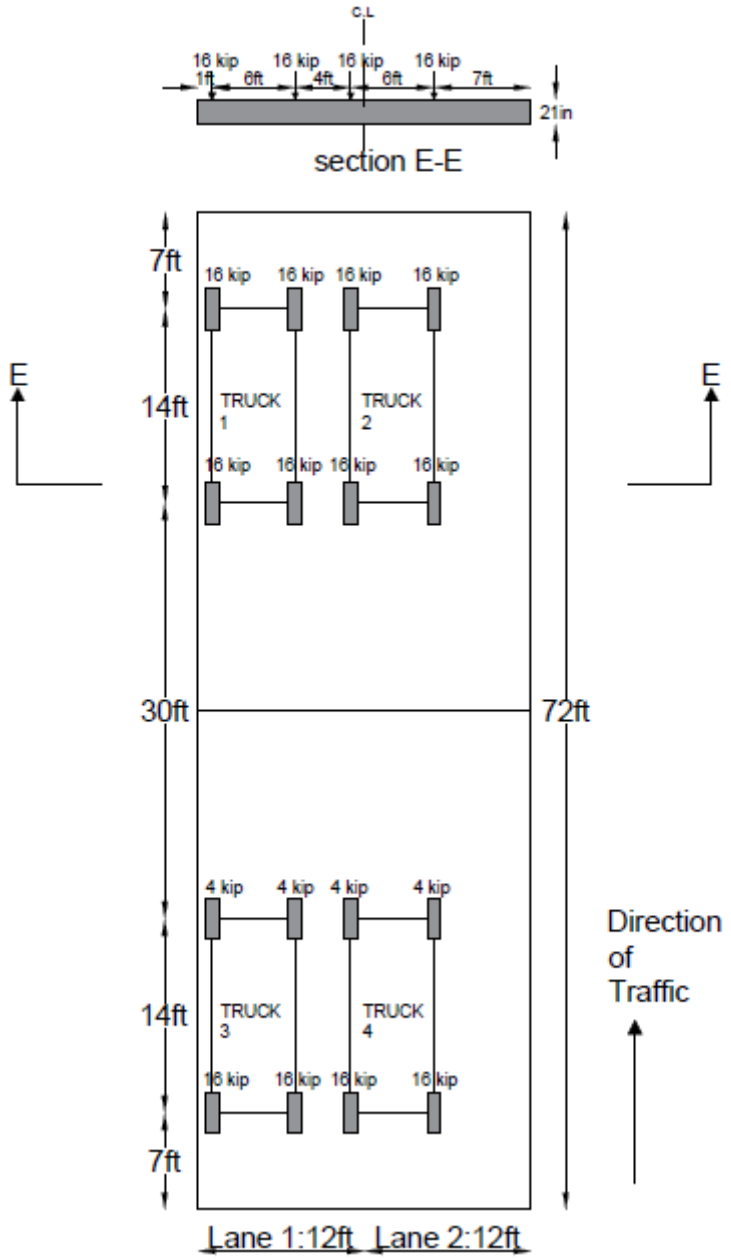


Figure 3.6: Typical Cross-Section and Plan of a Two-Lane 36ft Span Straight Bridge with No Railing under Edge Loading (Negative moment).

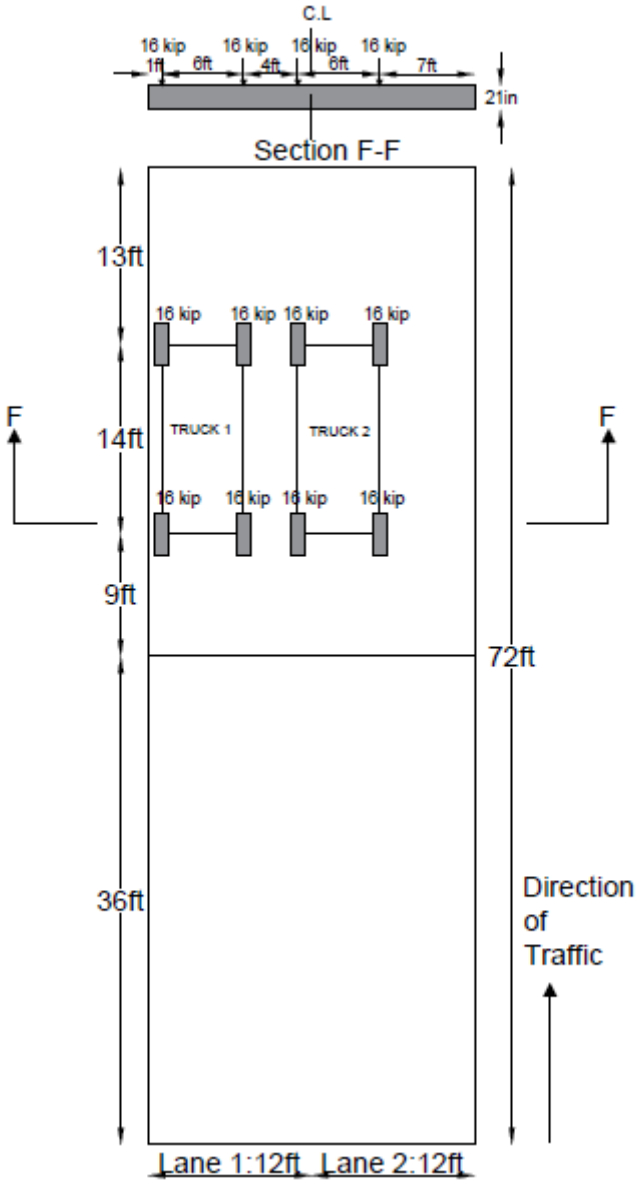


Figure 3.7: Typical Cross-Section and Plan of a Two-Lane 36ft Span Straight Bridge with No Railing under Edge Loading (Positive moment).

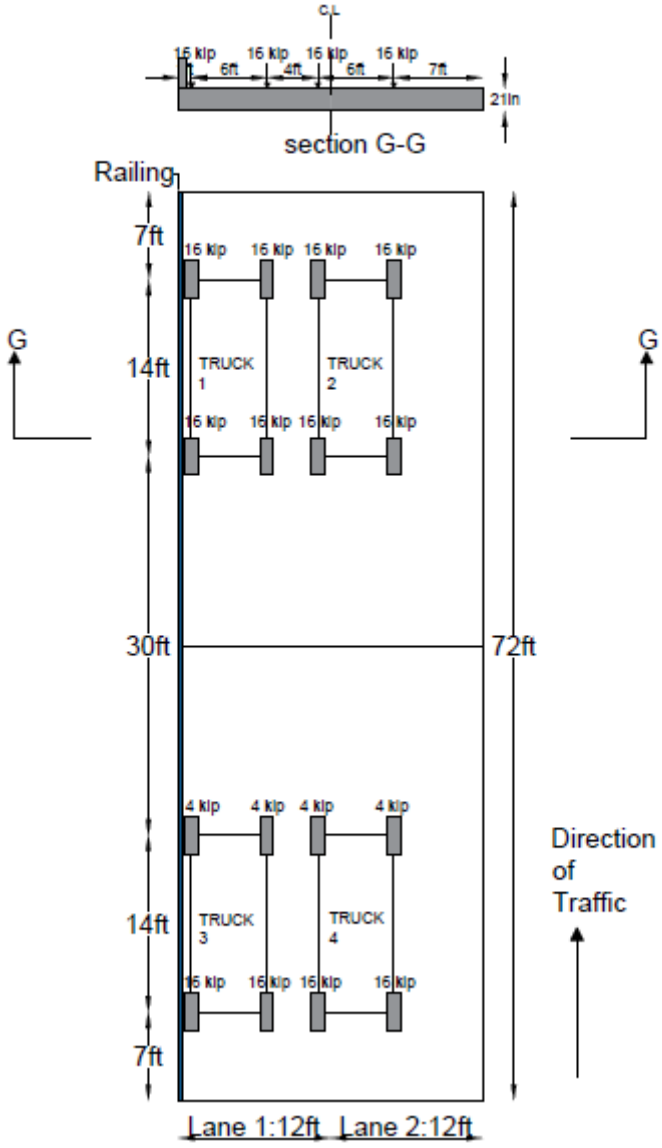


Figure 3.8: Typical Cross-Section and Plan of a Two-Lane 36ft straight Bridge with One Railing(Left) under Edge Loading (Negative moment).

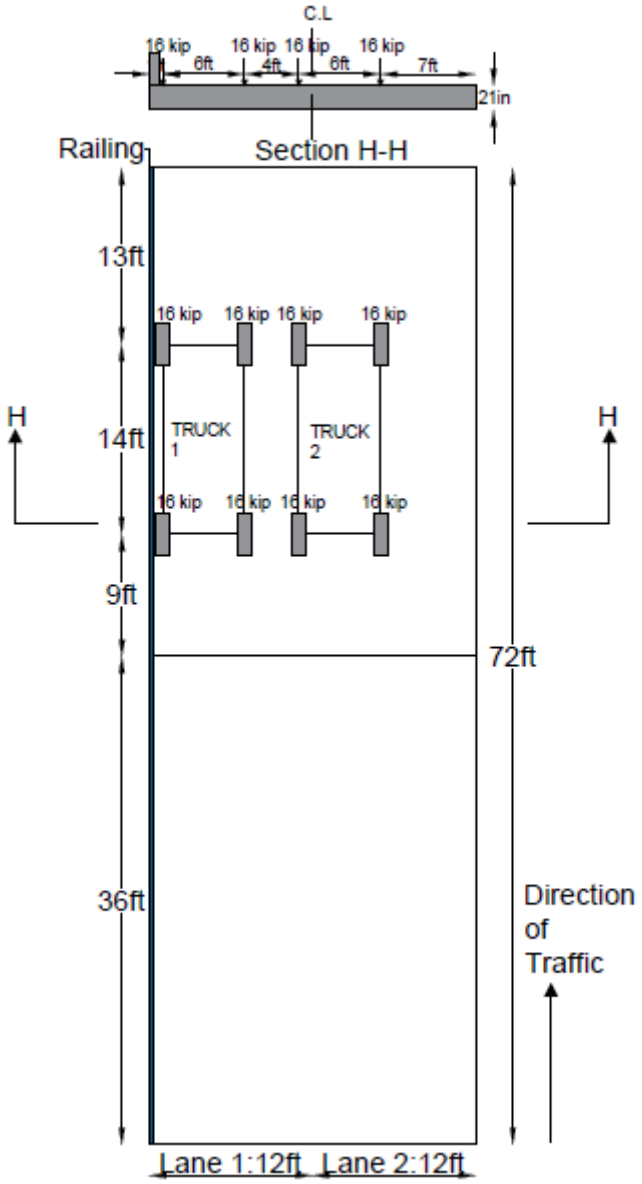


Figure 3.9: Typical Cross-Section and Plan of a Two-Lane 36ft straight Bridge with One Railing(Left) under Edge Loading (Positive moment).

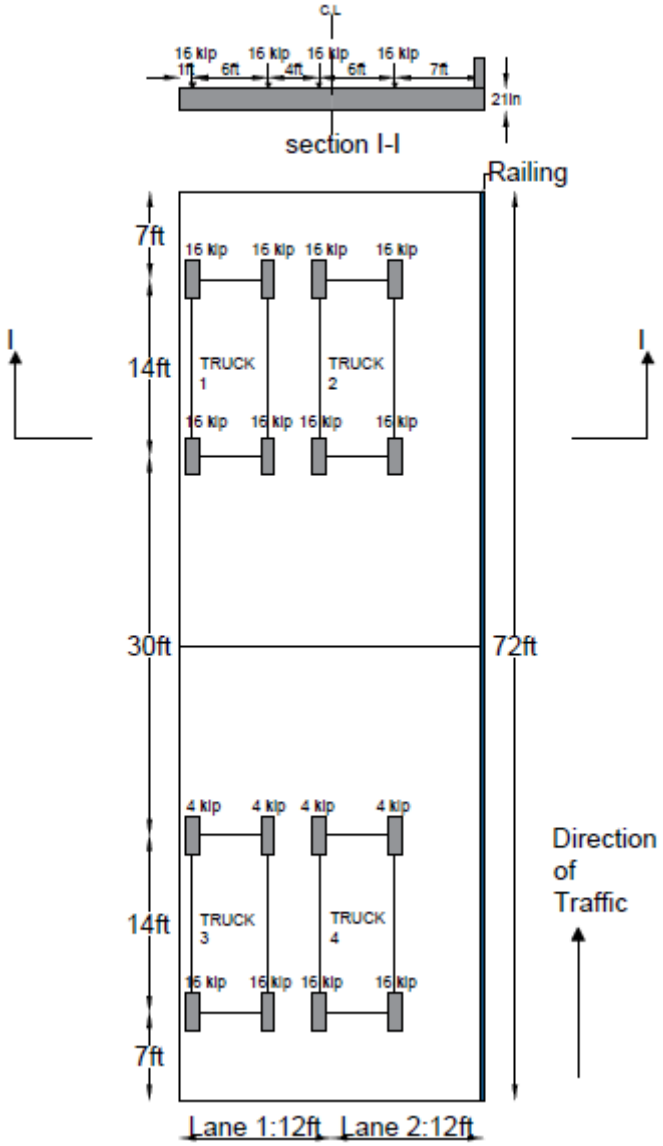


Figure 3.10: Typical Cross-Section and Plan of a Two-Lane 36ft straight Bridge with One Railing(Right) under Edge Loading (Negative moment).

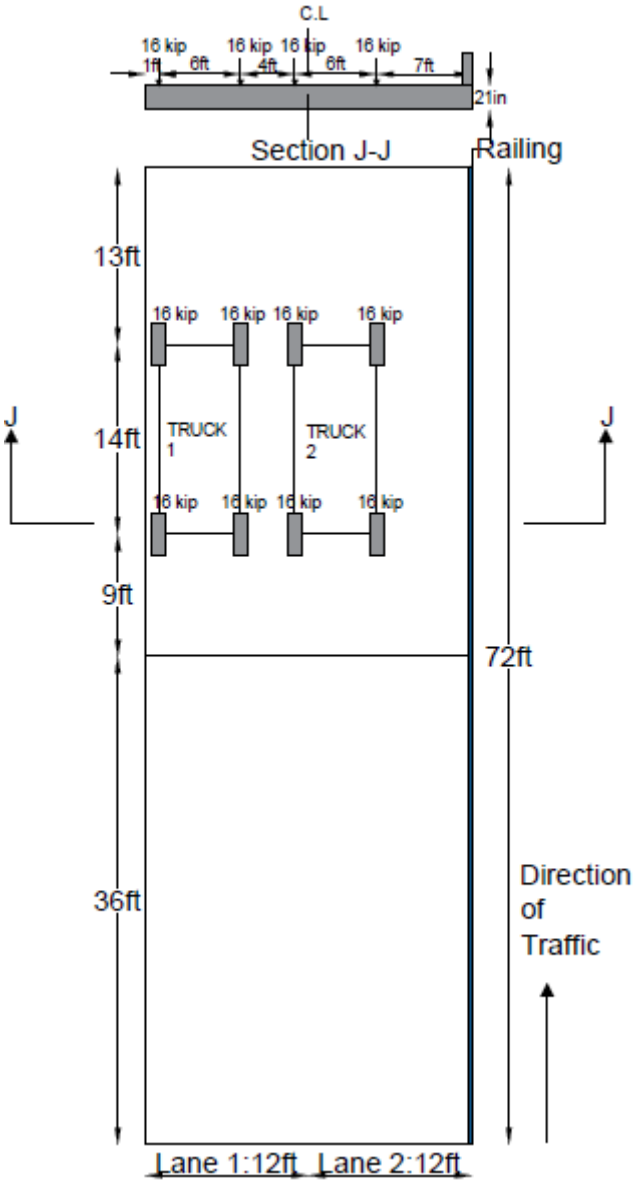


Figure 3.11: Typical Cross-Section and Plan of a Two-Lane 36ft straight Bridge with One Railing(Right) under Edge Loading (Positive moment).

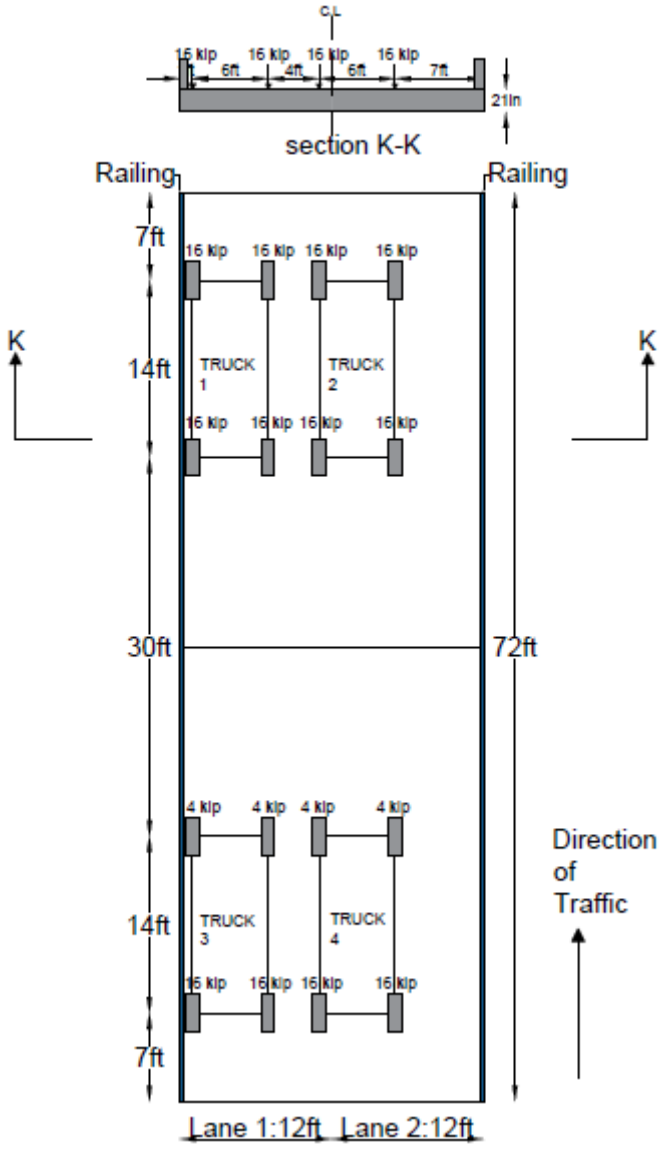


Figure 3.12: Typical Cross-Section and Plan of a Two-Lane 36ft Span Straight Bridge with two Railings under Edge Loading (Negative moment).

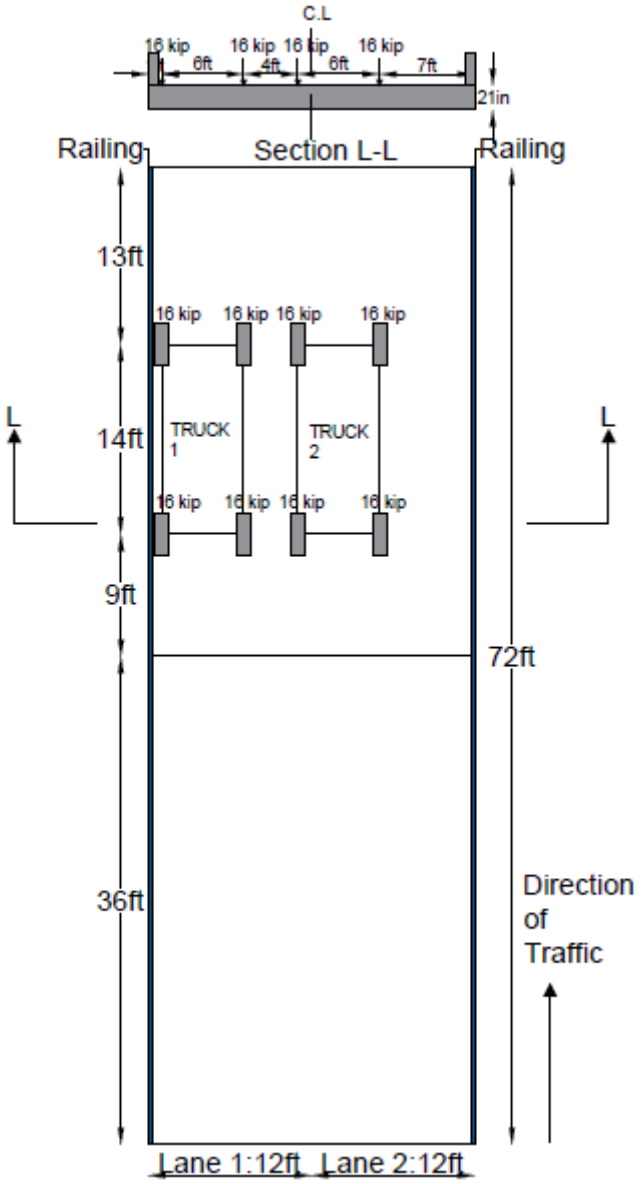


Figure 3.13: Typical Cross-Section and Plan of a Two-Lane 36ft Span Straight Bridge with two Railings under Edge Loading (Positive moment).

3.3 Finite Element Modeling and Analysis

The finite element method is used to investigate the effect of span length and slab width on two spans simply supported One to four lane concrete slab bridges in the presence of railings. Using SAP2000 (2017), the bridge is discretized into a convenient number of square four-node shell elements with six degrees of freedom per node, capable of simulating the membrane and plate-bending behavior. All elements are assumed to be linear elastic and the analysis assumed small deformations and deflections, and shear deformation was neglected. The selection of shell elements dimensions was based on the previous study by *Mabsout et al. (2004)* on simply supported concrete slab bridges which investigated the appropriate mesh discretization. A comparison was made on 0.5×0.5 ft, 1×1 ft and 2×2 ft elements, and the results obtained were nearly identical for the three cases. Thus, the 1×1 ft element size was adopted as sufficient for the bridge cases modeling. This mesh is also convenient for placing truck loads at 1 ft intervals to investigate maximum moments.

Railings modeling assessed using two mesh types:

- As vertical shell elements either on top of the slab or concentric elements.
- As equivalent frame elements either eccentric with moment of inertia equivalent to the top shells ($bh^3/3$) or concentric with moment of inertia equivalent to the concentric shell ($bh^3/12$).

The model adopted in this study is the simpler eccentric frame element which leads to similar results as the realistic case of top shells (*Fawaz et al. 2015*).

The support condition for the simply supported bridges was modeled as follows:

For the two-span bridges, the three piers are assigned as hinge support. Concentrated wheel loads of the HS-20 truck are applied at nodes to produce the maximum bending moment.

Longitudinal bending moments and deflections are reported and investigated in this study. SAP2000 generates the finite element models and contour plots of bending moments and deflections.

The geometry, loading, deflection diagram and longitudinal moment contours for a typical 36ft length, two-lane Bridge with two railings are presented in Figures 3.14.a, 3.14.b and 3.14.c for the negative moment and Figures 3.15a, 3.15b and 3.15c for the positive moment.

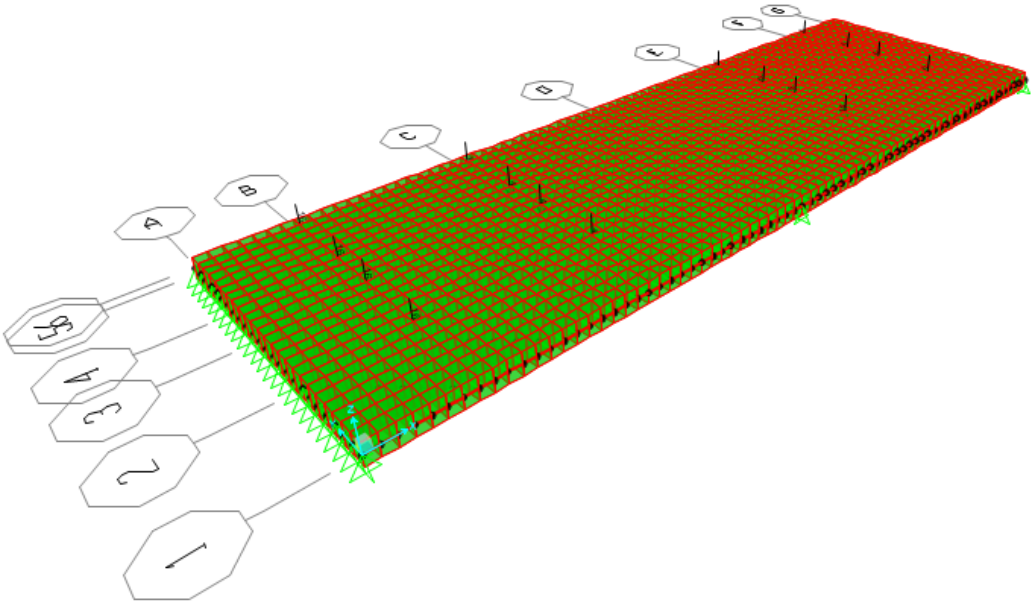


Figure 3.14.a: Finite Element Model of Two-Lane Bridge, Span 36ft, Edge Loading (Negative Moment).

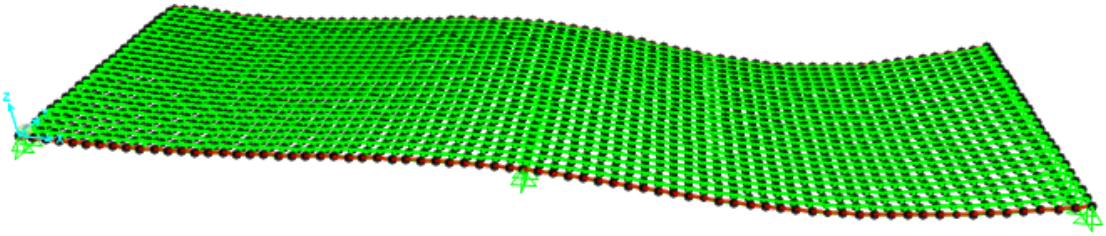


Figure 3.14.b: Slab Deflection of Two-Lane Bridge, Span 36ft, Edge Loading (Negative Moment).

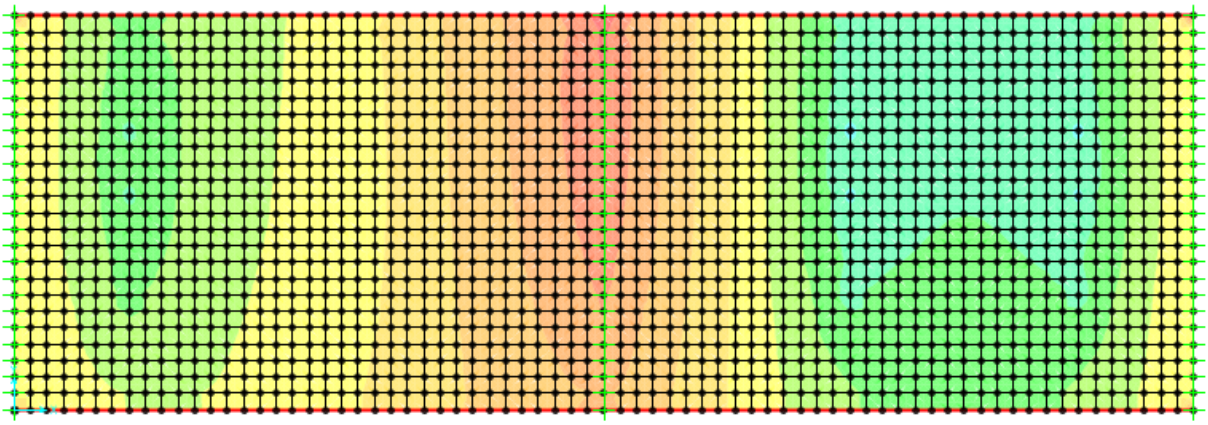


Figure. 3.14.c: Longitudinal Bending Moment Distribution in Two-Lane bridge, Span 36ft, Edge Loading (Negative moment).

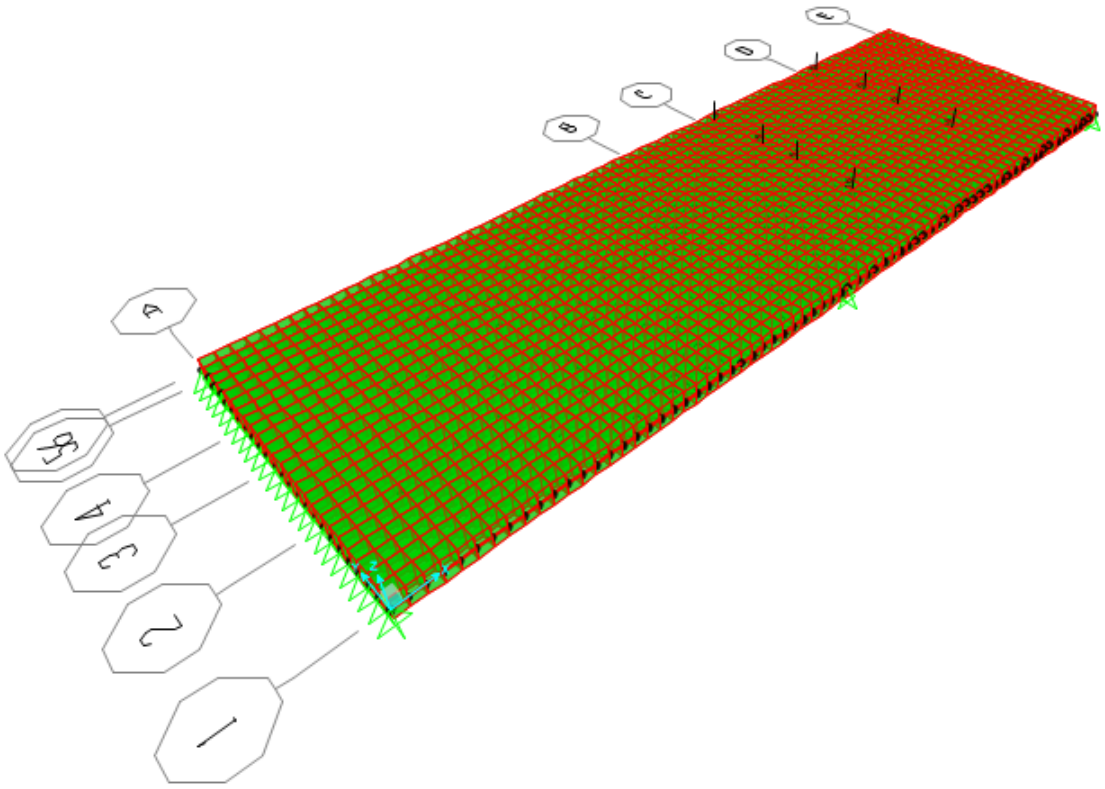


Figure 3.15.a: Finite Element Model of Two-Lane Bridge, Span 36ft, Edge Loading (Positive Moment).

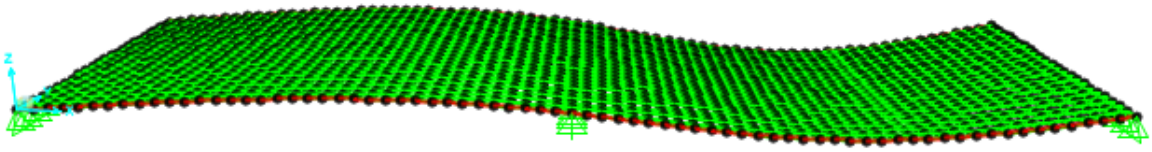


Figure 3.15.b: Slab Deflection of Two-Lane Bridge, Span 36ft, Edge Loading (Positive Moment).

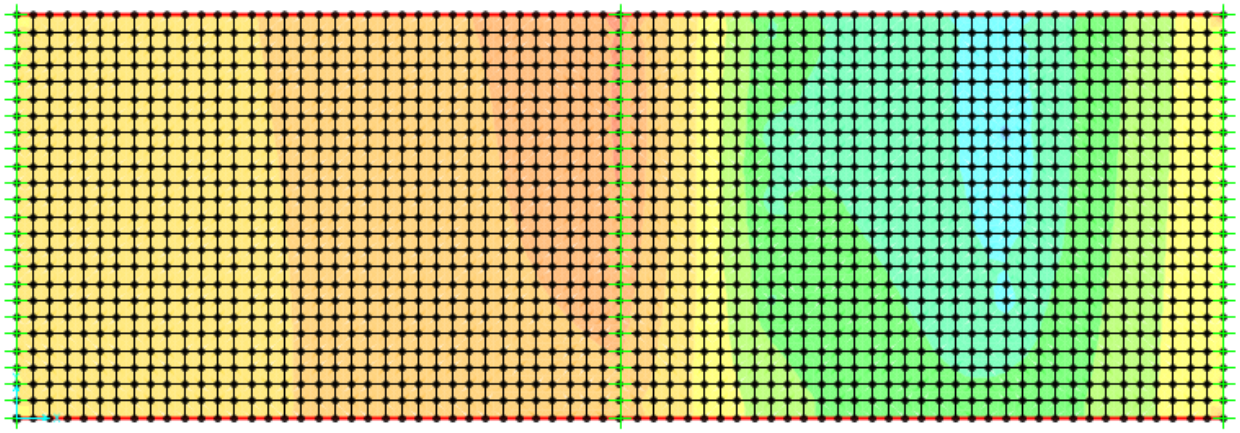


Figure. 3.15.c: Longitudinal Bending Moment Distribution in Two-Lane bridge, Span 36ft, Edge Loading (Positive moment).

3.4 Summary

A total number of 640 bridge cases are analyzed based on the variation of the geometric parameters, loading distribution and railings presence and stiffness.

Four different span sizes were adopted with a total number of four span widths and with five different railings stiffness factors, including the case with no railing.

The case of straight bridges with no railing will serve as reference bridges in order to investigate the influence of railings stiffnesses on concrete slab bridges.

For organizational purposes, the SAP2000 files are conveniently labeled for the various geometric, loading and railings presence configurations. For example, “R0L1S36Hx1EN”, where “R0” stands for the absence of railings presence, “L1” for 1 lane, “S36” for the 36 ft span length, “x1” for the railings stiffness factor, “E” for edge loading case and “N” for negative moment. Similarly, for “R1LL1S36Hx1EN”, where “R1L” stands for the presence of One railing on the left. The labeling for the 640 bridge cases is tabulated in Tables 3.3, 3.4, 3.5 and 3.6.

Table 3. 3: SAP2000 Files Organization and Labeling for all Bridges with No Railing, edge Transverse Loading Condition, and negative moment

No. of lanes n	Span length (ft)	Stiffness Factor				
		x1	x2	x3	x4	x0.5
1	24	R0L1S24Hx1EN	R0L1S24Hx2EN	R0L1S24Hx3EN	R0L1S24Hx4EN	R0L1S24Hx0.5EN
	36	R0L1S36Hx1EN	R0L1S36Hx2EN	R0L1S36Hx3EN	R0L1S36Hx4EN	R0L1S36Hx0.5EN
	46	R0L1S46Hx1EN	R0L1S46Hx2EN	R0L1S46Hx3EN	R0L1S46Hx4EN	R0L1S46Hx0.5EN
	54	R0L1S54Hx1EN	R0L1S54Hx2EN	R0L1S54Hx3EN	R0L1S54Hx4EN	R0L1S54Hx0.5EN
2	24	R0L2S24Hx1EN	R0L2S24Hx2EN	R0L2S24Hx3EN	R0L2S24Hx4EN	R0L2S24Hx0.5EN
	36	R0L2S36Hx1EN	R0L2S36Hx2EN	R0L2S36Hx3EN	R0L2S36Hx4EN	R0L2S36Hx0.5EN
	46	R0L2S46Hx1EN	R0L2S46Hx2EN	R0L2S46Hx3EN	R0L2S46Hx4EN	R0L2S46Hx0.5EN
	54	R0L2S54Hx1EN	R0L2S54Hx2EN	R0L2S54Hx3EN	R0L2S54Hx4EN	R0L2S54Hx0.5EN
3	24	R0L3S24Hx1EN	R0L3S24Hx2EN	R0L3S24Hx3EN	R0L3S24Hx4EN	R0L3S24Hx0.5EN
	36	R0L3S36Hx1EN	R0L3S36Hx2EN	R0L3S36Hx3EN	R0L3S36Hx4EN	R0L3S36Hx0.5EN
	46	R0L3S46Hx1EN	R0L3S46Hx2EN	R0L3S46Hx3EN	R0L3S46Hx4EN	R0L3S46Hx0.5EN
	54	R0L3S54Hx1EN	R0L3S54Hx2EN	R0L3S54Hx3EN	R0L3S54Hx4EN	R0L3S54Hx0.5EN
4	24	R0L4S24Hx1EN	R0L4S24Hx2EN	R0L4S24Hx3EN	R0L4S24Hx4EN	R0L4S24Hx0.5EN
	36	R0L4S36Hx1EN	R0L4S36Hx2EN	R0L4S36Hx3EN	R0L4S36Hx4EN	R0L4S36Hx0.5EN
	46	R0L4S46Hx1EN	R0L4S46Hx2EN	R0L4S46Hx3EN	R0L4S46Hx4EN	R0L4S46Hx0.5EN
	54	R0L4S54Hx1EN	R0L4S54Hx2EN	R0L4S54Hx3EN	R0L4S54Hx4EN	R0L4S54Hx0.5EN

Table 3. 4: SAP2000 Files Organization and Labeling for all Bridges with No Railing, edge Transverse Loading Condition, and positive moment

No. of lanes n	Span length (ft)	Stiffness Factor				
		x1	x2	x3	x4	x0.5
1	24	R0L1S24Hx1EP	R0L1S24Hx2EP	R0L1S24Hx3EP	R0L1S24Hx4EP	R0L1S24Hx0.5EP
	36	R0L1S36Hx1EP	R0L1S36Hx2EP	R0L1S36Hx3EP	R0L1S36Hx4EP	R0L1S36Hx0.5EP
	46	R0L1S46Hx1EP	R0L1S46Hx2EP	R0L1S46Hx3EP	R0L1S46Hx4EP	R0L1S46Hx0.5EP
	54	R0L1S54Hx1EP	R0L1S54Hx2EP	R0L1S54Hx3EP	R0L1S54Hx4EP	R0L1S54Hx0.5EP
2	24	R0L2S24Hx1EP	R0L2S24Hx2EP	R0L2S24Hx3EP	R0L2S24Hx4EP	R0L2S24Hx0.5EP
	36	R0L2S36Hx1EP	R0L2S36Hx2EP	R0L2S36Hx3EP	R0L2S36Hx4EP	R0L2S36Hx0.5EP
	46	R0L2S46Hx1EP	R0L2S46Hx2EP	R0L2S46Hx3EP	R0L2S46Hx4EP	R0L2S46Hx0.5EP
	54	R0L2S54Hx1EP	R0L2S54Hx2EP	R0L2S54Hx3EP	R0L2S54Hx4EP	R0L2S54Hx0.5EP
3	24	R0L3S24Hx1EP	R0L3S24Hx2EP	R0L3S24Hx3EP	R0L3S24Hx4EP	R0L3S24Hx0.5EP
	36	R0L3S36Hx1EP	R0L3S36Hx2EP	R0L3S36Hx3EP	R0L3S36Hx4EP	R0L3S36Hx0.5EP
	46	R0L3S46Hx1EP	R0L3S46Hx2EP	R0L3S46Hx3EP	R0L3S46Hx4EP	R0L3S46Hx0.5EP
	54	R0L3S54Hx1EP	R0L3S54Hx2EP	R0L3S54Hx3EP	R0L3S54Hx4EP	R0L3S54Hx0.5EP
4	24	R0L4S24Hx1EP	R0L4S24Hx2EP	R0L4S24Hx3EP	R0L4S24Hx4EP	R0L4S24Hx0.5EP
	36	R0L4S36Hx1EP	R0L4S36Hx2EP	R0L4S36Hx3EP	R0L4S36Hx4EP	R0L4S36Hx0.5EP
	46	R0L4S46Hx1EP	R0L4S46Hx2EP	R0L4S46Hx3EP	R0L4S46Hx4EP	R0L4S46Hx0.5EP
	54	R0L4S54Hx1EP	R0L4S54Hx2EP	R0L4S54Hx3EP	R0L4S54Hx4EP	R0L4S54Hx0.5EP

Table 3. 5: SAP2000 Files Organization and Labeling for all Bridges with One Left Railing, edge Transverse Loading Condition, and negative moment

No. of lanes n	Span length (ft)	Stiffness Factor				
		x1	x2	x3	x4	x0.5
1	24	R1LL1S24Hx1EN	R1LL1S24Hx2EN	R1LL1S24Hx3EN	R1LL1S24Hx4EN	R1LL1S24Hx0.5EN
	36	R1LL1S36Hx1EN	R1LL1S36Hx2EN	R1LL1S36Hx3EN	R1LL1S36Hx4EN	R1LL1S36Hx0.5EN
	46	R1LL1S46Hx1EN	R1LL1S46Hx2EN	R1LL1S46Hx3EN	R1LL1S46Hx4EN	R1LL1S46Hx0.5EN
	54	R1LL1S54Hx1EN	R1LL1S54Hx2EN	R1LL1S54Hx3EN	R1LL1S54Hx4EN	R1LL1S54Hx0.5EN
2	24	R1LL2S24Hx1EN	R1LL2S24Hx2EN	R1LL2S24Hx3EN	R1LL2S24Hx4EN	R1LL2S24Hx0.5EN
	36	R1LL2S36Hx1EN	R1LL2S36Hx2EN	R1LL2S36Hx3EN	R1LL2S36Hx4EN	R1LL2S36Hx0.5EN
	46	R1LL2S46Hx1EN	R1LL2S46Hx2EN	R1LL2S46Hx3EN	R1LL2S46Hx4EN	R1LL2S46Hx0.5EN
	54	R1LL2S54Hx1EN	R1LL2S54Hx2EN	R1LL2S54Hx3EN	R1LL2S54Hx4EN	R1LL2S54Hx0.5EN
3	24	R1LL3S24Hx1EN	R1LL3S24Hx2EN	R1LL3S24Hx3EN	R1LL3S24Hx4EN	R1LL3S24Hx0.5EN
	36	R1LL3S36Hx1EN	R1LL3S36Hx2EN	R1LL3S36Hx3EN	R1LL3S36Hx4EN	R1LL3S36Hx0.5EN
	46	R1LL3S46Hx1EN	R1LL3S46Hx2EN	R1LL3S46Hx3EN	R1LL3S46Hx4EN	R1LL3S46Hx0.5EN
	54	R1LL3S54Hx1EN	R1LL3S54Hx2EN	R1LL3S54Hx3EN	R1LL3S54Hx4EN	R1LL3S54Hx0.5EN
4	24	R1LL4S24Hx1EN	R1LL4S24Hx2EN	R1LL4S24Hx3EN	R1LL4S24Hx4EN	R1LL4S24Hx0.5EN
	36	R1LL4S36Hx1EN	R1LL4S36Hx2EN	R1LL4S36Hx3EN	R1LL4S36Hx4EN	R1LL4S36Hx0.5EN
	46	R1LL4S46Hx1EN	R1LL4S46Hx2EN	R1LL4S46Hx3EN	R1LL4S46Hx4EN	R1LL4S46Hx0.5EN
	54	R1LL4S54Hx1EN	R1LL4S54Hx2EN	R1LL4S54Hx3EN	R1LL4S54Hx4EN	R1LL4S54Hx0.5EN

Table 3. 6: SAP2000 Files Organization and Labeling for all Bridges with One Left Railing, edge Transverse Loading Condition, and positive moment

No. of lanes n	Span length (ft)	Stiffness Factor				
		x1	x2	x3	x4	x0.5
1	24	R1LL1S24Hx1EP	R1LL1S24Hx2EP	R1LL1S24Hx3EP	R1LL1S24Hx4EP	R1LL1S24Hx0.5EP
	36	R1LL1S36Hx1EP	R1LL1S36Hx2EP	R1LL1S36Hx3EP	R1LL1S36Hx4EP	R1LL1S36Hx0.5EP
	46	R1LL1S46Hx1EP	R1LL1S46Hx2EP	R1LL1S46Hx3EP	R1LL1S46Hx4EP	R1LL1S46Hx0.5EP
	54	R1LL1S54Hx1EP	R1LL1S54Hx2EP	R1LL1S54Hx3EP	R1LL1S54Hx4EP	R1LL1S54Hx0.5EP
2	24	R1LL2S24Hx1EP	R1LL2S24Hx2EP	R1LL2S24Hx3EP	R1LL2S24Hx4EP	R1LL2S24Hx0.5EP
	36	R1LL2S36Hx1EP	R1LL2S36Hx2EP	R1LL2S36Hx3EP	R1LL2S36Hx4EP	R1LL2S36Hx0.5EP
	46	R1LL2S46Hx1EP	R1LL2S46Hx2EP	R1LL2S46Hx3EP	R1LL2S46Hx4EP	R1LL2S46Hx0.5EP
	54	R1LL2S54Hx1EP	R1LL2S54Hx2EP	R1LL2S54Hx3EP	R1LL2S54Hx4EP	R1LL2S54Hx0.5EP
3	24	R1LL3S24Hx1EP	R1LL3S24Hx2EP	R1LL3S24Hx3EP	R1LL3S24Hx4EP	R1LL3S24Hx0.5EP
	36	R1LL3S36Hx1EP	R1LL3S36Hx2EP	R1LL3S36Hx3EP	R1LL3S36Hx4EP	R1LL3S36Hx0.5EP
	46	R1LL3S46Hx1EP	R1LL3S46Hx2EP	R1LL3S46Hx3EP	R1LL3S46Hx4EP	R1LL3S46Hx0.5EP
	54	R1LL3S54Hx1EP	R1LL3S54Hx2EP	R1LL3S54Hx3EP	R1LL3S54Hx4EP	R1LL3S54Hx0.5EP
4	24	R1LL4S24Hx1EP	R1LL4S24Hx2EP	R1LL4S24Hx3EP	R1LL4S24Hx4EP	R1LL4S24Hx0.5EP
	36	R1LL4S36Hx1EP	R1LL4S36Hx2EP	R1LL4S36Hx3EP	R1LL4S36Hx4EP	R1LL4S36Hx0.5EP
	46	R1LL4S46Hx1EP	R1LL4S46Hx2EP	R1LL4S46Hx3EP	R1LL4S46Hx4EP	R1LL4S46Hx0.5EP
	54	R1LL4S54Hx1EP	R1LL4S54Hx2EN	R1LL4S54Hx3EP	R1LL4S54Hx4EP	R1LL4S54Hx0.5EP

Table 3. 7: SAP2000 Files Organization and Labeling for all Bridges with One Right Railing, edge Transverse Loading Condition, and negative moment

No. of lanes n	Span length (ft)	Stiffness Factor				
		x1	x2	x3	x4	x0.5
1	24	R1RL1S24Hx1EN	R1RL1S24Hx2EN	R1RL1S24Hx3EN	R1RL1S24Hx4EN	R1RL1S24Hx0.5EN
	36	R1RL1S36Hx1EN	R1RL1S36Hx2EN	R1RL1S36Hx3EN	R1RL1S36Hx4EN	R1RL1S36Hx0.5EN
	46	R1RL1S46Hx1EN	R1RL1S46Hx2EN	R1RL1S46Hx3EN	R1RL1S46Hx4EN	R1RL1S46Hx0.5EN
	54	R1RL1S54Hx1EN	R1RL1S54Hx2EN	R1RL1S54Hx3EN	R1RL1S54Hx4EN	R1RL1S54Hx0.5EN
2	24	R1RL2S24Hx1EN	R1RL2S24Hx2EN	R1RL2S24Hx3EN	R1RL2S24Hx4EN	R1RL2S24Hx0.5EN
	36	R1RL2S36Hx1EN	R1RL2S36Hx2EN	R1RL2S36Hx3EN	R1RL2S36Hx4EN	R1RL2S36Hx0.5EN
	46	R1RL2S46Hx1EN	R1RL2S46Hx2EN	R1RL2S46Hx3EN	R1RL2S46Hx4EN	R1RL2S46Hx0.5EN
	54	R1RL2S54Hx1EN	R1RL2S54Hx2EN	R1RL2S54Hx3EN	R1RL2S54Hx4EN	R1RL2S54Hx0.5EN
3	24	R1RL3S24Hx1EN	R1RL3S24Hx2EN	R1RL3S24Hx3EN	R1RL3S24Hx4EN	R1RL3S24Hx0.5EN
	36	R1RL3S36Hx1EN	R1RL3S36Hx2EN	R1RL3S36Hx3EN	R1RL3S36Hx4EN	R1RL3S36Hx0.5EN
	46	R1RL3S46Hx1EN	R1RL3S46Hx2EN	R1RL3S46Hx3EN	R1RL3S46Hx4EN	R1RL3S46Hx0.5EN
	54	R1RL3S54Hx1EN	R1RL3S54Hx2EN	R1RL3S54Hx3EN	R1RL3S54Hx4EN	R1RL3S54Hx0.5EN
4	24	R1RL4S24Hx1EN	R1RL4S24Hx2EN	R1RL4S24Hx3EN	R1RL4S24Hx4EN	R1RL4S24Hx0.5EN
	36	R1RL4S36Hx1EN	R1RL4S36Hx2EN	R1RL4S36Hx3EN	R1RL4S36Hx4EN	R1RL4S36Hx0.5EN
	46	R1RL4S46Hx1EN	R1RL4S46Hx2EN	R1RL4S46Hx3EN	R1RL4S46Hx4EN	R1RL4S46Hx0.5EN
	54	R1RL4S54Hx1EN	R1RL4S54Hx2EN	R1RL4S54Hx3EN	R1RL4S54Hx4EN	R1RL4S54Hx0.5EN

Table 3. 8: SAP2000 Files Organization and Labeling for all Bridges with One Right Railing, edge Transverse Loading Condition, and positive moment

No. of lanes n	Span length (ft)	Stiffness Factor				
		x1	x2	x3	x4	x0.5
1	24	R1RL1S24Hx1EP	R1RL1S24Hx2EP	R1RL1S24Hx3EP	R1RL1S24Hx4EP	R1RL1S24Hx0.5EP
	36	R1RL1S36Hx1EP	R1RL1S36Hx2EP	R1RL1S36Hx3EP	R1RL1S36Hx4EP	R1RL1S36Hx0.5EP
	46	R1RL1S46Hx1EP	R1RL1S46Hx2EP	R1RL1S46Hx3EP	R1RL1S46Hx4EP	R1RL1S46Hx0.5EP
	54	R1RL1S54Hx1EP	R1RL1S54Hx2EP	R1RL1S54Hx3EP	R1RL1S54Hx4EP	R1RL1S54Hx0.5EP
2	24	R1RL2S24Hx1EP	R1RL2S24Hx2EP	R1RL2S24Hx3EP	R1RL2S24Hx4EP	R1RL2S24Hx0.5EP
	36	R1RL2S36Hx1EP	R1RL2S36Hx2EP	R1RL2S36Hx3EP	R1RL2S36Hx4EP	R1RL2S36Hx0.5EP
	46	R1RL2S46Hx1EP	R1RL2S46Hx2EP	R1RL2S46Hx3EP	R1RL2S46Hx4EP	R1RL2S46Hx0.5EP
	54	R1RL2S54Hx1EP	R1RL2S54Hx2EP	R1RL2S54Hx3EP	R1RL2S54Hx4EP	R1RL2S54Hx0.5EP
3	24	R1RL3S24Hx1EP	R1RL3S24Hx2EP	R1RL3S24Hx3EP	R1RL3S24Hx4EP	R1RL3S24Hx0.5EP
	36	R1RL3S36Hx1EP	R1RL3S36Hx2EP	R1RL3S36Hx3EP	R1RL3S36Hx4EP	R1RL3S36Hx0.5EP
	46	R1RL3S46Hx1EP	R1RL3S46Hx2EP	R1RL3S46Hx3EP	R1RL3S46Hx4EP	R1RL3S46Hx0.5EP
	54	R1RL3S54Hx1EP	R1RL3S54Hx2EP	R1RL3S54Hx3EP	R1RL3S54Hx4EP	R1RL3S54Hx0.5EP
4	24	R1RL4S24Hx1EP	R1RL4S24Hx2EP	R1RL4S24Hx3EP	R1RL4S24Hx4EP	R1RL4S24Hx0.5EP
	36	R1RL4S36Hx1EP	R1RL4S36Hx2EP	R1RL4S36Hx3EP	R1RL4S36Hx4EP	R1RL4S36Hx0.5EP
	46	R1RL4S46Hx1EP	R1RL4S46Hx2EP	R1RL4S46Hx3EP	R1RL4S46Hx4EP	R1RL4S46Hx0.5EP
	54	R1RL4S54Hx1EP	R1RL4S54Hx2EP	R1RL4S54Hx3EP	R1RL4S54Hx4EP	R1RL4S54Hx0.5EP

Table 3. 9: SAP2000 Files Organization and Labeling for all Bridges with Two Railings, edge Transverse Loading Condition, and negative moment

No. of lanes n	Span length (ft)	Stiffness Factor				
		x1	x2	x3	x4	x0.5
1	24	R2L1S24Hx1EN	R2L1S24Hx2EN	R2L1S24Hx3EN	R2L1S24Hx4EN	R2L1S24Hx0.5EN
	36	R2L1S36Hx1EN	R2L1S36Hx2EN	R2L1S36Hx3EN	R2L1S36Hx4EN	R2L1S36Hx0.5EN
	46	R2L1S46Hx1EN	R2L1S46Hx2EN	R2L1S46Hx3EN	R2L1S46Hx4EN	R2L1S46Hx0.5EN
	54	R2L1S54Hx1EN	R2L1S54Hx2EN	R2L1S54Hx3EN	R2L1S54Hx4EN	R2L1S54Hx0.5EN
2	24	R2L2S24Hx1EN	R2L2S24Hx2EN	R2L2S24Hx3EN	R2L2S24Hx4EN	R2L2S24Hx0.5EN
	36	R2L2S36Hx1EN	R2L2S36Hx2EN	R2L2S36Hx3EN	R2L2S36Hx4EN	R2L2S36Hx0.5EN
	46	R2L2S46Hx1EN	R2L2S46Hx2EN	R2L2S46Hx3EN	R2L2S46Hx4EN	R2L2S46Hx0.5EN
	54	R2L2S54Hx1EN	R2L2S54Hx2EN	R2L2S54Hx3EN	R2L2S54Hx4EN	R2L2S54Hx0.5EN
3	24	R2L3S24Hx1EN	R2L3S24Hx2EN	R2L3S24Hx3EN	R2L3S24Hx4EN	R2L3S24Hx0.5EN
	36	R2L3S36Hx1EN	R2L3S36Hx2EN	R2L3S36Hx3EN	R2L3S36Hx4EN	R2L3S36Hx0.5EN
	46	R2L3S46Hx1EN	R2L3S46Hx2EN	R2L3S46Hx3EN	R2L3S46Hx4EN	R2L3S46Hx0.5EN
	54	R2L3S54Hx1EN	R2L3S54Hx2EN	R2L3S54Hx3EN	R2L3S54Hx4EN	R23S54Hx0.5EN
4	24	R2L4S24Hx1EN	R2L4S24Hx2EN	R2L4S24Hx3EN	R2L4S24Hx4EN	R2L4S24Hx0.5EN
	36	R2L4S36Hx1EN	R2L4S36Hx2EN	R2L4S36Hx3EN	R2L4S36Hx4EN	R2L4S36Hx0.5EN
	46	R2L4S46Hx1EN	R2L4S46Hx2EN	R2L4S46Hx3EN	R2L4S46Hx4EN	R2L4S46Hx0.5EN
	54	R2L4S54Hx1EN	R2L4S54Hx2EN	R2L4S54Hx3EN	R2L4S54Hx4EN	R2L4S54Hx0.5EN

Table 3. 10: SAP2000 Files Organization and Labeling for all Bridges with Two Railings, edge Transverse Loading Condition, and positive moment

No. of lanes n	Span length (ft)	Stiffness Factor				
		x1	x2	x3	x4	x0.5
1	24	R2L1S24Hx1EP	R2L1S24Hx2EP	R2L1S24Hx3EP	R2L1S24Hx4EP	R2L1S24Hx0.5EP
	36	R2L1S36Hx1EP	R2L1S36Hx2EP	R2L1S36Hx3EP	R2L1S36Hx4EP	R2L1S36Hx0.5EP
	46	R2L1S46Hx1EP	R2L1S46Hx2EP	R2L1S46Hx3EP	R2L1S46Hx4EP	R2L1S46Hx0.5EP
	54	R2L1S54Hx1EP	R2L1S54Hx2EP	R2L1S54Hx3EP	R2L1S54Hx4EP	R2L1S54Hx0.5EP
2	24	R2L2S24Hx1EP	R2L2S24Hx2EP	R2L2S24Hx3EP	R2L2S24Hx4EP	R2L2S24Hx0.5EP
	36	R2L2S36Hx1EP	R2L2S36Hx2EP	R2L2S36Hx3EP	R2L2S36Hx4EP	R2L2S36Hx0.5EP
	46	R2L2S46Hx1EP	R2L2S46Hx2EP	R2L2S46Hx3EP	R2L2S46Hx4EP	R2L2S46Hx0.5EP
	54	R2L2S54Hx1EP	R2L2S54Hx2EP	R2L2S54Hx3EP	R2L2S54Hx4EP	R2L2S54Hx0.5EP
3	24	R2L3S24Hx1EP	R2L3S24Hx2EP	R2L3S24Hx3EP	R2L3S24Hx4EP	R2L3S24Hx0.5EP
	36	R2L3S36Hx1EP	R2L3S36Hx2EP	R2L3S36Hx3EP	R2L3S36Hx4EP	R2L3S36Hx0.5EP
	46	R2L3S46Hx1EP	R2L3S46Hx2EP	R2L3S46Hx3EP	R2L3S46Hx4EP	R2L3S46Hx0.5EP
	54	R2L3S54Hx1EP	R2L3S54Hx2EP	R2L3S54Hx3EP	R2L3S54Hx4EP	R2L3S54Hx0.5EP
4	24	R2L4S24Hx1EP	R2L4S24Hx2EP	R2L4S24Hx3EP	R2L4S24Hx4EP	R2L4S24Hx0.5EP
	36	R2L4S36Hx1EP	R2L4S36Hx2EP	R2L4S36Hx3EP	R2L4S36Hx4EP	R2L4S36Hx0.5EP
	46	R2L4S46Hx1EP	R2L4S46Hx2EP	R2L4S46Hx3EP	R2L4S46Hx4EP	R2L4S46Hx0.5EP
	54	R2L4S54Hx1EP	R2L4S54Hx2EP	R2L4S54Hx3EP	R2L4S54Hx4EP	R2L4S54Hx0.5EP

CHAPTER 4

ANALYSIS RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents the results of the parametric study of the bridge cases presented in Chapter 3. The bridge cases are analyzed using the SAP2000 software for various bridge and load configurations and summarized by using contour plots, tables, and graphs. The results are interpreted and compared with the AASHTO design procedures for validation purposes.

4.2 Presentation of Results

The FEA and AASHTO results evaluated and assessed consist of the maximum longitudinal bending moments, edge beam moments, and deflections at critical locations of the bridge slabs in both negative and positive moment case.

For every span length (24, 36, 46 and 54 ft), number of lanes from 1 to 4, bridge width (14, 24, 36 and 48ft), railings stiffnesses/sizes (x0, x1, x2, x3, x4 and x0.5), and loading condition (edge loading), with/without the presence of railings (R0, R1L, R1R and R2), longitudinal bending moments are extracted from SAP2000 output files. These FEA moments per unit foot along the critical cross-section are tabulated for all bridge cases as shown in Tables 4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, and 4.8 for the two-lane bridge with span length of 36ft with no railing edge loading condition, One left railing edge loading condition, One right railing edge loading condition and two railings edge loading condition respectively for both negative and positive moment case. For a complete set of moment distribution tables, refer to Appendix-1. These results are also presented in graph plots to facilitate comparison of the longitudinal moment distribution for various bridges. Figures 4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, and

4.8 are sample plots, which include longitudinal moment distribution values for the same tabulated bridges respectively. For a complete set of these plots, refer to Appendix-1.

A total of 640 bridges were analyzed, and for the purposes of comparison and results tabulation, the bridges were grouped in three categories:

Case 1: “Concrete bridges with no railing”

Case 2: “Concrete bridges with One railing”

Case 3: “Concrete bridges with two railings”

4.2.1 Maximum Longitudinal Bending Moment

The maximum longitudinal bending moment in slab is defined as the first peak value after the left edge peak moment (Figures 4.1 to 4.8). The maximum peak moment at the edge is resisted by an edge beam.

Mi/xj is the maximum FEA moment in the bridge, where “i” represents the presence of railings. It is 0 for no railing, 1 for One railing and 2 for two railings. On the other hand, ‘xj’ represents the railings stiffness which ranges from x0.5 to x4. For example, M0/xj and Mi/x0 represents the moment of concrete bridges with no railing, for any ‘i’ or ‘j’.

4.2.2 Edge Beam Moment

The edge beam moment is defined by the maximum moment at or near the leftmost node along the critical cross-section (Figures 4.1 to 4.8).

Mi/xj is the maximum FEA edge beam moment in the bridge, where “i” and ‘xj’ are defined as above represents the presence of railings.

4.2.3 Maximum Live Load Deflection

Live load deflection obtained from FEA for all the cases are obtained and compared to the AASHTO criterion of S/800. It is worth noting that the FEA is an elastic analysis, and not the actual cracked section analysis, which would yield higher deflection values.

Δi/xj is the FEA live load deflection in the bridge, where “i” and ‘xj’, are defined as above, represents the presence of railings.

Table 4. 1: Longitudinal Negative Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 36ft, Deck width = 24ft, No Railing with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)							
Location (ft)	Stiffness					LRFD Moment (kip.ft/ft)	AASHTO Moment (kip.ft/ft)
	x1	x2	x3	x4	X0.5		
	FEA	FEA	FEA	FEA	FEA		
0	20.1	20.1	20.1	20.1	20.1	52	32.4
1	27.7	27.7	27.7	27.7	27.7	52	32.4
2	27.1	27.1	27.1	27.1	27.1	52	32.4
3	26.3	26.3	26.3	26.3	26.3	52	32.4
4	25.4	25.4	25.4	25.4	25.4	52	32.4
5	24.7	24.7	24.7	24.7	24.7	52	32.4
6	23.9	23.9	23.9	23.9	23.9	52	32.4
7	23.3	23.3	23.3	23.3	23.3	52	32.4
8	22.7	22.7	22.7	22.7	22.7	52	32.4
9	22.1	22.1	22.1	22.1	22.1	52	32.4
10	21.6	21.6	21.6	21.6	21.6	52	32.4
11	21.1	21.1	21.1	21.1	21.1	52	32.4
12	20.6	20.6	20.6	20.6	20.6	52	32.4
13	20.1	20.1	20.1	20.1	20.1	52	32.4
14	19.7	19.7	19.7	19.7	19.7	52	32.4
15	19.3	19.3	19.3	19.3	19.3	52	32.4
16	18.8	18.8	18.8	18.8	18.8	52	32.4
17	18.4	18.4	18.4	18.4	18.4	52	32.4
18	18	18	18	18	18	52	32.4
19	17.6	17.6	17.6	17.6	17.6	52	32.4
20	17.1	17.1	17.1	17.1	17.1	52	32.4
21	16.5	16.5	16.5	16.5	16.5	52	32.4
22	15.7	15.7	15.7	15.7	15.7	52	32.4
23	14.1	14.1	14.1	14.1	14.1	52	32.4
24	7.3	7.3	7.3	7.3	7.3	52	32.4

Table 4. 2: Longitudinal Negative Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 36ft, Deck width = 24ft, One Left Railing with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)							
Location (ft)	Stiffness					LRFD Moment (kip.ft/ft)	AASHTO Moment (kip.ft/ft)
	x1	x2	x3	x4	X0.5		
	FEA	FEA	FEA	FEA	FEA		
0	19.3	18.8	18.5	18.3	19.8	52	32.4
1	17.5	13.3	11	9.6	21.4	52	32.4
2	17.5	13.9	11.9	10.7	20.9	52	32.4
3	17	13.4	11.5	10.3	20.3	52	32.4
4	16.9	13.6	11.8	10.7	19.9	52	32.4
5	16.8	13.7	12.1	11.1	19.6	52	32.4
6	16.8	14	12.5	11.5	19.3	52	32.4
7	16.7	14.2	12.8	11.9	19.1	52	32.4
8	16.7	14.4	13.1	12.3	18.9	52	32.4
9	16.7	14.6	13.4	12.7	18.7	52	32.4
10	16.7	14.7	13.7	13	18.4	52	32.4
11	16.6	14.8	13.9	13.3	18.2	52	32.4
12	16.6	14.9	14.1	13.5	18	52	32.4
13	16.5	15	14.2	13.7	17.8	52	32.4
14	16.4	15	14.3	13.8	17.6	52	32.4
15	16.3	15	14.4	14	17.4	52	32.4
16	16.1	15	14.4	14.1	17.1	52	32.4
17	16	15	14.5	14.1	16.9	52	32.4
18	15.8	15	14.5	14.2	16.6	52	32.4
19	15.7	14.9	14.5	14.3	16.4	52	32.4
20	15.5	14.9	14.5	14.3	16.1	52	32.4
21	15.3	14.8	14.5	14.3	15.7	52	32.4
22	14.8	14.5	14.3	14.2	15.1	52	32.4
23	13.9	13.8	13.8	13.8	13.9	52	32.4
24	8.2	8.5	8.8	8.9	7.8	52	32.4

Table 4. 3: Longitudinal Negative Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 36ft, Deck width = 24ft, One Right Railings with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)							
Location (ft)	Stiffness					LRFD Moment (kip.ft/ft)	AASHTO Moment (kip.ft/ft)
	x1	x2	x3	x4	X0.5		
	FEA	FEA	FEA	FEA	FEA		
0	20.7	21	21.1	21.2	20.5	52	32.4
1	27.7	27.6	27.6	27.6	27.7	52	32.4
2	26.5	26.3	26.2	26.1	26.7	52	32.4
3	25.5	25.1	25	24.8	25.8	52	32.4
4	24.4	24	23.7	23.6	24.7	52	32.4
5	23.5	23	22.7	22.5	23.9	52	32.4
6	22.6	22	21.7	21.5	23.1	52	32.4
7	21.7	21	20.8	20.6	22.3	52	32.4
8	21	20.3	19.9	19.7	21.6	52	32.4
9	20.2	19.4	19	18.8	20.9	52	32.4
10	19.5	18.6	18.2	17.9	20.2	52	32.4
11	18.8	17.9	17.4	17.1	19.6	52	32.4
12	18.1	17.1	16.6	16.2	19	52	32.4
13	17.4	16.3	15.7	15.4	18.4	52	32.4
14	16.7	15.5	14.9	14.5	17.8	52	32.4
15	16	14.7	14	13.6	17.2	52	32.4
16	15.3	13.9	13.1	12.6	16.6	52	32.4
17	14.6	13.1	12.2	11.7	16	52	32.4
18	13.9	12.3	11.4	10.8	15.4	52	32.4
19	13.2	11.4	10.4	9.8	14.8	52	32.4
20	12.5	10.6	9.6	8.9	14.2	52	32.4
21	11.8	9.8	8.6	7.9	13.6	52	32.4
22	11.1	9	7.9	7.2	12.9	52	32.4
23	10.2	7.9	6.7	5.9	12.1	52	32.4
24	7.3	7.1	6.9	6.8	7.6	52	32.4

Table 4. 4: Longitudinal Negative Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 36ft, Deck width = 24ft, Two Railings with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)							
Location (ft)	Stiffness					LRFD Moment (kip.ft/ft)	AASHTO Moment (kip.ft/ft)
	x1	x2	x3	x4	X0.5		
	FEA	FEA	FEA	FEA	FEA		
0	19.8	19.4	19.2	19	20.1	52	32.4
1	17.1	12.9	10.6	9.2	21.1	52	32.4
2	17	13.2	11.3	10	20.5	52	32.4
3	16.3	12.6	10.6	9.4	19.8	52	32.4
4	16.1	12.6	10.8	9.6	19.4	52	32.4
5	15.8	12.5	10.8	9.7	18.9	52	32.4
6	15.7	12.6	10.9	9.9	18.6	52	32.4
7	15.5	12.6	11	10.1	18.2	52	32.4
8	15.3	12.5	11.1	10.2	17.9	52	32.4
9	15.1	12.5	11.1	10.3	17.6	52	32.4

10	14.9	12.4	11.1	10.3	17.2	52	32.4
11	14.6	12.2	11	10.2	16.9	52	32.4
12	14.4	12.1	10.9	10.1	16.6	52	32.4
13	14.1	11.8	10.6	9.9	16.2	52	32.4
14	13.7	11.5	10.3	9.6	15.8	52	32.4
15	13.3	11.1	10	9.3	15.4	52	32.4
16	12.9	10.7	9.6	8.9	15	52	32.4
17	12.5	10.3	9.1	8.4	14.6	52	32.4
18	12	9.8	8.7	7.9	14.2	52	32.4
19	11.6	9.3	8.2	7.4	13.7	52	32.4
20	11.1	8.9	7.7	6.9	13.3	52	32.4
21	10.7	8.3	7.1	6.4	12.9	52	32.4
22	10.3	8	6.9	6.1	12.4	52	32.4
23	9.6	7.3	6	5.2	11.8	52	32.4
24	8.1	8.1	8.1	8.1	8.1	52	32.4

Longitudinal Positive Moment at Critical Section (kip.ft/ft)

Location (ft)	x1	x2	x3	x4	x0.5	LRFD Moment (kip.ft/ft)	AASHTO Moment (kip.ft/ft)
	FEA	FEA	FEA	FEA	FEA		
0	31.6	31.6	31.6	31.6	31.6	65.1	32.4
1	32.9	32.9	32.9	32.9	32.9	65.1	32.4
2	29.2	29.2	29.2	29.2	29.2	65.1	32.4
3	27.7	27.7	27.7	27.7	27.7	65.1	32.4
4	27	27	27	27	27	65.1	32.4
5	26.8	26.8	26.8	26.8	26.8	65.1	32.4
6	27.4	27.4	27.4	27.4	27.4	65.1	32.4

Table 4. 5: Longitudinal Positive Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 36ft, Deck width = 24ft, No Railing with Edge Loading.

7	29.9	29.9	29.9	29.9	29.9	65.1	32.4
8	27	27	27	27	27	65.1	32.4
9	26.1	26.1	26.1	26.1	26.1	65.1	32.4
10	26.4	26.4	26.4	26.4	26.4	65.1	32.4
11	28.5	28.5	28.5	28.5	28.5	65.1	32.4
12	25.4	25.4	25.4	25.4	25.4	65.1	32.4
13	24.1	24.1	24.1	24.1	24.1	65.1	32.4
14	23.4	23.4	23.4	23.4	23.4	65.1	32.4
15	23.3	23.3	23.3	23.3	23.3	65.1	32.4
16	23.8	23.8	23.8	23.8	23.8	65.1	32.4
17	26	26	26	26	26	65.1	32.4
18	22.9	22.9	22.9	22.9	22.9	65.1	32.4
19	21.5	21.5	21.5	21.5	21.5	65.1	32.4
20	20.8	20.8	20.8	20.8	20.8	65.1	32.4
21	20.2	20.2	20.2	20.2	20.2	65.1	32.4
22	19.9	19.9	19.9	19.9	19.9	65.1	32.4
23	19.6	19.6	19.6	19.6	19.6	65.1	32.4
24	19.5	19.5	19.5	19.5	19.5	65.1	32.4

Longitudinal Positive Moment at Critical Section (kip.ft/ft)

Location (ft)	Stiffness					LRFD Moment (kip.ft/ft)	AASHTO Moment (kip.ft/ft)
	x1	x2	x3	x4	x0.5		
	FEA	FEA	FEA	FEA	FEA		
0	20.2	15.8	13.3	11.7	24.1	65.1	32.4
1	21.2	16.7	14.2	12.6	25.1	65.1	32.4
2	19.4	15.4	13.1	11.7	22.9	65.1	32.4
3	18.7	14.9	12.8	11.4	22	65.1	32.4
4	18.8	15.3	13.3	12	21.9	65.1	32.4
5	19.3	16	14.1	12.9	22.1	65.1	32.4
6	20.4	17.3	15.6	14.5	23	65.1	32.4
7	23.3	20.5	18.8	17.8	25.8	65.1	32.4

Table 4. 6: Longitudinal Positive Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 36ft, Deck width = 24ft, One Left Railing with Edge Loading.

8	21	18.2	16.7	15.7	23.3	65.1	32.4
9	20.4	17.9	16.4	15.5	22.6	65.1	32.4
10	21	18.6	17.3	16.4	23.1	65.1	32.4
11	23.5	21.2	20	19.1	25.4	65.1	32.4
12	20.6	18.5	17.3	16.5	22.4	65.1	32.4
13	19.6	17.5	16.4	15.6	21.3	65.1	32.4
14	19.2	17.3	16.2	15.5	20.8	65.1	32.4
15	19.2	17.4	16.4	15.7	20.8	65.1	32.4
16	18.9	18.2	17.2	16.6	21.4	65.1	32.4
17	22.4	20.7	19.8	19.2	23.8	65.1	32.4
18	19.4	17.8	16.9	16.4	20.8	65.1	32.4
19	18.2	16.7	15.8	15.2	19.5	65.1	32.4
20	17.6	16.1	15.3	14.7	18.8	65.1	32.4
21	17.1	15.7	14.9	14.4	18.3	65.1	32.4
22	16.9	15.5	14.7	14.2	18	65.1	32.4
23	16.7	15.4	14.7	14.2	17.9	65.1	32.4
24	16.7	15.4	14.7	14.2	17.8	65.1	32.4

Longitudinal Positive Moment at Critical Section (kip.ft/ft)

Location (ft)	Stiffness				LRFD Moment (kip.ft/ft)	AASHTO Moment (kip.ft/ft)
	x1	x2	x3	x4	x0.5	
	FEA	FEA	FEA	FEA	FEA	
0	29.5	28.5	28	27.8	30.3	65.1	32.4
1	30.7	29.8	29.2	28.8	31.6	65.1	32.4
2	27	26	25.4	25.1	27.9	65.1	32.4
3	25.4	24.4	23.8	23.4	26.3	65.1	32.4
4	24.6	23.6	22.9	22.5	25.6	65.1	32.4
5	24.4	23.3	22.8	22.2	25.3	65.1	32.4
6	24.8	23.7	23	22.6	25.8	65.1	32.4
7	27.2	25.9	25.2	24.8	28.2	65.1	32.4

Table 4. 7: Longitudinal Positive Moment Distribution at Critical Section for Tow-Lane Two Span Bridge Deck Span = 36ft, Deck width = 24ft, One Right Railings with Edge Loading.

8	24.2	23	22.2	21.8	25.3	65.1	32.4
9	23.2	21.9	21.1	20.6	24.3	65.1	32.4
10	23.3	21.9	21.1	20.6	24.5	65.1	32.4
11	25.2	23.8	22.8	22.3	26.4	65.1	32.4
12	21.9	20.4	19.5	18.9	23.2	65.1	32.4
13	20.4	18.8	17.8	17.2	21.8	65.1	32.4
14	19.6	17.8	16.8	16.2	21.1	65.1	32.4
15	19.2	17.3	16.2	15.6	20.7	65.1	32.4
16	19.4	17.3	16.3	15.6	21.1	65.1	32.4
17	21.4	19.3	18.1	17.4	23.2	65.1	32.4
18	18	15.8	14.5	13.7	19.9	65.1	32.4
19	16.3	13.9	12.6	11.7	18.3	65.1	32.4
20	15.3	13.6	11.2	10.3	17.3	65.1	32.4
21	14.2	11.5	10	9	16.5	65.1	32.4
22	13.5	10.7	9.1	8	15.9	65.1	32.4
23	12.7	9.6	7.9	6.7	15.3	65.1	32.4
24	12.6	9.6	7.9	6.8	15.2	65.1	32.4

Longitudinal Positive Moment at Critical Section (kip.ft/ft)

Location (ft)	x1	x2	x3	x4	x0.5	LRFD Moment (kip.ft/ft)	AASHTO Moment (kip.ft/ft)
	FEA	FEA	FEA	FEA	FEA		
0	19	14.6	12.2	10.7	23.1	65.1	32.4
1	19.9	15.4	13	11.5	24.2	65.1	32.4
2	18.1	14	11.8	10.4	21.9	65.1	32.4
3	17.3	13.4	11.9	10	20.9	65.1	32.4
4	17.3	13.7	11.6	10.3	20.7	65.1	32.4
5	17.6	14.1	12.2	11	20.9	65.1	32.4
6	18.7	15.2	13.4	12.3	21.8	65.1	32.4
7	21.5	18.2	16.4	15.3	24.5	65.1	32.4

Table 4. 8: Longitudinal Positive Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 36ft, Deck width = 24ft, Two Railings with Edge Loading.

8	18.9	15.8	14.1	13	21.8	65.1	32.4
9	18.3	15.2	13.6	12.5	21.1	65.1	32.4
10	18.7	15.7	14.1	13.1	21.5	65.1	32.4
11	21	18.1	16.5	15.5	23.7	65.1	32.4
12	18	15.1	13.6	13	20.6	65.1	32.4
13	16.7	13.9	12.4	11.4	19.4	65.1	32.4
14	16.2	13.3	11.8	10.9	18.8	65.1	32.4
15	16	13.2	11.7	10.8	18.6	65.1	32.4
16	16.4	13.6	12.1	11.2	19	65.1	32.4
17	18.6	15.8	14.3	13.4	21.3	65.1	32.4
18	15.4	12.6	11.1	10.1	18.1	65.1	32.4
19	13.9	11	9.5	8.5	16.6	65.1	32.4
20	12.9	10	8.4	7.5	15.7	65.1	32.4
21	12.2	9.1	7.6	6.6	15	65.1	32.4
22	11.6	8.5	6.9	5.9	14.5	65.1	32.4
23	10.9	7.7	6	5	14	65.1	32.4
24	10.9	7.8	6.1	5.1	14	65.1	32.4

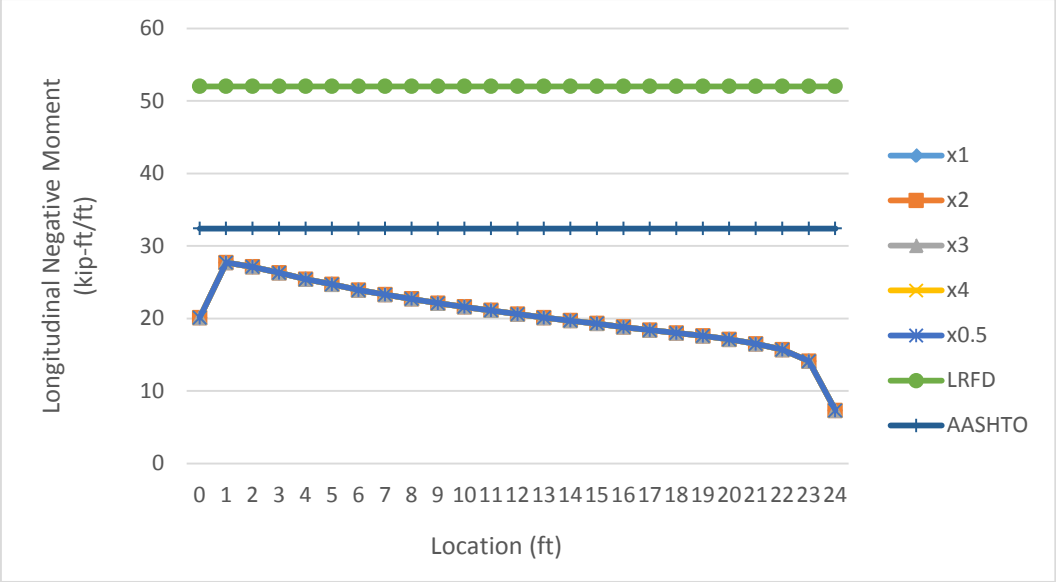


Figure 4.1: Longitudinal Negative Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 36ft, Deck width = 24ft, No Railing with Edge Loading.

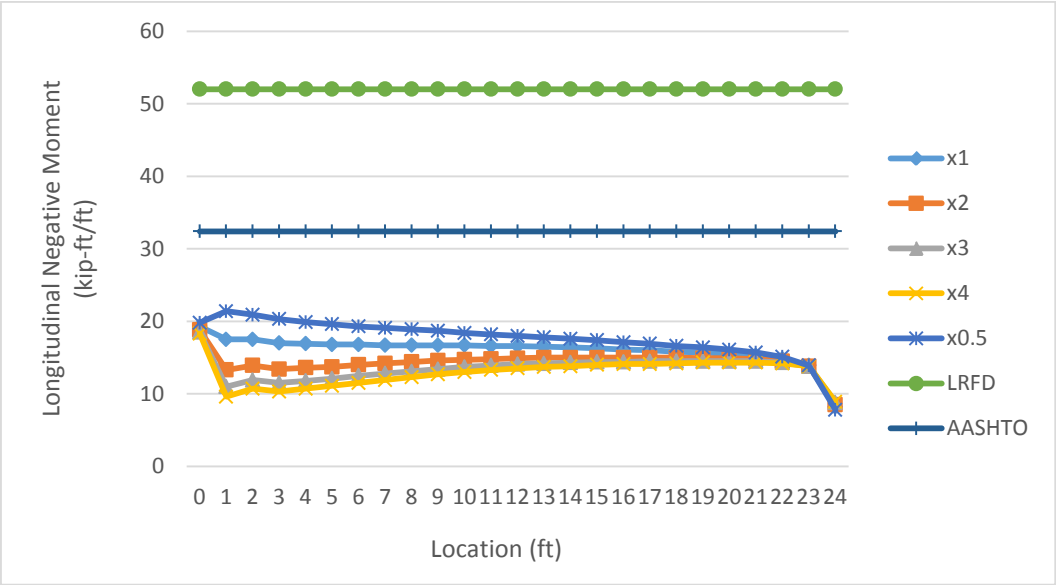


Figure 4.2: Longitudinal Negative Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 36ft, Deck width = 24ft, One Left Railing with Edge Loading.

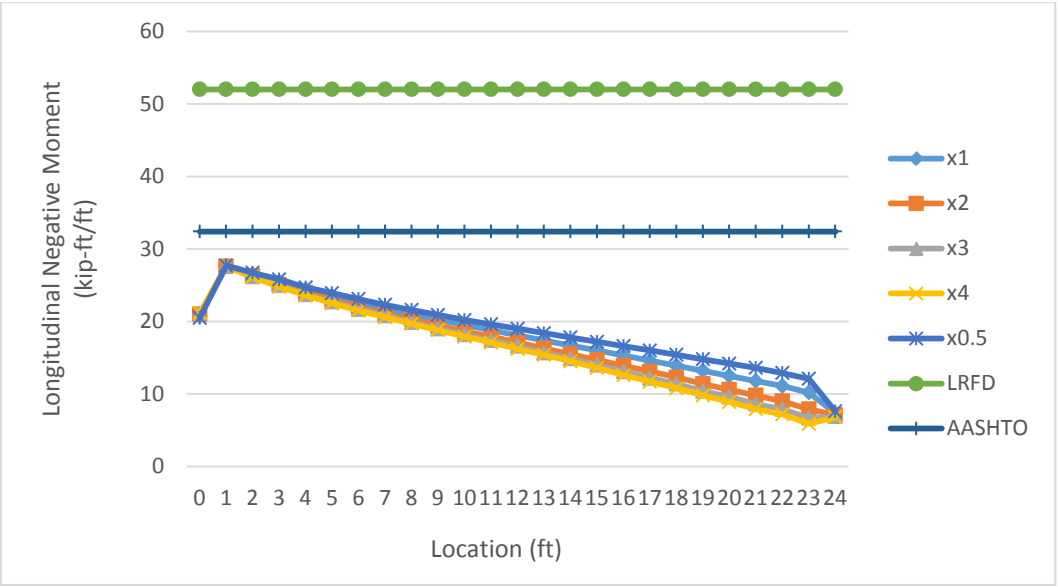


Figure 4.3: Longitudinal Negative Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 36ft, Deck width = 24ft, One Right Railings with Edge Loading.

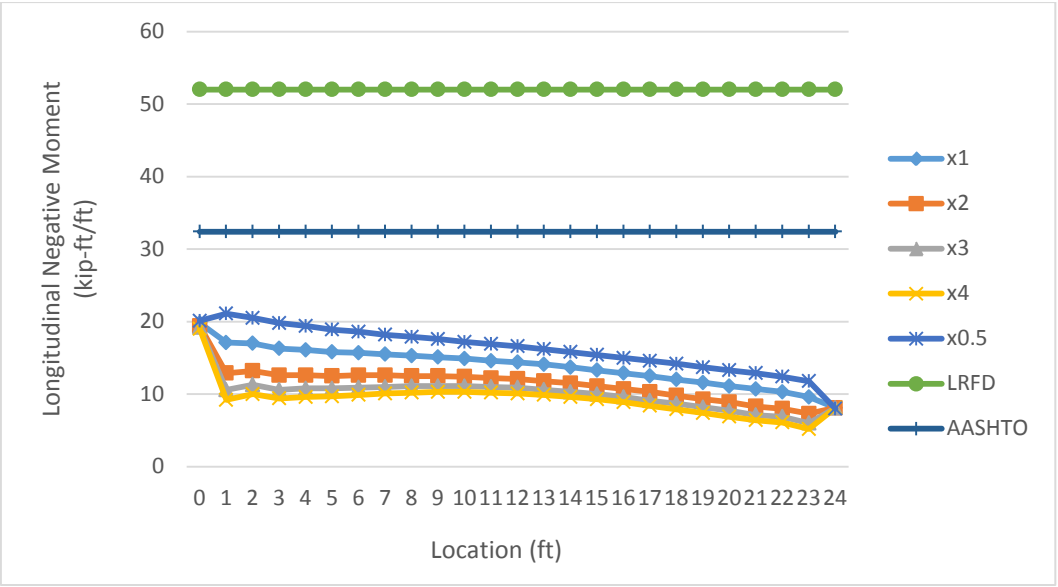


Figure 4.4: Longitudinal Negative Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 36ft, Deck width = 24ft, Two Railings with Edge Loading.

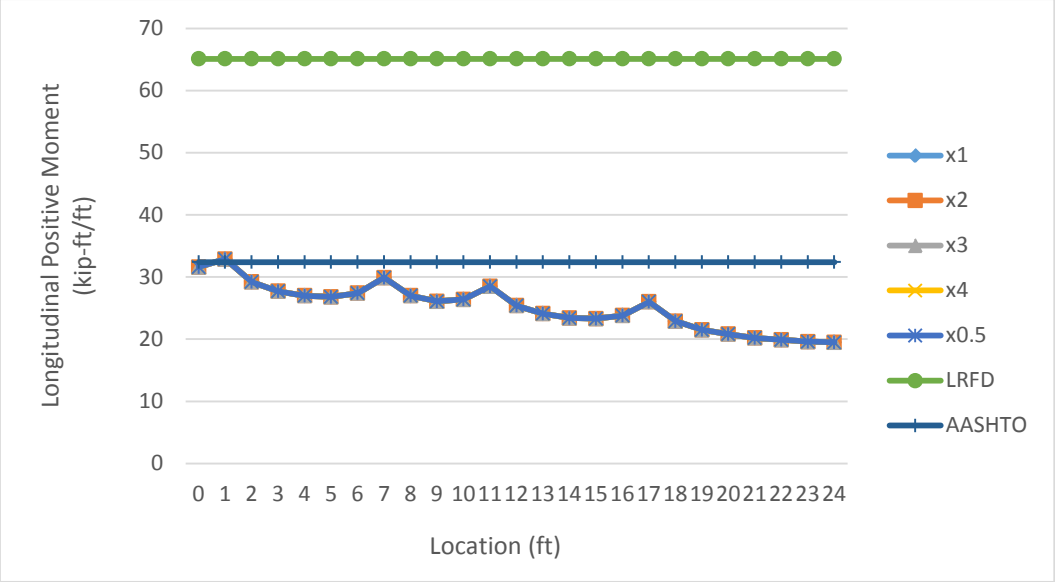


Figure 4.5: Longitudinal Positive Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 36ft, Deck width = 24ft, No Railing with Edge Loading.

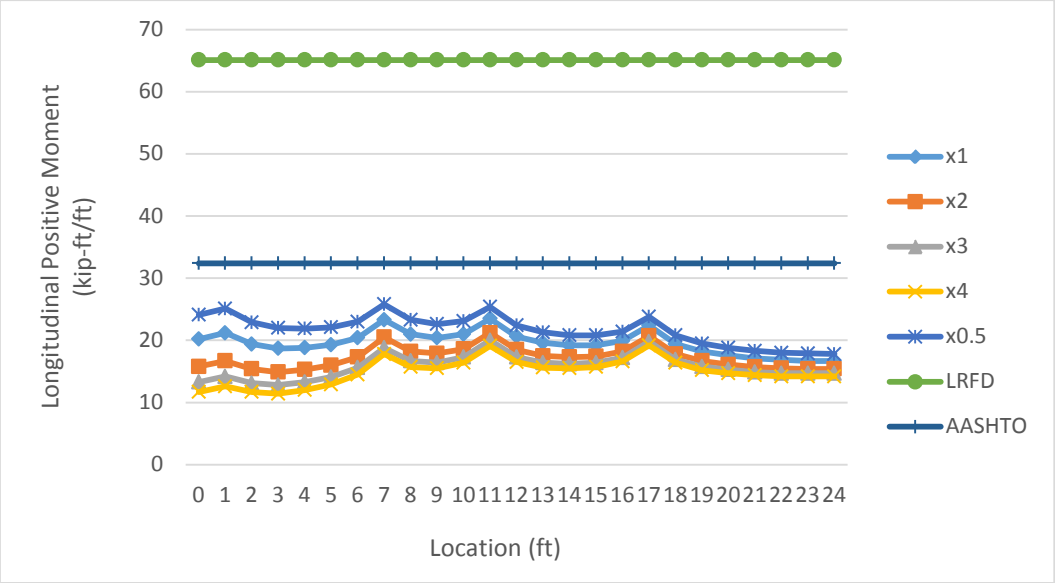


Figure 4.6: Longitudinal Positive Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 36ft, Deck width = 24ft, One Left Railing with Edge Loading.

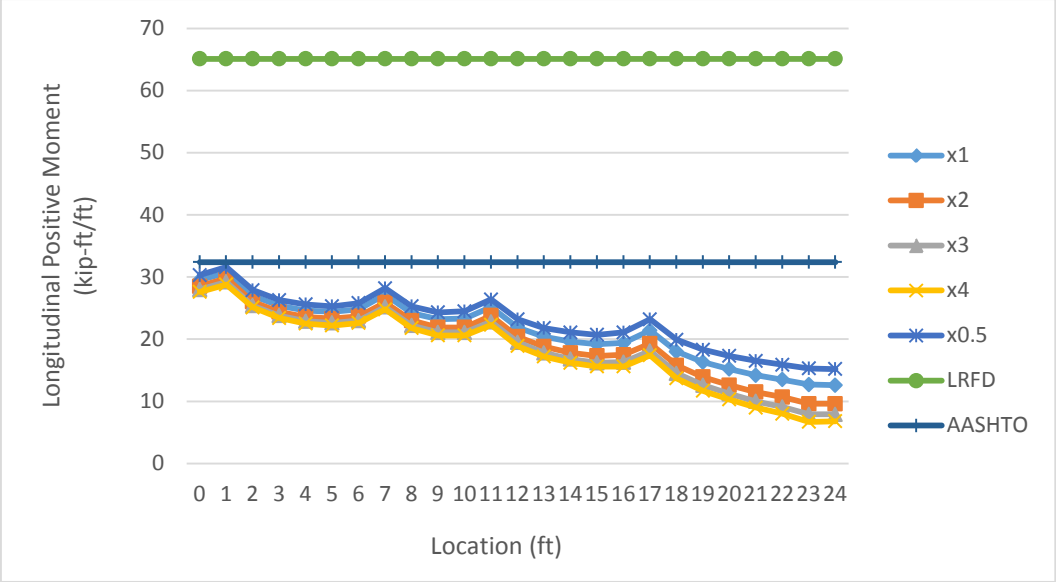


Figure 4.7: Longitudinal Positive Moment Distribution at Critical Section for Tow-Lane Two Span Bridge Deck Span = 36ft, Deck width = 24ft, One Right Railings with Edge Loading.

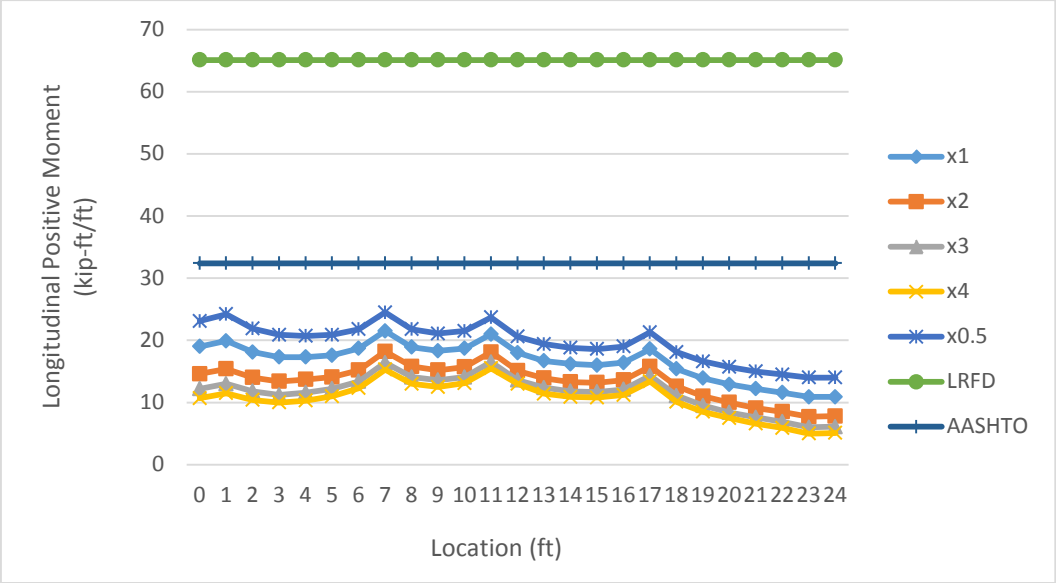


Figure 4.8: Longitudinal Positive Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 36ft, Deck width = 24ft, Two Railings with Edge Loading.

4.3 Finite Element Analysis (FEA) Results and Discussion

The FEA results for each bridge category (Case 1, Case2 and Case3) were primarily compared with AASHTO Standard Specifications and AASHTO LRFD procedures. After that, the effects of the increase in the railings stiffnesses/sizes on the maximum longitudinal moment, edge beam moment, and live load deflection for a given bridge span and number of lanes were also evaluated. Thus, the finite-element results for railings stiffnesses/sizes ranging between x0.5 and x4 are compared to their corresponding FEA values for straight bridges without railings for each bridge category. The FEA bending moments are presented in the form of the ratio (Mi/xj / Mi/x0), where Mi/xj is the maximum FEA moment in the bridge for a given railing stiffness xj between x0.5 and x4, and Mi/x0 is the FEA moment for straight bridges without railings. Similarly, the ratio (Δi/xj /Δi/x0) is calculated from the FEA deflection results.

4.3.1 Concrete Bridges with No Railing (X0) "Case 1"

4.3.1.1 FEA Results versus AASHTO

4.3.1.1.1 Maximum Longitudinal Bending Moment

The maximum slab and longitudinal bending moments are summarized in Tables 4.9 and 4.10 for the case on negative moment loading condition and Tables 4.14 and 4.15 for the case on positive moment loading condition, for all "Case 1" bridges analyzed along with the corresponding AASHTO bending moments. The AASHTO moments are computed using Eqs. (1) and (2) for the standard specifications, and Eq. (5) for LRFD. Considering the case on negative moment loading case, for One lane bridges with span lengths less than 46ft, AASHTO overestimates the maximum longitudinal bending moment by about 30%. AASHTO gives longitudinal bending moment similar to the FEA results for span lengths greater

than 46 ft. For two lane bridges, AASHTO overestimates the maximum moment by about 20% when the span lengths less than 46ft, and underestimates the maximum moment by about 25% when the span length is greater than 46 ft. For three and four lane bridges, AASHTO overestimates the maximum moment by about 20% for bridges with spans less than 46ft, and underestimates the maximum moments by about 35% for bridges with span lengths greater than 46ft.

Considering the case on positive moment loading case, for One lane bridges with span lengths less than 46ft, AASHTO overestimates the maximum longitudinal bending moment by about 30%. Also, AASHTO overestimates the maximum longitudinal bending moment by about 15% for span lengths greater than 46 ft. For two lane bridges, AASHTO overestimates the maximum moment by about 20% when the span lengths less than 36ft, and AASHTO gives longitudinal bending moment similar to the FEA results for span lengths greater than 36ft greater than 46 ft. For three and four lane bridges, AASHTO overestimates the maximum moment by about 15% for bridges with spans less than 36ft, and AASHTO gives longitudinal bending moment similar to the FEA results for span lengths greater than 36 ft.

The maximum FEA longitudinal bending moments were also compared to the AASHTO LRFD moments. Considering the case on negative moment loading case, for One lane bridges with span lengths less than 46ft, LRFD overestimates the maximum longitudinal bending moment by about 30%, and by about 20% for span lengths greater than 46 ft. For two lane bridges, AASHTO overestimates the maximum moment by about 47% for all span lengths. For three and four lane bridges, AASHTO overestimates the maximum moment by about 57% and 66% respectively for three and four lane bridge for the different span length.

Considering the case on positive moment loading case, for One lane bridges with span lengths less than 46ft, AASHTO overestimates the maximum longitudinal bending moment by about 35%, and by about 30% span lengths greater than 46 ft. For two lane bridges, AASHTO overestimates the maximum moment by about 55% for all span length. For three and four lane bridges, AASHTO overestimates the maximum moment by about 65% and 70% respectively for three and four lane bridge for the different span length.

4.3.1.1.2 Maximum Edge Beam Moment.

The maximum edge beam longitudinal moments are summarized in Tables 4.11 and 4.12 for the case on negative moment loading condition and Tables 4.16 and 4.17 for the case on positive moment loading condition. The AASHTO moments are computed using eqs. (1) and (2) for the standard specifications, and eq. (5) for LRFD.

The FEA maximum longitudinal edge beam moments were first compared to the AASHTO standard specifications equations. Considering the case on negative moment loading case, for One lane bridges, AASHTO overestimates the edge beam moment by about 35% for span length less than 46ft and 20% for span length equal to 46ft, and gives similar results for spans equal to 54ft. For two lane bridges, AASHTO overestimates the edge beam moment by about 25% for spans less than 46ft and gives similar results for span length greater than 46ft. For three and four lane bridges, AASTHTO overestimates the edge beam moment by about 25% for spans less than 46ft, and AASHTO recommended moments are similar to FEA edge beam moments for bridges with spans equal to 46ft, and underestimate moment for span length equal to 54ft.

Considering the case on positive moment loading case, for One lane bridges, AASHTO overestimates the edge beam moment by about 30% for span length less

than 46ft and 20% for span length greater than 46ft. For two lane bridges, AASHTO overestimates the edge beam moment by about 20% for spans less than 46ft and gives similar results for span length greater than 46ft. For three and four lane bridges, AASTHTO overestimates the edge beam moment by about 20% for spans less than 36ft, and AASHTO recommended moments are similar to FEA edge beam moments for bridges with spans greater than 36 ft.

The maximum FEA longitudinal edge beam moments were also compared to the AASHTO LRFD moments. Considering the case on negative moment loading case, LRFD underestimate the edge moment for the different case of span length and number of lane, this underestimation increase with the increase of number of lane. And regarding the span length, the underestimation is maximal in the case of 24ft and minimal in the case of 36ft.

Considering the case on positive moment loading case, for One lane bridge LRFD method overestimate the moment for the different span length. This overestimation decrease as the number of lane decrease until underestimation occur.

4.3.1.1.3 Maximum Live Load Deflection

For the case on negative moment loading condition, Table 4.13 summarizes the maximum FEA live load deflection as compared to the AASHTO criterion of (*S*/800). And for the case on positive moment loading condition, Table 4.18 summarizes the maximum FEA live load deflection as compared to the AASHTO criterion of (*S*/800). The FEA results are directly related to the assumed slab thickness, which was a reasonable assumption for deflection control. But One can always assume a different thickness and obtain different deflection results. The slab deflection increases as the span length increases from 24 to 54ft and the number of lanes from One to four.

Considering the case on negative moment loading case AASHTO overestimates the maximum deflection by about 95% for One, two, three, and four lane bridges with spans less than 36ft, and by about 75% for spans greater than 36ft. The percent difference with AASHTO is higher for short spans, and decreases as the span length increases to 54 ft. Moreover, the percent difference with AASHTO decreases as the number of lanes increases from One to four for a fixed span length. Considering the case on positive moment loading case AASHTO overestimates the maximum deflection by about 85% for One, two, three, and four lane bridges with spans less than 36ft, by about 70% for spans equal to 36ft, and by about 60% for spans greater than 36ft. The percent difference with AASHTO is higher for short spans, and decreases as the span length increases to 54 ft. Moreover, the percent difference with AASHTO decreases as the number of lanes increases from One to four for a fixed span length.

Table 4. 9: Comparison of FEA Maximum Longitudinal Bending Moment in Negative Moment Loading Case with AASHTO Moment

No. of lanes n	Span length (ft)	Stiffness Factor										AASHTO Moment (kip.ft/ft)
		x1		x2		x3		x4		x0.5		
1	24	15.1	-30%	15.1	-30%	15.1	-30%	15.1	-30%	15.1	-30%	21.6
	36	22.1	-32%	22.1	-32%	22.1	-32%	22.1	-32%	22.1	-32%	32.4
	46	39.6	-4%	39.6	-4%	39.6	-4%	39.6	-4%	39.6	-4%	41.4
	54	52.4	4%	52.4	4%	52.4	4%	52.4	4%	52.4	4%	50.2
2	24	17.1	-21%	17.1	-21%	17.1	-21%	17.1	-21%	17.1	-21%	21.6
	36	27.1	-16%	27.1	-16%	27.1	-16%	27.1	-16%	27.1	-16%	32.4
	46	47.8	15%	47.8	15%	47.8	15%	47.8	15%	47.8	15%	41.4
	54	63.3	26%	63.3	26%	63.3	26%	63.3	26%	63.3	26%	50.2
3	24	17.3	-20%	17.3	-20%	17.3	-20%	17.3	-20%	17.3	-20%	21.6
	36	28.6	-12%	28.6	-12%	28.6	-12%	28.6	-12%	28.6	-12%	32.4
	46	51.1	23%	51.1	23%	51.1	23%	51.1	23%	51.1	23%	41.4
	54	67.7	35%	67.7	35%	67.7	35%	67.7	35%	67.7	35%	50.2
4	24	17.3	-20%	17.3	-20%	17.3	-20%	17.3	-20%	17.3	-20%	21.6
	36	29.1	-10%	29.1	-10%	29.1	-10%	29.1	-10%	29.1	-10%	32.4
	46	52.1	26%	52.1	26%	52.1	26%	52.1	26%	52.1	26%	41.4
	54	70.4	40%	70.4	40%	70.4	40%	70.4	40%	70.4	40%	50.2

Table 4. 10: Comparison of FEA Maximum Longitudinal Bending Moment in Negative Moment Loading Case with LRFD Moment

No. of lanes n	Span length (ft)	Stiffness Factor										LRFD Moment (kip.ft/ft)
		x1		x2		x3		x4		x0.5		
1	24	15.1	-26%	15.1	-26%	15.1	-26%	15.1	-26%	15.1	-26%	20.5
	36	22.1	-31%	22.1	-31%	22.1	-31%	22.1	-31%	22.1	-31%	31.9
	46	39.6	-22%	39.6	-22%	39.6	-22%	39.6	-22%	39.6	-22%	50.9
	54	52.4	-19%	52.4	-19%	52.4	-19%	52.4	-19%	52.4	-19%	64.9
2	24	17.1	-44%	17.1	-44%	17.1	-44%	17.1	-44%	17.1	-44%	30.5
	36	27.1	-48%	27.1	-48%	27.1	-48%	27.1	-48%	27.1	-48%	52
	46	47.8	-47%	47.8	-47%	47.8	-47%	47.8	-47%	47.8	-47%	90.3
	54	63.3	-47%	63.3	-47%	63.3	-47%	63.3	-47%	63.3	-47%	120.2
3	24	17.3	-57%	17.3	-57%	17.3	-57%	17.3	-57%	17.3	-57%	40.7
	36	28.6	-58%	28.6	-58%	28.6	-58%	28.6	-58%	28.6	-58%	67.9
	46	51.1	-57%	51.1	-57%	51.1	-57%	51.1	-57%	51.1	-57%	118.1
	54	67.7	-58%	67.7	-58%	67.7	-58%	67.7	-58%	67.7	-58%	160.4
4	24	17.3	-66%	17.3	-66%	17.3	-66%	17.3	-66%	17.3	-66%	50.3
	36	29.1	-65%	29.1	-65%	29.1	-65%	29.1	-65%	29.1	-65%	82.6
	46	52.1	-66%	52.1	-66%	52.1	-66%	52.1	-66%	52.1	-66%	151.3
	54	70.4	-66%	70.4	-66%	70.4	-66%	70.4	-66%	70.4	-66%	207.4

Table 4. 11: Comparison of FEA Edge Beam Moment in Negative Moment Loading Case with AASHTO Moment

No. of lanes n	Span length (ft)	Stiffness Factor										AASHTO Moment (kip.ft/ft)
		x1		x2		x3		x4		x0.5		
1	24	17.1	-33%	17.1	-33%	17.1	-33%	17.1	-33%	17.1	-33%	25.6
	36	23.2	-40%	23.2	-40%	23.2	-40%	23.2	-40%	23.2	-40%	38.4
	46	40.2	-18%	40.2	-18%	40.2	-18%	40.2	-18%	40.2	-18%	49.1
	54	53.3	-7%	53.3	-7%	53.3	-7%	53.3	-7%	53.3	-7%	57.6
2	24	18.6	-27%	18.6	-27%	18.6	-27%	18.6	-27%	18.6	-27%	25.6
	36	27.7	-28%	27.7	-28%	27.7	-28%	27.7	-28%	27.7	-28%	38.4
	46	48.1	-2%	48.1	-2%	48.1	-2%	48.1	-2%	48.1	-2%	49.1
	54	63.9	11%	63.9	11%	63.9	11%	63.9	11%	63.9	11%	57.6
3	24	18.8	-27%	18.8	-27%	18.8	-27%	18.8	-27%	18.8	-27%	25.6
	36	29	-24%	29	-24%	29	-24%	29	-24%	29	-24%	38.4
	46	51.1	4%	51.1	4%	51.1	4%	51.1	4%	51.1	4%	49.1
	54	68.3	19%	68.3	19%	68.3	19%	68.3	19%	68.3	19%	57.6
4	24	18.7	-27%	18.7	-27%	18.7	-27%	18.7	-27%	18.7	-27%	25.6
	36	29.3	-24%	29.3	-24%	29.3	-24%	29.3	-24%	29.3	-24%	38.4
	46	52.6	7%	52.6	7%	52.6	7%	52.6	7%	52.6	7%	49.1
	54	70.7	23%	70.7	23%	70.7	23%	70.7	23%	70.7	23%	57.6

Table 4. 12: Comparison of FEA Edge Beam Moment in Negative Moment Loading Case with LRFD Moment

No. of lanes n	Span length (ft)	Stiffness Factor										LRFD Moment (kip.ft/ft)
		x1		x2		x3		x4		x0.5		
1	24	17.1	53%	17.1	53%	17.1	53%	17.1	53%	17.1	53%	11.2
	36	23.2	2%	23.2	2%	23.2	2%	23.2	2%	23.2	2%	22.8
	46	40.2	15%	40.2	15%	40.2	15%	40.2	15%	40.2	15%	34.9
	54	53.3	16%	53.3	16%	53.3	16%	53.3	16%	53.3	16%	46
2	24	18.6	81%	18.6	81%	18.6	81%	18.6	81%	18.6	81%	10.3
	36	27.7	24%	27.7	24%	27.7	24%	27.7	24%	27.7	24%	22.4
	46	48.1	35%	48.1	35%	48.1	35%	48.1	35%	48.1	35%	35.7
	54	63.9	32%	63.9	32%	63.9	32%	63.9	32%	63.9	32%	48.3
3	24	18.8	88%	18.8	88%	18.8	88%	18.8	88%	18.8	88%	10
	36	29	35%	29	35%	29	35%	29	35%	29	35%	21.5
	46	51.1	50%	51.1	50%	51.1	50%	51.1	50%	51.1	50%	34.1
	54	68.3	46%	68.3	46%	68.3	46%	68.3	46%	68.3	46%	46.7
4	24	18.7	93%	18.7	93%	18.7	93%	18.7	93%	18.7	93%	9.7
	36	29.3	41%	29.3	41%	29.3	41%	29.3	41%	29.3	41%	20.8
	46	52.6	55%	52.6	55%	52.6	55%	52.6	55%	52.6	55%	33.9
	54	70.7	51%	70.7	51%	70.7	51%	70.7	51%	70.7	51%	46.7

Table 4. 13: Comparison of FEA Maximum Live Load Deflection in Negative Moment Loading Case with AASHTO Criterion

No. of lanes n	Span length (ft)	Stiffness Factor										AASHTO Deflection (in)
		x1		x2		x3		x4		x0.5		
1	24	0.022	-94%	0.022	-94%	0.022	-94%	0.022	-94%	0.022	-94%	0.360
	36	0.117	-78%	0.117	-78%	0.117	-78%	0.117	-78%	0.117	-78%	0.540
	46	0.143	-79%	0.143	-79%	0.143	-79%	0.143	-79%	0.143	-79%	0.690
	54	0.168	-79%	0.168	-79%	0.168	-79%	0.168	-79%	0.168	-79%	0.810
2	24	0.026	-93%	0.026	-93%	0.026	-93%	0.026	-93%	0.026	-93%	0.360
	36	0.143	-74%	0.143	-74%	0.143	-74%	0.143	-74%	0.143	-74%	0.540
	46	0.175	-75%	0.175	-75%	0.175	-75%	0.175	-75%	0.175	-75%	0.690
	54	0.204	-75%	0.204	-75%	0.204	-75%	0.204	-75%	0.204	-75%	0.810
3	24	0.027	-93%	0.027	-93%	0.027	-93%	0.027	-93%	0.027	-93%	0.360
	36	0.152	-72%	0.152	-72%	0.152	-72%	0.152	-72%	0.152	-72%	0.540
	46	0.188	-73%	0.188	-73%	0.188	-73%	0.188	-73%	0.188	-73%	0.690
	54	0.218	-73%	0.218	-73%	0.218	-73%	0.218	-73%	0.218	-73%	0.810
4	24	0.027	-93%	0.027	-93%	0.027	-93%	0.027	-93%	0.027	-93%	0.360
	36	0.157	-71%	0.157	-71%	0.157	-71%	0.157	-71%	0.157	-71%	0.540
	46	0.195	-72%	0.195	-72%	0.195	-72%	0.195	-72%	0.195	-72%	0.690
	54	0.228	-72%	0.228	-72%	0.228	-72%	0.228	-72%	0.228	-72%	0.810

Table 4. 14: Comparison of FEA Maximum Longitudinal Bending Moment in Positive Moment Loading Case with AASHTO Moment

No. of lanes n	Span length (ft)	Stiffness Factor										AASHTO Moment (kip.ft/ft)
		x1		x2		x3		x4		x0.5		
1	24	14.1	-35%	14.1	-35%	14.1	-35%	14.1	-35%	14.1	-35%	21.6
	36	24.3	-25%	24.3	-25%	24.3	-25%	24.3	-25%	24.3	-25%	32.4
	46	34.4	-17%	34.4	-17%	34.4	-17%	34.4	-17%	34.4	-17%	41.4
	54	42.6	-15%	42.6	-15%	42.6	-15%	42.6	-15%	42.6	-15%	50.2
2	24	17.5	-19%	17.5	-19%	17.5	-19%	17.5	-19%	17.5	-19%	21.6
	36	29.9	-8%	29.9	-8%	29.9	-8%	29.9	-8%	29.9	-8%	32.4
	46	41.6	0%	41.6	0%	41.6	0%	41.6	0%	41.6	0%	41.4
	54	51.2	2%	51.2	2%	51.2	2%	51.2	2%	51.2	2%	50.2
3	24	18.6	-14%	18.6	-14%	18.6	-14%	18.6	-14%	18.6	-14%	21.6
	36	31.8	-2%	31.8	-2%	31.8	-2%	31.8	-2%	31.8	-2%	32.4
	46	43.9	6%	43.9	6%	43.9	6%	43.9	6%	43.9	6%	41.4
	54	53.7	7%	53.7	7%	53.7	7%	53.7	7%	53.7	7%	50.2
4	24	18.9	-13%	18.9	-13%	18.9	-13%	18.9	-13%	18.9	-13%	21.6
	36	33	2%	33	2%	33	2%	33	2%	33	2%	32.4
	46	45.8	11%	45.8	11%	45.8	11%	45.8	11%	45.8	11%	41.4
	54	56	12%	56	12%	56	12%	56	12%	56	12%	50.2

Table 4. 15: Comparison of FEA Maximum Longitudinal Bending Moment in Positive Moment Loading Case with LRFD Moment

No. of lanes n	Span length (ft)	Stiffness Factor										LRFD Moment (kip.ft/ft)
		x1		x2		x3		x4		x0.5		
1	24	14.1	-39%	14.1	-39%	14.1	-39%	14.1	-39%	14.1	-39%	23
	36	24.3	-35%	24.3	-35%	24.3	-35%	24.3	-35%	24.3	-35%	37.5
	46	34.4	-31%	34.4	-31%	34.4	-31%	34.4	-31%	34.4	-31%	50.2
	54	42.6	-29%	42.6	-29%	42.6	-29%	42.6	-29%	42.6	-29%	60
2	24	17.5	-51%	17.5	-51%	17.5	-51%	17.5	-51%	17.5	-51%	35.8
	36	29.9	-54%	29.9	-54%	29.9	-54%	29.9	-54%	29.9	-54%	65.1
	46	41.6	-55%	41.6	-55%	41.6	-55%	41.6	-55%	41.6	-55%	92.5
	54	51.2	-55%	51.2	-55%	51.2	-55%	51.2	-55%	51.2	-55%	114.4
3	24	18.6	-62%	18.6	-62%	18.6	-62%	18.6	-62%	18.6	-62%	48.7
	36	31.8	-64%	31.8	-64%	31.8	-64%	31.8	-64%	31.8	-64%	87.3
	46	43.9	-64%	43.9	-64%	43.9	-64%	43.9	-64%	43.9	-64%	122.8
	54	53.7	-65%	53.7	-65%	53.7	-65%	53.7	-65%	53.7	-65%	154.5
4	24	18.9	-69%	18.9	-69%	18.9	-69%	18.9	-69%	18.9	-69%	60.7
	36	33	-69%	33	-69%	33	-69%	33	-69%	33	-69%	107.7
	46	45.8	-71%	45.8	-71%	45.8	-71%	45.8	-71%	45.8	-71%	158.5
	54	56	-72%	56	-72%	56	-72%	56	-72%	56	-72%	201

Table 4. 16: Comparison of FEA Edge Beam Moment in Positive Moment Loading Case with AASHTO Moment

No. of lanes n	Span length (ft)	Stiffness Factor										AASHTO Moment (kip.ft/ft)
		x1		x2		x3		x4		x0.5		
1	24	17.6	-31%	17.6	-31%	17.6	-31%	17.6	-31%	17.6	-31%	25.6
	36	28	-27%	28	-27%	28	-27%	28	-27%	28	-27%	38.4
	46	38	-23%	38	-23%	38	-23%	38	-23%	38	-23%	49.1
	54	46.3	-20%	46.3	-20%	46.3	-20%	46.3	-20%	46.3	-20%	57.6
2	24	20.1	-21%	20.1	-21%	20.1	-21%	20.1	-21%	20.1	-21%	25.6
	36	32.9	-14%	32.9	-14%	32.9	-14%	32.9	-14%	32.9	-14%	38.4
	46	44.8	-9%	44.8	-9%	44.8	-9%	44.8	-9%	44.8	-9%	49.1
	54	54.5	-5%	54.5	-5%	54.5	-5%	54.5	-5%	54.5	-5%	57.6
3	24	20.7	-19%	20.7	-19%	20.7	-19%	20.7	-19%	20.7	-19%	25.6
	36	34.7	-10%	34.7	-10%	34.7	-10%	34.7	-10%	34.7	-10%	38.4
	46	47.2	-4%	47.2	-4%	47.2	-4%	47.2	-4%	47.2	-4%	49.1
	54	57.2	-1%	57.2	-1%	57.2	-1%	57.2	-1%	57.2	-1%	57.6
4	24	21	-18%	21	-18%	21	-18%	21	-18%	21	-18%	25.6
	36	35.5	-8%	35.5	-8%	35.5	-8%	35.5	-8%	35.5	-8%	38.4
	46	49	0%	49	0%	49	0%	49	0%	49	0%	49.1
	54	59.5	3%	59.5	3%	59.5	3%	59.5	3%	59.5	3%	57.6

Table 4. 17: Comparison of FEA Edge Beam Moment in Positive Moment Loading Case with LRFD Moment

No. of lanes n	Span length (ft)	Stiffness Factor										LRFD Moment (kip.ft/ft)
		x1		x2		x3		x4		x0.5		
1	24	17.6	-9%	17.6	-9%	17.6	-9%	17.6	-9%	17.6	-9%	19.3
	36	28	-16%	28	-16%	28	-16%	28	-16%	28	-16%	33.3
	46	38	-17%	38	-17%	38	-17%	38	-17%	38	-17%	45.7
	54	46.3	-16%	46.3	-16%	46.3	-16%	46.3	-16%	46.3	-16%	55
2	24	20.1	13%	20.1	13%	20.1	13%	20.1	13%	20.1	13%	17.8
	36	32.9	1%	32.9	1%	32.9	1%	32.9	1%	32.9	1%	32.7
	46	44.8	-4%	44.8	-4%	44.8	-4%	44.8	-4%	44.8	-4%	46.7
	54	54.5	-6%	54.5	-6%	54.5	-6%	54.5	-6%	54.5	-6%	57.8
3	24	20.7	20%	20.7	20%	20.7	20%	20.7	20%	20.7	20%	17.2
	36	34.7	11%	34.7	11%	34.7	11%	34.7	11%	34.7	11%	31.4
	46	47.2	6%	47.2	6%	47.2	6%	47.2	6%	47.2	6%	44.6
	54	57.2	3%	57.2	3%	57.2	3%	57.2	3%	57.2	3%	55.8
4	24	21	26%	21	26%	21	26%	21	26%	21	26%	16.7
	36	35.5	17%	35.5	17%	35.5	17%	35.5	17%	35.5	17%	30.3
	46	49	11%	49	11%	49	11%	49	11%	49	11%	44.3
	54	59.5	7%	59.5	7%	59.5	7%	59.5	7%	59.5	7%	55.8

Table 4. 18: Comparison of FEA Maximum Live Load Deflection in Positive Moment Loading Case with AASHTO Criterion

No. of lanes n	Span length (ft)	Stiffness Factor										AASHTO Deflection (in)
		x1		x2		x3		x4		x0.5		
1	24	0.049	-86%	0.049	-86%	0.049	-86%	0.049	-86%	0.049	-86%	0.360
	36	0.143	-74%	0.143	-74%	0.143	-74%	0.143	-74%	0.143	-74%	0.540
	46	0.219	-68%	0.219	-68%	0.219	-68%	0.219	-68%	0.219	-68%	0.690
	54	0.263	-68%	0.263	-68%	0.263	-68%	0.263	-68%	0.263	-68%	0.810
2	24	0.059	-84%	0.059	-84%	0.059	-84%	0.059	-84%	0.059	-84%	0.360
	36	0.175	-68%	0.175	-68%	0.175	-68%	0.175	-68%	0.175	-68%	0.540
	46	0.266	-61%	0.266	-61%	0.266	-61%	0.266	-61%	0.266	-61%	0.690
	54	0.317	-61%	0.317	-61%	0.317	-61%	0.317	-61%	0.317	-61%	0.810
3	24	0.062	-83%	0.062	-83%	0.062	-83%	0.062	-83%	0.062	-83%	0.360
	36	0.186	-66%	0.186	-66%	0.186	-66%	0.186	-66%	0.186	-66%	0.540
	46	0.283	-59%	0.283	-59%	0.283	-59%	0.283	-59%	0.283	-59%	0.690
	54	0.335	-59%	0.335	-59%	0.335	-59%	0.335	-59%	0.335	-59%	0.810
4	24	0.063	-83%	0.063	-83%	0.063	-83%	0.063	-83%	0.063	-83%	0.360
	36	0.193	-64%	0.193	-64%	0.193	-64%	0.193	-64%	0.193	-64%	0.540
	46	0.295	-57%	0.295	-57%	0.295	-57%	0.295	-57%	0.295	-57%	0.690
	54	0.350	-57%	0.350	-57%	0.350	-57%	0.350	-57%	0.350	-57%	0.810

4.3.1.2 Summary

For the case of negative moment loading condition, the AASHTO Standard Specifications overestimated the maximum longitudinal bending moment by about 30% for One lane bridges. As the span length increases, the overestimation value decreases to zero for span lengths greater than 46 ft. As the number of lanes increases from One to four, AASHTO starts to underestimate the maximum bending moment, and this value increases to 35% for span lengths greater than 46ft for four lane bridges.

For the case of positive moment loading condition, the AASHTO Standard Specifications overestimated the maximum longitudinal bending moment by about 30% for One lane bridges. As the span length increases, the overestimation value decreases to 15% for span lengths greater than 46 ft. As the number of lanes increases from One to four, AASHTO starts to give approximate similar results of maximum bending moment, for span lengths greater than 36ft for four lane bridge.

However, for the case of negative moment loading condition, the LRFD method overestimated the maximum longitudinal bending moment by about 25% for One lane bridges. As the number of lanes increases from One to four, LRFD overestimation factor increase with the increase of number of lane. Noting that the overestimation factor is not depended on the span length and with the increase of number of lane the overestimation is similar for the different span length.

For the case of positive moment loading condition, the LRFD method overestimated the maximum longitudinal bending moment by about 30% for One lane bridges. As the number of lanes increases from One to four, LRFD overestimation factor increase with the increase of number of lane. Noting that the overestimation

factor is not depended on the span length and with the increase of number of lane the overestimation is similar for the different span length.

4.3.2 Concrete Bridges with One Railing "Case 2"

4.3.2.1 FEA Results versus AASHTO

4.3.2.1.1 Maximum Longitudinal Bending Moment

The maximum slab longitudinal bending moments are summarized in Tables 4.19 and 4.20 for the case on negative moment loading condition, and Tables 4.24 and 4.25 for the case on positive moment loading condition, for all "Case 2" bridges analyzed along with the corresponding AASHTO bending moments.

The AASHTO moments are computed using Eqs. (1) and (2) for the standard specifications, and Eq. (5) for LRFD.

Considering the case of negative moment loading condition. For One lane bridge, for span length of 24ft, AASHTO overestimate the moment by about 30% for all stiffness factors (x0.5, x1, x2, x3 and x4), for span length of 36ft AASHTO overestimate the moment by about 40% for all stiffness factors (x0.5, x1, x2, x3 and x4), for span length of 46ft AASHTO overestimation factor increase from 11% to 27% respectively with increase of stiffness factor, and for span length of 54ft AASHTO overestimation factor increase from 0% to 19% respectively with increase of stiffness factor. For two lane bridges, for span length of 24 and 36ft AASHTO overestimate the moment by about 20% for all stiffness factors (x0.5, x1, x2, x3 and x4), for span length of 46ft AASHTO underestimation factor decrease from 13% to 8% respectively with increase of stiffness factor, and for span length of 54ft AASHTO underestimation factor decrease from 25% to 18% respectively with increase of stiffness factor. For three and four lane bridges, for span length of 24ft AASHTO overestimate the moment by about 20% for all stiffness factors (x0.5, x1, x2, x3 and x4), for span length of 36ft AASHTO overestimate the moment by about 10% for all stiffness factors (x0.5, x1, x2, x3 and x4), for span length of 46ft AASHTO underestimate the moment by about 25% for all stiffness factors (x0.5, x1, x2, x3 and x4), and for

span length of 54ft AASHTO underestimate the moment by about 35% and 40% for all stiffness factors (x0.5, x1, x2, x3 and x4) respectively for three and four lane bridge.

Considering the case of positive moment loading condition. For One lane bridge, for span length of 24ft, AASHTO overestimation factor increase from 37% to 43% respectively with increase of stiffness factor, for span length of 36ft AASHTO overestimation factor increase from 34% to 50% respectively with increase of stiffness factor, for span length of 46ft AASHTO overestimation factor increase from 26% to 48% respectively with increase of stiffness factor, and for span length of 54ft AASHTO overestimation factor increase from 23% to 46% respectively with increase of stiffness factor. For two lane bridges, for span length of 24ft AASHTO overestimation factor increase from 20% to 23% respectively with increase of stiffness factor, for span length of 36ft AASHTO overestimation factor increase from 13% to 23% respectively with increase of stiffness factor, for span length of 46ft AASHTO overestimation factor increase from 6% to 20% respectively with increase of stiffness factor, and for span length of 54ft AASHTO overestimation factor increase from 3% to 19% respectively with increase of stiffness factor. For three and four lane bridges, for span length of 24ft AASHTO overestimate the moment by about 15% for all stiffness factors (x0.5, x1, x2, x3 and x4), for span length of 36ft AASHTO overestimate the moment by about 5% for three lane bridge and gives approximately same results for four lane bridge for all stiffness factors (x0.5, x1, x2, x3 and x4) , for span length of 46ft AASHTO gives approximately same results for three lane bridge and underestimate the moment by about 10% for all stiffness factors (x0.5, x1, x2, x3 and x4), and for span length of 54ft AASHTO gives approximately same results for three lane bridge and underestimate the moment by about 10% for all stiffness factors (x0.5, x1, x2, x3 and x4).

The maximum FEA longitudinal bending moments were also compared to AASHTO LRFD moments.

Considering the case of negative moment loading condition. For One lane bridge, for span length of 24ft, LRFD overestimate the moment by about 30% for all stiffness factors (x0.5, x1, x2, x3 and x4), for span length of 36ft LRFD overestimation factor increase from 36% to 44% respectively with increase of stiffness factor, for span length of 46ft LRFD overestimation factor increase from 28% to 41% respectively with increase of stiffness factor, and for span length of 54ft LRFD overestimation factor increase from 23% to 37% respectively with increase of stiffness factor. For two lane bridges, for span length of 24ft LRFD overestimate the moment by about 44% for all stiffness factors (x0.5, x1, x2, x3 and x4), for span length of 36ft LRFD overestimate the moment by about 50% for all stiffness factors (x0.5, x1, x2, x3 and x4) for span length of 46ft and 54ft LRFD overestimation factor increase from 48% to 51% respectively with increase of stiffness factor. For three lane bridges, for span length of 24ft LRFD overestimate the moment by about 57% for all stiffness factors (x0.5, x1, x2, x3 and x4), for span length of 36ft LRFD overestimate the moment by about 58% for all stiffness factors (x0.5, x1, x2, x3 and x4), for span length of 46ft LRFD overestimate the moment by about 57% for all stiffness factors (x0.5, x1, x2, x3 and x4), and for span length of 54ft LRFD overestimate the moment by about 58% for all stiffness factors (x0.5, x1, x2, x3 and x4). For four lane bridges, for span length of 24ft LRFD overestimate the moment by about 66% for all stiffness factors (x0.5, x1, x2, x3 and x4), for span length of 36ft and 46ft LRFD overestimate the moment by about 65% for all stiffness factors (x0.5, x1, x2, x3 and x4), for span length of 54ft LRFD overestimate the moment by about 66% for all stiffness factors (x0.5, x1, x2, x3 and x4).

Considering the case of positive moment loading condition. For One lane bridge, for span length of 24ft, LRFD overestimation factor increase from 41% to 46% respectively with increase

of stiffness factor, for span length of 36ft LRFD overestimation factor increase from 43% to 57% respectively with increase of stiffness factor, for span length of 46ft LRFD overestimation factor increase from 39% to 57% respectively with increase of stiffness factor, and for span length of 54ft LRFD overestimation factor increase from 35% to 55% respectively with increase of stiffness factor. For two lane bridges, for span length of 24ft overestimation factor increase from 52% to 54% respectively with increase of stiffness factor, for span length of 36ft LRFD overestimation factor increase from 57% to 62% respectively with increase of stiffness factor, for span length of 46ft LRFD overestimation factor increase from 58% to 64% respectively with increase of stiffness factor, for span length of 54ft LRFD overestimation factor increase from 57% to 64% respectively with increase of stiffness factor. For three lane bridges, for span length of 24ft LRFD overestimate the moment by about 62% for all stiffness factors (x0.5, x1, x2, x3 and x4), for span length of 36ft LRFD overestimation factor increase from 64% to 66% respectively with increase of stiffness factor, for span length of 46ft LRFD overestimation factor increase from 65% to 67% respectively with increase of stiffness factor, for span length of 54ft LRFD overestimation factor increase from 66% to 68% respectively with increase of stiffness factor. For four lane bridges, for span length of 24ft LRFD overestimate the moment by about 69% for all stiffness factors (x0.5, x1, x2, x3 and x4), for span length of 36ft LRFD overestimate the moment by about 70% for all stiffness factors (x0.5, x1, x2, x3 and x4), for span length of 46ft LRFD overestimate the moment by about 72% for all stiffness factors (x0.5, x1, x2, x3 and x4), for span length of 54ft LRFD overestimate the moment by about 73% for all stiffness factors (x0.5, x1, x2, x3 and x4).

4.3.2.1.2 Maximum Edge Beam Moment

The maximum edge beam longitudinal moments are summarized in Tables 4.21 and 4.22 for the case on negative moment loading condition, and Tables 4.26 and 4.27 for the case on

positive moment loading condition. The AASHTO moments are computed using eqs.(1) and (2) for the standard specifications, and eq.(5) for LRFD.

Considering the case of negative moment loading condition. For One lane bridge, for span length of 24ft, AASHTO overestimate the moment by about 34% for all stiffness factors (x0.5, x1, x2, x3 and x4), for span length of 36ft AASHTO overestimation factor increase from 43% to 47% respectively with increase of stiffness factor, for span length of 46ft AASHTO overestimation factor increase from 23% to 33% respectively with increase of stiffness factor, and for span length of 54ft AASHTO overestimation factor increase from 12% to 24% respectively with increase of stiffness factor. For two lane bridges, for span length of 24 and 36ft AASHTO overestimate the moment by about 28% for all stiffness factors (x0.5, x1, x2, x3 and x4), for span length of 46ft AASHTO overestimation factor increase from 3% to 5% respectively with increase of stiffness factor, and for span length of 54ft AASHTO underestimation factor decrease from 9% to 6% respectively with increase of stiffness factor. For three and four lane bridges, for span length of 24ft AASHTO overestimate the moment by about 27% for all stiffness factors (x0.5, x1, x2, x3 and x4), for span length of 36ft AASHTO overestimate the moment by about 25% for all stiffness factors (x0.5, x1, x2, x3 and x4), for span length of 46ft AASHTO underestimate the moment by about 5% for three lane bridge and 8% for four lane bridge for all stiffness factors (x0.5, x1, x2, x3 and x4), and for span length of 54ft AASHTO underestimate the moment by about 18% and 23% for all stiffness factors (x0.5, x1, x2, x3 and x4) respectively for three and four lane bridge.

Considering the case of positive moment loading condition. For One lane bridge, for span length of 24ft, AASHTO overestimation factor increase from 33% to 38% respectively with increase of stiffness factor, for span length of 36ft AASHTO overestimation factor increase from 34% to 48% respectively with increase of stiffness factor, for span length of 46ft AASHTO

overestimation factor increase from 30% to 48% respectively with increase of stiffness factor, and for span length of 54ft AASHTO overestimation factor increase from 26% to 46% respectively with increase of stiffness factor. For two lane bridges, for span length of 24ft AASHTO overestimation factor increase from 23% to 24% respectively with increase of stiffness factor, for span length of 36ft AASHTO overestimation factor increase from 18% to 25% respectively with increase of stiffness factor, for span length of 46ft AASHTO overestimation factor increase from 13% to 25% respectively with increase of stiffness factor, and for span length of 54ft AASHTO overestimation factor increase from 9% to 25% respectively with increase of stiffness factor. For three and four lane bridges, for span length of 24ft AASHTO overestimate the moment by about 20% for all stiffness factors (x0.5, x1, x2, x3 and x4), for span length of 36ft AASHTO overestimate the moment by about 13% and 8% for all stiffness factors (x0.5, x1, x2, x3 and x4) respectively for three and four lane bridge , for span length of 46ft AASHTO overestimate the moment by about 10% for all stiffness factors (x0.5, x1, x2, x3 and x4) for three lane bridge and gives approximately same results for four lane bridge, and for span length of 54ft AASHTO overestimation factor increase from 2% to 9% respectively with increase of stiffness factor for three lane bridge and underestimation factor decrease form 18% to 14% % respectively with increase of stiffness factor.

The maximum FEA longitudinal edge beam moments were also compared to the AASHTO LRFD moments. Considering the case of negative moment loading condition. For One lane bridge, for span length of 24ft, LRFD underestimate the moment by about 50% for all stiffness factors (x0.5, x1, x2, x3 and x4), for span length of 36ft LRFD overestimation factor increase from 4% to 11% respectively with increase of stiffness factor, for span length of 46ft LRFD underestimate the moment for stiffness factor less than x3 respectively from 9% to 0% than overestimate the moment for stiffness factor greater than x3, and for span length of 54ft

LRFD underestimate the moment for stiffness factor less than x3 respectively from 11% to 2% than overestimate the moment for stiffness factor greater than x3. For two lane bridges, for span length of 24 and 36ft LRFD underestimate the moment respectively by about 82% and 23% for all stiffness factors (x0.5, x1, x2, x3 and x4), for span length of 46ft LRFD underestimation factor decrease from 34% to 31% respectively with increase of stiffness factor, and for span length of 54ft LRFD underestimation factor decrease from 30% to 26% respectively with increase of stiffness factor. For three and four lane bridges, for span length of 24ft LRFD underestimate the moment by about 88% and 93% respectively for three and four lane bridge for all stiffness factors (x0.5, x1, x2, x3 and x4), for span length of 36ft LRFD underestimate the moment by about 36 and 41% respectively for three and four lane bridge for all stiffness factors (x0.5, x1, x2, x3 and x4), for span length of 46ft LRFD underestimate the moment by about 51% and 55% for three and four lane bridge for all stiffness factors (x0.5, x1, x2, x3 and x4), and for span length of 54ft LRFD underestimate the moment by about 45% and 52% respectively for three and four lane bridge for all stiffness factors (x0.5, x1, x2, x3 and x4).

Considering the case of positive moment loading condition. For One lane bridge, for span length of 24ft, LRFD overestimation factor increase from 11% to 17% respectively with increase of stiffness factor, for span length of 36ft LRFD overestimation factor increase from 24% to 40% respectively with increase of stiffness factor, for span length of 46ft LRFD overestimation factor increase from 25% to 44% respectively with increase of stiffness factor, and for span length of 54ft LRFD overestimation factor increase from 23% to 43% respectively with increase of stiffness factor. For two lane bridges, for span length of 24ft underestimation factor decrease from 11% to 9% respectively with increase of stiffness factor, for span length 36ft LRFD overestimation factor increase from 3% to 12% respectively with increase of stiffness factor, for span length of 46ft LRFD overestimation factor increase from 8% to 21% respectively with

increase of stiffness factor, and for span length of 54ft LRFD overestimation factor increase from 9% to 23% respectively with increase of stiffness factor. For three and four lane bridges, for span length of 24ft LRFD underestimate the moment by about 20% and 26% respectively for three and four lane bridge for all stiffness factors (x0.5, x1, x2, x3 and x4), for span length of 36ft LRFD underestimate the moment by about 7% and 17% respectively for three and four lane bridge for all stiffness factors (x0.5, x1, x2, x3 and x4), for span length of 46ft LRFD give approximately same result for three lane bridge and underestimate the moment by 8% for four lane bridge for all stiffness factors (x0.5, x1, x2, x3 and x4), and for span length of 54ft LRFD give approximately same result for three and four lane bridge for all stiffness factors (x0.5, x1, x2, x3 and x4).

4.3.2.1.3 Maximum Live Load Deflection

Table 4.23 and 4.28 summarizes the maximum FEA live load deflection respectively for negative and positive loading condition as compared to the AASHTO criterion of (*S*/800). The FEA results are directly related to the assumed slab thickness, which was a reasonable assumption for deflection control. But One can always assume a different thickness and obtain different deflection results.

Considering the case of negative moment loading condition, for 24ft span bridge, AASHTO overestimates the maximum deflection by about 95% for all lane number and for all stiffness factors (x0.5, x1, x2, x3, x4). For span length greater than 24ft, AASHTO overestimation factor decrease from about 85% to 70% as the lane numbers increase from 1 to 4. The overestimation value by AASHTO increases slightly as the stiffness factor increases from x0.5 to x4. However, the percent difference decreases as the number of lanes increases from One to four lane.

Considering the case of positive moment loading condition, for 24ft span bridge, AASHTO overestimation factor decrease from about 90% to 85% as the lane numbers increase from 1 to 4.

for 36ft span bridge, AASHTO overestimation factor decrease from about 80% to 65% as the lane numbers increase from 1 to 4. For span length greater than 36ft, AASHTO overestimation factor decrease from about 80% to 60% as the lane numbers increase from 1 to 4. The overestimation value by AASHTO increases slightly as the stiffness factor increases from x0.5 to x4 when the span length increase from 24ft to 54ft. However, the percent difference decreases as the number of lanes increases from One to four lane.

Table 4. 19: Comparison of FEA Maximum Longitudinal Bending Moment in Negative Moment Loading Case with AASHTO Moment

No. of lanes n	Span length (ft)	Stiffness Factor										AASHTO Moment (kip.ft/ft)
		x1		x2		x3		x4		x0.5		
1	24	14.6	-32%	14.5	-33%	14.5	-33%	14.4	-33%	14.7	-32%	21.6
	36	19.6	-40%	18.6	-43%	18.2	-44%	17.9	-45%	20.5	-37%	32.4
	46	34.9	-16%	32.6	-21%	31.2	-25%	30.2	-27%	36.7	-11%	41.4
	54	47.8	-5%	44.6	-11%	42.5	-15%	40.9	-19%	50.1	0%	50.2
2	24	17	-21%	17	-21%	17	-21%	17.1	-21%	17	-21%	21.6
	36	26.5	-18%	26.3	-19%	26.2	-19%	26.1	-19%	26.7	-18%	32.4
	46	46.3	12%	45.5	10%	44.9	8%	44.6	8%	46.9	13%	41.4
	54	62	24%	60.8	21%	59.9	19%	59.2	18%	62.8	25%	50.2
3	24	17.3	-20%	17.3	-20%	17.3	-20%	17.3	-20%	17.3	-20%	21.6
	36	28.6	-12%	28.7	-11%	28.7	-11%	28.7	-11%	28.6	-12%	32.4
	46	50.9	23%	50.9	23%	50.8	23%	50.8	23%	51	23%	41.4
	54	67.1	34%	66.8	33%	66.5	32%	66.3	32%	67.4	34%	50.2
4	24	17.3	-20%	17.3	-20%	17.3	-20%	17.3	-20%	17.3	-20%	21.6
	36	29.1	-10%	29.2	-10%	29.2	-10%	29.2	-10%	29.1	-10%	32.4
	46	52.1	26%	52.2	26%	52.2	26%	52.2	26%	52.1	26%	41.4
	54	70.3	40%	70.3	40%	70.3	40%	70.2	40%	70.3	40%	50.2

Table 4. 20: Comparison of FEA Maximum Longitudinal Bending Moment in Negative Moment Loading Case with LRFD Moment

No. of lanes n	Span length (ft)	Stiffness Factor										LRFD Moment (kip.ft/ft)
		x1		x2		x3		x4		x0.5		
1	24	14.6	-29%	14.5	-29%	14.5	-29%	14.4	-30%	14.7	-28%	20.5
	36	19.6	-39%	18.6	-42%	18.2	-43%	17.9	-44%	20.5	-36%	31.9
	46	34.9	-31%	32.6	-36%	31.2	-39%	30.2	-41%	36.7	-28%	50.9
	54	47.8	-26%	44.6	-31%	42.5	-35%	40.9	-37%	50.1	-23%	64.9
2	24	17	-44%	17	-44%	17	-44%	17.1	-44%	17	-44%	30.5
	36	26.5	-49%	26.3	-49%	26.2	-50%	26.1	-50%	26.7	-49%	52
	46	46.3	-49%	45.5	-50%	44.9	-50%	44.6	-51%	46.9	-48%	90.3
	54	62	-48%	60.8	-49%	59.9	-50%	59.2	-51%	62.8	-48%	120.2
3	24	17.3	-57%	17.3	-57%	17.3	-57%	17.3	-57%	17.3	-57%	40.7
	36	28.6	-58%	28.7	-58%	28.7	-58%	28.7	-58%	28.6	-58%	67.9
	46	50.9	-57%	50.9	-57%	50.8	-57%	50.8	-57%	51	-57%	118.1
	54	67.1	-58%	66.8	-58%	66.5	-59%	66.3	-59%	67.4	-58%	160.4
4	24	17.3	-66%	17.3	-66%	17.3	-66%	17.3	-66%	17.3	-66%	50.3
	36	29.1	-65%	29.2	-65%	29.2	-65%	29.2	-65%	29.1	-65%	82.6
	46	52.1	-66%	52.2	-65%	52.2	-65%	52.2	-65%	52.1	-66%	151.3
	54	70.3	-66%	70.3	-66%	70.3	-66%	70.2	-66%	70.3	-66%	207.4

Table 4. 21: Comparison of FEA Edge Beam Moment in Negative Moment Loading Case with AASHTO Moment

No. of lanes n	Span length (ft)	Stiffness Factor										AASHTO Moment (kip.ft/ft)
		x1		x2		x3		x4		x0.5		
1	24	16.8	-34%	16.8	-34%	16.8	-34%	16.8	-34%	16.9	-34%	25.6
	36	21.4	-44%	20.8	-46%	20.4	-47%	20.2	-47%	22	-43%	38.4
	46	36.6	-25%	34.9	-29%	33.8	-31%	33.1	-33%	38	-23%	49.1
	54	49.1	-15%	46.7	-19%	45	-22%	43.9	-24%	50.9	-12%	57.6
2	24	18.7	-27%	18.7	-27%	18.7	-27%	18.7	-27%	18.7	-27%	25.6
	36	27.7	-28%	27.6	-28%	27.6	-28%	27.6	-28%	27.7	-28%	38.4
	46	47.4	-3%	47.1	-4%	46.8	-5%	46.7	-5%	47.7	-3%	49.1
	54	62.5	9%	61.8	7%	61.4	7%	61	6%	62.9	9%	57.6
3	24	18.8	-27%	18.8	-27%	18.8	-27%	18.8	-27%	18.8	-27%	25.6
	36	29.2	-24%	29.3	-24%	29.3	-24%	29.3	-24%	29.2	-24%	38.4
	46	51.3	4%	51.4	5%	51.5	5%	51.5	5%	51.2	4%	49.1
	54	68	18%	67.8	18%	67.7	18%	67.6	17%	68.1	18%	57.6
4	24	18.7	-27%	18.7	-27%	18.7	-27%	18.7	-27%	18.7	-27%	25.6
	36	29.4	-23%	29.4	-23%	29.4	-23%	29.4	-23%	29.4	-23%	38.4
	46	52.7	7%	52.7	7%	52.8	8%	52.8	8%	52.7	7%	49.1
	54	70.8	23%	70.8	23%	70.9	23%	70.9	23%	70.7	23%	57.6

Table 4. 22: Comparison of FEA Edge Beam Moment in Negative Moment Loading Case with LRFD Moment

No. of lanes n	Span length (ft)	Stiffness Factor										LRFD Moment (kip.ft/ft)
		x1		x2		x3		x4		x0.5		
1	24	16.8	50%	16.8	50%	16.8	50%	16.8	50%	16.9	51%	11.2
	36	21.4	-6%	20.8	-9%	20.4	-11%	20.2	-11%	22	-4%	22.8
	46	36.6	5%	34.9	0%	33.8	-3%	33.1	-5%	38	9%	34.9
	54	49.1	7%	46.7	2%	45	-2%	43.9	-5%	50.9	11%	46
2	24	18.7	82%	18.7	82%	18.7	82%	18.7	82%	18.7	82%	10.3
	36	27.7	24%	27.6	23%	27.6	23%	27.6	23%	27.7	24%	22.4
	46	47.4	33%	47.1	32%	46.8	31%	46.7	31%	47.7	34%	35.7
	54	62.5	29%	61.8	28%	61.4	27%	61	26%	62.9	30%	48.3
3	24	18.8	88%	18.8	88%	18.8	88%	18.8	88%	18.8	88%	10
	36	29.2	36%	29.3	36%	29.3	36%	29.3	36%	29.2	36%	21.5
	46	51.3	50%	51.4	51%	51.5	51%	51.5	51%	51.2	50%	34.1
	54	68	46%	67.8	45%	67.7	45%	67.6	45%	68.1	46%	46.7
4	24	18.7	93%	18.7	93%	18.7	93%	18.7	93%	18.7	93%	9.7
	36	29.4	41%	29.4	41%	29.4	41%	29.4	41%	29.4	41%	20.8
	46	52.7	55%	52.7	55%	52.8	56%	52.8	56%	52.7	55%	33.9
	54	70.8	52%	70.8	52%	70.9	52%	70.9	52%	70.7	51%	46.7

Table 4. 23: Comparison of FEA Maximum Live Load Deflection in Negative Moment Loading Case with AASHTO Criterion

No. of lanes n	Span length (ft)	Stiffness Factor										AASHTO Deflection (in)
		x1		x2		x3		x4		x0.5		
1	24	0.021	-94%	0.021	-94%	0.021	-94%	0.021	-94%	0.021	-94%	0.360
	36	0.096	-82%	0.088	-84%	0.083	-85%	0.081	-85%	0.104	-81%	0.540
	46	0.121	-82%	0.109	-84%	0.102	-85%	0.098	-86%	0.130	-81%	0.690
	54	0.144	-82%	0.130	-84%	0.121	-85%	0.114	-86%	0.154	-81%	0.810
2	24	0.026	-93%	0.026	-93%	0.026	-93%	0.026	-93%	0.026	-93%	0.360
	36	0.134	-75%	0.130	-76%	0.128	-76%	0.127	-76%	0.138	-74%	0.540
	46	0.165	-76%	0.160	-77%	0.156	-77%	0.154	-78%	0.169	-76%	0.690
	54	0.193	-76%	0.185	-77%	0.180	-78%	0.176	-78%	0.198	-76%	0.810
3	24	0.027	-93%	0.027	-93%	0.027	-93%	0.027	-93%	0.027	-93%	0.360
	36	0.150	-72%	0.149	-72%	0.148	-73%	0.148	-73%	0.151	-72%	0.540
	46	0.185	-73%	0.183	-73%	0.182	-74%	0.182	-74%	0.186	-73%	0.690
	54	0.214	-74%	0.212	-74%	0.210	-74%	0.206	-75%	0.216	-73%	0.810
4	24	0.027	-93%	0.027	-93%	0.027	-93%	0.027	-93%	0.027	-93%	0.360
	36	0.156	-71%	0.156	-71%	0.156	-71%	0.156	-71%	0.157	-71%	0.540
	46	0.194	-72%	0.194	-72%	0.194	-72%	0.193	-72%	0.194	-72%	0.690
	54	0.227	-72%	0.226	-72%	0.225	-72%	0.225	-72%	0.227	-72%	0.810

Table 4. 24: Comparison of FEA Maximum Longitudinal Bending Moment in Positive Moment Loading Case with AASHTO Moment

No. of lanes n	Span length (ft)	Stiffness Factor										AASHTO Moment (kip.ft/ft)
		x1		x2		x3		x4		x0.5		
1	24	13.3	-38%	12.8	-41%	12.6	-42%	12.4	-43%	13.6	-37%	21.6
	36	19.7	-39%	17.9	-45%	16.9	-48%	16.3	-50%	21.4	-34%	32.4
	46	28.2	-32%	24.9	-40%	22.9	-45%	21.5	-48%	30.7	-26%	41.4
	54	36.1	-28%	32	-36%	29.3	-42%	27.3	-46%	38.9	-23%	50.2
2	24	16.9	-22%	16.7	-23%	16.6	-23%	16.6	-23%	17.2	-20%	21.6
	36	27.2	-16%	25.9	-20%	25.2	-22%	24.8	-23%	28.2	-13%	32.4
	46	37.7	-9%	35.6	-14%	34.2	-17%	33.3	-20%	39.1	-6%	41.4
	54	47	-6%	44.3	-12%	42.4	-16%	40.9	-19%	48.7	-3%	50.2
3	24	18.5	-14%	18.4	-15%	18.4	-15%	18.4	-15%	18.5	-14%	21.6
	36	30.9	-5%	30.4	-6%	30.2	-7%	30	-7%	31.2	-4%	32.4
	46	42.3	2%	41.2	0%	40.5	-2%	40	-3%	43	4%	41.4
	54	51.7	3%	50.5	1%	49.5	-1%	48.7	-3%	52.6	5%	50.2
4	24	18.8	-13%	18.8	-13%	18.8	-13%	18.8	-13%	18.9	-13%	21.6
	36	32.6	1%	32.4	0%	32.3	0%	32.3	0%	32.7	1%	32.4
	46	45.1	9%	44.7	8%	44.4	7%	44.2	7%	45.4	10%	41.4
	54	55.1	10%	54.4	8%	53.9	7%	53.5	7%	55.5	11%	50.2

Table 4. 25: Comparison of FEA Maximum Longitudinal Bending Moment in Positive Moment Loading Case with LRFD Moment

No. of lanes n	Span length (ft)	Stiffness Factor										LRFD Moment (kip.ft/ft)
		x1		x2		x3		x4		x0.5		
1	24	13.3	-42%	12.8	-44%	12.6	-45%	12.4	-46%	13.6	-41%	23
	36	19.7	-47%	17.9	-52%	16.9	-55%	16.3	-57%	21.4	-43%	37.5
	46	28.2	-44%	24.9	-50%	22.9	-54%	21.5	-57%	30.7	-39%	50.2
	54	36.1	-40%	32	-47%	29.3	-51%	27.3	-55%	38.9	-35%	60
2	24	16.9	-53%	16.7	-53%	16.6	-54%	16.6	-54%	17.2	-52%	35.8
	36	27.2	-58%	25.9	-60%	25.2	-61%	24.8	-62%	28.2	-57%	65.1
	46	37.7	-59%	35.6	-62%	34.2	-63%	33.3	-64%	39.1	-58%	92.5
	54	47	-59%	44.3	-61%	42.4	-63%	40.9	-64%	48.7	-57%	114.4
3	24	18.5	-62%	18.4	-62%	18.4	-62%	18.4	-62%	18.5	-62%	48.7
	36	30.9	-65%	30.4	-65%	30.2	-65%	30	-66%	31.2	-64%	87.3
	46	42.3	-66%	41.2	-66%	40.5	-67%	40	-67%	43	-65%	122.8
	54	51.7	-67%	50.5	-67%	49.5	-68%	48.7	-68%	52.6	-66%	154.5
4	24	18.8	-69%	18.8	-69%	18.8	-69%	18.8	-69%	18.9	-69%	60.7
	36	32.6	-70%	32.4	-70%	32.3	-70%	32.3	-70%	32.7	-70%	107.7
	46	45.1	-72%	44.7	-72%	44.4	-72%	44.2	-72%	45.4	-71%	158.5
	54	55.1	-73%	54.4	-73%	53.9	-73%	53.5	-73%	55.5	-72%	201

Table 4. 26: Comparison of FEA Edge Beam Moment in Positive Moment Loading Case with AASHTO Moment

No. of lanes n	Span length (ft)	Stiffness Factor										AASHTO Moment (kip.ft/ft)
		x1		x2		x3		x4		x0.5		
1	24	16.9	-34%	16.5	-36%	16.2	-37%	16	-38%	17.2	-33%	25.6
	36	23.5	-39%	21.7	-43%	20.7	-46%	20.1	-48%	25.2	-34%	38.4
	46	31.9	-35%	28.7	-42%	26.7	-46%	25.4	-48%	34.4	-30%	49.1
	54	39.8	-31%	35.8	-38%	33.1	-43%	31.1	-46%	42.6	-26%	57.6
2	24	19.6	-23%	19.5	-24%	19.4	-24%	19.4	-24%	19.8	-23%	25.6
	36	30.7	-20%	29.8	-22%	29.2	-24%	28.8	-25%	31.6	-18%	38.4
	46	41.3	-16%	39.3	-20%	38	-23%	37	-25%	42.8	-13%	49.1
	54	50.7	-12%	48.1	-16%	46.2	-20%	44.7	-22%	52.4	-9%	57.6
3	24	20.7	-19%	20.7	-19%	20.7	-19%	20.6	-20%	20.7	-19%	25.6
	36	34	-11%	33.6	-13%	33.4	-13%	33.3	-13%	34.2	-11%	38.4
	46	45.8	-7%	45	-8%	44.4	-10%	44	-10%	46.5	-5%	49.1
	54	55.5	-4%	54.3	-6%	53.2	-8%	52.6	-9%	56.3	-2%	57.6
4	24	21	-18%	21	-18%	21	-18%	21	-18%	21	-18%	25.6
	36	35.4	-8%	35.3	-8%	35.2	-8%	35.2	-8%	35.5	-8%	38.4
	46	48.3	-2%	47.9	-2%	47.7	-3%	47.7	-3%	48.7	-1%	49.1
	54	58.7	17%	58.1	16%	57.7	15%	57.3	14%	59.1	18%	57.6

Table 4. 27: Comparison of FEA Edge Beam Moment in Positive Moment Loading Case with LRFD Moment

No. of lanes n	Span length (ft)	Stiffness Factor										LRFD Moment (kip.ft/ft)
		x1		x2		x3		x4		x0.5		
1	24	16.9	-12%	16.5	-15%	16.2	-16%	16	-17%	17.2	-11%	19.3
	36	23.5	-29%	21.7	-35%	20.7	-38%	20.1	-40%	25.2	-24%	33.3
	46	31.9	-30%	28.7	-37%	26.7	-42%	25.4	-44%	34.4	-25%	45.7
	54	39.8	-28%	35.8	-35%	33.1	-40%	31.1	-43%	42.6	-23%	55
2	24	19.6	10%	19.5	10%	19.4	9%	19.4	9%	19.8	11%	17.8
	36	30.7	-6%	29.8	-9%	29.2	-11%	28.8	-12%	31.6	-3%	32.7
	46	41.3	-12%	39.3	-16%	38	-19%	37	-21%	42.8	-8%	46.7
	54	50.7	-12%	48.1	-17%	46.2	-20%	44.7	-23%	52.4	-9%	57.8
3	24	20.7	20%	20.7	20%	20.7	20%	20.6	20%	20.7	20%	17.2
	36	34	8%	33.6	7%	33.4	6%	33.3	6%	34.2	9%	31.4
	46	45.8	3%	45	1%	44.4	0%	44	-1%	46.5	4%	44.6
	54	55.5	-1%	54.3	-3%	53.2	-5%	52.6	-6%	56.3	1%	55.8
4	24	21	26%	21	26%	21	26%	21	26%	21	26%	16.7
	36	35.4	17%	35.3	17%	35.2	16%	35.2	16%	35.5	17%	30.3
	46	48.3	9%	47.9	8%	47.7	8%	47.7	8%	48.7	10%	44.3
	54	58.7	5%	58.1	4%	57.7	3%	57.3	3%	59.1	6%	55.8

Table 4. 28: Comparison of FEA Maximum Live Load Deflection in Positive Moment Loading Case with AASHTO Criterion

No. of lanes n	Span length (ft)	Stiffness Factor										AASHTO Deflection (in)
		x1		x2		x3		x4		x0.5		
1	24	0.046	-87%	0.044	-88%	0.043	-88%	0.042	-88%	0.047	-87%	0.360
	36	0.114	-79%	0.102	-81%	0.096	-82%	0.092	-83%	0.125	-77%	0.540
	46	0.177	-74%	0.156	-77%	0.142	-79%	0.133	-81%	0.194	-72%	0.690
	54	0.220	-73%	0.194	-76%	0.176	-78%	0.163	-80%	0.239	-70%	0.810
2	24	0.057	-84%	0.056	-84%	0.056	-84%	0.056	-84%	0.058	-84%	0.360
	36	0.161	-70%	0.154	-71%	0.151	-72%	0.148	-73%	0.166	-69%	0.540
	46	0.243	-65%	0.229	-67%	0.220	-68%	0.213	-69%	0.253	-63%	0.690
	54	0.292	-64%	0.275	-66%	0.262	-68%	0.253	-69%	0.303	-63%	0.810
3	24	0.061	-83%	0.061	-83%	0.061	-83%	0.061	-83%	0.061	-83%	0.360
	36	0.181	-66%	0.179	-67%	0.178	-67%	0.177	-67%	0.183	-66%	0.540
	46	0.273	-60%	0.267	-61%	0.263	-62%	0.260	-62%	0.277	-60%	0.690
	54	0.324	-60%	0.315	-61%	0.309	-62%	0.304	-62%	0.329	-59%	0.810
4	24	0.063	-83%	0.063	-83%	0.063	-83%	0.063	-83%	0.063	-83%	0.360
	36	0.191	-65%	0.190	-65%	0.190	-65%	0.190	-65%	0.192	-64%	0.540
	46	0.291	-58%	0.288	-58%	0.286	-59%	0.285	-59%	0.292	-58%	0.690
	54	0.344	-58%	0.340	-58%	0.337	-58%	0.335	-59%	0.347	-57%	0.810

4.3.2.2 FEA Results of Bridges with different railing sizes versus Bridges with no railing

4.3.2.2.1 Maximum Longitudinal Bending Moment

The ratios M1/xj /M0/x0 for the maximum longitudinal moment are shown in Table 4.29, 4.32 and Figure 4.9, 4.12 respectively for negative and positive loading condition, for each of the four span lengths considered (24, 36, 46, and 54 ft) versus the railing's stiffness factor. Such Table/Figure indicates a decrease in the maximum longitudinal bending moment values with the increase in the stiffness factor, compared to that of bridges with no railing. This decrease appears to be significant when the span length is 36ft and 46ft. Also, the ratio M1/xj / M0/x0 increase with the increase in the number of lanes from One to four, which indicate that railing stiffness is less effective as the number of lane (width) of the bridge increase. This results are common for positive and negative moment loading condition.

4.3.2.2.2 Edge beam moment

The ratios M1/xj/M0/x0 for the edge beam moment are shown in Table 4.30 and Table 4.33 and Figure 4.10, 4.13 respectively for negative and positive loading condition, for each of the four span lengths considered (24, 36, 46, and 54 ft) versus the railing's stiffness factor. Such Table/ Figure indicate a decrease in edge beam moment values with the increase in the stiffness factor, compared to that of bridges with no railing. The ratio M1/xj /M0/x0 increase with the increase in the number of lanes from One to four, which also indicate that railing stiffness is less effective as the number of lane (width) of the bridge increase. This results are common for positive and negative moment loading condition.

4.3.2.2.3 Maximum Live Load Deflection

The ratio Δ1/xj / Δ0/x0 values obtained are presented in Table 4.31 and Table 4.34 and Figure 4.11, 4.14 respectively for negative and positive loading condition, for each of the four span lengths considered (24, 36, 46, and 54 ft). These values indicate that the maximum live load

deflection for bridges with different railings sizes compared to that of bridges without railings decreases with the increase in the railing's stiffness factor for all span lengths and the number of lanes. The ratio $\Delta 1/xj$ / $\Delta 0/x0$ increase with the increase in the number of lanes from One to four, which also indicate that railing stiffness is less effective as the number of lane (width) of the bridge increase. This results are common for positive and negative moment loading condition.

Table 4. 29: FEA Maximum Longitudinal Bending Moment – Ratio M1/xj / M0/x0 in Negative Moment Loading Case

No. of lanes n	Span length (ft)	Stiffness Factor										M0/x0 (Reference Moment)
		x1		x2		x3		x4		x0.5		
1	24	14.6	0.97	14.5	0.96	14.5	0.96	14.4	0.95	14.7	0.97	15.1
	36	19.6	0.89	18.6	0.84	18.2	0.82	17.9	0.81	20.5	0.93	22.1
	46	34.9	0.88	32.6	0.82	31.2	0.79	30.2	0.76	36.7	0.93	39.6
	54	47.8	0.91	44.6	0.85	42.5	0.81	40.9	0.78	50.1	0.96	52.4
2	24	17	0.99	17	0.99	17	0.99	17.1	1	17	0.99	17.1
	36	26.5	0.98	26.3	0.97	26.2	0.97	26.1	0.96	26.7	0.99	27.1
	46	46.3	0.97	45.5	0.95	44.9	0.94	44.6	0.93	46.9	0.98	47.8
	54	62	0.98	60.8	0.96	59.9	0.95	59.2	0.94	62.8	0.99	63.3
3	24	17.3	1	17.3	1	17.3	1	17.3	1	17.3	1	17.3
	36	28.6	1	28.7	1	28.7	1	28.7	1	28.6	1	28.6
	46	50.9	1	50.9	1	50.8	0.99	50.8	0.99	51	1	51.1
	54	67.1	0.99	66.8	0.99	66.5	0.98	66.3	0.98	67.4	1	67.7
4	24	17.3	1	17.3	1	17.3	1	17.3	1	17.3	1	17.3
	36	29.1	1	29.2	1	29.2	1	29.2	1	29.1	1	29.1
	46	52.1	1	52.2	1	52.2	1	52.2	1	52.1	1	52.1
	54	70.3	1	70.3	1	70.3	1	70.2	1	70.3	1	70.4

Table 4. 30: FEA Edge Beam Moment – Ratio M1/xj / M0/x0 in Negative Moment Loading Case

No. of lanes n	Span length (ft)	Stiffness Factor										M0/x0 (Reference Moment)
		x1		x2		x3		x4		x0.5		
1	24	16.8	0.98	16.8	0.98	16.8	0.98	16.8	0.98	16.9	0.99	17.1
	36	21.4	0.92	20.8	0.9	20.4	0.88	20.2	0.87	22	0.95	23.2
	46	36.6	0.91	34.9	0.87	33.8	0.84	33.1	0.82	38	0.95	40.2
	54	49.1	0.92	46.7	0.88	45	0.84	43.9	0.82	50.9	0.95	53.3
2	24	18.7	1	18.7	1	18.7	1	18.7	1	18.7	1	18.6
	36	27.7	1	27.6	1	27.6	1	27.6	1	27.7	1	27.7
	46	47.4	0.99	47.1	0.98	46.8	0.97	46.7	0.97	47.7	0.99	48.1
	54	62.5	0.98	61.8	0.97	61.4	0.96	61	0.95	62.9	0.98	63.9
3	24	18.8	1	18.8	1	18.8	1	18.8	1	18.8	1	18.8
	36	29.2	1	29.3	1	29.3	1	29.3	1	29.2	1	29
	46	51.3	1	51.4	1	51.5	1	51.5	1	51.2	1	51.1
	54	68	1	67.8	0.99	67.7	0.99	67.6	0.99	68.1	1	68.3
4	24	18.7	1	18.7	1	18.7	1	18.7	1	18.7	1	18.7
	36	29.4	1	29.4	1	29.4	1	29.4	1	29.4	1	29.3
	46	52.7	1	52.7	1	52.8	1	52.8	1	52.7	1	52.6
	54	70.8	1	70.8	1	70.9	1	70.9	1	70.7	1	70.7

Table 4. 31: FEA Maximum Live Load Deflection – Ratio Δ1/xj / Δ0/x0 in Negative Moment Loading Case

No. of lanes n	Span length (ft)	Stiffness Factor										Δ0/x0 (Reference Deflection)
		x1		x2		x3		x4		x0.5		
1	24	0.021	0.95	0.021	0.95	0.021	0.95	0.021	0.95	0.021	0.95	0.022
	36	0.096	0.82	0.088	0.75	0.083	0.71	0.081	0.69	0.104	0.89	0.117
	46	0.121	0.85	0.109	0.76	0.102	0.71	0.098	0.69	0.130	0.91	0.143
	54	0.144	0.86	0.130	0.77	0.121	0.72	0.114	0.68	0.154	0.92	0.168
2	24	0.026	1	0.026	1	0.026	1	0.026	1	0.026	1	0.026
	36	0.134	0.94	0.130	0.91	0.128	0.9	0.127	0.89	0.138	0.97	0.143
	46	0.165	0.94	0.160	0.91	0.156	0.89	0.154	0.88	0.169	0.97	0.175
	54	0.193	0.95	0.185	0.91	0.180	0.88	0.176	0.86	0.198	0.97	0.204
3	24	0.027	1	0.027	1	0.027	1	0.027	1	0.027	1	0.027
	36	0.150	0.99	0.149	0.98	0.148	0.97	0.148	0.97	0.151	0.99	0.152
	46	0.185	0.98	0.183	0.97	0.182	0.97	0.182	0.97	0.186	0.99	0.188
	54	0.214	0.98	0.212	0.97	0.210	0.96	0.206	0.94	0.216	0.99	0.218
4	24	0.027	1	0.027	1	0.027	1	0.027	1	0.027	1	0.027
	36	0.156	0.99	0.156	0.99	0.156	0.99	0.156	0.99	0.157	1	0.157
	46	0.194	0.99	0.194	0.99	0.194	0.99	0.193	0.99	0.194	0.99	0.195
	54	0.227	1	0.226	0.99	0.225	0.99	0.225	0.99	0.227	1	0.228

Table 4. 32: FEA Maximum Longitudinal Bending Moment – Ratio M1/xj / M0/x0 in Positive Moment Loading Case

No. of lanes n	Span length (ft)	Stiffness Factor										M0/x0 (Reference Moment)
		x1		x2		x3		x4		x0.5		
1	24	13.3	0.94	12.8	0.91	12.6	0.89	12.4	0.88	13.6	0.96	14.1
	36	19.7	0.81	17.9	0.74	16.9	0.7	16.3	0.67	21.4	0.88	24.3
	46	28.2	0.82	24.9	0.72	22.9	0.67	21.5	0.63	30.7	0.89	34.4
	54	36.1	0.85	32	0.75	29.3	0.69	27.3	0.64	38.9	0.91	42.6
2	24	16.9	0.97	16.7	0.95	16.6	0.95	16.6	0.95	17.2	0.98	17.5
	36	27.2	0.91	25.9	0.87	25.2	0.84	24.8	0.83	28.2	0.94	29.9
	46	37.7	0.91	35.6	0.86	34.2	0.82	33.3	0.8	39.1	0.94	41.6
	54	47	0.92	44.3	0.87	42.4	0.83	40.9	0.8	48.7	0.95	51.2
3	24	18.5	0.99	18.4	0.99	18.4	0.99	18.4	0.99	18.5	0.99	18.6
	36	30.9	0.97	30.4	0.96	30.2	0.95	30	0.94	31.2	0.98	31.8
	46	42.3	0.96	41.2	0.94	40.5	0.92	40	0.91	43	0.98	43.9
	54	51.7	0.96	50.5	0.94	49.5	0.92	48.7	0.91	52.6	0.98	53.7
4	24	18.8	0.99	18.8	0.99	18.8	0.99	18.8	0.99	18.9	1	18.9
	36	32.6	0.99	32.4	0.98	32.3	0.98	32.3	0.98	32.7	0.99	33
	46	45.1	0.98	44.7	0.98	44.4	0.97	44.2	0.97	45.4	0.99	45.8
	54	55.1	0.98	54.4	0.97	53.9	0.96	53.5	0.96	55.5	0.99	56

Table 4. 33: FEA Edge Beam Moment – Ratio M1/xj / M0/x0 in Positive Moment Loading Case

No. of lanes n	Span length (ft)	Stiffness Factor										M0/x0 (Reference Moment)
		x1		x2		x3		x4		x0.5		
1	24	16.9	0.96	16.5	0.94	16.2	0.92	16	0.91	17.2	0.98	17.6
	36	23.5	0.84	21.7	0.78	20.7	0.74	20.1	0.72	25.2	0.9	28
	46	31.9	0.84	28.7	0.76	26.7	0.7	25.4	0.67	34.4	0.91	38
	54	39.8	0.86	35.8	0.77	33.1	0.71	31.1	0.67	42.6	0.92	46.3
2	24	19.6	0.98	19.5	0.97	19.4	0.97	19.4	0.97	19.8	0.99	20.1
	36	30.7	0.93	29.8	0.91	29.2	0.89	28.8	0.88	31.6	0.96	32.9
	46	41.3	0.92	39.3	0.88	38	0.85	37	0.83	42.8	0.96	44.8
	54	50.7	0.93	48.1	0.88	46.2	0.85	44.7	0.82	52.4	0.96	54.5
3	24	20.7	1	20.7	1	20.7	1	20.6	1	20.7	1	20.7
	36	34	0.98	33.6	0.97	33.4	0.96	33.3	0.96	34.2	0.99	34.7
	46	45.8	0.97	45	0.95	44.4	0.94	44	0.93	46.5	0.99	47.2
	54	55.5	0.97	54.3	0.95	53.2	0.93	52.6	0.92	56.3	0.98	57.2
4	24	21	1	21	1	21	1	21	1	21	1	21
	36	35.4	1	35.3	0.99	35.2	0.99	35.2	0.99	35.5	1	35.5
	46	48.3	0.99	47.9	0.98	47.7	0.97	47.7	0.97	48.7	0.99	49
	54	58.7	0.99	58.1	0.98	57.7	0.97	57.3	0.96	59.1	0.99	59.5

Table 4. 34: FEA Maximum Live Load Deflection – Ratio Δ1/xj / Δ0/x0 in Positive Moment Loading Case

No. of lanes n	Span length (ft)	Stiffness Factor										Δ0/x0 (Reference Deflection)
		x1		x2		x3		x4		x0.5		
1	24	0.046	0.94	0.044	0.9	0.043	0.88	0.042	0.86	0.047	0.96	0.049
	36	0.114	0.8	0.102	0.71	0.096	0.67	0.092	0.64	0.125	0.87	0.143
	46	0.177	0.81	0.156	0.71	0.142	0.65	0.133	0.61	0.194	0.89	0.219
	54	0.220	0.84	0.194	0.74	0.176	0.67	0.163	0.62	0.239	0.91	0.263
2	24	0.057	0.97	0.056	0.95	0.056	0.95	0.056	0.95	0.058	0.98	0.059
	36	0.161	0.92	0.154	0.88	0.151	0.86	0.148	0.85	0.166	0.95	0.175
	46	0.243	0.91	0.229	0.86	0.220	0.83	0.213	0.8	0.253	0.95	0.266
	54	0.292	0.92	0.275	0.87	0.262	0.83	0.253	0.8	0.303	0.96	0.317
3	24	0.061	0.98	0.061	0.98	0.061	0.98	0.061	0.98	0.061	0.98	0.062
	36	0.181	0.97	0.179	0.96	0.178	0.96	0.177	0.95	0.183	0.98	0.186
	46	0.273	0.96	0.267	0.94	0.263	0.93	0.260	0.92	0.277	0.98	0.283
	54	0.324	0.97	0.315	0.94	0.309	0.92	0.304	0.91	0.329	0.98	0.335
4	24	0.063	1	0.063	1	0.063	1	0.063	1	0.063	1	0.063
	36	0.191	0.99	0.190	0.98	0.190	0.98	0.190	0.98	0.192	0.99	0.193
	46	0.291	0.99	0.288	0.98	0.286	0.97	0.285	0.97	0.292	0.99	0.295
	54	0.344	0.98	0.340	0.97	0.337	0.96	0.335	0.96	0.347	0.99	0.350

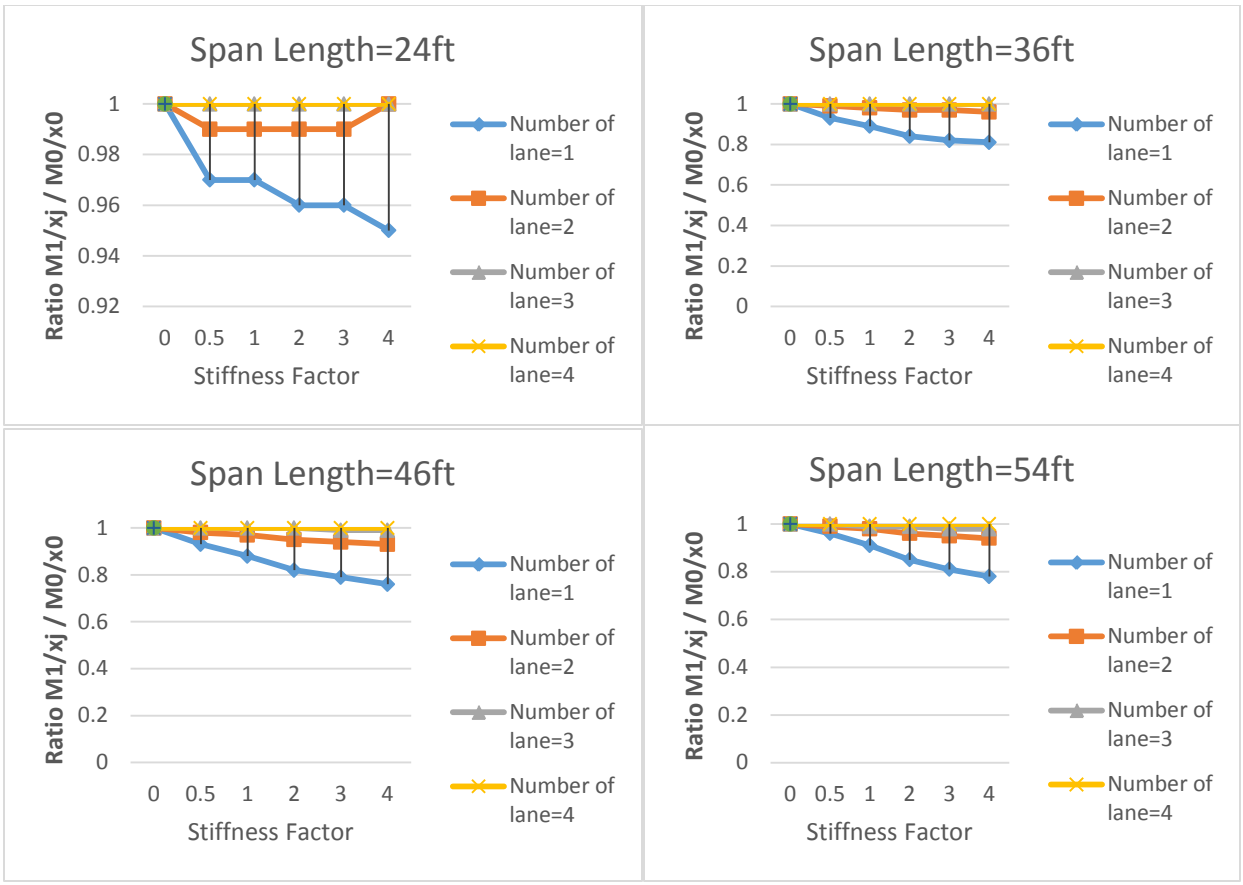


Figure 4.9: FEA Maximum Longitudinal Bending Moment – Ratio M1/xj / M0/x0 in Negative Moment Loading Case

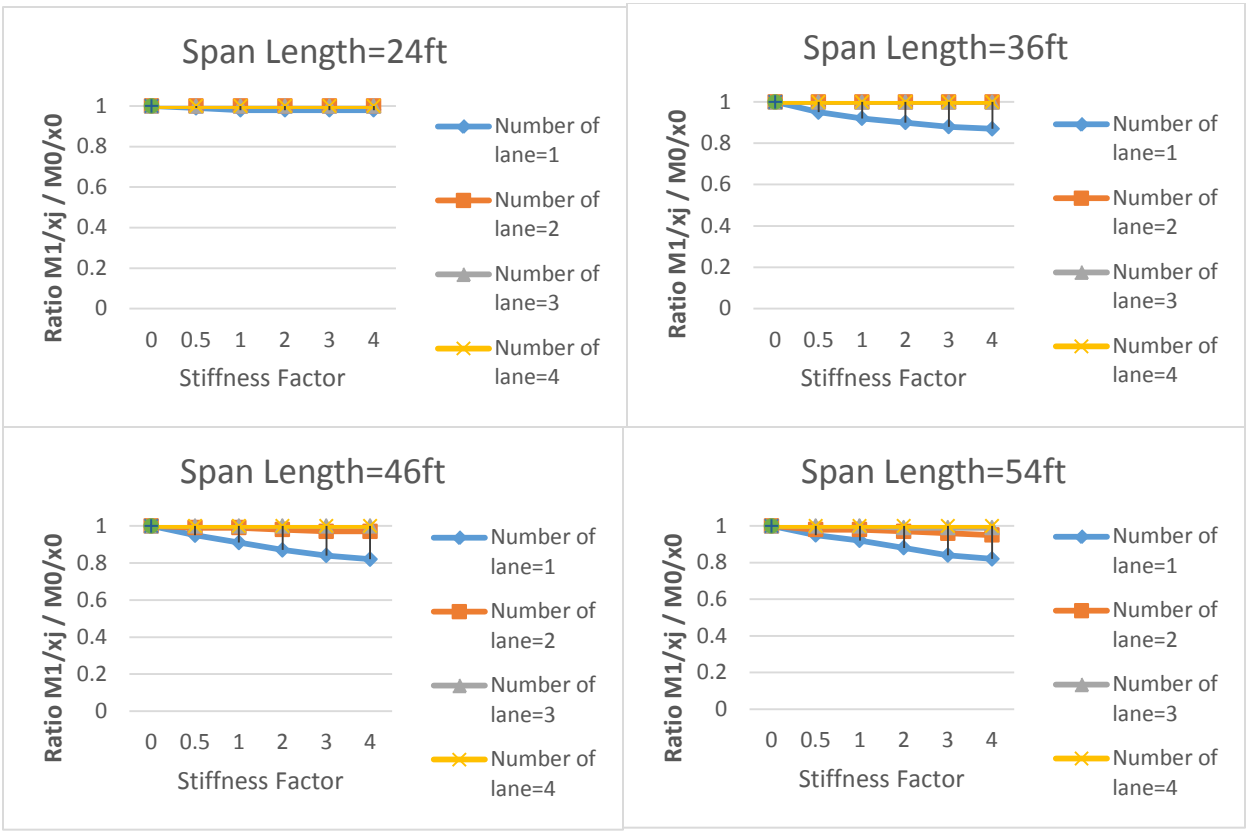


Figure 4.10: FEA Edge Beam Moment – Ratio M1/xj / M0/x0 in Negative Moment Loading Case

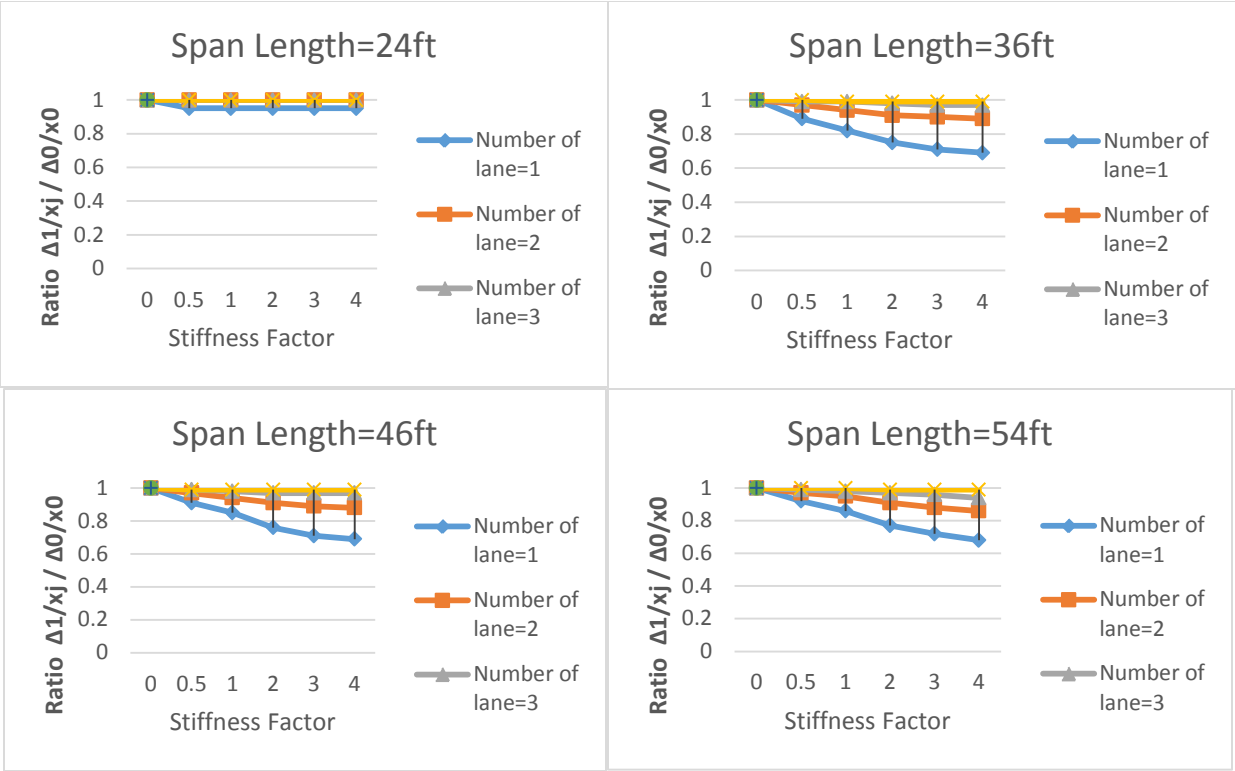


Figure 4.11: FEA Maximum Live Load Deflection – Ratio Δ1/xj / Δ0/x0 Negative Moment Loading Case

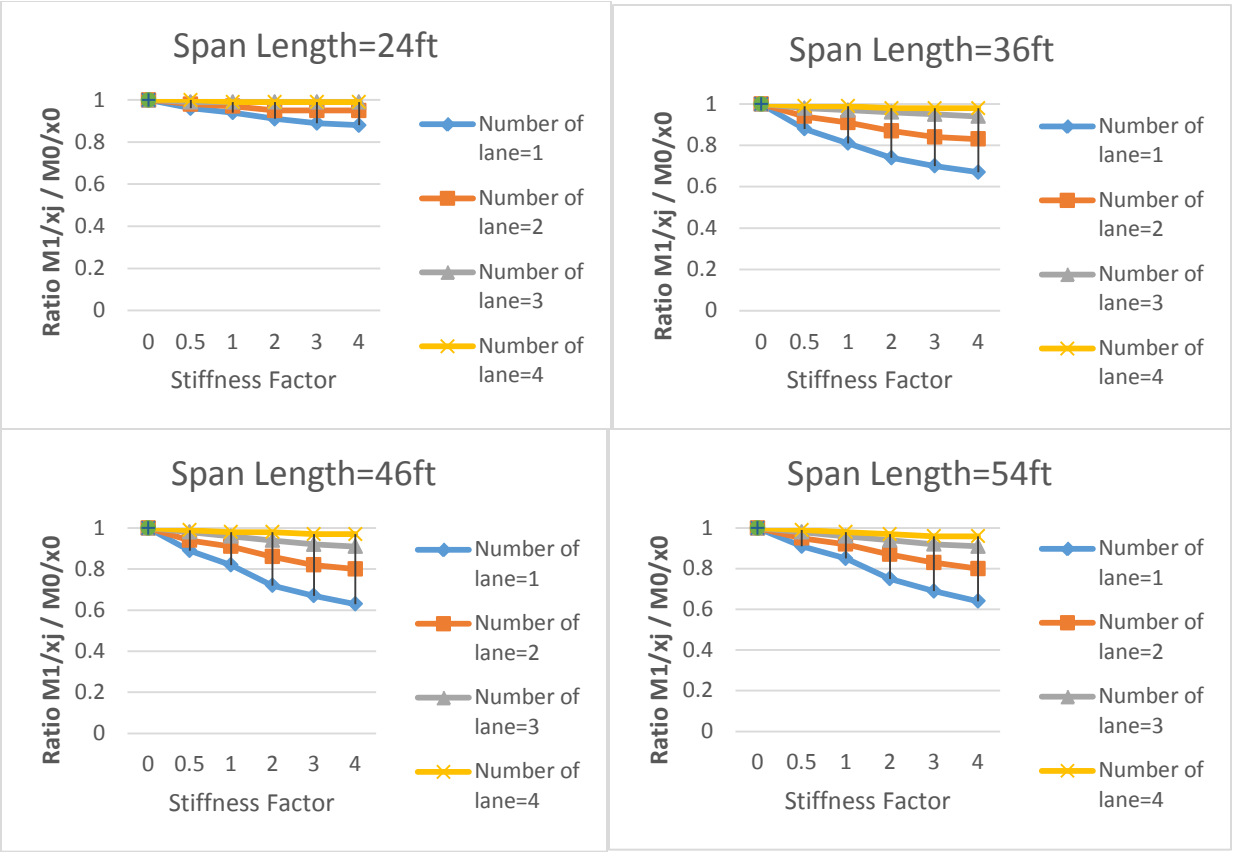


Figure 4.12: FEA Maximum Longitudinal Bending Moment – Ratio M1/xj / M0/x0 in Positive Moment Loading Case

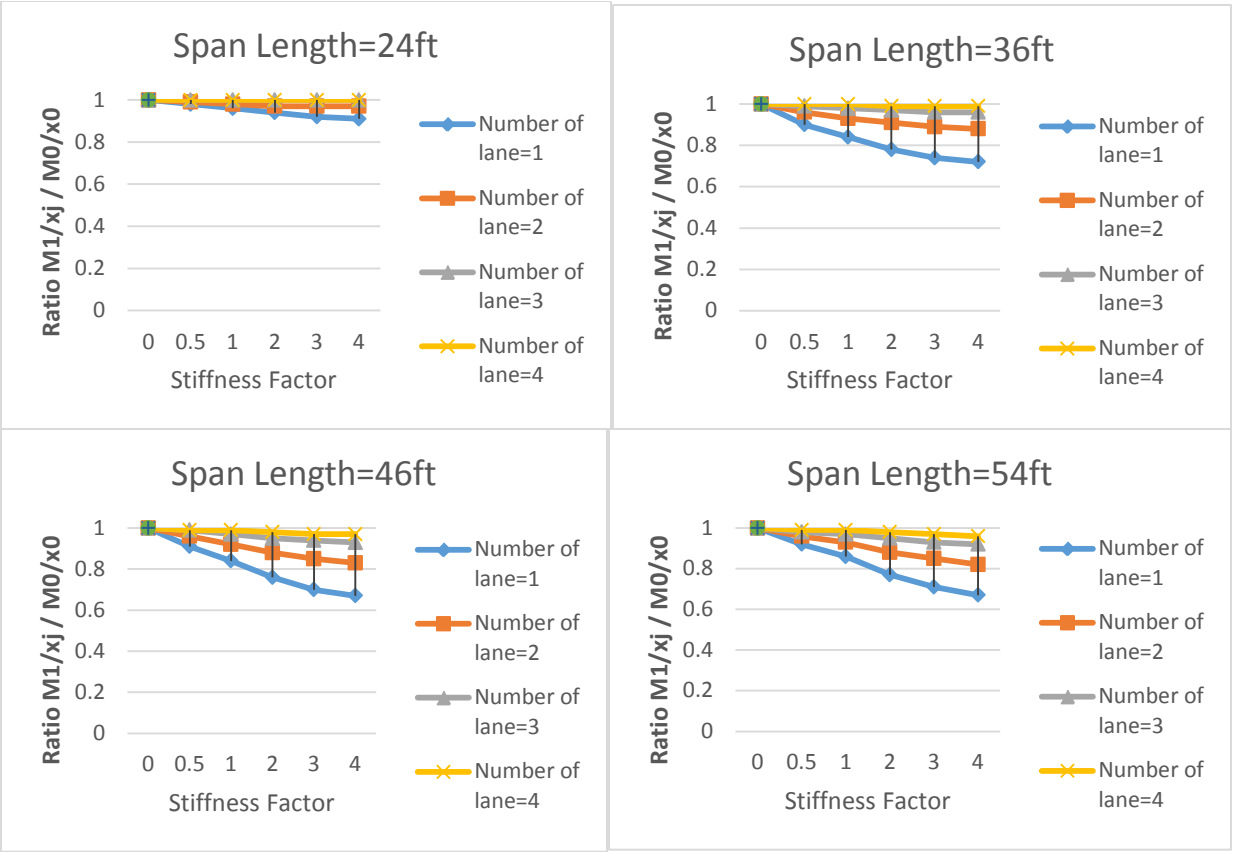


Figure 4.13: FEA Edge Beam Moment – Ratio M1/xj / M0/x0 in Positive Moment Loading Case

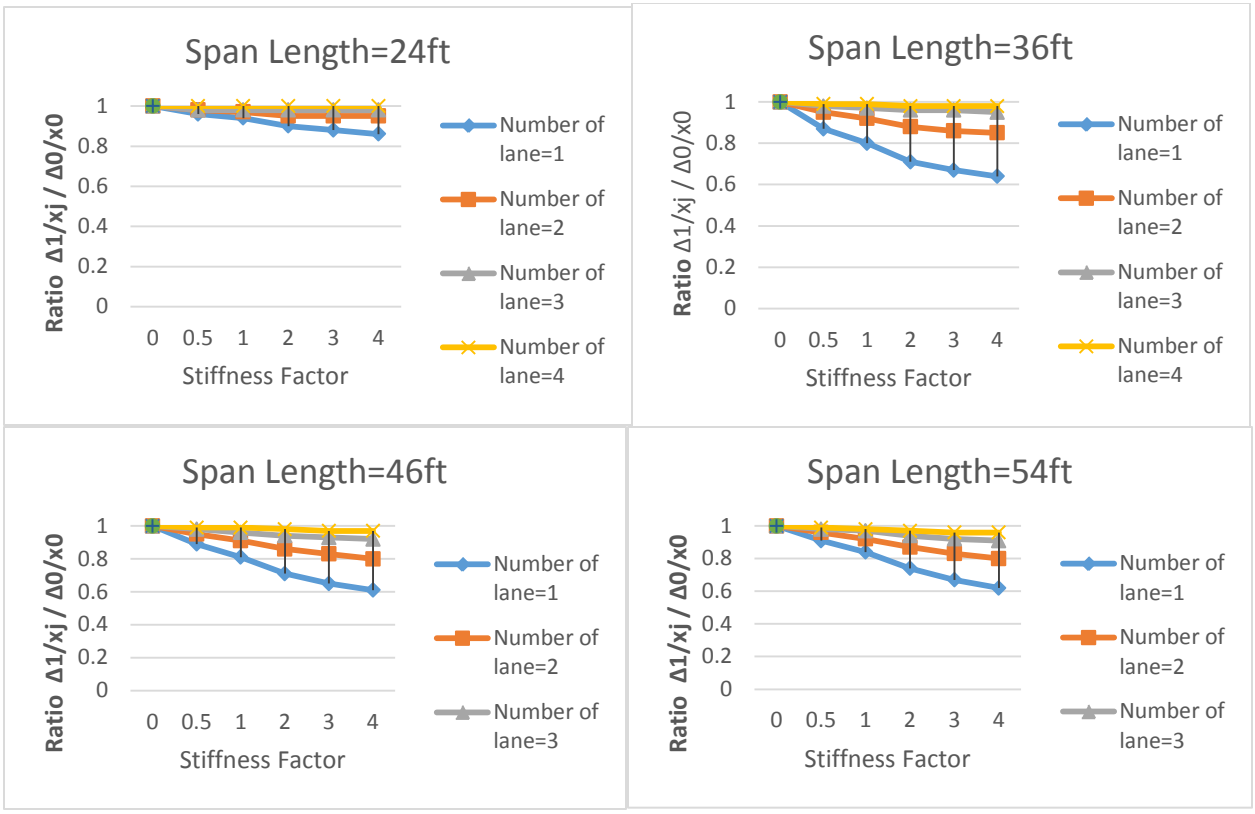


Figure 4.14: FEA Maximum Live Load Deflection – Ratio Δ1/xj/ Δ0/x0 in Positive Moment Loading Case

4.3.2.3 Summary

Considering maximum negative moment, for One lane bridge AASHTO overestimate the moment for the different span length (24, 36, 46, and 54ft). This overestimation factor decrease when the span length increase, and for the case of span length greater than 36ft the overestimation factor increases respectively with the increase of stiffness factor. For two lane bridge AASHTO overestimate the moment similarly for both 24 and 36ft for different stiffness factor. And stat to underestimate the moment for span length greater than 36ft, this underestimation factor increases respectively with the increase in span length and decreases with the increase of stiffness factor. For three and four lane bridge, AASHTO overestimate the moment for both 24 and 36ft for different stiffness factor, this overestimation decrease when the span length increase. For span length greater than 36ft AASHTO starts to underestimate the moment for all stiffness factors, and this underestimation increase with the increase in span length. Noting that when the number of the lane increase the overestimation factor decreases until getting zero and then an underestimation starts to increase.

Considering the case of maximum positive moment, for One and two lane bridge AASTO overestimate the moment for the different span length (24, 36, 46, and 54ft). This overestimation factor decreases respectively with the increase of span length and increase with increase of stiffness factor. For three and four lane bridge, AASHTO overestimate the moment for both 24 and 36ft for different stiffness factor, this overestimation decrease when the span length increase. For span length greater than 36ft AASHTO starts to underestimate the moment for all stiffness factors, and this underestimation increase with the increase of number of lane. Noting that when the number of the lane increase the overestimation factor decreases until getting zero and then an underestimation starts to increase.

However, for the AASHTO LRFD Design Specifications, LRFD overestimate the moment for the different span lengths and number of lane. This overestimation is affected by the number of lane and the stiffness factor and not the span length. It is noticed that the overestimation factor increase with the increase of the number of lane and the stiffness factor, also the effect of railing stiffness on the overestimation factor decrease with the increase of number of lane. This is common for both negative and positive moment.

The ratio between bridges with different railing sizes and bridges with no railing increased with the increase in the number of lanes from One to four. These ratio indicates a decrease in the maximum longitudinal bending moment values with the increase in the stiffness factor with being significant when the span length is greater than 36 ft. This results are common for positive and negative moment loading condition the only notice is that railing stiffness effect is more significant in the positive One.

4.3.3 Concrete Bridges with Two Railings "Case 3"

4.3.3.1 FEA Results versus AASHTO

4.3.3.1.1 Maximum Longitudinal Bending Moment

The maximum slab longitudinal bending moments are summarized in Tables 4.35 and 4.36 for the case on negative moment loading condition, and Tables 4.40 and 4.41 for the case on positive moment loading condition, for all "Case 3" bridges analyzed along with the corresponding AASHTO bending moments.

The AASHTO moments are computed using Eqs. (1) and (2) for the standard specifications, and Eq. (5) for LRFD.

Considering the case of negative moment loading condition. For One lane bridge, for span length of 24ft, AASHTO overestimation factor increase from 60% to 78% respectively with increase of stiffness factor, for span length of 36ft AASHTO overestimation factor increase from 51% to 81% respectively with increase of stiffness factor, for span length of 46ft AASHTO overestimation factor increase from 24% to 67% respectively with increase of stiffness factor, and for span length of 54ft AASHTO overestimation factor increase from 13% to 57% respectively with increase of stiffness factor. For two lane bridges, for span length of 24 AASHTO overestimation factor increase from 45% to 52% respectively with increase of stiffness factor, for span length of 36ft AASHTO overestimation factor increase from 35% to 72% respectively with increase of stiffness factor, for span length of 46ft AASHTO overestimation factor increase from 3% to 49% respectively with increase of stiffness factor, and for span length of 54ft AASHTO underestimate moment for stiffness factor of x0.5 and x1 respectively by 13% and 2% and start to overestimate the moment for the case of stiffness factor greater than x1 increasingly from 15% to 33% . For three lane bridges, for span length of 24ft AASHTO overestimate the moment by about 40% respectively for all stiffness factors (x0.5, x1, x2, x3 and

x4), for span length of 36ft AASHTO overestimation factor increase from 31% to 65% respectively with increase of stiffness factor, for span length of 46ft AASHTO underestimate the moment by 7% for stiffness factor of x0.5 and then start to overestimate the moment increasingly from 6% to 39% with the increase of stiffness factor, and for span length of 54ft AASHTO underestimate moment for stiffness factor of x0.5 and x1 respectively by 24% and 13% and start to overestimate the moment for the case of stiffness factor greater than x1 increasingly from 2% to 21%. For four lane bridges, for span length of 24ft AASHTO overestimate the moment by about 36% respectively for all stiffness factors (x0.5, x1, x2, x3 and x4), for span length of 36ft AASHTO overestimation factor increase from 33% to 40% respectively with increase of stiffness factor, for span length of 46ft AASHTO underestimate the moment by 10% for stiffness factor of x0.5 and then start to overestimate the moment increasingly from 18% to 35% with the increase of stiffness factor, and for span length of 54ft AASHTO underestimate moment for stiffness factor of x0.5, x1, and x2 respectively by 29%, 19%, and 4% and start to overestimate the moment for the case of stiffness factor greater than x2 increasingly from 7% to 16% .

Considering the case of positive moment loading condition. For One lane bridge, for span length of 24ft, AASHTO overestimation factor increase from 42% to 58% respectively with increase of stiffness factor, for span length of 36ft AASHTO overestimation factor increase from 46% to 70% respectively with increase of stiffness factor, for span length of 46ft AASHTO overestimation factor increase from 36% to 68% respectively with increase of stiffness factor, and for span length of 54ft AASHTO overestimation factor increase from 30% to 64% respectively with increase of stiffness factor. For two lane bridges, for span length of 24 AASHTO overestimation factor increase from 34% to 45% respectively with increase of stiffness factor, for span length of 36ft AASHTO overestimation factor increase from 24% to 53% respectively with increase of stiffness factor, for span length of 46ft AASHTO overestimation

factor increase from 14% to 49% respectively with increase of stiffness factor, and for span length of 54ft AASHTO overestimation factor increase from 10% to 44% respectively with increase of stiffness factor. For three lane bridges, for span length of 24ft AASHTO overestimation factor increase from 26% to 31% respectively with increase of stiffness factor, for span length of 36ft AASHTO overestimation factor increase from 16% to 38% respectively with increase of stiffness factor, for span length of 46ft AASHTO give similar result for stiffness factor of x0.5 and then start to overestimate the moment increasingly from 11% to 43% with the increase of stiffness factor, and for span length of 54ft AASHTO overestimation factor increase from 2% to 32% respectively with increase of stiffness factor. For four lane bridges, for span length of 24ft AASHTO overestimate the moment by about 24% respectively for all stiffness factors (x0.5, x1, x2, x3 and x4), for span length of 36ft AASHTO overestimation factor increase from 12% to 26% respectively with increase of stiffness factor, for span length of 46ft AASHTO overestimation factor increase from 1% to 26% respectively with increase of stiffness factor, and for span length of 54ft AASHTO underestimate moment for stiffness factor of x0.5 by 4% and start to overestimate the moment for the case of stiffness factor greater than x0.5 increasingly from 2% to 25% .

The maximum FEA longitudinal bending moments were also compared to AASHTO LRFD moments. Considering the case of negative moment loading condition. For One lane bridge, for span length of 24ft, LRFD overestimation factor increase from 58% to 77% respectively with increase of stiffness factor, for span length of 36ft LRFD overestimation factor increase from 50% to 81% respectively with increase of stiffness factor, for span length of 46ft LRFD overestimation factor increase from 38% to 73% respectively with increase of stiffness factor, and for span length of 54ft LRFD overestimation factor increase from 33% to 67% respectively with increase of stiffness factor. For two lane bridges, for span length of 24ft LRFD

overestimation factor increase from 61% to 66% respectively with increase of stiffness factor, for span length of 36ft LRFD overestimation factor increase from 59% to 82% respectively with increase of stiffness factor, for span length of 46ft LRFD overestimation factor increase from 56% to 76% respectively with increase of stiffness factor, for span length of 54ft LRFD overestimation factor increase from 53% to 72% respectively with increase of stiffness factor. For three lane bridges, for span length of 24ft LRFD overestimate the moment by about 69% for all stiffness factors (x0.5, x1, x2, x3 and x4), for span length of 36ft LRFD overestimation factor increase from 67% to 83% respectively with increase of stiffness factor, for span length of 46ft LRFD overestimation factor increase from 63% to 79% respectively with increase of stiffness factor, and for span length of 54ft LRFD overestimation factor increase from 61% to 75% respectively with increase of stiffness factor. For four lane bridges, for span length of 24ft LRFD overestimate the moment by about 72% for all stiffness factors (x0.5, x1, x2, x3 and x4), for span length of 36ft LRFD overestimation factor increase from 74% to 76% respectively with increase of stiffness factor, for span length of 46ft LRFD overestimation factor increase from 70% to 82% respectively with increase of stiffness factor, for span length of 54ft LRFD overestimation factor increase from 69% to 80% respectively with increase of stiffness factor.

Considering the case of positive moment loading condition. For One lane bridge, for span length of 24ft, LRFD overestimation factor increase from 45% to 60% respectively with increase of stiffness factor, for span length of 36ft LRFD overestimation factor increase from 53% to 74% respectively with increase of stiffness factor, for span length of 46ft LRFD overestimation factor increase from 47% to 74% respectively with increase of stiffness factor, and for span length of 54ft LRFD overestimation factor increase from 42% to 70% respectively with increase of stiffness factor. For two lane bridges, for span length of 24ft overestimation factor increase from 66% to 74% respectively with increase of stiffness factor, for span length of 36ft LRFD

overestimation factor increase from 62% to 76% respectively with increase of stiffness factor, for span length of 46ft LRFD overestimation factor increase from 62% to 77% respectively with increase of stiffness factor, for span length of 54ft LRFD overestimation factor increase from 60% to 75% respectively with increase of stiffness factor. For three lane bridges, for span length of 24ft LRFD overestimation factor increase from 67% to 70% respectively with increase of stiffness factor, for span length of 36ft LRFD overestimation factor increase from 69% to 77% respectively with increase of stiffness factor, for span length of 46ft LRFD overestimation factor increase from 66% to 81% respectively with increase of stiffness factor, for span length of 54ft LRFD overestimation factor increase from 68% to 78% respectively with increase of stiffness factor. For four lane bridges, for span length of 24ft LRFD overestimate the moment by about 73% for all stiffness factors (x0.5, x1, x2, x3 and x4), for span length of 36ft LRFD overestimation factor increase from 73% to 78% respectively with increase of stiffness factor, for span length of 46ft LRFD overestimation factor increase from 74% to 81% respectively with increase of stiffness factor, for span length of 54ft LRFD overestimation factor increase from 74% to 81% respectively with increase of stiffness factor.

4.3.3.1.2 Maximum Edge Beam Moment

The maximum edge beam longitudinal moments are summarized in Tables 4.37 and 4.38 for the case on negative moment loading condition, and Tables 4.42 and 4.43 for the case on positive moment loading condition. The AASHTO moments are computed using eqs.(1) and (2) for the standard specifications, and eq.(5) for LRFD.

Considering the case of negative moment loading condition. For One lane bridge, for span length of 24ft, AASHTO overestimation factor increase from 50% to 55% respectively with increase of stiffness factor, for span length of 36ft AASHTO overestimation factor increase from 57% to 63% respectively with increase of stiffness factor, for span length of 46ft AASHTO

overestimation factor increase from 44% to 50% respectively with increase of stiffness factor, and for span length of 54ft AASHTO overestimation factor increase from 22% to 62% respectively with increase of stiffness factor. For two lane bridges, for span length of 24 AASHTO overestimation factor increase from 48% to 54% respectively with increase of stiffness factor, for span length of 36ft AASHTO overestimation factor increase from 48% to 51% respectively with increase of stiffness factor, for span length of 46ft AASHTO overestimation factor increase from 16% to 58% respectively with increase of stiffness factor, and for span length of 54ft AASHTO give similar result for stiffness factor of x0.5 and start to overestimate the moment for the case of stiffness factor greater than x0.5 increasingly from 10% to 42% . For three lane bridges, for span length of 24ft AASHTO overestimation factor increase from 48% to 55% respectively with increase of stiffness factor, for span length of 36ft AASHTO overestimation factor increase from 46% to 49% respectively with increase of stiffness factor, for span length of 46ft AASHTO overestimation factor increase from 9% to 51% respectively with increase of stiffness factor, and for span length of 54ft AASHTO underestimate moment for stiffness factor of x0.5 by 24% and gives similar results for stiffness factor of x1 and start to overestimate the moment for the case of stiffness factor greater than x1 increasingly from 14% to 32%. For four lane bridges, for span length of 24ft AASHTO overestimation factor increase from 49% to 55% respectively with increase of stiffness factor, for span length of 36ft AASHTO overestimation factor increase from 47% to 51% respectively with increase of stiffness factor, for span length of 46ft AASHTO overestimation factor increase from 5% to 48% respectively with increase of stiffness factor, and for span length of 54ft AASHTO underestimate moment for stiffness factor of x0.5 and x1 respectively by 14% and 4% and start to overestimate the moment for the case of stiffness factor greater than x1 increasingly from 10% to 28% .

Considering the case of positive moment loading condition. For One lane bridge, for span length of 24ft, AASHTO overestimation factor increase from 45% to 68% respectively with increase of stiffness factor, for span length of 36ft AASHTO overestimation factor increase from 51% to 78% respectively with increase of stiffness factor, for span length of 46ft AASHTO overestimation factor increase from 43% to 74% respectively with increase of stiffness factor, and for span length of 54ft AASHTO overestimation factor increase from 36% to 69% respectively with increase of stiffness factor. For two lane bridges, for span length of 24 AASHTO overestimation factor increase from 51% to 74% respectively with increase of stiffness factor, for span length of 36ft AASHTO overestimation factor increase from 37% to 70% respectively with increase of stiffness factor, for span length of 46ft AASHTO overestimation factor increase from 26% to 63% respectively with increase of stiffness factor, and for span length of 54ft AASHTO overestimation factor increase from 19% to 55% respectively with increase of stiffness factor. For three lane bridges, for span length of 24ft AASHTO overestimation factor increase from 48% to 73% respectively with increase of stiffness factor, for span length of 36ft AASHTO overestimation factor increase from 31% to 66% respectively with increase of stiffness factor, for span length of 46ft AASHTO overestimation factor increase from 20% to 56% respectively with increase of stiffness factor, and for span length of 54ft AASHTO overestimation factor increase from 12% to 46% respectively with increase of stiffness factor. For four lane bridges, for span length of 24ft AASHTO overestimation factor increase from 48% to 73% respectively with increase of stiffness factor, for span length of 36ft AASHTO overestimation factor increase from 29% to 64% respectively with increase of stiffness factor, for span length of 46ft AASHTO overestimation factor increase from 20% to 47% respectively with increase of stiffness factor, and for span length of 54ft AASHTO overestimation factor increase from 8% to 41% respectively with increase of stiffness factor.

The maximum FEA longitudinal edge beam moments were also compared to the AASHTO LRFD moments. Considering the case of negative moment loading condition. For One lane bridge, for span length of 24ft, LRFD underestimation factor decrease from 13% to 2% respectively with increase of stiffness factor, for span length of 36ft LRFD overestimation factor increase from 28% to 37% respectively with increase of stiffness factor, for span length of 46ft LRFD overestimation factor increase from 22% to 30% respectively with increase of stiffness factor, and for span length of 54ft LRFD overestimation factor increase from 2% to 52% respectively with increase of stiffness factor. For two lane bridges, for span length of 24ft, LRFD underestimation factor decrease from 30% to 15% respectively with increase of stiffness factor, for span length of 36ft, LRFD overestimation factor increase from 10% to 15% respectively with increase of stiffness factor, for span length of 46ft LRFD underestimate the moment by 15% for stiffness factor x0.5 and then the overestimation factor increase from 1% to 42% respectively with increase of stiffness factor, for span length of 54ft LRFD underestimate the moment by 20% and 8% respectively for stiffness factor x0.5 and x1 and then the overestimation factor increase from 10% to 31% respectively with increase of stiffness factor. For three lane bridges, for span length of 24ft LRFD underestimation factor decrease from 32% to 16% respectively with increase of stiffness factor, for span length of 36ft LRFD overestimation factor increase from 4% to 10% respectively with increase of stiffness factor, for span length of 46ft LRFD underestimate the moment by 32% and 16% respectively for stiffness factor x0.5 and x1 and then the overestimation factor increase from 6% to 29% respectively with increase of stiffness factor, and for span length of 54ft LRFD underestimate the moment by 35%, 23%, and 6% respectively for stiffness factor x0.5, x1 and x2 and then the overestimation factor increase from 7% to 17% respectively with increase of stiffness factor. For four lane bridges, for span length of 24ft LRFD underestimation factor decrease from 35% to 19% respectively with increase of stiffness factor, for span length of

36ft LRFD overestimation factor increase from 2% to 9% respectively with increase of stiffness factor, for span length of 46ft LRFD underestimate the moment by 37% and 21% respectively for stiffness factor x0.5 and x1 and then the overestimation factor increase from 1% to 25% respectively with increase of stiffness factor, and for span length of 54ft LRFD underestimate the moment by 40%, 29%, and 11% respectively for stiffness factor x0.5, x1 and x2 and then the overestimation factor increase from 2% to 12% respectively with increase of stiffness factor.

Considering the case of positive moment loading condition. For One lane bridge, for span length of 24ft, LRFD overestimation factor increase from 27% to 58% respectively with increase of stiffness factor, for span length of 36ft LRFD overestimation factor increase from 44% to 74% respectively with increase of stiffness factor, for span length of 46ft LRFD overestimation factor increase from 39% to 72% respectively with increase of stiffness factor, and for span length of 54ft LRFD overestimation factor increase from 33% to 68% respectively with increase of stiffness factor. For two lane bridges, for span length of 24ft overestimation factor increase from 29% to 62% respectively with increase of stiffness factor, for span length 36ft LRFD overestimation factor increase from 26% to 65% respectively with increase of stiffness factor, for span length of 46ft LRFD overestimation factor increase from 22% to 61% respectively with increase of stiffness factor, and for span length of 54ft LRFD overestimation factor increase from 19% to 55% respectively with increase of stiffness factor. For three lane bridges, for span length of 24ft overestimation factor increase from 23% to 59% respectively with increase of stiffness factor, for span length 36ft LRFD overestimation factor increase from 16% to %58 respectively with increase of stiffness factor, for span length of 46ft LRFD overestimation factor increase from 11% to 52% respectively with increase of stiffness factor, and for span length of 54ft LRFD overestimation factor increase from 9% to 44% respectively with increase of stiffness factor. For three lane bridges, for span length of 24ft overestimation factor increase from 21% to 59%

respectively with increase of stiffness factor, for span length 36ft LRFD overestimation factor increase from 10% to 54% respectively with increase of stiffness factor, for span length of 46ft LRFD overestimation factor increase from 12% to 42% respectively with increase of stiffness factor, and for span length of 54ft LRFD overestimation factor increase from 5% to 39% respectively with increase of stiffness factor.

4.3.3.1.3 Maximum Live Load Deflection

Table 4.39 and 4.44 summarizes the maximum FEA live load deflection respectively for negative and positive loading condition as compared to the AASHTO criterion of (*S*/800). The FEA results are directly related to the assumed slab thickness, which was a reasonable assumption for deflection control. But One can always assume a different thickness and obtain different deflection results.

Considering the case of negative moment loading condition, for 24ft span bridge, AASHTO overestimation factor decrease from about 98% to 94% as the lane numbers increase from 1 to 4 for all stiffness factors. For 36ft span bridge, AASHTO overestimation factor decrease from about 86% to 78% for stiffness factor x0.5, 89% to 80% for stiffness factor x1, 93% to 81% for stiffness factor x2, 94% to 82% for stiffness factor x3 and 95% to 83%for stiffness factor x4 as the lane numbers increase from 1 to 4. For 46ft span bridge, AASHTO overestimation factor decrease from about 85% to 76% for stiffness factor x0.5, 88% to 79% for stiffness factor x1, 91% to 82% for stiffness factor x2, 93% to 83% for stiffness factor x3 and 94% to 83%for stiffness factor x4 as the lane numbers increase from 1 to 4. For 54ft span bridge, AASHTO overestimation factor decrease from about 83% to 75% for stiffness factor x0.5, 86% to 77% for stiffness factor x1, 89% to 80% for stiffness factor x2, 91% to 82% for stiffness factor x3 and 93% to 83%for stiffness factor x4 as the lane numbers increase from 1 to 4.

Considering the case of positive moment loading condition, for 24ft span bridge, AASHTO overestimation factor decrease from about 89% to 87% for stiffness factor x0.5, 91% to 88% for stiffness factor x1, 93% to 88% for stiffness factor x2, 94% to 88% for stiffness factor x3 and 95% to 88%for stiffness factor x4 as the lane numbers increase from 1 to 4. For 36ft span bridge, AASHTO overestimation factor decrease from about 83% to 72% for stiffness factor x0.5, 87% to 76% for stiffness factor x1, 91% to 78% for stiffness factor x2, 93% to 79% for stiffness factor x3 and 94% to 80%for stiffness factor x4 as the lane numbers increase from 1 to 4. For 46ft span bridge, AASHTO overestimation factor decrease from about 77% to 63% for stiffness factor x0.5, 81% to 68% for stiffness factor x1, 87% to 73% for stiffness factor x2, 89% to 75% for stiffness factor x3 and 91% to 76%for stiffness factor x4 as the lane numbers increase from 1 to 4. For 54ft span bridge, AASHTO overestimation factor decrease from about 74% to 61% for stiffness factor x0.5, 78% to 64% for stiffness factor x1, 84% to 69% for stiffness factor x2, 87% to 73% for stiffness factor x3 and 89% to 75%for stiffness factor x4 as the lane numbers increase from 1 to 4.

Table 4. 35: Comparison of FEA Maximum Longitudinal Bending Moment in Negative Moment Loading Case with AASHTO Moment

No. of lanes n	Span length (ft)	Stiffness Factor										AASHTO Moment (kip.ft/ft)
		x1		x2		x3		x4		x0.5		
1	24	6.9	-68%	5.6	-74%	5.1	-76%	4.8	-78%	8.6	-60%	21.6
	36	12.4	-62%	8.9	-73%	7.2	-78%	6.2	-81%	16	-51%	32.4
	46	25.8	-38%	19.4	-53%	15.8	-62%	13.6	-67%	31.5	-24%	41.4
	54	37.5	-25%	29.6	-41%	24.8	-51%	21.6	-57%	43.8	-13%	50.2
2	24	11.2	-48%	10.7	-50%	10.5	-51%	10.4	-52%	11.8	-45%	21.6
	36	17.1	-47%	12.9	-60%	10.6	-67%	9.2	-72%	21.1	-35%	32.4
	46	34.8	-16%	28.1	-32%	24	-42%	21.3	-49%	40.1	-3%	41.4
	54	51	2%	42.8	-15%	37.4	-25%	33.5	-33%	56.6	13%	50.2
3	24	12.9	-40%	12.8	-41%	12.8	-41%	12.7	-41%	13.1	-39%	21.6
	36	18.8	-42%	14.9	-54%	12.8	-60%	11.5	-65%	22.3	-31%	32.4
	46	39	-6%	32.4	-22%	28.2	-32%	25.3	-39%	44.1	7%	41.4
	54	56.8	13%	49.1	-2%	43.7	-13%	39.6	-21%	62	24%	50.2
4	24	13.9	-36%	13.8	-36%	13.9	-36%	13.8	-36%	14	-35%	21.6
	36	21	-35%	20.2	-38%	19.8	-39%	19.5	-40%	21.7	-33%	32.4
	46	40.7	-2%	34	-18%	29.8	-28%	26.8	-35%	45.7	10%	41.4
	54	59.6	19%	52	4%	46.5	-7%	42.4	-16%	64.6	29%	50.2

Table 4. 36: Comparison of FEA Maximum Longitudinal Bending Moment in Negative Moment Loading Case with LRFD Moment

No. of lanes n	Span length (ft)	Stiffness Factor										LRFD Moment (kip.ft/ft)
		x1		x2		x3		x4		x0.5		
1	24	6.9	-66%	5.6	-73%	5.1	-75%	4.8	-77%	8.6	-58%	20.5
	36	12.4	-61%	8.9	-72%	7.2	-77%	6.2	-81%	16	-50%	31.9
	46	25.8	-49%	19.4	-62%	15.8	-69%	13.6	-73%	31.5	-38%	50.9
	54	37.5	-42%	29.6	-54%	24.8	-62%	21.6	-67%	43.8	-33%	64.9
2	24	11.2	-63%	10.7	-65%	10.5	-66%	10.4	-66%	11.8	-61%	30.5
	36	17.1	-67%	12.9	-75%	10.6	-80%	9.2	-82%	21.1	-59%	52
	46	34.8	-61%	28.1	-69%	24	-73%	21.3	-76%	40.1	-56%	90.3
	54	51	-58%	42.8	-64%	37.4	-69%	33.5	-72%	56.6	-53%	120.2
3	24	12.9	-68%	12.8	-69%	12.8	-69%	12.7	-69%	13.1	-68%	40.7
	36	18.8	-72%	14.9	-78%	12.8	-81%	11.5	-83%	22.3	-67%	67.9
	46	39	-67%	32.4	-73%	28.2	-76%	25.3	-79%	44.1	-63%	118.1
	54	56.8	-65%	49.1	-69%	43.7	-73%	39.6	-75%	62	-61%	160.4
4	24	13.9	-72%	13.8	-73%	13.9	-72%	13.8	-73%	14	-72%	50.3
	36	21	-75%	20.2	-76%	19.8	-76%	19.5	-76%	21.7	-74%	82.6
	46	40.7	-73%	34	-78%	29.8	-80%	26.8	-82%	45.7	-70%	151.3
	54	59.6	-71%	52	-75%	46.5	-78%	42.4	-80%	64.6	-69%	207.4

Table 4. 37: Comparison of FEA Edge Beam Moment in Negative Moment Loading Case with AASHTO Moment

No. of lanes n	Span length (ft)	Stiffness Factor										AASHTO Moment (kip.ft/ft)
		x1		x2		x3		x4		x0.5		
1	24	12.1	-53%	11.8	-54%	11.4	-55%	11.4	-55%	12.7	-50%	25.6
	36	15.7	-59%	15	-61%	14.6	-62%	14.4	-63%	16.4	-57%	38.4
	46	26.4	-46%	25.4	-48%	24.8	-49%	24.5	-50%	27.3	-44%	49.1
	54	38.7	-33%	30.4	-47%	25.3	-56%	21.9	-62%	45.2	-22%	57.6
2	24	12.7	-50%	12.2	-52%	11.9	-54%	11.8	-54%	13.4	-48%	25.6
	36	19.8	-48%	19.4	-49%	19.2	-50%	19	-51%	20.1	-48%	38.4
	46	35.5	-28%	28.2	-43%	23.8	-52%	20.8	-58%	41.1	-16%	49.1
	54	52	-10%	43.4	-25%	37.5	-35%	33.3	-42%	57.8	0%	57.6
3	24	12.5	-51%	12	-53%	11.7	-54%	11.6	-55%	13.2	-48%	25.6
	36	20.2	-47%	19.8	-48%	19.5	-49%	19.4	-49%	20.6	-46%	38.4
	46	39.5	-20%	32.1	-35%	27.4	-44%	24.2	-51%	44.9	-9%	49.1
	54	57.6	0%	49.3	-14%	43.4	-25%	38.9	-32%	63	9%	57.6
4	24	12.4	-52%	11.9	-54%	11.6	-55%	11.5	-55%	13.1	-49%	25.6
	36	19.9	-48%	19.4	-49%	19.2	-50%	19	-51%	20.4	-47%	38.4
	46	40.9	-17%	33.5	-32%	28.7	-42%	25.4	-48%	46.4	-5%	49.1
	54	60.1	4%	51.9	-10%	45.9	-20%	41.3	-28%	65.4	14%	57.6

Table 4. 38: Comparison of FEA Edge Beam Moment in Negative Moment Loading Case with LRFD Moment

No. of lanes n	Span length (ft)	Stiffness Factor										LRFD Moment (kip.ft/ft)
		x1		x2		x3		x4		x0.5		
1	24	12.1	8%	11.8	5%	11.4	2%	11.4	2%	12.7	13%	11.2
	36	15.7	-31%	15	-34%	14.6	-36%	14.4	-37%	16.4	-28%	22.8
	46	26.4	-24%	25.4	-27%	24.8	-29%	24.5	-30%	27.3	-22%	34.9
	54	38.7	-16%	30.4	-34%	25.3	-45%	21.9	-52%	45.2	-2%	46
2	24	12.7	23%	12.2	18%	11.9	16%	11.8	15%	13.4	30%	10.3
	36	19.8	-12%	19.4	-13%	19.2	-14%	19	-15%	20.1	-10%	22.4
	46	35.5	-1%	28.2	-21%	23.8	-33%	20.8	-42%	41.1	15%	35.7
	54	52	8%	43.4	-10%	37.5	-22%	33.3	-31%	57.8	20%	48.3
3	24	12.5	25%	12	20%	11.7	17%	11.6	16%	13.2	32%	10
	36	20.2	-6%	19.8	-8%	19.5	-9%	19.4	-10%	20.6	-4%	21.5
	46	39.5	16%	32.1	-6%	27.4	-20%	24.2	-29%	44.9	32%	34.1
	54	57.6	23%	49.3	6%	43.4	-7%	38.9	-17%	63	35%	46.7
4	24	12.4	28%	11.9	23%	11.6	20%	11.5	19%	13.1	35%	9.7
	36	19.9	-4%	19.4	-7%	19.2	-8%	19	-9%	20.4	-2%	20.8
	46	40.9	21%	33.5	-1%	28.7	-15%	25.4	-25%	46.4	37%	33.9
	54	60.1	29%	51.9	11%	45.9	-2%	41.3	-12%	65.4	40%	46.7

Table 4. 39: Comparison of FEA Maximum Live Load Deflection in Negative Moment Loading Case with AASHTO Criterion

No. of lanes n	Span length (ft)	Stiffness Factor										AASHTO Deflection (in)
		x1		x2		x3		x4		x0.5		
1	24	0.008	-98%	0.006	-98%	0.006	-98%	0.005	-99%	0.012	-97%	0.360
	36	0.058	-89%	0.040	-93%	0.031	-94%	0.025	-95%	0.077	-86%	0.540
	46	0.085	-88%	0.062	-91%	0.049	-93%	0.041	-94%	0.106	-85%	0.690
	54	0.113	-86%	0.086	-89%	0.070	-91%	0.060	-93%	0.134	-83%	0.810
2	24	0.014	-96%	0.013	-96%	0.013	-96%	0.012	-97%	0.016	-96%	0.360
	36	0.083	-85%	0.062	-89%	0.053	-90%	0.047	-91%	0.105	-81%	0.540
	46	0.120	-83%	0.093	-87%	0.076	-89%	0.065	-91%	0.142	-79%	0.690
	54	0.156	-81%	0.127	-84%	0.107	-87%	0.093	-89%	0.177	-78%	0.810
3	24	0.018	-95%	0.018	-95%	0.017	-95%	0.017	-95%	0.019	-95%	0.360
	36	0.096	-82%	0.084	-84%	0.077	-86%	0.073	-86%	0.116	-79%	0.540
	46	0.136	-80%	0.110	-84%	0.099	-86%	0.092	-87%	0.157	-77%	0.690
	54	0.175	-78%	0.147	-82%	0.127	-84%	0.115	-86%	0.194	-76%	0.810
4	24	0.020	-94%	0.020	-94%	0.020	-94%	0.020	-94%	0.020	-94%	0.360
	36	0.109	-80%	0.101	-81%	0.097	-82%	0.094	-83%	0.120	-78%	0.540
	46	0.143	-79%	0.127	-82%	0.120	-83%	0.115	-83%	0.165	-76%	0.690
	54	0.186	-77%	0.158	-80%	0.144	-82%	0.136	-83%	0.205	-75%	0.810

Table 4. 40: Comparison of FEA Maximum Longitudinal Bending Moment in Positive Moment Loading Case with AASHTO Moment

No. of lanes n	Span length (ft)	Stiffness Factor										AASHTO Moment (kip.ft/ft)
		x1		x2		x3		x4		x0.5		
1	24	11.5	-47%	10.3	-52%	9.5	-56%	9.1	-58%	12.6	-42%	21.6
	36	14.6	-55%	11.7	-64%	10.4	-68%	9.6	-70%	17.6	-46%	32.4
	46	22.2	-46%	17.5	-58%	14.9	-64%	13.3	-68%	26.6	-36%	41.4
	54	29.9	-40%	23.9	-52%	20.3	-60%	18	-64%	34.9	-30%	50.2
2	24	13.3	-38%	12.5	-42%	12	-44%	11.9	45%	14.3	0.82	21.6
	36	21.5	-34%	18.2	-44%	16.4	-49%	15.3	-53%	24.5	-24%	32.4
	46	31.5	-24%	26.4	-36%	23.3	-44%	21.2	-49%	35.5	-14%	41.4
	54	41.1	-18%	35	-30%	31	-38%	28.1	-44%	45.4	-10%	50.2
3	24	15.5	-28%	15.1	-30%	14.9	-31%	14.8	-31%	16	-26%	21.6
	36	24.9	-23%	22.3	-31%	20.9	-35%	20	-38%	27.1	-16%	32.4
	46	36.9	-11%	30.6	-26%	26.5	-36%	23.6	-43%	41.6	0%	41.4
	54	45.8	-9%	40.6	-19%	36.8	-27%	34	-32%	49.3	-2%	50.2
4	24	16.7	-23%	16.4	-24%	16.3	-25%	16.3	-25%	16.9	-22%	21.6
	36	27.2	-16%	25.5	-21%	24.6	-24%	24	-26%	28.6	-12%	32.4
	46	38.4	-7%	34.7	-16%	32.3	-22%	30.5	-26%	41.1	-1%	41.4
	54	49	-2%	44.1	-12%	40.6	-19%	37.8	-25%	52.1	4%	50.2

Table 4. 41: Comparison of FEA Maximum Longitudinal Bending Moment in Positive Moment Loading Case with LRFD Moment

No. of lanes n	Span length (ft)	Stiffness Factor										LRFD Moment (kip.ft/ft)
		x1		x2		x3		x4		x0.5		
1	24	11.5	-50%	10.3	-55%	9.5	-59%	9.1	-60%	12.6	-45%	23
	36	14.6	-61%	11.7	-69%	10.4	-72%	9.6	-74%	17.6	-53%	37.5
	46	22.2	-56%	17.5	-65%	14.9	-70%	13.3	-74%	26.6	-47%	50.2
	54	29.9	-50%	23.9	-60%	20.3	-66%	18	-70%	34.9	-42%	60
2	24	10.9	-70%	10	-72%	9.7	-73%	9.4	-74%	12	-66%	35.8
	36	21.5	-67%	18.2	-72%	16.4	-75%	15.3	-76%	24.5	-62%	65.1
	46	31.5	-66%	26.4	-71%	23.3	-75%	21.2	-77%	35.5	-62%	92.5
	54	41.1	-64%	35	-69%	31	-73%	28.1	-75%	45.4	-60%	114.4
3	24	15.5	-68%	15.1	-69%	14.9	-69%	14.8	-70%	16	-67%	48.7
	36	24.9	-71%	22.3	-74%	20.9	-76%	20	-77%	27.1	-69%	87.3
	46	36.9	-70%	30.6	-75%	26.5	-78%	23.6	-81%	41.6	-66%	122.8
	54	45.8	-70%	40.6	-74%	36.8	-76%	34	-78%	49.3	-68%	154.5
4	24	16.7	-72%	16.4	-73%	16.3	-73%	16.3	-73%	16.9	-72%	60.7
	36	27.2	-75%	25.5	-76%	24.6	-77%	24	-78%	28.6	-73%	107.7
	46	38.4	-76%	34.7	-78%	32.3	-80%	30.5	-81%	41.1	-74%	158.5
	54	49	-76%	44.1	-78%	40.6	-80%	37.8	-81%	52.1	-74%	201

Table 4. 42: Comparison of FEA Edge Beam Moment in Positive Moment Loading Case with AASHTO Moment

No. of lanes n	Span length (ft)	Stiffness Factor										AASHTO Moment (kip.ft/ft)
		x1		x2		x3		x4		x0.5		
1	24	12.3	-52%	10.2	-60%	9	-65%	8.2	-68%	14.1	-45%	25.6
	36	15	-61%	11.4	-70%	9.7	-75%	8.6	-78%	18.8	-51%	38.4
	46	23	-53%	17.5	-64%	14.6	-70%	12.8	-74%	28.1	-43%	49.1
	54	31.2	-46%	24.4	-58%	20.4	-65%	17.8	-69%	36.8	-36%	57.6
2	24	10.1	-61%	8.1	-68%	7.2	-72%	6.7	-74%	12.6	-51%	25.6
	36	19.9	-48%	15.4	-60%	13	-66%	11.5	-70%	24.2	-37%	38.4
	46	31.1	-37%	24.7	-50%	20.9	-57%	18.4	-63%	36.2	-26%	49.1
	54	41.4	-28%	34.2	-41%	29.5	-49%	26.1	-55%	46.6	-19%	57.6
3	24	10.7	-58%	8.5	-67%	7.5	-71%	7	-73%	13.2	-48%	25.6
	36	22.2	-42%	17.4	-55%	14.8	-61%	13.1	-66%	26.4	-31%	38.4
	46	34.7	-29%	28.5	-42%	24.4	-50%	21.6	-56%	39.5	-20%	49.1
	54	46	-20%	39.3	-32%	34.6	-40%	31.1	-46%	50.6	-12%	57.6
4	24	10.7	-58%	8.5	-67%	7.5	-71%	6.9	-73%	13.2	-48%	25.6
	36	23.2	-40%	18.3	-52%	15.5	-60%	13.8	-64%	27.4	-29%	38.4
	46	35.8	-27%	31.1	-37%	28.1	-43%	25.9	-47%	39.2	-20%	49.1
	54	48.8	-15%	42.3	-27%	37.5	-35%	33.9	-41%	53.2	-8%	57.6

Table 4. 43: Comparison of FEA Edge Beam Moment in Positive Moment Loading Case with LRFD Moment

No. of lanes n	Span length (ft)	Stiffness Factor										LRFD Moment (kip.ft/ft)
		x1		x2		x3		x4		x0.5		
1	24	12.3	-36%	10.2	-47%	9	-53%	8.2	-58%	14.1	-27%	19.3
	36	15	-55%	11.4	-66%	9.7	-71%	8.6	-74%	18.8	-44%	33.3
	46	23	-50%	17.5	-62%	14.6	-68%	12.8	-72%	28.1	-39%	45.7
	54	31.2	-43%	24.4	-56%	20.4	-63%	17.8	-68%	36.8	-33%	55
2	24	10.1	-43%	8.1	-54%	7.2	-60%	6.7	-62%	12.6	-29%	17.8
	36	19.9	-39%	15.4	-53%	13	-60%	11.5	-65%	24.2	-26%	32.7
	46	31.1	-33%	24.7	-47%	20.9	-55%	18.4	-61%	36.2	-22%	46.7
	54	41.4	-28%	34.2	-41%	29.5	-49%	26.1	-55%	46.6	-19%	57.8
3	24	10.7	-38%	8.5	-51%	7.5	-56%	7	-59%	13.2	-23%	17.2
	36	22.2	-29%	17.4	-45%	14.8	-53%	13.1	-58%	26.4	-16%	31.4
	46	34.7	-22%	28.5	-36%	24.4	-45%	21.6	-52%	39.5	-11%	44.6
	54	46	-18%	39.3	-30%	34.6	-38%	31.1	-44%	50.6	-9%	55.8
4	24	10.7	-36%	8.5	-49%	7.5	-55%	6.9	-59%	13.2	-21%	16.7
	36	23.2	-23%	18.3	-40%	15.5	-49%	13.8	-54%	27.4	-10%	30.3
	46	35.8	-19%	31.1	-30%	28.1	-37%	25.9	-42%	39.2	-12%	44.3
	54	48.8	-13%	42.3	-24%	37.5	-33%	33.9	-39%	53.2	-5%	55.8

Table 4. 44: Comparison of FEA Maximum Live Load Deflection in Positive Moment Loading Case with AASHTO Criterion

No. of lanes n	Span length (ft)	Stiffness Factor										AASHTO Deflection (in)
		x1		x2		x3		x4		x0.5		
1	24	0.033	-91%	0.025	-93%	0.021	-94%	0.018	-95%	0.039	-89%	0.360
	36	0.071	-87%	0.049	-91%	0.037	-93%	0.031	-94%	0.094	-83%	0.540
	46	0.129	-81%	0.093	-87%	0.074	-89%	0.061	-91%	0.162	-77%	0.690
	54	0.175	-78%	0.133	-84%	0.108	-87%	0.091	-89%	0.207	-74%	0.810
2	24	0.030	-92%	0.026	-93%	0.024	-93%	0.023	-94%	0.035	-90%	0.360
	36	0.103	-81%	0.075	-86%	0.063	-88%	0.056	-90%	0.129	-76%	0.540
	46	0.184	-73%	0.142	-79%	0.116	-83%	0.098	-86%	0.217	-69%	0.690
	54	0.242	-70%	0.197	-76%	0.167	-79%	0.145	-82%	0.274	-66%	0.810
3	24	0.039	-89%	0.036	-90%	0.035	-90%	0.035	-90%	0.042	-88%	0.360
	36	0.118	-78%	0.100	-81%	0.091	-83%	0.085	-84%	0.143	-74%	0.540
	46	0.210	-70%	0.168	-76%	0.145	-79%	0.132	-81%	0.240	-65%	0.690
	54	0.273	-66%	0.231	-71%	0.200	-75%	0.177	-78%	0.300	-63%	0.810
4	24	0.044	-88%	0.043	-88%	0.043	-88%	0.042	-88%	0.046	-87%	0.360
	36	0.132	-76%	0.120	-78%	0.114	-79%	0.110	-80%	0.150	-72%	0.540
	46	0.224	-68%	0.188	-73%	0.173	-75%	0.163	-76%	0.254	-63%	0.690
	54	0.292	-64%	0.251	-69%	0.220	-73%	0.204	-75%	0.318	-61%	0.810

4.3.3.2 FEA Results of Bridges with different railing sizes versus Bridges with no railing

4.3.3.2.1 Maximum Longitudinal Bending Moment

The ratios M2/xj /M0/x0 for the maximum longitudinal moment are shown in Table 4.45, 4.48 and Figure 4.15, 4.21 respectively for negative and positive loading condition, for each of the four span lengths considered (24, 36, 46, and 54 ft) versus the railing's stiffness factor. Such Table/Figure indicates a decrease in the maximum longitudinal bending moment values with the increase in the stiffness factor, compared to that of bridges with no railing. This decrease appears to be significant when the span length is 36ft and 46ft. Also, the ratio M2/xj / M0/x0 increase with the increase in the number of lanes from One to four, which indicate that railing stiffness is less effective as the number of lane (width) of the bridge increase. This results are common for positive and negative moment loading condition.

4.3.3.2.2 Edge beam moment

The ratios M2/xj/M0/x0 for the edge beam moment are shown in Table 4.46 and Table 4.49 and Figure 4.19 and 4.22, respectively for negative and positive loading condition, for each of the four span lengths considered (24, 36, 46, and 54 ft) versus the railing's stiffness factor. Such Table/ Figure indicate a decrease in edge beam moment values with the increase in the stiffness factor, compared to that of bridges with no railing. This results are common for positive and negative moment loading condition.

4.3.3.2.3 Maximum Live Load Deflection

The ratio Δ2/xj / Δ0/x0 values obtained are presented in Table 4.47 and Table 4.50 and Figure 4.20, 4.23 respectively for negative and positive loading condition, for each of the four span lengths considered (24, 36, 46, and 54 ft). These values indicate that the maximum live load deflection for bridges with different railings sizes compared to that of bridges without railings decreases with the increase in the railing's stiffness factor for all span lengths and the number of

lanes. The ratio Δ2/xj / Δ0/x0 increase with the increase in the number of lanes from One to four, which also indicate that railing stiffness is less effective as the number of lane (width) of the bridge increase. This results are common for positive and negative moment loading condition.

Table 4. 45: FEA Maximum Longitudinal Bending Moment – Ratio M2/xj / M0/x0 in Negative Moment Loading Case

No. of lanes n	Span length (ft)	Stiffness Factor										M0/x0 (Reference Moment)
		x1		x2		x3		x4		x0.5		
1	24	6.9	0.46	5.6	0.37	5.1	0.34	4.8	0.32	8.6	0.57	15.1
	36	12.4	0.56	8.9	0.4	7.2	0.33	6.2	0.28	16	0.72	22.1
	46	25.8	0.65	19.4	0.49	15.8	0.4	13.6	0.34	31.5	0.8	39.6
	54	37.5	0.72	29.6	0.56	24.8	0.47	21.6	0.41	43.8	0.84	52.4
2	24	11.2	0.65	10.7	0.63	10.5	0.61	10.4	0.61	11.8	0.69	17.1
	36	17.1	0.63	12.9	0.48	10.6	0.39	9.2	0.34	21.1	0.78	27.1
	46	34.8	0.73	28.1	0.59	24	0.5	21.3	0.45	40.1	0.84	47.8
	54	51	0.81	42.8	0.68	37.4	0.59	33.5	0.53	56.6	0.89	63.3
3	24	12.9	0.75	12.8	0.74	12.8	0.74	12.7	0.73	13.1	0.76	17.3
	36	18.8	0.66	14.9	0.52	12.8	0.45	11.5	0.4	22.3	0.78	28.6
	46	39	0.76	32.4	0.63	28.2	0.55	25.3	0.5	44.1	0.86	51.1
	54	56.8	0.84	49.1	0.73	43.7	0.65	39.6	0.58	62	0.92	67.7
4	24	13.9	0.8	13.8	0.8	13.9	0.8	13.8	0.8	14	0.81	17.3
	36	21	0.72	20.2	0.69	19.8	0.68	19.5	0.67	21.7	0.75	29.1
	46	40.7	0.78	34	0.65	29.8	0.57	26.8	0.51	45.7	0.88	52.1
	54	59.6	0.85	52	0.74	46.5	0.66	42.4	0.6	64.6	0.92	70.4

Table 4. 46: FEA Edge Beam Moment – Ratio M2/xj / M0/x0 in Negative Moment Loading Case

No. of lanes n	Span length (ft)	Stiffness Factor										M0/x0 (Reference Moment)
		x1		x2		x3		x4		x0.5		
1	24	12.1	0.71	11.8	0.69	11.4	0.67	11.4	0.67	12.6	0.73	17.1
	36	15.7	0.68	15	0.65	14.6	0.63	14.4	0.62	16.4	0.71	23.2
	46	26.4	0.66	25.4	0.63	24.8	0.62	24.5	0.61	27.3	0.68	40.2
	54	38.7	0.73	30.4	0.57	25.3	0.47	21.9	0.41	45.2	0.85	53.3
2	24	12.7	0.68	12.2	0.66	11.9	0.64	11.8	0.63	13.4	0.72	18.6
	36	19.8	0.71	19.4	0.7	19.2	0.69	19	0.69	20.1	0.73	27.7
	46	35.5	0.74	28.2	0.59	23.8	0.49	20.8	0.43	41.1	0.85	48.1
	54	52	0.81	43.4	0.68	37.5	0.59	33.3	0.52	57.8	0.9	63.9
3	24	12.5	0.66	12	0.64	11.7	0.62	11.6	0.62	13.2	0.7	18.8
	36	20.2	0.7	19.8	0.68	19.5	0.67	19.4	0.67	20.6	0.71	29
	46	39.5	0.77	32.1	0.63	27.4	0.54	24.2	0.47	44.9	0.88	51.1
	54	57.6	0.84	49.3	0.72	43.4	0.64	38.9	0.57	63	0.92	68.3
4	24	12.4	0.66	11.9	0.64	11.6	0.62	11.5	0.61	13.1	0.7	18.7
	36	19.9	0.68	19.4	0.66	19.2	0.66	19	0.65	20.4	0.7	29.3
	46	40.9	0.78	33.5	0.64	28.7	0.55	25.4	0.48	46.4	0.88	52.6
	54	60.1	0.85	51.9	0.73	45.9	0.65	41.3	0.58	65.4	0.93	70.7

Table 4. 47: FEA Maximum Live Load Deflection – Ratio Δ2/xj / Δ0/x0 in Negative Moment Loading Case

No. of lanes n	Span length (ft)	Stiffness Factor										Δ0/x0 (Reference Deflection)
		x1		x2		x3		x4		x0.5		
1	24	0.008	0.36	0.006	0.27	0.006	0.27	0.005	0.23	0.012	0.55	0.022
	36	0.058	0.5	0.04	0.34	0.031	0.26	0.025	0.21	0.077	0.66	0.117
	46	0.085	0.59	0.062	0.43	0.049	0.34	0.041	0.29	0.106	0.74	0.143
	54	0.113	0.67	0.086	0.51	0.07	0.42	0.06	0.36	0.134	0.8	0.168
2	24	0.014	0.54	0.013	0.5	0.013	0.5	0.012	0.46	0.016	0.62	0.026
	36	0.083	0.58	0.062	0.43	0.053	0.37	0.047	0.33	0.105	0.73	0.143
	46	0.12	0.69	0.093	0.53	0.076	0.43	0.065	0.37	0.142	0.81	0.175
	54	0.156	0.76	0.127	0.62	0.107	0.52	0.093	0.46	0.177	0.87	0.204
3	24	0.018	0.67	0.018	0.67	0.017	0.63	0.017	0.63	0.019	0.7	0.027
	36	0.096	0.63	0.084	0.55	0.077	0.51	0.073	0.48	0.116	0.76	0.152
	46	0.136	0.72	0.11	0.59	0.099	0.53	0.092	0.49	0.157	0.84	0.188
	54	0.175	0.8	0.147	0.67	0.127	0.58	0.115	0.53	0.194	0.89	0.218
4	24	0.02	0.74	0.02	0.74	0.02	0.74	0.02	0.74	0.02	0.74	0.027
	36	0.109	0.69	0.101	0.64	0.097	0.62	0.094	0.6	0.12	0.76	0.157
	46	0.143	0.73	0.127	0.65	0.12	0.62	0.115	0.59	0.165	0.85	0.195
	54	0.186	0.82	0.158	0.69	0.144	0.63	0.136	0.6	0.205	0.9	0.228

Table 4. 48: FEA Maximum Longitudinal Bending Moment – Ratio M2/xj / M0/x0 in Positive Moment Loading Case

No. of lanes n	Span length (ft)	Stiffness Factor										M0/x0 (Reference Moment)
		x1		x2		x3		x4		x0.5		
1	24	11.5	0.82	10.3	0.73	9.5	0.67	9.1	0.65	12.6	0.89	14.1
	36	14.6	0.6	11.7	0.48	10.4	0.43	9.6	0.4	17.6	0.72	24.3
	46	22.2	0.65	17.5	0.51	14.9	0.43	13.3	0.39	26.6	0.77	34.4
	54	29.9	0.7	23.9	0.56	20.3	0.48	18	0.42	34.9	0.82	42.6
2	24	13.3	0.76	12.5	0.71	12	0.69	11.9	0.68	14.3	0.82	17.5
	36	21.5	0.72	18.2	0.61	16.4	0.55	15.3	0.51	24.5	0.82	29.9
	46	31.5	0.76	26.4	0.63	23.3	0.56	21.2	0.51	35.5	0.85	41.6
	54	41.1	0.8	35	0.68	31	0.61	28.1	0.55	45.4	0.89	51.2
3	24	15.5	0.83	15.1	0.81	14.9	0.8	14.8	0.8	16	0.86	18.6
	36	24.9	0.78	22.3	0.7	20.9	0.66	20	0.63	27.1	0.85	31.8
	46	36.9	0.84	30.6	0.7	26.5	0.6	23.6	0.54	41.6	0.95	43.9
	54	45.8	0.85	40.6	0.76	36.8	0.69	34	0.63	49.3	0.92	53.7
4	24	16.7	0.88	16.4	0.87	16.3	0.86	16.3	0.86	16.9	0.89	18.9
	36	27.2	0.82	25.5	0.77	24.6	0.75	24	0.73	28.6	0.87	33
	46	38.4	0.84	34.7	0.76	32.3	0.71	30.5	0.67	41.1	0.9	45.8
	54	49	0.88	44.1	0.79	40.6	0.73	37.8	0.68	52.1	0.93	56

Table 4. 49: FEA Edge Beam Moment – Ratio M2/xj / M0/x0 in Positive Moment Loading Case

No. of lanes n	Span length (ft)	Stiffness Factor										M0/x0 (Reference Moment)
		x1		x2		x3		x4		x0.5		
1	24	12.3	0.7	10.2	0.58	9	0.51	8.2	0.47	14.1	0.8	17.6
	36	15	0.54	11.4	0.41	9.7	0.35	8.6	0.31	18.8	0.67	28
	46	23	0.61	17.5	0.46	14.6	0.38	12.8	0.34	28.1	0.74	38
	54	31.2	0.67	24.4	0.53	20.4	0.44	17.8	0.38	36.8	0.79	46.3
2	24	10.1	0.5	8.1	0.4	7.2	0.36	6.7	0.33	12.6	0.63	20.1
	36	19.9	0.6	15.4	0.47	13	0.4	11.5	0.35	24.2	0.74	32.9
	46	31.1	0.69	24.7	0.55	20.9	0.47	18.4	0.41	36.2	0.81	44.8
	54	41.4	0.76	34.2	0.63	29.5	0.54	26.1	0.48	46.6	0.86	54.5
3	24	10.7	0.52	8.5	0.41	7.5	0.36	7	0.34	13.2	0.64	20.7
	36	22.2	0.64	17.4	0.5	14.8	0.43	13.1	0.38	26.4	0.76	34.7
	46	34.7	0.74	28.5	0.6	24.4	0.52	21.6	0.46	39.5	0.84	47.2
	54	46	0.8	39.3	0.69	34.6	0.6	31.1	0.54	50.6	0.88	57.2
4	24	10.7	0.51	8.5	0.4	7.5	0.36	6.9	0.33	13.2	0.63	21
	36	23.2	0.65	18.3	0.52	15.5	0.44	13.8	0.39	27.4	0.77	35.5
	46	35.8	0.73	31.1	0.63	28.1	0.57	25.9	0.53	39.2	0.8	49
	54	48.8	0.82	42.3	0.71	37.5	0.63	33.9	0.57	53.2	0.89	59.5

Table 4. 50: FEA Maximum Live Load Deflection – Ratio Δ2/xj / Δ0/x0 in Positive Moment Loading Case

No. of lanes n	Span length (ft)	Stiffness Factor										Δ**0**/x0 (Reference Deflection)
		x1		x2		x3		x4		x0.5		
1	24	0.033	0.67	0.025	0.51	0.021	0.43	0.018	0.37	0.039	0.8	0.049
	36	0.071	0.5	0.049	0.34	0.037	0.26	0.031	0.22	0.094	0.66	0.143
	46	0.129	0.59	0.093	0.42	0.074	0.34	0.061	0.28	0.162	0.74	0.219
	54	0.175	0.67	0.133	0.51	0.108	0.41	0.091	0.35	0.207	0.79	0.263
2	24	0.03	0.51	0.026	0.44	0.024	0.41	0.023	0.39	0.035	0.59	0.059
	36	0.103	0.59	0.075	0.43	0.063	0.36	0.056	0.32	0.129	0.74	0.175
	46	0.184	0.69	0.142	0.53	0.116	0.44	0.098	0.37	0.217	0.82	0.266
	54	0.242	0.76	0.197	0.62	0.167	0.53	0.145	0.46	0.274	0.86	0.317
3	24	0.039	0.63	0.036	0.58	0.035	0.56	0.035	0.56	0.042	0.68	0.062
	36	0.118	0.63	0.1	0.54	0.091	0.49	0.085	0.46	0.143	0.77	0.186
	46	0.21	0.74	0.168	0.59	0.145	0.51	0.132	0.47	0.24	0.85	0.283
	54	0.273	0.81	0.231	0.69	0.2	0.6	0.177	0.53	0.3	0.9	0.335
4	24	0.044	0.7	0.043	0.68	0.043	0.68	0.042	0.67	0.046	0.73	0.063
	36	0.132	0.68	0.12	0.62	0.114	0.59	0.11	0.57	0.15	0.78	0.193
	46	0.224	0.76	0.188	0.64	0.173	0.59	0.163	0.55	0.254	0.86	0.295
	54	0.292	0.83	0.251	0.72	0.22	0.63	0.204	0.58	0.318	0.91	0.35

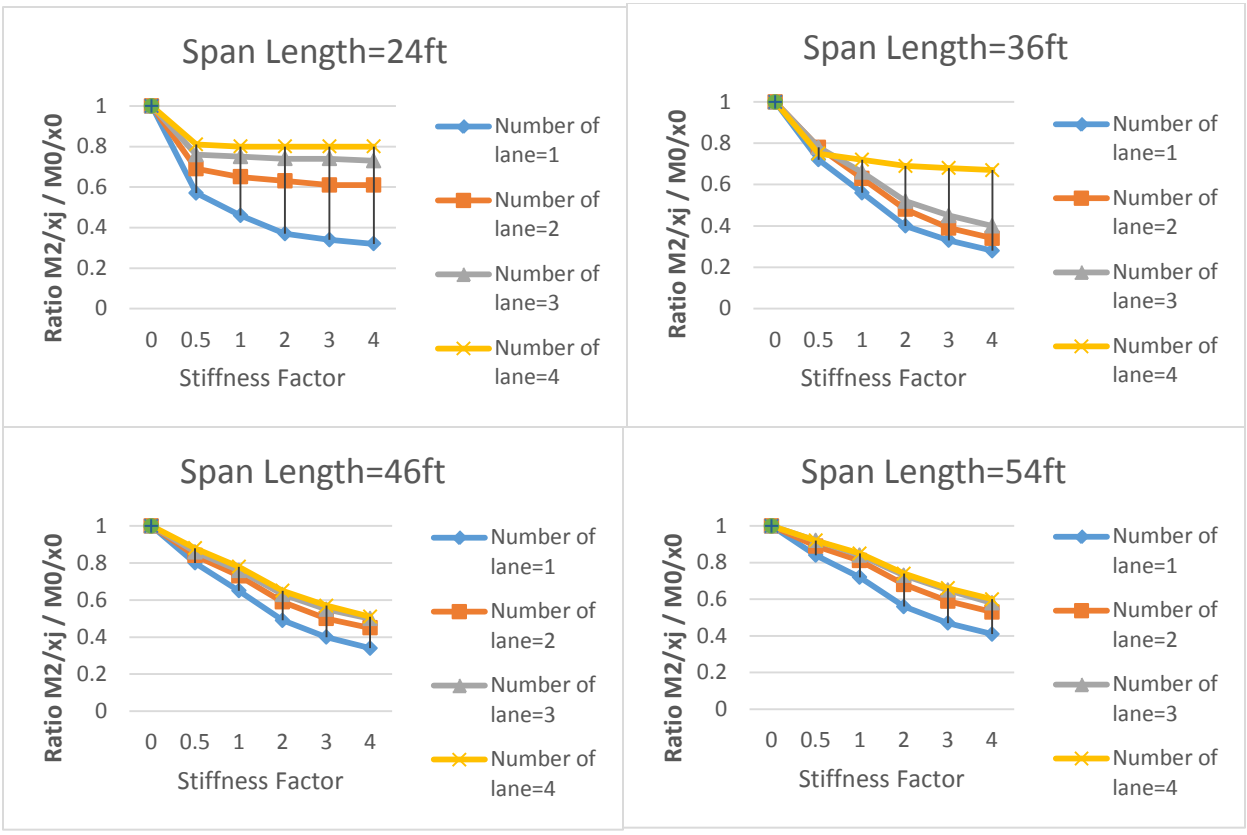


Figure 4.15: FEA Maximum Longitudinal Bending Moment – Ratio M2/xj / M0/x0 in Negative Moment Loading Case

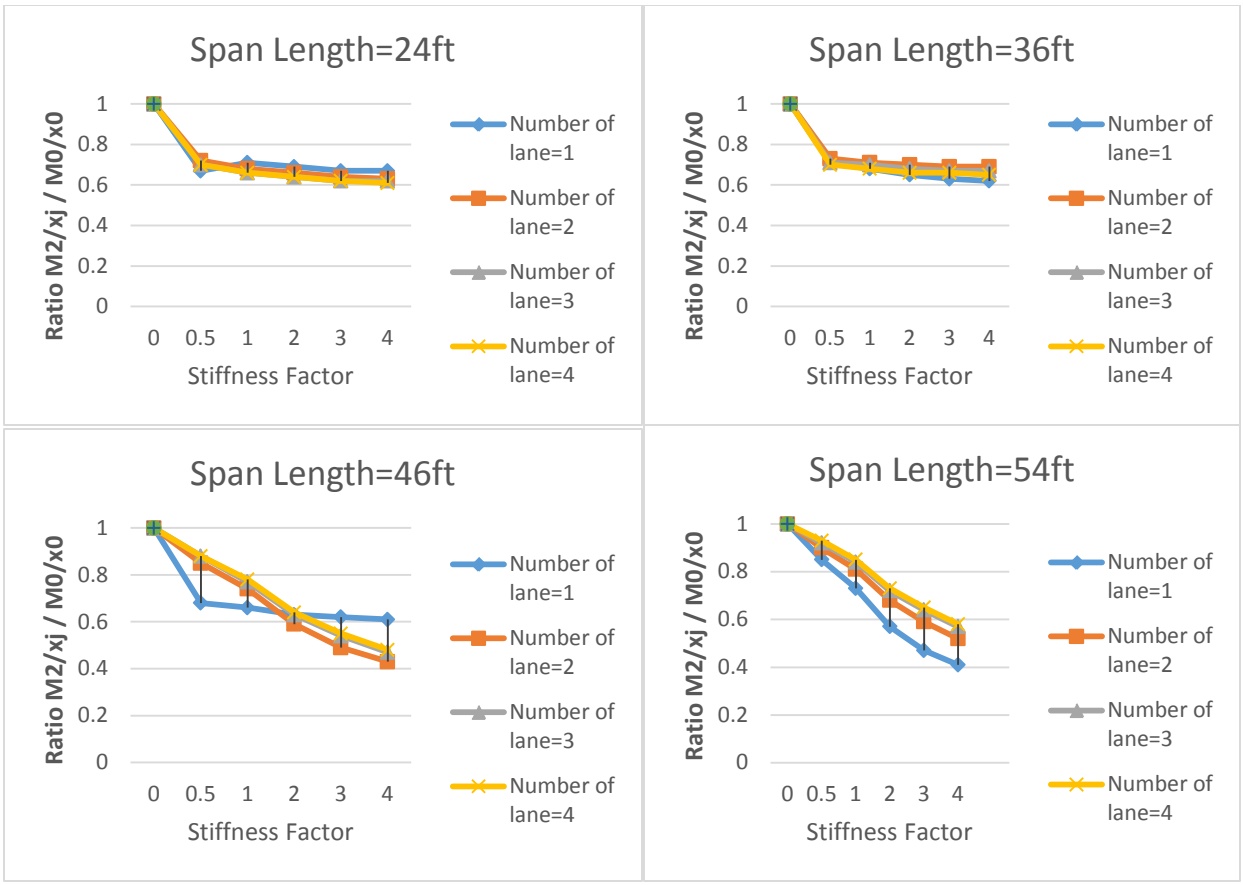


Figure 4.16: FEA Edge Beam Moment – Ratio M2/xj / M0/x0 in Negative Moment Loading Case

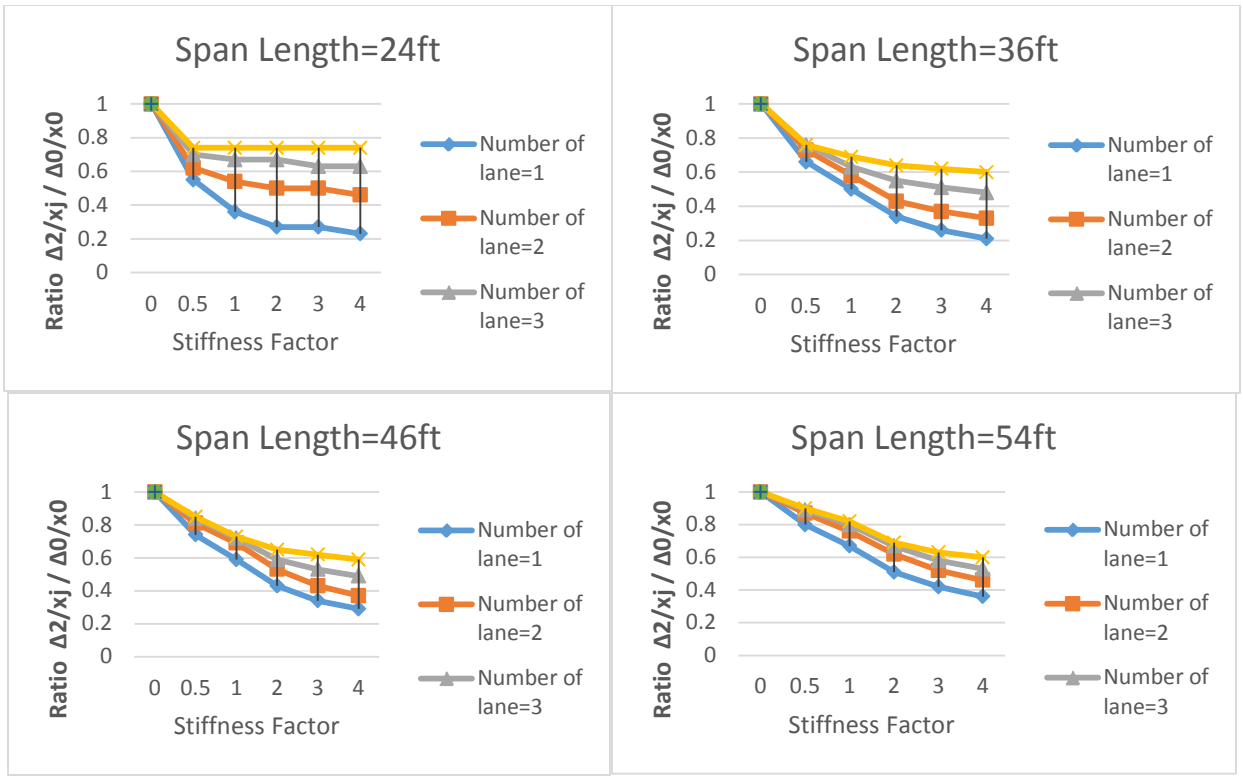


Figure 4.17: FEA Maximum Live Load Deflection – Ratio Δ2/xj/ Δ0/x0 in Negative Moment Loading Case

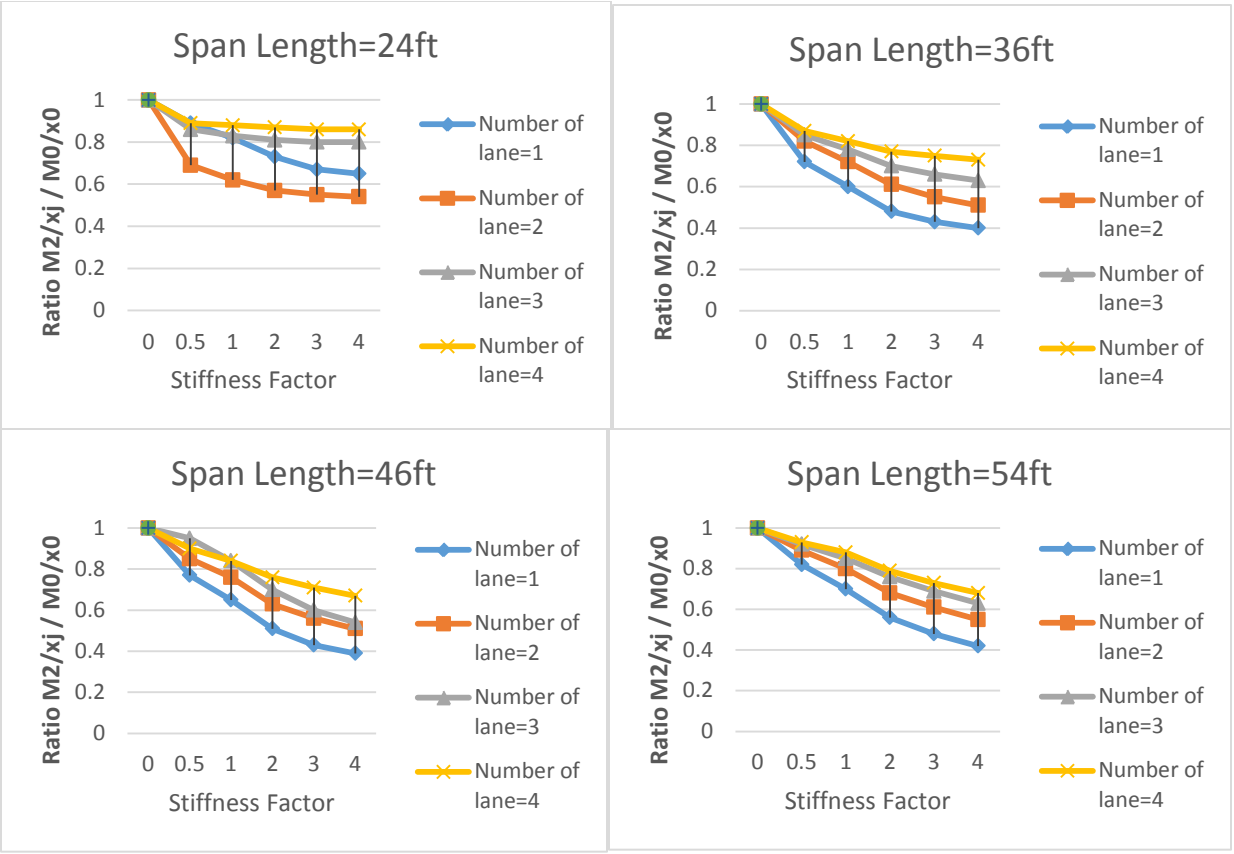


Figure 4.18: FEA Maximum Longitudinal Bending Moment – Ratio M2/xj / M0/x0 in Positive Moment Loading Case

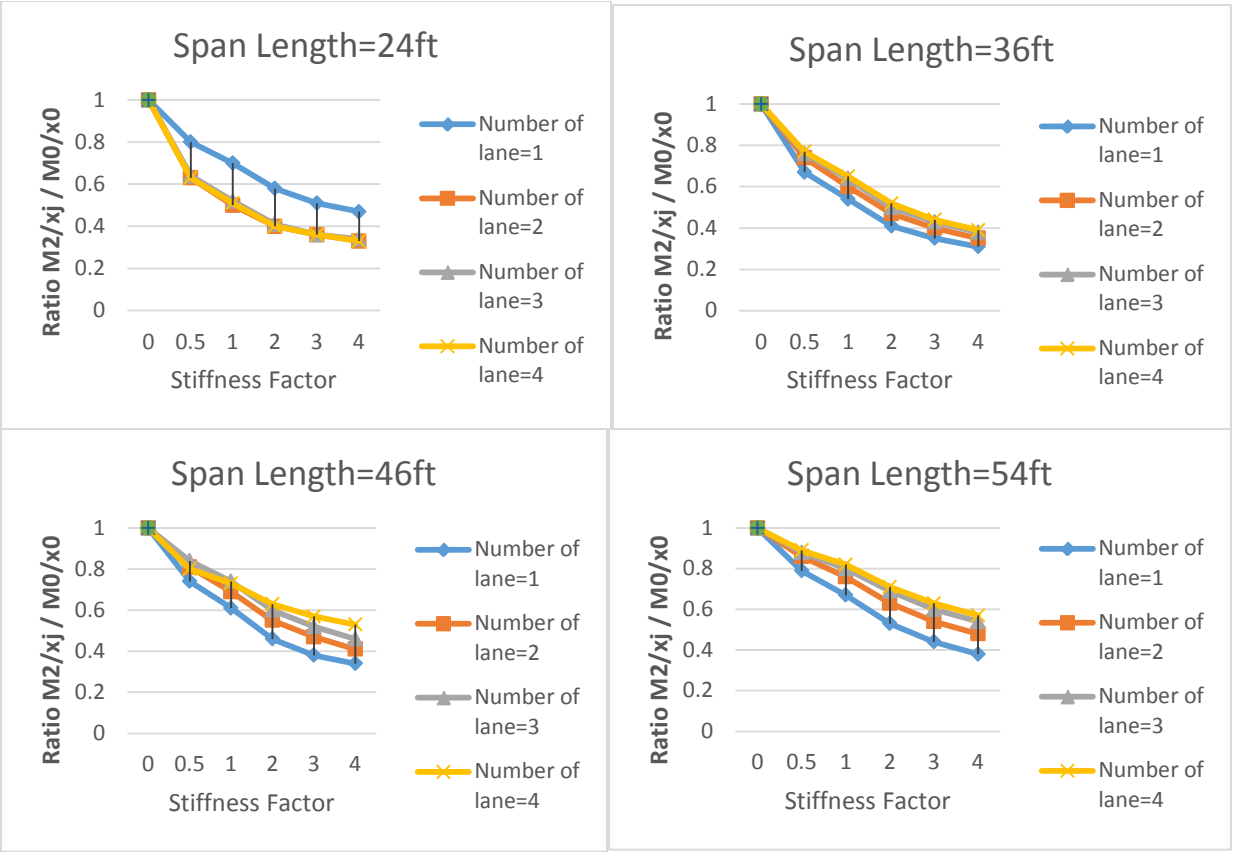


Figure 4.19: FEA Edge Beam Moment – Ratio M2/xj / M0/x0 in Positive Moment Loading Case

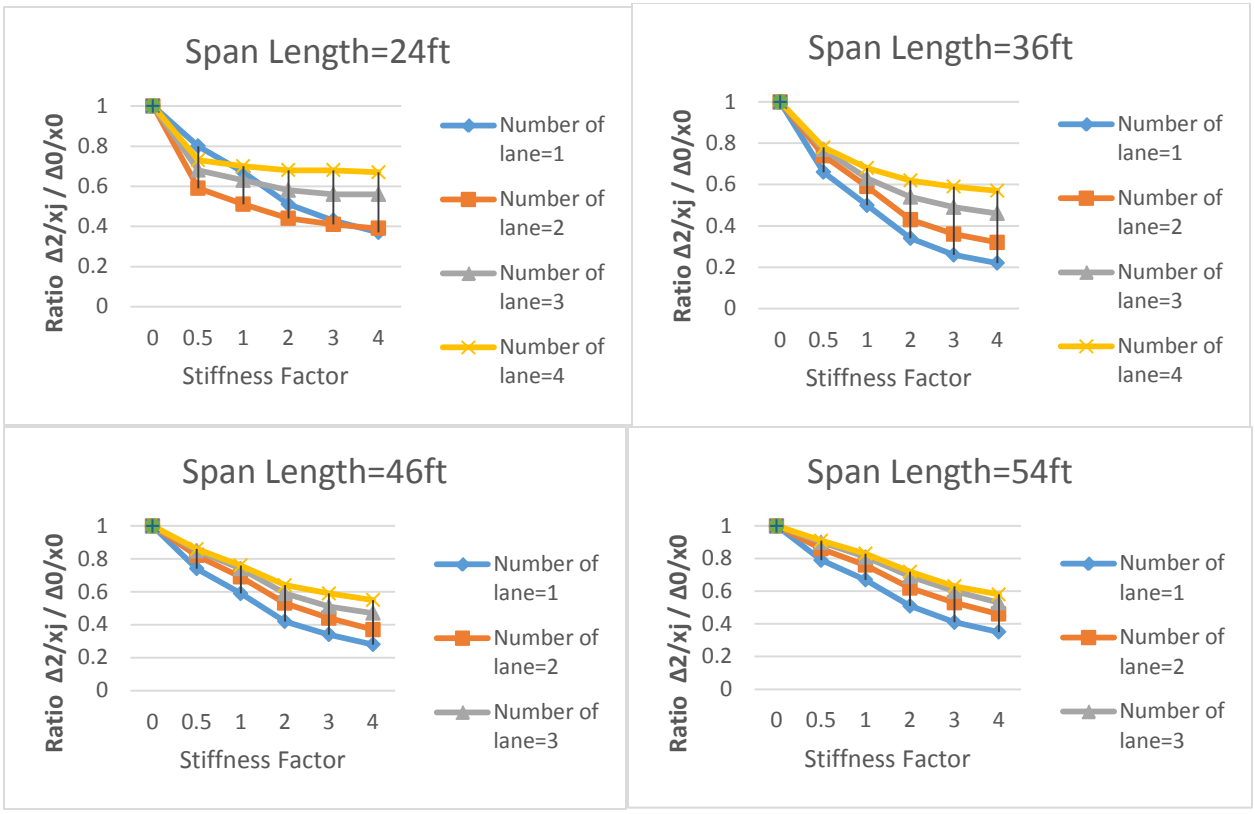


Figure 4.20: FEA Maximum Live Load Deflection – Ratio Δ2/xj/ Δ0/x0 in Positive Moment Loading Case

4.3.3.3 Summary

Considering maximum negative moment, for One lane bridge AASHTO overestimate the moment for the different span length (24, 36, 46, and 54ft). This overestimation factor decrease when the span length increase, and for the case of span length greater than 36ft the overestimation factor increases respectively with the increase of stiffness factor. For two lane bridge AASHTO overestimate the moment similarly for both 24 and 36ft for different stiffness factor. And stat to underestimate the moment for span length greater than 36ft, this underestimation factor increases respectively with the increase in span length and decreases with the increase of stiffness factor. For three and four lane bridge, AASHTO overestimate the moment for both 24 and 36ft for different stiffness factor, this overestimation decrease when the span length increase. For span length greater than 36ft AASHTO starts to underestimate the moment for all stiffness factors, and this underestimation increase with the increase in span length. Noting that when the number of the lane increase the overestimation factor decreases until getting zero and then an underestimation starts to increase.

Considering the case of maximum positive moment, for One and two lane bridge AASTO overestimate the moment for the different span length (24, 36, 46, and 54ft). This overestimation factor decreases respectively with the increase of span length and increase with increase of stiffness factor. For three and four lane bridge, AASHTO overestimate the moment for both 24 and 36ft for different stiffness factor, this overestimation decrease when the span length increase. For span length greater than 36ft AASHTO starts to underestimate the moment for all stiffness factors, and this underestimation increase with the increase of number of lane. Noting that when the number of the lane increase the overestimation factor decreases until getting zero and then an underestimation starts to increase.

However, for the AASHTO LRFD Design Specifications, LRFD overestimate the moment for the different span lengths and number of lane. This overestimation is affected by the number of lane and the stiffness factor and not the span length. It is noticed that the overestimation factor increase with the increase of the number of lane and the stiffness factor, also the effect of railing stiffness on the overestimation factor decrease with the increase of number of lane. This is common for both negative and positive moment.

The ratio between bridges with different railing sizes and bridges with no railing increased with the increase in the number of lanes from One to four. These ratio indicates a decrease in the maximum longitudinal bending moment values with the increase in the stiffness factor with being significant when the span length is greater than 36 ft. This results are common for positive and negative moment loading condition the only notice is that railing stiffness effect is more significant in the positive One.

CHAPTER 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

5.1 Summary

The current research studies the influence of varying the railing size or stiffness on wheel load distribution as well as on the wheel load-carrying capacity of continues straight concrete slab bridges. In this research, the finite-element method is used to investigate the effect of span length and slab width, and to calculate the wheel load distribution on the bridge slab at the critical section. AASHTO (HS20) design trucks loads are placed transversally and longitudinally to produce maximum moments at the critical section of the slabs. Various configurations of railings sizes/stiffnesses on either or both edges of the slab are considered for straight bridges, where the cases with no railing will serve as reference cases. The wheel load distribution on the bridge slab at the critical section for the reference cases and for cases with railings are calculated and compared. The results are also assessed with the AASHTO Standard Specifications (2003) and AASHTO LRFD (2010) procedures which do not include railing stiffness as a criterion in design.

The FEA method was used to analyze the slab bridges; where by, the slabs were modeled and analyzed using SAP2000 computer program. In the present research, the finite-element modeling consists of shells for concrete slab, frames for railings and simple supports for the piers.

For the purpose of this study, a total number of 640 bridges were modeled divided into four categories: One lane, two lane, three lane, and four lane bridges with lane width of 14ft for the case of One lane and 12ft for the other cases. Each category was subdivided further into four other categories according to span length: 24ft, 36ft, 46ft, and 54ft, with the slab thickness being 18in, 21in, 24in and 27in, respectively, and after that, each category is subdivided in to six other

categories representing six distinct stiffness factors, which are x0, x0.5, x1, x2, x3 and x4. Bridges were then split into three major categories:

Case 1: “Concrete Bridges with no railing”

Case 2: “Concrete Bridges with One railing”

Case 3: “Concrete Bridges with two railings”

AASHTO HS20 design trucks were positioned longitudinally on the bridges to produce maximum moments where One configurations were considered witch is the edge loading conditions. These loading conditions give maximum longitudinal and edge beam moments.

Based on FEA tabulated results a comparison between the reference case bridges and bridges with railings of different stiffness factors was conducted to assess the influence of railing’s stiffness on the capacity of the bridges. Bending moments, edge beam moments and deflections were considered. In addition, a comparison with AASHTO design moments and deflection values was also conducted. Results were presented in plots, graphs, and tables, and summarized in comparative tables which show the relative percentage differences and ratios.

5.2 Conclusions

The results of this research evaluated the influence of railing’s stiffness on the maximum bending moments, edge beam moments, and maximum live load deflections for two span bridges. The following conclusions are drawn based on the results of this investigation.

5.2.1 Longitudinal Bending Moments

Based on the results obtained it has been shown that using railing either at One or both edges, the longitudinal maximum positive and negative moment will be reduced. This reduction is affected by the number of lane, stiffness factor, and span length.

Comparing the longitudinal moment of all bridges with the reference case bridges, the following conclusions can be made:

Considering the negative moment; for stiffness factor x0.5 and for bridges with One railing, the reduction in the maximum longitudinal moment reaches 7% for One lane bridges and about none for two, three, and four lane bridges. However, for bridges with two railing, the reductions in the maximum longitudinal moment reaches 43%, 31%, 25% for One, two and three and four lane bridges respectively. For stiffness factor x1, and for bridges with One railing, the reduction in the maximum moment reaches 12% for One lane bridges, and about none for two, three and for lane bridges. However, for bridges with two railings, the reduction in the maximum moment reaches 54%, 37%, 34% and 28% for One, two, three and four lane bridges respectively. For stiffness factor x2, and for bridges with One railing, the reduction in the maximum moment reaches 18% and 5% for One and two lane bridges, and about none for three and four lane bridges. However, for bridges with two railings, the reduction in the maximum moment reaches 63%, 52%, 48%, and 35% for One, two, three and four lane bridges respectively. For stiffness factor x3, and for bridges with One railing, the reduction in the maximum moment reaches 21% and 6% for One and two lane bridges, and about none for three and four lane bridges. However, for bridges with two railings, the reduction in the maximum moment reaches 67%, 61%, 55% and 43% for One, two, three and four lane bridges respectively. For stiffness factor x4, and for bridges with One railing, the reduction in the maximum moment reaches 24% and 7% for One and two lane bridges, and about none for three and four lane bridges. However, for bridges with two railings, the reduction in the maximum moment reaches 72%, 66%, 60% and 49% for One, two, three and four lane bridges respectively.

Considering the positive moment; for stiffness factor x0.5 and for bridges with One railing, the reduction in the maximum longitudinal moment reaches 11% and 6% for One and two

lane bridges and about none for three, and four lane bridges. However, for bridges with two railing, the reductions in the maximum longitudinal moment reaches 28%, 18%, 14% for One, two and three and four lane bridges respectively. For stiffness factor x1, and for bridges with One railing, the reduction in the maximum moment reaches 19% and 9% for One and two lane bridges and about none for three, and four lane bridges. However, for bridges with two railings, the reduction in the maximum moment reaches 40%, 28%, 22% and 18% for One, two, three and four lane bridges respectively. For stiffness factor x2, and for bridges with One railing, the reduction in the maximum moment reaches 28%, 14%, and 6% for One, two, and three lane bridges, and about none for four lane bridges. However, for bridges with two railings, the reduction in the maximum moment reaches 52%, 39%, 30%, and 24% for One, two, three and four lane bridges respectively. For stiffness factor x3, and for bridges with One railing, the reduction in the maximum moment reaches 33%, 18%, and 8% for One, two, and three lane bridges, and about none for four lane bridges. However, for bridges with two railings, the reduction in the maximum moment reaches 57%, 45%, 40% and 29% for One, two, three and four lane bridges respectively. For stiffness factor x4, and for bridges with One railing, the reduction in the maximum moment reaches 37%, 20%, and 9% for One, two, and three lane bridges, and about none for four lane bridges. However, for bridges with two railings, the reduction in the maximum moment reaches 61%, 49%, 46% and 33% for One, two, three and four lane bridges respectively.

The reduction in the maximum longitudinal negative moment is not affected by the span length, it is shown that the most affected cases are 36ft and 46ft. The reduction in the longitudinal moment is more when the number of lanes decreases. So, the reduction in the maximum moment increases with the increase in the stiffness factor, and decreases with the increase in the number of lanes.

5.2.2 Edge Beam Moments

Based on the results obtained it has been shown that using railing either at One or both edges, the edge positive and negative moment will be reduced. This reduction is affected by the number of lane, stiffness factor, and span length.

Comparing the longitudinal moment of all bridges with the reference case bridges, the following conclusions can be made:

Considering the negative moment; for stiffness factor x0.5 and for bridges with One railing, the reduction in the edge longitudinal moment reaches 5% for One lane bridges and about none for two, three, and four lane bridges. However, for bridges with two railing, the reductions in the edge longitudinal moment reaches 32%, 28%, 30% for One, two and three and four lane bridges respectively. For stiffness factor x1, and for bridges with One railing, the reduction in the edge moment reaches 9% for One lane bridges, and about none for two, three and for lane bridges. However, for bridges with two railings, the reduction in the edge moment reaches 34%, 32%, 34% and 34% for One, two, three and four lane bridges respectively. For stiffness factor x2, and for bridges with One railing, the reduction in the edge moment reaches 13% for One lane bridges, and about none for two, three and four lane bridges. However, for bridges with two railings, the reduction in the edge moment reaches 43%, 41%, 37%, and 36% for One, two, three and four lane bridges respectively. For stiffness factor x3, and for bridges with One railing, the reduction in the edge moment reaches 16% for One lane bridges, and about none for two, three and four lane bridges. However, for bridges with two railings, the reduction in the edge moment reaches 53%, 51%, 46% and 45% for One, two, three and four lane bridges respectively. For stiffness factor x4, and for bridges with One railing, the reduction in the edge moment reaches 8% and 5% for One and two lane bridges, and about none for three and four lane bridges. However,

for bridges with two railings, the reduction in the edge moment reaches 59%, 57%, 53% and 52% for One, two, three and four lane bridges respectively.

Considering the positive moment; for stiffness factor x0.5 and for bridges with One railing, the reduction in the edge longitudinal moment reaches 10% for One lane bridges and about none for two, three, and four lane bridges. However, for bridges with two railing, the reductions in the edge moment reaches 33%, 37%, 36% for One, two and three and four lane bridges respectively.

For stiffness factor x1, and for bridges with One railing, the reduction in the edge moment reaches 16% and 8% for One and two lane bridges and about none for three, and four lane bridges. However, for bridges with two railings, the reduction in the edge moment reaches 46%, 50%, 48% and 49% for One, two, three and four lane bridges respectively. For stiffness factor x2, and for bridges with One railing, the reduction in the edge moment reaches 24%, 12%, and 5% for One, two, and three lane bridges, and about none for four lane bridges. However, for bridges with two railings, the reduction in the edge moment reaches 59%, 60%, 59%, and 60% for One, two, three and four lane bridges respectively. For stiffness factor x3, and for bridges with One railing, the reduction in the edge moment reaches 30%, 15%, and 7% for One, two, and three lane bridges, and about none for four lane bridges. However, for bridges with two railings, the reduction in the edge moment reaches 65%, 64%, for One, and two, three and four lane bridges respectively. For stiffness factor x4, and for bridges with One railing, the reduction in the edge moment reaches 33%, 18%, and 8% for One, two, and three lane bridges, and about none for four lane bridges. However, for bridges with two railings, the reduction in the edge moment reaches 69%, 67%, 66% and 67% for One, two, three and four lane bridges respectively. The reduction in the maximum longitudinal negative moment is not affected by the span length, and the number of

lane. The reduction is mainly affected by the stiffness factor, the edge moment increases with the increase in the stiffness factor.

5.2.3 Maximum Deflections

The FEA results are directly related to the assumed slab thickness, which was a reasonable assumption for deflection control. But One can always assume a different thickness and obtain different deflection results.

For any given span length and its corresponding slab thickness, the maximum live load deflection results decrease as the railing's stiffness factor increases from x0.5 to x4. The percent difference with the AASHTO limiting criteria increases with the increase in the stiffness factor. The percent difference is higher for short spans, and decreases as the span length increases to 54 ft for a given stiffness factor. Moreover, the basic assumption of the FEA model is the elastic section behavior, an actual cracked section analysis would yield higher deflections in the slabs.

5.3 Recommendations

AASHTO Standard specifications and AASHTO LRFD empirical equations did not account neither for the presence of railings as integral parts of the bridges nor for the influence of railing's stiffness on the wheel load were distribution in concrete bridges, and these elements were neglected during the design stage. Based on the finite element analysis, it is clearly shown that these elements increase the capacity of the bridges if the same are modeled as integral parts of the bridge. In addition, railings can be used as a reinforcement method to upgrade already existing bridges that require rehabilitation or upgrading. Experimental work is recommended to assess the accuracy of the finite element analysis results obtained in this investigation.

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APPENDIX

Table 1.1: Longitudinal Negative Moment Distribution at Critical Section for One-Lane Two Span Bridge Deck Span = 24ft, Deck width = 14ft, No Railing with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	15.3	20.5	15.3	20.5	15.3	20.5	15.3	20.5	15.3	20.5	21.6
1	17.1	20.5	17.1	20.5	17.1	20.5	17.1	20.5	17.1	20.5	21.6
2	15.1	20.5	15.1	20.5	15.1	20.5	15.1	20.5	15.1	20.5	21.6
3	13.7	20.5	13.7	20.5	13.7	20.5	13.7	20.5	13.7	20.5	21.6
4	12.6	20.5	12.6	20.5	12.6	20.5	12.6	20.5	12.6	20.5	21.6
5	11.7	20.5	11.7	20.5	11.7	20.5	11.7	20.5	11.7	20.5	21.6
6	10.9	20.5	10.9	20.5	10.9	20.5	10.9	20.5	10.9	20.5	21.6
7	10.1	20.5	10.1	20.5	10.1	20.5	10.1	20.5	10.1	20.5	21.6
8	9.3	20.5	9.3	20.5	9.3	20.5	9.3	20.5	9.3	20.5	21.6
9	8.5	20.5	8.5	20.5	8.5	20.5	8.5	20.5	8.5	20.5	21.6
10	7.7	20.5	7.7	20.5	7.7	20.5	7.7	20.5	7.7	20.5	21.6
11	6.9	20.5	6.9	20.5	6.9	20.5	6.9	20.5	6.9	20.5	21.6
12	6	20.5	6	20.5	6	20.5	6	20.5	6	20.5	21.6
13	4.9	20.5	4.9	20.5	4.9	20.5	4.9	20.5	4.9	20.5	21.6
14	1.9	20.5	1.9	20.5	1.9	20.5	1.9	20.5	1.9	20.5	21.6

Figure 1.1: Longitudinal Negative Moment Distribution at Critical Section for One-Lane Lane Two Span Bridge Deck Span = 24ft, Deck width = 14ft, No Railing with Edge Loading.

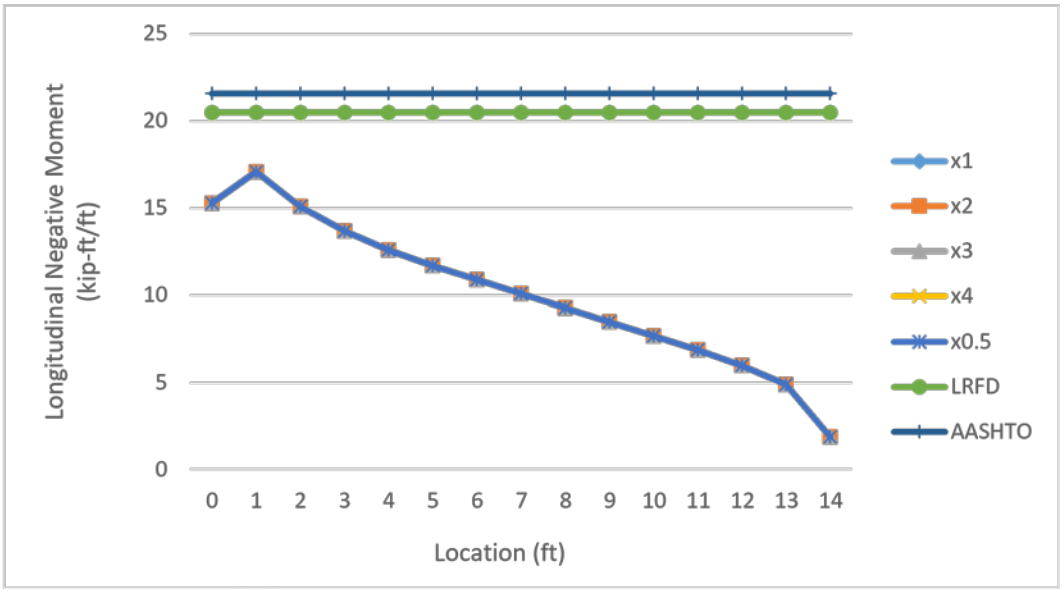

Table 1.2: Longitudinal Negative Moment Distribution at Critical Section for One-Lane Two Span Bridge Deck Span = 24ft, Deck width = 14ft, One Left Railing with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	12	20.5	11.6	20.5	11.4	20.5	11.2	20.5	12.7	20.5	21.6
1	6.6	20.5	5	20.5	4.3	20.5	4	20.5	8.8	20.5	21.6
2	7.2	20.5	5.9	20.5	5.4	20.5	5.1	20.5	8.9	20.5	21.6
3	6.9	20.5	5.8	20.5	5.3	20.5	5	20.5	8.4	20.5	21.6
4	7.1	20.5	6.2	20.5	5.7	20.5	5.5	20.5	8.3	20.5	21.6
5	7.2	20.5	6.4	20.5	6	20.5	5.8	20.5	8.2	20.5	21.6
6	7.2	20.5	6.5	20.5	6.2	20.5	6.1	20.5	8	20.5	21.6
7	7.1	20.5	6.5	20.5	6.3	20.5	6.1	20.5	7.8	20.5	21.6
8	6.8	20.5	6.4	20.5	6.2	20.5	6	20.5	7.5	20.5	21.6
9	6.5	20.5	6.1	20.5	5.9	20.5	5.8	20.5	7	20.5	21.6
10	6.1	20.5	5.7	20.5	5.6	20.5	5.5	20.5	6.4	20.5	21.6
11	5.6	20.5	5.3	20.5	5.2	20.5	5.2	20.5	5.9	20.5	21.6
12	5.12	20.5	5	20.5	4.9	20.5	4.8	20.5	5.4	20.5	21.6
13	4.6	20.5	5	20.5	4.5	20.5	4.4	20.5	4.7	20.5	21.6
14	2.5	20.5	2.6	20.5	2.8	20.5	2.7	20.5	2.4	20.5	21.6

Figure 1.2: Longitudinal Negative Moment Distribution at Critical Section for One-Lane Lane Two Span Bridge Deck Span = 24ft, Deck width = 14ft, One Left Railing with Edge Loading.

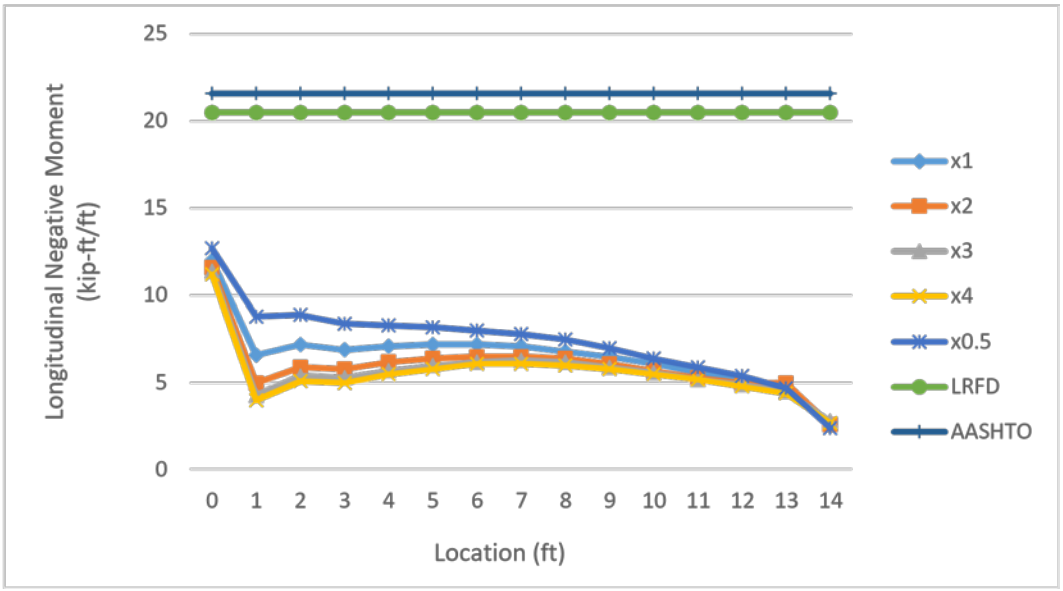

Table 1.3: Longitudinal Negative Moment Distribution at Critical Section for One-Lane Two Span Bridge Deck Span = 24ft, Deck width = 14ft, One Right Railings with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	15.5	20.5	15.5	20.5	15.5	20.5	15.5	20.5	15.3	20.5	21.6
1	16.8	20.5	16.8	20.5	16.8	20.5	16.8	20.5	16.9	20.5	21.6
2	14.6	20.5	14.5	20.5	14.5	20.5	14.4	20.5	14.7	20.5	21.6
3	13.1	20.5	13	20.5	12.9	20.5	12.8	20.5	13.2	20.5	21.6
4	11.8	20.5	11.6	20.5	11.6	20.5	11.6	20.5	12	20.5	21.6
5	10.7	20.5	10.6	20.5	10.5	20.5	10.5	20.5	11	20.5	21.6
6	9.8	20.5	9.6	20.5	9.5	20.5	9.4	20.5	10.1	20.5	21.6
7	8.9	20.5	8.6	20.5	8.5	20.5	8.4	20.5	9.2	20.5	21.6
8	7.9	20.5	7.6	20.5	7.5	20.5	7.4	20.5	8.3	20.5	21.6
9	6.9	20.5	6.5	20.5	6.4	20.5	6.3	20.5	7.3	20.5	21.6
10	5.8	20.5	5.5	20.5	5.3	20.5	5.2	20.5	6.3	20.5	21.6
11	4.8	20.5	4.4	20.5	4.2	20.5	4.1	20.5	5.3	20.5	21.6
12	3.9	20.5	3.4	20.5	3.2	20.5	3.1	20.5	4.4	20.5	21.6
13	2.8	20.5	2.3	20.5	2	20.5	1.9	20.5	3.5	20.5	21.6
14	1.5	20.5	1.3	20.5	1.2	20.5	1.2	20.5	1.7	20.5	21.6

Figure 1.3: Longitudinal Negative Moment Distribution at Critical Section for One-Lane Lane Two Span Bridge Deck Span = 24ft, Deck width = 14ft, One Right Railings with Edge Loading.

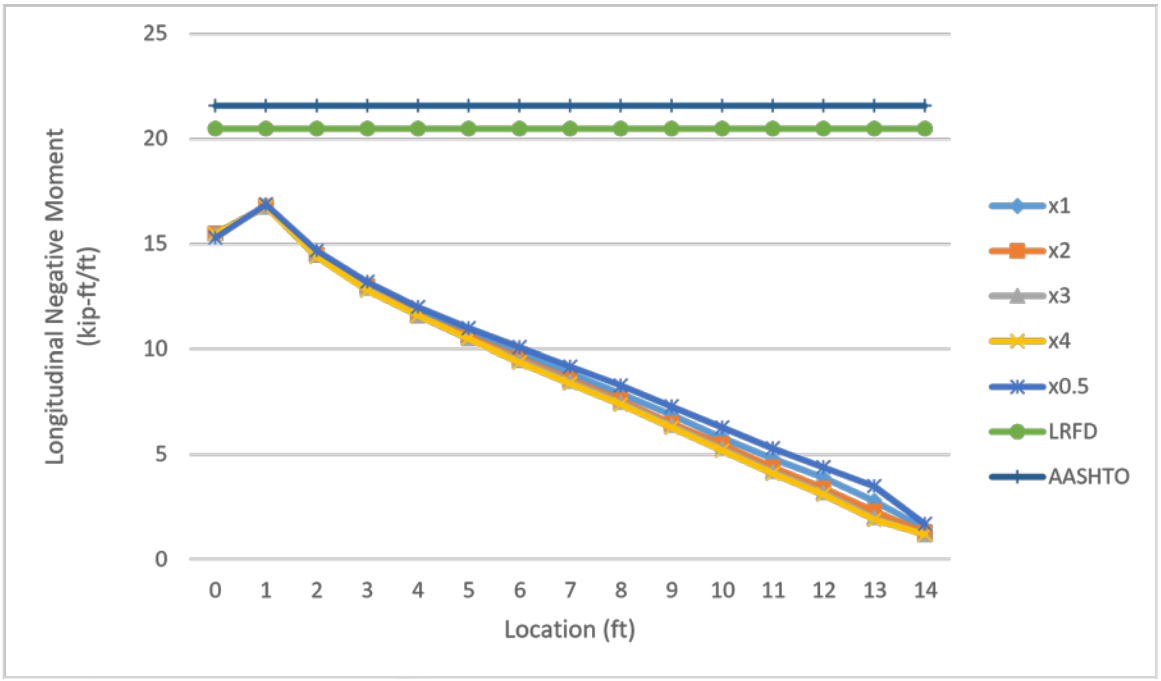

Table 1.4: Longitudinal Negative Moment Distribution at Critical Section for One-Lane Two Span Bridge Deck Span = 24ft, Deck width = 14ft, Two Railings with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	12.1	20.5	11.8	20.5	11.4	20.5	11.4	20.5	12.7	20.5	21.6
1	6.5	20.5	4.8	20.5	4.2	20.5	3.8	20.5	8.6	20.5	21.6
2	6.9	20.5	5.6	20.5	5.1	20.5	4.8	20.5	8.6	20.5	21.6
3	6.5	20.5	5.4	20.5	4.9	20.5	4.6	20.5	8.1	20.5	21.6
4	6.6	20.5	5.6	20.5	5.2	20.5	5	20.5	7.9	20.5	21.6
5	6.6	20.5	5.7	20.5	5.3	20.5	5.1	20.5	7.7	20.5	21.6
6	6.4	20.5	5.7	20.5	5.3	20.5	5.2	20.5	7.4	20.5	21.6
7	6.2	20.5	5.5	20.5	5.2	20.5	5	20.5	7.1	20.5	21.6
8	5.7	20.5	5.1	20.5	4.8	20.5	4.7	20.5	6.5	20.5	21.6
9	5.1	20.5	4.6	20.5	4.3	20.5	4.2	20.5	5.9	20.5	21.6
10	4.5	20.5	3.9	20.5	3.7	20.5	3.6	20.5	5.2	20.5	21.6
11	3.8	20.5	3.2	20.5	3	20.5	2.9	20.5	4.5	20.5	21.6
12	3.2	20.5	2.6	20.5	2.4	20.5	2.3	20.5	3.9	20.5	21.6
13	2.4	20.5	1.9	20.5	1.6	20.5	1.5	20.5	3.1	20.5	21.6
14	2	20.5	1.9	20.5	1.9	20.5	1.9	20.5	2.1	20.5	21.6

Figure 1.4: Longitudinal Negative Moment Distribution at Critical Section for One-Lane Two Span Bridge Deck Span = 24ft, Deck width = 14ft, Two Railings with Edge Loading.

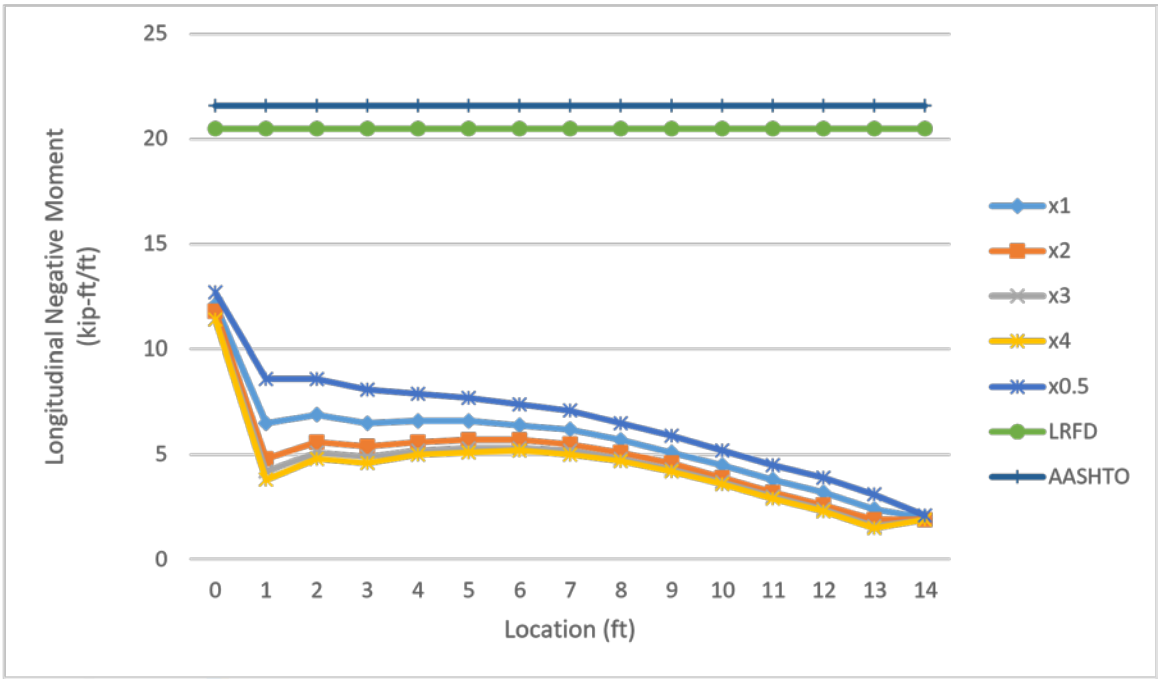

Table 2.1: Longitudinal Positive Moment Distribution at Critical Section for One-Lane Two Span Bridge Deck Span = 24ft, Deck width = 14ft, No Railing with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	16.3	23	16.3	23	16.3	23	16.3	23	16.3	23	21.6
1	17.6	23	17.6	23	17.6	23	17.6	23	17.6	23	21.6
2	14	23	14	23	14	23	14	23	14	23	21.6
3	12.5	23	12.5	23	12.5	23	12.5	23	12.5	23	21.6
4	11.8	23	11.8	23	11.8	23	11.8	23	11.8	23	21.6
5	11.5	23	11.5	23	11.5	23	11.5	23	11.5	23	21.6
6	12	23	12	23	12	23	12	23	12	23	21.6
7	14.1	23	14.1	23	14.1	23	14.1	23	14.1	23	21.6
8	11	23	11	23	11	23	11	23	11	23	21.6
9	9.7	23	9.7	23	9.7	23	9.7	23	9.7	23	21.6
10	8.9	23	8.9	23	8.9	23	8.9	23	8.9	23	21.6
11	8.3	23	8.3	23	8.3	23	8.3	23	8.3	23	21.6
12	7.9	23	7.9	23	7.9	23	7.9	23	7.9	23	21.6
13	7.6	23	7.6	23	7.6	23	7.6	23	7.6	23	21.6
14	7.4	23	7.4	23	7.4	23	7.4	23	7.4	23	21.6

Figure 2.1: Longitudinal Positive Moment Distribution at Critical Section for One-Lane Lane Two Span Bridge Deck Span = 24ft, Deck width = 14ft, No Railing with Edge Loading.

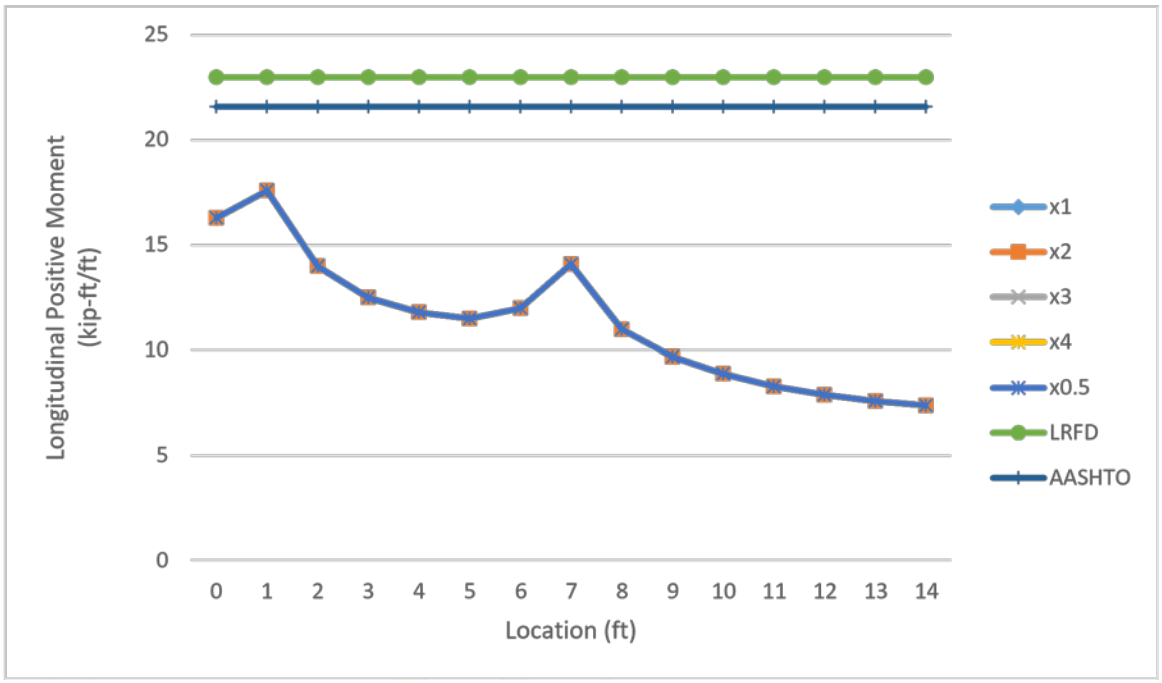

Table 2.2: Longitudinal Positive Moment Distribution at Critical Section for One-Lane Two Span Bridge Deck Span = 24ft, Deck width = 14ft, One Left Railing with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	11.6	23	9.6	23	8.4	23	7.6	23	13.3	23	21.6
1	12.8	23	10.8	23	9.6	23	8.7	23	14.5	23	21.6
2	10.5	23	8.8	23	7.8	23	7.1	23	11.8	23	21.6
3	9.4	23	7.9	23	7	23	6.4	23	10.6	23	21.6
4	9.1	23	7.8	23	7	23	6.4	23	10.2	23	21.6
5	9.2	23	8	23	7.3	23	6.7	23	10.1	23	21.6
6	9.9	23	8.8	23	8.2	23	7.7	23	10.7	23	21.6
7	12.3	23	11.4	23	10.7	23	10.3	23	13.1	23	21.6
8	9.4	23	8.5	23	7.9	23	7.5	23	10.1	23	21.6
9	8.1	23	7.3	23	6.8	23	6.4	23	8.8	23	21.6
10	7.4	23	6.7	23	6.2	23	5.9	23	8	23	21.6
11	7	23	6.3	23	5.8	23	5.5	23	7.5	23	21.6
12	6.7	23	6	23	5.6	23	5.3	23	7.2	23	21.6
13	6.5	23	5.8	23	5.4	23	5.1	23	7	23	21.6
14	6.4	23	5.7	23	5.4	23	5.1	23	6.8	23	21.6

Figure 2.2: Longitudinal Positive Moment Distribution at Critical Section for One-Lane Lane Two Span Bridge Deck Span = 24ft, Deck width = 14ft, One Left Railing with Edge Loading.

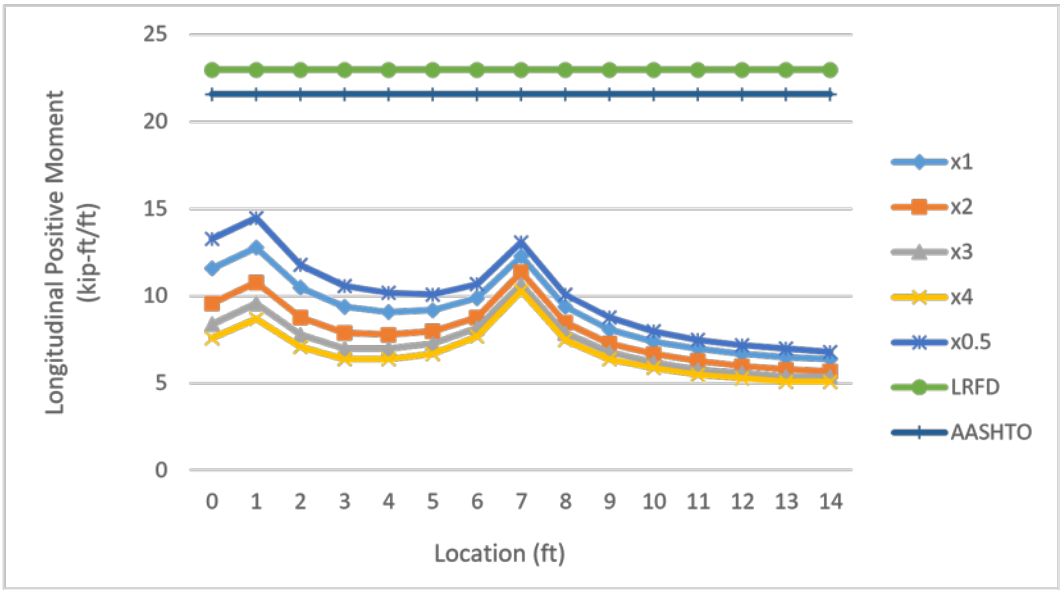

Table 2.3: Longitudinal Positive Moment Distribution at Critical Section for One-Lane Two Span Bridge Deck Span = 24ft, Deck width = 14ft, One Right Railings with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	15.5	23	15.1	23	14.9	23	14.7	23	15.8	23	21.6
1	16.9	23	16.5	23	16.2	23	16	23	17.2	23	21.6
2	13.3	23	12.8	23	12.6	23	12.4	23	13.6	23	21.6
3	11.7	23	11.2	23	10.9	23	10.7	23	12	23	21.6
4	10.9	23	10.4	23	10.1	23	9.9	23	11.3	23	21.6
5	10.6	23	10	23	9.7	23	9.5	23	11	23	21.6
6	10.9	23	10.4	23	10	23	9.8	23	11.4	23	21.6
7	13.1	23	12.5	23	12.1	23	11.9	23	13.5	23	21.6
8	9.9	23	9.2	23	8.8	23	8.5	23	10.3	23	21.6
9	8.3	23	7.6	23	7.2	23	6.9	23	8.9	23	21.6
10	7.4	23	6.6	23	6.1	23	5.8	23	8	23	21.6
11	6.7	23	5.8	23	5.3	23	4.9	23	7.3	23	21.6
12	6.1	23	5.2	23	4.6	23	4.2	23	6.8	23	21.6
13	5.6	23	4.5	23	3.9	23	3.4	23	6.4	23	21.6
14	5.5	23	4.4	23	3.8	23	3.3	23	6.3	23	21.6

Figure 2.3: Longitudinal Positive Moment Distribution at Critical Section for One-Lane Two Span Bridge Deck Span = 24ft, Deck width = 14ft, One Right Railings with Edge Loading.

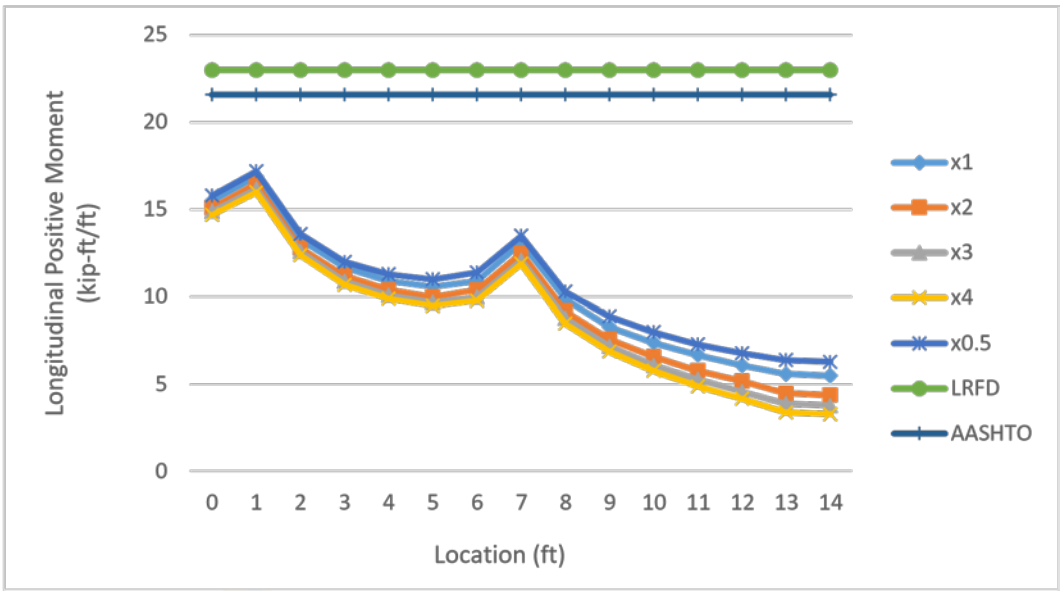

Table 2.4: Longitudinal Positive Moment Distribution at Critical Section for One-Lane Two Span Bridge Deck Span = 24ft, Deck width = 14ft, Two Railings with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	11.2	23	9.1	23	7.9	23	7.2	23	12.9	23	21.6
1	12.3	23	10.2	23	9	23	8.2	23	14.1	23	21.6
2	9.9	23	8.2	23	7.1	23	6.4	23	11.5	23	21.6
3	8.8	23	7.2	23	6.3	23	5.6	23	10.2	23	21.6
4	8.5	23	7	23	6.1	23	5.6	23	9.8	23	21.6
5	8.5	23	7.1	23	6.3	23	5.8	23	9.7	23	21.6
6	9.1	23	7.8	23	7.1	23	6.6	23	10.2	23	21.6
7	11.5	23	10.3	23	9.5	23	9.1	23	12.6	23	21.6
8	8.4	23	7.2	23	6.5	23	6.1	23	9.5	23	21.6
9	7.1	23	5.9	23	5.2	23	4.8	23	8.1	23	21.6
10	6.3	23	5.1	23	4.4	23	4	23	7.3	23	21.6
11	5.7	23	4.5	23	3.8	23	3.4	23	6.7	23	21.6
12	5.2	23	4	23	3.3	23	2.9	23	6.2	23	21.6
13	4.8	23	3.5	23	2.8	23	2.4	23	5.9	23	21.6
14	4.7	23	3.5	23	2.8	23	2.4	23	5.8	23	21.6

Figure 2.4: Longitudinal Positive Moment Distribution at Critical Section for One-Lane Two Span Bridge Deck Span = 24ft, Deck width = 14ft, Two Railings with Edge Loading.

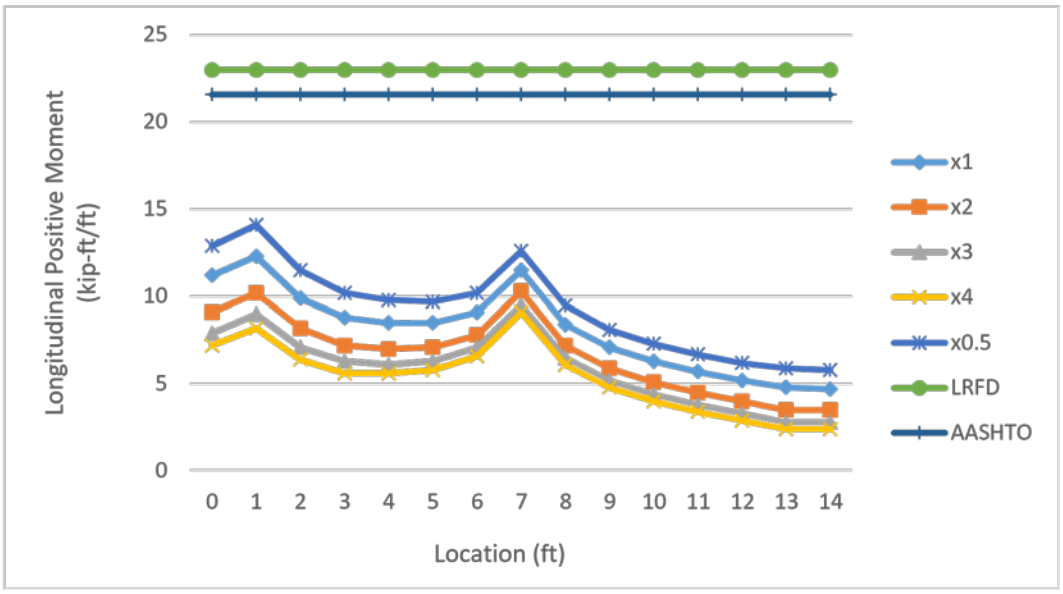

Table 3.1: Longitudinal Negative Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 24ft, Deck width = 24ft, No Railing with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	15.8	30.5	15.8	30.5	15.8	30.5	15.8	30.5	15.8	30.5	21.6
1	18.6	30.5	18.6	30.5	18.6	30.5	18.6	30.5	18.6	30.5	21.6
2	17.1	30.5	17.1	30.5	17.1	30.5	17.1	30.5	17.1	30.5	21.6
3	16.1	30.5	16.1	30.5	16.1	30.5	16.1	30.5	16.1	30.5	21.6
4	15.3	30.5	15.3	30.5	15.3	30.5	15.3	30.5	15.3	30.5	21.6
5	14.8	30.5	14.8	30.5	14.8	30.5	14.8	30.5	14.8	30.5	21.6
6	14.4	30.5	14.4	30.5	14.4	30.5	14.4	30.5	14.4	30.5	21.6
7	14.1	30.5	14.1	30.5	14.1	30.5	14.1	30.5	14.1	30.5	21.6
8	13.9	30.5	13.9	30.5	13.9	30.5	13.9	30.5	13.9	30.5	21.6
9	13.6	30.5	13.6	30.5	13.6	30.5	13.6	30.5	13.6	30.5	21.6
10	13.3	30.5	13.3	30.5	13.3	30.5	13.3	30.5	13.3	30.5	21.6
11	12.9	30.5	12.9	30.5	12.9	30.5	12.9	30.5	12.9	30.5	21.6
12	12.4	30.5	12.4	30.5	12.4	30.5	12.4	30.5	12.4	30.5	21.6
13	11.9	30.5	11.9	30.5	11.9	30.5	11.9	30.5	11.9	30.5	21.6
14	11.4	30.5	11.4	30.5	11.4	30.5	11.4	30.5	11.4	30.5	21.6
15	11	30.5	11	30.5	11	30.5	11	30.5	11	30.5	21.6
16	10.4	30.5	10.4	30.5	10.4	30.5	10.4	30.5	10.4	30.5	21.6
17	9.9	30.5	9.9	30.5	9.9	30.5	9.9	30.5	9.9	30.5	21.6
18	9.2	30.5	9.2	30.5	9.2	30.5	9.2	30.5	9.2	30.5	21.6
19	8.5	30.5	8.5	30.5	8.5	30.5	8.5	30.5	8.5	30.5	21.6

20	7.8	30.5	7.8	30.5	7.8	30.5	7.8	30.5	7.8	30.5	21.6
21	7.1	30.5	7.1	30.5	7.1	30.5	7.1	30.5	7.1	30.5	21.6
22	6.3	30.5	6.3	30.5	6.3	30.5	6.3	30.5	6.3	30.5	21.6
23	5.3	30.5	5.3	30.5	5.3	30.5	5.3	30.5	5.3	30.5	21.6
24	2.4	30.5	2.4	30.5	2.4	30.5	2.4	30.5	2.4	30.5	21.6

Figure 3.1: Longitudinal Negative Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 24ft, Deck width = 24ft, No Railing with Edge Loading.

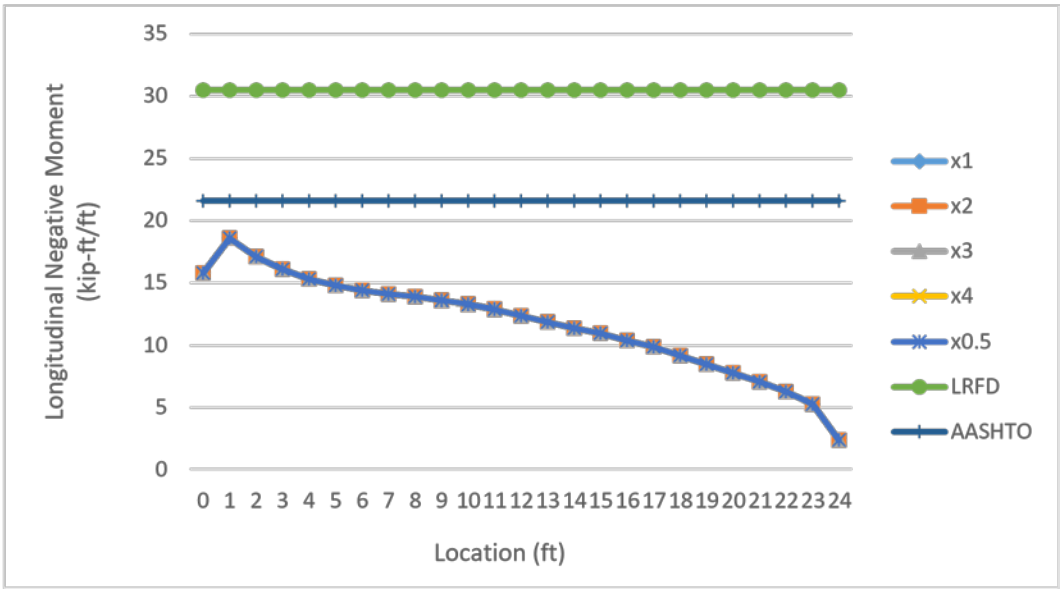

Table 3.2: Longitudinal Negative Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 24ft, Deck width = 24ft, One Left Railing with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	12.3	30.5	12	30.5	11.8	30.5	11.7	30.5	13	30.5	21.6
1	7.7	30.5	6	30.5	5.1	30.5	4.7	30.5	10.1	30.5	21.6
2	8.6	30.5	7.2	30.5	6.6	30.5	6.2	30.5	10.5	30.5	21.6
3	8.7	30.5	7.5	30.5	6.9	30.5	6.6	30.5	10.4	30.5	21.6
4	9.4	30.5	8.3	30.5	7.8	30.5	7.6	30.5	10.7	30.5	21.6
5	9.9	30.5	9	30.5	8.6	30.5	8.4	30.5	11.1	30.5	21.6
6	10.5	30.5	9.7	30.5	9.4	30.5	9.2	30.5	11.4	30.5	21.6
7	10.9	30.5	10.3	30.5	10	30.5	9.8	30.5	11.7	30.5	21.6
8	11.3	30.5	10.7	30.5	10.5	30.5	10.4	30.5	12	30.5	21.6
9	11.5	30.5	11.1	30.5	10.9	30.5	10.8	30.5	12	30.5	21.6
10	11.6	30.5	11.2	30.5	11.1	30.5	11	30.5	12	30.5	21.6
11	11.4	30.5	11	30.5	11	30.5	10.9	30.5	12	30.5	21.6
12	11.2	30.5	11	30.5	10.9	30.5	10.8	30.5	11.6	30.5	21.6
13	11	30.5	10.8	30.5	10.7	30.5	10.7	30.5	11.3	30.5	21.6
14	10.7	30.5	10.5	30.5	10.5	30.5	10.4	30.5	10.9	30.5	21.6
15	10.3	30.5	10.2	30.5	10.1	30.5	10	30.5	10.5	30.5	21.6
16	9.9	30.5	9.8	30.5	9.7	30.5	9.7	30.5	10.1	30.5	21.6
17	9.4	30.5	9.3	30.5	9.3	30.5	9.3	30.5	9.6	30.5	21.6
18	8.9	30.5	8.9	30.5	8.8	30.5	8.8	30.5	9	30.5	21.6
19	8.3	30.5	8.3	30.5	8.2	30.5	8.2	30.5	8.4	30.5	21.6

20	7.6	30.5	7.6	30.5	7.6	30.5	7.5	30.5	7.7	30.5	21.6
21	7	30.5	7	30.5	6.9	30.5	6.9	30.5	7	30.5	21.6
22	6.3	30.5	6.3	30.5	6.3	30.5	6.3	30.5	6.3	30.5	21.6
23	5.4	30.5	5.4	30.5	5.5	30.5	5.5	30.5	5.4	30.5	21.6
24	2.8	30.5	2.7	30.5	2.7	30.5	2.7	30.5	2.6	30.5	21.6

Figure 3.2: Longitudinal Negative Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 24ft, Deck width = 24ft, One Left Railing with Edge Loading.

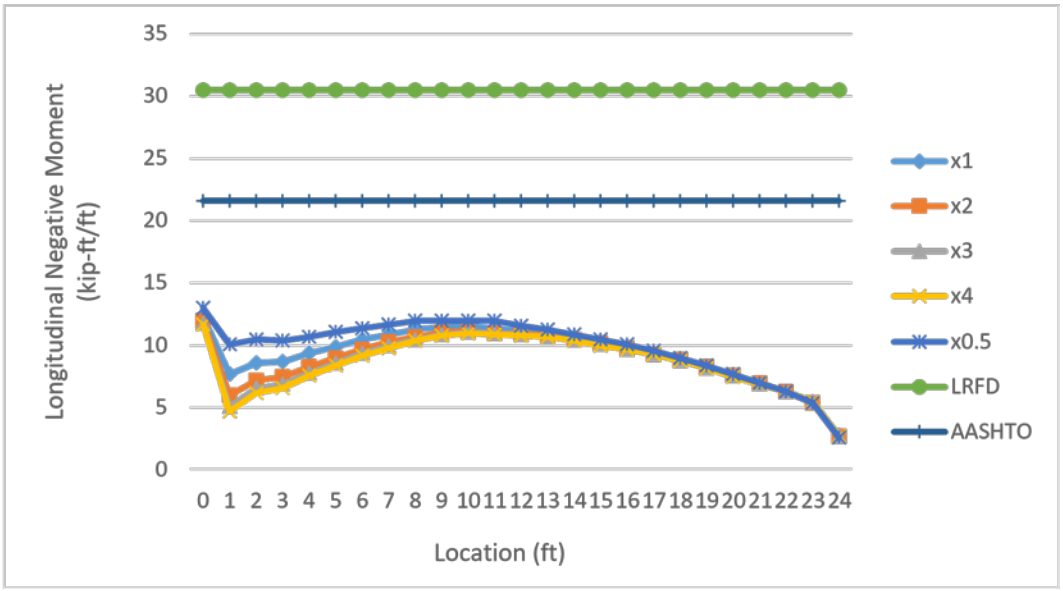

Table 3.3: Longitudinal Negative Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 24ft, Deck width = 24ft, One Right Railings with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	15.9	30.5	15.9	30.5	15.9	30.5	15.9	30.5	16.1	30.5	21.6
1	18.7	30.5	18.7	30.5	18.7	30.5	18.7	30.5	18.7	30.5	21.6
2	17	30.5	17	30.5	17	30.5	17.1	30.5	17	30.5	21.6
3	15.8	30.5	15.9	30.5	15.9	30.5	15.9	30.5	16	30.5	21.6
4	15.2	30.5	15.2	30.5	15.2	30.5	15.2	30.5	15.2	30.5	21.6
5	14.7	30.5	14.6	30.5	14.6	30.5	14.6	30.5	14.6	30.5	21.6
6	14.3	30.5	14.2	30.5	14.2	30.5	14.2	30.5	14.3	30.5	21.6
7	13.9	30.5	13.9	30.5	13.8	30.5	13.8	30.5	14	30.5	21.6
8	13.6	30.5	13.6	30.5	13.5	30.5	13.5	30.5	13.7	30.5	21.6
9	13.3	30.5	13.3	30.5	13.2	30.5	13.2	30.5	13.4	30.5	21.6
10	13	30.5	12.9	30.5	12.8	30.5	12.8	30.5	13	30.5	21.6
11	12.4	30.5	12.3	30.5	12.3	30.5	12.3	30.5	12.5	30.5	21.6
12	11.9	30.5	11.8	30.5	11.7	30.5	11.7	30.5	12	30.5	21.6
13	11.3	30.5	11.2	30.5	11.2	30.5	11.1	30.5	11.5	30.5	21.6
14	10.7	30.5	10.6	30.5	10.5	30.5	10.5	30.5	10.9	30.5	21.6
15	10	30.5	9.9	30.5	9.8	30.5	9.8	30.5	10.3	30.5	21.6
16	9.4	30.5	9.2	30.5	9.1	30.5	9	30.5	9.6	30.5	21.6
17	8.6	30.5	8.4	30.5	8.3	30.5	8.2	30.5	8.9	30.5	21.6
18	7.8	30.5	7.5	30.5	7.4	30.5	7.3	30.5	8.2	30.5	21.6
19	6.9	30.5	6.6	30.5	6.4	30.5	6.3	30.5	7.3	30.5	21.6

20	5.9	30.5	5.5	30.5	5.3	30.5	5.2	30.5	6.4	30.5	21.6
21	4.9	30.5	4.4	30.5	4.2	30.5	4.1	30.5	5.4	30.5	21.6
22	4	30.5	3.5	30.5	3.3	30.5	3.2	30.5	4.6	30.5	21.6
23	3	30.5	2.4	30.5	2.2	30.5	2	30.5	3.7	30.5	21.6
24	1.9	30.5	1.8	30.5	1.7	30.5	1.6	30.5	2.1	30.5	21.6

Figure 3.3: Longitudinal Negative Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 24ft, Deck width = 24ft, One Right Railings with Edge Loading.

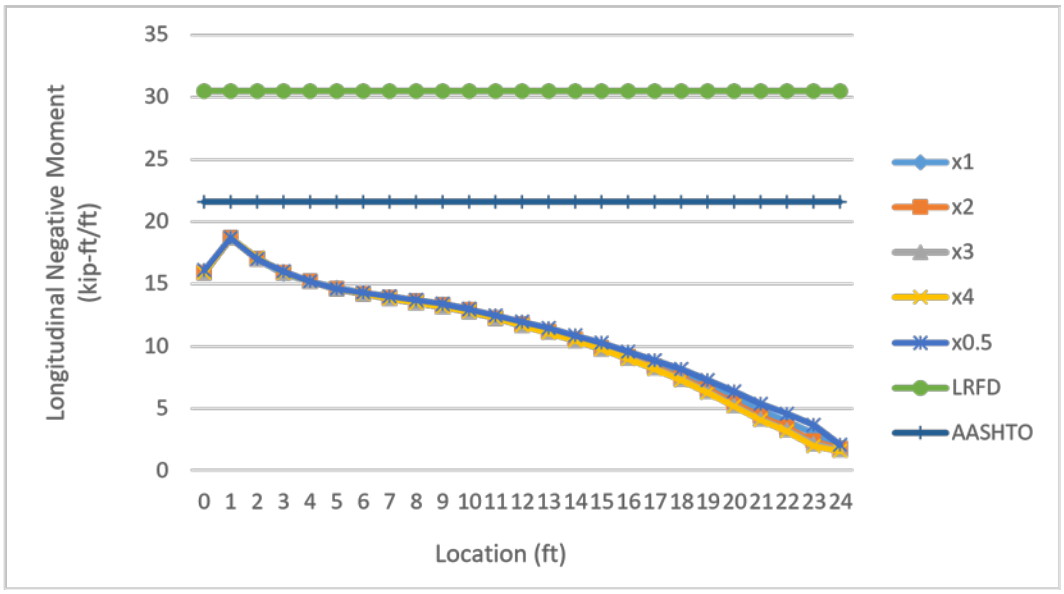

Table 3.4: Longitudinal Negative Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 24ft, Deck width = 24ft, Two Railings with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	12.7	30.5	12.2	30.5	11.9	30.5	11.8	30.5	13.4	30.5	21.6
1	7.7	30.5	5.9	30.5	5.1	30.5	4.7	30.5	10.1	30.5	21.6
2	8.6	30.5	7.2	30.5	6.6	30.5	6.2	30.5	10.5	30.5	21.6
3	8.7	30.5	7.4	30.5	6.9	30.5	6.5	30.5	10.4	30.5	21.6
4	9.3	30.5	8.2	30.5	7.7	30.5	7.5	30.5	10.7	30.5	21.6
5	9.8	30.5	8.9	30.5	8.5	30.5	8.3	30.5	11	30.5	21.6
6	10.3	30.5	9.5	30.5	9.2	30.5	9	30.5	11.3	30.5	21.6
7	10.8	30.5	10.1	30.5	9.8	30.5	9.6	30.5	11.6	30.5	21.6
8	11.1	30.5	10.5	30.5	10.3	30.5	10.1	30.5	11.8	30.5	21.6
9	11.2	30.5	10.7	30.5	10.5	30.5	10.4	30.5	11.8	30.5	21.6
10	11.2	30.5	10.8	30.5	10.6	30.5	10.5	30.5	11.8	30.5	21.6
11	11.1	30.5	10.7	30.5	10.5	30.5	10.4	30.5	11.6	30.5	21.6
12	10.8	30.5	10.5	30.5	10.3	30.5	10.2	30.5	11.2	30.5	21.6
13	10.4	30.5	10.1	30.5	10	30.5	9.9	30.5	10.8	30.5	21.6
14	10	30.5	9.7	30.5	9.5	30.5	9.5	30.5	10.4	30.5	21.6
15	9.5	30.5	9.2	30.5	9.1	30.5	9	30.5	9.9	30.5	21.6
16	9	30.5	8.6	30.5	8.5	30.5	8.4	30.5	9.3	30.5	21.6
17	8.3	30.5	8	30.5	7.8	30.5	7.7	30.5	8.7	30.5	21.6
18	7.5	30.5	7.2	30.5	7	30.5	6.9	30.5	8	30.5	21.6
19	6.7	30.5	6.3	30.5	6.1	30.5	6	30.5	7.1	30.5	21.6

20	5.7	30.5	5.3	30.5	5.1	30.5	5	30.5	6.3	30.5	21.6
21	4.8	30.5	4.3	30.5	4.1	30.5	4	30.5	5.4	30.5	21.6
22	4	30.5	3.5	30.5	3.2	30.5	3.1	30.5	4.6	30.5	21.6
23	3	30.5	2.4	30.5	2.1	30.5	2	30.5	3.7	30.5	21.6
24	2.1	30.5	2	30.5	2	30.5	1.9	30.5	2.3	30.5	21.6

Figure 3.4: Longitudinal Negative Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 24ft, Deck width = 24ft, Two Railings with Edge Loading.

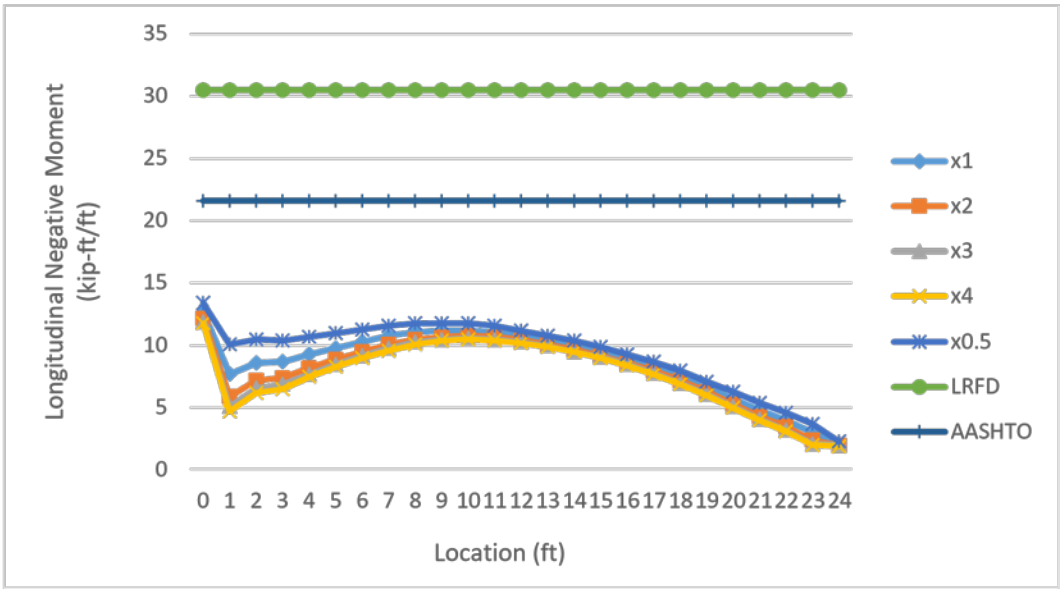

Table 4.1: Longitudinal Positive Moment Distribution at Critical Section for Two-Lane Lane Two Span Bridge Deck Span = 24ft, Deck width = 24ft, No Railing with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	18.7	35.8	18.7	35.8	18.7	35.8	18.7	35.8	18.7	35.8	21.6
1	20.1	35.8	20.1	35.8	20.1	35.8	20.1	35.8	20.1	35.8	21.6
2	16.5	35.8	16.5	35.8	16.5	35.8	16.5	35.8	16.5	35.8	21.6
3	15.1	35.8	15.1	35.8	15.1	35.8	15.1	35.8	15.1	35.8	21.6
4	14.5	35.8	14.5	35.8	14.5	35.8	14.5	35.8	14.5	35.8	21.6
5	14.4	35.8	14.4	35.8	14.4	35.8	14.4	35.8	14.4	35.8	21.6
6	15.1	35.8	15.1	35.8	15.1	35.8	15.1	35.8	15.1	35.8	21.6
7	17.5	35.8	17.5	35.8	17.5	35.8	17.5	35.8	17.5	35.8	21.6
8	14.9	35.8	14.9	35.8	14.9	35.8	14.9	35.8	14.9	35.8	21.6
9	14.1	35.8	14.1	35.8	14.1	35.8	14.1	35.8	14.1	35.8	21.6
10	14.4	35.8	14.4	35.8	14.4	35.8	14.4	35.8	14.4	35.8	21.6
11	16.5	35.8	16.5	35.8	16.5	35.8	16.5	35.8	16.5	35.8	21.6
12	13.5	35.8	13.5	35.8	13.5	35.8	13.5	35.8	13.5	35.8	21.6
13	12.3	35.8	12.3	35.8	12.3	35.8	12.3	35.8	12.3	35.8	21.6
14	11.7	35.8	11.7	35.8	11.7	35.8	11.7	35.8	11.7	35.8	21.6
15	11.6	35.8	11.6	35.8	11.6	35.8	11.6	35.8	11.6	35.8	21.6
16	12.1	35.8	12.1	35.8	12.1	35.8	12.1	35.8	12.1	35.8	21.6
17	14.4	35.8	14.4	35.8	14.4	35.8	14.4	35.8	14.4	35.8	21.6
18	11.3	35.8	11.3	35.8	11.3	35.8	11.3	35.8	11.3	35.8	21.6
19	9.9	35.8	9.9	35.8	9.9	35.8	9.9	35.8	9.9	35.8	21.6

20	9.2	35.8	9.2	35.8	9.2	35.8	9.2	35.8	9.2	35.8	21.6
21	8.6	35.8	8.6	35.8	8.6	35.8	8.6	35.8	8.6	35.8	21.6
22	8.3	35.8	8.3	35.8	8.3	35.8	8.3	35.8	8.3	35.8	21.6
23	8	35.8	8	35.8	8	35.8	8	35.8	8	35.8	21.6
24	7.9	35.8	7.9	35.8	7.9	35.8	7.9	35.8	7.9	35.8	21.6

Figure 4.1: Longitudinal Positive Moment Distribution at Critical Section for Two-Lane Lane Two Span Bridge Deck Span = 24ft, Deck width = 24ft, No Railing with Edge Loading.

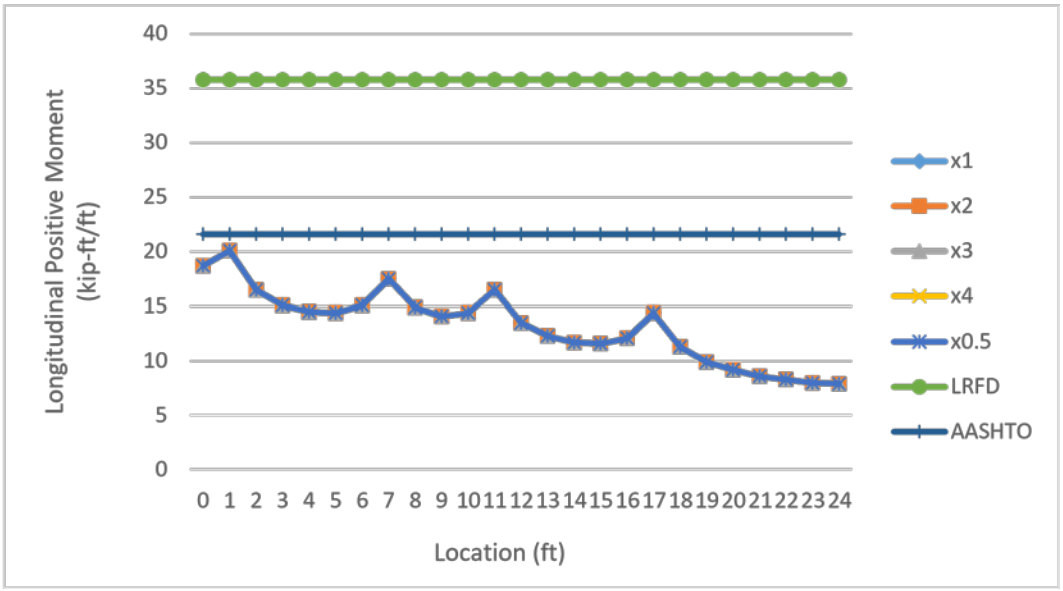

Table 4.2: Longitudinal Positive Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 24ft, Deck width = 24ft, One Left Railing with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	9	35.8	6.9	35.8	6	35.8	5.5	35.8	11.4	35.8	21.6
1	10.4	35.8	8.2	35.8	7.4	35.8	6.8	35.8	12.7	35.8	21.6
2	8.9	35.8	7.1	35.8	6.4	35.8	5.9	35.8	10.9	35.8	21.6
3	8.4	35.8	6.9	35.8	6.1	35.8	5.7	35.8	10.2	35.8	21.6
4	8.8	35.8	7.4	35.8	6.7	35.8	6.4	35.8	10.3	35.8	21.6
5	9.4	35.8	8.1	35.8	7.6	35.8	7.2	35.8	10.8	35.8	21.6
6	10.7	35.8	9.6	35.8	9.1	35.8	8.8	35.8	11.9	35.8	21.6
7	13.7	35.8	12.7	35.8	12.3	35.8	12	35.8	14.8	35.8	21.6
8	11.5	35.8	10.6	35.8	10.2	35.8	9.9	35.8	12.4	35.8	21.6
9	11	35.8	10.3	35.8	9.9	35.8	9.7	35.8	11.9	35.8	21.6
10	11.7	35.8	11	35.8	10.7	35.8	10.5	35.8	12.5	35.8	21.6
11	14.1	35.8	13.5	35.8	13.3	35.8	13.1	35.8	14.8	35.8	21.6
12	11.4	35.8	10.8	35.8	10.6	35.8	10.4	35.8	12	35.8	21.6
13	10.4	35.8	9.8	35.8	9.6	35.8	9.5	35.8	10.9	35.8	21.6
14	10	35.8	9.5	35.8	9.3	35.8	9.2	35.8	10.5	35.8	21.6
15	10	35.8	9.6	35.8	9.4	35.8	9.3	35.8	10.5	35.8	21.6
16	10.7	35.8	10.3	35.8	10.2	35.8	10	35.8	11.1	35.8	21.6
17	13.1	35.8	12.7	35.8	12.6	35.8	12.5	35.8	13.4	35.8	21.6
18	10.1	35.8	9.8	35.8	9.7	35.8	9.6	35.8	10.5	35.8	21.6
19	8.9	35.8	8.6	35.8	8.4	35.8	8.4	35.8	9.2	35.8	21.6

20	8.2	35.8	7.9	35.8	7.8	35.8	7.7	35.8	8.5	35.8	21.6
21	7.7	35.8	7.4	35.8	7.3	35.8	7.3	35.8	8	35.8	21.6
22	7.4	35.8	7.2	35.8	7	35.8	7	35.8	7.6	35.8	21.6
23	7.2	35.8	7	35.8	6.9	35.8	6.8	35.8	7.4	35.8	21.6
24	7.1	35.8	6.9	35.8	6.8	35.8	6.7	35.8	7.3	35.8	21.6

Figure 4.2: Longitudinal Positive Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 24ft, Deck width = 24ft, One Left Railing with Edge Loading.

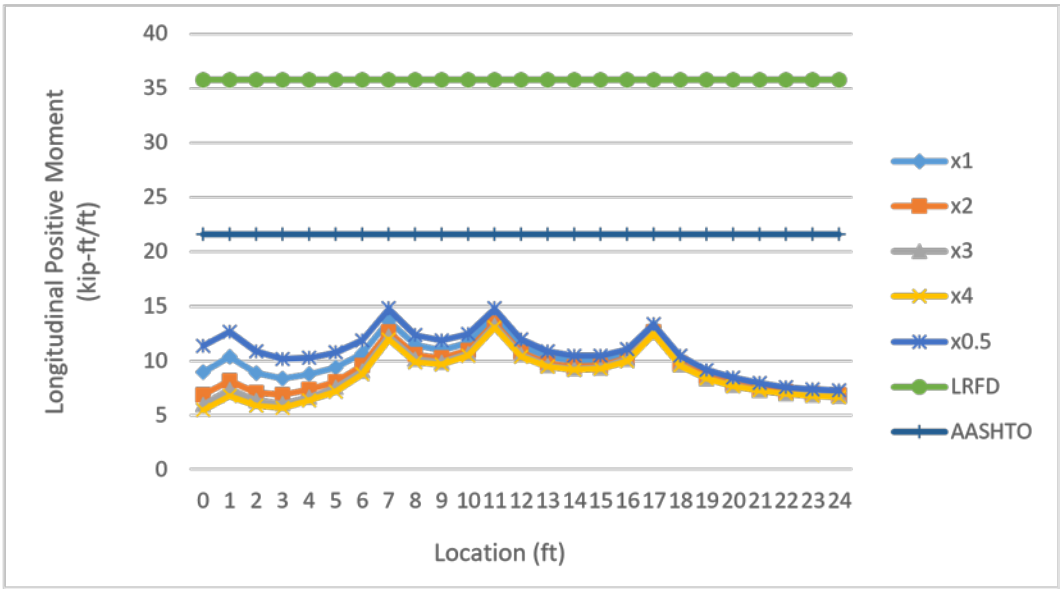

Table 4.3: Longitudinal Positive Moment Distribution at Critical Section for Tow-Lane Two Span Bridge Deck Span = 24ft, Deck width = 24ft, One Right Railings with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	18.2	35.8	18.1	35.8	18.1	35.8	18	35.8	18.4	35.8	21.6
1	19.6	35.8	19.5	35.8	19.4	35.8	19.4	35.8	19.8	35.8	21.6
2	16.1	35.8	15.9	35.8	15.9	35.8	15.8	35.8	16.2	35.8	21.6
3	14.6	35.8	14.4	35.8	14.4	35.8	14.3	35.8	14.8	35.8	21.6
4	14	35.8	13.8	35.8	13.7	35.8	13.7	35.8	14.1	35.8	21.6
5	13.8	35.8	13.7	35.8	13.6	35.8	13.5	35.8	14	35.8	21.6
6	14.4	35.8	14.3	35.8	14.2	35.8	14.1	35.8	14.6	35.8	21.6
7	16.9	35.8	16.7	35.8	16.6	35.8	16.6	35.8	17.2	35.8	21.6
8	14.1	35.8	13.9	35.8	13.8	35.8	13.8	35.8	14.4	35.8	21.6
9	13.2	35.8	13	35.8	12.9	35.8	12.8	35.8	13.5	35.8	21.6
10	13.5	35.8	13.2	35.8	13.1	35.8	13	35.8	13.7	35.8	21.6
11	15.6	35.8	15.3	35.8	15.1	35.8	15.1	35.8	15.9	35.8	21.6
12	12.4	35.8	12	35.8	11.9	35.8	11.8	35.8	12.7	35.8	21.6
13	11	35.8	10.6	35.8	10.4	35.8	10.3	35.8	11.4	35.8	21.6
14	10.3	35.8	9.9	35.8	9.7	35.8	9.6	35.8	10.7	35.8	21.6
15	9.9	35.8	9.5	35.8	9.3	35.8	9.2	35.8	10.4	35.8	21.6
16	10.3	35.8	9.8	35.8	9.5	35.8	9.4	35.8	10.8	35.8	21.6
17	12.3	35.8	11.8	35.8	11.5	35.8	11.4	35.8	13	35.8	21.6
18	9	35.8	8.4	35.8	8.1	35.8	7.9	35.8	9.7	35.8	21.6
19	7.3	35.8	6.7	35.8	6.4	35.8	6.2	35.8	8.1	35.8	21.6

20	6.3	35.8	5.5	35.8	5.2	35.8	5	35.8	7.1	35.8	21.6
21	5.4	35.8	4.5	35.8	4.1	35.8	3.9	35.8	6.3	35.8	21.6
22	4.6	35.8	3.7	35.8	3.3	35.8	3	35.8	5.7	35.8	21.6
23	3.8	35.8	2.8	35.8	2.3	35.8	2	35.8	5	35.8	21.6
24	3.7	35.8	2.7	35.8	2.2	35.8	1.9	35.8	4.9	35.8	21.6

Figure 4.3: Longitudinal Positive Moment Distribution at Critical Section for Tow-Lane Two Span Bridge Deck Span = 24ft, Deck width = 24ft, One Right Railings with Edge Loading.

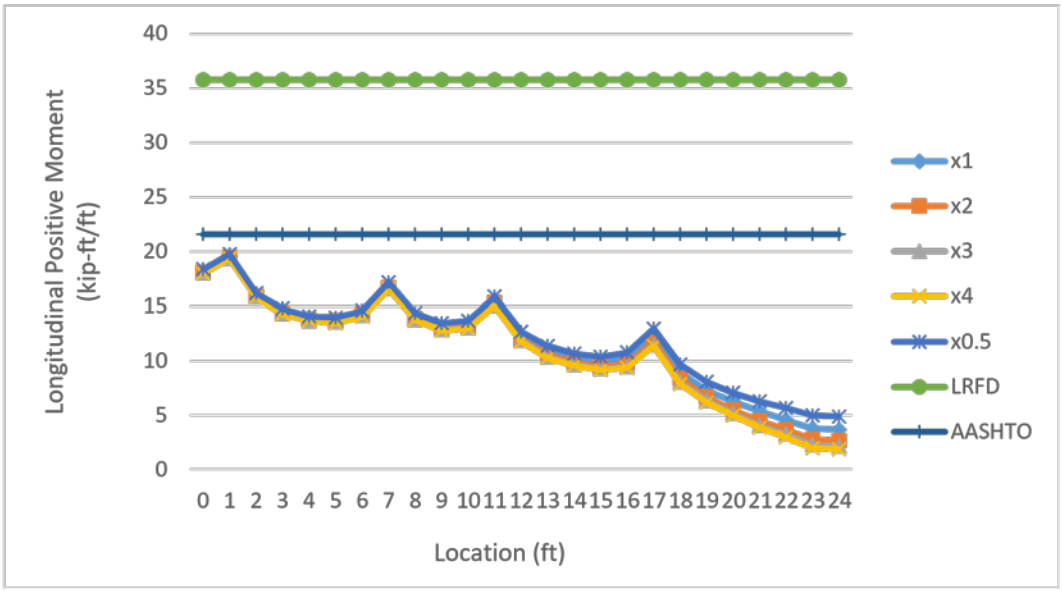

Table 4.4: Longitudinal Positive Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 24ft, Deck width = 24ft, Two Railings with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	8.8	35.8	6.8	35.8	5.9	35.8	5.4	35.8	11.2	35.8	21.6
1	10.1	35.8	8.1	35.8	7.2	35.8	6.7	35.8	12.6	35.8	21.6
2	8.6	35.8	6.9	35.8	6.1	35.8	5.7	35.8	10.7	35.8	21.6
3	8.1	35.8	6.5	35.8	5.8	35.8	5.4	35.8	10	35.8	21.6
4	8.4	35.8	7	35.8	6.3	35.8	6	35.8	10.1	35.8	21.6
5	9	35.8	7.7	35.8	7.1	35.8	6.8	35.8	10.5	35.8	21.6
6	10.2	35.8	9	35.8	8.5	35.8	8.2	35.8	11.6	35.8	21.6
7	13.2	35.8	12.1	35.8	11.6	35.8	11.3	35.8	14.4	35.8	21.6
8	10.8	35.8	9.8	35.8	9.4	35.8	9.1	35.8	12	35.8	21.6
9	10.4	35.8	9.4	35.8	9	35.8	8.8	35.8	11.4	35.8	21.6
10	10.9	35.8	10	35.8	9.7	35.8	9.4	35.8	12	35.8	21.6
11	13.3	35.8	12.5	35.8	12	35.8	11.9	35.8	14.3	35.8	21.6
12	10.4	35.8	9.6	35.8	9.3	35.8	9.1	35.8	11.3	35.8	21.6
13	9.2	35.8	8.5	35.8	8	35.8	7.9	35.8	10.1	35.8	21.6
14	8.7	35.8	8	35.8	7.7	35.8	7.5	35.8	9.6	35.8	21.6
15	8.6	35.8	7.9	35.8	7.5	35.8	7.3	35.8	9.4	35.8	21.6
16	9.1	35.8	8.4	35.8	8	35.8	7.8	35.8	9.9	35.8	21.6
17	11.3	35.8	10.6	35.8	10.2	35.8	10	35.8	12.2	35.8	21.6
18	8.1	35.8	7.3	35.8	7	35.8	6.8	35.8	9	35.8	21.6
19	6.5	35.8	5.7	35.8	5.4	35.8	5.2	35.8	7.5	35.8	21.6

20	5.6	35.8	4.7	35.8	4.4	35.8	4.2	35.8	6.5	35.8	21.6
21	4.8	35.8	3.9	35.8	3.5	35.8	3.3	35.8	5.8	35.8	21.6
22	4.1	35.8	3.2	35.8	2.8	35.8	2.6	35.8	5.2	35.8	21.6
23	3.5	35.8	2.4	35.8	2	35.8	1.7	35.8	4.7	35.8	21.6
24	3.4	35.8	2.3	35.8	1.9	35.8	1.6	35.8	4.6	35.8	21.6

Figure 4.4: Longitudinal Positive Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 24ft, Deck width = 24ft, Two Railings with Edge Loading.

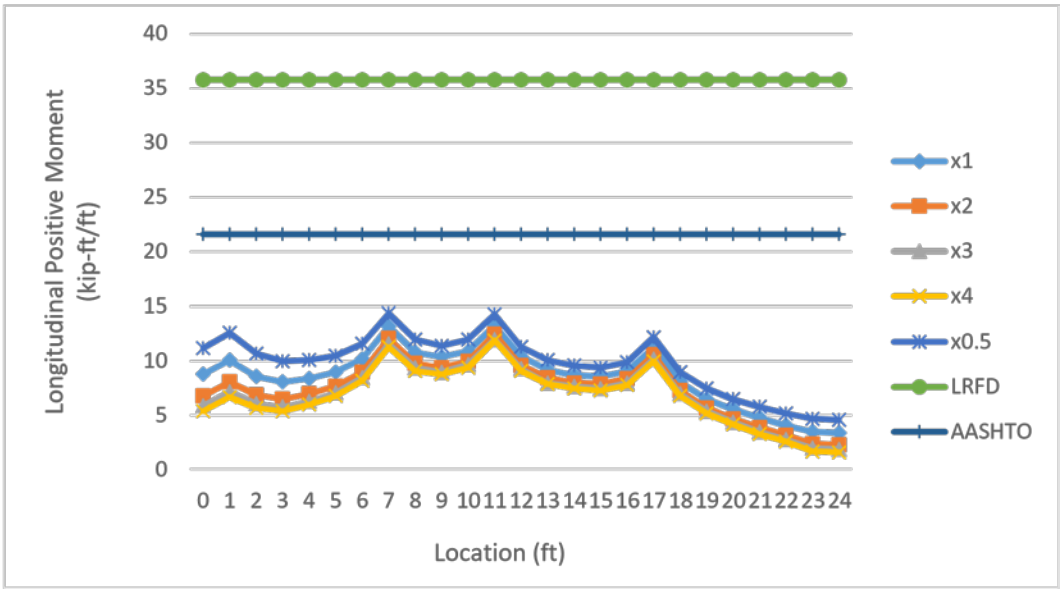

Table 5.1: Longitudinal Negative Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 24ft, Deck width = 36ft, No Railing with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	15.6	40.7	15.6	40.7	15.6	40.7	15.6	40.7	15.6	40.7	21.6
1	18.8	40.7	18.8	40.7	18.8	40.7	18.8	40.7	18.8	40.7	21.6
2	17.3	40.7	17.3	40.7	17.3	40.7	17.3	40.7	17.3	40.7	21.6
3	16.4	40.7	16.4	40.7	16.4	40.7	16.4	40.7	16.4	40.7	21.6
4	15.7	40.7	15.7	40.7	15.7	40.7	15.7	40.7	15.7	40.7	21.6
5	15.2	40.7	15.2	40.7	15.2	40.7	15.2	40.7	15.2	40.7	21.6
6	15	40.7	15	40.7	15	40.7	15	40.7	15	40.7	21.6
7	14.8	40.7	14.8	40.7	14.8	40.7	14.8	40.7	14.8	40.7	21.6
8	14.7	40.7	14.7	40.7	14.7	40.7	14.7	40.7	14.7	40.7	21.6
9	14.5	40.7	14.5	40.7	14.5	40.7	14.5	40.7	14.5	40.7	21.6
10	14.4	40.7	14.4	40.7	14.4	40.7	14.4	40.7	14.4	40.7	21.6
11	14.2	40.7	14.2	40.7	14.2	40.7	14.2	40.7	14.2	40.7	21.6
12	14	40.7	14	40.7	14	40.7	14	40.7	14	40.7	21.6
13	13.8	40.7	13.8	40.7	13.8	40.7	13.8	40.7	13.8	40.7	21.6
14	13.6	40.7	13.6	40.7	13.6	40.7	13.6	40.7	13.6	40.7	21.6
15	13.5	40.7	13.5	40.7	13.5	40.7	13.5	40.7	13.5	40.7	21.6
16	13.5	40.7	13.5	40.7	13.5	40.7	13.5	40.7	13.5	40.7	21.6
17	13.5	40.7	13.5	40.7	13.5	40.7	13.5	40.7	13.5	40.7	21.6
18	13.4	40.7	13.4	40.7	13.4	40.7	13.4	40.7	13.4	40.7	21.6
19	13.2	40.7	13.2	40.7	13.2	40.7	13.2	40.7	13.2	40.7	21.6

20	13	40.7	13	40.7	13	40.7	13	40.7	13	40.7	21.6
21	12.6	40.7	12.6	40.7	12.6	40.7	12.6	40.7	12.6	40.7	21.6
22	12.1	40.7	12.1	40.7	12.1	40.7	12.1	40.7	12.1	40.7	21.6
23	11.7	40.7	11.7	40.7	11.7	40.7	11.7	40.7	11.7	40.7	21.6
24	11.1	40.7	11.1	40.7	11.1	40.7	11.1	40.7	11.1	40.7	21.6
25	10.6	40.7	10.6	40.7	10.6	40.7	10.6	40.7	10.6	40.7	21.6
26	10	40.7	10	40.7	10	40.7	10	40.7	10	40.7	21.6
27	9.4	40.7	9.4	40.7	9.4	40.7	9.4	40.7	9.4	40.7	21.6
28	8.7	40.7	8.7	40.7	8.7	40.7	8.7	40.7	8.7	40.7	21.6
29	7.9	40.7	7.9	40.7	7.9	40.7	7.9	40.7	7.9	40.7	21.6
30	7.1	40.7	7.1	40.7	7.1	40.7	7.1	40.7	7.1	40.7	21.6
31	6.3	40.7	6.3	40.7	6.3	40.7	6.3	40.7	6.3	40.7	21.6
32	5.6	40.7	5.6	40.7	5.6	40.7	5.6	40.7	5.6	40.7	21.6
33	4.9	40.7	4.9	40.7	4.9	40.7	4.9	40.7	4.9	40.7	21.6
34	4.2	40.7	4.2	40.7	4.2	40.7	4.2	40.7	4.2	40.7	21.6
35	3.3	40.7	3.3	40.7	3.3	40.7	3.3	40.7	3.3	40.7	21.6
36	1	40.7	1	40.7	1	40.7	1	40.7	1	40.7	21.6

Figure 5.1: Longitudinal Negative Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 24ft, Deck width = 36ft, No Railing with Edge Loading.

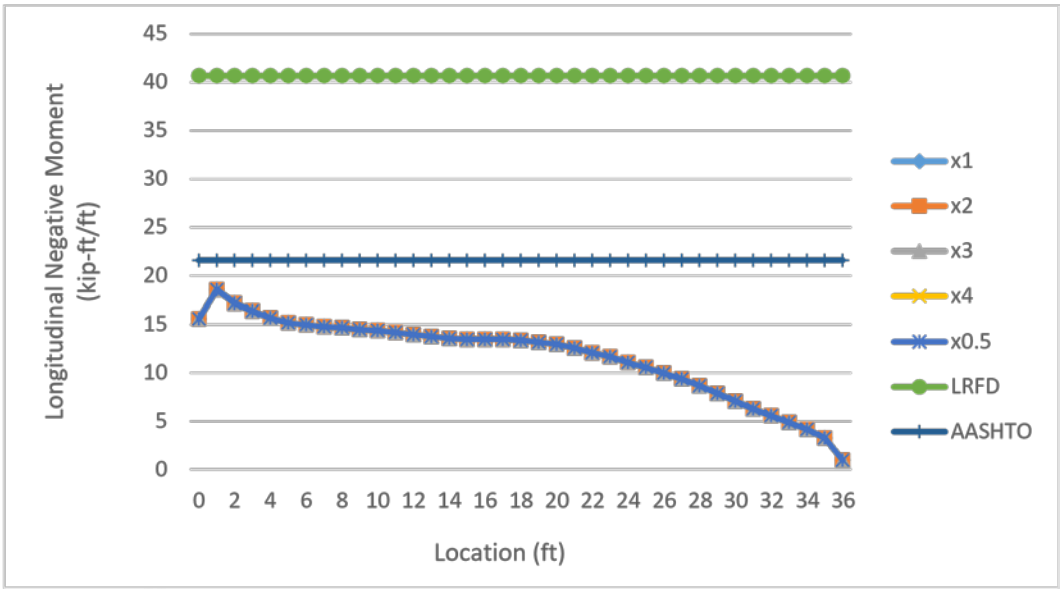

Table 5.2: Longitudinal Negative Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 24ft, Deck width = 36ft, One Left Railing with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	12.5	40.7	11.9	40.7	11.7	40.7	11.5	40.7	13.2	40.7	21.6
1	7.8	40.7	6	40.7	5.2	40.7	4.8	40.7	10.2	40.7	21.6
2	8.9	40.7	7.4	40.7	6.8	40.7	6.4	40.7	10.7	40.7	21.6
3	9	40.7	7.7	40.7	7.2	40.7	6.8	40.7	10.7	40.7	21.6
4	9.7	40.7	8.6	40.7	8.1	40.7	7.9	40.7	11.1	40.7	21.6
5	10.3	40.7	9.4	40.7	9	40.7	8.8	40.7	11.5	40.7	21.6
6	11	40.7	10.2	40.7	9.9	40.7	9.7	40.7	11.9	40.7	21.6
7	11.6	40.7	10.9	40.7	10.6	40.7	10.5	40.7	12.2	40.7	21.6
8	12	40.7	11.5	40.7	11.3	40.7	11.1	40.7	12.7	40.7	21.6
9	12.4	40.7	11.9	40.7	11.8	40.7	11.6	40.7	12.9	40.7	21.6
10	12.6	40.7	12.3	40.7	12.1	40.7	12	40.7	13.1	40.7	21.6
11	12.8	40.7	12.5	40.7	12.3	40.7	12.2	40.7	13.1	40.7	21.6
12	12.8	40.7	12.6	40.7	12.4	40.7	12.4	40.7	13.1	40.7	21.6
13	12.8	40.7	12.6	40.7	12.5	40.7	12.5	40.7	13.1	40.7	21.6
14	12.9	40.7	12.7	40.7	12.6	40.7	12.6	40.7	13.1	40.7	21.6
15	12.9	40.7	12.8	40.7	12.7	40.7	12.7	40.7	13.1	40.7	21.6
16	13	40.7	12.9	40.7	12.9	40.7	12.8	40.7	13.1	40.7	21.6
17	13.1	40.7	13	40.7	13	40.7	12.9	40.7	13.2	40.7	21.6
18	13.1	40.7	13	40.7	13	40.7	13	40.7	13.2	40.7	21.6
19	13	40.7	12.9	40.7	12.9	40.7	12.9	40.7	13	40.7	21.6

20	12.8	40.7	12.7	40.7	12.7	40.7	12.7	40.7	12.8	40.7	21.6
21	12.4	40.7	12.4	40.7	12.4	40.7	12.4	40.7	12.5	40.7	21.6
22	12	40.7	12	40.7	12	40.7	12	40.7	12.1	40.7	21.6
23	11.6	40.7	11.5	40.7	11.5	40.7	11.5	40.7	11.6	40.7	21.6
24	11.1	40.7	11.1	40.7	11	40.7	11	40.7	11.1	40.7	21.6
25	10.6	40.7	10.6	40.7	10.5	40.7	10.5	40.7	10.6	40.7	21.6
26	10	40.7	10	40.7	10	40.7	10	40.7	10	40.7	21.6
27	9.4	40.7	9.4	40.7	9.4	40.7	9.4	40.7	9.4	40.7	21.6
28	8.7	40.7	8.7	40.7	8.7	40.7	8.7	40.7	8.7	40.7	21.6
29	7.9	40.7	7.9	40.7	7.9	40.7	7.9	40.7	7.9	40.7	21.6
30	7.1	40.7	7.1	40.7	7.1	40.7	7.1	40.7	7.1	40.7	21.6
31	6.4	40.7	6.4	40.7	6.4	40.7	6.4	40.7	6.4	40.7	21.6
32	5.6	40.7	5.6	40.7	5.6	40.7	5.6	40.7	5.6	40.7	21.6
33	5	40.7	5	40.7	5	40.7	5	40.7	4.9	40.7	21.6
34	4.3	40.7	4.3	40.7	4.3	40.7	4.3	40.7	4.3	40.7	21.6
35	3.3	40.7	3.4	40.7	3.4	40.7	3.4	40.7	3.3	40.7	21.6
36	1	40.7	1.1	40.7	1.1	40.7	1.1	40.7	1	40.7	21.6

Figure 5.2: Longitudinal Negative Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 24ft, Deck width = 36ft, One Left Railing with Edge Loading.

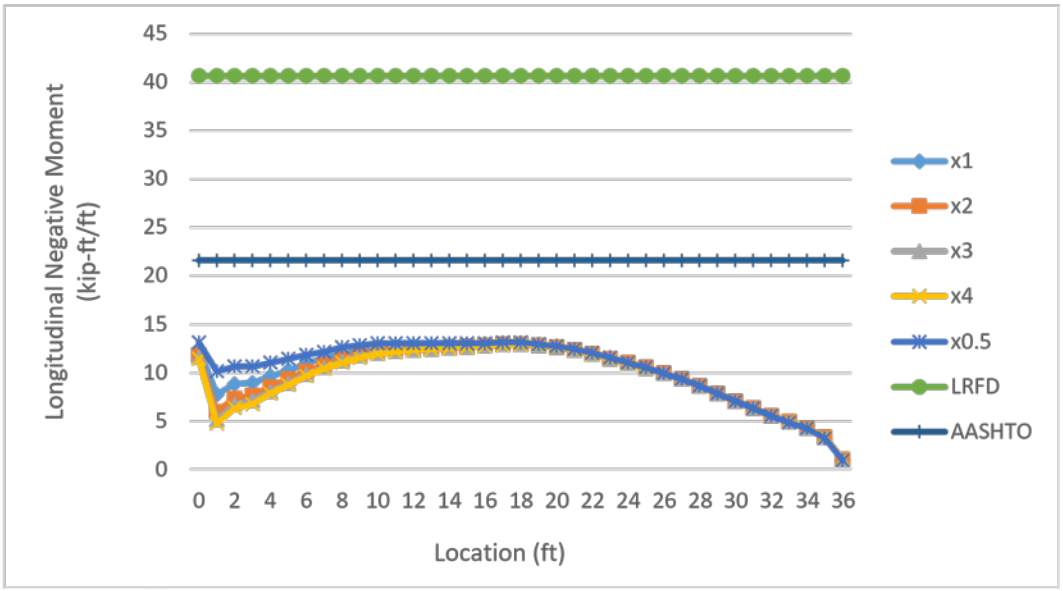

Table 5.3: Longitudinal Negative Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 24ft, Deck width = 36ft, One Right Railings with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	15.7	40.7	15.7	40.7	15.7	40.7	15.7	40.7	15.7	40.7	21.6
1	18.8	40.7	18.8	40.7	18.8	40.7	18.8	40.7	18.8	40.7	21.6
2	17.3	40.7	17.3	40.7	17.3	40.7	17.3	40.7	17.3	40.7	21.6
3	16.4	40.7	16.4	40.7	16.4	40.7	16.4	40.7	16.4	40.7	21.6
4	15.7	40.7	15.7	40.7	15.7	40.7	15.7	40.7	15.7	40.7	21.6
5	15.2	40.7	15.2	40.7	15.2	40.7	15.2	40.7	15.2	40.7	21.6
6	15	40.7	15	40.7	15	40.7	15	40.7	15	40.7	21.6
7	14.8	40.7	14.8	40.7	14.8	40.7	14.8	40.7	14.8	40.7	21.6
8	14.7	40.7	14.7	40.7	14.7	40.7	14.7	40.7	14.7	40.7	21.6
9	14.5	40.7	14.5	40.7	14.5	40.7	14.5	40.7	14.5	40.7	21.6
10	14.4	40.7	14.4	40.7	14.4	40.7	14.4	40.7	14.4	40.7	21.6
11	14.1	40.7	14.1	40.7	14.1	40.7	14.1	40.7	14.2	40.7	21.6
12	13.9	40.7	13.9	40.7	13.9	40.7	13.9	40.7	13.9	40.7	21.6
13	13.7	40.7	13.7	40.7	13.7	40.7	13.7	40.7	13.7	40.7	21.6
14	13.6	40.7	13.6	40.7	13.6	40.7	13.6	40.7	13.6	40.7	21.6
15	13.5	40.7	13.5	40.7	13.5	40.7	13.5	40.7	13.5	40.7	21.6
16	13.4	40.7	13.4	40.7	13.4	40.7	13.4	40.7	13.5	40.7	21.6
17	13.4	40.7	13.4	40.7	13.3	40.7	13.3	40.7	13.4	40.7	21.6
18	13.3	40.7	13.2	40.7	13.2	40.7	13.2	40.7	13.3	40.7	21.6
19	13.1	40.7	13.1	40.7	13	40.7	13	40.7	13.1	40.7	21.6

20	12.8	40.7	12.7	40.7	12.7	40.7	12.7	40.7	12.8	40.7	21.6
21	12.4	40.7	12.3	40.7	12.3	40.7	12.3	40.7	12.4	40.7	21.6
22	11.9	40.7	11.8	40.7	11.8	40.7	11.8	40.7	12	40.7	21.6
23	11.4	40.7	11.3	40.7	11.3	40.7	11.2	40.7	11.4	40.7	21.6
24	10.8	40.7	10.7	40.7	10.7	40.7	10.6	40.7	10.9	40.7	21.6
25	10.2	40.7	10.1	40.7	10	40.7	10	40.7	10.3	40.7	21.6
26	9.5	40.7	9.4	40.7	9.4	40.7	9.4	40.7	9.7	40.7	21.6
27	8.8	40.7	8.7	40.7	8.6	40.7	8.6	40.7	9	40.7	21.6
28	8	40.7	7.8	40.7	7.8	40.7	7.7	40.7	8.2	40.7	21.6
29	7.1	40.7	6.9	40.7	6.8	40.7	6.8	40.7	7.3	40.7	21.6
30	6.2	40.7	5.9	40.7	5.9	40.7	5.8	40.7	6.4	40.7	21.6
31	5.2	40.7	5	40.7	4.9	40.7	4.8	40.7	5.5	40.7	21.6
32	4.3	40.7	4.1	40.7	3.8	40.7	3.9	40.7	4.7	40.7	21.6
33	3.5	40.7	3.2	40.7	3.1	40.7	3	40.7	3.9	40.7	21.6
34	2.8	40.7	2.5	40.7	2.3	40.7	2.2	40.7	3.2	40.7	21.6
35	2	40.7	1.7	40.7	1.5	40.7	1.4	40.7	2.5	40.7	21.6
36	0.83	40.7	0.7	40.7	0.7	40.7	0.6	40.7	1	40.7	21.6

Figure 5.3: Longitudinal Negative Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 24ft, Deck width = 36ft, One Right Railings with Edge Loading.

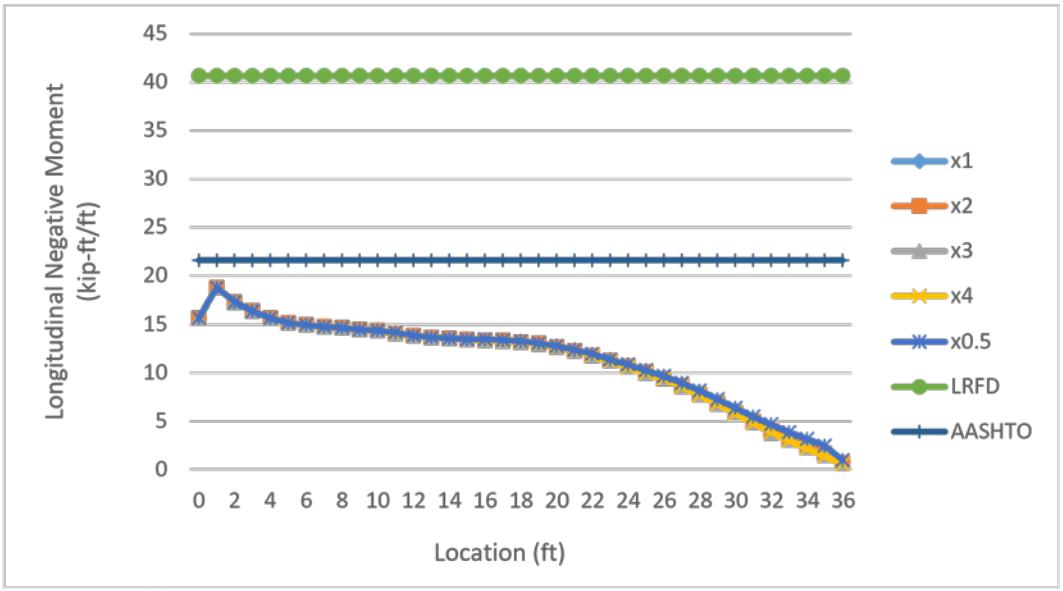

Table 5.4: Longitudinal Negative Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 24ft, Deck width = 36ft, Two Railings with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	12.5	40.7	12	40.7	11.7	40.7	11.6	40.7	13.2	40.7	21.6
1	7.8	40.7	6	40.7	5.2	40.7	4.8	40.7	10.2	40.7	21.6
2	8.9	40.7	7.4	40.7	6.8	40.7	6.4	40.7	10.7	40.7	21.6
3	9	40.7	7.7	40.7	7.2	40.7	6.9	40.7	10.7	40.7	21.6
4	9.7	40.7	8.6	40.7	8.1	40.7	7.9	40.7	11.1	40.7	21.6
5	10.3	40.7	9.4	40.7	9	40.7	8.8	40.7	11.5	40.7	21.6
6	11	40.7	10.2	40.7	9.9	40.7	9.7	40.7	11.9	40.7	21.6
7	11.5	40.7	10.9	40.7	10.6	40.7	10.5	40.7	12.3	40.7	21.6
8	12	40.7	11.5	40.7	11.3	40.7	11.1	40.7	12.7	40.7	21.6
9	12.4	40.7	11.9	40.7	11.7	40.7	11.6	40.7	12.9	40.7	21.6
10	12.6	40.7	12.2	40.7	12.1	40.7	12	40.7	13.1	40.7	21.6
11	12.7	40.7	12.4	40.7	12.3	40.7	12.2	40.7	13.1	40.7	21.6
12	12.8	40.7	12.5	40.7	12.4	40.7	12.3	40.7	13.1	40.7	21.6
13	12.8	40.7	12.6	40.7	12.5	40.7	12.4	40.7	13	40.7	21.6
14	12.8	40.7	12.6	40.7	12.6	40.7	12.5	40.7	13	40.7	21.6
15	12.9	40.7	12.7	40.7	12.7	40.7	12.6	40.7	13.1	40.7	21.6
16	12.9	40.7	12.8	40.7	12.8	40.7	12.7	40.7	13.1	40.7	21.6
17	13	40.7	12.9	40.7	12.8	40.7	12.8	40.7	13.1	40.7	21.6
18	13	40.7	12.9	40.7	12.8	40.7	12.8	40.7	13.1	40.7	21.6
19	12.8	40.7	12.7	40.7	12.7	40.7	12.7	40.7	12.9	40.7	21.6

20	12.6	40.7	12.5	40.7	12.5	40.7	12.5	40.7	12.7	40.7	21.6
21	12.2	40.7	12.2	40.7	12.1	40.7	12.1	40.7	12.3	40.7	21.6
22	11.8	40.7	11.7	40.7	11.7	40.7	11.6	40.7	11.9	40.7	21.6
23	11.3	40.7	11.2	40.7	11.1	40.7	11.1	40.7	11.4	40.7	21.6
24	10.7	40.7	10.6	40.7	10.6	40.7	10.6	40.7	10.8	40.7	21.6
25	10.2	40.7	10	40.7	10	40.7	10	40.7	10.3	40.7	21.6
26	9.5	40.7	9.4	40.7	9.3	40.7	9.3	40.7	9.6	40.7	21.6
27	8.8	40.7	8.7	40.7	8.6	40.7	8.6	40.7	9	40.7	21.6
28	8	40.7	7.8	40.7	7.8	40.7	7.7	40.7	8.2	40.7	21.6
29	7.1	40.7	6.9	40.7	6.8	40.7	6.8	40.7	7.3	40.7	21.6
30	6.2	40.7	5.9	40.7	5.8	40.7	5.8	40.7	6.4	40.7	21.6
31	5.2	40.7	5	40.7	4.9	40.7	4.8	40.7	5.5	40.7	21.6
32	4.4	40.7	4.1	40.7	3.9	40.7	3.9	40.7	4.7	40.7	21.6
33	3.5	40.7	3.2	40.7	3.1	40.7	3	40.7	3.9	40.7	21.6
34	2.8	40.7	2.5	40.7	2.3	40.7	2.2	40.7	3.2	40.7	21.6
35	2.1	40.7	1.7	40.7	1.5	40.7	1.4	40.7	2.5	40.7	21.6
36	0.9	40.7	0.8	40.7	0.7	40.7	0.7	40.7	1	40.7	21.6

Figure 5.4: Longitudinal Negative Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 24ft, Deck width = 36ft, Two Railings with Edge Loading.

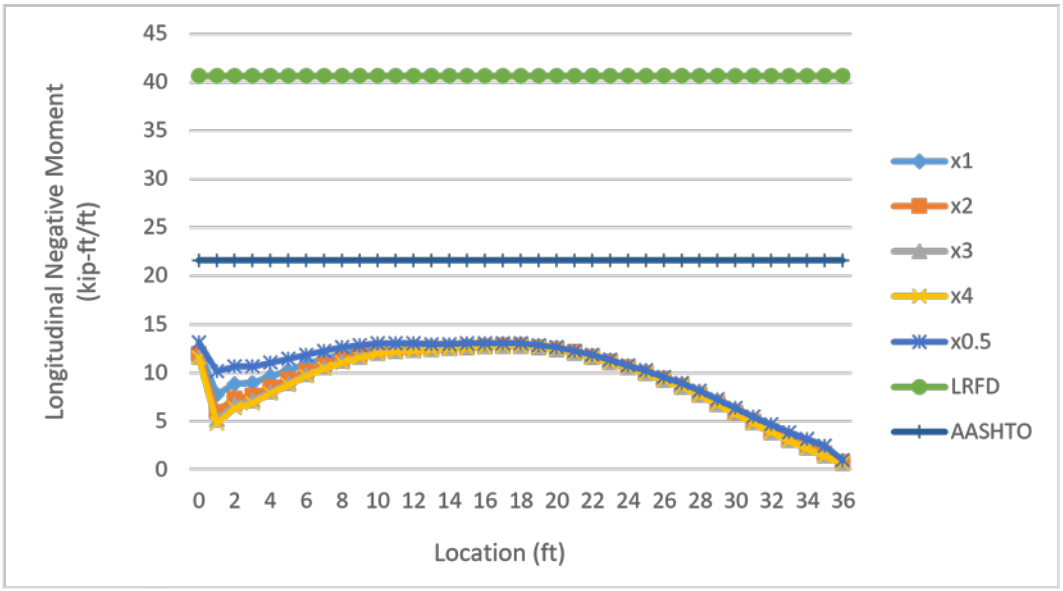

Table 6.1: Longitudinal Positive Moment Distribution at Critical Section for Three-Lane Lane Two Span Bridge Deck Span = 24ft, Deck width = 36ft, No Railing with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	19.3	48.7	19.3	48.7	19.3	48.7	19.3	48.7	19.3	48.7	21.6
1	20.7	48.7	20.7	48.7	20.7	48.7	20.7	48.7	20.7	48.7	21.6
2	17.2	48.7	17.2	48.7	17.2	48.7	17.2	48.7	17.2	48.7	21.6
3	15.9	48.7	15.9	48.7	15.9	48.7	15.9	48.7	15.9	48.7	21.6
4	15.3	48.7	15.3	48.7	15.3	48.7	15.3	48.7	15.3	48.7	21.6
5	15.3	48.7	15.3	48.7	15.3	48.7	15.3	48.7	15.3	48.7	21.6
6	16	48.7	16	48.7	16	48.7	16	48.7	16	48.7	21.6
7	18.6	48.7	18.6	48.7	18.6	48.7	18.6	48.7	18.6	48.7	21.6
8	15.9	48.7	15.9	48.7	15.9	48.7	15.9	48.7	15.9	48.7	21.6
9	15.3	48.7	15.3	48.7	15.3	48.7	15.3	48.7	15.3	48.7	21.6
10	15.7	48.7	15.7	48.7	15.7	48.7	15.7	48.7	15.7	48.7	21.6
11	18	48.7	18	48.7	18	48.7	18	48.7	18	48.7	21.6
12	15.1	48.7	15.1	48.7	15.1	48.7	15.1	48.7	15.1	48.7	21.6
13	14	48.7	14	48.7	14	48.7	14	48.7	14	48.7	21.6
14	13.6	48.7	13.6	48.7	13.6	48.7	13.6	48.7	13.6	48.7	21.6
15	13.7	48.7	13.7	48.7	13.7	48.7	13.7	48.7	13.7	48.7	21.6
16	14.5	48.7	14.5	48.7	14.5	48.7	14.5	48.7	14.5	48.7	21.6
17	17.1	48.7	17.1	48.7	17.1	48.7	17.1	48.7	17.1	48.7	21.6
18	14.4	48.7	14.4	48.7	14.4	48.7	14.4	48.7	14.4	48.7	21.6
19	13.6	48.7	13.6	48.7	13.6	48.7	13.6	48.7	13.6	48.7	21.6

20	14	48.7	14	48.7	14	48.7	14	48.7	14	48.7	21.6
21	16.1	48.7	16.1	48.7	16.1	48.7	16.1	48.7	16.1	48.7	21.6
22	13	48.7	13	48.7	13	48.7	13	48.7	13	48.7	21.6
23	11.8	48.7	11.8	48.7	11.8	48.7	11.8	48.7	11.8	48.7	21.6
24	11.2	48.7	11.2	48.7	11.2	48.7	11.2	48.7	11.2	48.7	21.6
25	11	48.7	11	48.7	11	48.7	11	48.7	11	48.7	21.6
26	11.5	48.7	11.5	48.7	11.5	48.7	11.5	48.7	11.5	48.7	21.6
27	13.7	48.7	13.7	48.7	13.7	48.7	13.7	48.7	13.7	48.7	21.6
28	10.5	48.7	10.5	48.7	10.5	48.7	10.5	48.7	10.5	48.7	21.6
29	9.1	48.7	9.1	48.7	9.1	48.7	9.1	48.7	9.1	48.7	21.6
30	8.3	48.7	8.3	48.7	8.3	48.7	8.3	48.7	8.3	48.7	21.6
31	7.6	48.7	7.6	48.7	7.6	48.7	7.6	48.7	7.6	48.7	21.6
32	7.1	48.7	7.1	48.7	7.1	48.7	7.1	48.7	7.1	48.7	21.6
33	6.7	48.7	6.7	48.7	6.7	48.7	6.7	48.7	6.7	48.7	21.6
34	6.5	48.7	6.5	48.7	6.5	48.7	6.5	48.7	6.5	48.7	21.6
35	6.3	48.7	6.3	48.7	6.3	48.7	6.3	48.7	6.3	48.7	21.6
36	6.2	48.7	6.2	48.7	6.2	48.7	6.2	48.7	6.2	48.7	21.6

Figure 6.1: Longitudinal Positive Moment Distribution at Critical Section for Three-Lane Lane Two Span Bridge Deck Span = 24ft, Deck width = 36ft, No Railing with Edge Loading.

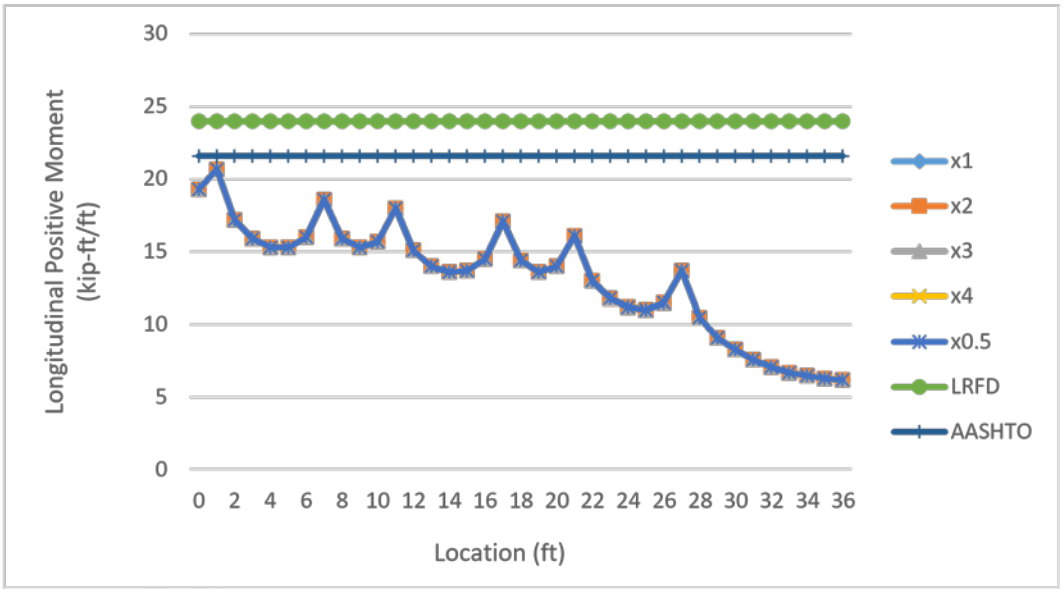

Table 6.2: Longitudinal Positive Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 24ft, Deck width = 36ft, One Left Railing with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	9.3	48.7	7.2	48.7	6.2	48.7	5.6	48.7	11.8	48.7	21.6
1	10.7	48.7	8.6	48.7	7.6	48.7	7	48.7	13.2	48.7	21.6
2	9.4	48.7	7.5	48.7	6.7	48.7	6.2	48.7	11.5	48.7	21.6
3	8.9	48.7	7.3	48.7	6.5	48.7	6.1	48.7	10.8	48.7	21.6
4	9.3	48.7	7.9	48.7	7.2	48.7	6.8	48.7	11	48.7	21.6
5	10	48.7	8.7	48.7	8.2	48.7	7.8	48.7	11.5	48.7	21.6
6	11.4	48.7	10.3	48.7	9.7	48.7	9.4	48.7	12.7	48.7	21.6
7	14.6	48.7	13.6	48.7	13.1	48.7	12.8	48.7	15.7	48.7	21.6
8	12.4	48.7	11.5	48.7	11.1	48.7	10.8	48.7	13.4	48.7	21.6
9	12.1	48.7	11.3	48.7	10.9	48.7	10.7	48.7	13	48.7	21.6
10	12.9	48.7	12.2	48.7	11.8	48.7	11.6	48.7	13.7	48.7	21.6
11	15.6	48.7	14.9	48.7	14.6	48.7	14.5	48.7	16.3	48.7	21.6
12	12.9	48.7	12.3	48.7	12.1	48.7	11.9	48.7	13.5	48.7	21.6
13	12.1	48.7	11.5	48.7	11.3	48.7	11.2	48.7	12.6	48.7	21.6
14	11.9	48.7	11.5	48.7	11.2	48.7	11.1	48.7	12.4	48.7	21.6
15	12.2	48.7	11.8	48.7	11.6	48.7	11.5	48.7	12.6	48.7	21.6
16	13.1	48.7	12.8	48.7	12.6	48.7	12.5	48.7	13.5	48.7	21.6
17	15.9	48.7	15.6	48.7	15.5	48.7	15.4	48.7	16.3	48.7	21.6
18	13.4	48.7	13.1	48.7	13	48.7	12.9	48.7	13.7	48.7	21.6
19	12.7	48.7	12.5	48.7	12.3	48.7	12.3	48.7	13	48.7	21.6

20	13.1	48.7	12.9	48.7	12.8	48.7	12.7	48.7	13.4	48.7	21.6
21	15.4	48.7	15.2	48.7	15.1	48.7	15	48.7	15.6	48.7	21.6
22	12.5	48.7	12.3	48.7	12.2	48.7	12.2	48.7	12.6	48.7	21.6
23	11.3	48.7	11.1	48.7	11	48.7	11	48.7	11.4	48.7	21.6
24	10.7	48.7	10.6	48.7	10.5	48.7	10.5	48.7	10.9	48.7	21.6
25	10.6	48.7	10.5	48.7	10.4	48.7	10.4	48.7	10.7	48.7	21.6
26	11.1	48.7	11	48.7	10.9	48.7	10.9	48.7	11.2	48.7	21.6
27	13.4	48.7	13.3	48.7	13.2	48.7	13.2	48.7	13.5	48.7	21.6
28	10.3	48.7	10.2	48.7	10.1	48.7	10.1	48.7	10.4	48.7	21.6
29	8.8	48.7	8.7	48.7	8.7	48.7	8.6	48.7	8.9	48.7	21.6
30	8	48.7	7.9	48.7	7.9	48.7	7.8	48.7	8.1	48.7	21.6
31	7.4	48.7	7.3	48.7	7.3	48.7	7.2	48.7	7.4	48.7	21.6
32	6.9	48.7	6.8	48.7	6.8	48.7	6.8	48.7	7	48.7	21.6
33	6.5	48.7	6.5	48.7	6.5	48.7	6.4	48.7	6.6	48.7	21.6
34	6.3	48.7	6.2	48.7	6.2	48.7	6.2	48.7	6.3	48.7	21.6
35	6.1	48.7	6	48.7	6	48.7	6	48.7	6.1	48.7	21.6
36	6	48.7	5.9	48.7	5.9	48.7	5.9	48.7	6	48.7	21.6

Figure 6.2: Longitudinal Positive Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 24ft, Deck width = 36ft, One Left Railing with Edge Loading.

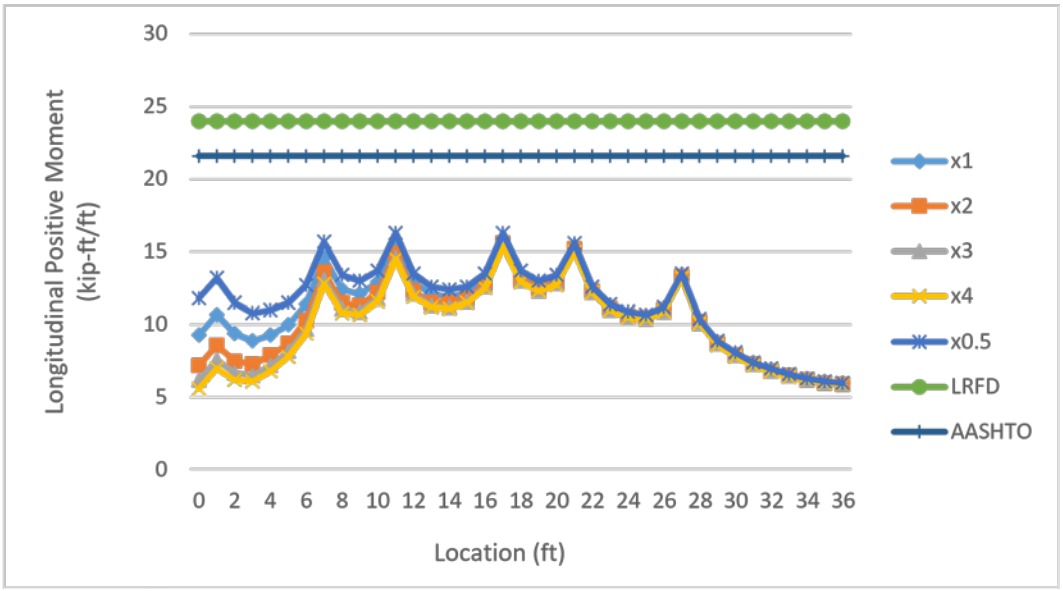

Table 6.3: Longitudinal Positive Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 24ft, Deck width = 36ft, One Right Railings with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	19.2	48.7	19.2	48.7	19.2	48.7	19.2	48.7	19.2	48.7	21.6
1	20.7	48.7	20.7	48.7	20.7	48.7	20.6	48.7	20.7	48.7	21.6
2	17.2	48.7	17.1	48.7	17.1	48.7	17.1	48.7	17.2	48.7	21.6
3	15.8	48.7	15.7	48.7	15.7	48.7	15.7	48.7	15.8	48.7	21.6
4	15.2	48.7	15.1	48.7	15.1	48.7	15.1	48.7	15.2	48.7	21.6
5	15.1	48.7	15.1	48.7	15.1	48.7	15.1	48.7	15.2	48.7	21.6
6	15.9	48.7	15.8	48.7	15.8	48.7	15.8	48.7	15.9	48.7	21.6
7	18.5	48.7	18.4	48.7	18.4	48.7	18.4	48.7	18.5	48.7	21.6
8	15.8	48.7	15.8	48.7	15.8	48.7	15.7	48.7	15.9	48.7	21.6
9	15.1	48.7	15	48.7	15	48.7	15	48.7	15.1	48.7	21.6
10	15.5	48.7	15.4	48.7	15.4	48.7	15.4	48.7	15.5	48.7	21.6
11	17.8	48.7	17.8	48.7	17.7	48.7	17.7	48.7	17.9	48.7	21.6
12	14.8	48.7	14.8	48.7	14.7	48.7	14.7	48.7	14.9	48.7	21.6
13	13.7	48.7	13.6	48.7	13.6	48.7	13.6	48.7	13.8	48.7	21.6
14	13.3	48.7	13.2	48.7	13.2	48.7	13.2	48.7	13.4	48.7	21.6
15	13.3	48.7	13.2	48.7	13.2	48.7	13.2	48.7	13.4	48.7	21.6
16	14.1	48.7	14	48.7	13.9	48.7	13.9	48.7	14.2	48.7	21.6
17	16.7	48.7	16.6	48.7	16.5	48.7	16.5	48.7	16.8	48.7	21.6
18	14	48.7	13.8	48.7	13.8	48.7	13.7	48.7	14.1	48.7	21.6
19	13.1	48.7	13	48.7	12.9	48.7	12.9	48.7	13.3	48.7	21.6

20	13.4	48.7	13.2	48.7	13.1	48.7	13.1	48.7	13.5	48.7	21.6
21	15.4	48.7	15.2	48.7	15.2	48.7	15.1	48.7	15.6	48.7	21.6
22	12.4	48.7	12.2	48.7	12.1	48.7	12	48.7	12.6	48.7	21.6
23	11	48.7	10.8	48.7	10.7	48.7	10.6	48.7	11.2	48.7	21.6
24	10.3	48.7	10	48.7	9.9	48.7	9.9	48.7	10.6	48.7	21.6
25	10	48.7	9.7	48.7	9.6	48.7	9.5	48.7	10.3	48.7	21.6
26	10.3	48.7	10	48.7	9.9	48.7	9.8	48.7	10.7	48.7	21.6
27	12.5	48.7	12.1	48.7	12	48.7	11.9	48.7	12.9	48.7	21.6
28	9.1	48.7	8.7	48.7	8.6	48.7	8.5	48.7	9.6	48.7	21.6
29	7.5	48.7	7	48.7	6.8	48.7	6.7	48.7	7.9	48.7	21.6
30	6.4	48.7	5.9	48.7	5.7	48.7	5.6	48.7	7	48.7	21.6
31	5.6	48.7	5	48.7	4.8	48.7	4.6	48.7	6.2	48.7	21.6
32	4.9	48.7	4.3	48.7	4	48.7	3.8	48.7	5.5	48.7	21.6
33	4.2	48.7	3.6	48.7	3.2	48.7	3.1	48.7	5	48.7	21.6
34	3.6	48.7	2.9	48.7	2.6	48.7	2.4	48.7	4.5	48.7	21.6
35	3	48.7	2.2	48.7	1.8	48.7	1.6	48.7	4	48.7	21.6
36	2.9	48.7	2.1	48.7	1.7	48.7	1.5	48.7	4	48.7	21.6

Figure 6.3: Longitudinal Positive Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 24ft, Deck width = 36ft, One Right Railings with Edge Loading.

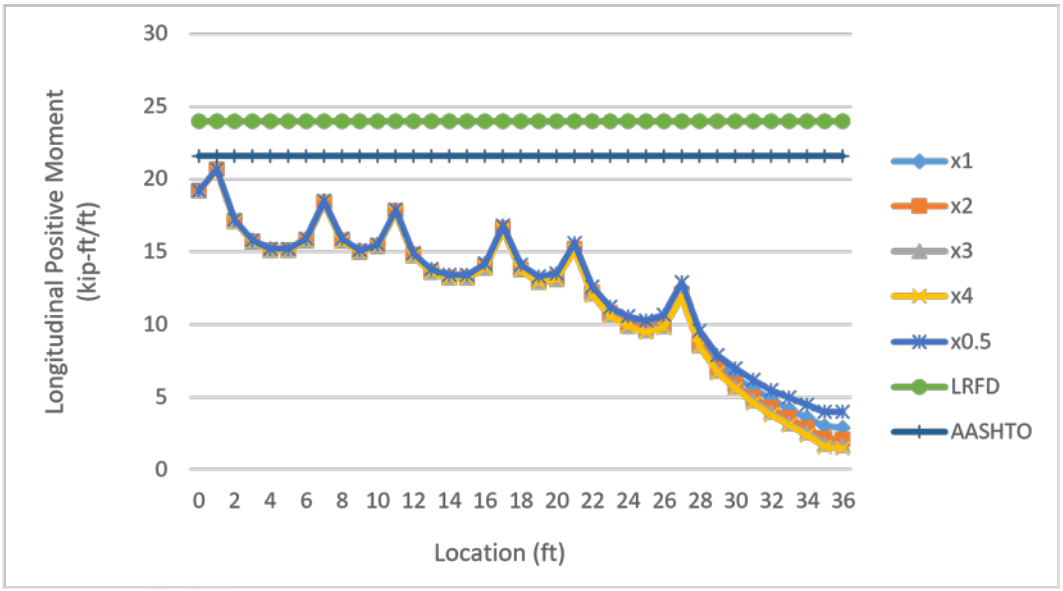

Table 6.4: Longitudinal Positive Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 24ft, Deck width = 36ft, Two Railings with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	9.3	48.7	7.1	48.7	6.2	48.7	5.6	48.7	11.8	48.7	21.6
1	10.7	48.7	8.5	48.7	7.5	48.7	7	48.7	13.2	48.7	21.6
2	9.3	48.7	7.5	48.7	6.6	48.7	6.2	48.7	11.4	48.7	21.6
3	8.9	48.7	7.2	48.7	6.5	48.7	6	48.7	10.8	48.7	21.6
4	9.3	48.7	7.8	48.7	7.1	48.7	6.8	48.7	10.9	48.7	21.6
5	10	48.7	8.7	48.7	8.1	48.7	7.7	48.7	11.4	48.7	21.6
6	11.3	48.7	10.2	48.7	9.6	48.7	9.3	48.7	12.7	48.7	21.6
7	14.5	48.7	13.4	48.7	13	48.7	12.7	48.7	15.7	48.7	21.6
8	12.3	48.7	11.4	48.7	10.9	48.7	10.7	48.7	13.3	48.7	21.6
9	12	48.7	11.1	48.7	10.7	48.7	10.5	48.7	12.9	48.7	21.6
10	12.7	48.7	12	48.7	11.6	48.7	11.4	48.7	13.6	48.7	21.6
11	15.4	48.7	14.7	48.7	14.4	48.7	14.2	48.7	16.1	48.7	21.6
12	12.7	48.7	12.1	48.7	11.8	48.7	11.6	48.7	13.4	48.7	21.6
13	11.8	48.7	11.3	48.7	11	48.7	10.8	48.7	12.4	48.7	21.6
14	11.6	48.7	11.1	48.7	10.9	48.7	10.7	48.7	12.2	48.7	21.6
15	11.9	48.7	11.4	48.7	11.2	48.7	11	48.7	12.4	48.7	21.6
16	12.8	48.7	12.4	48.7	12.2	48.7	12	48.7	13.3	48.7	21.6
17	15.5	48.7	15.1	48.7	14.9	48.7	14.8	48.7	16	48.7	21.6
18	12.9	48.7	12.6	48.7	12.4	48.7	12.3	48.7	13.4	48.7	21.6
19	12.2	48.7	11.8	48.7	11.7	48.7	11.6	48.7	12.6	48.7	21.6

20	12.6	48.7	12.2	48.7	12.1	48.7	12	48.7	13	48.7	21.6
21	14.7	48.7	14.4	48.7	14.2	48.7	14.1	48.7	15.1	48.7	21.6
22	11.8	48.7	11.4	48.7	11.2	48.7	11.2	48.7	12.2	48.7	21.6
23	10.5	48.7	10.1	48.7	9.9	48.7	9.8	48.7	10.9	48.7	21.6
24	9.8	48.7	9.5	48.7	9.3	48.7	9.2	48.7	10.2	48.7	21.6
25	9.6	48.7	9.2	48.7	9	48.7	8.9	48.7	10	48.7	21.6
26	10	48.7	9.6	48.7	9.4	48.7	9.3	48.7	10.4	48.7	21.6
27	12.2	48.7	11.7	48.7	11.5	48.7	11.4	48.7	12.6	48.7	21.6
28	8.9	48.7	8.4	48.7	8.2	48.7	8.1	48.7	9.4	48.7	21.6
29	7.2	48.7	6.7	48.7	6.5	48.7	6.4	48.7	7.8	48.7	21.6
30	6.2	48.7	5.7	48.7	5.4	48.7	5.3	48.7	6.8	48.7	21.6
31	5.4	48.7	4.8	48.7	4.6	48.7	4.4	48.7	6	48.7	21.6
32	4.7	48.7	4.1	48.7	3.8	48.7	3.6	48.7	5.4	48.7	21.6
33	4	48.7	3.4	48.7	3.1	48.7	2.9	48.7	4.8	48.7	21.6
34	3.5	48.7	2.8	48.7	2.5	48.7	2.3	48.7	4.4	48.7	21.6
35	3	48.7	2.1	48.7	1.8	48.7	1.5	48.7	3.9	48.7	21.6
36	2.8	48.7	2	48.7	1.6	48.7	1.4	48.7	3.8	48.7	21.6

Figure 6.4: Longitudinal Positive Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 24ft, Deck width = 36ft, Two Railings with Edge Loading.

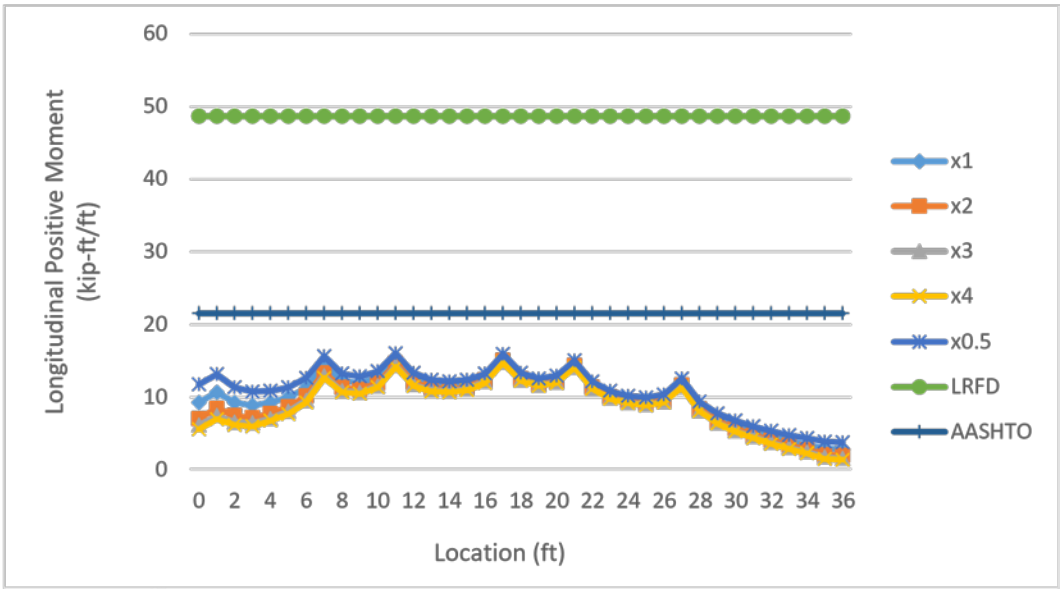

Table 7.1: Longitudinal Negative Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 24ft, Deck width = 48ft, No Railing with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	15.6	50.3	15.6	50.3	15.6	50.3	15.6	50.3	15.6	50.3	21.6
1	18.7	50.3	18.7	50.3	18.7	50.3	18.7	50.3	18.7	50.3	21.6
2	17.3	50.3	17.3	50.3	17.3	50.3	17.3	50.3	17.3	50.3	21.6
3	16.4	50.3	16.4	50.3	16.4	50.3	16.4	50.3	16.4	50.3	21.6
4	15.7	50.3	15.7	50.3	15.7	50.3	15.7	50.3	15.7	50.3	21.6
5	15.3	50.3	15.3	50.3	15.3	50.3	15.3	50.3	15.3	50.3	21.6
6	15	50.3	15	50.3	15	50.3	15	50.3	15	50.3	21.6
7	14.9	50.3	14.9	50.3	14.9	50.3	14.9	50.3	14.9	50.3	21.6
8	14.7	50.3	14.7	50.3	14.7	50.3	14.7	50.3	14.7	50.3	21.6
9	14.6	50.3	14.6	50.3	14.6	50.3	14.6	50.3	14.6	50.3	21.6
10	14.6	50.3	14.6	50.3	14.6	50.3	14.6	50.3	14.6	50.3	21.6
11	14.3	50.3	14.3	50.3	14.3	50.3	14.3	50.3	14.3	50.3	21.6
12	14.2	50.3	14.2	50.3	14.2	50.3	14.2	50.3	14.2	50.3	21.6
13	14	50.3	14	50.3	14	50.3	14	50.3	14	50.3	21.6
14	14	50.3	14	50.3	14	50.3	14	50.3	14	50.3	21.6
15	14	50.3	14	50.3	14	50.3	14	50.3	14	50.3	21.6
16	14	50.3	14	50.3	14	50.3	14	50.3	14	50.3	21.6
17	14.1	50.3	14.1	50.3	14.1	50.3	14.1	50.3	14.1	50.3	21.6
18	14.1	50.3	14.1	50.3	14.1	50.3	14.1	50.3	14.1	50.3	21.6

19	14.2	50.3	14.2	50.3	14.2	50.3	14.2	50.3	14.2	50.3	21.6
20	14	50.3	14	50.3	14	50.3	14	50.3	14	50.3	21.6
21	13.9	50.3	13.9	50.3	13.9	50.3	13.9	50.3	13.9	50.3	21.6
22	13.8	50.3	13.8	50.3	13.8	50.3	13.8	50.3	13.8	50.3	21.6
23	13.6	50.3	13.6	50.3	13.6	50.3	13.6	50.3	13.6	50.3	21.6
24	13.5	50.3	13.5	50.3	13.5	50.3	13.5	50.3	13.5	50.3	21.6
25	13.4	50.3	13.4	50.3	13.4	50.3	13.4	50.3	13.4	50.3	21.6
26	13.4	50.3	13.4	50.3	13.4	50.3	13.4	50.3	13.4	50.3	21.6
27	13.4	50.3	13.4	50.3	13.4	50.3	13.4	50.3	13.4	50.3	21.6
28	13.3	50.3	13.3	50.3	13.3	50.3	13.3	50.3	13.3	50.3	21.6
29	13.2	50.3	13.2	50.3	13.2	50.3	13.2	50.3	13.2	50.3	21.6
30	12.8	50.3	12.8	50.3	12.8	50.3	12.8	50.3	12.8	50.3	21.6
31	12.5	50.3	12.5	50.3	12.5	50.3	12.5	50.3	12.5	50.3	21.6
32	12	50.3	12	50.3	12	50.3	12	50.3	12	50.3	21.6
33	11.5	50.3	11.5	50.3	11.5	50.3	11.5	50.3	11.5	50.3	21.6
34	11	50.3	11	50.3	11	50.3	11	50.3	11	50.3	21.6
35	10.4	50.3	10.4	50.3	10.4	50.3	10.4	50.3	10.4	50.3	21.6
36	9.8	50.3	9.8	50.3	9.8	50.3	9.8	50.3	9.8	50.3	21.6
37	9.1	50.3	9.1	50.3	9.1	50.3	9.1	50.3	9.1	50.3	21.6
38	8.4	50.3	8.4	50.3	8.4	50.3	8.4	50.3	8.4	50.3	21.6
39	7.6	50.3	7.6	50.3	7.6	50.3	7.6	50.3	7.6	50.3	21.6
40	6.7	50.3	6.7	50.3	6.7	50.3	6.7	50.3	6.7	50.3	21.6
41	5.9	50.3	5.9	50.3	5.9	50.3	5.9	50.3	5.9	50.3	21.6
42	5.1	50.3	5.1	50.3	5.1	50.3	5.1	50.3	5.1	50.3	21.6
43	4.5	50.3	4.5	50.3	4.5	50.3	4.5	50.3	4.5	50.3	21.6
44	3.9	50.3	3.9	50.3	3.9	50.3	3.9	50.3	3.9	50.3	21.6

45	3.3	50.3	3.3	50.3	3.3	50.3	3.3	50.3	3.3	50.3	21.6
46	2.8	50.3	2.8	50.3	2.8	50.3	2.8	50.3	2.8	50.3	21.6
47	2	50.3	2	50.3	2	50.3	2	50.3	2	50.3	21.6
48	0.3	50.3	0.3	50.3	0.3	50.3	0.3	50.3	0.3	50.3	21.6

Figure 7.1: Longitudinal Negative Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 24ft, Deck width = 48ft, No Railing with Edge Loading.

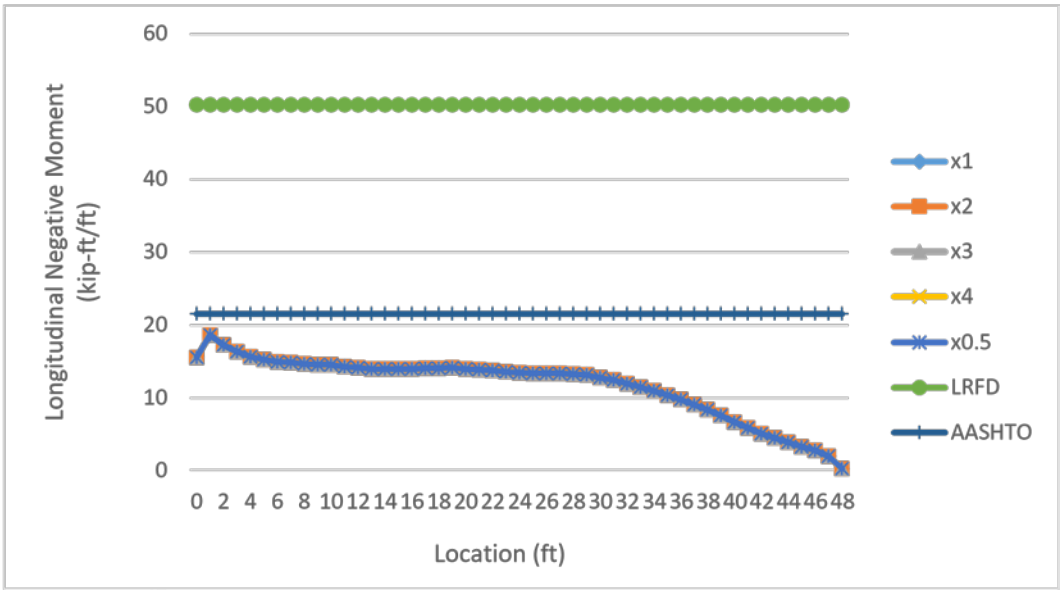

Table 7.2: Longitudinal Negative Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 24ft, Deck width = 48ft, One Left Railing with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	12.4	50.3	11.9	50.3	11.6	50.3	11.5	50.3	13.1	50.3	21.6
1	7.8	50.3	6	50.3	5.2	50.3	4.8	50.3	10.2	50.3	21.6
2	8.8	50.3	7.4	50.3	6.7	50.3	6.4	50.3	10.6	50.3	21.6
3	9	50.3	7.7	50.3	7.1	50.3	6.8	50.3	10.6	50.3	21.6
4	9.7	50.3	8.6	50.3	8.1	50.3	7.9	50.3	11	50.3	21.6
5	10.3	50.3	9.4	50.3	9	50.3	8.8	50.3	11.5	50.3	21.6
6	11	50.3	10.3	50.3	9.9	50.3	9.8	50.3	12	50.3	21.6
7	11.6	50.3	11	50.3	10.7	50.3	10.6	50.3	12.4	50.3	21.6
8	12.1	50.3	11.6	50.3	11.4	50.3	11.3	50.3	12.8	50.3	21.6
9	12.5	50.3	12.1	50.3	11.9	50.3	11.8	50.3	13.1	50.3	21.6
10	12.7	50.3	12.3	50.3	12.2	50.3	12.1	50.3	13.1	50.3	21.6
11	12.9	50.3	12.6	50.3	12.4	50.3	12.4	50.3	13.2	50.3	21.6
12	13	50.3	12.7	50.3	12.6	50.3	12.5	50.3	13.3	50.3	21.6
13	13	50.3	12.8	50.3	12.7	50.3	12.7	50.3	13.3	50.3	21.6
14	13.2	50.3	13.1	50.3	13	50.3	13	50.3	13.4	50.3	21.6
15	13.4	50.3	13.3	50.3	13.2	50.3	13.2	50.3	13.6	50.3	21.6
16	13.6	50.3	13.5	50.3	13.4	50.3	13.4	50.3	13.7	50.3	21.6
17	13.8	50.3	13.7	50.3	13.6	50.3	13.6	50.3	13.9	50.3	21.6
18	13.8	50.3	13.7	50.3	13.7	50.3	13.6	50.3	13.9	50.3	21.6
19	13.8	50.3	13.8	50.3	13.7	50.3	13.7	50.3	13.9	50.3	21.6

20	13.8	50.3	13.8	50.3	13.7	50.3	13.7	50.3	13.9	50.3	21.6
21	13.7	50.3	13.7	50.3	13.7	50.3	13.7	50.3	13.8	50.3	21.6
22	13.6	50.3	13.6	50.3	13.6	50.3	13.5	50.3	13.6	50.3	21.6
23	13.6	50.3	13.6	50.3	13.5	50.3	13.5	50.3	13.6	50.3	21.6
24	13.5	50.3	13.5	50.3	13.5	50.3	13.4	50.3	13.5	50.3	21.6
25	13.4	50.3	13.4	50.3	13.4	50.3	13.4	50.3	13.4	50.3	21.6
26	13.4	50.3	13.4	50.3	13.4	50.3	13.4	50.3	13.4	50.3	21.6
27	13.3	50.3	13.3	50.3	13.3	50.3	13.3	50.3	13.3	50.3	21.6
28	13.2	50.3	13.2	50.3	13.2	50.3	13.2	50.3	13.2	50.3	21.6
29	13	50.3	13	50.3	13	50.3	13	50.3	13	50.3	21.6
30	12.8	50.3	12.8	50.3	12.8	50.3	12.8	50.3	12.8	50.3	21.6
31	12.5	50.3	12.5	50.3	12.5	50.3	12.5	50.3	12.5	50.3	21.6
32	12.1	50.3	11.9	50.3	12	50.3	12.1	50.3	12.1	50.3	21.6
33	11.5	50.3	11.5	50.3	11.5	50.3	11.5	50.3	11.5	50.3	21.6
34	11	50.3	11	50.3	11	50.3	11	50.3	11	50.3	21.6
35	10.3	50.3	10.3	50.3	10.3	50.3	10.4	50.3	10.3	50.3	21.6
36	9.8	50.3	9.8	50.3	9.8	50.3	9.8	50.3	9.8	50.3	21.6
37	9.1	50.3	9.1	50.3	9.1	50.3	9.1	50.3	9.1	50.3	21.6
38	8.4	50.3	8.4	50.3	8.4	50.3	8.4	50.3	8.4	50.3	21.6
39	7.6	50.3	7.6	50.3	7.6	50.3	7.6	50.3	7.6	50.3	21.6
40	6.8	50.3	6.8	50.3	6.8	50.3	6.8	50.3	6.8	50.3	21.6
41	5.9	50.3	5.9	50.3	5.9	50.3	5.9	50.3	5.9	50.3	21.6
42	5.2	50.3	5.2	50.3	5.2	50.3	5.2	50.3	5.2	50.3	21.6
43	4.5	50.3	4.5	50.3	4.5	50.3	4.5	50.3	4.5	50.3	21.6
44	3.9	50.3	3.9	50.3	3.9	50.3	3.9	50.3	3.8	50.3	21.6
45	3.3	50.3	3.3	50.3	3.3	50.3	3.3	50.3	3.3	50.3	21.6

46	2.8	50.3	2.8	50.3	2.8	50.3	2.8	50.3	2.8	50.3	21.6
47	2	50.3	2	50.3	2	50.3	2	50.3	2	50.3	21.6
48	0.3	50.3	0.3	50.3	0.3	50.3	0.3	50.3	0.3	50.3	21.6

Figure 7.2: Longitudinal Negative Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 24ft, Deck width = 48ft, One Left Railing with Edge Loading.

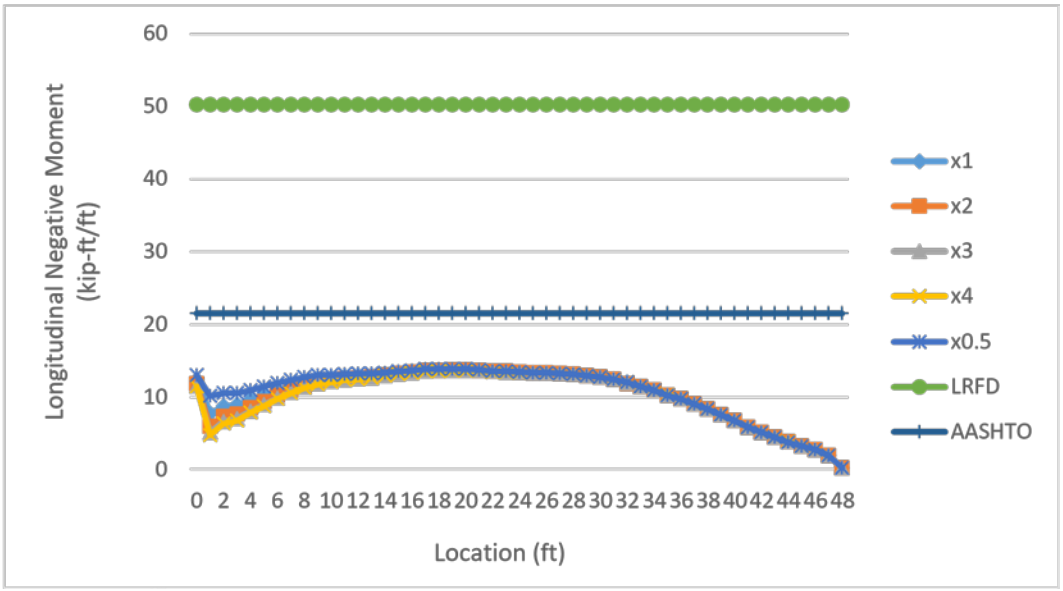

Table 7.3: Longitudinal Negative Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 24ft, Deck width = 48ft, One Right Railings with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	15.6	50.3	15.6	50.3	15.6	50.3	15.6	50.3	15.6	50.3	21.6
1	18.7	50.3	18.7	50.3	18.7	50.3	18.7	50.3	18.7	50.3	21.6
2	17.3	50.3	17.3	50.3	17.3	50.3	17.3	50.3	17.3	50.3	21.6
3	16.4	50.3	16.4	50.3	16.4	50.3	16.4	50.3	16.4	50.3	21.6
4	15.7	50.3	15.7	50.3	15.7	50.3	15.7	50.3	15.7	50.3	21.6
5	15.3	50.3	15.3	50.3	15.3	50.3	15.3	50.3	15.3	50.3	21.6
6	15.1	50.3	15.1	50.3	15.1	50.3	15.1	50.3	15.1	50.3	21.6
7	14.9	50.3	14.9	50.3	14.9	50.3	14.9	50.3	14.9	50.3	21.6
8	14.8	50.3	14.8	50.3	14.8	50.3	14.8	50.3	14.8	50.3	21.6
9	14.7	50.3	14.7	50.3	14.7	50.3	14.7	50.3	14.7	50.3	21.6
10	14.6	50.3	14.6	50.3	14.6	50.3	14.6	50.3	14.6	50.3	21.6
11	14.4	50.3	14.4	50.3	14.4	50.3	14.4	50.3	14.4	50.3	21.6
12	14.2	50.3	14.2	50.3	14.2	50.3	14.2	50.3	14.2	50.3	21.6
13	14.1	50.3	14.1	50.3	14.1	50.3	14.1	50.3	14.1	50.3	21.6
14	14	50.3	14	50.3	14	50.3	14	50.3	14	50.3	21.6
15	14	50.3	14	50.3	14	50.3	14	50.3	14	50.3	21.6
16	14.1	50.3	14.1	50.3	14.1	50.3	14.1	50.3	14.1	50.3	21.6
17	14.1	50.3	14.1	50.3	14.1	50.3	14.1	50.3	14.1	50.3	21.6
18	14.2	50.3	14.2	50.3	14.2	50.3	14.2	50.3	14.2	50.3	21.6
19	14.2	50.3	14.2	50.3	14.2	50.3	14.2	50.3	14.2	50.3	21.6

20	14.1	50.3	14.1	50.3	14.1	50.3	14.1	50.3	14.1	50.3	21.6
21	14	50.3	14	50.3	14	50.3	14	50.3	14	50.3	21.6
22	13.8	50.3	13.8	50.3	13.8	50.3	13.8	50.3	13.8	50.3	21.6
23	13.6	50.3	13.6	50.3	13.6	50.3	13.6	50.3	13.6	50.3	21.6
24	13.5	50.3	13.5	50.3	13.5	50.3	13.5	50.3	13.5	50.3	21.6
25	13.5	50.3	13.5	50.3	13.4	50.3	13.4	50.3	13.5	50.3	21.6
26	13.4	50.3	13.4	50.3	13.4	50.3	13.4	50.3	13.4	50.3	21.6
27	13.4	50.3	13.4	50.3	13.4	50.3	13.4	50.3	13.4	50.3	21.6
28	13.3	50.3	13.3	50.3	13.3	50.3	13.3	50.3	13.3	50.3	21.6
29	13.1	50.3	13.1	50.3	13.1	50.3	13.1	50.3	13.1	50.3	21.6
30	13	50.3	12.8	50.3	12.8	50.3	12.8	50.3	12.8	50.3	21.6
31	12.4	50.3	12.4	50.3	12.4	50.3	12.4	50.3	12.4	50.3	21.6
32	11.9	50.3	11.9	50.3	11.9	50.3	11.9	50.3	12	50.3	21.6
33	11.4	50.3	11.3	50.3	11.3	50.3	11.3	50.3	11.4	50.3	21.6
34	10.8	50.3	10.8	50.3	10.8	50.3	10.7	50.3	10.9	50.3	21.6
35	10.2	50.3	10.2	50.3	10.2	50.3	10.1	50.3	10.3	50.3	21.6
36	9.6	50.3	9.5	50.3	9.5	50.3	9.5	50.3	9.7	50.3	21.6
37	8.9	50.3	8.8	50.3	8.8	50.3	8.8	50.3	9	50.3	21.6
38	8.1	50.3	8	50.3	8	50.3	7.9	50.3	8.2	50.3	21.6
39	7.2	50.3	7.1	50.3	7	50.3	7	50.3	7.3	50.3	21.6
40	6.3	50.3	6.1	50.3	6.1	50.3	6.1	50.3	6.4	50.3	21.6
41	5.4	50.3	5.2	50.3	5.2	50.3	5.1	50.3	5.5	50.3	21.6
42	4.5	50.3	4.4	50.3	4.3	50.3	4.3	50.3	4.7	50.3	21.6
43	3.7	50.3	3.6	50.3	3.5	50.3	3.5	50.3	4	50.3	21.6
44	3.1	50.3	2.9	50.3	2.8	50.3	2.7	50.3	3.3	50.3	21.6
45	2.5	50.3	2.2	50.3	2.2	50.3	2.1	50.3	2.7	50.3	21.6

46	1.9	50.3	1.7	50.3	1.6	50.3	1.5	50.3	2.2	50.3	21.6
47	1.4	50.3	1.1	50.3	1	50.3	0.9	50.3	1.7	50.3	21.6
48	0.2	50.3	0.2	50.3	0.1	50.3	0.1	50.3	0.3	50.3	21.6

Figure 7.3: Longitudinal Negative Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 24ft, Deck width = 48ft, One Right Railings with Edge Loading.

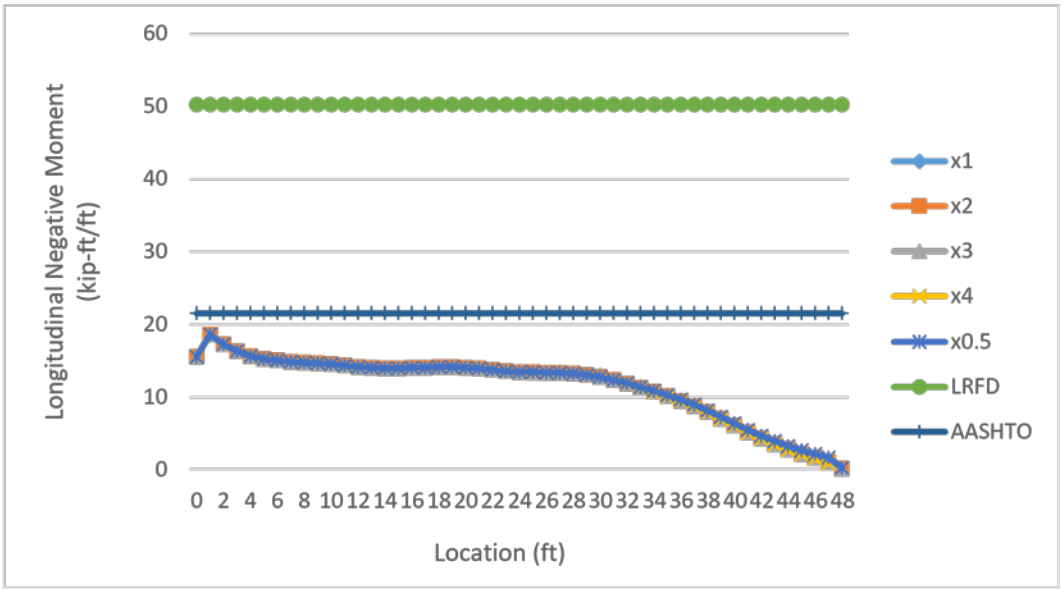

Table 7.4: Longitudinal Negative Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 24ft, Deck width = 48ft, Two Railings with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	12.4	50.3	11.9	50.3	11.6	50.3	11.5	50.3	13.1	50.3	21.6
1	7.8	50.3	6	50.3	5.2	50.3	4.8	50.3	10.2	50.3	21.6
2	8.8	50.3	7.4	50.3	6.8	50.3	6.4	50.3	10.7	50.3	21.6
3	9	50.3	7.7	50.3	7.2	50.3	6.9	50.3	10.7	50.3	21.6
4	9.7	50.3	8.6	50.3	8.2	50.3	7.9	50.3	11.1	50.3	21.6
5	10.4	50.3	9.4	50.3	9.1	50.3	8.8	50.3	11.5	50.3	21.6
6	11	50.3	10.3	50.3	9.9	50.3	9.8	50.3	12	50.3	21.6
7	11.5	50.3	11	50.3	10.7	50.3	10.6	50.3	12.4	50.3	21.6
8	12.1	50.3	11.6	50.3	11.4	50.3	11.2	50.3	12.8	50.3	21.6
9	12.5	50.3	12.1	50.3	11.9	50.3	11.8	50.3	13.1	50.3	21.6
10	12.7	50.3	12.3	50.3	12.3	50.3	12.2	50.3	13.3	50.3	21.6
11	12.9	50.3	12.7	50.3	12.5	50.3	12.5	50.3	13.3	50.3	21.6
12	12.9	50.3	12.7	50.3	12.7	50.3	12.6	50.3	13.4	50.3	21.6
13	13.1	50.3	12.8	50.3	12.8	50.3	12.8	50.3	13.4	50.3	21.6
14	13.2	50.3	13.1	50.3	13	50.3	13	50.3	13.4	50.3	21.6
15	13.3	50.3	13.3	50.3	13.2	50.3	13.2	50.3	13.6	50.3	21.6
16	13.6	50.3	13.5	50.3	13.4	50.3	13.4	50.3	13.7	50.3	21.6
17	13.7	50.3	13.7	50.3	13.6	50.3	13.6	50.3	13.9	50.3	21.6
18	13.9	50.3	13.7	50.3	13.8	50.3	13.8	50.3	14	50.3	21.6
19	13.9	50.3	13.8	50.3	13.9	50.3	13.8	50.3	14	50.3	21.6

20	13.9	50.3	13.8	50.3	13.8	50.3	13.8	50.3	14	50.3	21.6
21	13.7	50.3	13.7	50.3	13.8	50.3	13.8	50.3	13.9	50.3	21.6
22	13.7	50.3	13.5	50.3	13.6	50.3	13.6	50.3	13.7	50.3	21.6
23	13.6	50.3	13.5	50.3	13.5	50.3	13.5	50.3	13.6	50.3	21.6
24	13.3	50.3	13.4	50.3	13.4	50.3	13.4	50.3	13.5	50.3	21.6
25	13.3	50.3	13.4	50.3	13.4	50.3	13.4	50.3	13.4	50.3	21.6
26	13.4	50.3	13.4	50.3	13.4	50.3	13.4	50.3	13.4	50.3	21.6
27	13.4	50.3	13.2	50.3	13.3	50.3	13.3	50.3	13.4	50.3	21.6
28	13.1	50.3	13.1	50.3	13.2	50.3	13.2	50.3	13.3	50.3	21.6
29	13	50.3	13	50.3	13.1	50.3	13.1	50.3	13.1	50.3	21.6
30	12.8	50.3	12.7	50.3	12.8	50.3	12.8	50.3	12.8	50.3	21.6
31	12.4	50.3	12.4	50.3	12.4	50.3	12.4	50.3	12.4	50.3	21.6
32	11.9	50.3	11.9	50.3	11.9	50.3	11.9	50.3	12	50.3	21.6
33	11.3	50.3	11.4	50.3	11.3	50.3	11.3	50.3	11.4	50.3	21.6
34	10.7	50.3	10.8	50.3	10.8	50.3	10.8	50.3	10.9	50.3	21.6
35	10.2	50.3	10.1	50.3	10.2	50.3	10.1	50.3	10.3	50.3	21.6
36	9.6	50.3	9.5	50.3	9.5	50.3	9.5	50.3	9.7	50.3	21.6
37	8.8	50.3	8.8	50.3	8.8	50.3	8.8	50.3	9	50.3	21.6
38	8	50.3	7.9	50.3	8	50.3	7.9	50.3	8.2	50.3	21.6
39	7.2	50.3	7.1	50.3	7.1	50.3	7	50.3	7.3	50.3	21.6
40	6.3	50.3	6.2	50.3	6.1	50.3	6.1	50.3	6.4	50.3	21.6
41	5.3	50.3	5.2	50.3	5.2	50.3	5.1	50.3	5.5	50.3	21.6
42	4.5	50.3	4.4	50.3	4.3	50.3	4.3	50.3	4.7	50.3	21.6
43	3.7	50.3	3.6	50.3	3.5	50.3	3.5	50.3	4	50.3	21.6
44	3.1	50.3	2.8	50.3	2.8	50.3	2.8	50.3	3.3	50.3	21.6
45	2.5	50.3	2.2	50.3	2.2	50.3	2.1	50.3	2.7	50.3	21.6

46	1.9	50.3	1.7	50.3	1.6	50.3	1.5	50.3	2.2	50.3	21.6
47	1.3	50.3	1.1	50.3	1	50.3	0.9	50.3	1.7	50.3	21.6
48	0.3	50.3	0.3	50.3	0.1	50.3	0.1	50.3	0.3	50.3	21.6

Figure 7.4: Longitudinal Negative Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 24ft, Deck width = 48ft, Two Railings with Edge Loading.

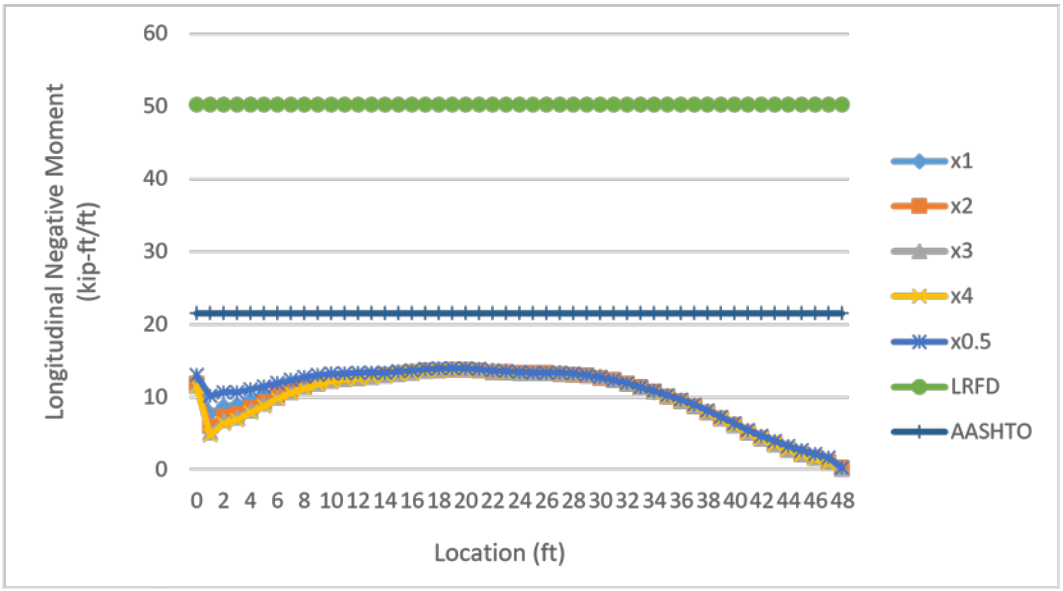

Table 8.1: Longitudinal Positive Moment Distribution at Critical Section for Four-Lane Lane Two Span Bridge Deck Span = 24ft, Deck width = 48ft, No Railing with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	19.5	60.7	19.5	60.7	19.5	60.7	19.5	60.7	19.5	60.7	21.6
1	21	60.7	21	60.7	21	60.7	21	60.7	21	60.7	21.6
2	17.5	60.7	17.5	60.7	17.5	60.7	17.5	60.7	17.5	60.7	21.6
3	16.1	60.7	16.1	60.7	16.1	60.7	16.1	60.7	16.1	60.7	21.6
4	15.6	60.7	15.6	60.7	15.6	60.7	15.6	60.7	15.6	60.7	21.6
5	15.6	60.7	15.6	60.7	15.6	60.7	15.6	60.7	15.6	60.7	21.6
6	16.3	60.7	16.3	60.7	16.3	60.7	16.3	60.7	16.3	60.7	21.6
7	18.9	60.7	18.9	60.7	18.9	60.7	18.9	60.7	18.9	60.7	21.6
8	16.3	60.7	16.3	60.7	16.3	60.7	16.3	60.7	16.3	60.7	21.6
9	15.7	60.7	15.7	60.7	15.7	60.7	15.7	60.7	15.7	60.7	21.6
10	16.2	60.7	16.2	60.7	16.2	60.7	16.2	60.7	16.2	60.7	21.6
11	18.5	60.7	18.5	60.7	18.5	60.7	18.5	60.7	18.5	60.7	21.6
12	15.6	60.7	15.6	60.7	15.6	60.7	15.6	60.7	15.6	60.7	21.6
13	14.6	60.7	14.6	60.7	14.6	60.7	14.6	60.7	14.6	60.7	21.6
14	14.3	60.7	14.3	60.7	14.3	60.7	14.3	60.7	14.3	60.7	21.6
15	14.5	60.7	14.5	60.7	14.5	60.7	14.5	60.7	14.5	60.7	21.6
16	15.3	60.7	15.3	60.7	15.3	60.7	15.3	60.7	15.3	60.7	21.6
17	17.9	60.7	17.9	60.7	17.9	60.7	17.9	60.7	17.9	60.7	21.6
18	15.5	60.7	15.5	60.7	15.5	60.7	15.5	60.7	15.5	60.7	21.6
19	14.8	60.7	14.8	60.7	14.8	60.7	14.8	60.7	14.8	60.7	21.6

20	15.3	60.7	15.3	60.7	15.3	60.7	15.3	60.7	15.3	60.7	21.6
21	17.6	60.7	17.6	60.7	17.6	60.7	17.6	60.7	17.6	60.7	21.6
22	14.7	60.7	14.7	60.7	14.7	60.7	14.7	60.7	14.7	60.7	21.6
23	13.7	60.7	13.7	60.7	13.7	60.7	13.7	60.7	13.7	60.7	21.6
24	13.4	60.7	13.4	60.7	13.4	60.7	13.4	60.7	13.4	60.7	21.6
25	13.5	60.7	13.5	60.7	13.5	60.7	13.5	60.7	13.5	60.7	21.6
26	14.2	60.7	14.2	60.7	14.2	60.7	14.2	60.7	14.2	60.7	21.6
27	16.9	60.7	16.9	60.7	16.9	60.7	16.9	60.7	16.9	60.7	21.6
28	14.2	60.7	14.2	60.7	14.2	60.7	14.2	60.7	14.2	60.7	21.6
29	13.4	60.7	13.4	60.7	13.4	60.7	13.4	60.7	13.4	60.7	21.6
30	13.7	60.7	13.7	60.7	13.7	60.7	13.7	60.7	13.7	60.7	21.6
31	15.8	60.7	15.8	60.7	15.8	60.7	15.8	60.7	15.8	60.7	21.6
32	12.8	60.7	12.8	60.7	12.8	60.7	12.8	60.7	12.8	60.7	21.6
33	11.5	60.7	11.5	60.7	11.5	60.7	11.5	60.7	11.5	60.7	21.6
34	10.9	60.7	10.9	60.7	10.9	60.7	10.9	60.7	10.9	60.7	21.6
35	10.7	60.7	10.7	60.7	10.7	60.7	10.7	60.7	10.7	60.7	21.6
36	11.1	60.7	11.1	60.7	11.1	60.7	11.1	60.7	11.1	60.7	21.6
37	13.3	60.7	13.3	60.7	13.3	60.7	13.3	60.7	13.3	60.7	21.6
38	10.1	60.7	10.1	60.7	10.1	60.7	10.1	60.7	10.1	60.7	21.6
39	8.6	60.7	8.6	60.7	8.6	60.7	8.6	60.7	8.6	60.7	21.6
40	7.7	60.7	7.7	60.7	7.7	60.7	7.7	60.7	7.7	60.7	21.6
41	7	60.7	7	60.7	7	60.7	7	60.7	7	60.7	21.6
42	6.4	60.7	6.4	60.7	6.4	60.7	6.4	60.7	6.4	60.7	21.6
43	6	60.7	6	60.7	6	60.7	6	60.7	6	60.7	21.6
44	5.6	60.7	5.6	60.7	5.6	60.7	5.6	60.7	5.6	60.7	21.6
45	5.3	60.7	5.3	60.7	5.3	60.7	5.3	60.7	5.3	60.7	21.6

46	5.1	60.7	5.1	60.7	5.1	60.7	5.1	60.7	5.1	60.7	21.6
47	4.9	60.7	4.9	60.7	4.9	60.7	4.9	60.7	4.9	60.7	21.6
48	4.8	60.7	4.8	60.7	4.8	60.7	4.8	60.7	4.8	60.7	21.6

Figure 8.1: Longitudinal Positive Moment Distribution at Critical Section for Four-Lane Lane Two Span Bridge Deck Span = 24ft, Deck width = 48ft, No Railing with Edge Loading.

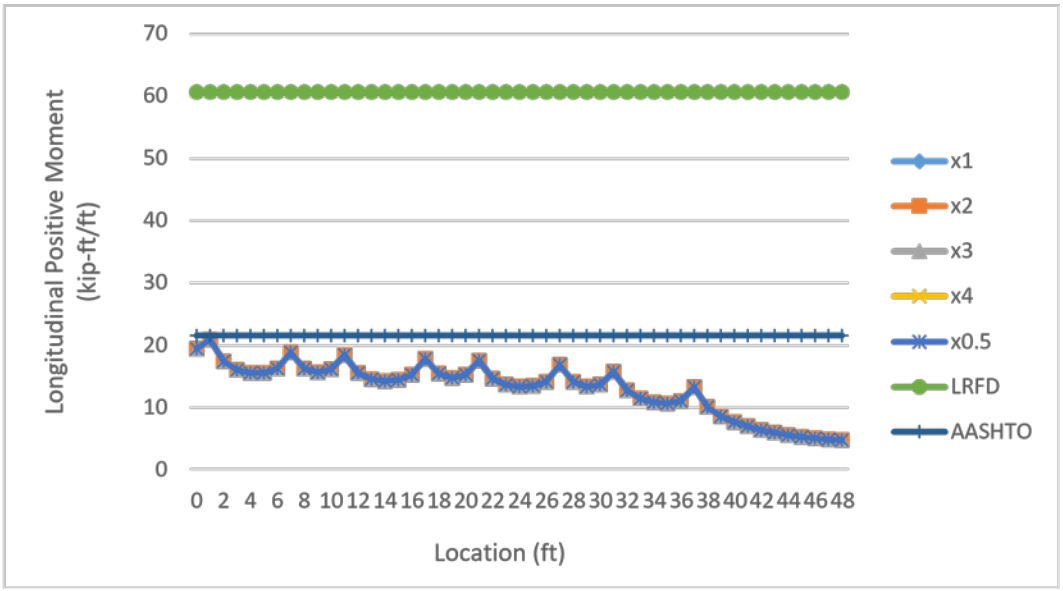

Table 8.2: Longitudinal Positive Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 24ft, Deck width = 48ft, One Left Railing with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	9.4	60.7	7.2	60.7	6.3	60.7	5.7	60.7	11.9	60.7	21.6
1	10.8	60.7	8.6	60.7	7.7	60.7	7.1	60.7	13.4	60.7	21.6
2	9.5	60.7	7.6	60.7	6.8	60.7	6.3	60.7	11.6	60.7	21.6
3	9.1	60.7	7.5	60.7	6.7	60.7	6.3	60.7	11	60.7	21.6
4	9.5	60.7	8.1	60.7	7.4	60.7	7	60.7	11.2	60.7	21.6
5	10.3	60.7	9	60.7	8.4	60.7	8	60.7	11.8	60.7	21.6
6	11.7	60.7	10.5	60.7	10	60.7	9.7	60.7	13	60.7	21.6
7	14.8	60.7	13.8	60.7	13.3	60.7	13	60.7	16	60.7	21.6
8	12.8	60.7	11.8	60.7	11.4	60.7	11.2	60.7	13.8	60.7	21.6
9	12.5	60.7	11.7	60.7	11.3	60.7	11.1	60.7	13.4	60.7	21.6
10	13.4	60.7	12.6	60.7	12.3	60.7	12.1	60.7	14.2	60.7	21.6
11	16.1	60.7	15.4	60.7	15.1	60.7	14.9	60.7	16.8	60.7	21.6
12	13.4	60.7	12.8	60.7	12.6	60.7	12.4	60.7	14.1	60.7	21.6
13	12.7	60.7	12.2	60.7	11.9	60.7	11.8	60.7	13.2	60.7	21.6
14	12.6	60.7	12.1	60.7	11.9	60.7	11.8	60.7	13.1	60.7	21.6
15	13	60.7	12.6	60.7	12.4	60.7	12.3	60.7	13.4	60.7	21.6
16	14	60.7	13.6	60.7	13.5	60.7	13.4	60.7	14.4	60.7	21.6
17	16.8	60.7	16.6	60.7	16.3	60.7	16.2	60.7	17.1	60.7	21.6
18	14.5	60.7	14.2	60.7	14.1	60.7	14	60.7	14.8	60.7	21.6
19	13.9	60.7	13.7	60.7	13.6	60.7	13.5	60.7	14.2	60.7	21.6

20	14.5	60.7	14.3	60.7	14.2	60.7	14.1	60.7	14.8	60.7	21.6
21	16.9	60.7	16.7	60.7	16.6	60.7	16.6	60.7	17.1	60.7	21.6
22	14.1	60.7	13.9	60.7	13.9	60.7	13.8	60.7	14.3	60.7	21.6
23	13.2	60.7	13	60.7	12.9	60.7	12.9	60.7	13.3	60.7	21.6
24	12.9	60.7	12.7	60.7	12.7	60.7	12.6	60.7	13	60.7	21.6
25	13	60.7	12.9	60.7	12.8	60.7	12.8	60.7	13.2	60.7	21.6
26	13.9	60.7	13.8	60.7	13.7	60.7	13.7	60.7	14	60.7	21.6
27	16.6	60.7	16.5	60.7	16.4	60.7	16.4	60.7	16.7	60.7	21.6
28	13.9	60.7	13.8	60.7	13.8	60.7	13.8	60.7	14	60.7	21.6
29	13.2	60.7	13.1	60.7	13	60.7	13	60.7	13.2	60.7	21.6
30	13.5	60.7	13.4	60.7	13.4	60.7	13.4	60.7	13.6	60.7	21.6
31	15.6	60.7	15.6	60.7	15.6	60.7	15.5	60.7	15.7	60.7	21.6
32	12.7	60.7	12.6	60.7	12.6	60.7	12.6	60.7	12.7	60.7	21.6
33	11.4	60.7	11.3	60.7	11.3	60.7	11.3	60.7	11.4	60.7	21.6
34	10.8	60.7	10.7	60.7	10.7	60.7	10.7	60.7	10.8	60.7	21.6
35	10.6	60.7	10.5	60.7	10.5	60.7	10.5	60.7	10.6	60.7	21.6
36	11	60.7	11	60.7	11	60.7	11	60.7	11.1	60.7	21.6
37	13.2	60.7	13.2	60.7	13.2	60.7	13.2	60.7	13.3	60.7	21.6
38	10	60.7	10	60.7	10	60.7	10	60.7	10	60.7	21.6
39	8.5	60.7	8.5	60.7	8.5	60.7	8.5	60.7	8.6	60.7	21.6
40	7.6	60.7	7.6	60.7	7.6	60.7	7.6	60.7	7.7	60.7	21.6
41	6.9	60.7	6.9	60.7	6.9	60.7	6.9	60.7	6.9	60.7	21.6
42	6.4	60.7	6.3	60.7	6.3	60.7	6.3	60.7	6.4	60.7	21.6
43	5.9	60.7	5.9	60.7	5.9	60.7	5.9	60.7	5.9	60.7	21.6
44	5.6	60.7	5.5	60.7	5.5	60.7	5.5	60.7	5.6	60.7	21.6
45	5.3	60.7	5.2	60.7	5.2	60.7	5.2	60.7	5.3	60.7	21.6

46	5	60.7	5	60.7	5	60.7	5	60.7	5	60.7	21.6
47	4.9	60.7	4.9	60.7	4.9	60.7	4.9	60.7	4.9	60.7	21.6
48	4.8	60.7	4.7	60.7	4.7	60.7	4.7	60.7	4.8	60.7	21.6

Figure 8.2: Longitudinal Positive Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 24ft, Deck width = 48ft, One Left Railing with Edge Loading.

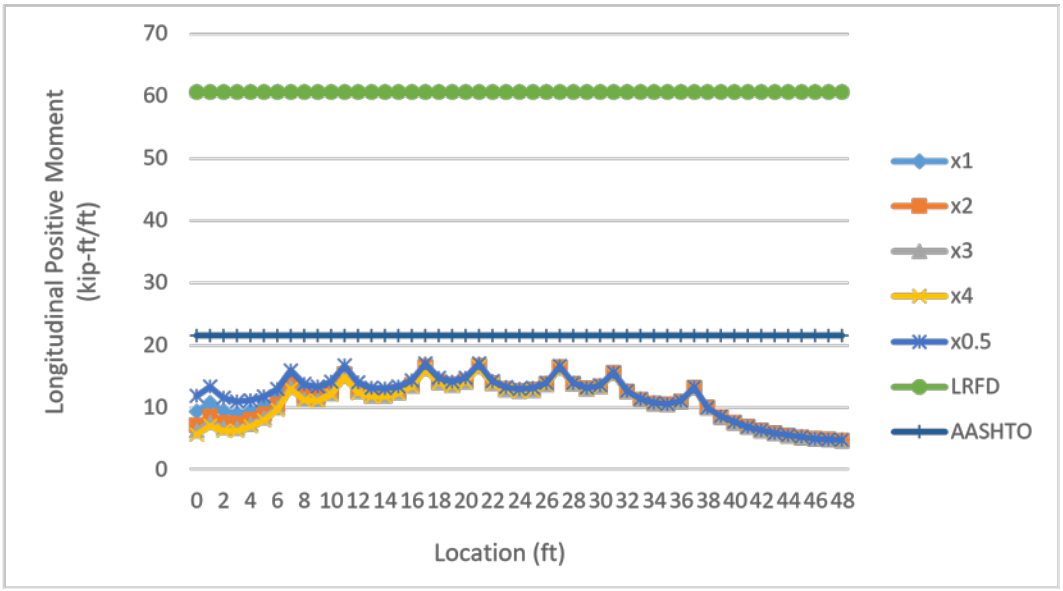

Table 8.3: Longitudinal Positive Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 24ft, Deck width = 48ft, One Right Railings with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	19.5	60.7	19.5	60.7	19.5	60.7	19.5	60.7	19.5	60.7	21.6
1	21	60.7	21	60.7	21	60.7	21	60.7	21	60.7	21.6
2	17.5	60.7	17.4	60.7	17.4	60.7	17.4	60.7	17.5	60.7	21.6
3	16.1	60.7	16.1	60.7	16	60.7	16	60.7	16.1	60.7	21.6
4	15.5	60.7	15.5	60.7	15.5	60.7	15.5	60.7	15.6	60.7	21.6
5	15.5	60.7	15.5	60.7	15.5	60.7	15.5	60.7	15.5	60.7	21.6
6	16.3	60.7	16.3	60.7	16.3	60.7	16.3	60.7	16.3	60.7	21.6
7	18.8	60.7	18.8	60.7	18.8	60.7	18.8	60.7	18.9	60.7	21.6
8	16.3	60.7	16.3	60.7	16.3	60.7	16.3	60.7	16.3	60.7	21.6
9	15.6	60.7	15.6	60.7	15.6	60.7	15.6	60.7	15.6	60.7	21.6
10	16.1	60.7	16.1	60.7	16.1	60.7	16.1	60.7	16.1	60.7	21.6
11	18.5	60.7	18.5	60.7	18.5	60.7	18.5	60.7	18.5	60.7	21.6
12	15.6	60.7	15.5	60.7	15.5	60.7	15.5	60.7	15.6	60.7	21.6
13	14.5	60.7	14.5	60.7	14.5	60.7	14.5	60.7	14.6	60.7	21.6
14	14.2	60.7	14.2	60.7	14.2	60.7	14.2	60.7	14.3	60.7	21.6
15	14.4	60.7	14.4	60.7	14.4	60.7	14.4	60.7	14.4	60.7	21.6
16	15.3	60.7	15.2	60.7	15.2	60.7	15.2	60.7	15.3	60.7	21.6
17	17.9	60.7	17.8	60.7	17.8	60.7	17.8	60.7	17.9	60.7	21.6
18	15.4	60.7	15.4	60.7	15.4	60.7	15.4	60.7	15.4	60.7	21.6
19	14.7	60.7	14.7	60.7	14.7	60.7	14.7	60.7	14.8	60.7	21.6

20	15.2	60.7	15.2	60.7	15.2	60.7	15.2	60.7	15.2	60.7	21.6
21	17.5	60.7	17.5	60.7	17.5	60.7	17.4	60.7	17.5	60.7	21.6
22	14.6	60.7	14.6	60.7	14.5	60.7	14.5	60.7	14.6	60.7	21.6
23	13.6	60.7	13.5	60.7	13.5	60.7	13.5	60.7	13.6	60.7	21.6
24	13.2	60.7	13.1	60.7	13.1	60.7	13.1	60.7	13.2	60.7	21.6
25	13.3	60.7	13.2	60.7	13.2	60.7	13.2	60.7	13.3	60.7	21.6
26	14	60.7	14	60.7	13.9	60.7	13.9	60.7	14.1	60.7	21.6
27	16.6	60.7	16.6	60.7	16.5	60.7	16.5	60.7	16.7	60.7	21.6
28	13.9	60.7	13.8	60.7	13.8	60.7	13.8	60.7	14	60.7	21.6
29	13.1	60.7	13	60.7	13	60.7	12.9	60.7	13.2	60.7	21.6
30	13.4	60.7	13.3	60.7	13.2	60.7	13.2	60.7	13.5	60.7	21.6
31	15.4	60.7	15.3	60.7	15.3	60.7	15.2	60.7	15.6	60.7	21.6
32	12.4	60.7	12.3	60.7	12.2	60.7	12.2	60.7	12.5	60.7	21.6
33	11	60.7	10.9	60.7	10.8	60.7	10.8	60.7	11.2	60.7	21.6
34	10.3	60.7	10.2	60.7	10.1	60.7	10.1	60.7	10.5	60.7	21.6
35	10.1	60.7	9.9	60.7	9.8	60.7	9.8	60.7	10.2	60.7	21.6
36	10.4	60.7	10.2	60.7	10.1	60.7	10.1	60.7	10.6	60.7	21.6
37	12.5	60.7	12.3	60.7	12.2	60.7	12.2	60.7	12.8	60.7	21.6
38	9.2	60.7	8.9	60.7	8.8	60.7	8.8	60.7	9.5	60.7	21.6
39	7.6	60.7	7.3	60.7	7.2	60.7	7.1	60.7	7.9	60.7	21.6
40	6.5	60.7	6.2	60.7	6.1	60.7	6	60.7	6.9	60.7	21.6
41	5.7	60.7	5.3	60.7	5.2	60.7	5.1	60.7	6.1	60.7	21.6
42	5	60.7	4.6	60.7	4.4	60.7	4.3	60.7	5.4	60.7	21.6
43	4.4	60.7	3.9	60.7	3.7	60.7	3.6	60.7	4.8	60.7	21.6
44	3.8	60.7	3.4	60.7	3.1	60.7	3	60.7	4.3	60.7	21.6
45	3.3	60.7	2.8	60.7	2.6	60.7	2.4	60.7	3.9	60.7	21.6

46	2.9	60.7	2.3	60.7	2	60.7	1.9	60.7	3.5	60.7	21.6
47	2.4	60.7	1.8	60.7	1.5	60.7	1.7	60.7	3.1	60.7	21.6
48	2.3	60.7	1.6	60.7	1.3	60.7	1.2	60.7	3	60.7	21.6

Figure 8.3: Longitudinal Positive Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 24ft, Deck width = 48ft, One Right Railings with Edge Loading.

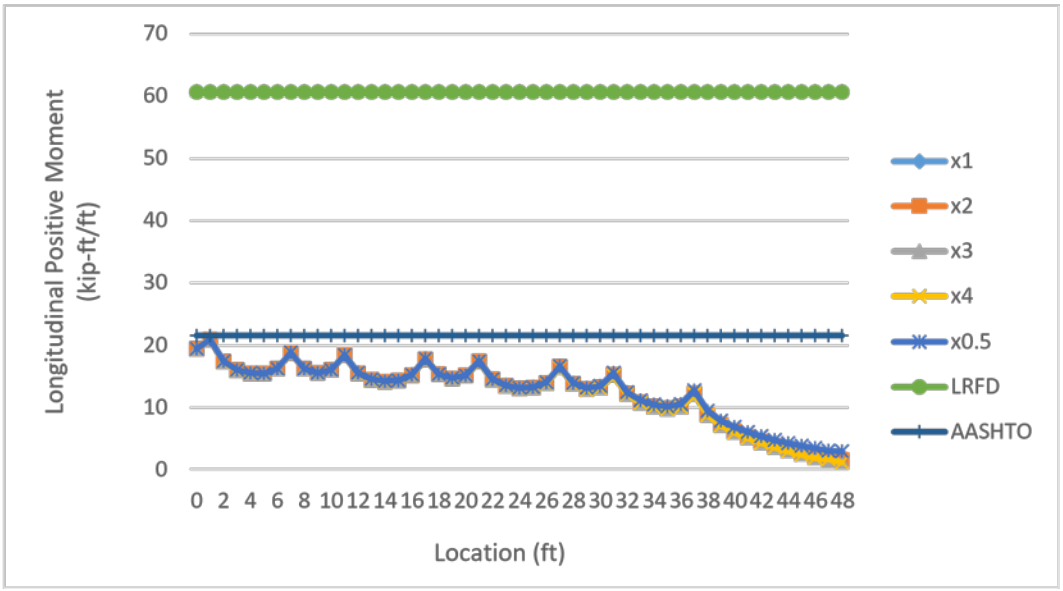

Table 8.4: Longitudinal Positive Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 24ft, Deck width = 36ft, Two Railings with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	9.4	60.7	7.2	60.7	6.2	60.7	5.7	60.7	11.9	60.7	21.6
1	10.7	60.7	8.5	60.7	7.5	60.7	6.9	60.7	13.2	60.7	21.6
2	9.5	60.7	7.6	60.7	6.8	60.7	6.3	60.7	11.6	60.7	21.6
3	9.1	60.7	7.4	60.7	6.7	60.7	6.2	60.7	11	60.7	21.6
4	9.5	60.7	8	60.7	7.4	60.7	7	60.7	11.2	60.7	21.6
5	10.3	60.7	9	60.7	8.3	60.7	8	60.7	11.7	60.7	21.6
6	11.6	60.7	10.5	60.7	9.9	60.7	9.6	60.7	12.9	60.7	21.6
7	14.9	60.7	13.8	60.7	13.3	60.7	13.1	60.7	16	60.7	21.6
8	12.7	60.7	11.8	60.7	11.4	60.7	11.1	60.7	13.8	60.7	21.6
9	12.5	60.7	11.6	60.7	11.2	60.7	11	60.7	13.4	60.7	21.6
10	13.3	60.7	12.5	60.7	12.2	60.7	12	60.7	14.1	60.7	21.6
11	16	60.7	15.4	60.7	15	60.7	14.9	60.7	16.7	60.7	21.6
12	13.4	60.7	12.8	60.7	12.5	60.7	12.4	60.7	14.1	60.7	21.6
13	12.6	60.7	12.1	60.7	11.8	60.7	11.7	60.7	13.2	60.7	21.6
14	12.5	60.7	12.1	60.7	11.8	60.7	11.7	60.7	13	60.7	21.6
15	12.9	60.7	12.5	60.7	12.3	60.7	12.2	60.7	13.3	60.7	21.6
16	13.9	60.7	13.6	60.7	13.4	60.7	13.3	60.7	14.4	60.7	21.6
17	16.6	60.7	16.3	60.7	16.1	60.7	16	60.7	17	60.7	21.6
18	14.3	60.7	14	60.7	13.9	60.7	13.8	60.7	14.7	60.7	21.6
19	13.8	60.7	13.6	60.7	13.4	60.7	13.4	60.7	14.1	60.7	21.6

20	14.4	60.7	14.2	60.7	14	60.7	14	60.7	14.7	60.7	21.6
21	16.7	60.7	16.4	60.7	16.3	60.7	16.3	60.7	16.9	60.7	21.6
22	14	60.7	13.8	60.7	13.7	60.7	13.6	60.7	14.2	60.7	21.6
23	13	60.7	12.8	60.7	12.7	60.7	12.7	60.7	13.2	60.7	21.6
24	12.7	60.7	12.5	60.7	12.4	60.7	12.4	60.7	12.9	60.7	21.6
25	12.8	60.7	12.7	60.7	12.6	60.7	12.5	60.7	13	60.7	21.6
26	13.6	60.7	13.5	60.7	13.4	60.7	13.3	60.7	13.8	60.7	21.6
27	16.3	60.7	16.1	60.7	16.1	60.7	16	60.7	16.5	60.7	21.6
28	13.6	60.7	13.5	60.7	13.4	60.7	13.4	60.7	13.8	60.7	21.6
29	12.8	60.7	12.7	60.7	12.6	60.7	12.5	60.7	13	60.7	21.6
30	13.1	60.7	13	60.7	12.9	60.7	12.8	60.7	13.3	60.7	21.6
31	15.4	60.7	15.2	60.7	15.1	60.7	15.1	60.7	15.5	60.7	21.6
32	12.2	60.7	12	60.7	12	60.7	11.9	60.7	12.4	60.7	21.6
33	10.8	60.7	10.6	60.7	10.6	60.7	10.5	60.7	11	60.7	21.6
34	10.2	60.7	10	60.7	9.9	60.7	9.9	60.7	10.4	60.7	21.6
35	9.9	60.7	9.7	60.7	9.6	60.7	9.6	60.7	10.2	60.7	21.6
36	10.3	60.7	10.1	60.7	10	60.7	9.9	60.7	10.6	60.7	21.6
37	12.2	60.7	11.9	60.7	11.8	60.7	11.8	60.7	12.5	60.7	21.6
38	9.1	60.7	8.8	60.7	8.7	60.7	8.6	60.7	9.4	60.7	21.6
39	7.5	60.7	7.2	60.7	7.1	60.7	7	60.7	7.8	60.7	21.6
40	6.5	60.7	6.2	60.7	6	60.7	5.9	60.7	6.8	60.7	21.6
41	5.6	60.7	5.3	60.7	5.1	60.7	5	60.7	6	60.7	21.6
42	4.9	60.7	4.5	60.7	4.4	60.7	4.2	60.7	5.4	60.7	21.6
43	4.3	60.7	3.9	60.7	3.7	60.7	3.6	60.7	4.8	60.7	21.6
44	3.8	60.7	3.3	60.7	3.1	60.7	3	60.7	4.3	60.7	21.6
45	3.3	60.7	2.8	60.7	2.5	60.7	2.4	60.7	3.9	60.7	21.6

46	2.9	60.7	2.3	60.7	2	60.7	2	60.7	3.5	60.7	21.6
47	2.4	60.7	1.7	60.7	1.4	60.7	1.3	60.7	3.1	60.7	21.6
48	2.3	60.7	1.6	60.7	1.3	60.7	1.1	60.7	3	60.7	21.6

Figure 8.4: Longitudinal Positive Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 24ft, Deck width = 36ft, Two Railings with Edge Loading.

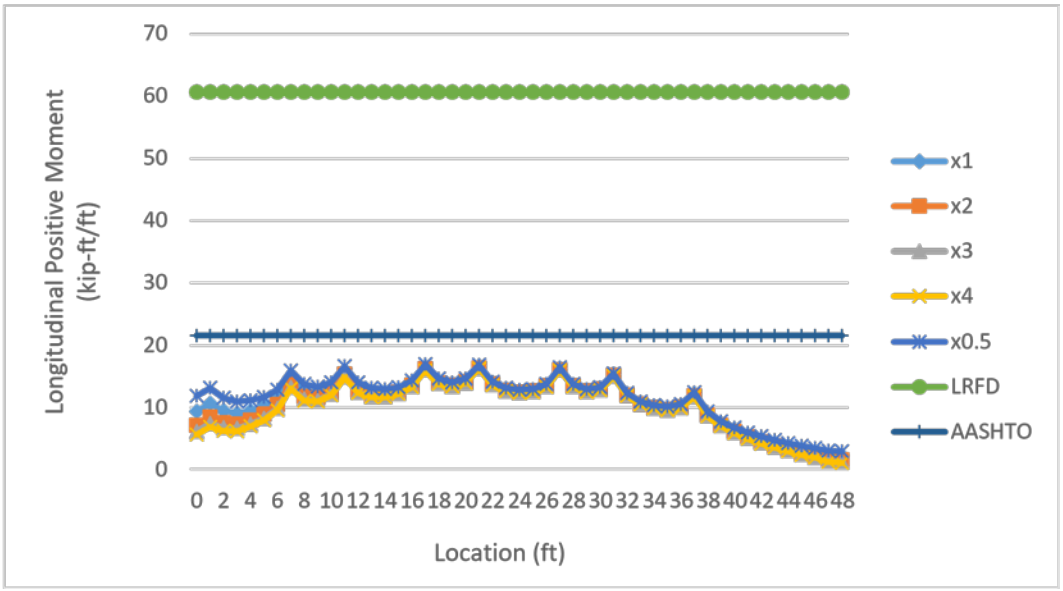

Table 9.1: Longitudinal Negative Moment Distribution at Critical Section for One-Lane Two Span Bridge Deck Span = 36ft, Deck width = 14ft, No Railing with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	17.6	31.9	17.6	31.9	17.6	31.9	17.6	31.9	17.6	31.9	32.4
1	23.2	31.9	23.2	31.9	23.2	31.9	23.2	31.9	23.2	31.9	32.4
2	22.1	31.9	22.1	31.9	22.1	31.9	22.1	31.9	22.1	31.9	32.4
3	21.3	31.9	21.3	31.9	21.3	31.9	21.3	31.9	21.3	31.9	32.4
4	20.4	31.9	20.4	31.9	20.4	31.9	20.4	31.9	20.4	31.9	32.4
5	19.5	31.9	19.5	31.9	19.5	31.9	19.5	31.9	19.5	31.9	32.4
6	18.9	31.9	18.9	31.9	18.9	31.9	18.9	31.9	18.9	31.9	32.4
7	18.1	31.9	18.1	31.9	18.1	31.9	18.1	31.9	18.1	31.9	32.4
8	17.5	31.9	17.5	31.9	17.5	31.9	17.5	31.9	17.5	31.9	32.4
9	16.9	31.9	16.9	31.9	16.9	31.9	16.9	31.9	16.9	31.9	32.4
10	16.2	31.9	16.2	31.9	16.2	31.9	16.2	31.9	16.2	31.9	32.4
11	15.5	31.9	15.5	31.9	15.5	31.9	15.5	31.9	15.5	31.9	32.4
12	14.5	31.9	14.5	31.9	14.5	31.9	14.5	31.9	14.5	31.9	32.4
13	12.5	31.9	12.5	31.9	12.5	31.9	12.5	31.9	12.5	31.9	32.4
14	6.5	31.9	6.5	31.9	6.5	31.9	6.5	31.9	6.5	31.9	32.4

Figure 9.1: Longitudinal Negative Moment Distribution at Critical Section for One-Lane Two Span Bridge Deck Span = 36ft, Deck width = 14ft, No Railing with Edge Loading.

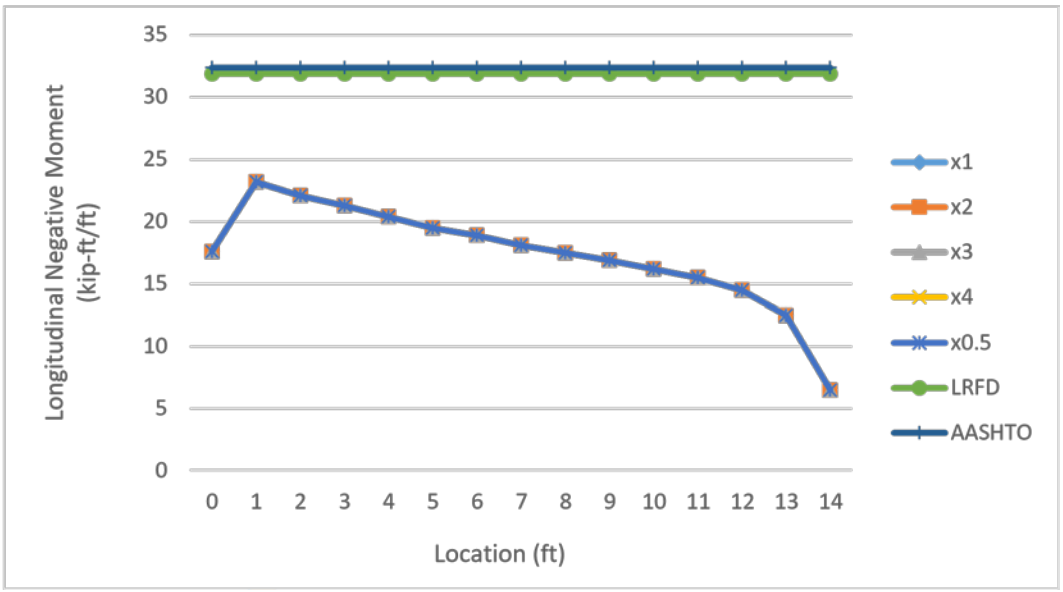

Table 9.2: Longitudinal Negative Moment Distribution at Critical Section for One-Lane Two Span Bridge Deck Span = 36ft, Deck width = 14ft, One Left Railing with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	15.8	31.9	15	31.9	14.6	31.9	14.3	31.9	16.5	31.9	32.4
1	13.6	31.9	10	31.9	8.2	31.9	7.1	31.9	17	31.9	32.4
2	13.3	31.9	10.2	31.9	8.6	31.9	7.6	31.9	16.3	31.9	32.4
3	12.7	31.9	9.6	31.9	8	31.9	7.1	31.9	15.6	31.9	32.4
4	12.5	31.9	9.6	31.9	8.1	31.9	7.2	31.9	15.2	31.9	32.4
5	12.2	31.9	9.5	31.9	8.1	31.9	7.3	31.9	14.7	31.9	32.4
6	12	31.9	9.5	31.9	8.2	31.9	7.4	31.9	14.4	31.9	32.4
7	11.8	31.9	9.5	31.9	8.3	31.9	7.6	31.9	14	31.9	32.4
8	11.7	31.9	9.5	31.9	8.4	31.9	7.8	31.9	13.7	31.9	32.4
9	11.6	31.9	9.6	31.9	8.6	31.9	8	31.9	13.4	31.9	32.4
10	11.4	31.9	9.6	31.9	8.7	31.9	8.1	31.9	13.1	31.9	32.4
11	11.3	31.9	9.7	31.9	8.9	31.9	8.4	31.9	12.8	31.9	32.4
12	11	31.9	9.6	31.9	9	31.9	8.5	31.9	12.2	31.9	32.4
13	10.2	31.9	9.3	31.9	8.9	31.9	8.6	31.9	11	31.9	32.4
14	6.2	31.9	6.2	31.9	6.2	31.9	6.2	31.9	6.2	31.9	32.4

Figure 9.2: Longitudinal Negative Moment Distribution at Critical Section for One-Lane Two Span Bridge Deck Span = 36ft, Deck width = 14ft, One Left Railing with Edge Loading.

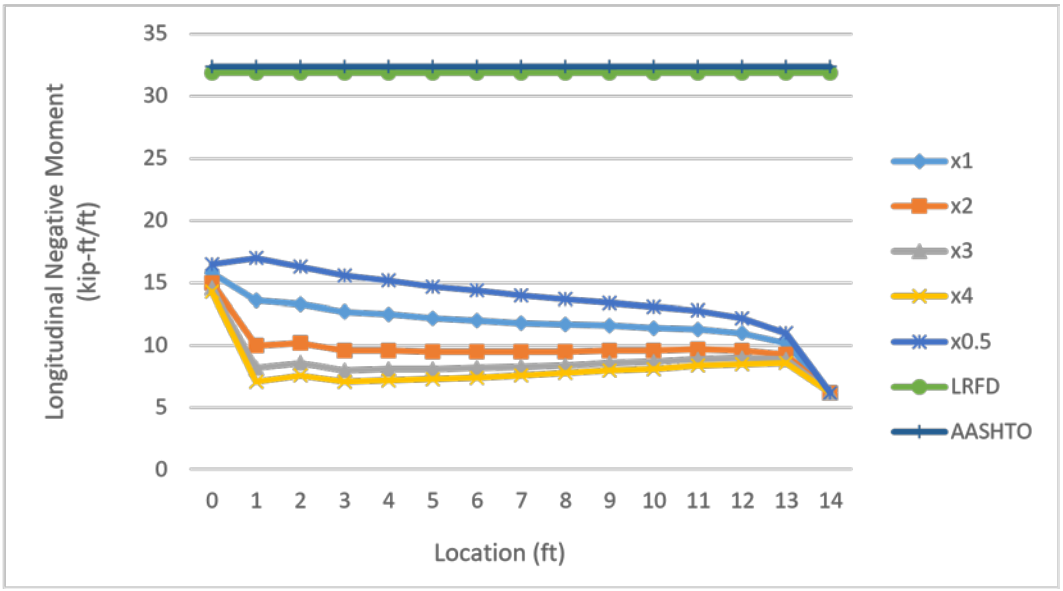

Table 9.3: Longitudinal Negative Moment Distribution at Critical Section for One-Lane Two Span Bridge Deck Span = 36ft, Deck width = 14ft, One Right Railings with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	17.4	31.9	17.4	31.9	17.4	31.9	17.4	31.9	17.5	31.9	32.4
1	21.4	31.9	20.8	31.9	20.4	31.9	20.2	31.9	22	31.9	32.4
2	19.6	31.9	18.6	31.9	18.2	31.9	17.9	31.9	20.5	31.9	32.4
3	18.3	31.9	17.3	31.9	16.6	31.9	16.3	31.9	19.3	31.9	32.4
4	17.1	31.9	15.9	31.9	15.2	31.9	14.8	31.9	18.3	31.9	32.4
5	15.9	31.9	14.6	31.9	13.8	31.9	13.4	31.9	17.2	31.9	32.4
6	15	31.9	13.5	31.9	12.7	31.9	12.3	31.9	16.3	31.9	32.4
7	13.9	31.9	12.3	31.9	11.5	31.9	11	31.9	15.4	31.9	32.4
8	13.1	31.9	11.4	31.9	10.5	31.9	10	31.9	14.6	31.9	32.4
9	12.3	31.9	10.5	31.9	9.6	31.9	9	31.9	13.9	31.9	32.4
10	11.4	31.9	9.5	31.9	8.5	31.9	8	31.9	13.1	31.9	32.4
11	10.6	31.9	8.7	31.9	7.6	31.9	7	31.9	12.5	31.9	32.4
12	9.8	31.9	7.9	31.9	6.8	31.9	6.2	31.9	11.6	31.9	32.4
13	8.8	31.9	6.7	31.9	5.6	31.9	4.9	31.9	10.6	31.9	32.4
14	5.7	31.9	5.2	31.9	5	31.9	4.8	31.9	6.1	31.9	32.4

Figure 9.3: Longitudinal Negative Moment Distribution at Critical Section for One-Lane Two Span Bridge Deck Span = 36ft, Deck width = 14ft, One Right Railings with Edge Loading.

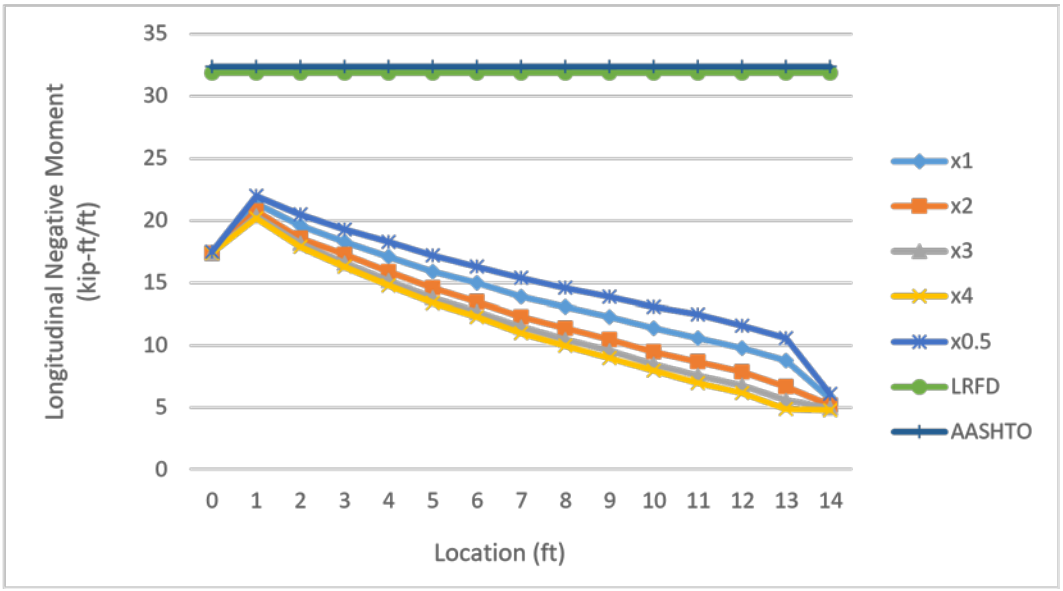

Table 9.4: Longitudinal Negative Moment Distribution at Critical Section for One-Lane Two Span Bridge Deck Span = 36ft, Deck width = 14ft, Two Railings with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	15.7	31.9	15	31.9	14.6	31.9	14.4	31.9	16.4	31.9	32.4
1	12.4	31.9	8.9	31.9	7.2	31.9	6.2	31.9	16	31.9	32.4
2	11.9	31.9	8.7	31.9	7.2	31.9	6.3	31.9	15.1	31.9	32.4
3	11	31.9	7.9	31.9	6.3	31.9	5.4	31.9	14.2	31.9	32.4
4	10.5	31.9	7.5	31.9	6.1	31.9	5.2	31.9	13.6	31.9	32.4
5	10	31.9	7.1	31.9	5.7	31.9	4.9	31.9	13	31.9	32.4
6	9.6	31.9	6.8	31.9	5.5	31.9	4.7	31.9	12.5	31.9	32.4
7	9.1	31.9	6.5	31.9	5.2	31.9	4.5	31.9	11.9	31.9	32.4
8	8.8	31.9	6.2	31.9	5	31.9	4.3	31.9	11.5	31.9	32.4
9	8.4	31.9	5.9	31.9	4.7	31.9	4	31.9	11.1	31.9	32.4
10	8	31.9	5.6	31.9	4.5	31.9	3.8	31.9	10.6	31.9	32.4
11	7.7	31.9	5.3	31.9	4.2	31.9	3.6	31.9	10.2	31.9	32.4
12	7.4	31.9	5.2	31.9	4.1	31.9	3.5	31.9	9.8	31.9	32.4
13	6.9	31.9	4.7	31.9	3.7	31.9	3.1	31.9	9.2	31.9	32.4
14	5.7	31.9	5.3	31.9	5.2	31.9	5.1	31.9	6.1	31.9	32.4

Figure 9.4: Longitudinal Negative Moment Distribution at Critical Section for One-Lane Two Span Bridge Deck Span = 24ft, Deck width = 14ft, Two Railings with Edge Loading.

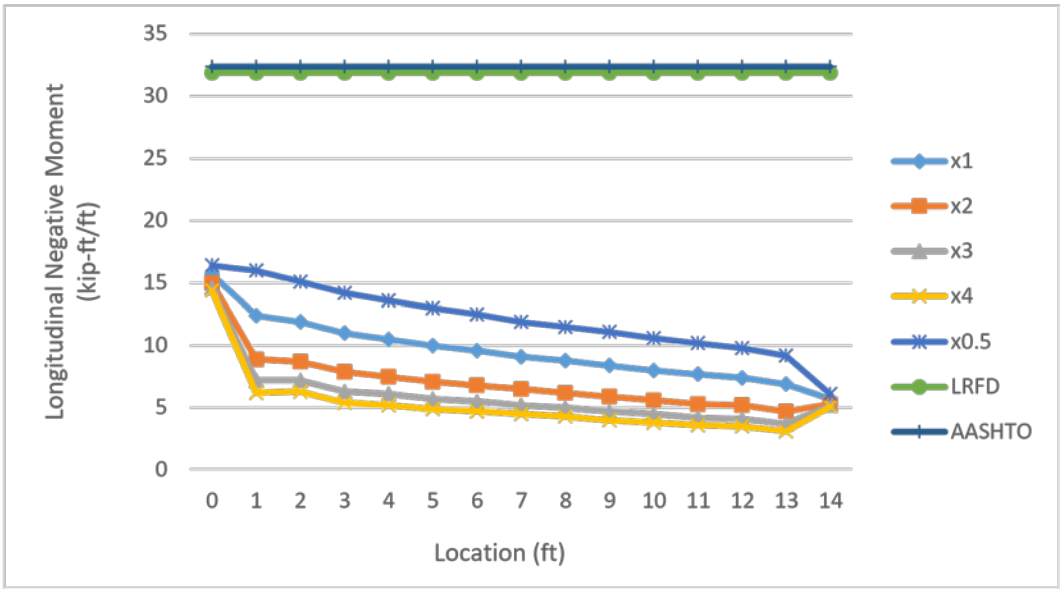

Table 10.1: Longitudinal Positive Moment Distribution at Critical Section for One-Lane Two Span Bridge Deck Span = 36ft, Deck width = 14ft, No Railing with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	26.6	37.5	26.6	37.5	26.6	37.5	26.6	37.5	26.6	37.5	32.4
1	28	37.5	28	37.5	28	37.5	28	37.5	28	37.5	32.4
2	24.3	37.5	24.3	37.5	24.3	37.5	24.3	37.5	24.3	37.5	32.4
3	22.8	37.5	22.8	37.5	22.8	37.5	22.8	37.5	22.8	37.5	32.4
4	22.1	37.5	22.1	37.5	22.1	37.5	22.1	37.5	22.1	37.5	32.4
5	21.8	37.5	21.8	37.5	21.8	37.5	21.8	37.5	21.8	37.5	32.4
6	22.2	37.5	22.2	37.5	22.2	37.5	22.2	37.5	22.2	37.5	32.4
7	24.3	37.5	24.3	37.5	24.3	37.5	24.3	37.5	24.3	37.5	32.4
8	21.3	37.5	21.3	37.5	21.3	37.5	21.3	37.5	21.3	37.5	32.4
9	19.9	37.5	19.9	37.5	19.9	37.5	19.9	37.5	19.9	37.5	32.4
10	19	37.5	19	37.5	19	37.5	19	37.5	19	37.5	32.4
11	18.5	37.5	18.5	37.5	18.5	37.5	18.5	37.5	18.5	37.5	32.4
12	18.1	37.5	18.1	37.5	18.1	37.5	18.1	37.5	18.1	37.5	32.4
13	17.9	37.5	17.9	37.5	17.9	37.5	17.9	37.5	17.9	37.5	32.4
14	17.7	37.5	17.7	37.5	17.7	37.5	17.7	37.5	17.7	37.5	32.4

Figure 10.1: Longitudinal Positive Moment Distribution at Critical Section for One-Lane Two Span Bridge Deck Span = 36ft, Deck width = 14ft, No Railing with Edge Loading.

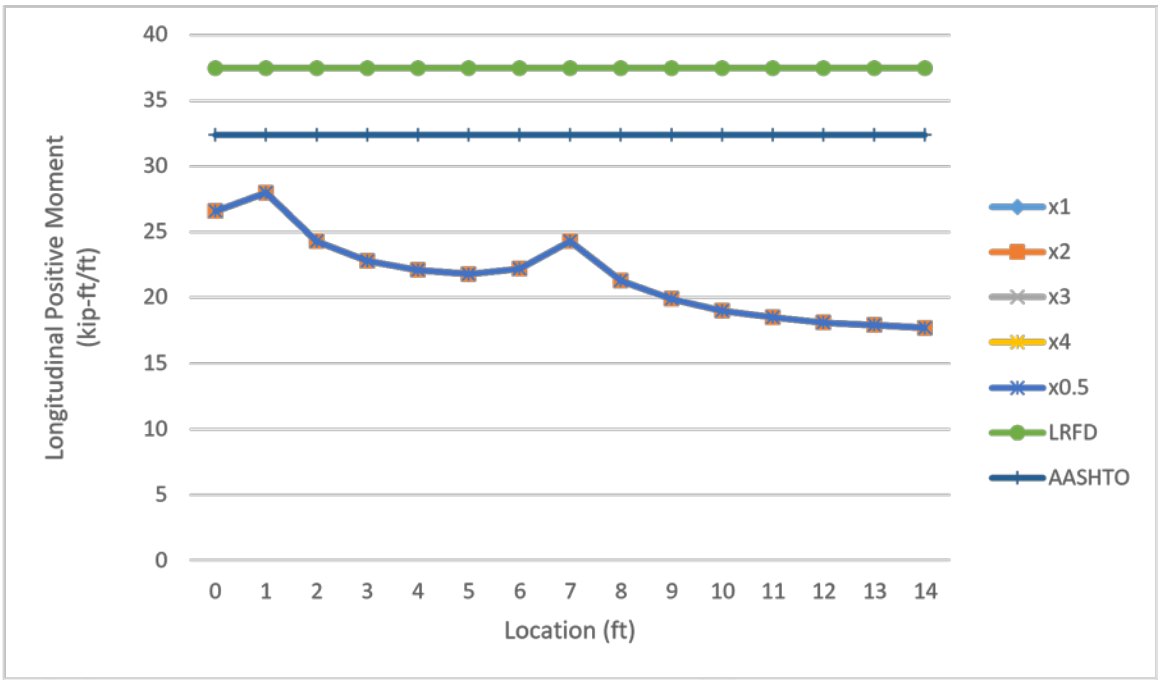

Table 10.2: Longitudinal Positive Moment Distribution at Critical Section for One-Lane Lane Two Span Bridge Deck Span = 36ft, Deck width = 14ft, One Left Railing with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	15.9	37.5	12.2	37.5	10.2	37.5	9	37.5	19.4	37.5	32.4
1	17	37.5	13.2	37.5	11.2	37.5	10	37.5	20.5	37.5	32.4
2	15	37.5	11.6	37.5	9.7	37.5	8.6	37.5	18.2	37.5	32.4
3	14.1	37.5	10.9	37.5	9.1	37.5	8	37.5	17.2	37.5	32.4
4	14	37.5	11	37.5	9.3	37.5	8.3	37.5	16.9	37.5	32.4
5	14.3	37.5	11.3	37.5	9.8	37.5	8.8	37.5	16.9	37.5	32.4
6	15.1	37.5	12.3	37.5	10.8	37.5	9.8	37.5	17.6	37.5	32.4
7	17.5	37.5	14.8	37.5	13.4	37.5	12.5	37.5	20	37.5	32.4
8	14.8	37.5	12.2	37.5	10.8	37.5	9.9	37.5	17.1	37.5	32.4
9	13.6	37.5	11.1	37.5	9.8	37.5	8.9	37.5	15.9	37.5	32.4
10	13	37.5	10.6	37.5	9.3	37.5	8.5	37.5	15.2	37.5	32.4
11	12.7	37.5	10.3	37.5	9	37.5	8.2	37.5	14.8	37.5	32.4
12	12.4	37.5	10.1	37.5	8.9	37.5	8.1	37.5	14.5	37.5	32.4
13	12.3	37.5	10	37.5	8.8	37.5	8.1	37.5	14.3	37.5	32.4
14	12.2	37.5	10	37.5	8.8	37.5	8.1	37.5	14.2	37.5	32.4

Figure 10.2: Longitudinal Positive Moment Distribution at Critical Section for One-Lane Lane Two Span Bridge Deck Span = 36ft, Deck width = 14ft, One Left Railing with Edge Loading.

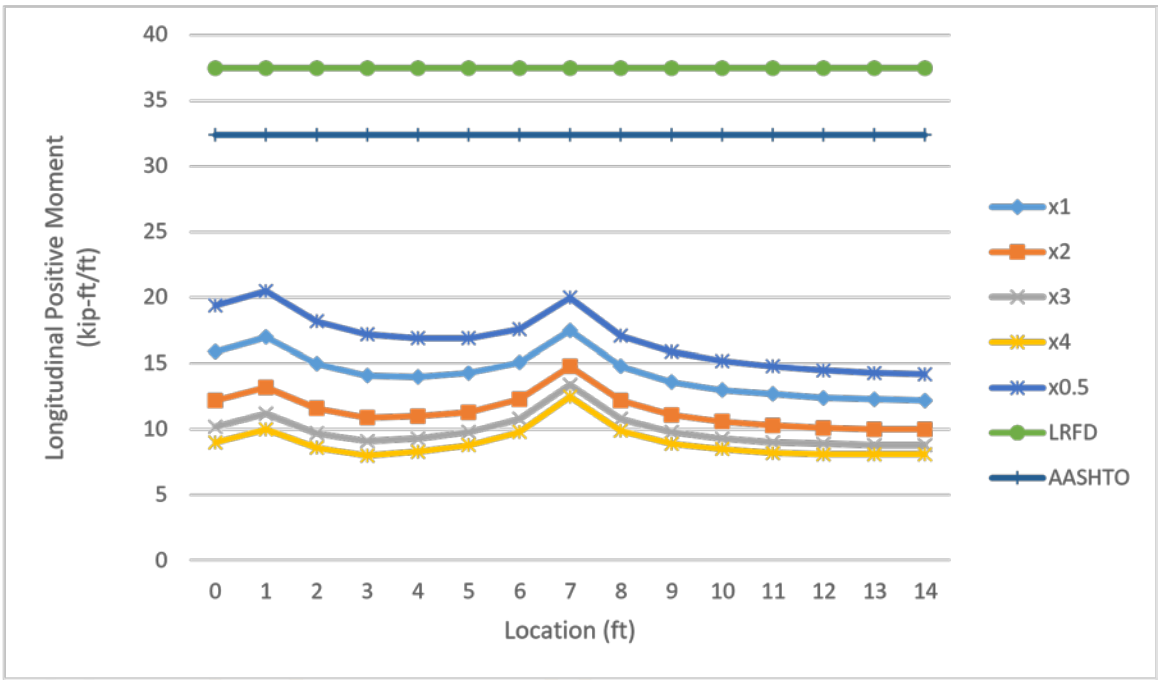

Table 10.3: Longitudinal Positive Moment Distribution at Critical Section for One-Lane Two Span Bridge Deck Span = 36ft, Deck width = 14ft, One Right Railings with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	22.2	37.5	20.4	37.5	19.5	37.5	18.9	37.5	23.8	37.5	32.4
1	23.5	37.5	21.7	37.5	20.7	37.5	20.1	37.5	25.2	37.5	32.4
2	19.7	37.5	17.9	37.5	16.9	37.5	16.3	37.5	21.4	37.5	32.4
3	18.1	37.5	16.2	37.5	15.2	37.5	14.6	37.5	19.8	37.5	32.4
4	17.2	37.5	15.3	37.5	14.2	37.5	13.6	37.5	19	37.5	32.4
5	16.8	37.5	14.8	37.5	13.7	37.5	13	37.5	18.6	37.5	32.4
6	17	37.5	15	37.5	13.9	37.5	13.2	37.5	18.9	37.5	32.4
7	18.9	37.5	16.8	37.5	15.6	37.5	14.9	37.5	20.9	37.5	32.4
8	15.7	37.5	13.5	37.5	12.3	37.5	11.5	37.5	17.7	37.5	32.4
9	14.1	37.5	11.7	37.5	10.5	37.5	9.7	37.5	16.2	37.5	32.4
10	13	37.5	10.5	37.5	9.2	37.5	8.4	37.5	15.2	37.5	32.4
11	12.1	37.5	9.6	37.5	8.2	37.5	7.3	37.5	14.4	37.5	32.4
12	11.4	37.5	8.8	37.5	7.3	37.5	6.4	37.5	13.8	37.5	32.4
13	10.7	37.5	7.8	37.5	6.3	37.5	5.3	37.5	13.3	37.5	32.4
14	10.6	37.5	7.8	37.5	6.3	37.5	5.3	37.5	13.2	37.5	32.4

Figure 10.3: Longitudinal Positive Moment Distribution at Critical Section for One-Lane Two Span Bridge Deck Span = 36ft, Deck width = 14ft, One Right Railings with Edge Loading.

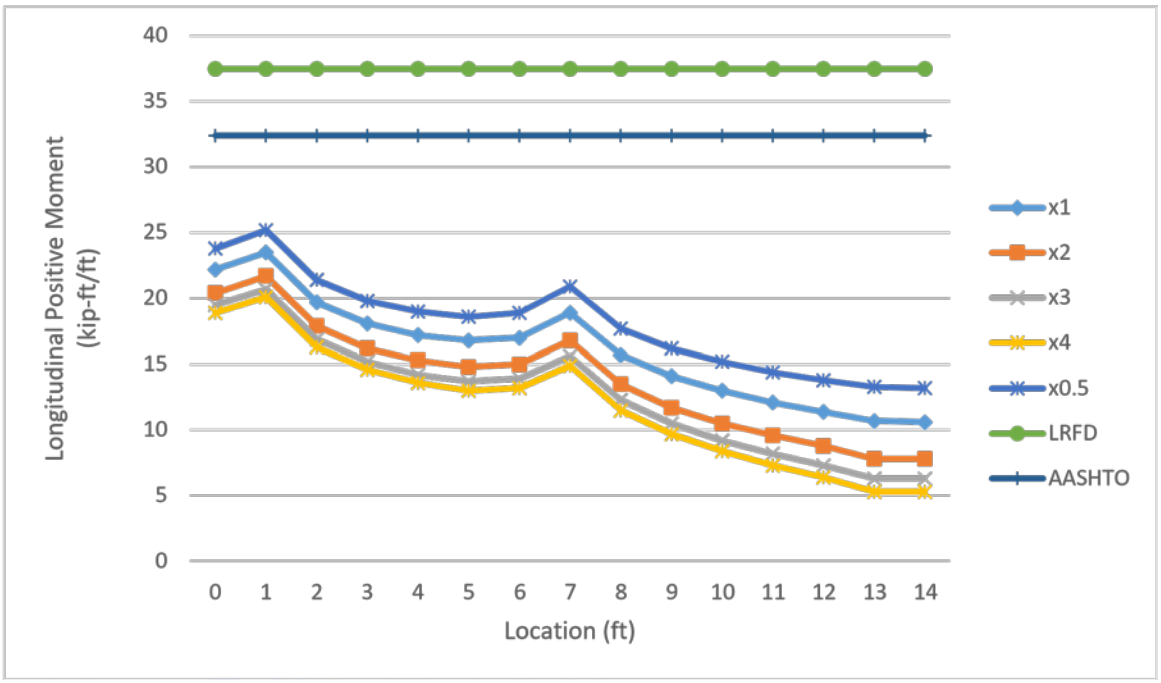

Table 10.4: Longitudinal Positive Moment Distribution at Critical Section for One-Lane Two Span Bridge Deck Span = 36ft, Deck width = 14ft, Two Railings with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	14	37.5	10.5	37.5	8.8	37.5	7.7	37.5	17.7	37.5	32.4
1	15	37.5	11.4	37.5	9.7	37.5	8.6	37.5	18.8	37.5	32.4
2	12.9	37.5	9.5	37.5	7.9	37.5	7	37.5	16.3	37.5	32.4
3	11.9	37.5	8.7	37.5	7.1	37.5	6.2	37.5	15.2	37.5	32.4
4	11.6	37.5	8.5	37.5	7.1	37.5	6.2	37.5	14.9	37.5	32.4
5	11.7	37.5	8.7	37.5	7.2	37.5	6.4	37.5	14.8	37.5	32.4
6	12.3	37.5	9.4	37.5	8	37.5	7.2	37.5	15.4	37.5	32.4
7	14.6	37.5	11.7	37.5	10.4	37.5	9.6	37.5	17.6	37.5	32.4
8	11.6	37.5	8.8	37.5	7.5	37.5	6.7	37.5	14.6	37.5	32.4
9	10.3	37.5	7.5	37.5	6.2	37.5	5.4	37.5	13.3	37.5	32.4
10	9.5	37.5	6.7	37.5	5.4	37.5	4.6	37.5	12.4	37.5	32.4
11	8.8	37.5	6.1	37.5	4.8	37.5	4	37.5	11.8	37.5	32.4
12	8.3	37.5	5.6	37.5	4.3	37.5	3.5	37.5	11.4	37.5	32.4
13	7.8	37.5	5	37.5	3.7	37.5	3	37.5	10.9	37.5	32.4
14	7.8	37.5	5	37.5	3.8	37.5	3	37.5	10.9	37.5	32.4

Figure 10.4: Longitudinal Positive Moment Distribution at Critical Section for One-Lane Two Span Bridge Deck Span = 36ft, Deck width = 14ft, Two Railings with Edge Loading.

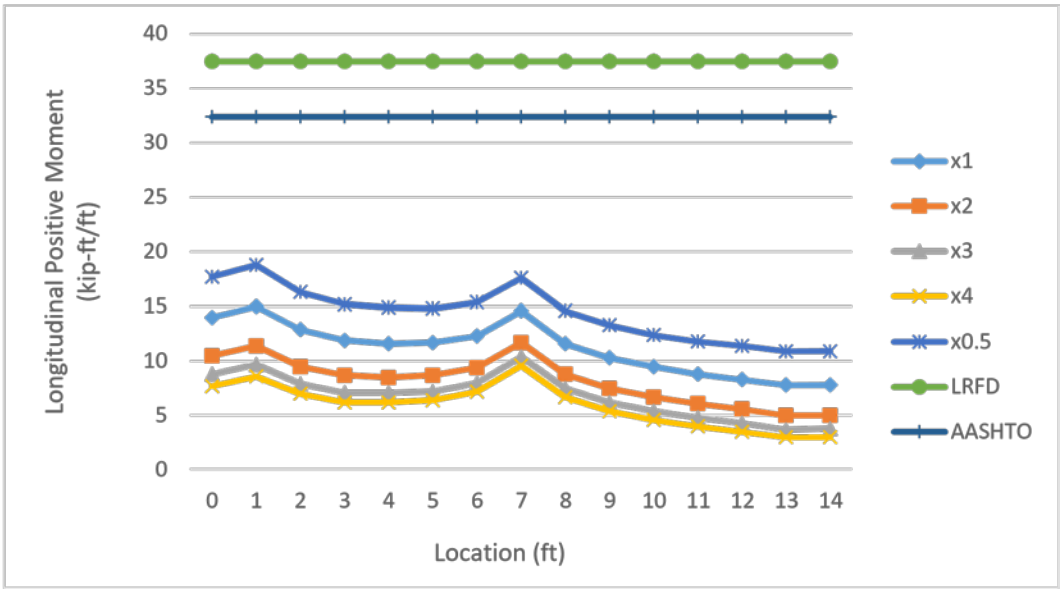

Table 11.1: Longitudinal Negative Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 36ft, Deck width = 24ft, No Railing with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	20.1	52	20.1	52	20.1	52	20.1	52	20.1	52	32.4
1	27.7	52	27.7	52	27.7	52	27.7	52	27.7	52	32.4
2	27.1	52	27.1	52	27.1	52	27.1	52	27.1	52	32.4
3	26.3	52	26.3	52	26.3	52	26.3	52	26.3	52	32.4
4	25.4	52	25.4	52	25.4	52	25.4	52	25.4	52	32.4
5	24.7	52	24.7	52	24.7	52	24.7	52	24.7	52	32.4
6	23.9	52	23.9	52	23.9	52	23.9	52	23.9	52	32.4
7	23.3	52	23.3	52	23.3	52	23.3	52	23.3	52	32.4
8	22.7	52	22.7	52	22.7	52	22.7	52	22.7	52	32.4
9	22.1	52	22.1	52	22.1	52	22.1	52	22.1	52	32.4
10	21.6	52	21.6	52	21.6	52	21.6	52	21.6	52	32.4
11	21.1	52	21.1	52	21.1	52	21.1	52	21.1	52	32.4
12	20.6	52	20.6	52	20.6	52	20.6	52	20.6	52	32.4
13	20.1	52	20.1	52	20.1	52	20.1	52	20.1	52	32.4
14	19.7	52	19.7	52	19.7	52	19.7	52	19.7	52	32.4
15	19.3	52	19.3	52	19.3	52	19.3	52	19.3	52	32.4
16	18.8	52	18.8	52	18.8	52	18.8	52	18.8	52	32.4
17	18.4	52	18.4	52	18.4	52	18.4	52	18.4	52	32.4
18	18	52	18	52	18	52	18	52	18	52	32.4
19	17.6	52	17.6	52	17.6	52	17.6	52	17.6	52	32.4

20	17.1	52	17.1	52	17.1	52	17.1	52	17.1	52	32.4
21	16.5	52	16.5	52	16.5	52	16.5	52	16.5	52	32.4
22	15.7	52	15.7	52	15.7	52	15.7	52	15.7	52	32.4
23	14.1	52	14.1	52	14.1	52	14.1	52	14.1	52	32.4
24	7.3	52	7.3	52	7.3	52	7.3	52	7.3	52	32.4

Figure 11.1: Longitudinal Negative Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 36ft, Deck width = 24ft, No Railing with Edge Loading.

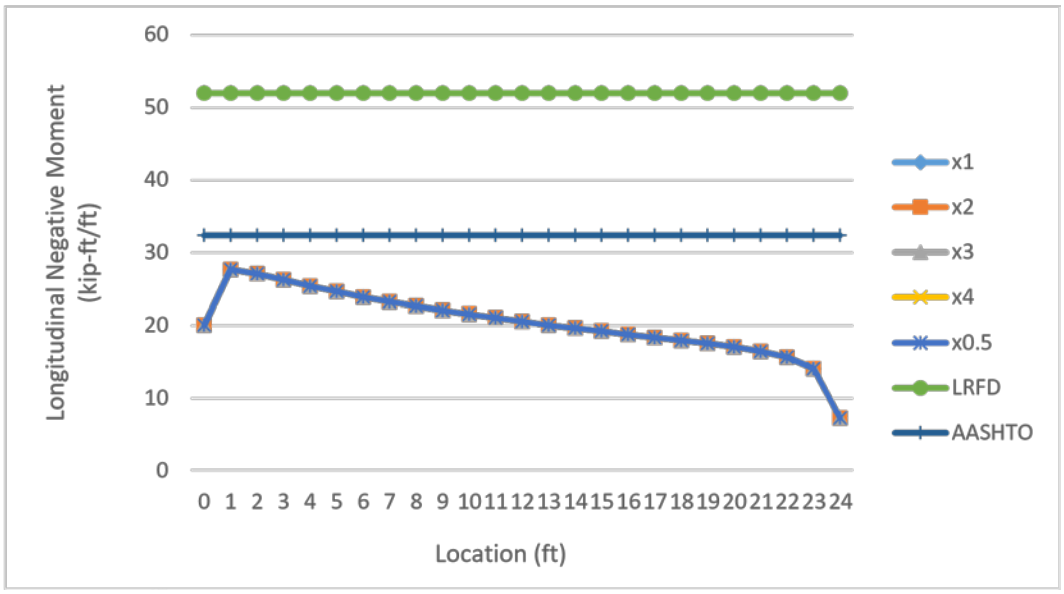

Table 11.2: Longitudinal Negative Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 36ft, Deck width = 24ft, One Left Railing with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	19.3	52	18.8	52	18.5	52	18.3	52	19.8	52	32.4
1	17.5	52	13.3	52	11	52	9.6	52	21.4	52	32.4
2	17.5	52	13.9	52	11.9	52	10.7	52	20.9	52	32.4
3	17	52	13.4	52	11.5	52	10.3	52	20.3	52	32.4
4	16.9	52	13.6	52	11.8	52	10.7	52	19.9	52	32.4
5	16.8	52	13.7	52	12.1	52	11.1	52	19.6	52	32.4
6	16.8	52	14	52	12.5	52	11.5	52	19.3	52	32.4
7	16.7	52	14.2	52	12.8	52	11.9	52	19.1	52	32.4
8	16.7	52	14.4	52	13.1	52	12.3	52	18.9	52	32.4
9	16.7	52	14.6	52	13.4	52	12.7	52	18.7	52	32.4
10	16.7	52	14.7	52	13.7	52	13	52	18.4	52	32.4
11	16.6	52	14.8	52	13.9	52	13.3	52	18.2	52	32.4
12	16.6	52	14.9	52	14.1	52	13.5	52	18	52	32.4
13	16.5	52	15	52	14.2	52	13.7	52	17.8	52	32.4
14	16.4	52	15	52	14.3	52	13.8	52	17.6	52	32.4
15	16.3	52	15	52	14.4	52	14	52	17.4	52	32.4
16	16.1	52	15	52	14.4	52	14.1	52	17.1	52	32.4
17	16	52	15	52	14.5	52	14.1	52	16.9	52	32.4
18	15.8	52	15	52	14.5	52	14.2	52	16.6	52	32.4
19	15.7	52	14.9	52	14.5	52	14.3	52	16.4	52	32.4

20	15.5	52	14.9	52	14.5	52	14.3	52	16.1	52	32.4
21	15.3	52	14.8	52	14.5	52	14.3	52	15.7	52	32.4
22	14.8	52	14.5	52	14.3	52	14.2	52	15.1	52	32.4
23	13.9	52	13.8	52	13.8	52	13.8	52	13.9	52	32.4
24	8.2	52	8.5	52	8.8	52	8.9	52	7.8	52	32.4

Figure 11.2: Longitudinal Negative Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 36ft, Deck width = 24ft, One Left Railing with Edge Loading.

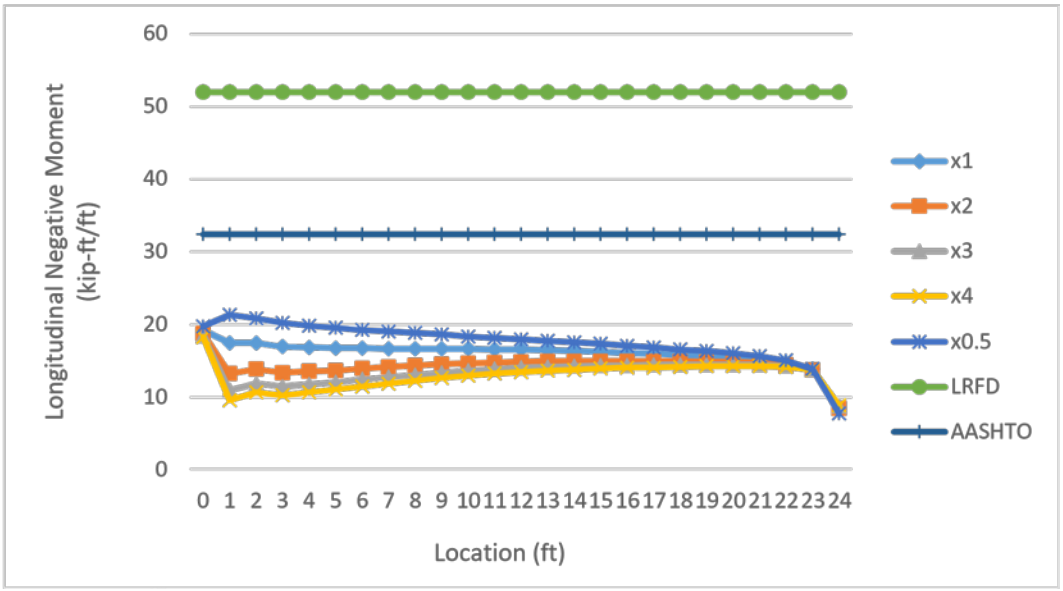

Table 11.3: Longitudinal Negative Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 36ft, Deck width = 24ft, One Right Railings with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	20.7	52	21	52	21.1	52	21.2	52	20.5	52	32.4
1	27.7	52	27.6	52	27.6	52	27.6	52	27.7	52	32.4
2	26.5	52	26.3	52	26.2	52	26.1	52	26.7	52	32.4
3	25.5	52	25.1	52	25	52	24.8	52	25.8	52	32.4
4	24.4	52	24	52	23.7	52	23.6	52	24.7	52	32.4
5	23.5	52	23	52	22.7	52	22.5	52	23.9	52	32.4
6	22.6	52	22	52	21.7	52	21.5	52	23.1	52	32.4
7	21.7	52	21	52	20.8	52	20.6	52	22.3	52	32.4
8	21	52	20.3	52	19.9	52	19.7	52	21.6	52	32.4
9	20.2	52	19.4	52	19	52	18.8	52	20.9	52	32.4
10	19.5	52	18.6	52	18.2	52	17.9	52	20.2	52	32.4
11	18.8	52	17.9	52	17.4	52	17.1	52	19.6	52	32.4
12	18.1	52	17.1	52	16.6	52	16.2	52	19	52	32.4
13	17.4	52	16.3	52	15.7	52	15.4	52	18.4	52	32.4
14	16.7	52	15.5	52	14.9	52	14.5	52	17.8	52	32.4
15	16	52	14.7	52	14	52	13.6	52	17.2	52	32.4
16	15.3	52	13.9	52	13.1	52	12.6	52	16.6	52	32.4
17	14.6	52	13.1	52	12.2	52	11.7	52	16	52	32.4
18	13.9	52	12.3	52	11.4	52	10.8	52	15.4	52	32.4
19	13.2	52	11.4	52	10.4	52	9.8	52	14.8	52	32.4

20	12.5	52	10.6	52	9.6	52	8.9	52	14.2	52	32.4
21	11.8	52	9.8	52	8.6	52	7.9	52	13.6	52	32.4
22	11.1	52	9	52	7.9	52	7.2	52	12.9	52	32.4
23	10.2	52	7.9	52	6.7	52	5.9	52	12.1	52	32.4
24	7.3	52	7.1	52	6.9	52	6.8	52	7.6	52	32.4

Figure 11.3: Longitudinal Negative Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 36ft, Deck width = 24ft, One Right Railings with Edge Loading.

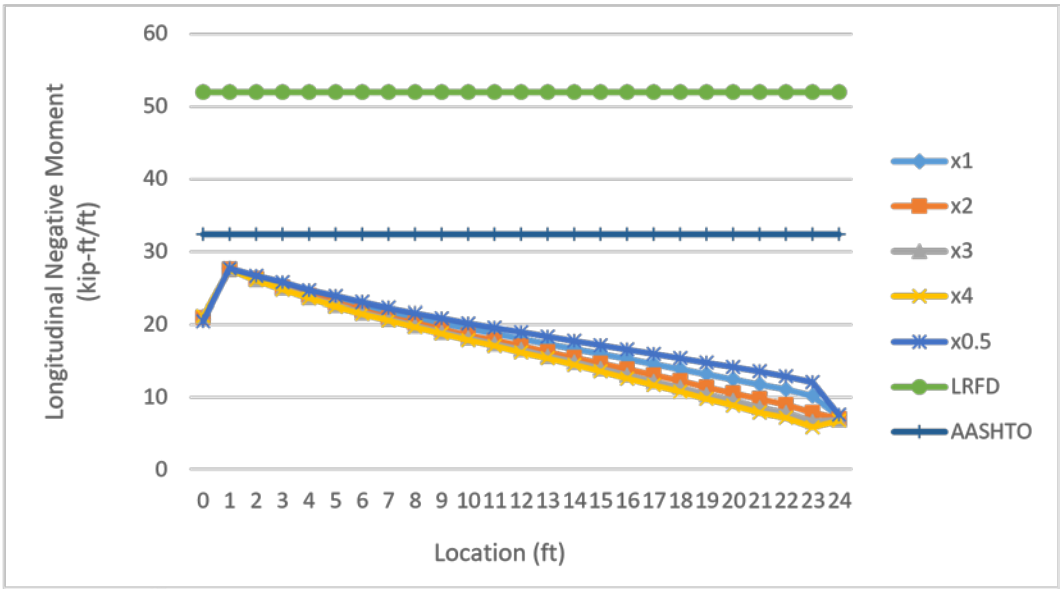

Table 11.4: Longitudinal Negative Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 36ft, Deck width = 24ft, Two Railings with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	19.8	52	19.4	52	19.2	52	19	52	20.1	52	32.4
1	17.1	52	12.9	52	10.6	52	9.2	52	21.1	52	32.4
2	17	52	13.2	52	11.3	52	10	52	20.5	52	32.4
3	16.3	52	12.6	52	10.6	52	9.4	52	19.8	52	32.4
4	16.1	52	12.6	52	10.8	52	9.6	52	19.4	52	32.4
5	15.8	52	12.5	52	10.8	52	9.7	52	18.9	52	32.4
6	15.7	52	12.6	52	10.9	52	9.9	52	18.6	52	32.4
7	15.5	52	12.6	52	11	52	10.1	52	18.2	52	32.4
8	15.3	52	12.5	52	11.1	52	10.2	52	17.9	52	32.4
9	15.1	52	12.5	52	11.1	52	10.3	52	17.6	52	32.4
10	14.9	52	12.4	52	11.1	52	10.3	52	17.2	52	32.4
11	14.6	52	12.2	52	11	52	10.2	52	16.9	52	32.4
12	14.4	52	12.1	52	10.9	52	10.1	52	16.6	52	32.4
13	14.1	52	11.8	52	10.6	52	9.9	52	16.2	52	32.4
14	13.7	52	11.5	52	10.3	52	9.6	52	15.8	52	32.4
15	13.3	52	11.1	52	10	52	9.3	52	15.4	52	32.4
16	12.9	52	10.7	52	9.6	52	8.9	52	15	52	32.4
17	12.5	52	10.3	52	9.1	52	8.4	52	14.6	52	32.4
18	12	52	9.8	52	8.7	52	7.9	52	14.2	52	32.4
19	11.6	52	9.3	52	8.2	52	7.4	52	13.7	52	32.4

20	11.1	52	8.9	52	7.7	52	6.9	52	13.3	52	32.4
21	10.7	52	8.3	52	7.1	52	6.4	52	12.9	52	32.4
22	10.3	52	8	52	6.9	52	6.1	52	12.4	52	32.4
23	9.6	52	7.3	52	6	52	5.2	52	11.8	52	32.4
24	8.1	52	8.1	52	8.1	52	8.1	52	8	52	32.4

Figure 11.4: Longitudinal Negative Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 36ft, Deck width = 24ft, Two Railings with Edge Loading.

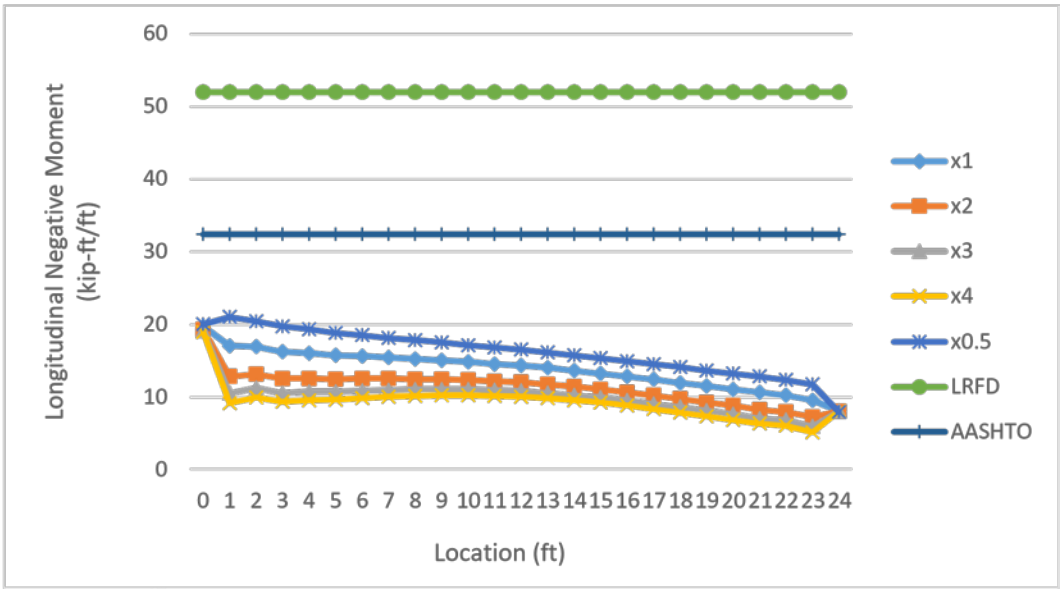

Table 12.1: Longitudinal Positive Moment Distribution at Critical Section for Two-Lane Lane Two Span Bridge Deck Span = 36ft, Deck width = 24ft, No Railing with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	31.6	65.1	31.6	65.1	31.6	65.1	31.6	65.1	31.6	65.1	32.4
1	32.9	65.1	32.9	65.1	32.9	65.1	32.9	65.1	32.9	65.1	32.4
2	29.2	65.1	29.2	65.1	29.2	65.1	29.2	65.1	29.2	65.1	32.4
3	27.7	65.1	27.7	65.1	27.7	65.1	27.7	65.1	27.7	65.1	32.4
4	27	65.1	27	65.1	27	65.1	27	65.1	27	65.1	32.4
5	26.8	65.1	26.8	65.1	26.8	65.1	26.8	65.1	26.8	65.1	32.4
6	27.4	65.1	27.4	65.1	27.4	65.1	27.4	65.1	27.4	65.1	32.4
7	29.9	65.1	29.9	65.1	29.9	65.1	29.9	65.1	29.9	65.1	32.4
8	27	65.1	27	65.1	27	65.1	27	65.1	27	65.1	32.4
9	26.1	65.1	26.1	65.1	26.1	65.1	26.1	65.1	26.1	65.1	32.4
10	26.4	65.1	26.4	65.1	26.4	65.1	26.4	65.1	26.4	65.1	32.4
11	28.5	65.1	28.5	65.1	28.5	65.1	28.5	65.1	28.5	65.1	32.4
12	25.4	65.1	25.4	65.1	25.4	65.1	25.4	65.1	25.4	65.1	32.4
13	24.1	65.1	24.1	65.1	24.1	65.1	24.1	65.1	24.1	65.1	32.4
14	23.4	65.1	23.4	65.1	23.4	65.1	23.4	65.1	23.4	65.1	32.4
15	23.3	65.1	23.3	65.1	23.3	65.1	23.3	65.1	23.3	65.1	32.4
16	23.8	65.1	23.8	65.1	23.8	65.1	23.8	65.1	23.8	65.1	32.4
17	26	65.1	26	65.1	26	65.1	26	65.1	26	65.1	32.4
18	22.9	65.1	22.9	65.1	22.9	65.1	22.9	65.1	22.9	65.1	32.4
19	21.5	65.1	21.5	65.1	21.5	65.1	21.5	65.1	21.5	65.1	32.4

20	20.8	65.1	20.8	65.1	20.8	65.1	20.8	65.1	20.8	65.1	32.4
21	20.2	65.1	20.2	65.1	20.2	65.1	20.2	65.1	20.2	65.1	32.4
22	19.9	65.1	19.9	65.1	19.9	65.1	19.9	65.1	19.9	65.1	32.4
23	19.6	65.1	19.6	65.1	19.6	65.1	19.6	65.1	19.6	65.1	32.4
24	19.5	65.1	19.5	65.1	19.5	65.1	19.5	65.1	19.5	65.1	32.4

Figure 12.1: Longitudinal Positive Moment Distribution at Critical Section for Two-Lane Lane Two Span Bridge Deck Span = 36ft, Deck width = 24ft, No Railing with Edge Loading.

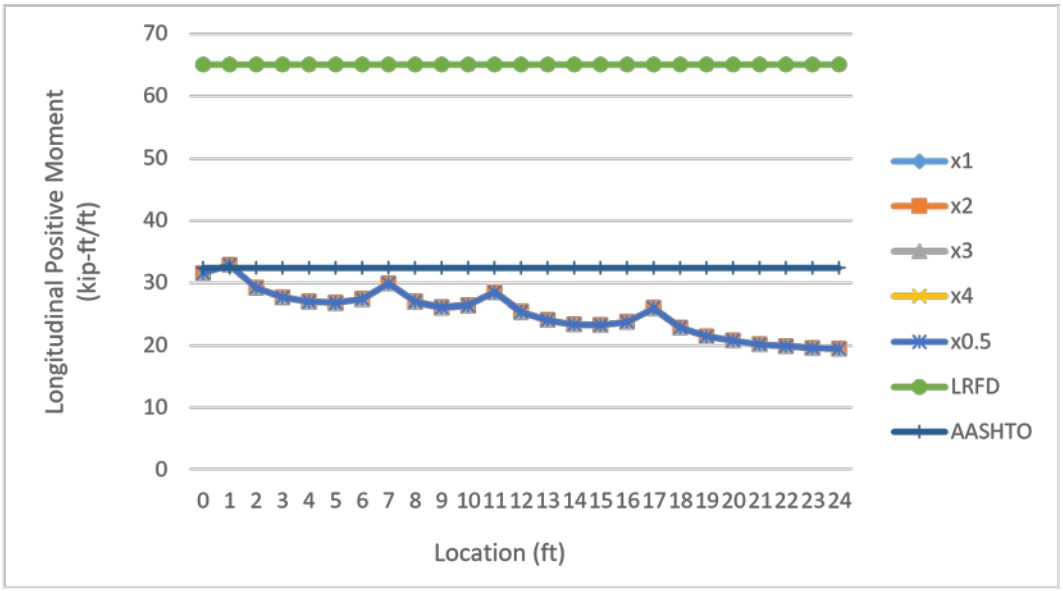

Table 12.2: Longitudinal Positive Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 36ft, Deck width = 24ft, One Left Railing with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	20.2	65.1	15.8	65.1	13.3	65.1	11.7	65.1	24.1	65.1	32.4
1	21.2	65.1	16.7	65.1	14.2	65.1	12.6	65.1	25.1	65.1	32.4
2	19.4	65.1	15.4	65.1	13.1	65.1	11.7	65.1	22.9	65.1	32.4
3	18.7	65.1	14.9	65.1	12.8	65.1	11.4	65.1	22	65.1	32.4
4	18.8	65.1	15.3	65.1	13.3	65.1	12	65.1	21.9	65.1	32.4
5	19.3	65.1	16	65.1	14.1	65.1	12.9	65.1	22.1	65.1	32.4
6	20.4	65.1	17.3	65.1	15.6	65.1	14.5	65.1	23	65.1	32.4
7	23.3	65.1	20.5	65.1	18.8	65.1	17.8	65.1	25.8	65.1	32.4
8	21	65.1	18.2	65.1	16.7	65.1	15.7	65.1	23.3	65.1	32.4
9	20.4	65.1	17.9	65.1	16.4	65.1	15.5	65.1	22.6	65.1	32.4
10	21	65.1	18.6	65.1	17.3	65.1	16.4	65.1	23.1	65.1	32.4
11	23.5	65.1	21.2	65.1	20	65.1	19.1	65.1	25.4	65.1	32.4
12	20.6	65.1	18.5	65.1	17.3	65.1	16.5	65.1	22.4	65.1	32.4
13	19.6	65.1	17.5	65.1	16.4	65.1	15.6	65.1	21.3	65.1	32.4
14	19.2	65.1	17.3	65.1	16.2	65.1	15.5	65.1	20.8	65.1	32.4
15	19.2	65.1	17.4	65.1	16.4	65.1	15.7	65.1	20.8	65.1	32.4
16	19.9	65.1	18.2	65.1	17.2	65.1	16.6	65.1	21.4	65.1	32.4
17	22.4	65.1	20.7	65.1	19.8	65.1	19.2	65.1	23.8	65.1	32.4
18	19.4	65.1	17.8	65.1	16.9	65.1	16.4	65.1	20.8	65.1	32.4
19	18.2	65.1	16.7	65.1	15.8	65.1	15.2	65.1	19.5	65.1	32.4

20	17.6	65.1	16.1	65.1	15.3	65.1	14.7	65.1	18.8	65.1	32.4
21	17.1	65.1	15.7	65.1	14.9	65.1	14.4	65.1	18.3	65.1	32.4
22	16.9	65.1	15.5	65.1	14.7	65.1	14.2	65.1	18	65.1	32.4
23	16.7	65.1	15.4	65.1	14.7	65.1	14.2	65.1	17.9	65.1	32.4
24	16.7	65.1	15.4	65.1	14.7	65.1	14.2	65.1	17.8	65.1	32.4

Figure 12.2: Longitudinal Positive Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 36ft, Deck width = 24ft, One Left Railing with Edge Loading.

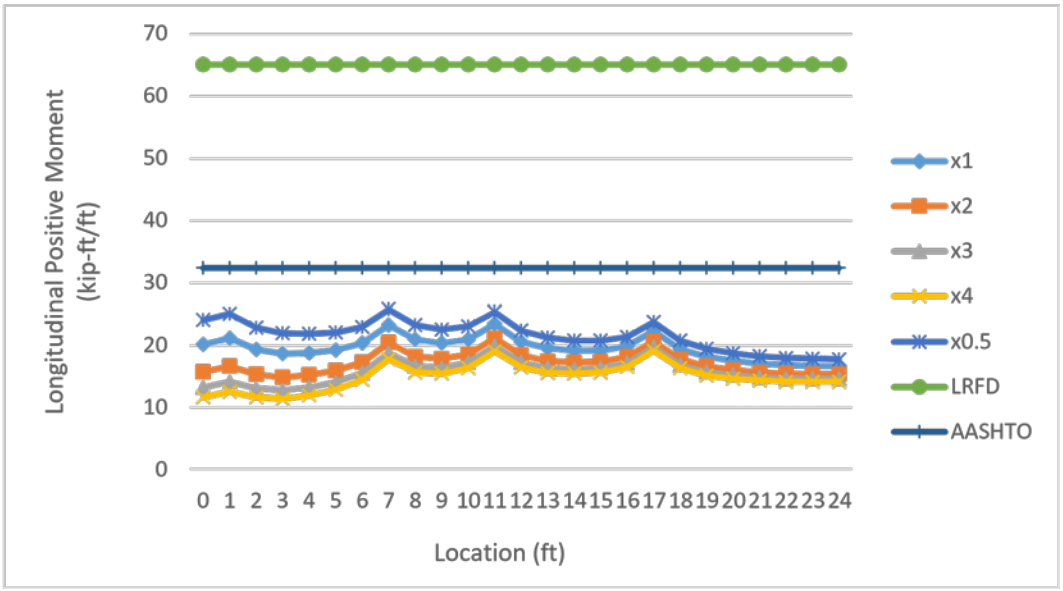

Table 12.3: Longitudinal Positive Moment Distribution at Critical Section for Tow-Lane Two Span Bridge Deck Span = 36ft, Deck width = 24ft, One Right Railings with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	29.5	65.1	28.5	65.1	28	65.1	27.6	65.1	30.3	65.1	32.4
1	30.7	65.1	29.8	65.1	29.2	65.1	28.8	65.1	31.6	65.1	32.4
2	27	65.1	26	65.1	25.4	65.1	25.1	65.1	27.9	65.1	32.4
3	25.4	65.1	24.4	65.1	23.8	65.1	23.4	65.1	26.3	65.1	32.4
4	24.6	65.1	23.6	65.1	22.9	65.1	22.5	65.1	25.6	65.1	32.4
5	24.4	65.1	23.3	65.1	22.6	65.1	22.2	65.1	25.3	65.1	32.4
6	24.8	65.1	23.7	65.1	23	65.1	22.6	65.1	25.8	65.1	32.4
7	27.2	65.1	25.9	65.1	25.2	65.1	24.8	65.1	28.2	65.1	32.4
8	24.2	65.1	23	65.1	22.2	65.1	21.8	65.1	25.3	65.1	32.4
9	23.2	65.1	21.9	65.1	21.1	65.1	20.6	65.1	24.3	65.1	32.4
10	23.3	65.1	21.9	65.1	21.1	65.1	20.6	65.1	24.5	65.1	32.4
11	25.2	65.1	23.8	65.1	22.8	65.1	22.3	65.1	26.4	65.1	32.4
12	21.9	65.1	20.4	65.1	19.5	65.1	18.9	65.1	23.2	65.1	32.4
13	20.4	65.1	18.8	65.1	17.8	65.1	17.2	65.1	21.8	65.1	32.4
14	19.6	65.1	17.8	65.1	16.8	65.1	16.2	65.1	21.1	65.1	32.4
15	19.2	65.1	17.3	65.1	16.2	65.1	15.6	65.1	20.7	65.1	32.4
16	19.4	65.1	17.5	65.1	16.3	65.1	15.6	65.1	21.1	65.1	32.4
17	21.4	65.1	19.3	65.1	18.1	65.1	17.4	65.1	23.2	65.1	32.4
18	18	65.1	15.8	65.1	14.5	65.1	13.7	65.1	19.9	65.1	32.4
19	16.3	65.1	13.9	65.1	12.6	65.1	11.7	65.1	18.3	65.1	32.4

20	15.2	65.1	12.6	65.1	11.2	65.1	10.3	65.1	17.3	65.1	32.4
21	14.2	65.1	11.5	65.1	10	65.1	9	65.1	16.5	65.1	32.4
22	13.5	65.1	10.7	65.1	9.1	65.1	8	65.1	15.9	65.1	32.4
23	12.7	65.1	9.6	65.1	7.9	65.1	6.7	65.1	15.3	65.1	32.4
24	12.6	65.1	9.6	65.1	7.9	65.1	6.8	65.1	15.2	65.1	32.4

Figure 12.3: Longitudinal Positive Moment Distribution at Critical Section for Tow-Lane Two Span Bridge Deck Span = 36ft, Deck width = 24ft, One Right Railings with Edge Loading.

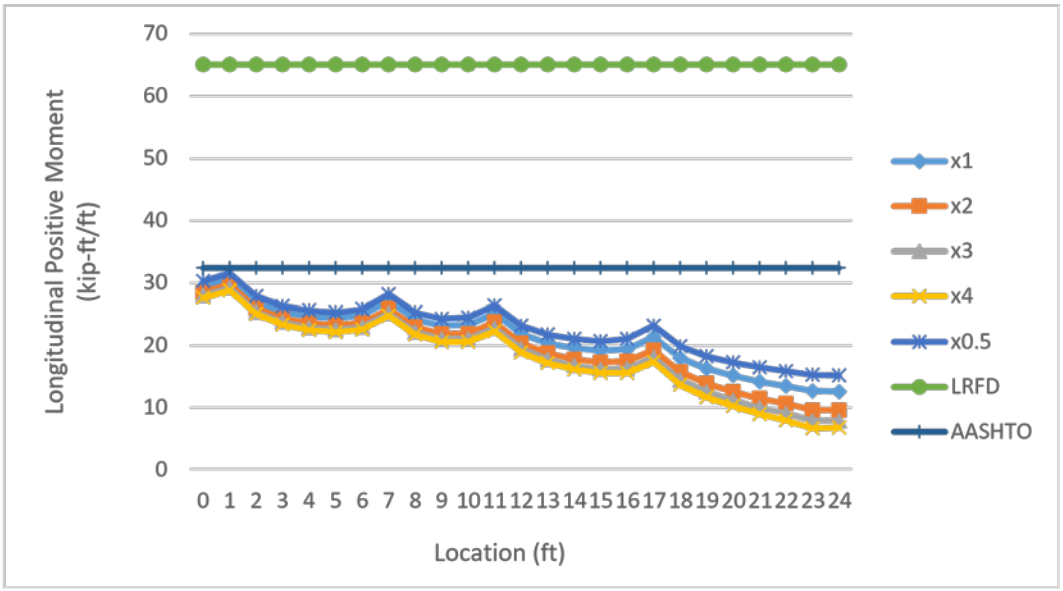

Table 12.4: Longitudinal Positive Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 36ft, Deck width = 24ft, Two Railings with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	19	65.1	14.6	65.1	12.2	65.1	10.7	65.1	23.1	65.1	32.4
1	19.9	65.1	15.4	65.1	13	65.1	11.5	65.1	24.2	65.1	32.4
2	18.1	65.1	14	65.1	11.8	65.1	10.4	65.1	21.9	65.1	32.4
3	17.3	65.1	13.4	65.1	11.2	65.1	10	65.1	20.9	65.1	32.4
4	17.3	65.1	13.7	65.1	11.6	65.1	10.3	65.1	20.7	65.1	32.4
5	17.6	65.1	14.1	65.1	12.2	65.1	11	65.1	20.9	65.1	32.4
6	18.7	65.1	15.2	65.1	13.4	65.1	12.3	65.1	21.8	65.1	32.4
7	21.5	65.1	18.2	65.1	16.4	65.1	15.3	65.1	24.5	65.1	32.4
8	18.9	65.1	15.8	65.1	14.1	65.1	13	65.1	21.8	65.1	32.4
9	18.3	65.1	15.2	65.1	13.6	65.1	12.5	65.1	21.1	65.1	32.4
10	18.7	65.1	15.7	65.1	14.1	65.1	13.1	65.1	21.5	65.1	32.4
11	21	65.1	18.1	65.1	16.5	65.1	15.5	65.1	23.7	65.1	32.4
12	18	65.1	15.1	65.1	13.6	65.1	13	65.1	20.6	65.1	32.4
13	16.7	65.1	13.9	65.1	12.4	65.1	11.4	65.1	19.4	65.1	32.4
14	16.2	65.1	13.3	65.1	11.8	65.1	10.9	65.1	18.8	65.1	32.4
15	16	65.1	13.2	65.1	11.7	65.1	10.8	65.1	18.6	65.1	32.4
16	16.4	65.1	13.6	65.1	12.1	65.1	11.2	65.1	19	65.1	32.4
17	18.6	65.1	15.8	65.1	14.3	65.1	13.4	65.1	21.3	65.1	32.4
18	15.4	65.1	12.6	65.1	11.1	65.1	10.1	65.1	18.1	65.1	32.4
19	13.9	65.1	11	65.1	9.5	65.1	8.5	65.1	16.6	65.1	32.4

20	12.9	65.1	10	65.1	8.4	65.1	7.5	65.1	15.7	65.1	32.4
21	12.2	65.1	9.1	65.1	7.6	65.1	6.6	65.1	15	65.1	32.4
22	11.6	65.1	8.5	65.1	6.9	65.1	5.9	65.1	14.5	65.1	32.4
23	10.9	65.1	7.7	65.1	6	65.1	5	65.1	14	65.1	32.4
24	10.9	65.1	7.8	65.1	6.1	65.1	5.1	65.1	14	65.1	32.4

Figure 12.4: Longitudinal Positive Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 36ft, Deck width = 24ft, Two Railings with Edge Loading.

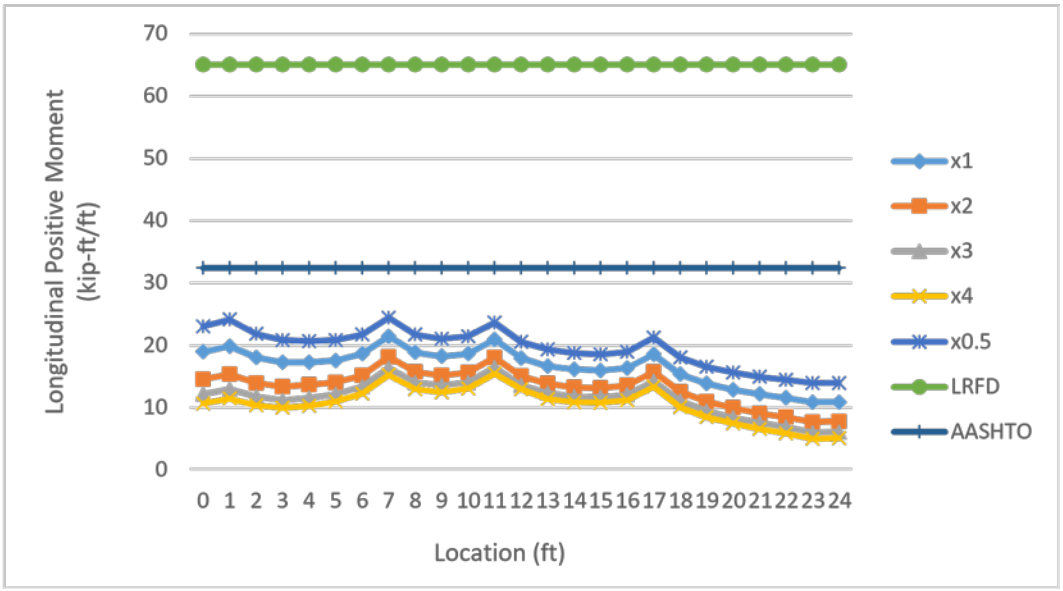

Table 13.1: Longitudinal Negative Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 36ft, Deck width = 36ft, No Railing with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	20.6	67.9	20.6	67.9	20.6	67.9	20.6	67.9	20.6	67.9	32.4
1	29	67.9	29	67.9	29	67.9	29	67.9	29	67.9	32.4
2	28.6	67.9	28.6	67.9	28.6	67.9	28.6	67.9	28.6	67.9	32.4
3	28	67.9	28	67.9	28	67.9	28	67.9	28	67.9	32.4
4	27.3	67.9	27.3	67.9	27.3	67.9	27.3	67.9	27.3	67.9	32.4
5	26.5	67.9	26.5	67.9	26.5	67.9	26.5	67.9	26.5	67.9	32.4
6	25.9	67.9	25.9	67.9	25.9	67.9	25.9	67.9	25.9	67.9	32.4
7	25.3	67.9	25.3	67.9	25.3	67.9	25.3	67.9	25.3	67.9	32.4
8	24.8	67.9	24.8	67.9	24.8	67.9	24.8	67.9	24.8	67.9	32.4
9	24.4	67.9	24.4	67.9	24.4	67.9	24.4	67.9	24.4	67.9	32.4
10	23.9	67.9	23.9	67.9	23.9	67.9	23.9	67.9	23.9	67.9	32.4
11	23.6	67.9	23.6	67.9	23.6	67.9	23.6	67.9	23.6	67.9	32.4
12	23.2	67.9	23.2	67.9	23.2	67.9	23.2	67.9	23.2	67.9	32.4
13	22.8	67.9	22.8	67.9	22.8	67.9	22.8	67.9	22.8	67.9	32.4
14	22.4	67.9	22.4	67.9	22.4	67.9	22.4	67.9	22.4	67.9	32.4
15	22.1	67.9	22.1	67.9	22.1	67.9	22.1	67.9	22.1	67.9	32.4
16	21.7	67.9	21.7	67.9	21.7	67.9	21.7	67.9	21.7	67.9	32.4
17	21.4	67.9	21.4	67.9	21.4	67.9	21.4	67.9	21.4	67.9	32.4
18	21	67.9	21	67.9	21	67.9	21	67.9	21	67.9	32.4
19	20.6	67.9	20.6	67.9	20.6	67.9	20.6	67.9	20.6	67.9	32.4

20	20.2	67.9	20.2	67.9	20.2	67.9	20.2	67.9	20.2	67.9	32.4
21	19.8	67.9	19.8	67.9	19.8	67.9	19.8	67.9	19.8	67.9	32.4
22	19.3	67.9	19.3	67.9	19.3	67.9	19.3	67.9	19.3	67.9	32.4
23	18.9	67.9	18.9	67.9	18.9	67.9	18.9	67.9	18.9	67.9	32.4
24	18.4	67.9	18.4	67.9	18.4	67.9	18.4	67.9	18.4	67.9	32.4
25	17.9	67.9	17.9	67.9	17.9	67.9	17.9	67.9	17.9	67.9	32.4
26	17.5	67.9	17.5	67.9	17.5	67.9	17.5	67.9	17.5	67.9	32.4
27	17	67.9	17	67.9	17	67.9	17	67.9	17	67.9	32.4
28	16.5	67.9	16.5	67.9	16.5	67.9	16.5	67.9	16.5	67.9	32.4
29	16.1	67.9	16.1	67.9	16.1	67.9	16.1	67.9	16.1	67.9	32.4
30	15.6	67.9	15.6	67.9	15.6	67.9	15.6	67.9	15.6	67.9	32.4
31	15.1	67.9	15.1	67.9	15.1	67.9	15.1	67.9	15.1	67.9	32.4
32	14.5	67.9	14.5	67.9	14.5	67.9	14.5	67.9	14.5	67.9	32.4
33	13.9	67.9	13.9	67.9	13.9	67.9	13.9	67.9	13.9	67.9	32.4
34	13	67.9	13	67.9	13	67.9	13	67.9	13	67.9	32.4
35	11.3	67.9	11.3	67.9	11.3	67.9	11.3	67.9	11.3	67.9	32.4
36	5.4	67.9	5.4	67.9	5.4	67.9	5.4	67.9	5.4	67.9	32.4

Figure 13.1: Longitudinal Negative Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 36ft, Deck width = 36ft, No Railing with Edge Loading.

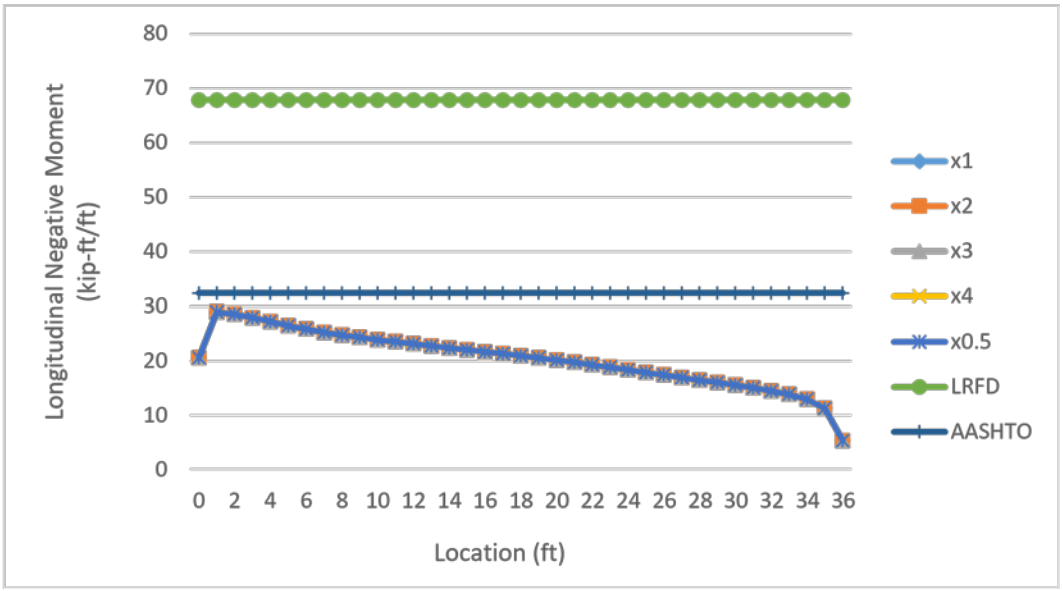

Table 13.2: Longitudinal Negative Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 36ft, Deck width = 36ft, One Left Railing with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	19.9	67.9	19.5	67.9	19.2	67.9	19	67.9	20.4	67.9	32.4
1	18.6	67.9	14.3	67.9	11.9	67.9	10.4	67.9	22.6	67.9	32.4
2	18.8	67.9	15	67.9	12.9	67.9	11.6	67.9	22.4	67.9	32.4
3	18.4	67.9	14.7	67.9	12.7	67.9	11.4	67.9	21.9	67.9	32.4
4	18.5	67.9	15	67.9	13.2	67.9	12	67.9	21.6	67.9	32.4
5	18.5	67.9	15.3	67.9	13.6	67.9	12.5	67.9	21.4	67.9	32.4
6	18.6	67.9	15.7	67.9	14.1	67.9	13.1	67.9	21.2	67.9	32.4
7	18.7	67.9	16	67.9	14.6	67.9	13.7	67.9	21.1	67.9	32.4
8	18.8	67.9	16.4	67.9	15.1	67.9	14.3	67.9	21	67.9	32.4
9	18.9	67.9	16.8	67.9	15.6	67.9	14.8	67.9	20.9	67.9	32.4
10	19	67.9	17.1	67.9	16	67.9	15.3	67.9	20.8	67.9	32.4
11	19.1	67.9	17.3	67.9	16.4	67.9	15.8	67.9	20.7	67.9	32.4
12	19.2	67.9	17.6	67.9	16.7	67.9	16.2	67.9	20.6	67.9	32.4
13	19.2	67.9	17.8	67.9	17	67.9	16.5	67.9	20.5	67.9	32.4
14	19.2	67.9	17.9	67.9	17.2	67.9	16.8	67.9	20.4	67.9	32.4
15	19.2	67.9	18	67.9	17.4	67.9	17	67.9	20.3	67.9	32.4
16	19.1	67.9	18.1	67.9	17.5	67.9	17.2	67.9	20.1	67.9	32.4
17	19	67.9	18.1	67.9	17.6	67.9	17.3	67.9	19.9	67.9	32.4
18	18.9	67.9	18.1	67.9	17.6	67.9	17.3	67.9	19.7	67.9	32.4
19	18.7	67.9	18	67.9	17.6	67.9	17.3	67.9	19.4	67.9	32.4

20	18.5	67.9	17.9	67.9	17.5	67.9	17.3	67.9	19.1	67.9	32.4
21	18.3	67.9	17.7	67.9	17.4	67.9	17.2	67.9	18.8	67.9	32.4
22	18	67.9	17.5	67.9	17.2	67.9	17	67.9	18.5	67.9	32.4
23	17.7	67.9	17.3	67.9	17	67.9	16.8	67.9	18.1	67.9	32.4
24	17.4	67.9	17	67.9	16.8	67.9	16.6	67.9	17.8	67.9	32.4
25	17	67.9	16.7	67.9	16.5	67.9	16.4	67.9	17.4	67.9	32.4
26	16.7	67.9	16.4	67.9	16.2	67.9	16.1	67.9	17	67.9	32.4
27	16.3	67.9	16.1	67.9	15.9	67.9	15.8	67.9	16.6	67.9	32.4
28	16	67.9	15.7	67.9	15.6	67.9	15.5	67.9	16.2	67.9	32.4
29	15.5	67.9	15.4	67.9	15.2	67.9	15.2	67.9	15.7	67.9	32.4
30	15.2	67.9	15	67.9	14.9	67.9	14.9	67.9	15.3	67.9	32.4
31	14.7	67.9	14.6	67.9	14.6	67.9	14.5	67.9	14.9	67.9	32.4
32	14.3	67.9	14.2	67.9	14.2	67.9	14.2	67.9	14.4	67.9	32.4
33	13.8	67.9	13.8	67.9	13.7	67.9	13.7	67.9	13.8	67.9	32.4
34	13	67.9	13	67.9	13	67.9	13.1	67.9	13	67.9	32.4
35	11.6	67.9	11.7	67.9	11.8	67.9	11.8	67.9	11.5	67.9	32.4
36	6	67.9	6	67.9	6.1	67.9	6.2	67.9	5.8	67.9	32.4

Figure 13.2: Longitudinal Negative Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 36ft, Deck width = 36ft, One Left Railing with Edge Loading.

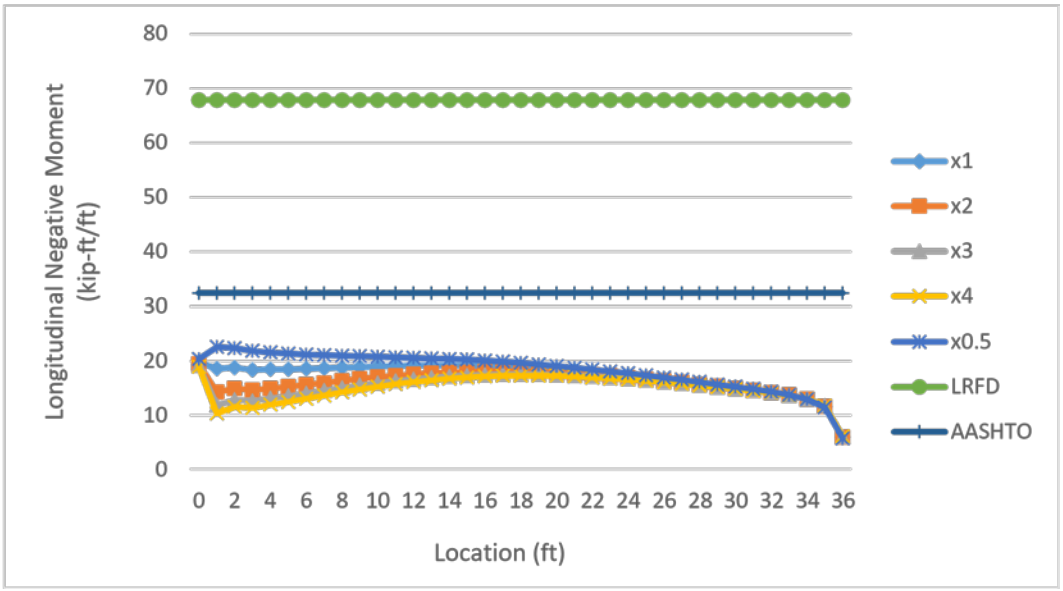

Table 13.3: Longitudinal Negative Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 36ft, Deck width = 36ft, One Right Railings with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	20.9	67.9	21	67.9	21.1	67.9	21.1	67.9	20.8	67.9	32.4
1	29.2	67.9	29.3	67.9	29.3	67.9	29.3	67.9	29.2	67.9	32.4
2	28.6	67.9	28.7	67.9	28.7	67.9	28.7	67.9	28.6	67.9	32.4
3	28	67.9	27.9	67.9	27.9	67.9	27.9	67.9	28	67.9	32.4
4	27.1	67.9	27.1	67.9	27.1	67.9	27	67.9	27.2	67.9	32.4
5	26.4	67.9	26.3	67.9	26.3	67.9	26.3	67.9	26.5	67.9	32.4
6	25.7	67.9	25.6	67.9	25.6	67.9	25.5	67.9	25.8	67.9	32.4
7	25.1	67.9	25	67.9	24.9	67.9	24.9	67.9	25.2	67.9	32.4
8	24.6	67.9	24.4	67.9	24.4	67.9	24.3	67.9	24.7	67.9	32.4
9	24	67.9	23.9	67.9	23.8	67.9	23.8	67.9	24.2	67.9	32.4
10	23.6	67.9	23.4	67.9	23.3	67.9	23.3	67.9	23.7	67.9	32.4
11	23.1	67.9	22.9	67.9	22.8	67.9	22.8	67.9	23.3	67.9	32.4
12	22.7	67.9	22.5	67.9	22.3	67.9	22.3	67.9	22.9	67.9	32.4
13	22.2	67.9	22	67.9	21.9	67.9	21.8	67.9	22.4	67.9	32.4
14	21.8	67.9	21.5	67.9	21.4	67.9	21.3	67.9	22	67.9	32.4
15	21.4	67.9	21.1	67.9	20.9	67.9	20.8	67.9	21.6	67.9	32.4
16	20.9	67.9	20.6	67.9	20.4	67.9	20.3	67.9	21.2	67.9	32.4
17	20.4	67.9	20.1	67.9	19.9	67.9	19.7	67.9	20.8	67.9	32.4
18	20	67.9	19.5	67.9	19.3	67.9	19.2	67.9	20.3	67.9	32.4
19	19.4	67.9	19	67.9	18.7	67.9	18.6	67.9	19.9	67.9	32.4

20	18.9	67.9	18.4	67.9	18.1	67.9	17.9	67.9	19.4	67.9	32.4
21	18.4	67.9	17.8	67.9	17.5	67.9	17.3	67.9	18.9	67.9	32.4
22	17.8	67.9	17.1	67.9	16.8	67.9	16.6	67.9	18.4	67.9	32.4
23	17.2	67.9	16.4	67.9	16.1	67.9	15.8	67.9	17.8	67.9	32.4
24	16.5	67.9	15.7	67.9	15.3	67.9	15	67.9	17.2	67.9	32.4
25	15.9	67.9	15	67.9	14.5	67.9	14.2	67.9	16.6	67.9	32.4
26	15.2	67.9	14.2	67.9	13.7	67.9	13.4	67.9	16	67.9	32.4
27	14.5	67.9	13.4	67.9	12.9	67.9	12.5	67.9	15.4	67.9	32.4
28	13.8	67.9	12.6	67.9	12	67.9	11.6	67.9	14.8	67.9	32.4
29	13.1	67.9	11.8	67.9	11.1	67.9	10.7	67.9	14.2	67.9	32.4
30	12.3	67.9	11	67.9	10.2	67.9	9.8	67.9	13.6	67.9	32.4
31	11.6	67.9	10.2	67.9	9.4	67.9	8.8	67.9	12.9	67.9	32.4
32	10.9	67.9	9.3	67.9	8.5	67.9	7.9	67.9	12.3	67.9	32.4
33	10.2	67.9	8.5	67.9	7.6	67.9	7	67.9	11.7	67.9	32.4
34	9.4	67.9	7.7	67.9	6.8	67.9	6.2	67.9	10.9	67.9	32.4
35	8.6	67.9	6.7	67.9	5.7	67.9	5	67.9	10.1	67.9	32.4
36	5.5	67.9	5.3	67.9	5.2	67.9	5.1	67.9	5.6	67.9	32.4

Figure 13.3: Longitudinal Negative Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 36ft, Deck width = 36ft, One Right Railings with Edge Loading.

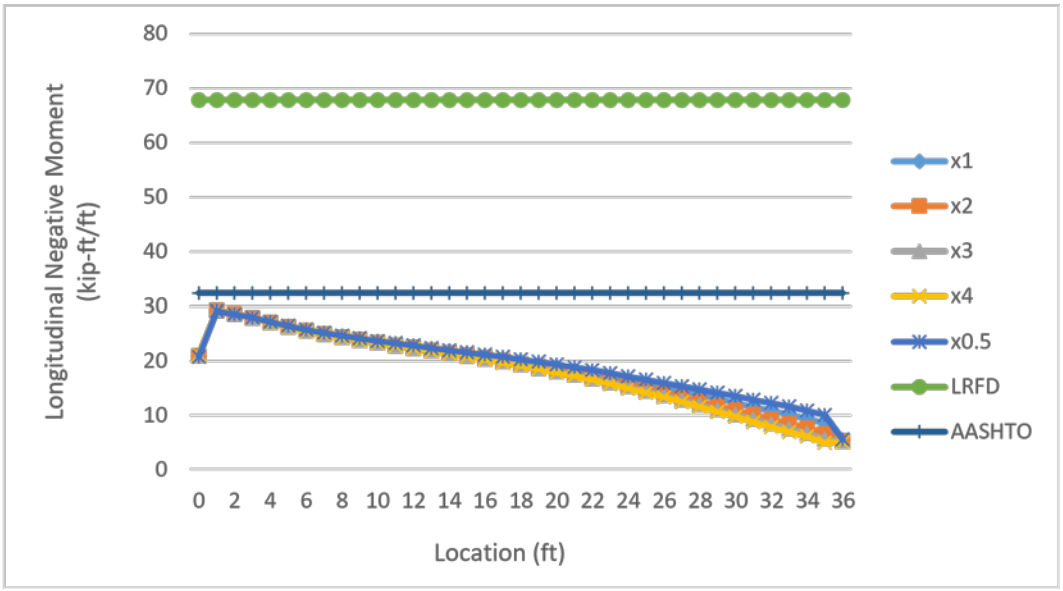

Table 13.4: Longitudinal Negative Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 36ft, Deck width = 36ft, Two Railings with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	20.2	67.9	19.8	67.9	19.5	67.9	19.4	67.9	20.6	67.9	32.4
1	18.6	67.9	14.2	67.9	11.9	67.9	10.4	67.9	22.7	67.9	32.4
2	18.8	67.9	14.9	67.9	12.8	67.9	11.5	67.9	22.3	67.9	32.4
3	18.4	67.9	14.6	67.9	12.5	67.9	11.2	67.9	21.8	67.9	32.4
4	18.3	67.9	14.8	67.9	13	67.9	11.8	67.9	21.5	67.9	32.4
5	18.3	67.9	15.1	67.9	13.3	67.9	12.2	67.9	21.3	67.9	32.4
6	18.4	67.9	15.4	67.9	13.8	67.9	12.8	67.9	21.1	67.9	32.4
7	18.4	67.9	15.7	67.9	14.2	67.9	13.3	67.9	20.9	67.9	32.4
8	18.5	67.9	16	67.9	14.7	67.9	13.8	67.9	20.8	67.9	32.4
9	18.6	67.9	16.3	67.9	15	67.9	14.3	67.9	20.7	67.9	32.4
10	18.7	67.9	16.5	67.9	15.4	67.9	14.7	67.9	20.6	67.9	32.4
11	18.7	67.9	16.7	67.9	15.7	67.9	15	67.9	20.5	67.9	32.4
12	18.7	67.9	16.9	67.9	15.9	67.9	15.3	67.9	20.3	67.9	32.4
13	18.7	67.9	17	67.9	16.1	67.9	15.5	67.9	20.2	67.9	32.4
14	18.6	67.9	17.1	67.9	16.2	67.9	15.7	67.9	20	67.9	32.4
15	18.5	67.9	17	67.9	16.3	67.9	15.8	67.9	19.8	67.9	32.4
16	18.3	67.9	17	67.9	16.3	67.9	15.8	67.9	19.6	67.9	32.4
17	18.2	67.9	16.9	67.9	16.2	67.9	15.7	67.9	19.3	67.9	32.4
18	17.9	67.9	16.7	67.9	16	67.9	15.6	67.9	19	67.9	32.4
19	17.6	67.9	16.4	67.9	15.8	67.9	15.4	67.9	18.7	67.9	32.4

20	17.3	67.9	16.1	67.9	15.5	67.9	15.1	67.9	18.4	67.9	32.4
21	16.9	67.9	15.8	67.9	15.2	67.9	14.8	67.9	18	67.9	32.4
22	16.5	67.9	15.4	67.9	14.7	67.9	14.4	67.9	17.5	67.9	32.4
23	16	67.9	14.9	67.9	14.3	67.9	13.9	67.9	17.1	67.9	32.4
24	15.5	67.9	14.4	67.9	13.7	67.9	13.3	67.9	16.6	67.9	32.4
25	15	67.9	13.8	67.9	13.1	67.9	12.7	67.9	16.1	67.9	32.4
26	14.4	67.9	13.2	67.9	12.5	67.9	12.1	67.9	15.5	67.9	32.4
27	13.8	67.9	12.5	67.9	11.8	67.9	11.4	67.9	15	67.9	32.4
28	13.2	67.9	11.8	67.9	11.1	67.9	10.6	67.9	14.4	67.9	32.4
29	12.6	67.9	11.1	67.9	10.4	67.9	9.9	67.9	13.9	67.9	32.4
30	11.9	67.9	10.4	67.9	9.6	67.9	9.1	67.9	13.3	67.9	32.4
31	11.3	67.9	9.7	67.9	8.8	67.9	8.3	67.9	12.7	67.9	32.4
32	10.6	67.9	9	67.9	8.1	67.9	7.5	67.9	12.1	67.9	32.4
33	10	67.9	8.2	67.9	7.3	67.9	6.7	67.9	11.5	67.9	32.4
34	9.3	67.9	7.6	67.9	6.7	67.9	6.1	67.9	10.8	67.9	32.4
35	8.5	67.9	6.7	67.9	5.6	67.9	5	67.9	10.1	67.9	32.4
36	5.9	67.9	5.9	67.9	5.9	67.9	5.9	67.9	5.9	67.9	32.4

Figure 13.4: Longitudinal Negative Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 36ft, Deck width = 36ft, Two Railings with Edge Loading.

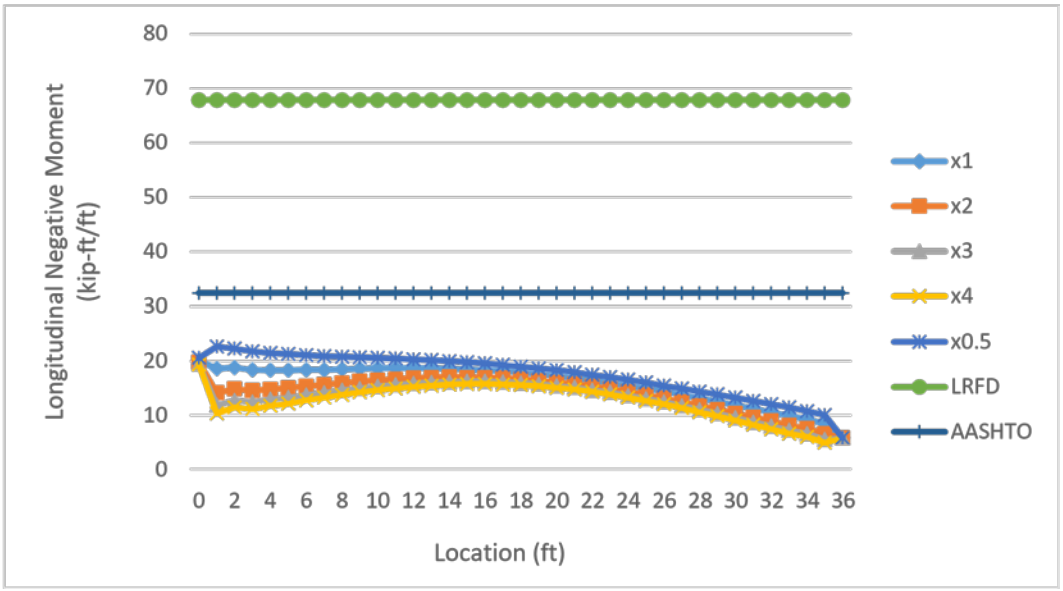

Table 14.1: Longitudinal Positive Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 36ft, Deck width = 36ft, No Railing with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	33.3	87.3	33.3	87.3	33.3	87.3	33.3	87.3	33.3	87.3	32.4
1	34.7	87.3	34.7	87.3	34.7	87.3	34.7	87.3	34.7	87.3	32.4
2	31	87.3	31	87.3	31	87.3	31	87.3	31	87.3	32.4
3	29.5	87.3	29.5	87.3	29.5	87.3	29.5	87.3	29.5	87.3	32.4
4	28.8	87.3	28.8	87.3	28.8	87.3	28.8	87.3	28.8	87.3	32.4
5	28.7	87.3	28.7	87.3	28.7	87.3	28.7	87.3	28.7	87.3	32.4
6	29.3	87.3	29.3	87.3	29.3	87.3	29.3	87.3	29.3	87.3	32.4
7	31.8	87.3	31.8	87.3	31.8	87.3	31.8	87.3	31.8	87.3	32.4
8	29	87.3	29	87.3	29	87.3	29	87.3	29	87.3	32.4
9	28.1	87.3	28.1	87.3	28.1	87.3	28.1	87.3	28.1	87.3	32.4
10	28.4	87.3	28.4	87.3	28.4	87.3	28.4	87.3	28.4	87.3	32.4
11	30.6	87.3	30.6	87.3	30.6	87.3	30.6	87.3	30.6	87.3	32.4
12	27.6	87.3	27.6	87.3	27.6	87.3	27.6	87.3	27.6	87.3	32.4
13	26.3	87.3	26.3	87.3	26.3	87.3	26.3	87.3	26.3	87.3	32.4
14	25.8	87.3	25.8	87.3	25.8	87.3	25.8	87.3	25.8	87.3	32.4
15	25.8	87.3	25.8	87.3	25.8	87.3	25.8	87.3	25.8	87.3	32.4
16	26.4	87.3	26.4	87.3	26.4	87.3	26.4	87.3	26.4	87.3	32.4
17	28.9	87.3	28.9	87.3	28.9	87.3	28.9	87.3	28.9	87.3	32.4
18	26.1	87.3	26.1	87.3	26.1	87.3	26.1	87.3	26.1	87.3	32.4
19	25.3	87.3	25.3	87.3	25.3	87.3	25.3	87.3	25.3	87.3	32.4

20	25.5	87.3	25.5	87.3	25.5	87.3	25.5	87.3	25.5	87.3	32.4
21	27.6	87.3	27.6	87.3	27.6	87.3	27.6	87.3	27.6	87.3	32.4
22	24.4	87.3	24.4	87.3	24.4	87.3	24.4	87.3	24.4	87.3	32.4
23	23	87.3	23	87.3	23	87.3	23	87.3	23	87.3	32.4
24	22.4	87.3	22.4	87.3	22.4	87.3	22.4	87.3	22.4	87.3	32.4
25	22.1	87.3	22.1	87.3	22.1	87.3	22.1	87.3	22.1	87.3	32.4
26	22.5	87.3	22.5	87.3	22.5	87.3	22.5	87.3	22.5	87.3	32.4
27	24.7	87.3	24.7	87.3	24.7	87.3	24.7	87.3	24.7	87.3	32.4
28	21.5	87.3	21.5	87.3	21.5	87.3	21.5	87.3	21.5	87.3	32.4
29	20	87.3	20	87.3	20	87.3	20	87.3	20	87.3	32.4
30	19.1	87.3	19.1	87.3	19.1	87.3	19.1	87.3	19.1	87.3	32.4
31	18.5	87.3	18.5	87.3	18.5	87.3	18.5	87.3	18.5	87.3	32.4
32	18	87.3	18	87.3	18	87.3	18	87.3	18	87.3	32.4
33	17.6	87.3	17.6	87.3	17.6	87.3	17.6	87.3	17.6	87.3	32.4
34	17.7	87.3	17.7	87.3	17.7	87.3	17.7	87.3	17.7	87.3	32.4
35	17.5	87.3	17.5	87.3	17.5	87.3	17.5	87.3	17.5	87.3	32.4
36	17.4	87.3	17.4	87.3	17.4	87.3	17.4	87.3	17.4	87.3	32.4

Figure 14.1: Longitudinal Positive Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 36ft, Deck width = 36ft, No Railing with Edge Loading.

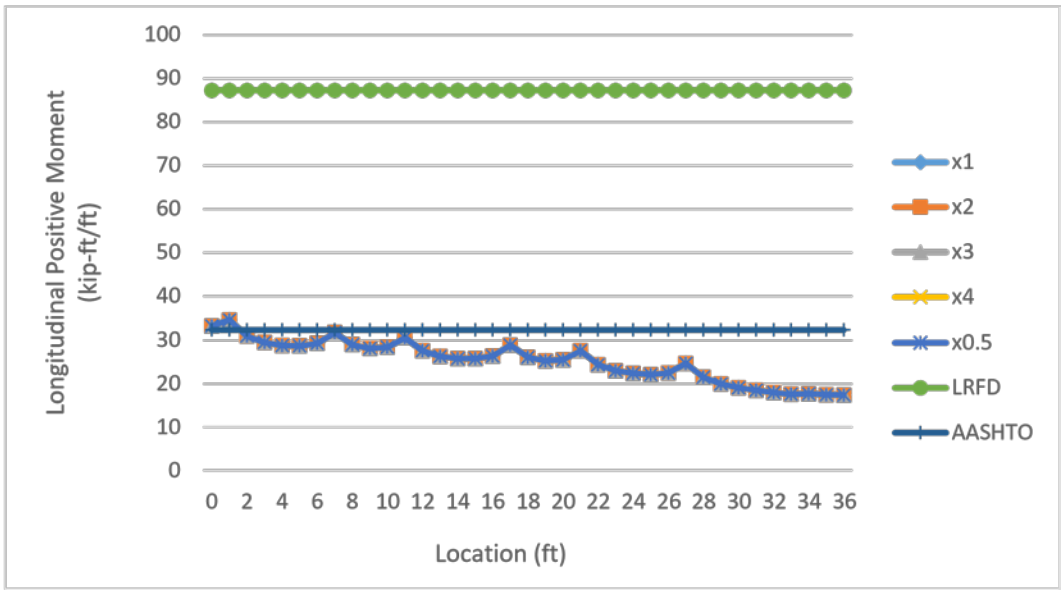

Table 14.2: Longitudinal Positive Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 36ft, Deck width = 36ft, One Left Railing with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	21.6	87.3	17	87.3	14.4	87.3	12.7	87.3	25.7	87.3	32.4
1	22.6	87.3	17.9	87.3	15.2	87.3	13.5	87.3	26.7	87.3	32.4
2	21	87.3	16.7	87.3	14.3	87.3	12.8	87.3	24.6	87.3	32.4
3	20.3	87.3	16.4	87.3	14.1	87.3	12.7	87.3	23.7	87.3	32.4
4	20.5	87.3	16.9	87.3	14.8	87.3	13.4	87.3	23.6	87.3	32.4
5	21	87.3	17.6	87.3	15.7	87.3	14.4	87.3	23.9	87.3	32.4
6	22.2	87.3	19.1	87.3	17.3	87.3	16.1	87.3	24.9	87.3	32.4
7	25.2	87.3	22.3	87.3	20.6	87.3	19.5	87.3	27.7	87.3	32.4
8	23	87.3	20.2	87.3	18.6	87.3	17.6	87.3	25.3	87.3	32.4
9	22.6	87.3	20	87.3	18.5	87.3	17.6	87.3	24.7	87.3	32.4
10	23.2	87.3	20.9	87.3	19.5	87.3	18.6	87.3	25.2	87.3	32.4
11	25.8	87.3	23.6	87.3	22.3	87.3	21.4	87.3	27.6	87.3	32.4
12	23.1	87.3	21	87.3	19.8	87.3	19	87.3	24.8	87.3	32.4
13	22.2	87.3	20.2	87.3	19.1	87.3	18.4	87.3	23.8	87.3	32.4
14	21.9	87.3	20.2	87.3	19.1	87.3	18.4	87.3	23.4	87.3	32.4
15	22.2	87.3	20.5	87.3	19.5	87.3	18.9	87.3	23.6	87.3	32.4
16	23.1	87.3	21.5	87.3	20.6	87.3	20	87.3	24.4	87.3	32.4
17	25.8	87.3	24.4	87.3	23.5	87.3	23	87.3	27	87.3	32.4
18	23.2	87.3	21.9	87.3	21.1	87.3	20.6	87.3	24.4	87.3	32.4
19	22.5	87.3	21.3	87.3	20.5	87.3	20.1	87.3	23.6	87.3	32.4

20	22.9	87.3	21.8	87.3	21.1	87.3	20.6	87.3	23.9	87.3	32.4
21	25.2	87.3	24.1	87.3	23.5	87.3	23.1	87.3	26.2	87.3	32.4
22	22.2	87.3	21.1	87.3	20.5	87.3	20.2	87.3	23	87.3	32.4
23	21	87.3	20	87.3	19.4	87.3	19.1	87.3	21.8	87.3	32.4
24	20.4	87.3	19.5	87.3	19	87.3	18.6	87.3	21.2	87.3	32.4
25	20.3	87.3	19.4	87.3	18.9	87.3	18.6	87.3	21	87.3	32.4
26	20.8	87.3	20	87.3	19.6	87.3	19.3	87.3	21.5	87.3	32.4
27	23	87.3	22.2	87.3	21.8	87.3	21.5	87.3	23.6	87.3	32.4
28	20	87.3	19.3	87.3	18.8	87.3	18.6	87.3	20.6	87.3	32.4
29	18.6	87.3	17.9	87.3	17.5	87.3	17.2	87.3	19.2	87.3	32.4
30	17.8	87.3	17.1	87.3	16.7	87.3	16.5	87.3	18.3	87.3	32.4
31	17.2	87.3	16.5	87.3	16.2	87.3	15.9	87.3	17.7	87.3	32.4
32	16.7	87.3	16.1	87.3	15.8	87.3	15.6	87.3	17.2	87.3	32.4
33	16.4	87.3	15.8	87.3	15.5	87.3	15.3	87.3	16.9	87.3	32.4
34	16.2	87.3	15.6	87.3	15.3	87.3	15.1	87.3	16.6	87.3	32.4
35	16	87.3	15.5	87.3	15.2	87.3	15	87.3	16.5	87.3	32.4
36	16	87.3	15.5	87.3	15.2	87.3	15	87.3	16.4	87.3	32.4

Figure 14.2: Longitudinal Positive Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 36ft, Deck width = 36ft, One Left Railing with Edge Loading.

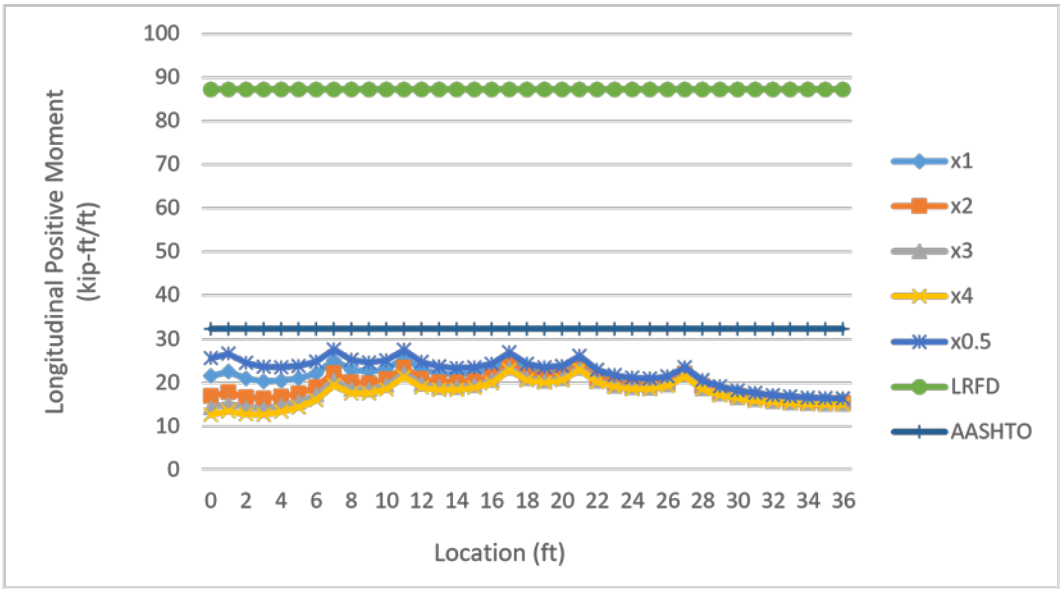

Table 14.3: Longitudinal Positive Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 36ft, Deck width = 36ft, One Right Railings with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	32.6	87.3	32.3	87.3	32.1	87.3	32	87.3	32.9	87.3	32.4
1	34	87.3	33.6	87.3	33.4	87.3	33.3	87.3	34.2	87.3	32.4
2	30.3	87.3	30	87.3	29.8	87.3	29.6	87.3	30.6	87.3	32.4
3	28.7	87.3	28.4	87.3	28.2	87.3	28	87.3	29	87.3	32.4
4	28	87.3	27.7	87.3	27.4	87.3	27.3	87.3	28.3	87.3	32.4
5	27.8	87.3	27.5	87.3	27.2	87.3	27.1	87.3	28.2	87.3	32.4
6	28.4	87.3	28	87.3	27.8	87.3	27.6	87.3	28.8	87.3	32.4
7	30.9	87.3	30.4	87.3	30.2	87.3	30	87.3	31.2	87.3	32.4
8	28	87.3	27.6	87.3	27.3	87.3	27.2	87.3	28.4	87.3	32.4
9	27.1	87.3	26.7	87.3	26.4	87.3	26.2	87.3	27.5	87.3	32.4
10	27.4	87.3	26.9	87.3	26.6	87.3	26.4	87.3	27.8	87.3	32.4
11	29.5	87.3	29	87.3	28.7	87.3	28.5	87.3	30	87.3	32.4
12	26.4	87.3	25.8	87.3	25.5	87.3	25.3	87.3	26.8	87.3	32.4
13	25.1	87.3	24.5	87.3	24.1	87.3	23.9	87.3	25.6	87.3	32.4
14	24.5	87.3	23.8	87.3	23.5	87.3	23.2	87.3	25	87.3	32.4
15	24.3	87.3	23.6	87.3	23.3	87.3	23	87.3	24.9	87.3	32.4
16	24.9	87.3	24.2	87.3	23.7	87.3	23.5	87.3	25.5	87.3	32.4
17	27.3	87.3	26.5	87.3	26.1	87.3	25.8	87.3	27.9	87.3	32.4
18	24.4	87.3	23.6	87.3	23.1	87.3	22.8	87.3	25.1	87.3	32.4
19	23.4	87.3	22.5	87.3	22	87.3	21.6	87.3	24.1	87.3	32.4

20	23.4	87.3	22.5	87.3	22	87.3	21.6	87.3	24.2	87.3	32.4
21	25.4	87.3	24.4	87.3	23.8	87.3	23.4	87.3	26.3	87.3	32.4
22	22.1	87.3	21	87.3	20.4	87.3	20	87.3	23	87.3	32.4
23	20.6	87.3	19.4	87.3	18.7	87.3	18.3	87.3	21.5	87.3	32.4
24	19.7	87.3	18.5	87.3	17.7	87.3	17.3	87.3	20.7	87.3	32.4
25	19.3	87.3	17.9	87.3	17.2	87.3	16.6	87.3	20.4	87.3	32.4
26	19.5	87.3	18	87.3	17.2	87.3	16.7	87.3	20.7	87.3	32.4
27	21.4	87.3	19.9	87.3	19	87.3	18.4	87.3	22.7	87.3	32.4
28	18	87.3	16.4	87.3	15.4	87.3	14.8	87.3	19.4	87.3	32.4
29	16.2	87.3	14.5	87.3	13.5	87.3	12.8	87.3	17.7	87.3	32.4
30	15.1	87.3	13.2	87.3	12.1	87.3	11.4	87.3	16.6	87.3	32.4
31	14.1	87.3	12.1	87.3	10.9	87.3	10.2	87.3	15.8	87.3	32.4
32	13.3	87.3	11.2	87.3	9.9	87.3	9.1	87.3	15.1	87.3	32.4
33	12.6	87.3	10.3	87.3	9	87.3	8.1	87.3	14.5	87.3	32.4
34	12	87.3	9.5	87.3	8.1	87.3	7.2	87.3	14	87.3	32.4
35	11.3	87.3	8.6	87.3	7.1	87.3	6.1	87.3	13.5	87.3	32.4
36	11.2	87.3	8.6	87.3	7.1	87.3	6.1	87.3	13.5	87.3	32.4

Figure 14.3: Longitudinal Positive Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 36ft, Deck width = 36ft, One Right Railings with Edge Loading.

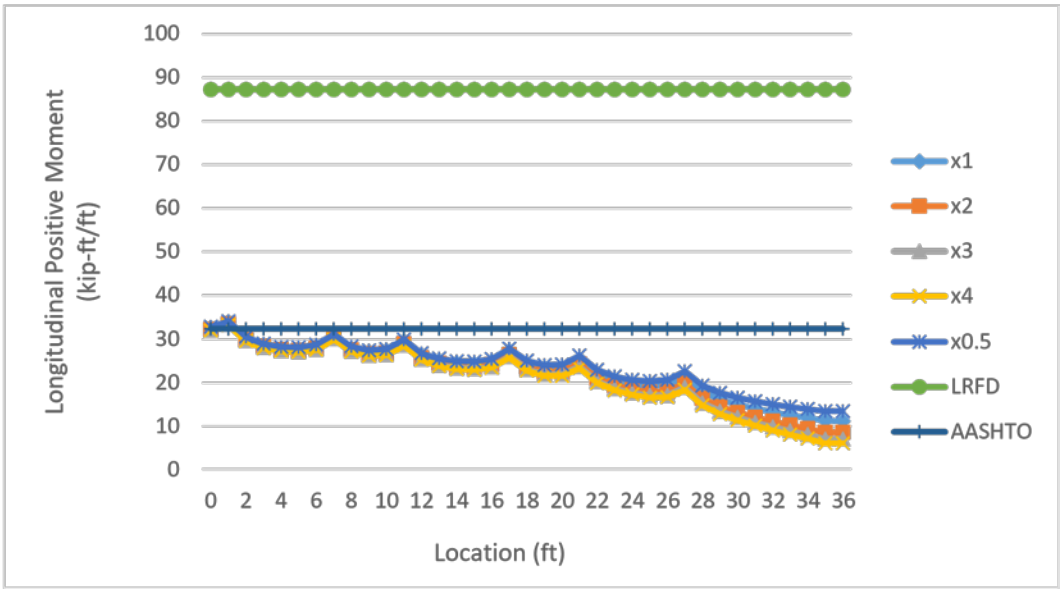

Table 14.4: Longitudinal Positive Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 36ft, Deck width = 36ft, Two Railings with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	21.2	87.3	16.5	87.3	13.9	87.3	12.3	87.3	25.4	87.3	32.4
1	22.2	87.3	17.4	87.3	14.8	87.3	13.1	87.3	26.4	87.3	32.4
2	20.5	87.3	16.2	87.3	13.8	87.3	12.2	87.3	24.3	87.3	32.4
3	19.8	87.3	15.8	87.3	13.5	87.3	12	87.3	23.3	87.3	32.4
4	19.9	87.3	16.2	87.3	14	87.3	12.7	87.3	23.2	87.3	32.4
5	20.4	87.3	16.9	87.3	14.9	87.3	13.6	87.3	23.5	87.3	32.4
6	21.6	87.3	18.3	87.3	16.4	87.3	15.2	87.3	24.5	87.3	32.4
7	24.6	87.3	21.4	87.3	19.7	87.3	18.5	87.3	27.3	87.3	32.4
8	22.2	87.3	19.2	87.3	17.6	87.3	16.5	87.3	24.8	87.3	32.4
9	21.7	87.3	18.9	87.3	17.3	87.3	16.3	87.3	24.2	87.3	32.4
10	22.4	87.3	19.7	87.3	18.2	87.3	17.2	87.3	24.7	87.3	32.4
11	24.9	87.3	22.3	87.3	20.9	87.3	20	87.3	27.1	87.3	32.4
12	22.1	87.3	19.6	87.3	18.3	87.3	17.4	87.3	24.2	87.3	32.4
13	21.1	87.3	18.8	87.3	17.4	87.3	16.6	87.3	23.1	87.3	32.4
14	20.8	87.3	18.5	87.3	17.3	87.3	16.5	87.3	22.7	87.3	32.4
15	20.9	87.3	18.7	87.3	17.5	87.3	16.8	87.3	22.7	87.3	32.4
16	21.7	87.3	19.6	87.3	18.5	87.3	17.7	87.3	23.5	87.3	32.4
17	24.3	87.3	22.3	87.3	21.2	87.3	20.4	87.3	26.1	87.3	32.4
18	21.6	87.3	19.7	87.3	18.6	87.3	17.8	87.3	23.3	87.3	32.4
19	20.8	87.3	18.9	87.3	17.8	87.3	17.1	87.3	22.5	87.3	32.4

20	21.1	87.3	19.2	87.3	18.1	87.3	17.4	87.3	22.8	87.3	32.4
21	23.3	87.3	21.4	87.3	20.3	87.3	19.6	87.3	24.9	87.3	32.4
22	20.1	87.3	18.2	87.3	17.1	87.3	16.4	87.3	21.7	87.3	32.4
23	18.7	87.3	16.8	87.3	15.7	87.3	15	87.3	20.3	87.3	32.4
24	18	87.3	16.1	87.3	15	87.3	14.3	87.3	19.6	87.3	32.4
25	17.7	87.3	15.7	87.3	14.6	87.3	13.9	87.3	19.3	87.3	32.4
26	18	87.3	16	87.3	14.9	87.3	14.2	87.3	19.7	87.3	32.4
27	20.1	87.3	18	87.3	16.9	87.3	16.2	87.3	21.8	87.3	32.4
28	16.7	87.3	14.6	87.3	13.5	87.3	12.8	87.3	18.5	87.3	32.4
29	15.1	87.3	12.9	87.3	11.7	87.3	11	87.3	16.9	87.3	32.4
30	14	87.3	11.8	87.3	10.6	87.3	9.8	87.3	15.9	87.3	32.4
31	13.1	87.3	10.8	87.3	9.5	87.3	8.7	87.3	15.1	87.3	32.4
32	12.4	87.3	10	87.3	8.7	87.3	7.8	87.3	14.5	87.3	32.4
33	11.7	87.3	9.2	87.3	7.9	87.3	7	87.3	13.9	87.3	32.4
34	11.2	87.3	8.6	87.3	7.2	87.3	6.3	87.3	13.5	87.3	32.4
35	10.6	87.3	7.8	87.3	6.3	87.3	5.3	87.3	13	87.3	32.4
36	10.6	87.3	7.8	87.3	6.3	87.3	5.4	87.3	13	87.3	32.4

Figure 14.4: Longitudinal Positive Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 36ft, Deck width = 36ft, Two Railings with Edge Loading.

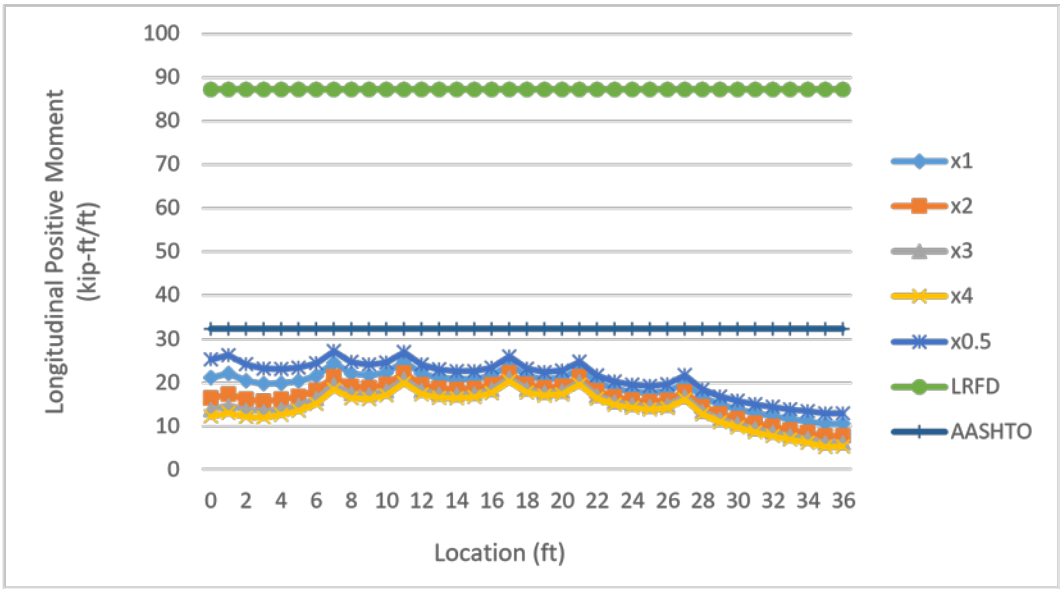

Table 15.1: Longitudinal Negative Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 36ft, Deck width = 48ft, No Railing with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	20.4	82.6	20.4	82.6	20.4	82.6	20.4	82.6	20.4	82.6	32.4
1	29.3	82.6	29.3	82.6	29.3	82.6	29.3	82.6	29.3	82.6	32.4
2	29.1	82.6	29.1	82.6	29.1	82.6	29.1	82.6	29.1	82.6	32.4
3	28.6	82.6	28.6	82.6	28.6	82.6	28.6	82.6	28.6	82.6	32.4
4	28	82.6	28	82.6	28	82.6	28	82.6	28	82.6	32.4
5	27.4	82.6	27.4	82.6	27.4	82.6	27.4	82.6	27.4	82.6	32.4
6	26.8	82.6	26.8	82.6	26.8	82.6	26.8	82.6	26.8	82.6	32.4
7	26.3	82.6	26.3	82.6	26.3	82.6	26.3	82.6	26.3	82.6	32.4
8	25.9	82.6	25.9	82.6	25.9	82.6	25.9	82.6	25.9	82.6	32.4
9	25.5	82.6	25.5	82.6	25.5	82.6	25.5	82.6	25.5	82.6	32.4
10	25.2	82.6	25.2	82.6	25.2	82.6	25.2	82.6	25.2	82.6	32.4
11	24.9	82.6	24.9	82.6	24.9	82.6	24.9	82.6	24.9	82.6	32.4
12	25	82.6	25	82.6	25	82.6	25	82.6	25	82.6	32.4
13	24.4	82.6	24.4	82.6	24.4	82.6	24.4	82.6	24.4	82.6	32.4
14	24.2	82.6	24.2	82.6	24.2	82.6	24.2	82.6	24.2	82.6	32.4
15	23.9	82.6	23.9	82.6	23.9	82.6	23.9	82.6	23.9	82.6	32.4
16	23.7	82.6	23.7	82.6	23.7	82.6	23.7	82.6	23.7	82.6	32.4
17	23.5	82.6	23.5	82.6	23.5	82.6	23.5	82.6	23.5	82.6	32.4
18	23.3	82.6	23.3	82.6	23.3	82.6	23.3	82.6	23.3	82.6	32.4
19	23.1	82.6	23.1	82.6	23.1	82.6	23.1	82.6	23.1	82.6	32.4

20	22.8	82.6	22.8	82.6	22.8	82.6	22.8	82.6	22.8	82.6	32.4
21	22.6	82.6	22.6	82.6	22.6	82.6	22.6	82.6	22.6	82.6	32.4
22	22.4	82.6	22.4	82.6	22.4	82.6	22.4	82.6	22.4	82.6	32.4
23	22.1	82.6	22.1	82.6	22.1	82.6	22.1	82.6	22.1	82.6	32.4
24	21.8	82.6	21.8	82.6	21.8	82.6	21.8	82.6	21.8	82.6	32.4
25	21.5	82.6	21.5	82.6	21.5	82.6	21.5	82.6	21.5	82.6	32.4
26	21.2	82.6	21.2	82.6	21.2	82.6	21.2	82.6	21.2	82.6	32.4
27	20.8	82.6	20.8	82.6	20.8	82.6	20.8	82.6	20.8	82.6	32.4
28	20.5	82.6	20.5	82.6	20.5	82.6	20.5	82.6	20.5	82.6	32.4
29	20	82.6	20	82.6	20	82.6	20	82.6	20	82.6	32.4
30	19.6	82.6	19.6	82.6	19.6	82.6	19.6	82.6	19.6	82.6	32.4
31	19.2	82.6	19.2	82.6	19.2	82.6	19.2	82.6	19.2	82.6	32.4
32	18.7	82.6	18.7	82.6	18.7	82.6	18.7	82.6	18.7	82.6	32.4
33	18.2	82.6	18.2	82.6	18.2	82.6	18.2	82.6	18.2	82.6	32.4
34	17.7	82.6	17.7	82.6	17.7	82.6	17.7	82.6	17.7	82.6	32.4
35	17.2	82.6	17.2	82.6	17.2	82.6	17.2	82.6	17.2	82.6	32.4
36	16.6	82.6	16.6	82.6	16.6	82.6	16.6	82.6	16.6	82.6	32.4
37	16.1	82.6	16.1	82.6	16.1	82.6	16.1	82.6	16.1	82.6	32.4
38	15.5	82.6	15.5	82.6	15.5	82.6	15.5	82.6	15.5	82.6	32.4
39	15	82.6	15	82.6	15	82.6	15	82.6	15	82.6	32.4
40	14.4	82.6	14.4	82.6	14.4	82.6	14.4	82.6	14.4	82.6	32.4
41	13.9	82.6	13.9	82.6	13.9	82.6	13.9	82.6	13.9	82.6	32.4
42	13.3	82.6	13.3	82.6	13.3	82.6	13.3	82.6	13.3	82.6	32.4
43	12.8	82.6	12.8	82.6	12.8	82.6	12.8	82.6	12.8	82.6	32.4
44	12.1	82.6	12.1	82.6	12.1	82.6	12.1	82.6	12.1	82.6	32.4
45	11.4	82.6	11.4	82.6	11.4	82.6	11.4	82.6	11.4	82.6	32.4

46	10.5	82.6	10.5	82.6	10.5	82.6	10.5	82.6	10.5	82.6	32.4
47	8.8	82.6	8.8	82.6	8.8	82.6	8.8	82.6	8.8	82.6	32.4
48	3.4	82.6	3.4	82.6	3.4	82.6	3.4	82.6	3.4	82.6	32.4

Figure 15.1: Longitudinal Negative Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 36ft, Deck width = 48ft, No Railing with Edge Loading.

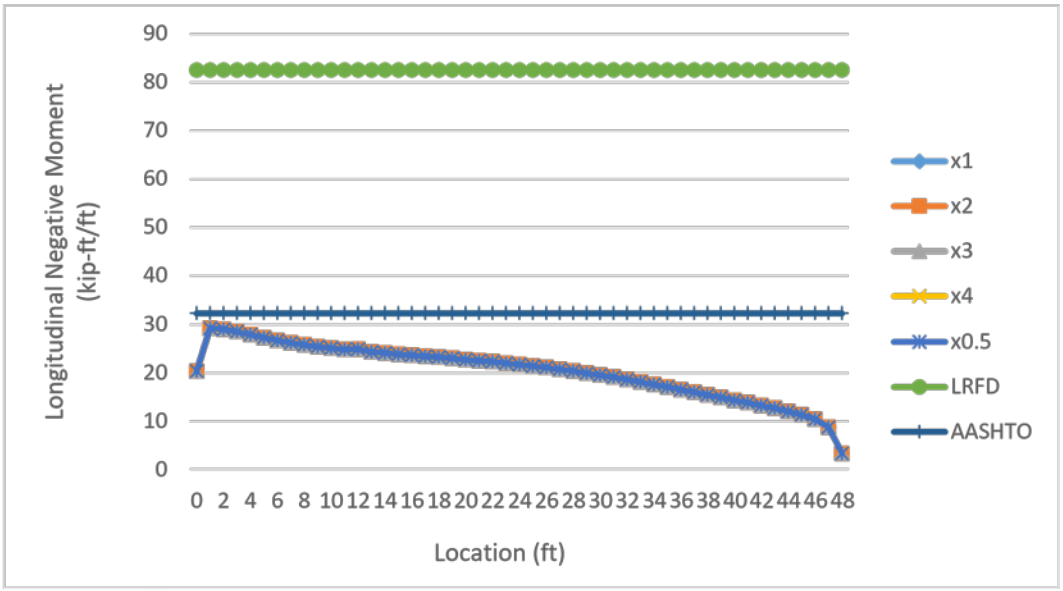

Table 15.2: Longitudinal Negative Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 36ft, Deck width = 48ft, One Left Railing with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	19.9	82.6	19.3	82.6	19.1	82.6	18.9	82.6	20.3	82.6	32.4
1	19	82.6	14.5	82.6	12.1	82.6	10.6	82.6	23	82.6	32.4
2	19.3	82.6	15.4	82.6	13.3	82.6	11.9	82.6	22.8	82.6	32.4
3	19	82.6	15.2	82.6	13.1	82.6	11.8	82.6	22.5	82.6	32.4
4	19.1	82.6	15.6	82.6	13.7	82.6	12.5	82.6	22.3	82.6	32.4
5	19.2	82.6	16	82.6	14.2	82.6	13.1	82.6	22.1	82.6	32.4
6	19.4	82.6	16.4	82.6	14.8	82.6	13.8	82.6	22.1	82.6	32.4
7	19.6	82.6	16.9	82.6	15.4	82.6	14.5	82.6	22	82.6	32.4
8	19.8	82.6	17.3	82.6	16	82.6	15.2	82.6	22	82.6	32.4
9	20	82.6	17.8	82.6	16.6	82.6	15.8	82.6	22	82.6	32.4
10	20.2	82.6	18.2	82.6	17.1	82.6	16.4	82.6	22	82.6	32.4
11	20.4	82.6	18.6	82.6	17.6	82.6	17	82.6	22.1	82.6	32.4
12	20.6	82.6	19	82.6	18.1	82.6	17.5	82.6	22.1	82.6	32.4
13	20.8	82.6	19.3	82.6	18.5	82.6	18	82.6	22.1	82.6	32.4
14	20.9	82.6	19.6	82.6	18.9	82.6	18.4	82.6	22.1	82.6	32.4
15	21	82.6	19.9	82.6	19.2	82.6	18.8	82.6	22.1	82.6	32.4
16	21.1	82.6	20.1	82.6	19.5	82.6	19.1	82.6	22.1	82.6	32.4
17	21.2	82.6	20.2	82.6	19.7	82.6	19.4	82.6	22	82.6	32.4
18	21.2	82.6	20.4	82.6	19.9	82.6	19.6	82.6	22	82.6	32.4
19	21.2	82.6	20.5	82.6	20.1	82.6	19.8	82.6	21.9	82.6	32.4

20	21.2	82.6	20.5	82.6	20.2	82.6	20	82.6	21.8	82.6	32.4
21	21.2	82.6	20.6	82.6	20.2	82.6	20	82.6	21.7	82.6	32.4
22	21.1	82.6	20.5	82.6	20.3	82.6	20.1	82.6	21.5	82.6	32.4
23	21	82.6	20.5	82.6	20.2	82.6	20.1	82.6	21.4	82.6	32.4
24	20.8	82.6	20.4	82.6	20.2	82.6	20	82.6	21.2	82.6	32.4
25	20.6	82.6	20.3	82.6	20.1	82.6	19.9	82.6	20.9	82.6	32.4
26	20.4	82.6	20.1	82.6	19.9	82.6	19.8	82.6	20.7	82.6	32.4
27	20.1	82.6	19.9	82.6	19.7	82.6	19.6	82.6	20.4	82.6	32.4
28	19.9	82.6	19.6	82.6	19.5	82.6	19.4	82.6	20.1	82.6	32.4
29	19.5	82.6	19.3	82.6	19.2	82.6	19.1	82.6	19.7	82.6	32.4
30	19.2	82.6	19	82.6	18.9	82.6	18.8	82.6	19.3	82.6	32.4
31	18.8	82.6	18.6	82.6	18.5	82.6	18.5	82.6	18.9	82.6	32.4
32	18.4	82.6	18.2	82.6	18.2	82.6	18.1	82.6	18.5	82.6	32.4
33	17.9	82.6	17.8	82.6	17.7	82.6	17.7	82.6	18	82.6	32.4
34	17.5	82.6	17.3	82.6	17.3	82.6	17.3	82.6	17.6	82.6	32.4
35	17	82.6	16.9	82.6	16.8	82.6	16.8	82.6	17	82.6	32.4
36	16.5	82.6	16.4	82.6	16.3	82.6	16.3	82.6	16.5	82.6	32.4
37	15.9	82.6	15.9	82.6	15.8	82.6	15.8	82.6	16	82.6	32.4
38	15.4	82.6	15.4	82.6	15.3	82.6	15.3	82.6	15.5	82.6	32.4
39	14.9	82.6	14.8	82.6	14.8	82.6	14.8	82.6	14.9	82.6	32.4
40	14.4	82.6	14.3	82.6	14.3	82.6	14.3	82.6	14.4	82.6	32.4
41	13.8	82.6	13.8	82.6	13.8	82.6	13.8	82.6	13.8	82.6	32.4
42	13.3	82.6	13.3	82.6	13.3	82.6	13.3	82.6	13.3	82.6	32.4
43	12.8	82.6	12.8	82.6	12.8	82.6	12.8	82.6	12.8	82.6	32.4
44	12.2	82.6	12.2	82.6	12.2	82.6	12.2	82.6	12.2	82.6	32.4
45	11.5	82.6	11.5	82.6	11.5	82.6	11.5	82.6	11.5	82.6	32.4

46	10.5	82.6	10.6	82.6	10.6	82.6	10.6	82.6	10.5	82.6	32.4
47	8.9	82.6	9	82.6	9	82.6	9.1	82.6	8.9	82.6	32.4
48	3.6	82.6	3.7	82.6	3.7	82.6	3.8	82.6	3.5	82.6	32.4

Figure 15.2: Longitudinal Negative Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 36ft, Deck width = 48ft, One Left Railing with Edge Loading.

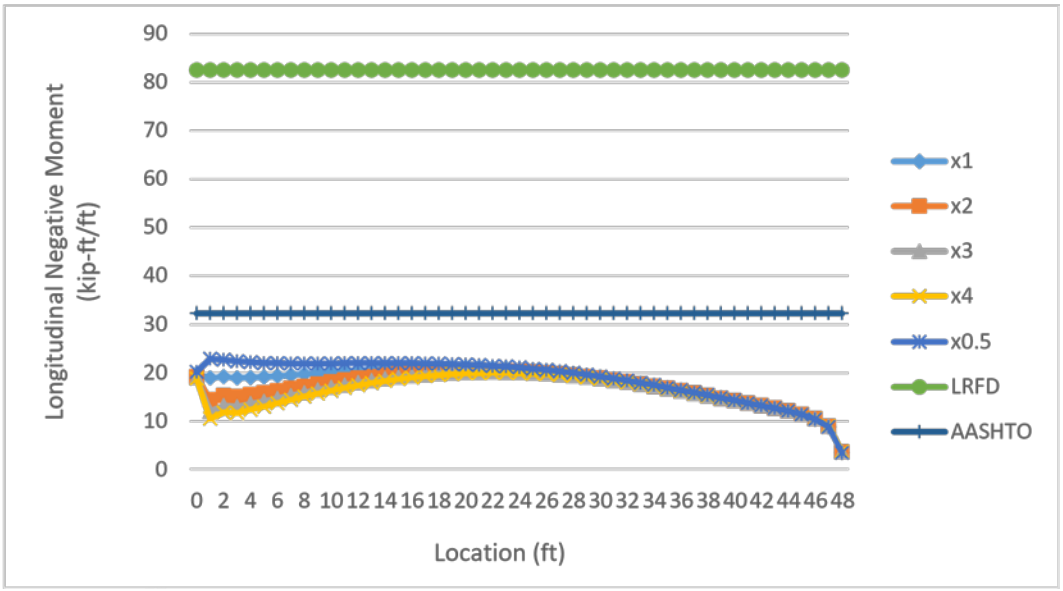

Table 15.3: Longitudinal Negative Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 36ft, Deck width = 48ft, One Right Railings with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	20.5	82.6	20.6	82.6	20.6	82.6	20.6	82.6	20.5	82.6	32.4
1	29.4	82.6	29.4	82.6	29.4	82.6	29.4	82.6	29.4	82.6	32.4
2	29.1	82.6	29.2	82.6	29.2	82.6	29.2	82.6	29.1	82.6	32.4
3	28.6	82.6	28.6	82.6	28.7	82.6	28.7	82.6	28.6	82.6	32.4
4	28	82.6	28	82.6	28	82.6	28	82.6	28	82.6	32.4
5	27.4	82.6	27.3	82.6	27.3	82.6	27.3	82.6	27.4	82.6	32.4
6	26.8	82.6	26.8	82.6	26.8	82.6	26.8	82.6	26.8	82.6	32.4
7	26.3	82.6	26.3	82.6	26.3	82.6	26.3	82.6	26.3	82.6	32.4
8	25.9	82.6	25.9	82.6	25.9	82.6	25.9	82.6	25.9	82.6	32.4
9	25.5	82.6	25.5	82.6	25.5	82.6	25.5	82.6	25.5	82.6	32.4
10	25.2	82.6	25.1	82.6	25.1	82.6	25.1	82.6	25.2	82.6	32.4
11	24.9	82.6	24.8	82.6	24.8	82.6	24.8	82.6	24.9	82.6	32.4
12	24.6	82.6	24.5	82.6	24.5	82.6	24.5	82.6	24.6	82.6	32.4
13	24.3	82.6	24.3	82.6	24.3	82.6	24.2	82.6	24.3	82.6	32.4
14	24.1	82.6	24	82.6	24	82.6	24	82.6	24.1	82.6	32.4
15	23.8	82.6	23.8	82.6	23.7	82.6	23.7	82.6	23.9	82.6	32.4
16	23.6	82.6	23.5	82.6	23.5	82.6	23.5	82.6	23.6	82.6	32.4
17	23.3	82.6	23.3	82.6	23.2	82.6	23.2	82.6	23.4	82.6	32.4
18	23.1	82.6	23	82.6	23	82.6	23	82.6	23.2	82.6	32.4
19	22.9	82.6	22.8	82.6	22.7	82.6	22.7	82.6	22.9	82.6	32.4

20	22.6	82.6	22.5	82.6	22.4	82.6	22.4	82.6	22.7	82.6	32.4
21	22.3	82.6	22.2	82.6	22.1	82.6	22.1	82.6	22.4	82.6	32.4
22	22	82.6	21.9	82.6	21.8	82.6	21.8	82.6	22.1	82.6	32.4
23	21.7	82.6	21.6	82.6	21.5	82.6	21.4	82.6	21.8	82.6	32.4
24	21.4	82.6	21.2	82.6	21.1	82.6	21.1	82.6	21.5	82.6	32.4
25	21	82.6	20.8	82.6	20.7	82.6	20.7	82.6	21.2	82.6	32.4
26	20.6	82.6	20.4	82.6	20.3	82.6	20.2	82.6	20.8	82.6	32.4
27	20.2	82.6	20	82.6	19.9	82.6	19.8	82.6	20.4	82.6	32.4
28	19.8	82.6	19.5	82.6	19.4	82.6	19.3	82.6	20	82.6	32.4
29	19.3	82.6	19	82.6	18.8	82.6	18.7	82.6	19.6	82.6	32.4
30	18.8	82.6	18.5	82.6	18.3	82.6	18.2	82.6	19.1	82.6	32.4
31	18.2	82.6	17.9	82.6	17.7	82.6	17.5	82.6	18.6	82.6	32.4
32	17.7	82.6	17.2	82.6	17	82.6	16.9	82.6	18	82.6	32.4
33	17.1	82.6	16.6	82.6	16.3	82.6	16.2	82.6	17.5	82.6	32.4
34	16.4	82.6	15.9	82.6	15.6	82.6	15.4	82.6	16.9	82.6	32.4
35	15.8	82.6	15.2	82.6	14.9	82.6	14.7	82.6	16.3	82.6	32.4
36	15.1	82.6	14.4	82.6	14.1	82.6	13.9	82.6	15.6	82.6	32.4
37	14.4	82.6	13.7	82.6	13.3	82.6	13	82.6	15	82.6	32.4
38	13.6	82.6	12.9	82.6	12.4	82.6	12.2	82.6	14.3	82.6	32.4
39	12.9	82.6	12.1	82.6	11.6	82.6	11.3	82.6	13.7	82.6	32.4
40	12.2	82.6	11.3	82.6	10.7	82.6	10.4	82.6	13	82.6	32.4
41	11.5	82.6	10.4	82.6	9.9	82.6	9.5	82.6	12.4	82.6	32.4
42	10.7	82.6	9.6	82.6	9	82.6	8.6	82.6	11.7	82.6	32.4
43	10	82.6	8.8	82.6	8.2	82.6	7.7	82.6	11	82.6	32.4
44	9.3	82.6	8	82.6	7.3	82.6	6.9	82.6	10.4	82.6	32.4
45	8.6	82.6	7.2	82.6	6.4	82.6	6	82.6	9.7	82.6	32.4

46	7.8	82.6	6.4	82.6	5.6	82.6	5.2	82.6	8.9	82.6	32.4
47	6.9	82.6	5.5	82.6	4.6	82.6	4.1	82.6	8.1	82.6	32.4
48	3.7	82.6	3.6	82.6	3.5	82.6	3.5	82.6	3.8	82.6	32.4

Figure 15.3: Longitudinal Negative Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 36ft, Deck width = 48ft, One Right Railings with Edge Loading.

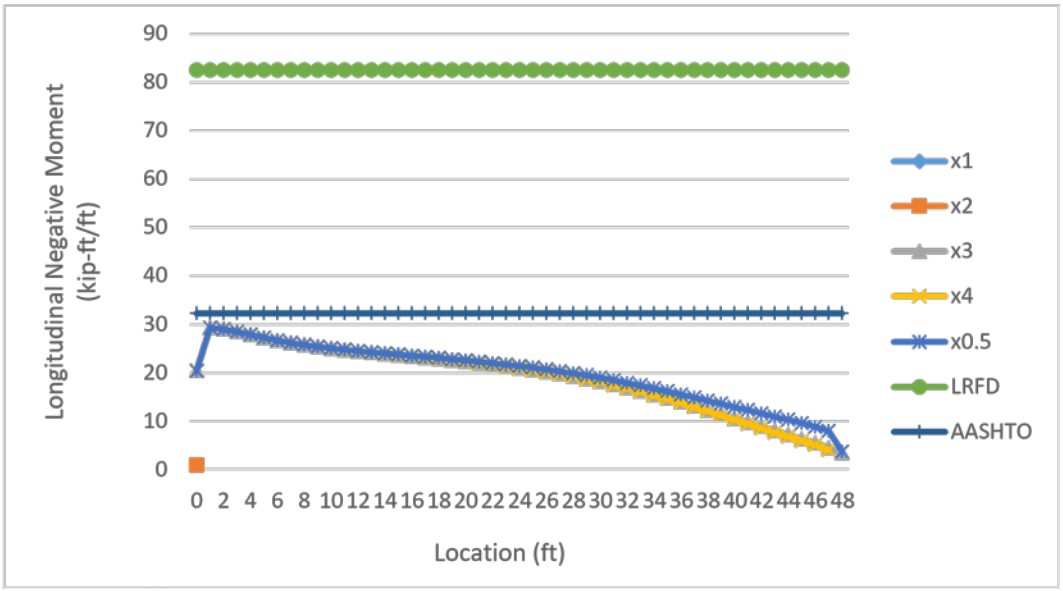

Table 15.4: Longitudinal Negative Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 36ft, Deck width = 48ft, Two Railings with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	19.9	82.6	19.4	82.6	19.2	82.6	19	82.6	20.4	82.6	32.4
1	19	82.6	14.5	82.6	12.1	82.6	10.6	82.6	23	82.6	32.4
2	19.3	82.6	15.4	82.6	13.3	82.6	11.9	82.6	22.8	82.6	32.4
3	19	82.6	15.2	82.6	13.1	82.6	11.8	82.6	22.5	82.6	32.4
4	19.1	82.6	15.6	82.6	13.7	82.6	12.5	82.6	22.3	82.6	32.4
5	19.2	82.6	15.9	82.6	14.2	82.6	13.1	82.6	22.1	82.6	32.4
6	19.4	82.6	16.4	82.6	14.8	82.6	13.8	82.6	22	82.6	32.4
7	19.5	82.6	16.8	82.6	15.4	82.6	14.4	82.6	22	82.6	32.4
8	19.8	82.6	17.3	82.6	15.9	82.6	15.1	82.6	22	82.6	32.4
9	20	82.6	17.7	82.6	16.5	82.6	15.7	82.6	22	82.6	32.4
10	20.2	82.6	18.1	82.6	17	82.6	16.3	82.6	22	82.6	32.4
11	20.4	82.6	18.5	82.6	17.5	82.6	16.9	82.6	22	82.6	32.4
12	20.5	82.6	18.9	82.6	18	82.6	17.4	82.6	22	82.6	32.4
13	20.7	82.6	19.2	82.6	18.4	82.6	17.8	82.6	22	82.6	32.4
14	20.8	82.6	19.4	82.6	18.7	82.6	18.2	82.6	22	82.6	32.4
15	20.9	82.6	19.7	82.6	19	82.6	18.6	82.6	22	82.6	32.4
16	21	82.6	19.9	82.6	19.3	82.6	18.9	82.6	22	82.6	32.4
17	21	82.6	20	82.6	19.5	82.6	19.1	82.6	22	82.6	32.4
18	21	82.6	20.1	82.6	19.6	82.6	19.3	82.6	21.9	82.6	32.4
19	21	82.6	20.2	82.6	19.7	82.6	19.4	82.6	21.8	82.6	32.4

20	21	82.6	20.2	82.6	19.8	82.6	19.5	82.6	21.7	82.6	32.4
21	20.9	82.6	20.2	82.6	19.8	82.6	19.5	82.6	21.5	82.6	32.4
22	20.8	82.6	20.1	82.6	19.7	82.6	19.5	82.6	21.3	82.6	32.4
23	20.6	82.6	20	82.6	19.6	82.6	19.4	82.6	21.1	82.6	32.4
24	20.4	82.6	19.8	82.6	19.5	82.6	19.3	82.6	20.9	82.6	32.4
25	20.2	82.6	19.6	82.6	19.3	82.6	19.1	82.6	20.6	82.6	32.4
26	19.9	82.6	19.3	82.6	19.1	82.6	18.9	82.6	20.3	82.6	32.4
27	19.6	82.6	19	82.6	18.8	82.6	18.6	82.6	20	82.6	32.4
28	19.2	82.6	18.7	82.6	18.4	82.6	18.2	82.6	19.6	82.6	32.4
29	18.8	82.6	18.3	82.6	18	82.6	17.8	82.6	19.2	82.6	32.4
30	18.3	82.6	17.8	82.6	17.5	82.6	17.4	82.6	18.8	82.6	32.4
31	17.9	82.6	17.3	82.6	17	82.6	16.8	82.6	18.3	82.6	32.4
32	17.3	82.6	16.8	82.6	16.5	82.6	16.3	82.6	17.8	82.6	32.4
33	16.8	82.6	16.2	82.6	15.9	82.6	15.7	82.6	17.3	82.6	32.4
34	16.2	82.6	15.5	82.6	15.2	82.6	15	82.6	16.7	82.6	32.4
35	15.5	82.6	14.9	82.6	14.5	82.6	14.3	82.6	16.1	82.6	32.4
36	14.9	82.6	14.2	82.6	13.8	82.6	13.5	82.6	15.5	82.6	32.4
37	14.2	82.6	13.4	82.6	13	82.6	12.8	82.6	14.9	82.6	32.4
38	13.5	82.6	12.7	82.6	12.2	82.6	11.9	82.6	14.3	82.6	32.4
39	12.8	82.6	11.9	82.6	11.4	82.6	11.1	82.6	13.6	82.6	32.4
40	12.1	82.6	11.1	82.6	10.6	82.6	10.3	82.6	13	82.6	32.4
41	11.4	82.6	10.3	82.6	9.8	82.6	9.4	82.6	12.3	82.6	32.4
42	10.7	82.6	9.5	82.6	8.9	82.6	8.5	82.6	11.7	82.6	32.4
43	10	82.6	8.8	82.6	8.1	82.6	7.7	82.6	11	82.6	32.4
44	9.3	82.6	8	82.6	7.3	82.6	6.8	82.6	10.4	82.6	32.4
45	8.6	82.6	7.2	82.6	6.4	82.6	5.9	82.6	9.7	82.6	32.4

46	7.8	82.6	6.4	82.6	5.7	82.6	5.2	82.6	9	82.6	32.4
47	7	82.6	5.5	82.6	4.7	82.6	4.1	82.6	8.2	82.6	32.4
48	3.9	82.6	3.8	82.6	3.8	82.6	3.8	82.6	3.9	82.6	32.4

Figure 15.4: Longitudinal Negative Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 36ft, Deck width = 48ft, Two Railings with Edge Loading.

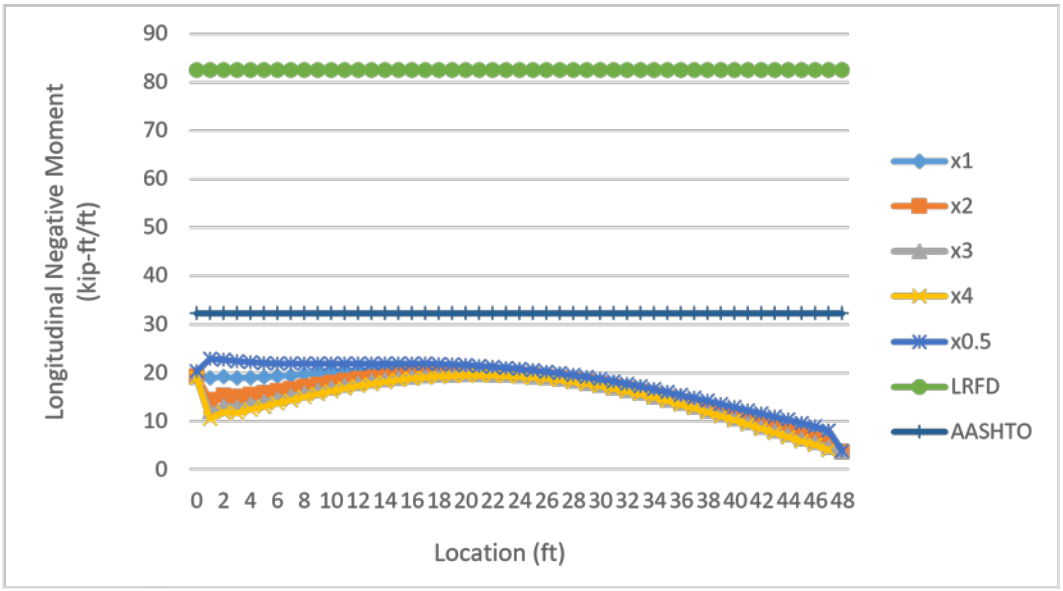

Table 16.1: Longitudinal Positive Moment Distribution at Critical Section for Four-Lane Lane Two Span Bridge Deck Span = 36ft, Deck width = 48ft, No Railing with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	34.3	107.7	34.3	107.7	34.3	107.7	34.3	107.7	34.3	107.7	32.4
1	35.5	107.7	35.5	107.7	35.5	107.7	35.5	107.7	35.5	107.7	32.4
2	32.1	107.7	32.1	107.7	32.1	107.7	32.1	107.7	32.1	107.7	32.4
3	30.6	107.7	30.6	107.7	30.6	107.7	30.6	107.7	30.6	107.7	32.4
4	29.9	107.7	29.9	107.7	29.9	107.7	29.9	107.7	29.9	107.7	32.4
5	29.8	107.7	29.8	107.7	29.8	107.7	29.8	107.7	29.8	107.7	32.4
6	30.5	107.7	30.5	107.7	30.5	107.7	30.5	107.7	30.5	107.7	32.4
7	33	107.7	33	107.7	33	107.7	33	107.7	33	107.7	32.4
8	30.3	107.7	30.3	107.7	30.3	107.7	30.3	107.7	30.3	107.7	32.4
9	29.5	107.7	29.5	107.7	29.5	107.7	29.5	107.7	29.5	107.7	32.4
10	29.8	107.7	29.8	107.7	29.8	107.7	29.8	107.7	29.8	107.7	32.4
11	32.1	107.7	32.1	107.7	32.1	107.7	32.1	107.7	32.1	107.7	32.4
12	29.1	107.7	29.1	107.7	29.1	107.7	29.1	107.7	29.1	107.7	32.4
13	27.9	107.7	27.9	107.7	27.9	107.7	27.9	107.7	27.9	107.7	32.4
14	27.5	107.7	27.5	107.7	27.5	107.7	27.5	107.7	27.5	107.7	32.4
15	27.5	107.7	27.5	107.7	27.5	107.7	27.5	107.7	27.5	107.7	32.4
16	28.3	107.7	28.3	107.7	28.3	107.7	28.3	107.7	28.3	107.7	32.4
17	30.9	107.7	30.9	107.7	30.9	107.7	30.9	107.7	30.9	107.7	32.4
18	28.2	107.7	28.2	107.7	28.2	107.7	28.2	107.7	28.2	107.7	32.4
19	27.4	107.7	27.4	107.7	27.4	107.7	27.4	107.7	27.4	107.7	32.4

20	27.7	107.7	27.7	107.7	27.7	107.7	27.7	107.7	27.7	107.7	32.4
21	29.8	107.7	29.8	107.7	29.8	107.7	29.8	107.7	29.8	107.7	32.4
22	26.9	107.7	26.9	107.7	26.9	107.7	26.9	107.7	26.9	107.7	32.4
23	25.7	107.7	25.7	107.7	25.7	107.7	25.7	107.7	25.7	107.7	32.4
24	25.2	107.7	25.2	107.7	25.2	107.7	25.2	107.7	25.2	107.7	32.4
25	25.2	107.7	25.2	107.7	25.2	107.7	25.2	107.7	25.2	107.7	32.4
26	25.8	107.7	25.8	107.7	25.8	107.7	25.8	107.7	25.8	107.7	32.4
27	28.2	107.7	28.2	107.7	28.2	107.7	28.2	107.7	28.2	107.7	32.4
28	25.5	107.7	25.5	107.7	25.5	107.7	25.5	107.7	25.5	107.7	32.4
29	24.6	107.7	24.6	107.7	24.6	107.7	24.6	107.7	24.6	107.7	32.4
30	24.8	107.7	24.8	107.7	24.8	107.7	24.8	107.7	24.8	107.7	32.4
31	26.9	107.7	26.9	107.7	26.9	107.7	26.9	107.7	26.9	107.7	32.4
32	23.6	107.7	23.6	107.7	23.6	107.7	23.6	107.7	23.6	107.7	32.4
33	22.2	107.7	22.2	107.7	22.2	107.7	22.2	107.7	22.2	107.7	32.4
34	21.5	107.7	21.5	107.7	21.5	107.7	21.5	107.7	21.5	107.7	32.4
35	21.2	107.7	21.2	107.7	21.2	107.7	21.2	107.7	21.2	107.7	32.4
36	21.5	107.7	21.5	107.7	21.5	107.7	21.5	107.7	21.5	107.7	32.4
37	23.7	107.7	23.7	107.7	23.7	107.7	23.7	107.7	23.7	107.7	32.4
38	20.3	107.7	20.3	107.7	20.3	107.7	20.3	107.7	20.3	107.7	32.4
39	18.8	107.7	18.8	107.7	18.8	107.7	18.8	107.7	18.8	107.7	32.4
40	17.8	107.7	17.8	107.7	17.8	107.7	17.8	107.7	17.8	107.7	32.4
41	17.1	107.7	17.1	107.7	17.1	107.7	17.1	107.7	17.1	107.7	32.4
42	16.4	107.7	16.4	107.7	16.4	107.7	16.4	107.7	16.4	107.7	32.4
43	16	107.7	16	107.7	16	107.7	16	107.7	16	107.7	32.4
44	15.6	107.7	15.6	107.7	15.6	107.7	15.6	107.7	15.6	107.7	32.4
45	15.2	107.7	15.2	107.7	15.2	107.7	15.2	107.7	15.2	107.7	32.4

46	15	107.7	15	107.7	15	107.7	15	107.7	15	107.7	32.4
47	14.8	107.7	14.8	107.7	14.8	107.7	14.8	107.7	14.8	107.7	32.4
48	14.7	107.7	14.7	107.7	14.7	107.7	14.7	107.7	14.7	107.7	32.4

Figure 16.1: Longitudinal Positive Moment Distribution at Critical Section for Four-Lane Lane Two Span Bridge Deck Span = 36ft, Deck width = 48ft, No Railing with Edge Loading.

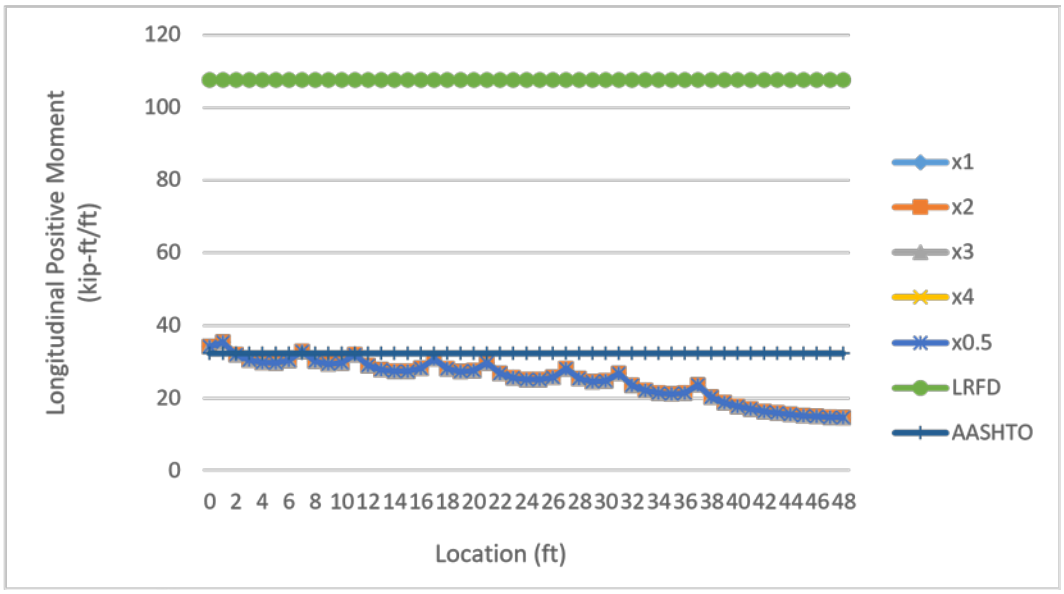

Table 16.2: Longitudinal Positive Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 36ft, Deck width = 48ft, One Left Railing with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	22.4	107.7	17.6	107.7	14.8	107.7	13.1	107.7	26.5	107.7	32.4
1	23.3	107.7	18.5	107.7	15.7	107.7	13.9	107.7	27.6	107.7	32.4
2	21.8	107.7	17.4	107.7	14.9	107.7	13.3	107.7	25.5	107.7	32.4
3	21.2	107.7	17.1	107.7	14.8	107.7	13.2	107.7	24.6	107.7	32.4
4	21.4	107.7	17.6	107.7	15.5	107.7	14.1	107.7	24.6	107.7	32.4
5	22	107.7	18.5	107.7	16.5	107.7	15.2	107.7	24.9	107.7	32.4
6	23.3	107.7	20	107.7	18.1	107.7	16.9	107.7	26	107.7	32.4
7	26.2	107.7	23.2	107.7	21.5	107.7	20.3	107.7	28.8	107.7	32.4
8	24.1	107.7	21.3	107.7	19.7	107.7	18.6	107.7	26.5	107.7	32.4
9	23.8	107.7	21.2	107.7	19.7	107.7	18.7	107.7	26	107.7	32.4
10	24.5	107.7	22.1	107.7	20.7	107.7	19.8	107.7	26.6	107.7	32.4
11	27.2	107.7	24.9	107.7	23.6	107.7	22.8	107.7	29.1	107.7	32.4
12	24.6	107.7	22.4	107.7	21.2	107.7	20.4	107.7	26.3	107.7	32.4
13	23.7	107.7	21.8	107.7	20.6	107.7	19.9	107.7	25.4	107.7	32.4
14	23.6	107.7	21.8	107.7	20.7	107.7	20.1	107.7	25.1	107.7	32.4
15	23.9	107.7	22.3	107.7	21.3	107.7	20.7	107.7	25.3	107.7	32.4
16	25	107.7	23.4	107.7	22.5	107.7	21.9	107.7	26.3	107.7	32.4
17	27.7	107.7	26.3	107.7	25.4	107.7	24.9	107.7	28.9	107.7	32.4
18	25.3	107.7	24	107.7	23.2	107.7	22.7	107.7	26.4	107.7	32.4
19	24.7	107.7	23.5	107.7	22.8	107.7	22.3	107.7	25.8	107.7	32.4

20	25.3	107.7	24.1	107.7	23.5	107.7	23	107.7	26.2	107.7	32.4
21	27.7	107.7	26.6	107.7	26	107.7	25.6	107.7	28.6	107.7	32.4
22	24.8	107.7	23.8	107.7	23.2	107.7	22.8	107.7	25.6	107.7	32.4
23	23.8	107.7	22.8	107.7	22.3	107.7	22	107.7	24.5	107.7	32.4
24	23.4	107.7	22.6	107.7	22.1	107.7	21.8	107.7	24.1	107.7	32.4
25	23.5	107.7	22.7	107.7	22.3	107.7	22	107.7	24.2	107.7	32.4
26	24.3	107.7	23.6	107.7	23.1	107.7	22.8	107.7	24.9	107.7	32.4
27	26.9	107.7	26.2	107.7	25.8	107.7	25.6	107.7	27.5	107.7	32.4
28	24.2	107.7	23.5	107.7	23.2	107.7	22.9	107.7	24.7	107.7	32.4
29	23.4	107.7	22.8	107.7	22.4	107.7	22.2	107.7	23.8	107.7	32.4
30	23.7	107.7	23.2	107.7	22.8	107.7	22.6	107.7	24.1	107.7	32.4
31	25.7	107.7	25.2	107.7	24.9	107.7	24.7	107.7	26.1	107.7	32.4
32	22.6	107.7	22.2	107.7	21.9	107.7	21.7	107.7	23	107.7	32.4
33	21.3	107.7	20.9	107.7	20.6	107.7	20.4	107.7	21.7	107.7	32.4
34	20.7	107.7	20.2	107.7	20	107.7	19.8	107.7	21	107.7	32.4
35	20.4	107.7	20	107.7	19.8	107.7	19.6	107.7	20.7	107.7	32.4
36	20.8	107.7	20.4	107.7	20.2	107.7	20.1	107.7	21.1	107.7	32.4
37	23	107.7	22.6	107.7	22.4	107.7	22.3	107.7	23.2	107.7	32.4
38	19.6	107.7	19.3	107.7	19.1	107.7	19	107.7	19.9	107.7	32.4
39	18.2	107.7	17.9	107.7	17.7	107.7	17.6	107.7	18.4	107.7	32.4
40	17.2	107.7	16.9	107.7	16.8	107.7	16.7	107.7	17.5	107.7	32.4
41	16.5	107.7	16.2	107.7	16.1	107.7	16	107.7	16.7	107.7	32.4
42	15.9	107.7	15.7	107.7	15.5	107.7	15.4	107.7	16.1	107.7	32.4
43	15.5	107.7	15.2	107.7	15.1	107.7	15	107.7	15.7	107.7	32.4
44	15.1	107.7	14.9	107.7	14.7	107.7	14.6	107.7	15.3	107.7	32.4
45	14.8	107.7	14.6	107.7	14.4	107.7	14.4	107.7	15	107.7	32.4

46	14.6	107.7	14.4	107.7	14.2	107.7	14.2	107.7	14.7	107.7	32.4
47	14.4	107.7	14.2	107.7	14.1	107.7	14	107.7	14.6	107.7	32.4
48	14.3	107.7	14.1	107.7	14	107.7	13.9	107.7	14.5	107.7	32.4

Figure 16.2: Longitudinal Positive Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 36ft, Deck width = 48ft, One Left Railing with Edge Loading.

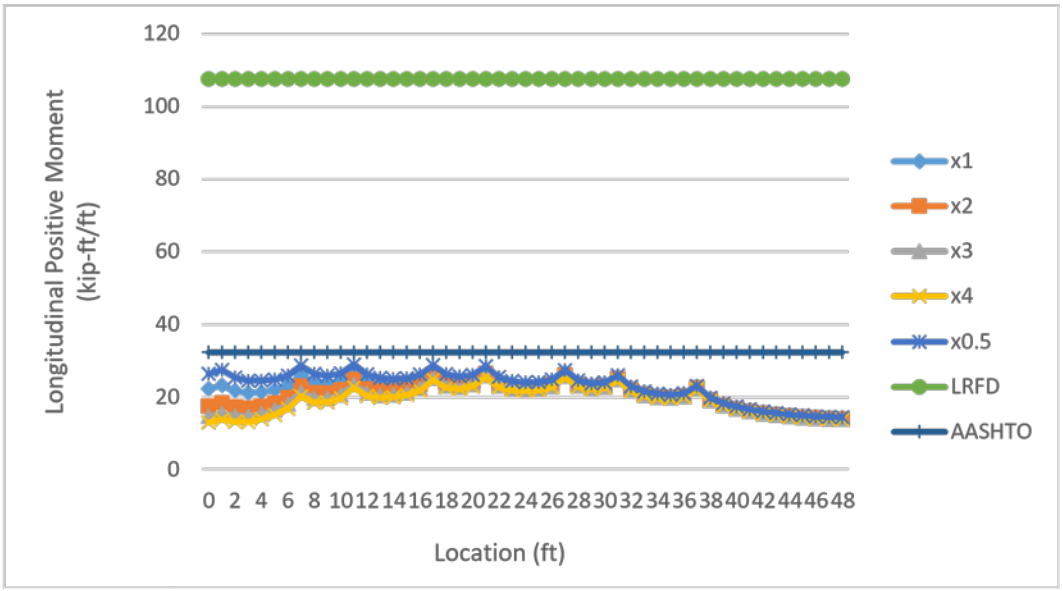

Table 16.3: Longitudinal Positive Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 36ft, Deck width = 48ft, One Right Railings with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	34.1	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
1	35.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
2	31.8	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
3	30.3	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
4	29.7	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
5	29.5	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
6	30.2	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
7	32.6	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
8	29.9	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
9	29.1	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
10	29.5	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
11	31.7	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
12	28.7	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
13	27.5	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
14	27	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
15	27.1	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
16	27.8	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
17	30.3	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
18	27.6	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
19	26.8	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4

20	27.1	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
21	29.3	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
22	26.1	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
23	24.8	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
24	24.3	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
25	24.2	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
26	24.8	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
27	27.2	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
28	24.3	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
29	23.2	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
30	23.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
31	25.2	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
32	21.9	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
33	20.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
34	19.5	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
35	19.1	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
36	19.3	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
37	21.2	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
38	17.7	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
39	16	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
40	14.8	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
41	13.8	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
42	13	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
43	12.2	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
44	11.6	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
45	11	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4

46	10.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
47	9.8	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
48	9.8	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4

Figure 16.3: Longitudinal Positive Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 36ft, Deck width = 48ft, One Right Railings with Edge Loading.

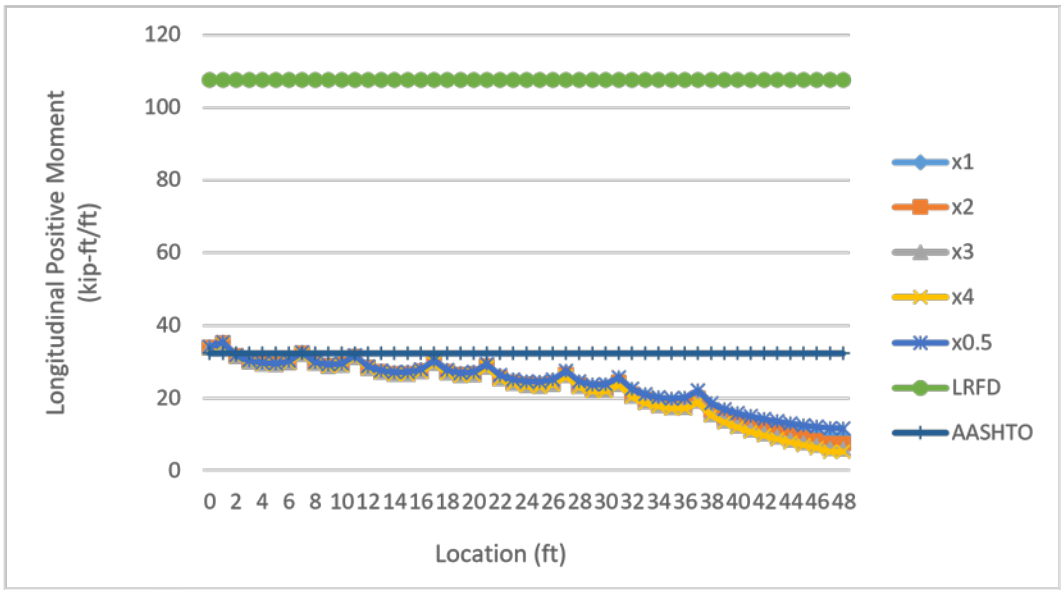

Table 16.4: Longitudinal Positive Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 36ft, Deck width = 36ft, Two Railings with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	22.2	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
1	23.2	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
2	21.6	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
3	21	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
4	21.2	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
5	21.8	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
6	23	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
7	26	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
8	23.8	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
9	23.5	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
10	24.2	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
11	26.9	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
12	24.2	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
13	23.3	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
14	23.2	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
15	23.5	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
16	24.5	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
17	27.2	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
18	24.5	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
19	24.1	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4

20	24.6	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
21	27	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
22	24	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
23	22.9	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
24	22.5	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
25	22.5	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
26	23.2	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
27	25.8	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
28	23	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
29	22.1	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
30	22.3	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
31	24.2	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
32	21	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
33	19.5	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
34	18.8	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
35	18.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
36	18.6	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
37	20.6	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
38	17.1	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
39	15.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
40	14.3	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
41	13.3	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
42	12.5	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
43	11.8	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
44	11.2	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
45	10.6	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4

46	10.1	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
47	9.6	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4
48	9.5	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4	107.7	32.4

Figure 16.4: Longitudinal Positive Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 36ft, Deck width = 36ft, Two Railings with Edge Loading.

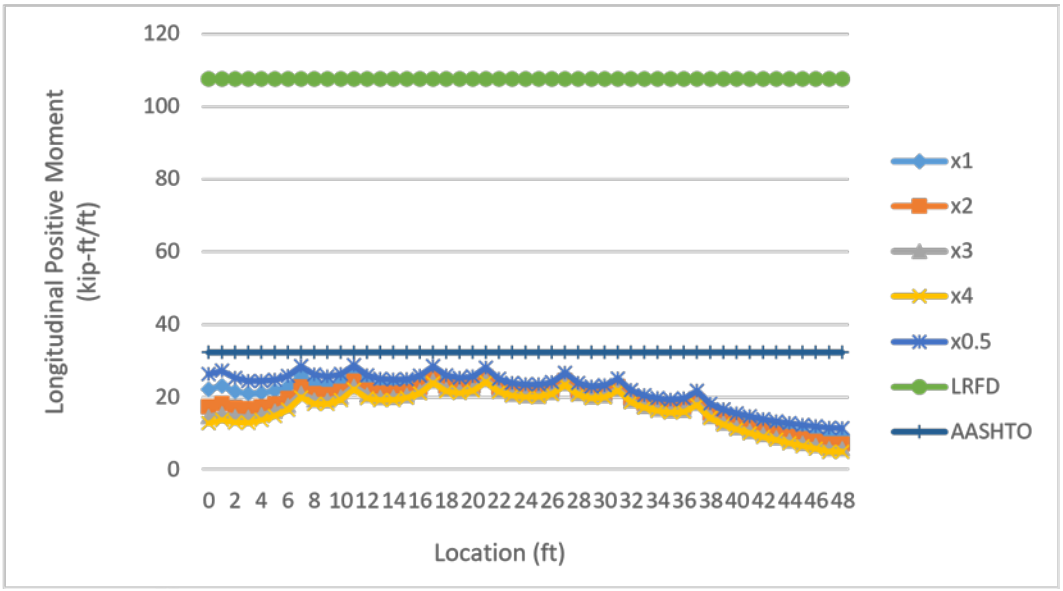

Table 17.1: Longitudinal Negative Moment Distribution at Critical Section for One-Lane Two 28Span Bridge Deck Span = 46ft, Deck width = 14ft, No Railing with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	28.2	50.9	28.2	50.9	28.2	50.9	28.2	50.9	28.2	50.9	41.4
1	40.2	50.9	40.2	50.9	40.2	50.9	40.2	50.9	40.2	50.9	41.4
2	39.6	50.9	39.6	50.9	39.6	50.9	39.6	50.9	39.6	50.9	41.4
3	38.7	50.9	38.7	50.9	38.7	50.9	38.7	50.9	38.7	50.9	41.4
4	37.5	50.9	37.5	50.9	37.5	50.9	37.5	50.9	37.5	50.9	41.4
5	36.4	50.9	36.4	50.9	36.4	50.9	36.4	50.9	36.4	50.9	41.4
6	35.3	50.9	35.3	50.9	35.3	50.9	35.3	50.9	35.3	50.9	41.4
7	34.3	50.9	34.3	50.9	34.3	50.9	34.3	50.9	34.3	50.9	41.4
8	33.4	50.9	33.4	50.9	33.4	50.9	33.4	50.9	33.4	50.9	41.4
9	32.4	50.9	32.4	50.9	32.4	50.9	32.4	50.9	32.4	50.9	41.4
10	31.3	50.9	31.3	50.9	31.3	50.9	31.3	50.9	31.3	50.9	41.4
11	30.1	50.9	30.1	50.9	30.1	50.9	30.1	50.9	30.1	50.9	41.4
12	28.1	50.9	28.1	50.9	28.1	50.9	28.1	50.9	28.1	50.9	41.4
13	24.6	50.9	24.6	50.9	24.6	50.9	24.6	50.9	24.6	50.9	41.4
14	11.1	50.9	11.1	50.9	11.1	50.9	11.1	50.9	11.1	50.9	41.4

Figure17.1: Longitudinal Negative Moment Distribution at Critical Section for One-Lane Two Span Bridge Deck Span = 46ft, Deck width = 14ft, No Railing with Edge Loading.

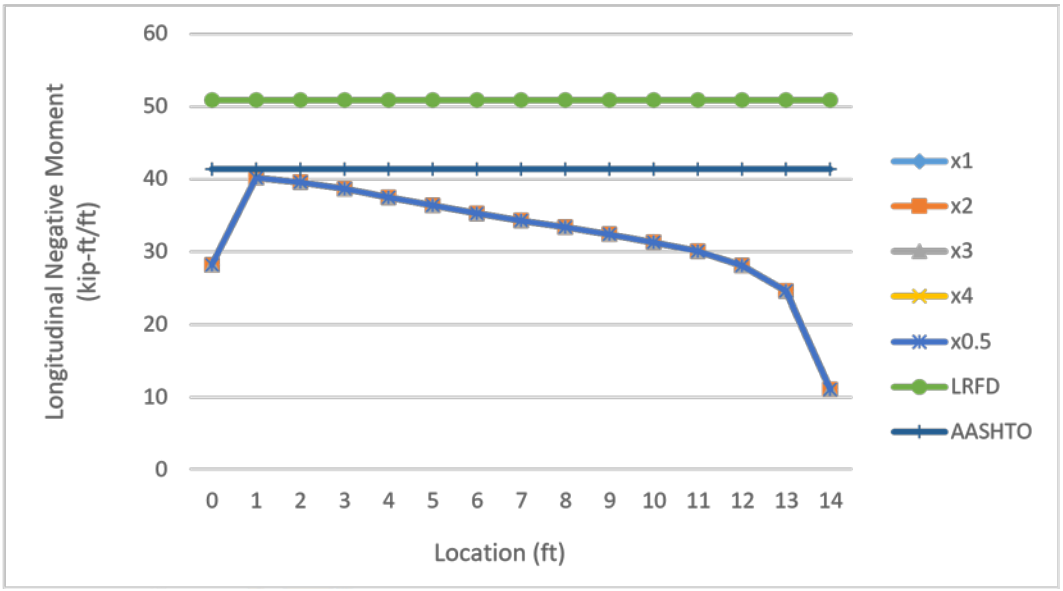

Table 17.2: Longitudinal Negative Moment Distribution at Critical Section for One-Lane Two Span Bridge Deck Span = 46ft, Deck width = 14ft, One Left Railing with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	26.8	50.9	25.9	50.9	25.3	50.9	24.9	50.9	27.6	50.9	41.4
1	28.4	50.9	22.2	50.9	18.5	50.9	16.1	50.9	33.4	50.9	41.4
2	27.9	50.9	22.2	50.9	18.9	50.9	16.6	50.9	32.5	50.9	41.4
3	27	50.9	21.3	50.9	17.9	50.9	15.7	50.9	31.6	50.9	41.4
4	26.4	50.9	21	50.9	17.8	50.9	15.7	50.9	30.7	50.9	41.4
5	25.8	50.9	20.7	50.9	17.6	50.9	15.6	50.9	30	50.9	41.4
6	25.4	50.9	20.5	50.9	17.6	50.9	15.7	50.9	29.3	50.9	41.4
7	24.9	50.9	20.3	50.9	17.6	50.9	15.7	50.9	28.7	50.9	41.4
8	24.6	50.9	20.2	50.9	17.6	50.9	15.9	50.9	28.1	50.9	41.4
9	24.2	50.9	20.1	50.9	17.7	50.9	16	50.9	27.4	50.9	41.4
10	23.7	50.9	20	50.9	17.7	50.9	16.2	50.9	26.8	50.9	41.4
11	23.2	50.9	19.8	50.9	17.7	50.9	16.4	50.9	25.9	50.9	41.4
12	22.2	50.9	19.3	50.9	17.5	50.9	16.3	50.9	24.6	50.9	41.4
13	20.3	50.9	18.2	50.9	16.9	50.9	16	50.9	22	50.9	41.4
14	10.8	50.9	10.6	50.9	10.4	50.9	10.4	50.9	10.9	50.9	41.4

Figure 17.2: Longitudinal Negative Moment Distribution at Critical Section for One-Lane Two Span Bridge Deck Span = 46ft, Deck width = 14ft, One Left Railing with Edge Loading.

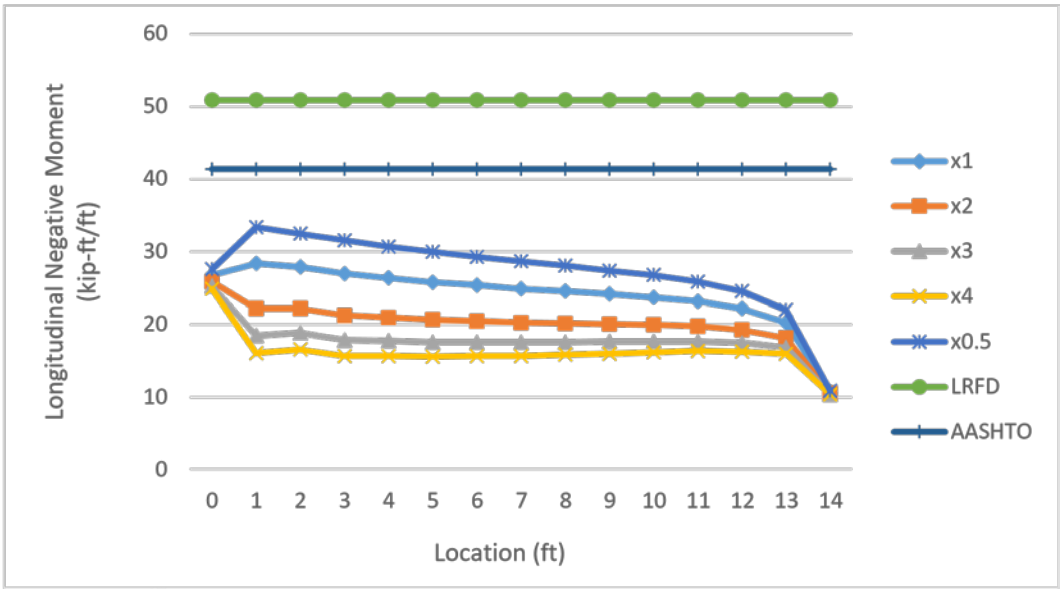

Table 17.3: Longitudinal Negative Moment Distribution at Critical Section for One-Lane Two Span Bridge Deck Span = 46ft, Deck width = 14ft, One Right Railings with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	27.6	50.9	27.4	50.9	27.2	50.9	27.1	50.9	27.8	50.9	41.4
1	36.6	50.9	34.9	50.9	33.8	50.9	33.1	50.9	38	50.9	41.4
2	34.9	50.9	32.6	50.9	31.2	50.9	30.2	50.9	36.7	50.9	41.4
3	33.3	50.9	30.6	50.9	29	50.9	28	50.9	35.4	50.9	41.4
4	31.6	50.9	28.7	50.9	27	50.9	25.8	50.9	34	50.9	41.4
5	30.1	50.9	27	50.9	25.1	50.9	23.9	50.9	32.6	50.9	41.4
6	28.8	50.9	25.4	50.9	23.4	50.9	22.1	50.9	31.4	50.9	41.4
7	27.5	50.9	24	50.9	21.9	50.9	20.5	50.9	30.2	50.9	41.4
8	26.3	50.9	22.6	50.9	20.4	50.9	19	50.9	29.1	50.9	41.4
9	25.1	50.9	21.3	50.9	19	50.9	17.5	50.9	28.1	50.9	41.4
10	24	50.9	20.1	50.9	17.7	50.9	16.1	50.9	27	50.9	41.4
11	22.9	50.9	18.9	50.9	16.4	50.9	14.8	50.9	26	50.9	41.4
12	21.5	50.9	17.6	50.9	15.2	50.9	13.6	50.9	24.5	50.9	41.4
13	20.1	50.9	16.1	50.9	13.6	50.9	11.9	50.9	23	50.9	41.4
14	10.9	50.9	10.3	50.9	9.9	50.9	9.7	50.9	11.4	50.9	41.4

Figure 17.3: Longitudinal Negative Moment Distribution at Critical Section for One-Lane Two Span Bridge Deck Span = 46ft, Deck width = 14ft, One Right Railings with Edge Loading.

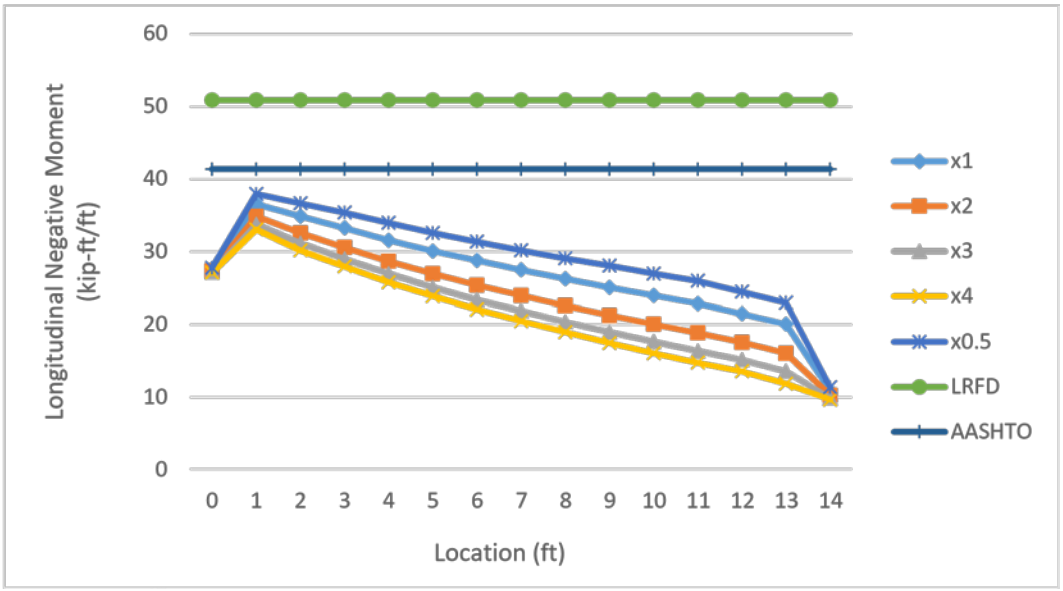

Table 17.4: Longitudinal Negative Moment Distribution at Critical Section for One-Lane Two Span Bridge Deck Span = 46ft, Deck width = 14ft, Two Railings with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	26.4	50.9	25.4	50.9	24.8	50.9	24.5	50.9	27.3	50.9	41.4
1	25.8	50.9	19.4	50.9	15.8	50.9	13.6	50.9	31.5	50.9	41.4
2	24.9	50.9	18.9	50.9	15.6	50.9	13.5	50.9	30.3	50.9	41.4
3	23.5	50.9	17.4	50.9	14.1	50.9	12	50.9	29.1	50.9	41.4
4	22.6	50.9	16.7	50.9	13.5	50.9	11.5	50.9	28	50.9	41.4
5	21.8	50.9	16	50.9	12.8	50.9	10.9	50.9	27.1	50.9	41.4
6	21	50.9	15.4	50.9	12.3	50.9	10.4	50.9	26.2	50.9	41.4
7	20.3	50.9	14.8	50.9	11.8	50.9	9.9	50.9	25.4	50.9	41.4
8	19.7	50.9	14.3	50.9	11.3	50.9	9.5	50.9	24.7	50.9	41.4
9	19.1	50.9	13.7	50.9	10.9	50.9	9.1	50.9	23.9	50.9	41.4
10	18.5	50.9	13.3	50.9	10.5	50.9	8.8	50.9	23.2	50.9	41.4
11	17.9	50.9	12.8	50.9	10.1	50.9	8.4	50.9	22.5	50.9	41.4
12	17.2	50.9	12.4	50.9	9.9	50.9	8.3	50.9	21.5	50.9	41.4
13	16.4	50.9	11.8	50.9	9.2	50.9	7.6	50.9	20.4	50.9	41.4
14	10.6	50.9	10	50.9	9.6	50.9	9.4	50.9	11.1	50.9	41.4

Figure 17.4: Longitudinal Negative Moment Distribution at Critical Section for One-Lane Two Span Bridge Deck Span = 46ft, Deck width = 14ft, Two Railings with Edge Loading.

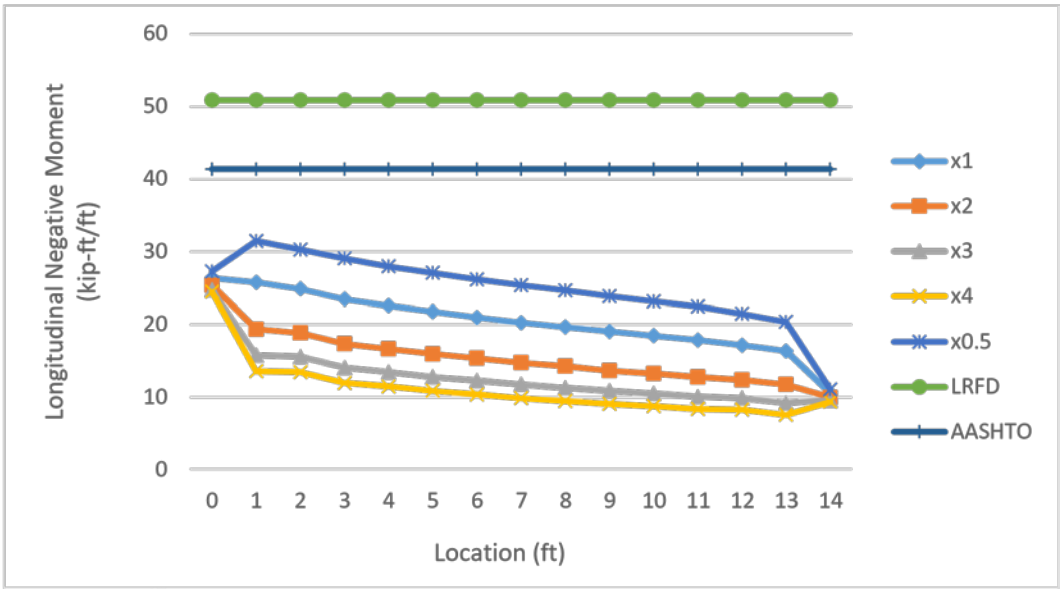

Table 18.1: Longitudinal Positive Moment Distribution at Critical Section for One-Lane Two Span Bridge Deck Span = 46ft, Deck width = 14ft, No Railing with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	36.7	50.2	36.7	50.2	36.7	50.2	36.7	50.2	36.7	50.2	41.4
1	38	50.2	38	50.2	38	50.2	38	50.2	38	50.2	41.4
2	34.4	50.2	34.4	50.2	34.4	50.2	34.4	50.2	34.4	50.2	41.4
3	32.8	50.2	32.8	50.2	32.8	50.2	32.8	50.2	32.8	50.2	41.4
4	32	50.2	32	50.2	32	50.2	32	50.2	32	50.2	41.4
5	31.7	50.2	31.7	50.2	31.7	50.2	31.7	50.2	31.7	50.2	41.4
6	32.2	50.2	32.2	50.2	32.2	50.2	32.2	50.2	32.2	50.2	41.4
7	34.4	50.2	34.4	50.2	34.4	50.2	34.4	50.2	34.4	50.2	41.4
8	31.2	50.2	31.2	50.2	31.2	50.2	31.2	50.2	31.2	50.2	41.4
9	29.8	50.2	29.8	50.2	29.8	50.2	29.8	50.2	29.8	50.2	41.4
10	29	50.2	29	50.2	29	50.2	29	50.2	29	50.2	41.4
11	28.5	50.2	28.5	50.2	28.5	50.2	28.5	50.2	28.5	50.2	41.4
12	28.1	50.2	28.1	50.2	28.1	50.2	28.1	50.2	28.1	50.2	41.4
13	27.8	50.2	27.8	50.2	27.8	50.2	27.8	50.2	27.8	50.2	41.4
14	27.7	50.2	27.7	50.2	27.7	50.2	27.7	50.2	27.7	50.2	41.4

Figure 18.1: Longitudinal Positive Moment Distribution at Critical Section for One-Lane Two Span Bridge Deck Span = 46ft, Deck width = 14ft, No Railing with Edge Loading.

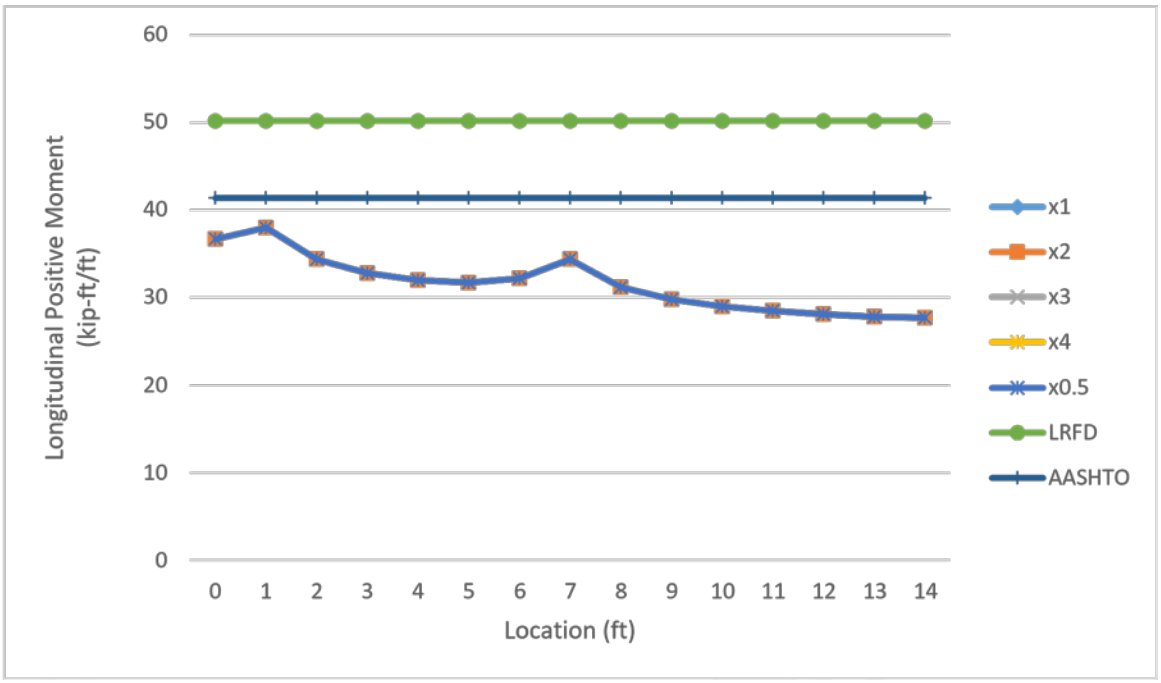

Table 18.2: Longitudinal Positive Moment Distribution at Critical Section for One-Lane Lane Two Span Bridge Deck Span = 46ft, Deck width = 14ft, One Left Railing with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	25.5	50.2	20.3	50.2	17.2	50.2	15	50.2	29.7	50.2	41.4
1	26.4	50.2	21.1	50.2	17.9	50.2	15.7	50.2	30.7	50.2	41.4
2	24.3	50.2	19.3	50.2	16.3	50.2	14.3	50.2	28.2	50.2	41.4
3	23.2	50.2	18.5	50.2	15.6	50.2	13.6	50.2	27	50.2	41.4
4	23	50.2	18.5	50.2	15.7	50.2	13.8	50.2	26.6	50.2	41.4
5	23.1	50.2	18.7	50.2	16	50.2	14.2	50.2	26.6	50.2	41.4
6	23.9	50.2	19.6	50.2	17	50.2	15.2	50.2	27.2	50.2	41.4
7	26.3	50.2	22.2	50.2	19.7	50.2	17.9	50.2	29.6	50.2	41.4
8	23.4	50.2	19.4	50.2	16.9	50.2	15.2	50.2	26.6	50.2	41.4
9	22.3	50.2	18.3	50.2	15.9	50.2	14.2	50.2	25.3	50.2	41.4
10	21.6	50.2	17.7	50.2	15.3	50.2	13.7	50.2	24.6	50.2	41.4
11	21.2	50.2	17.4	50.2	15	50.2	13.4	50.2	24.2	50.2	41.4
12	20.9	50.2	17.2	50.2	14.9	50.2	13.3	50.2	23.9	50.2	41.4
13	20.8	50.2	17.1	50.2	14.8	50.2	13.3	50.2	23.7	50.2	41.4
14	20.7	50.2	17.1	50.2	14.8	50.2	13.3	50.2	23.6	50.2	41.4

Figure 18.2: Longitudinal Positive Moment Distribution at Critical Section for One-Lane Lane Two Span Bridge Deck Span = 46ft, Deck width = 14ft, One Left Railing with Edge Loading.

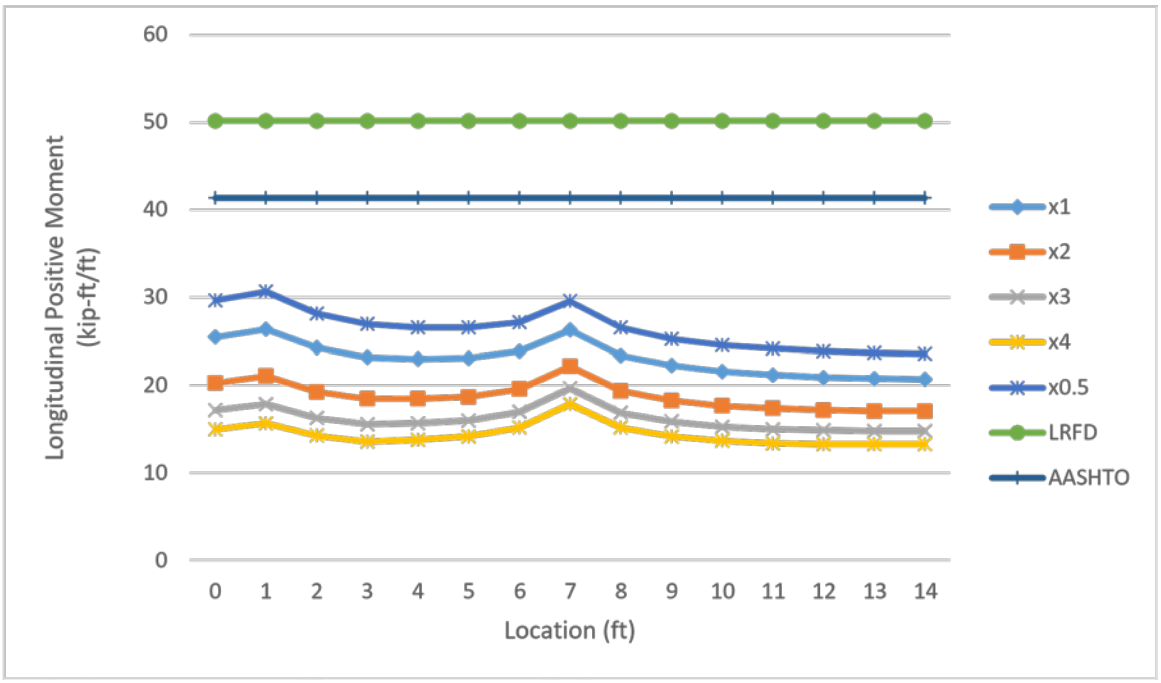

Table 18.3: Longitudinal Positive Moment Distribution at Critical Section for One-Lane Two Span Bridge Deck Span = 46ft, Deck width = 14ft, One Right Railings with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	30.6	50.2	27.4	50.2	25.5	50.2	24.1	50.2	33.1	50.2	41.4
1	31.9	50.2	28.7	50.2	26.7	50.2	25.4	50.2	34.4	50.2	41.4
2	28.2	50.2	24.9	50.2	22.9	50.2	21.5	50.2	30.7	50.2	41.4
3	26.5	50.2	23.2	50.2	21.1	50.2	19.8	50.2	29.1	50.2	41.4
4	25.6	50.2	22.3	50.2	20.2	50.2	18.8	50.2	28.2	50.2	41.4
5	25.2	50.2	21.8	50.2	19.7	50.2	18.2	50.2	27.9	50.2	41.4
6	25.5	50.2	22	50.2	19.8	50.2	18.4	50.2	28.2	50.2	41.4
7	27.6	50.2	24	50.2	21.8	50.2	20.3	50.2	30.3	50.2	41.4
8	24.2	50.2	20.5	50.2	18.3	50.2	16.7	50.2	27.1	50.2	41.4
9	22.6	50.2	18.8	50.2	16.5	50.2	14.9	50.2	25.5	50.2	41.4
10	21.6	50.2	17.7	50.2	15.3	50.2	13.7	50.2	24.6	50.2	41.4
11	20.8	50.2	16.7	50.2	14.3	50.2	12.6	50.2	23.9	50.2	41.4
12	20.1	50.2	16	50.2	13.5	50.2	11.7	50.2	23.4	50.2	41.4
13	19.5	50.2	15.1	50.2	12.5	50.2	10.7	50.2	22.8	50.2	41.4
14	19.4	50.2	15.1	50.2	12.5	50.2	10.7	50.2	22.8	50.2	41.4

Figure 18.3: Longitudinal Positive Moment Distribution at Critical Section for One-Lane Two Span Bridge Deck Span = 46ft, Deck width = 14ft, One Right Railings with Edge Loading.

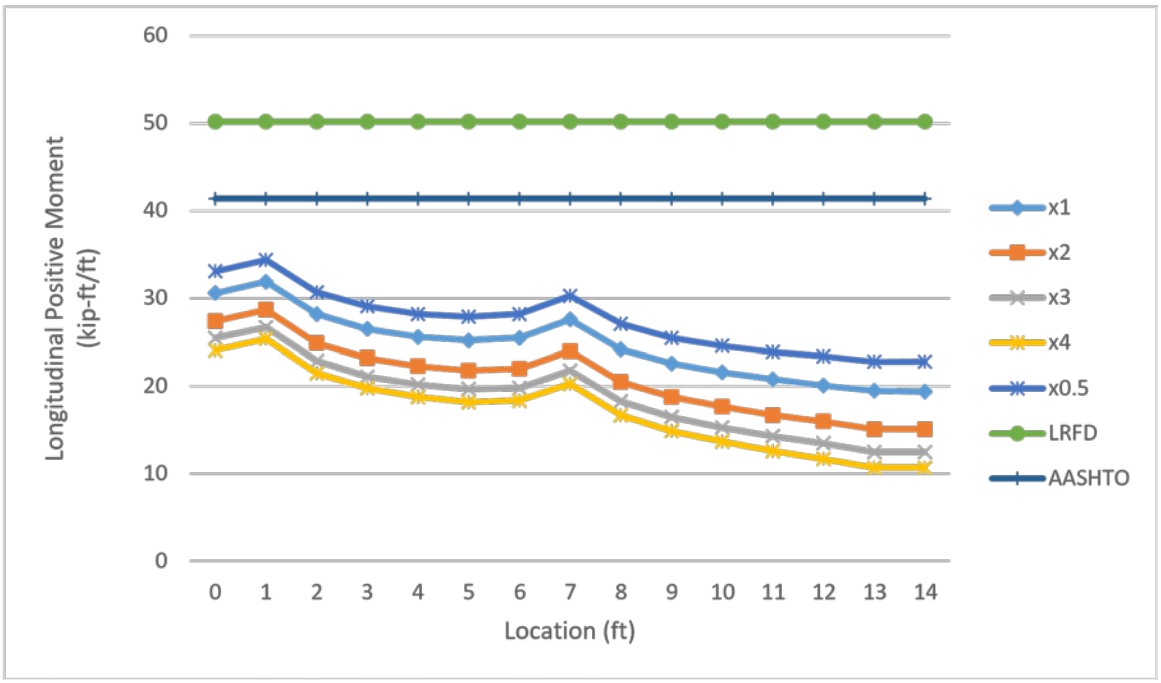

Table 18.4: Longitudinal Positive Moment Distribution at Critical Section for One-Lane Two Span Bridge Deck Span = 46ft, Deck width = 14ft, Two Railings with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	22.2	50.2	16.8	50.2	14	50.2	12.2	50.2	27.1	50.2	41.4
1	23	50.2	17.5	50.2	14.6	50.2	12.8	50.2	28.1	50.2	41.4
2	20.7	50.2	15.6	50.2	12.8	50.2	11	50.2	25.5	50.2	41.4
3	19.6	50.2	14.6	50.2	11.9	50.2	10.2	50.2	24.3	50.2	41.4
4	19.3	50.2	14.3	50.2	11.7	50.2	10	50.2	23.8	50.2	41.4
5	19.3	50.2	14.4	50.2	11.8	50.2	10.2	50.2	23.7	50.2	41.4
6	19.9	50.2	15.1	50.2	12.5	50.2	10.9	50.2	24.3	50.2	41.4
7	22.2	50.2	17.5	50.2	14.9	50.2	13.3	50.2	26.6	50.2	41.4
8	19.1	50.2	14.4	50.2	11.9	50.2	10.3	50.2	23.5	50.2	41.4
9	17.7	50.2	13	50.2	10.5	50.2	8.9	50.2	22.1	50.2	41.4
10	16.9	50.2	12.2	50.2	9.7	50.2	8.1	50.2	21.2	50.2	41.4
11	16.2	50.2	11.5	50.2	9	50.2	7.5	50.2	20.6	50.2	41.4
12	15.8	50.2	11	50.2	8.5	50.2	7	50.2	20.2	50.2	41.4
13	15.3	50.2	10.5	50.2	7.9	50.2	6.4	50.2	19.8	50.2	41.4
14	15.3	50.2	10.5	50.2	8	50.2	6.5	50.2	19.7	50.2	41.4

Figure 18.4: Longitudinal Positive Moment Distribution at Critical Section for One-Lane Two Span Bridge Deck Span = 46ft, Deck width = 14ft, Two Railings with Edge Loading.

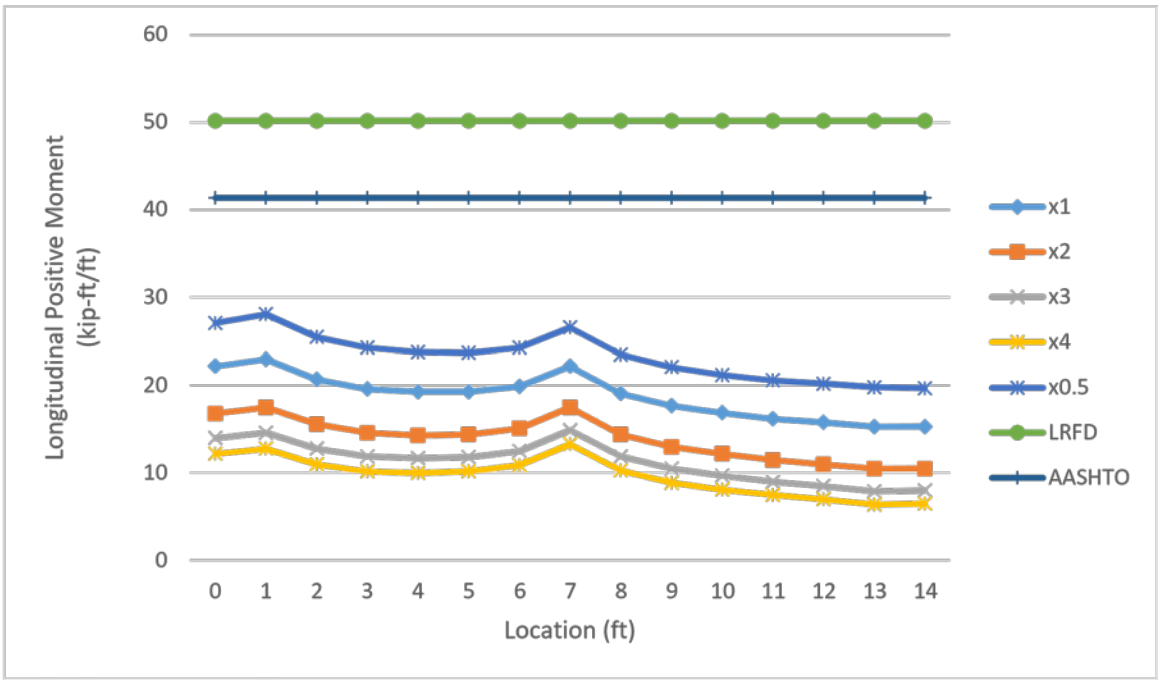

Table 19.1: Longitudinal Negative Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 46ft, Deck width = 24ft, No Railing with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	33	90.3	33	90.3	33	90.3	33	90.3	33	90.3	41.4
1	48.1	90.3	48.1	90.3	48.1	90.3	48.1	90.3	48.1	90.3	41.4
2	47.8	90.3	47.8	90.3	47.8	90.3	47.8	90.3	47.8	90.3	41.4
3	47	90.3	47	90.3	47	90.3	47	90.3	47	90.3	41.4
4	45.9	90.3	45.9	90.3	45.9	90.3	45.9	90.3	45.9	90.3	41.4
5	44.7	90.3	44.7	90.3	44.7	90.3	44.7	90.3	44.7	90.3	41.4
6	43.7	90.3	43.7	90.3	43.7	90.3	43.7	90.3	43.7	90.3	41.4
7	42.7	90.3	42.7	90.3	42.7	90.3	42.7	90.3	42.7	90.3	41.4
8	41.8	90.3	41.8	90.3	41.8	90.3	41.8	90.3	41.8	90.3	41.4
9	40.9	90.3	40.9	90.3	40.9	90.3	40.9	90.3	40.9	90.3	41.4
10	40.1	90.3	40.1	90.3	40.1	90.3	40.1	90.3	40.1	90.3	41.4
11	39.4	90.3	39.4	90.3	39.4	90.3	39.4	90.3	39.4	90.3	41.4
12	38.7	90.3	38.7	90.3	38.7	90.3	38.7	90.3	38.7	90.3	41.4
13	38	90.3	38	90.3	38	90.3	38	90.3	38	90.3	41.4
14	37.4	90.3	37.4	90.3	37.4	90.3	37.4	90.3	37.4	90.3	41.4
15	36.7	90.3	36.7	90.3	36.7	90.3	36.7	90.3	36.7	90.3	41.4
16	36.1	90.3	36.1	90.3	36.1	90.3	36.1	90.3	36.1	90.3	41.4
17	35.5	90.3	35.5	90.3	35.5	90.3	35.5	90.3	35.5	90.3	41.4
18	34.9	90.3	34.9	90.3	34.9	90.3	34.9	90.3	34.9	90.3	41.4
19	34.3	90.3	34.3	90.3	34.3	90.3	34.3	90.3	34.3	90.3	41.4

20	33.5	90.3	33.5	90.3	33.5	90.3	33.5	90.3	33.5	90.3	41.4
21	32.5	90.3	32.5	90.3	32.5	90.3	32.5	90.3	32.5	90.3	41.4
22	30.8	90.3	30.8	90.3	30.8	90.3	30.8	90.3	30.8	90.3	41.4
23	27.5	90.3	27.5	90.3	27.5	90.3	27.5	90.3	27.5	90.3	41.4
24	13.5	90.3	13.5	90.3	13.5	90.3	13.5	90.3	13.5	90.3	41.4

Figure 19.1: Longitudinal Negative Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 46ft, Deck width = 24ft, No Railing with Edge Loading.

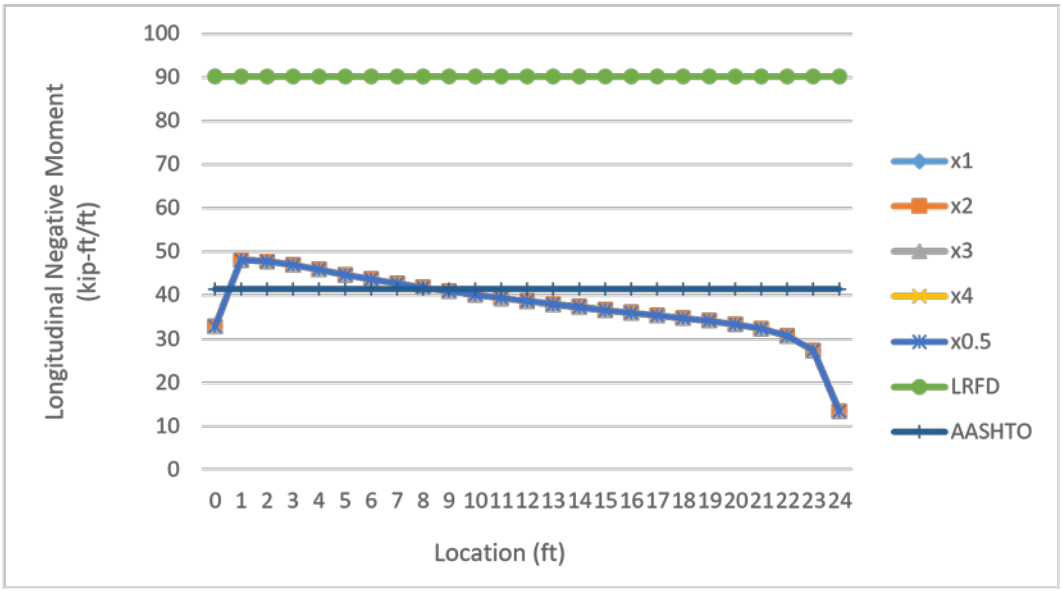

Table 19.2: Longitudinal Negative Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 46ft, Deck width = 24ft, One Left Railing with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	33.2	90.3	32.8	90.3	32.6	90.3	32.5	90.3	33.5	90.3	41.4
1	36.5	90.3	29.5	90.3	25.1	90.3	22.1	90.3	41.7	90.3	41.4
2	36.2	90.3	29.9	90.3	25.9	90.3	23.2	90.3	41	90.3	41.4
3	35.3	90.3	29	90.3	25	90.3	22.3	90.3	40.1	90.3	41.4
4	34.7	90.3	28.8	90.3	25.1	90.3	22.5	90.3	39.2	90.3	41.4
5	34.2	90.3	28.6	90.3	25.1	90.3	22.7	90.3	38.5	90.3	41.4
6	33.8	90.3	28.6	90.3	25.3	90.3	23	90.3	37.8	90.3	41.4
7	33.4	90.3	28.5	90.3	25.4	90.3	23.3	90.3	37.2	90.3	41.4
8	33.2	90.3	28.6	90.3	25.6	90.3	23.6	90.3	36.7	90.3	41.4
9	32.9	90.3	28.6	90.3	25.8	90.3	23.9	90.3	36.2	90.3	41.4
10	32.6	90.3	28.5	90.3	26	90.3	24.2	90.3	35.7	90.3	41.4
11	32.4	90.3	28.6	90.3	26.2	90.3	24.6	90.3	35.3	90.3	41.4
12	32.2	90.3	28.6	90.3	26.4	90.3	24.8	90.3	34.8	90.3	41.4
13	31.9	90.3	28.6	90.3	26.5	90.3	25.1	90.3	34.4	90.3	41.4
14	31.7	90.3	28.6	90.3	26.7	90.3	25.3	90.3	34.1	90.3	41.4
15	31.5	90.3	28.6	90.3	26.8	90.3	25.6	90.3	33.7	90.3	41.4
16	31.3	90.3	28.6	90.3	26.9	90.3	25.8	90.3	33.3	90.3	41.4
17	31.1	90.3	28.6	90.3	27.1	90.3	26	90.3	32.9	90.3	41.4
18	30.9	90.3	28.6	90.3	27.2	90.3	26.2	90.3	32.6	90.3	41.4
19	30.6	90.3	28.6	90.3	27.3	90.3	26.4	90.3	32.1	90.3	41.4

20	30.3	90.3	28.5	90.3	27.3	90.3	26.6	90.3	31.6	90.3	41.4
21	29.9	90.3	28.4	90.3	27.5	90.3	26.8	90.3	31	90.3	41.4
22	28.8	90.3	27.8	90.3	27.1	90.3	26.6	90.3	29.6	90.3	41.4
23	26.6	90.3	26.2	90.3	25.9	90.3	25.7	90.3	26.9	90.3	41.4
24	15.1	90.3	15.7	90.3	16.2	90.3	16.5	90.3	14.5	90.3	41.4

Figure 19.2: Longitudinal Negative Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 46ft, Deck width = 24ft, One Left Railing with Edge Loading.

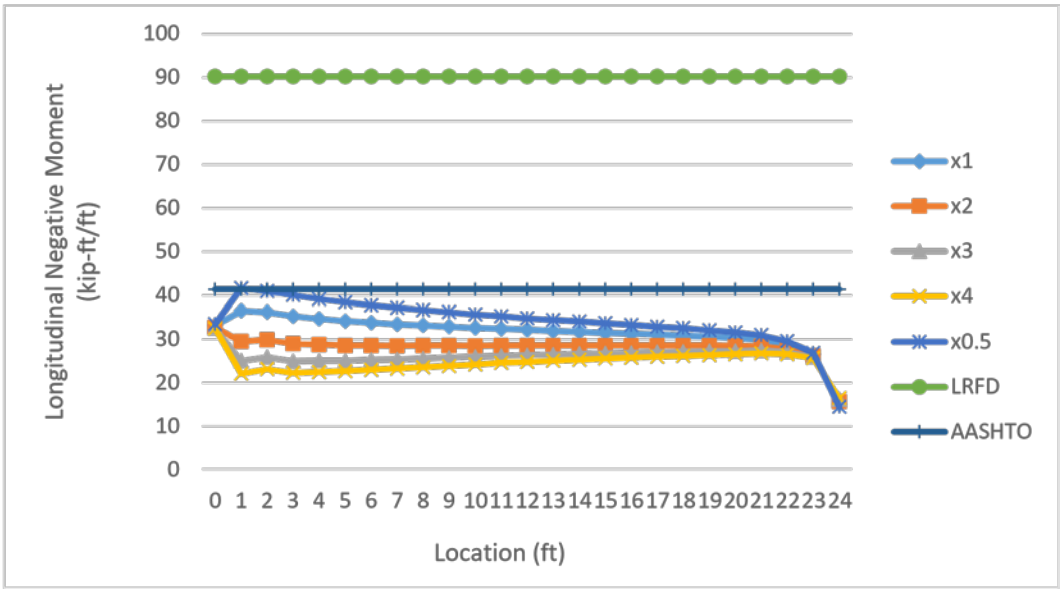

Table 19.3: Longitudinal Negative Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 46ft, Deck width = 24ft, One Right Railings with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	34.1	90.3	34.6	90.3	34.9	90.3	35.1	90.3	33.8	90.3	41.4
1	47.4	90.3	47.1	90.3	46.8	90.3	46.7	90.3	47.7	90.3	41.4
2	46.3	90.3	45.5	90.3	44.9	90.3	44.6	90.3	46.9	90.3	41.4
3	45.1	90.3	44	90.3	43.3	90.3	42.9	90.3	45.9	90.3	41.4
4	43.4	90.3	42.1	90.3	41.4	90.3	40.8	90.3	44.4	90.3	41.4
5	42.1	90.3	40.6	90.3	39.7	90.3	39.1	90.3	43.2	90.3	41.4
6	40.6	90.3	39	90.3	38	90.3	37.3	90.3	41.9	90.3	41.4
7	39.5	90.3	37.7	90.3	36.6	90.3	35.8	90.3	40.8	90.3	41.4
8	38.2	90.3	36.3	90.3	35.1	90.3	34.3	90.3	39.7	90.3	41.4
9	37.2	90.3	35.2	90.3	33.9	90.3	33	90.3	38.7	90.3	41.4
10	36.1	90.3	33.9	90.3	32.5	90.3	31.5	90.3	37.7	90.3	41.4
11	35.1	90.3	32.8	90.3	31.3	90.3	30.3	90.3	36.9	90.3	41.4
12	34.1	90.3	31.6	90.3	30	90.3	29	90.3	36	90.3	41.4
13	33.2	90.3	30.5	90.3	28.9	90.3	27.7	90.3	35.2	90.3	41.4
14	32.2	90.3	29.4	90.3	27.6	90.3	26.4	90.3	34.3	90.3	41.4
15	31.4	90.3	28.4	90.3	26.5	90.3	25.1	90.3	33.6	90.3	41.4
16	30.4	90.3	27.2	90.3	25.2	90.3	23.8	90.3	32.8	90.3	41.4
17	29.6	90.3	26.2	90.3	24.1	90.3	22.6	90.3	32.1	90.3	41.4
18	28.6	90.3	25.1	90.3	22.9	90.3	21.3	90.3	31.3	90.3	41.4
19	27.8	90.3	24.1	90.3	21.7	90.3	20.1	90.3	30.6	90.3	41.4

20	26.9	90.3	23	90.3	20.5	90.3	18.8	90.3	29.7	90.3	41.4
21	26	90.3	22	90.3	19.4	90.3	17.6	90.3	28.9	90.3	41.4
22	24.8	90.3	20.9	90.3	18.3	90.3	16.6	90.3	27.6	90.3	41.4
23	23.7	90.3	19.6	90.3	16.8	90.3	14.9	90.3	26.4	90.3	41.4
24	14.4	90.3	14.3	90.3	14.2	90.3	14.2	90.3	14.4	90.3	41.4

Figure 19.3: Longitudinal Negative Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 46ft, Deck width = 24ft, One Right Railings with Edge Loading.

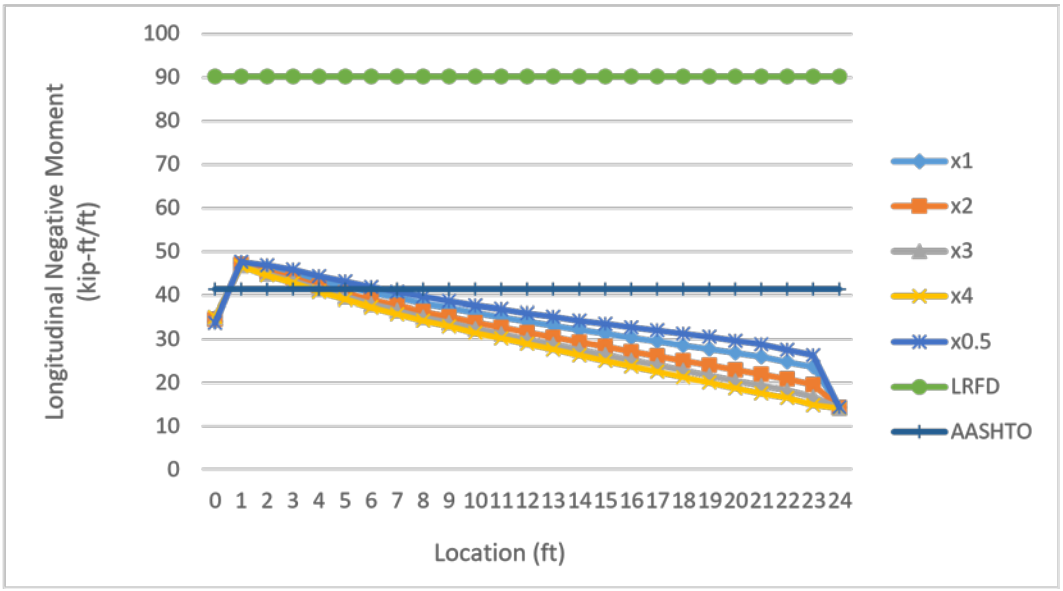

Table 19.4: Longitudinal Negative Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 46ft, Deck width = 24ft, Two Railings with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	33.8	90.3	33.7	90.3	33.7	90.3	33.6	90.3	33.8	90.3	41.4
1	35.5	90.3	28.2	90.3	23.8	90.3	20.8	90.3	41.1	90.3	41.4
2	34.8	90.3	28.1	90.3	24	90.3	21.3	90.3	40.1	90.3	41.4
3	33.6	90.3	26.8	90.3	22.6	90.3	19.9	90.3	39	90.3	41.4
4	32.8	90.3	26.3	90.3	22.3	90.3	19.7	90.3	38	90.3	41.4
5	32.1	90.3	25.8	90.3	21.9	90.3	19.4	90.3	37.1	90.3	41.4
6	31.5	90.3	25.4	90.3	21.7	90.3	19.2	90.3	36.3	90.3	41.4
7	30.8	90.3	25	90.3	21.4	90.3	19	90.3	35.5	90.3	41.4
8	30.3	90.3	24.6	90.3	21.2	90.3	18.9	90.3	34.9	90.3	41.4
9	29.8	90.3	24.3	90.3	21	90.3	18.7	90.3	34.2	90.3	41.4
10	29.3	90.3	23.9	90.3	20.7	90.3	18.5	90.3	33.6	90.3	41.4
11	28.8	90.3	23.6	90.3	20.4	90.3	18.3	90.3	33	90.3	41.4
12	28.3	90.3	23.1	90.3	20	90.3	18	90.3	32.4	90.3	41.4
13	27.8	90.3	22.7	90.3	19.7	90.3	17.6	90.3	31.8	90.3	41.4
14	27.3	90.3	22.3	90.3	19.3	90.3	17.3	90.3	31.3	90.3	41.4
15	26.8	90.3	21.8	90.3	18.8	90.3	16.9	90.3	30.8	90.3	41.4
16	26.3	90.3	21.3	90.3	18.3	90.3	16.4	90.3	30.2	90.3	41.4
17	25.7	90.3	20.8	90.3	17.8	90.3	15.9	90.3	29.7	90.3	41.4
18	25.2	90.3	20.2	90.3	17.3	90.3	15.3	90.3	29.1	90.3	41.4
19	24.7	90.3	19.7	90.3	16.8	90.3	14.8	90.3	28.6	90.3	41.4

20	24.2	90.3	19.2	90.3	16.3	90.3	14.3	90.3	28	90.3	41.4
21	23.6	90.3	18.7	90.3	15.7	90.3	13.8	90.3	27.4	90.3	41.4
22	23	90.3	18.4	90.3	15.6	90.3	13.7	90.3	26.5	90.3	41.4
23	22.1	90.3	17.5	90.3	14.7	90.3	12.8	90.3	25.3	90.3	41.4
24	15.4	90.3	15.8	90.3	16	90.3	16.1	90.3	15.1	90.3	41.4

Figure 19.4: Longitudinal Negative Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 46ft, Deck width = 24ft, Two Railings with Edge Loading.

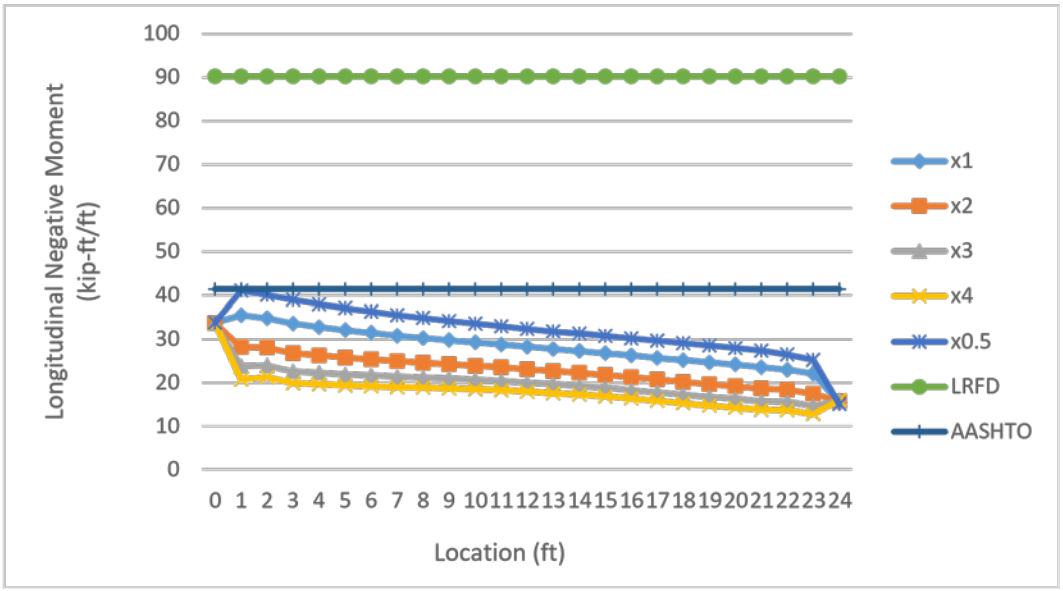

Table 20.1: Longitudinal Positive Moment Distribution at Critical Section for Two-Lane Lane Two Span Bridge Deck Span = 46ft, Deck width = 24ft, No Railing with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	43.5	92.5	43.5	92.5	43.5	92.5	43.5	92.5	43.5	92.5	41.4
1	44.8	92.5	44.8	92.5	44.8	92.5	44.8	92.5	44.8	92.5	41.4
2	41.1	92.5	41.1	92.5	41.1	92.5	41.1	92.5	41.1	92.5	41.4
3	39.6	92.5	39.6	92.5	39.6	92.5	39.6	92.5	39.6	92.5	41.4
4	38.8	92.5	38.8	92.5	38.8	92.5	38.8	92.5	38.8	92.5	41.4
5	38.6	92.5	38.6	92.5	38.6	92.5	38.6	92.5	38.6	92.5	41.4
6	39.1	92.5	39.1	92.5	39.1	92.5	39.1	92.5	39.1	92.5	41.4
7	41.6	92.5	41.6	92.5	41.6	92.5	41.6	92.5	41.6	92.5	41.4
8	38.7	92.5	38.7	92.5	38.7	92.5	38.7	92.5	38.7	92.5	41.4
9	37.8	92.5	37.8	92.5	37.8	92.5	37.8	92.5	37.8	92.5	41.4
10	38	92.5	38	92.5	38	92.5	38	92.5	38	92.5	41.4
11	40.1	92.5	40.1	92.5	40.1	92.5	40.1	92.5	40.1	92.5	41.4
12	36.9	92.5	36.9	92.5	36.9	92.5	36.9	92.5	36.9	92.5	41.4
13	35.6	92.5	35.6	92.5	35.6	92.5	35.6	92.5	35.6	92.5	41.4
14	35	92.5	35	92.5	35	92.5	35	92.5	35	92.5	41.4
15	34.8	92.5	34.8	92.5	34.8	92.5	34.8	92.5	34.8	92.5	41.4
16	35.3	92.5	35.3	92.5	35.3	92.5	35.3	92.5	35.3	92.5	41.4
17	37.6	92.5	37.6	92.5	37.6	92.5	37.6	92.5	37.6	92.5	41.4
18	34.4	92.5	34.4	92.5	34.4	92.5	34.4	92.5	34.4	92.5	41.4
19	33.1	92.5	33.1	92.5	33.1	92.5	33.1	92.5	33.1	92.5	41.4

20	32.3	92.5	32.3	92.5	32.3	92.5	32.3	92.5	32.3	92.5	41.4
21	31.8	92.5	31.8	92.5	31.8	92.5	31.8	92.5	31.8	92.5	41.4
22	31.4	92.5	31.4	92.5	31.4	92.5	31.4	92.5	31.4	92.5	41.4
23	31.2	92.5	31.2	92.5	31.2	92.5	31.2	92.5	31.2	92.5	41.4
24	31.1	92.5	31.1	92.5	31.1	92.5	31.1	92.5	31.1	92.5	41.4

Figure 20.1: Longitudinal Positive Moment Distribution at Critical Section for Two-Lane Lane Two Span Bridge Deck Span = 46ft, Deck width = 24ft, No Railing with Edge Loading.

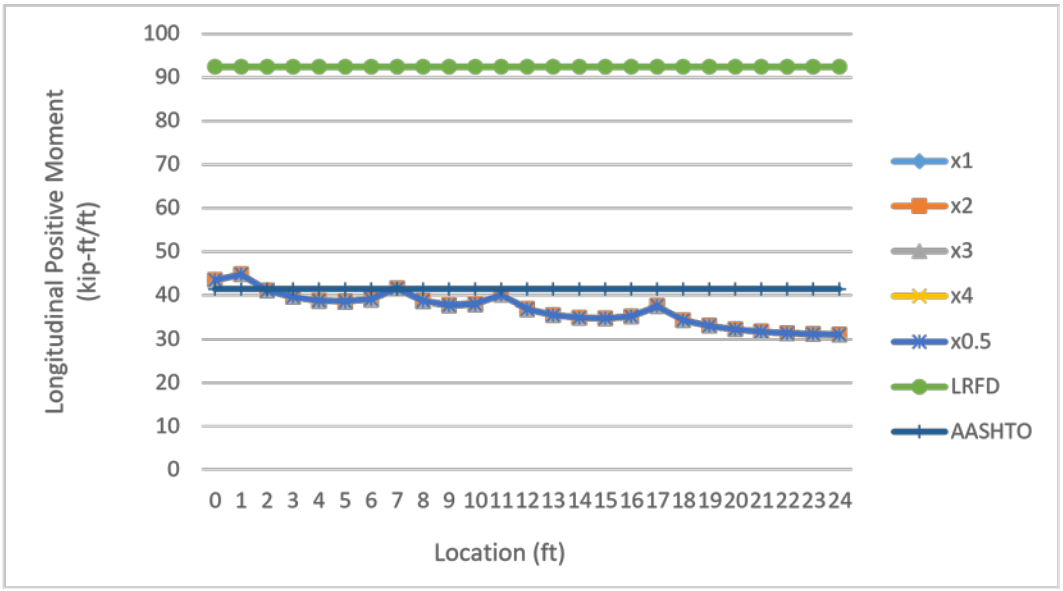

Table 20.2: Longitudinal Positive Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 46ft, Deck width = 24ft, One Left Railing with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	32.5	92.5	26.8	92.5	23	92.5	20.4	92.5	36.8	92.5	41.4
1	33.3	92.5	27.4	92.5	23.7	92.5	21	92.5	37.7	92.5	41.4
2	31.3	92.5	25.9	92.5	22.4	92.5	19.9	92.5	35.3	92.5	41.4
3	30.4	92.5	25.3	92.5	21.9	92.5	19.5	92.5	34.1	92.5	41.4
4	30.3	92.5	25.4	92.5	22.3	92.5	20	92.5	33.8	92.5	41.4
5	30.6	92.5	26	92.5	22.9	92.5	20.8	92.5	33.9	92.5	41.4
6	31.6	92.5	27.2	92.5	24.3	92.5	22.2	92.5	34.8	92.5	41.4
7	34.4	92.5	30.2	92.5	27.4	92.5	25.4	92.5	37.4	92.5	41.4
8	31.9	92.5	27.8	92.5	25.2	92.5	23.3	92.5	34.8	92.5	41.4
9	31.2	92.5	27.4	92.5	24.8	92.5	23	92.5	34	92.5	41.4
10	31.7	92.5	28	92.5	25.6	92.5	23.8	92.5	34.4	92.5	41.4
11	34	92.5	30.5	92.5	28.1	92.5	26.5	92.5	36.7	92.5	41.4
12	31.2	92.5	27.8	92.5	25.5	92.5	23.9	92.5	33.6	92.5	41.4
13	30.1	92.5	26.8	92.5	24.6	92.5	23	92.5	32.4	92.5	41.4
14	29.6	92.5	26.5	92.5	24.4	92.5	22.9	92.5	31.9	92.5	41.4
15	29.6	92.5	26.6	92.5	24.5	92.5	23.1	92.5	31.8	92.5	41.4
16	30.3	92.5	27.3	92.5	25.3	92.5	23.9	92.5	32.4	92.5	41.4
17	32.7	92.5	29.8	92.5	27.9	92.5	26.5	92.5	34.8	92.5	41.4
18	29.8	92.5	27	92.5	25.1	92.5	23.8	92.5	31.8	92.5	41.4
19	28.5	92.5	25.8	92.5	24	92.5	22.7	92.5	30.5	92.5	41.4

20	27.9	92.5	25.2	92.5	23.4	92.5	22.2	92.5	29.8	92.5	41.4
21	27.4	92.5	24.8	92.5	23.1	92.5	21.9	92.5	29.3	92.5	41.4
22	27.2	92.5	24.7	92.5	23	92.5	21.8	92.5	29	92.5	41.4
23	27.1	92.5	24.6	92.5	22.9	92.5	21.8	92.5	28.8	92.5	41.4
24	27	92.5	24.6	92.5	23	92.5	21.8	92.5	28.8	92.5	41.4

Figure 20.2: Longitudinal Positive Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 46ft, Deck width = 24ft, One Left Railing with Edge Loading.

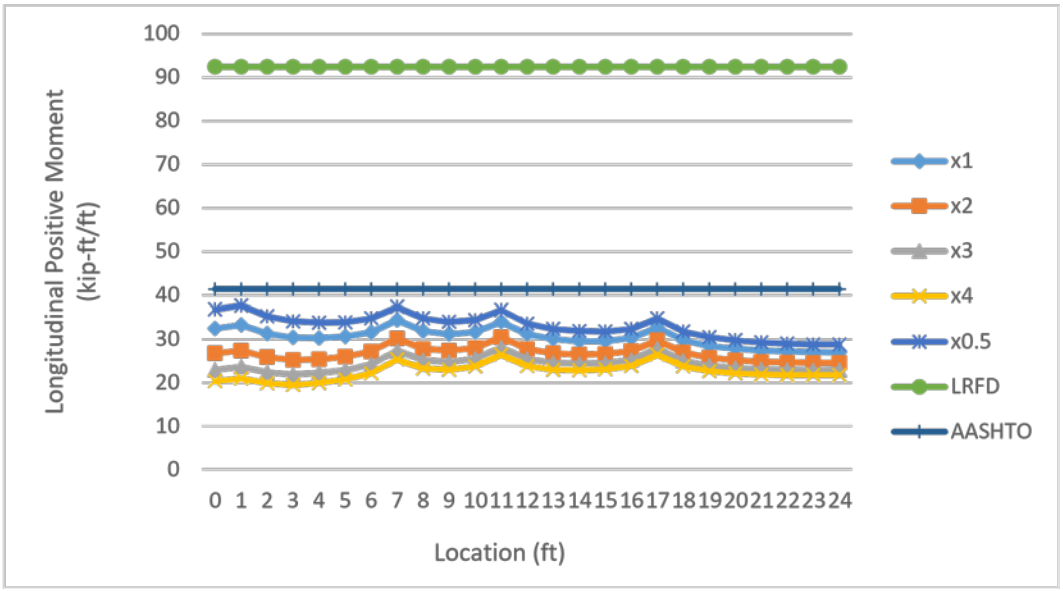

Table 20.3: Longitudinal Positive Moment Distribution at Critical Section for Tow-Lane Two Span Bridge Deck Span = 46ft, Deck width = 24ft, One Right Railings with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	40.2	92.5	38.2	92.5	36.9	92.5	36	92.5	41.6	92.5	41.4
1	41.3	92.5	39.3	92.5	38	92.5	37	92.5	42.8	92.5	41.4
2	37.7	92.5	35.6	92.5	34.2	92.5	33.3	92.5	39.1	92.5	41.4
3	36	92.5	33.9	92.5	32.5	92.5	31.5	92.5	37.5	92.5	41.4
4	35.2	92.5	33.1	92.5	31.6	92.5	30.6	92.5	36.7	92.5	41.4
5	34.9	92.5	32.7	92.5	31.2	92.5	30.2	92.5	36.5	92.5	41.4
6	35.3	92.5	33.1	92.5	31.6	92.5	30.5	92.5	37	92.5	41.4
7	37.6	92.5	35.3	92.5	33.8	92.5	32.7	92.5	39.3	92.5	41.4
8	34.7	92.5	32.3	92.5	30.7	92.5	29.5	92.5	36.4	92.5	41.4
9	33.6	92.5	31.1	92.5	29.5	92.5	28.3	92.5	35.4	92.5	41.4
10	33.7	92.5	31.1	92.5	29.4	92.5	28.2	92.5	35.5	92.5	41.4
11	35.6	92.5	33	92.5	31.2	92.5	30	92.5	37.6	92.5	41.4
12	32.3	92.5	29.6	92.5	27.7	92.5	26.4	92.5	34.3	92.5	41.4
13	30.8	92.5	27.9	92.5	26	92.5	24.7	92.5	32.8	92.5	41.4
14	30	92.5	27	92.5	25	92.5	23.6	92.5	32.1	92.5	41.4
15	29.6	92.5	26.5	92.5	24.4	92.5	23	92.5	31.8	92.5	41.4
16	29.8	92.5	26.6	92.5	24.5	92.5	23	92.5	32.2	92.5	41.4
17	31.8	92.5	28.4	92.5	26.2	92.5	24.6	92.5	34.2	92.5	41.4
18	28.5	92.5	25	92.5	22.7	92.5	21	92.5	31	92.5	41.4
19	26.9	92.5	23.2	92.5	20.8	92.5	19.1	92.5	29.5	92.5	41.4

20	25.8	92.5	22	92.5	19.4	92.5	17.6	92.5	28.6	92.5	41.4
21	24.9	92.5	20.9	92.5	18.3	92.5	16.4	92.5	27.8	92.5	41.4
22	24.3	92.5	20.1	92.5	17.4	92.5	15.4	92.5	27.3	92.5	41.4
23	23.6	92.5	19.1	92.5	16.2	92.5	14.1	92.5	26.8	92.5	41.4
24	23.6	92.5	19.2	92.5	16.3	92.5	14.2	92.5	26.8	92.5	41.4

Figure 20.3: Longitudinal Positive Moment Distribution at Critical Section for Tow-Lane Two Span Bridge Deck Span = 46ft, Deck width = 24ft, One Right Railings with Edge Loading.

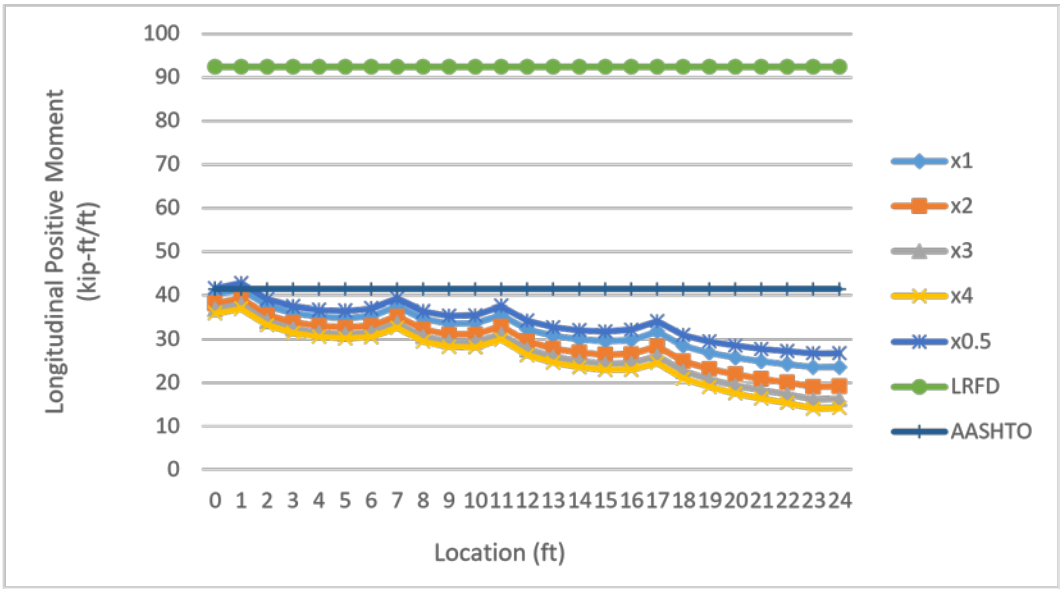

Table 20.4: Longitudinal Positive Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 46ft, Deck width = 24ft, Two Railings with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	30.3	92.5	24.1	92.5	20.4	92.5	17.9	92.5	35.3	92.5	41.4
1	31.1	92.5	24.7	92.5	20.9	92.5	18.4	92.5	36.2	92.5	41.4
2	28.9	92.5	23	92.5	19.4	92.5	17	92.5	33.7	92.5	41.4
3	27.9	92.5	22.2	92.5	18.7	92.5	16.4	92.5	32.5	92.5	41.4
4	27.7	92.5	22.2	92.5	18.8	92.5	16.6	92.5	32.1	92.5	41.4
5	27.9	92.5	22.5	92.5	19.3	92.5	17.1	92.5	32.2	92.5	41.4
6	28.8	92.5	23.6	92.5	20.4	92.5	18.2	92.5	32.9	92.5	41.4
7	31.5	92.5	26.4	92.5	23.3	92.5	21.2	92.5	35.5	92.5	41.4
8	28.8	92.5	23.8	92.5	20.8	92.5	18.7	92.5	32.8	92.5	41.4
9	28.1	92.5	23.1	92.5	20.2	92.5	18.1	92.5	32	92.5	41.4
10	28.4	92.5	23.6	92.5	20.6	92.5	18.6	92.5	32.3	92.5	41.4
11	30.6	92.5	25.8	92.5	22.9	92.5	21	92.5	34.5	92.5	41.4
12	27.5	92.5	22.8	92.5	19.9	92.5	18	92.5	31.3	92.5	41.4
13	26.3	92.5	21.5	92.5	18.7	92.5	16.8	92.5	30	92.5	41.4
14	25.7	92.5	20.9	92.5	18.1	92.5	16.2	92.5	29.4	92.5	41.4
15	25.4	92.5	20.7	92.5	17.9	92.5	16	92.5	29.2	92.5	41.4
16	25.9	92.5	21.2	92.5	18.3	92.5	16.5	92.5	29.7	92.5	41.4
17	28.1	92.5	23.4	92.5	20.5	92.5	18.6	92.5	31.9	92.5	41.4
18	24.9	92.5	20.1	92.5	17.3	92.5	15.4	92.5	28.7	92.5	41.4
19	23.4	92.5	18.6	92.5	15.7	92.5	13.8	92.5	27.3	92.5	41.4

20	22.5	92.5	17.6	92.5	14.7	92.5	12.8	92.5	26.4	92.5	41.4
21	21.8	92.5	16.8	92.5	13.9	92.5	11.9	92.5	25.8	92.5	41.4
22	21.2	92.5	16.2	92.5	13.2	92.5	11.3	92.5	25.3	92.5	41.4
23	20.7	92.5	15.5	92.5	12.4	92.5	10.4	92.5	24.9	92.5	41.4
24	20.7	92.5	15.6	92.5	12.6	92.5	10.6	92.5	24.9	92.5	41.4

Figure 20.4: Longitudinal Positive Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 46ft, Deck width = 24ft, Two Railings with Edge Loading.

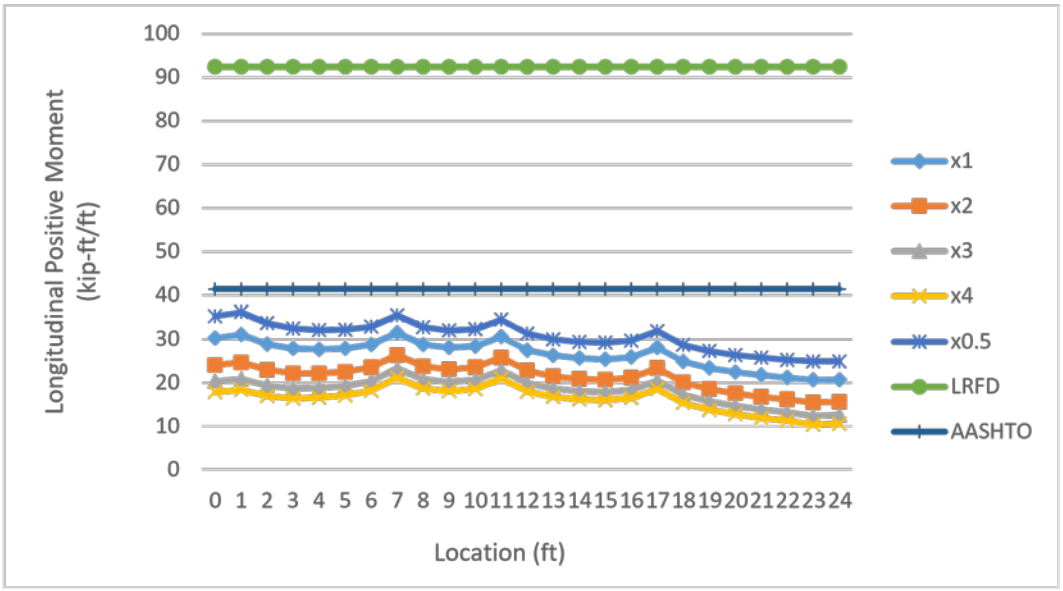

Table 21.1: Longitudinal Negative Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 46ft, Deck width = 36ft, No Railing with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	34.8	118.1	34.8	118.1	34.8	118.1	34.8	118.1	34.8	118.1	41.4
1	51.1	118.1	51.1	118.1	51.1	118.1	51.1	118.1	51.1	118.1	41.4
2	51.1	118.1	51.1	118.1	51.1	118.1	51.1	118.1	51.1	118.1	41.4
3	50.4	118.1	50.4	118.1	50.4	118.1	50.4	118.1	50.4	118.1	41.4
4	49.2	118.1	49.2	118.1	49.2	118.1	49.2	118.1	49.2	118.1	41.4
5	48.2	118.1	48.2	118.1	48.2	118.1	48.2	118.1	48.2	118.1	41.4
6	47.1	118.1	47.1	118.1	47.1	118.1	47.1	118.1	47.1	118.1	41.4
7	46.1	118.1	46.1	118.1	46.1	118.1	46.1	118.1	46.1	118.1	41.4
8	45.3	118.1	45.3	118.1	45.3	118.1	45.3	118.1	45.3	118.1	41.4
9	44.4	118.1	44.4	118.1	44.4	118.1	44.4	118.1	44.4	118.1	41.4
10	43.6	118.1	43.6	118.1	43.6	118.1	43.6	118.1	43.6	118.1	41.4
11	42.9	118.1	42.9	118.1	42.9	118.1	42.9	118.1	42.9	118.1	41.4
12	42.2	118.1	42.2	118.1	42.2	118.1	42.2	118.1	42.2	118.1	41.4
13	41.5	118.1	41.5	118.1	41.5	118.1	41.5	118.1	41.5	118.1	41.4
14	40.9	118.1	40.9	118.1	40.9	118.1	40.9	118.1	40.9	118.1	41.4
15	40.2	118.1	40.2	118.1	40.2	118.1	40.2	118.1	40.2	118.1	41.4
16	39.7	118.1	39.7	118.1	39.7	118.1	39.7	118.1	39.7	118.1	41.4
17	39	118.1	39	118.1	39	118.1	39	118.1	39	118.1	41.4
18	38.4	118.1	38.4	118.1	38.4	118.1	38.4	118.1	38.4	118.1	41.4
19	37.9	118.1	37.9	118.1	37.9	118.1	37.9	118.1	37.9	118.1	41.4

20	37.2	118.1	37.2	118.1	37.2	118.1	37.2	118.1	37.2	118.1	41.4
21	36.7	118.1	36.7	118.1	36.7	118.1	36.7	118.1	36.7	118.1	41.4
22	36.1	118.1	36.1	118.1	36.1	118.1	36.1	118.1	36.1	118.1	41.4
23	35.4	118.1	35.4	118.1	35.4	118.1	35.4	118.1	35.4	118.1	41.4
24	34.9	118.1	34.9	118.1	34.9	118.1	34.9	118.1	34.9	118.1	41.4
25	34.2	118.1	34.2	118.1	34.2	118.1	34.2	118.1	34.2	118.1	41.4
26	33.6	118.1	33.6	118.1	33.6	118.1	33.6	118.1	33.6	118.1	41.4
27	33	118.1	33	118.1	33	118.1	33	118.1	33	118.1	41.4
28	32.4	118.1	32.4	118.1	32.4	118.1	32.4	118.1	32.4	118.1	41.4
29	31.8	118.1	31.8	118.1	31.8	118.1	31.8	118.1	31.8	118.1	41.4
30	31	118.1	31	118.1	31	118.1	31	118.1	31	118.1	41.4
31	30.3	118.1	30.3	118.1	30.3	118.1	30.3	118.1	30.3	118.1	41.4
32	29.5	118.1	29.5	118.1	29.5	118.1	29.5	118.1	29.5	118.1	41.4
33	28.4	118.1	28.4	118.1	28.4	118.1	28.4	118.1	28.4	118.1	41.4
34	26.7	118.1	26.7	118.1	26.7	118.1	26.7	118.1	26.7	118.1	41.4
35	23.5	118.1	23.5	118.1	23.5	118.1	23.5	118.1	23.5	118.1	41.4
36	10.9	118.1	10.9	118.1	10.9	118.1	10.9	118.1	10.9	118.1	41.4

Figure 21.1: Longitudinal Negative Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 46ft, Deck width = 36ft, No Railing with Edge Loading.

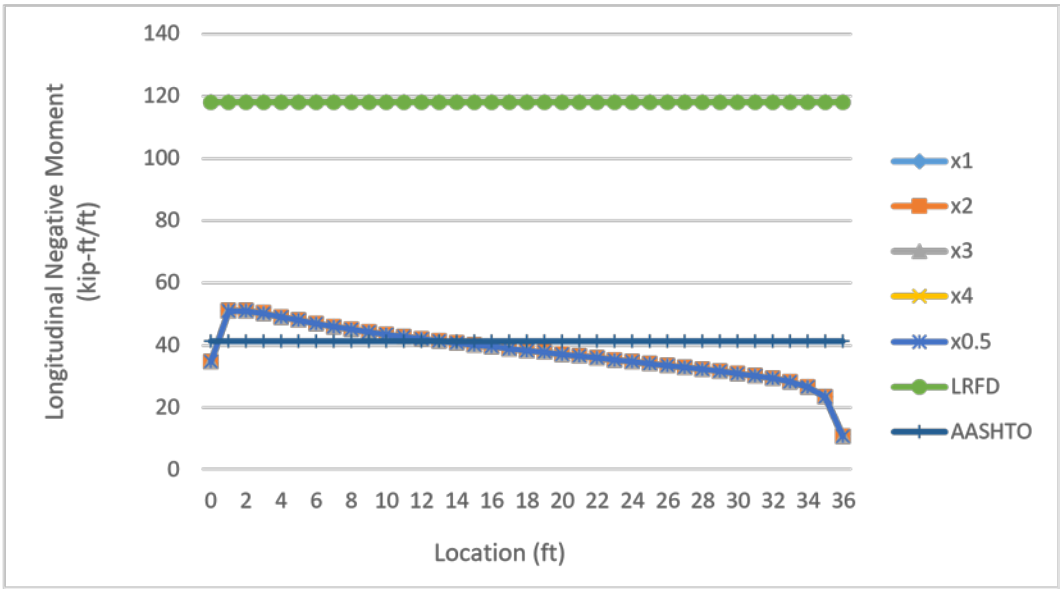

Table 21.2: Longitudinal Negative Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 46ft, Deck width = 36ft, One Left Railing with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	35.3	118.1	35.1	118.1	35	118.1	34.9	118.1	35.5	118.1	41.4
1	39.6	118.1	32.3	118.1	27.7	118.1	24.5	118.1	45	118.1	41.4
2	39.3	118.1	32.8	118.1	28.6	118.1	25.7	118.1	44.2	118.1	41.4
3	38.5	118.1	32	118.1	27.8	118.1	24.9	118.1	43.4	118.1	41.4
4	38	118.1	31.9	118.1	28	118.1	25.3	118.1	42.6	118.1	41.4
5	37.6	118.1	31.9	118.1	28.2	118.1	25.6	118.1	42	118.1	41.4
6	37.3	118.1	31.9	118.1	28.5	118.1	26.1	118.1	41.3	118.1	41.4
7	37	118.1	32	118.1	28.8	118.1	26.6	118.1	40.8	118.1	41.4
8	36.8	118.1	32.1	118.1	29.1	118.1	27.1	118.1	40.3	118.1	41.4
9	36.6	118.1	32.2	118.1	29.5	118.1	27.5	118.1	39.8	118.1	41.4
10	36.4	118.1	32.3	118.1	29.8	118.1	28	118.1	39.4	118.1	41.4
11	36.2	118.1	32.5	118.1	30.1	118.1	28.4	118.1	39	118.1	41.4
12	36	118.1	32.5	118.1	30.3	118.1	28.8	118.1	38.6	118.1	41.4
13	35.8	118.1	32.6	118.1	30.5	118.1	29.1	118.1	38.2	118.1	41.4
14	35.6	118.1	32.6	118.1	30.7	118.1	29.4	118.1	37.8	118.1	41.4
15	35.4	118.1	32.6	118.1	30.9	118.1	29.7	118.1	37.4	118.1	41.4
16	35.2	118.1	32.6	118.1	31	118.1	29.9	118.1	37	118.1	41.4
17	34.9	118.1	32.6	118.1	31.1	118.1	30	118.1	36.7	118.1	41.4
18	34.6	118.1	32.5	118.1	31.1	118.1	30.1	118.1	36.2	118.1	41.4
19	34.3	118.1	32.4	118.1	31.1	118.1	30.2	118.1	35.8	118.1	41.4

20	34	118.1	32.2	118.1	31	118.1	30.2	118.1	35.4	118.1	41.4
21	33.7	118.1	32	118.1	30.9	118.1	30.1	118.1	34.9	118.1	41.4
22	33.3	118.1	31.8	118.1	30.8	118.1	30	118.1	34.5	118.1	41.4
23	32.9	118.1	31.5	118.1	30.6	118.1	29.9	118.1	34	118.1	41.4
24	32.5	118.1	31.2	118.1	30.4	118.1	29.8	118.1	33.5	118.1	41.4
25	32.1	118.1	30.9	118.1	30.1	118.1	29.6	118.1	33	118.1	41.4
26	31.7	118.1	30.6	118.1	29.9	118.1	29.4	118.1	32.5	118.1	41.4
27	31.3	118.1	30.3	118.1	29.6	118.1	29.2	118.1	32	118.1	41.4
28	30.8	118.1	29.9	118.1	29.4	118.1	29	118.1	31.5	118.1	41.4
29	30.4	118.1	29.6	118.1	29.1	118.1	28.7	118.1	31	118.1	41.4
30	29.9	118.1	29.2	118.1	28.8	118.1	28.5	118.1	30.4	118.1	41.4
31	29.4	118.1	28.8	118.1	28.4	118.1	28.2	118.1	29.8	118.1	41.4
32	28.8	118.1	28.3	118.1	28	118.1	27.8	118.1	29.1	118.1	41.4
33	28	118.1	27.7	118.1	27.5	118.1	27.3	118.1	28.2	118.1	41.4
34	26.6	118.1	26.5	118.1	26.4	118.1	26.4	118.1	26.7	118.1	41.4
35	23.9	118.1	24.1	118.1	24.3	118.1	24.4	118.1	23.8	118.1	41.4
36	12	118.1	12.6	118.1	13.1	118.1	13.3	118.1	11.5	118.1	41.4

Figure 21.2: Longitudinal Negative Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 46ft, Deck width = 36ft, One Left Railing with Edge Loading.

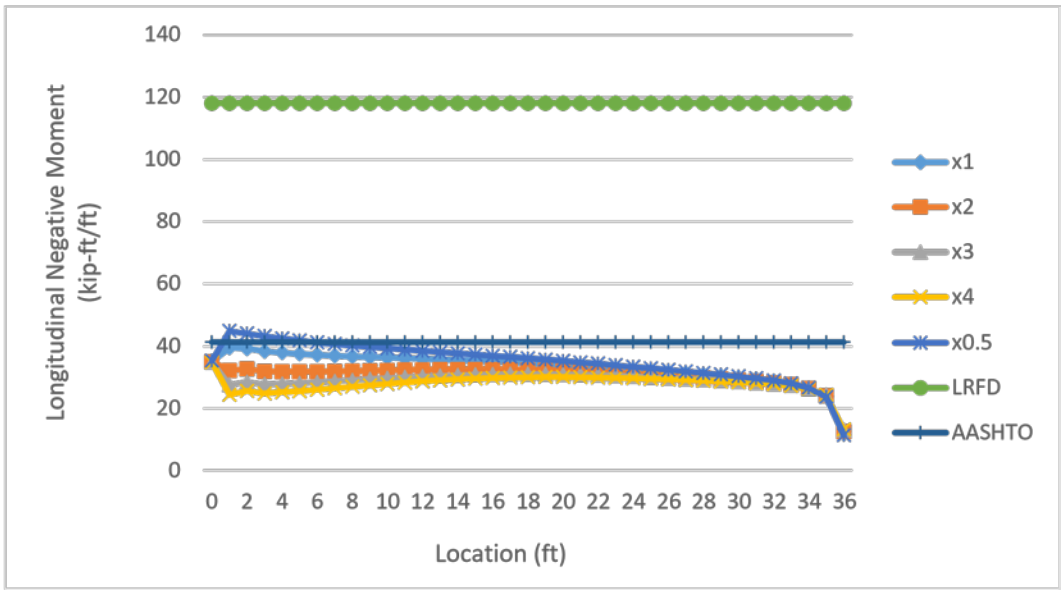

Table 21.3: Longitudinal Negative Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 46ft, Deck width = 36ft, One Right Railings with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	35.4	118.1	35.8	118.1	36	118.1	36.2	118.1	35.1	118.1	41.4
1	51.3	118.1	51.4	118.1	51.5	118.1	51.5	118.1	51.2	118.1	41.4
2	50.9	118.1	50.9	118.1	50.8	118.1	50.8	118.1	51	118.1	41.4
3	50.1	118.1	49.9	118.1	49.8	118.1	49.7	118.1	50.2	118.1	41.4
4	48.7	118.1	48.5	118.1	48.3	118.1	48.2	118.1	48.9	118.1	41.4
5	47.5	118.1	47.2	118.1	47	118.1	46.8	118.1	47.8	118.1	41.4
6	46.4	118.1	46	118.1	45.7	118.1	45.5	118.1	46.7	118.1	41.4
7	45.3	118.1	44.8	118.1	44.5	118.1	44.3	118.1	45.6	118.1	41.4
8	44.3	118.1	43.8	118.1	43.4	118.1	43.2	118.1	44.7	118.1	41.4
9	43.4	118.1	42.8	118.1	42.4	118.1	42.1	118.1	43.8	118.1	41.4
10	42.4	118.1	41.8	118.1	41.4	118.1	41.1	118.1	42.9	118.1	41.4
11	41.6	118.1	40.9	118.1	40.4	118.1	40.1	118.1	42.2	118.1	41.4
12	40.8	118.1	40	118.1	39.5	118.1	39.2	118.1	41.4	118.1	41.4
13	40	118.1	39.1	118.1	38.6	118.1	38.2	118.1	40.6	118.1	41.4
14	39.2	118.1	38.3	118.1	37.7	118.1	37.3	118.1	39.9	118.1	41.4
15	38.5	118.1	37.5	118.1	36.8	118.1	36.4	118.1	39.2	118.1	41.4
16	37.7	118.1	36.6	118.1	35.9	118.1	35.4	118.1	38.5	118.1	41.4
17	37	118.1	35.8	118.1	35.1	118.1	34.5	118.1	37.9	118.1	41.4
18	36.2	118.1	34.9	118.1	34.1	118.1	33.5	118.1	37.1	118.1	41.4
19	35.4	118.1	34.1	118.1	33.2	118.1	32.6	118.1	36.5	118.1	41.4

20	34.7	118.1	33.2	118.1	32.2	118.1	31.6	118.1	35.8	118.1	41.4
21	33.8	118.1	32.2	118.1	31.2	118.1	30.5	118.1	35	118.1	41.4
22	33	118.1	31.3	118.1	30.2	118.1	29.4	118.1	34.3	118.1	41.4
23	32.2	118.1	30.3	118.1	29.2	118.1	28.3	118.1	33.6	118.1	41.4
24	31.3	118.1	29.3	118.1	28.1	118.1	27.2	118.1	32.8	118.1	41.4
25	30.5	118.1	28.4	118.1	27	118.1	26	118.1	32.1	118.1	41.4
26	29.6	118.1	27.3	118.1	25.9	118.1	24.8	118.1	31.3	118.1	41.4
27	28.7	118.1	26.3	118.1	24.7	118.1	23.6	118.1	30.5	118.1	41.4
28	27.9	118.1	25.3	118.1	23.6	118.1	22.4	118.1	29.8	118.1	41.4
29	27	118.1	24.2	118.1	22.4	118.1	21.2	118.1	29	118.1	41.4
30	26.1	118.1	23.1	118.1	21.2	118.1	19.9	118.1	28.2	118.1	41.4
31	25.2	118.1	22.1	118.1	20.1	118.1	18.6	118.1	27.4	118.1	41.4
32	24.2	118.1	21	118.1	18.9	118.1	17.4	118.1	26.5	118.1	41.4
33	23.3	118.1	19.9	118.1	17.7	118.1	16.2	118.1	25.7	118.1	41.4
34	22.1	118.1	18.8	118.1	16.7	118.1	15.1	118.1	24.4	118.1	41.4
35	20.7	118.1	17.3	118.1	15	118.1	13.4	118.1	22.8	118.1	41.4
36	12.1	118.1	12.1	118.1	12	118.1	12	118.1	12.1	118.1	41.4

Figure 21.3: Longitudinal Negative Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 46ft, Deck width = 36ft, One Right Railings with Edge Loading.

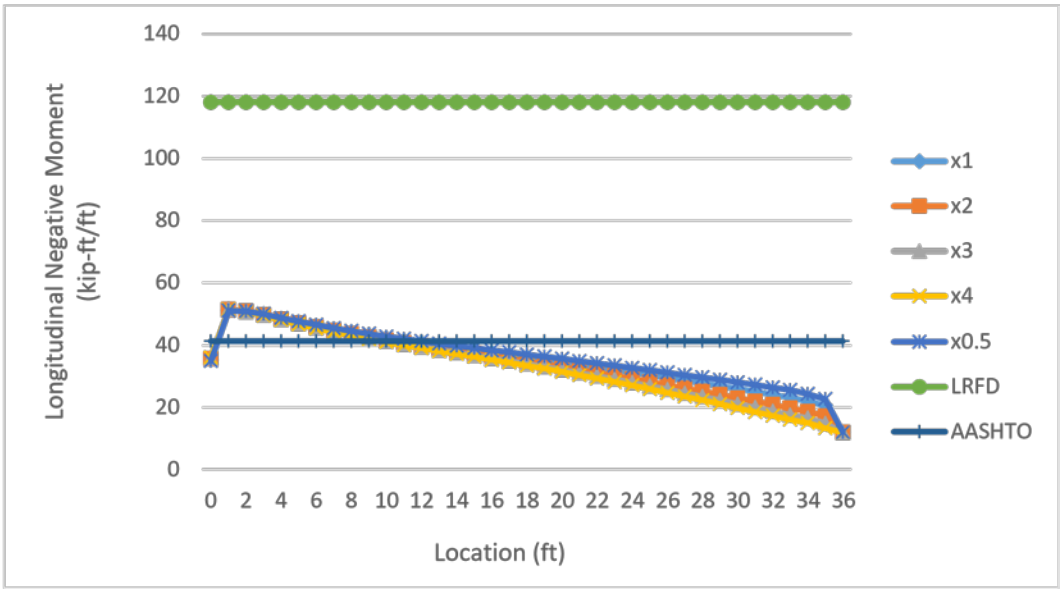

Table 21.4: Longitudinal Negative Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 46ft, Deck width = 36ft, Two Railings with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	35.9	118.1	35.9	118.1	36	118.1	36	118.1	35.8	118.1	41.4
1	39.5	118.1	32.1	118.1	27.4	118.1	24.2	118.1	44.9	118.1	41.4
2	39	118.1	32.4	118.1	28.2	118.1	25.3	118.1	44.1	118.1	41.4
3	38.1	118.1	31.4	118.1	27.1	118.1	24.2	118.1	43.2	118.1	41.4
4	37.5	118.1	31.2	118.1	27.2	118.1	24.4	118.1	42.3	118.1	41.4
5	37	118.1	31	118.1	27.2	118.1	24.5	118.1	41.6	118.1	41.4
6	36.6	118.1	30.9	118.1	27.3	118.1	24.8	118.1	40.9	118.1	41.4
7	36.2	118.1	30.8	118.1	27.4	118.1	25.1	118.1	40.3	118.1	41.4
8	35.9	118.1	30.8	118.1	27.6	118.1	25.4	118.1	39.7	118.1	41.4
9	35.6	118.1	30.8	118.1	27.8	118.1	25.7	118.1	39.2	118.1	41.4
10	35.3	118.1	30.8	118.1	27.9	118.1	25.9	118.1	38.7	118.1	41.4
11	35	118.1	30.7	118.1	28	118.1	26.1	118.1	38.3	118.1	41.4
12	34.7	118.1	30.6	118.1	28	118.1	26.2	118.1	37.8	118.1	41.4
13	34.4	118.1	30.5	118.1	28	118.1	26.3	118.1	37.3	118.1	41.4
14	34.1	118.1	30.3	118.1	28	118.1	26.3	118.1	36.9	118.1	41.4
15	33.7	118.1	30.1	118.1	27.9	118.1	26.3	118.1	36.4	118.1	41.4
16	33.3	118.1	29.9	118.1	27.7	118.1	26.2	118.1	36	118.1	41.4
17	32.9	118.1	29.6	118.1	27.5	118.1	26	118.1	35.5	118.1	41.4
18	32.5	118.1	29.2	118.1	27.2	118.1	25.8	118.1	35	118.1	41.4
19	32	118.1	28.8	118.1	26.8	118.1	25.4	118.1	34.5	118.1	41.4

20	31.5	118.1	28.4	118.1	26.4	118.1	25	118.1	33.9	118.1	41.4
21	31	118.1	27.9	118.1	25.9	118.1	24.5	118.1	33.3	118.1	41.4
22	30.4	118.1	27.3	118.1	25.3	118.1	24	118.1	32.7	118.1	41.4
23	29.8	118.1	26.7	118.1	24.7	118.1	23.4	118.1	32.1	118.1	41.4
24	29.1	118.1	26	118.1	24	118.1	22.7	118.1	31.5	118.1	41.4
25	28.5	118.1	25.3	118.1	23.3	118.1	22	118.1	30.9	118.1	41.4
26	27.8	118.1	24.6	118.1	22.6	118.1	21.2	118.1	30.2	118.1	41.4
27	27.1	118.1	23.8	118.1	21.8	118.1	20.3	118.1	29.6	118.1	41.4
28	26.4	118.1	23	118.1	20.9	118.1	19.5	118.1	28.9	118.1	41.4
29	25.6	118.1	22.2	118.1	20.1	118.1	18.6	118.1	28.2	118.1	41.4
30	24.9	118.1	21.4	118.1	19.2	118.1	17.7	118.1	27.5	118.1	41.4
31	24.2	118.1	20.6	118.1	18.3	118.1	16.7	118.1	26.8	118.1	41.4
32	23.4	118.1	19.8	118.1	17.4	118.1	15.8	118.1	26.1	118.1	41.4
33	22.7	118.1	19	118.1	16.6	118.1	14.9	118.1	25.3	118.1	41.4
34	21.7	118.1	18.2	118.1	15.9	118.1	14.3	118.1	24.2	118.1	41.4
35	20.7	118.1	17.1	118.1	14.7	118.1	13	118.1	23	118.1	41.4
36	12.9	118.1	13.5	118.1	13.8	118.1	14	118.1	12.4	118.1	41.4

Figure 21.4: Longitudinal Negative Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 46ft, Deck width = 36ft, Two Railings with Edge Loading.

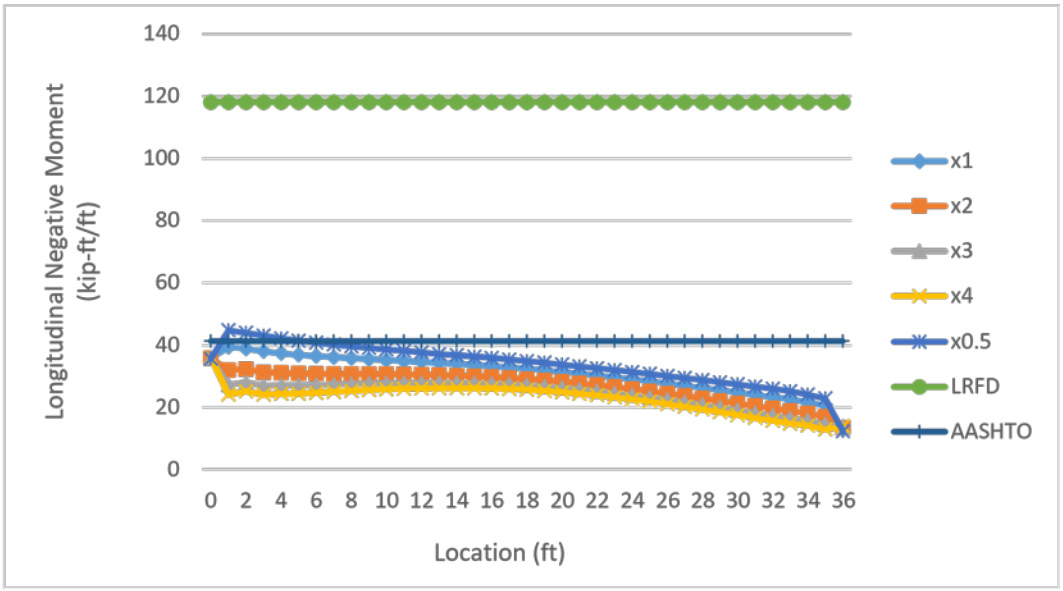

Table 22.1: Longitudinal Positive Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 46ft, Deck width = 36ft, No Railing with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	46	122.8	46	122.8	46	122.8	46	122.8	46	122.8	41.4
1	47.2	122.8	47.2	122.8	47.2	122.8	47.2	122.8	47.2	122.8	41.4
2	43.5	122.8	43.5	122.8	43.5	122.8	43.5	122.8	43.5	122.8	41.4
3	41.9	122.8	41.9	122.8	41.9	122.8	41.9	122.8	41.9	122.8	41.4
4	41.2	122.8	41.2	122.8	41.2	122.8	41.2	122.8	41.2	122.8	41.4
5	41	122.8	41	122.8	41	122.8	41	122.8	41	122.8	41.4
6	41.5	122.8	41.5	122.8	41.5	122.8	41.5	122.8	41.5	122.8	41.4
7	43.9	122.8	43.9	122.8	43.9	122.8	43.9	122.8	43.9	122.8	41.4
8	41.1	122.8	41.1	122.8	41.1	122.8	41.1	122.8	41.1	122.8	41.4
9	40.1	122.8	40.1	122.8	40.1	122.8	40.1	122.8	40.1	122.8	41.4
10	40.4	122.8	40.4	122.8	40.4	122.8	40.4	122.8	40.4	122.8	41.4
11	42.5	122.8	42.5	122.8	42.5	122.8	42.5	122.8	42.5	122.8	41.4
12	39.4	122.8	39.4	122.8	39.4	122.8	39.4	122.8	39.4	122.8	41.4
13	38.1	122.8	38.1	122.8	38.1	122.8	38.1	122.8	38.1	122.8	41.4
14	37.5	122.8	37.5	122.8	37.5	122.8	37.5	122.8	37.5	122.8	41.4
15	37.4	122.8	37.4	122.8	37.4	122.8	37.4	122.8	37.4	122.8	41.4
16	38	122.8	38	122.8	38	122.8	38	122.8	38	122.8	41.4
17	40.5	122.8	40.5	122.8	40.5	122.8	40.5	122.8	40.5	122.8	41.4
18	37.6	122.8	37.6	122.8	37.6	122.8	37.6	122.8	37.6	122.8	41.4
19	36.7	122.8	36.7	122.8	36.7	122.8	36.7	122.8	36.7	122.8	41.4

20	36.9	122.8	36.9	122.8	36.9	122.8	36.9	122.8	36.9	122.8	41.4
21	39	122.8	39	122.8	39	122.8	39	122.8	39	122.8	41.4
22	35.7	122.8	35.7	122.8	35.7	122.8	35.7	122.8	35.7	122.8	41.4
23	34.3	122.8	34.3	122.8	34.3	122.8	34.3	122.8	34.3	122.8	41.4
24	33.7	122.8	33.7	122.8	33.7	122.8	33.7	122.8	33.7	122.8	41.4
25	33.4	122.8	33.4	122.8	33.4	122.8	33.4	122.8	33.4	122.8	41.4
26	33.8	122.8	33.8	122.8	33.8	122.8	33.8	122.8	33.8	122.8	41.4
27	36	122.8	36	122.8	36	122.8	36	122.8	36	122.8	41.4
28	32.7	122.8	32.7	122.8	32.7	122.8	32.7	122.8	32.7	122.8	41.4
29	31.3	122.8	31.3	122.8	31.3	122.8	31.3	122.8	31.3	122.8	41.4
30	30.4	122.8	30.4	122.8	30.4	122.8	30.4	122.8	30.4	122.8	41.4
31	29.7	122.8	29.7	122.8	29.7	122.8	29.7	122.8	29.7	122.8	41.4
32	29.2	122.8	29.2	122.8	29.2	122.8	29.2	122.8	29.2	122.8	41.4
33	28.8	122.8	28.8	122.8	28.8	122.8	28.8	122.8	28.8	122.8	41.4
34	28.6	122.8	28.6	122.8	28.6	122.8	28.6	122.8	28.6	122.8	41.4
35	28.4	122.8	28.4	122.8	28.4	122.8	28.4	122.8	28.4	122.8	41.4
36	28.3	122.8	28.3	122.8	28.3	122.8	28.3	122.8	28.3	122.8	41.4

Figure 22.1: Longitudinal Positive Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 46ft, Deck width = 36ft, No Railing with Edge Loading.

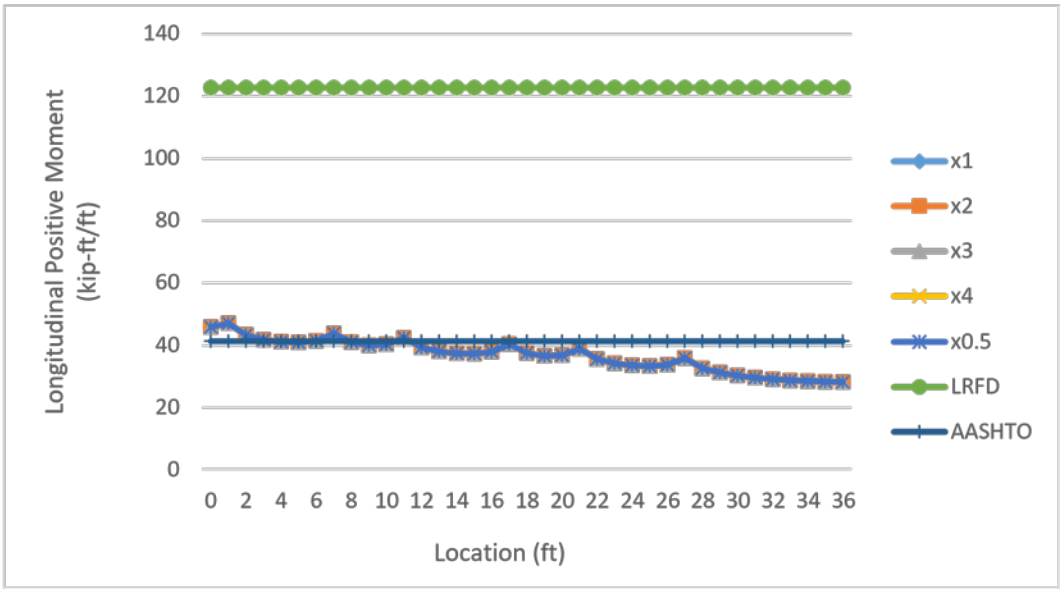

Table 22.2: Longitudinal Positive Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 46ft, Deck width = 36ft, One Left Railing with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	35.1	122.8	29.2	122.8	25.3	122.8	22.6	122.8	39.4	122.8	41.4
1	35.9	122.8	29.9	122.8	25.9	122.8	23.1	122.8	40.3	122.8	41.4
2	33.9	122.8	28.4	122.8	24.8	122.8	22.2	122.8	37.8	122.8	41.4
3	33	122.8	27.8	122.8	24.3	122.8	21.9	122.8	36.7	122.8	41.4
4	32.9	122.8	28.1	122.8	24.8	122.8	22.4	122.8	36.4	122.8	41.4
5	33.2	122.8	28.6	122.8	25.6	122.8	23.3	122.8	36.5	122.8	41.4
6	34.3	122.8	29.9	122.8	27	122.8	24.9	122.8	37.3	122.8	41.4
7	37.1	122.8	33	122.8	30.2	122.8	28.2	122.8	40	122.8	41.4
8	34.6	122.8	30.7	122.8	28.1	122.8	26.2	122.8	37.4	122.8	41.4
9	34.1	122.8	30.4	122.8	27.9	122.8	26.1	122.8	36.7	122.8	41.4
10	34.6	122.8	31.1	122.8	28.7	122.8	27	122.8	37.1	122.8	41.4
11	37.1	122.8	33.7	122.8	31.5	122.8	29.9	122.8	39.4	122.8	41.4
12	34.2	122.8	31	122.8	28.9	122.8	27.4	122.8	36.4	122.8	41.4
13	33.2	122.8	30.2	122.8	28.1	122.8	26.7	122.8	35.3	122.8	41.4
14	32.9	122.8	30	122.8	28.1	122.8	26.7	122.8	34.9	122.8	41.4
15	33	122.8	30.3	122.8	28.4	122.8	27.1	122.8	34.9	122.8	41.4
16	33.8	122.8	31.2	122.8	29.5	122.8	28.2	122.8	35.6	122.8	41.4
17	36.5	122.8	34	122.8	32.3	122.8	31.1	122.8	38.2	122.8	41.4
18	33.8	122.8	31.5	122.8	29.9	122.8	28.7	122.8	35.5	122.8	41.4
19	33.1	122.8	30.8	122.8	29.3	122.8	28.2	122.8	34.6	122.8	41.4

20	33.4	122.8	31.3	122.8	29.9	122.8	28.8	122.8	34.9	122.8	41.4
21	35.7	122.8	33.6	122.8	32.3	122.8	31.3	122.8	37.1	122.8	41.4
22	32.6	122.8	30.7	122.8	29.3	122.8	28.4	122.8	34	122.8	41.4
23	31.3	122.8	29.5	122.8	28.2	122.8	27.3	122.8	32.6	122.8	41.4
24	30.8	122.8	29	122.8	27.8	122.8	26.9	122.8	32	122.8	41.4
25	30.6	122.8	28.9	122.8	27.8	122.8	26.9	122.8	31.8	122.8	41.4
26	31.2	122.8	29.5	122.8	28.4	122.8	27.6	122.8	32.3	122.8	41.4
27	33.4	122.8	31.9	122.8	30.8	122.8	30	122.8	34.5	122.8	41.4
28	30.3	122.8	28.8	122.8	27.8	122.8	27	122.8	31.4	122.8	41.4
29	28.9	122.8	27.5	122.8	26.5	122.8	25.7	122.8	29.9	122.8	41.4
30	28.1	122.8	26.7	122.8	25.7	122.8	25	122.8	29.1	122.8	41.4
31	27.5	122.8	26.2	122.8	25.2	122.8	24.6	122.8	28.5	122.8	41.4
32	27.1	122.8	25.8	122.8	24.9	122.8	24.2	122.8	28	122.8	41.4
33	26.8	122.8	25.5	122.8	24.6	122.8	24	122.8	27.7	122.8	41.4
34	26.6	122.8	25.3	122.8	24.5	122.8	23.9	122.8	27.5	122.8	41.4
35	26.5	122.8	25.3	122.8	24.4	122.8	23.8	122.8	27.3	122.8	41.4
36	26.4	122.8	25.3	122.8	24.4	122.8	23.8	122.8	27.3	122.8	41.4

Figure 22.2: Longitudinal Positive Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 46ft, Deck width = 36ft, One Left Railing with Edge Loading.

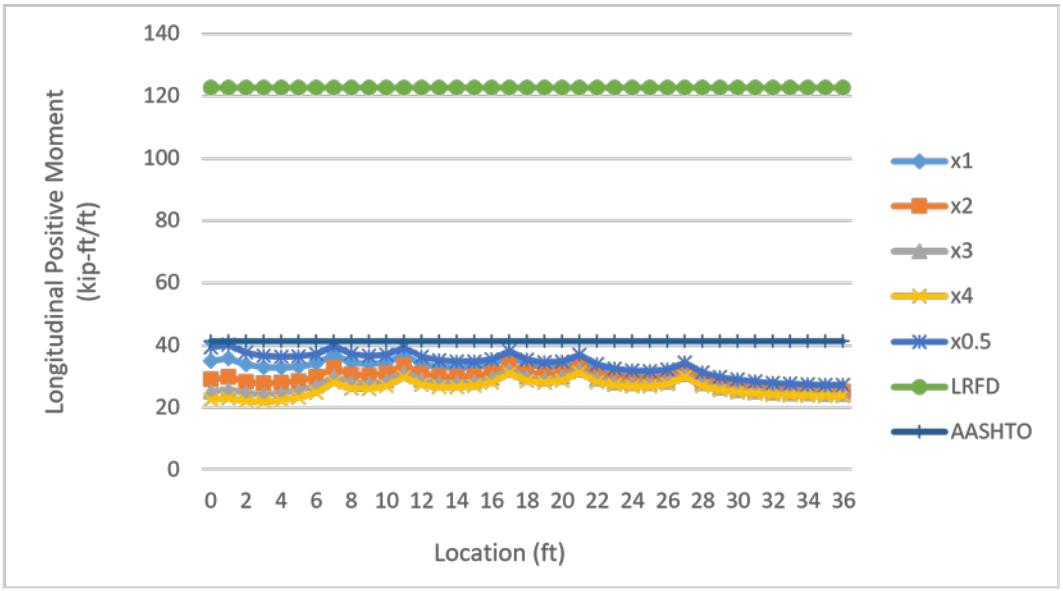

Table 22.3: Longitudinal Positive Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 46ft, Deck width = 36ft, One Right Railings with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	44.6	122.8	43.7	122.8	43.2	122.8	42.7	122.8	38	122.8	41.4
1	45.8	122.8	45	122.8	44.4	122.8	44	122.8	46.5	122.8	41.4
2	42.1	122.8	41.2	122.8	40.6	122.8	40.1	122.8	42.7	122.8	41.4
3	40.5	122.8	39.6	122.8	38.9	122.8	38.5	122.8	41.1	122.8	41.4
4	39.7	122.8	38.7	122.8	38.1	122.8	37.6	122.8	40.3	122.8	41.4
5	39.4	122.8	38.4	122.8	37.8	122.8	37.3	122.8	40.1	122.8	41.4
6	39.9	122.8	38.9	122.8	38.2	122.8	37.7	122.8	40.6	122.8	41.4
7	42.3	122.8	41.2	122.8	40.5	122.8	40	122.8	43	122.8	41.4
8	39.3	122.8	38.3	122.8	37.5	122.8	37	122.8	40.1	122.8	41.4
9	38.4	122.8	37.3	122.8	36.5	122.8	35.9	122.8	39.1	122.8	41.4
10	38.5	122.8	37.4	122.8	36.6	122.8	36	122.8	39.3	122.8	41.4
11	40.4	122.8	39.2	122.8	38.4	122.8	37.8	122.8	41.3	122.8	41.4
12	37.4	122.8	36.1	122.8	35.3	122.8	34.6	122.8	38.2	122.8	41.4
13	36	122.8	34.7	122.8	33.8	122.8	33.1	122.8	36.9	122.8	41.4
14	35.3	122.8	34	122.8	33	122.8	32.4	122.8	36.3	122.8	41.4
15	35.1	122.8	33.7	122.8	32.7	122.8	32	122.8	36.1	122.8	41.4
16	35.6	122.8	34.1	122.8	33.1	122.8	32.4	122.8	36.6	122.8	41.4
17	37.8	122.8	36.3	122.8	35.2	122.8	34.5	122.8	38.9	122.8	41.4
18	34.9	122.8	33.3	122.8	32.2	122.8	31.4	122.8	36.1	122.8	41.4
19	33.9	122.8	32.2	122.8	31	122.8	30.2	122.8	35.1	122.8	41.4

20	34	122.8	32.2	122.8	30.9	122.8	30	122.8	35.2	122.8	41.4
21	35.9	122.8	34	122.8	32.7	122.8	31.8	122.8	37.2	122.8	41.4
22	32.5	122.8	30.5	122.8	29.1	122.8	28.2	122.8	33.9	122.8	41.4
23	31	122.8	28.9	122.8	27.5	122.8	26.4	122.8	32.4	122.8	41.4
24	30.1	122.8	27.9	122.8	26.4	122.8	25.3	122.8	31.6	122.8	41.4
25	29.6	122.8	27.3	122.8	25.8	122.8	24.6	122.8	31.3	122.8	41.4
26	29.8	122.8	27.4	122.8	25.7	122.8	24.6	122.8	31.5	122.8	41.4
27	31.8	122.8	29.3	122.8	27.5	122.8	26.3	122.8	33.6	122.8	41.4
28	28.4	122.8	25.7	122.8	23.9	122.8	22.5	122.8	30.3	122.8	41.4
29	26.6	122.8	23.8	122.8	21.9	122.8	20.5	122.8	28.6	122.8	41.4
30	25.5	122.8	22.5	122.8	20.5	122.8	19.1	122.8	27.6	122.8	41.4
31	24.6	122.8	21.4	122.8	19.3	122.8	17.8	122.8	26.8	122.8	41.4
32	23.8	122.8	20.5	122.8	18.3	122.8	16.7	122.8	26.1	122.8	41.4
33	23.2	122.8	19.7	122.8	17.3	122.8	15.6	122.8	25.6	122.8	41.4
34	22.6	122.8	19	122.8	16.5	122.8	14.8	122.8	25.2	122.8	41.4
35	22	122.8	18.1	122.8	15.5	122.8	13.6	122.8	24.8	122.8	41.4
36	22	122.8	18.2	122.8	15.6	122.8	13.7	122.8	24.7	122.8	41.4

Figure 22.3: Longitudinal Positive Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 46ft, Deck width = 36ft, One Right Railings with Edge Loading.

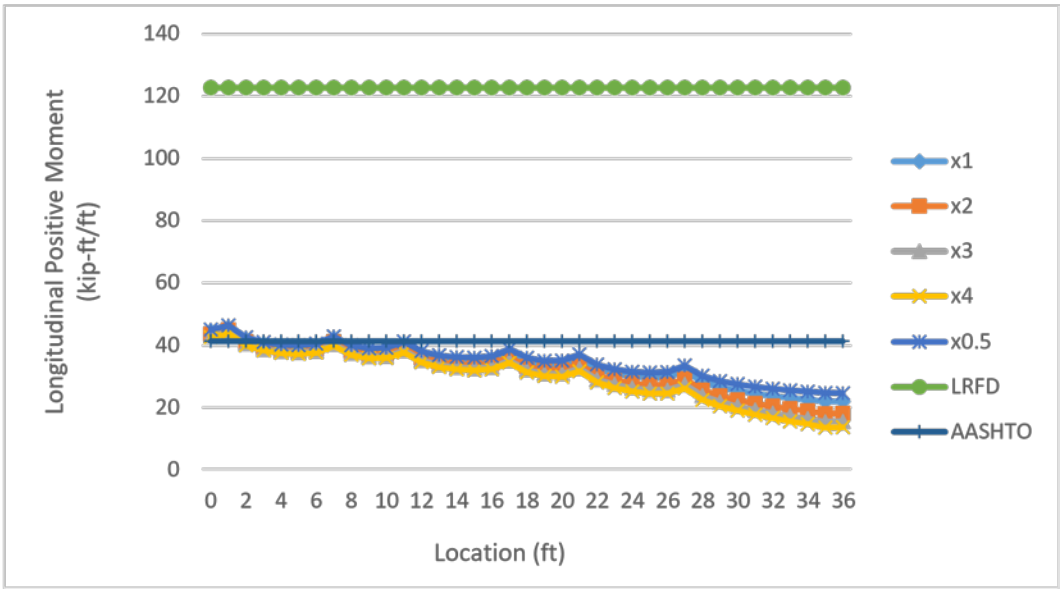

Table 22.4: Longitudinal Positive Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 46ft, Deck width = 36ft, Two Railings with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	34.1	122.8	27.9	122.8	24	122.8	21.2	122.8	38.7	122.8	41.4
1	34.7	122.8	28.5	122.8	24.4	122.8	21.6	122.8	39.5	122.8	41.4
2	32.8	122.8	27	122.8	23.3	122.8	20.6	122.8	37.1	122.8	41.4
3	31.9	122.8	26.3	122.8	22.7	122.8	20.2	122.8	36	122.8	41.4
4	31.8	122.8	26.5	122.8	23.1	122.8	20.6	122.8	35.7	122.8	41.4
5	32	122.8	27	122.8	23.7	122.8	21.4	122.8	35.7	122.8	41.4
6	33	122.8	28.1	122.8	25	122.8	22.8	122.8	36.5	122.8	41.4
7	35.8	122.8	31.1	122.8	28.1	122.8	25.9	122.8	39.2	122.8	41.4
8	33.2	122.8	28.7	122.8	25.8	122.8	23.7	122.8	36.5	122.8	41.4
9	32.6	122.8	28.3	122.8	25.5	122.8	23.5	122.8	35.8	122.8	41.4
10	33.1	122.8	28.9	122.8	26.1	122.8	24.2	122.8	36.1	122.8	41.4
11	35.4	122.8	31.4	122.8	28.7	122.8	26.9	122.8	38.4	122.8	41.4
12	32.5	122.8	28.5	122.8	26	122.8	24.2	122.8	35.4	122.8	41.4
13	31.4	122.8	27.5	122.8	25	122.8	23.2	122.8	34.2	122.8	41.4
14	31	122.8	27.2	122.8	24.8	122.8	23	122.8	33.7	122.8	41.4
15	31	122.8	27.3	122.8	24.9	122.8	23.2	122.8	33.7	122.8	41.4
16	31.7	122.8	28.1	122.8	25.7	122.8	24.1	122.8	34.4	122.8	41.4
17	34.1	122.8	30.5	122.8	28.2	122.8	26.6	122.8	36.7	122.8	41.4
18	31.5	122.8	28	122.8	25.7	122.8	24.1	122.8	34.1	122.8	41.4
19	30.6	122.8	27.1	122.8	24.9	122.8	23.3	122.8	33.1	122.8	41.4

20	30.8	122.8	27.3	122.8	25.1	122.8	23.5	122.8	33.3	122.8	41.4
21	32.9	122.8	29.5	122.8	27.3	122.8	25.7	122.8	35.5	122.8	41.4
22	29.7	122.8	26.2	122.8	24	122.8	22.5	122.8	32.2	122.8	41.4
23	28.3	122.8	24.8	122.8	22.6	122.8	21.1	122.8	30.8	122.8	41.4
24	27.5	122.8	24.1	122.8	21.9	122.8	20.3	122.8	30.1	122.8	41.4
25	27.2	122.8	23.7	122.8	21.5	122.8	19.9	122.8	29.8	122.8	41.4
26	27.5	122.8	24	122.8	21.8	122.8	20.2	122.8	30.2	122.8	41.4
27	29.6	122.8	26.1	122.8	23.8	122.8	22.2	122.8	32.3	122.8	41.4
28	26.3	122.8	22.7	122.8	20.4	122.8	18.7	122.8	29	122.8	41.4
29	24.7	122.8	21	122.8	18.6	122.8	17	122.8	27.4	122.8	41.4
30	23.6	122.8	19.9	122.8	17.5	122.8	15.8	122.8	26.5	122.8	41.4
31	22.8	122.8	18.9	122.8	16.5	122.8	14.8	122.8	25.7	122.8	41.4
32	22.1	122.8	18.2	122.8	15.6	122.8	13.9	122.8	25.1	122.8	41.4
33	21.5	122.8	17.5	122.8	14.9	122.8	13.1	122.8	24.6	122.8	41.4
34	21.1	122.8	16.9	122.8	14.2	122.8	12.4	122.8	24.2	122.8	41.4
35	20.6	122.8	16.2	122.8	13.4	122.8	11.5	122.8	23.8	122.8	41.4
36	20.6	122.8	16.3	122.8	13.6	122.8	11.7	122.8	23.8	122.8	41.4

Figure 22.4: Longitudinal Positive Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 46ft, Deck width = 36ft, Two Railings with Edge Loading.

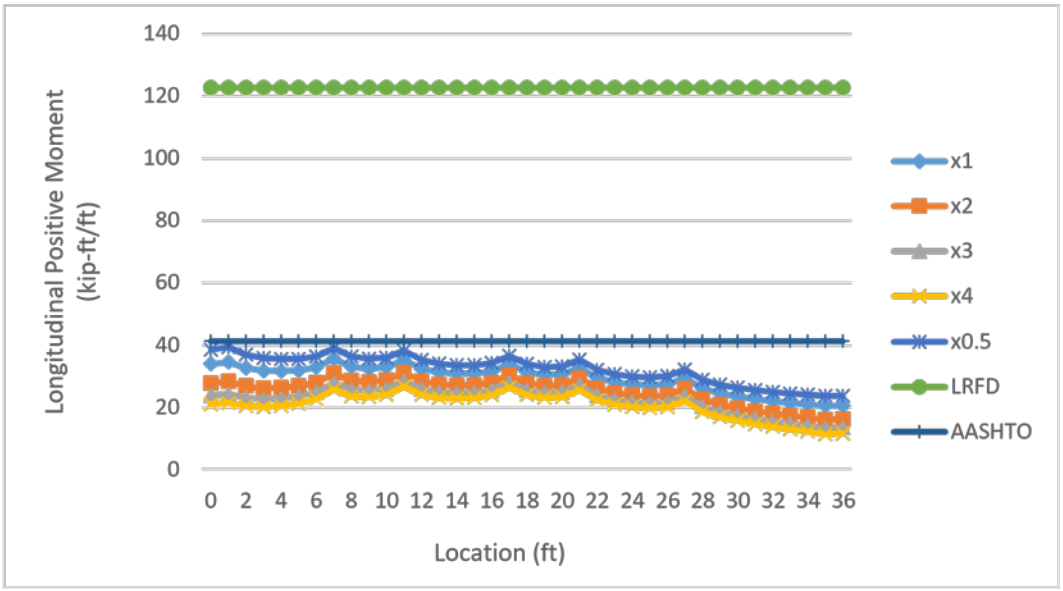

Table 23.1: Longitudinal Negative Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 46ft, Deck width = 48ft, No Railing with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	34.9	151.3	34.9	151.3	34.9	151.3	34.9	151.3	34.9	151.3	41.4
1	52.3	151.3	52.3	151.3	52.3	151.3	52.3	151.3	52.3	151.3	41.4
2	52.6	151.3	52.6	151.3	52.6	151.3	52.6	151.3	52.6	151.3	41.4
3	52.1	151.3	52.1	151.3	52.1	151.3	52.1	151.3	52.1	151.3	41.4
4	51.2	151.3	51.2	151.3	51.2	151.3	51.2	151.3	51.2	151.3	41.4
5	50.2	151.3	50.2	151.3	50.2	151.3	50.2	151.3	50.2	151.3	41.4
6	49.3	151.3	49.3	151.3	49.3	151.3	49.3	151.3	49.3	151.3	41.4
7	48.4	151.3	48.4	151.3	48.4	151.3	48.4	151.3	48.4	151.3	41.4
8	47.6	151.3	47.6	151.3	47.6	151.3	47.6	151.3	47.6	151.3	41.4
9	46.9	151.3	46.9	151.3	46.9	151.3	46.9	151.3	46.9	151.3	41.4
10	46.3	151.3	46.3	151.3	46.3	151.3	46.3	151.3	46.3	151.3	41.4
11	45.6	151.3	45.6	151.3	45.6	151.3	45.6	151.3	45.6	151.3	41.4
12	45.1	151.3	45.1	151.3	45.1	151.3	45.1	151.3	45.1	151.3	41.4
13	44.5	151.3	44.5	151.3	44.5	151.3	44.5	151.3	44.5	151.3	41.4
14	44	151.3	44	151.3	44	151.3	44	151.3	44	151.3	41.4
15	43.5	151.3	43.5	151.3	43.5	151.3	43.5	151.3	43.5	151.3	41.4
16	43.1	151.3	43.1	151.3	43.1	151.3	43.1	151.3	43.1	151.3	41.4
17	42.6	151.3	42.6	151.3	42.6	151.3	42.6	151.3	42.6	151.3	41.4
18	42.1	151.3	42.1	151.3	42.1	151.3	42.1	151.3	42.1	151.3	41.4
19	41.7	151.3	41.7	151.3	41.7	151.3	41.7	151.3	41.7	151.3	41.4

20	41.2	151.3	41.2	151.3	41.2	151.3	41.2	151.3	41.2	151.3	41.4
21	40.8	151.3	40.8	151.3	40.8	151.3	40.8	151.3	40.8	151.3	41.4
22	40.3	151.3	40.3	151.3	40.3	151.3	40.3	151.3	40.3	151.3	41.4
23	39.8	151.3	39.8	151.3	39.8	151.3	39.8	151.3	39.8	151.3	41.4
24	39.3	151.3	39.3	151.3	39.3	151.3	39.3	151.3	39.3	151.3	41.4
25	38.8	151.3	38.8	151.3	38.8	151.3	38.8	151.3	38.8	151.3	41.4
26	38.2	151.3	38.2	151.3	38.2	151.3	38.2	151.3	38.2	151.3	41.4
27	37.7	151.3	37.7	151.3	37.7	151.3	37.7	151.3	37.7	151.3	41.4
28	37.1	151.3	37.1	151.3	37.1	151.3	37.1	151.3	37.1	151.3	41.4
29	36.5	151.3	36.5	151.3	36.5	151.3	36.5	151.3	36.5	151.3	41.4
30	35.9	151.3	35.9	151.3	35.9	151.3	35.9	151.3	35.9	151.3	41.4
31	35.3	151.3	35.3	151.3	35.3	151.3	35.3	151.3	35.3	151.3	41.4
32	34.6	151.3	34.6	151.3	34.6	151.3	34.6	151.3	34.6	151.3	41.4
33	33.9	151.3	33.9	151.3	33.9	151.3	33.9	151.3	33.9	151.3	41.4
34	33.3	151.3	33.3	151.3	33.3	151.3	33.3	151.3	33.3	151.3	41.4
35	32.6	151.3	32.6	151.3	32.6	151.3	32.6	151.3	32.6	151.3	41.4
36	31.9	151.3	31.9	151.3	31.9	151.3	31.9	151.3	31.9	151.3	41.4
37	31.2	151.3	31.2	151.3	31.2	151.3	31.2	151.3	31.2	151.3	41.4
38	30.4	151.3	30.4	151.3	30.4	151.3	30.4	151.3	30.4	151.3	41.4
39	29.7	151.3	29.7	151.3	29.7	151.3	29.7	151.3	29.7	151.3	41.4
40	29	151.3	29	151.3	29	151.3	29	151.3	29	151.3	41.4
41	28.2	151.3	28.2	151.3	28.2	151.3	28.2	151.3	28.2	151.3	41.4
42	27.5	151.3	27.5	151.3	27.5	151.3	27.5	151.3	27.5	151.3	41.4
43	26.6	151.3	26.6	151.3	26.6	151.3	26.6	151.3	26.6	151.3	41.4
44	25.7	151.3	25.7	151.3	25.7	151.3	25.7	151.3	25.7	151.3	41.4
45	24.5	151.3	24.5	151.3	24.5	151.3	24.5	151.3	24.5	151.3	41.4

46	22.7	151.3	22.7	151.3	22.7	151.3	22.7	151.3	22.7	151.3	41.4
47	19.5	151.3	19.5	151.3	19.5	151.3	19.5	151.3	19.5	151.3	41.4
48	8.1	151.3	8.1	151.3	8.1	151.3	8.1	151.3	8.1	151.3	41.4

Figure 23.1: Longitudinal Negative Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 46ft, Deck width = 48ft, No Railing with Edge Loading.

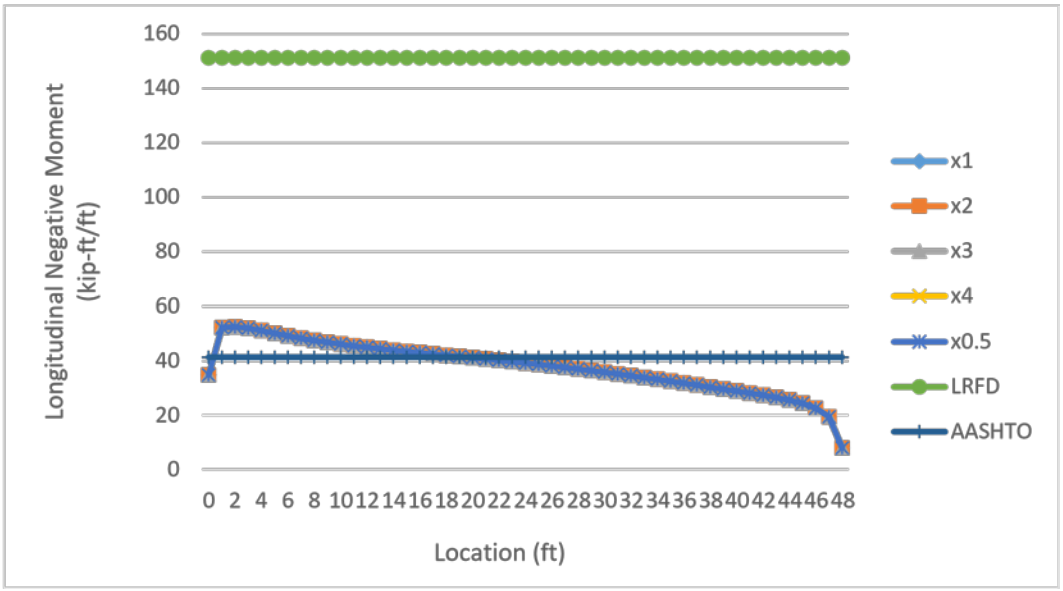

Table 23.2: Longitudinal Negative Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 46ft, Deck width = 48ft, One Left Railing with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	35.6	151.3	35.5	151.3	35.3	151.3	35.3	151.3	35.7	151.3	41.4
1	40.9	151.3	33.5	151.3	28.7	151.3	25.4	151.3	46.3	151.3	41.4
2	40.7	151.3	34.1	151.3	29.8	151.3	26.8	151.3	45.7	151.3	41.4
3	40.1	151.3	33.4	151.3	29.2	151.3	26.2	151.3	45.1	151.3	41.4
4	39.8	151.3	33.5	151.3	29.5	151.3	26.7	151.3	44.5	151.3	41.4
5	39.5	151.3	33.6	151.3	29.8	151.3	27.2	151.3	43.9	151.3	41.4
6	39.3	151.3	33.8	151.3	30.2	151.3	27.8	151.3	43.4	151.3	41.4
7	39.1	151.3	34	151.3	30.7	151.3	28.4	151.3	43	151.3	41.4
8	39	151.3	34.3	151.3	31.2	151.3	29.1	151.3	42.6	151.3	41.4
9	38.9	151.3	34.5	151.3	31.7	151.3	29.7	151.3	42.3	151.3	41.4
10	38.9	151.3	34.8	151.3	32.2	151.3	30.3	151.3	41.9	151.3	41.4
11	38.8	151.3	35	151.3	32.6	151.3	30.9	151.3	41.7	151.3	41.4
12	38.8	151.3	35.3	151.3	33	151.3	31.5	151.3	41.4	151.3	41.4
13	38.7	151.3	35.5	151.3	33.4	151.3	32	151.3	41.2	151.3	41.4
14	38.7	151.3	35.7	151.3	33.8	151.3	32.4	151.3	40.9	151.3	41.4
15	38.6	151.3	35.9	151.3	34.1	151.3	32.9	151.3	40.7	151.3	41.4
16	38.6	151.3	36	151.3	34.4	151.3	33.3	151.3	40.4	151.3	41.4
17	38.5	151.3	36.1	151.3	34.6	151.3	33.6	151.3	40.2	151.3	41.4
18	38.4	151.3	36.2	151.3	34.8	151.3	33.9	151.3	39.9	151.3	41.4
19	38.2	151.3	36.2	151.3	35	151.3	34.1	151.3	39.7	151.3	41.4

20	38	151.3	36.2	151.3	35.1	151.3	34.3	151.3	39.4	151.3	41.4
21	37.8	151.3	36.2	151.3	35.1	151.3	34.4	151.3	39.1	151.3	41.4
22	37.6	151.3	36.1	151.3	35.1	151.3	34.4	151.3	38.7	151.3	41.4
23	37.3	151.3	36	151.3	35.1	151.3	34.4	151.3	38.4	151.3	41.4
24	37.1	151.3	35.8	151.3	35	151.3	34.4	151.3	38	151.3	41.4
25	36.7	151.3	35.6	151.3	34.8	151.3	34.3	151.3	37.6	151.3	41.4
26	36.4	151.3	35.3	151.3	34.6	151.3	34.2	151.3	37.2	151.3	41.4
27	36	151.3	35	151.3	34.4	151.3	34	151.3	36.7	151.3	41.4
28	35.6	151.3	34.7	151.3	34.1	151.3	33.7	151.3	36.2	151.3	41.4
29	35.1	151.3	34.3	151.3	33.8	151.3	33.4	151.3	35.7	151.3	41.4
30	34.6	151.3	33.9	151.3	33.4	151.3	33.1	151.3	35.2	151.3	41.4
31	34.1	151.3	33.5	151.3	33	151.3	32.7	151.3	34.6	151.3	41.4
32	33.6	151.3	33	151.3	32.6	151.3	32.3	151.3	34	151.3	41.4
33	33	151.3	32.5	151.3	32.1	151.3	31.9	151.3	33.4	151.3	41.4
34	32.4	151.3	31.9	151.3	31.6	151.3	31.4	151.3	32.8	151.3	41.4
35	31.8	151.3	31.4	151.3	31.1	151.3	30.9	151.3	32.1	151.3	41.4
36	31.2	151.3	30.8	151.3	30.5	151.3	30.3	151.3	31.5	151.3	41.4
37	30.5	151.3	30.2	151.3	30	151.3	29.8	151.3	30.8	151.3	41.4
38	29.9	151.3	29.6	151.3	29.4	151.3	29.2	151.3	30.1	151.3	41.4
39	29.2	151.3	29	151.3	28.8	151.3	28.7	151.3	29.4	151.3	41.4
40	28.6	151.3	28.4	151.3	28.2	151.3	28.1	151.3	28.8	151.3	41.4
41	27.9	151.3	27.7	151.3	27.6	151.3	27.5	151.3	28	151.3	41.4
42	27.2	151.3	27.1	151.3	27	151.3	26.9	151.3	27.3	151.3	41.4
43	26.5	151.3	26.4	151.3	26.3	151.3	26.3	151.3	26.5	151.3	41.4
44	25.6	151.3	25.6	151.3	25.5	151.3	25.5	151.3	25.6	151.3	41.4
45	24.5	151.3	24.6	151.3	24.6	151.3	24.6	151.3	24.5	151.3	41.4

46	22.9	151.3	23	151.3	23.1	151.3	23.1	151.3	22.8	151.3	41.4
47	19.9	151.3	20.1	151.3	20.2	151.3	20.3	151.3	19.7	151.3	41.4
48	8.7	151.3	9	151.3	9.3	151.3	9.4	151.3	8.4	151.3	41.4

Figure 23.2: Longitudinal Negative Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 46ft, Deck width = 48ft, One Left Railing with Edge Loading.

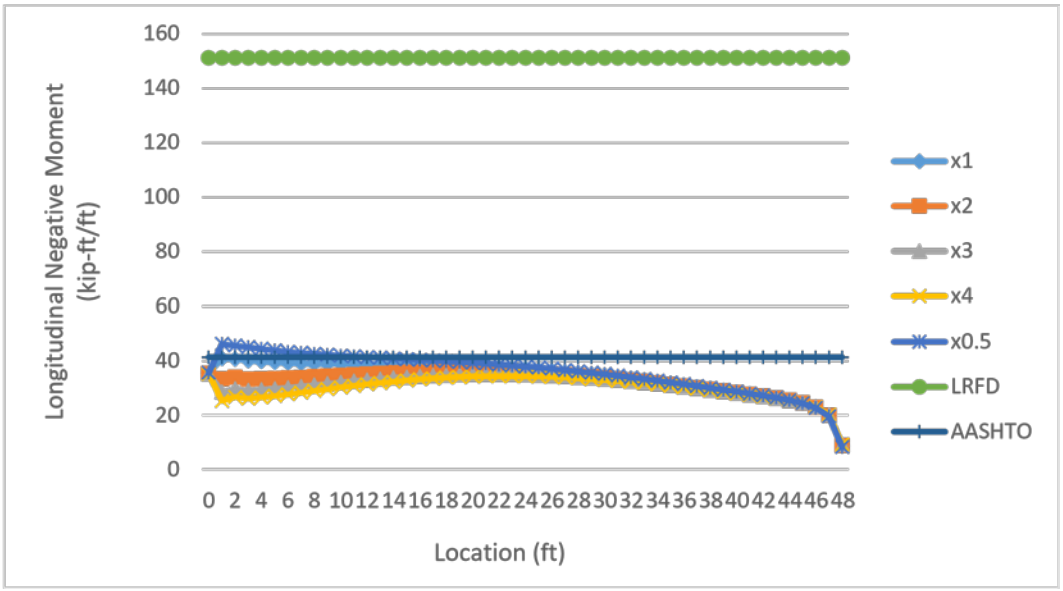

Table 23.3: Longitudinal Negative Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 46ft, Deck width = 48ft, One Right Railings with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	35.2	151.3	35.4	151.3	35.5	151.3	35.6	151.3	35.1	151.3	41.4
1	52.4	151.3	52.5	151.3	52.6	151.3	52.7	151.3	52.4	151.3	41.4
2	52.7	151.3	52.7	151.3	52.8	151.3	52.8	151.3	52.7	151.3	41.4
3	52.1	151.3	52.2	151.3	52.2	151.3	52.2	151.3	52.1	151.3	41.4
4	51.1	151.3	51.1	151.3	51.1	151.3	51.1	151.3	51.1	151.3	41.4
5	50.1	151.3	50	151.3	50	151.3	50	151.3	50.1	151.3	41.4
6	49.1	151.3	49.1	151.3	49	151.3	49	151.3	49.2	151.3	41.4
7	48.2	151.3	48.1	151.3	48.1	151.3	48	151.3	48.3	151.3	41.4
8	47.4	151.3	47.3	151.3	47.2	151.3	47.2	151.3	47.5	151.3	41.4
9	46.7	151.3	46.5	151.3	46.4	151.3	46.4	151.3	46.8	151.3	41.4
10	46	151.3	45.8	151.3	45.7	151.3	45.6	151.3	46.1	151.3	41.4
11	45.3	151.3	45.1	151.3	45	151.3	44.9	151.3	45.5	151.3	41.4
12	44.7	151.3	44.5	151.3	44.4	151.3	44.3	151.3	44.9	151.3	41.4
13	44.1	151.3	43.9	151.3	43.8	151.3	43.7	151.3	44.3	151.3	41.4
14	43.6	151.3	43.3	151.3	43.2	151.3	43.1	151.3	43.8	151.3	41.4
15	43	151.3	42.8	151.3	42.6	151.3	42.5	151.3	43.2	151.3	41.4
16	42.5	151.3	42.2	151.3	42	151.3	41.9	151.3	42.7	151.3	41.4
17	42	151.3	41.7	151.3	41.5	151.3	41.3	151.3	42.3	151.3	41.4
18	41.5	151.3	41.1	151.3	40.9	151.3	40.7	151.3	41.8	151.3	41.4
19	41	151.3	40.6	151.3	40.3	151.3	40.1	151.3	41.3	151.3	41.4

20	40.4	151.3	40	151.3	39.7	151.3	39.5	151.3	40.8	151.3	41.4
21	39.9	151.3	39.4	151.3	39.1	151.3	38.9	151.3	40.3	151.3	41.4
22	39.3	151.3	38.8	151.3	38.5	151.3	38.2	151.3	39.7	151.3	41.4
23	38.8	151.3	38.2	151.3	37.8	151.3	37.5	151.3	39.2	151.3	41.4
24	38.2	151.3	37.5	151.3	37.1	151.3	36.8	151.3	38.6	151.3	41.4
25	37.5	151.3	36.9	151.3	36.4	151.3	36.1	151.3	38.1	151.3	41.4
26	36.9	151.3	36.1	151.3	35.7	151.3	35.3	151.3	37.5	151.3	41.4
27	36.2	151.3	35.4	151.3	34.9	151.3	34.5	151.3	36.8	151.3	41.4
28	35.5	151.3	34.6	151.3	34.1	151.3	33.7	151.3	36.2	151.3	41.4
29	34.8	151.3	33.8	151.3	33.2	151.3	32.8	151.3	35.5	151.3	41.4
30	34	151.3	33	151.3	32.3	151.3	31.8	151.3	34.8	151.3	41.4
31	33.3	151.3	32.1	151.3	31.4	151.3	30.9	151.3	34.1	151.3	41.4
32	32.4	151.3	31.2	151.3	30.4	151.3	29.8	151.3	33.3	151.3	41.4
33	31.6	151.3	30.3	151.3	29.4	151.3	28.8	151.3	32.6	151.3	41.4
34	30.7	151.3	29.3	151.3	28.3	151.3	27.7	151.3	31.8	151.3	41.4
35	29.8	151.3	28.3	151.3	27.3	151.3	26.6	151.3	31	151.3	41.4
36	28.9	151.3	27.2	151.3	26.2	151.3	25.4	151.3	30.2	151.3	41.4
37	28	151.3	26.2	151.3	25	151.3	24.2	151.3	29.3	151.3	41.4
38	27.1	151.3	25.1	151.3	23.9	151.3	23	151.3	28.5	151.3	41.4
39	26.1	151.3	24	151.3	22.7	151.3	21.8	151.3	27.6	151.3	41.4
40	25.2	151.3	23	151.3	21.5	151.3	20.5	151.3	26.8	151.3	41.4
41	24.2	151.3	21.9	151.3	20.3	151.3	19.3	151.3	25.9	151.3	41.4
42	23.3	151.3	20.8	151.3	19.2	151.3	18	151.3	25.1	151.3	41.4
43	22.3	151.3	19.7	151.3	18	151.3	16.8	151.3	24.2	151.3	41.4
44	21.3	151.3	18.6	151.3	16.8	151.3	15.5	151.3	23.3	151.3	41.4
45	20.3	151.3	17.5	151.3	15.6	151.3	14.3	151.3	22.3	151.3	41.4

46	19.1	151.3	16.3	151.3	14.5	151.3	13.2	151.3	20.9	151.3	41.4
47	17.8	151.3	14.9	151.3	13	151.3	11.5	151.3	19.6	151.3	41.4
48	9.1	151.3	9.2	151.3	9.2	151.3	9.2	151.3	9	151.3	41.4

Figure 23.3: Longitudinal Negative Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 46ft, Deck width = 48ft, One Right Railings with Edge Loading.

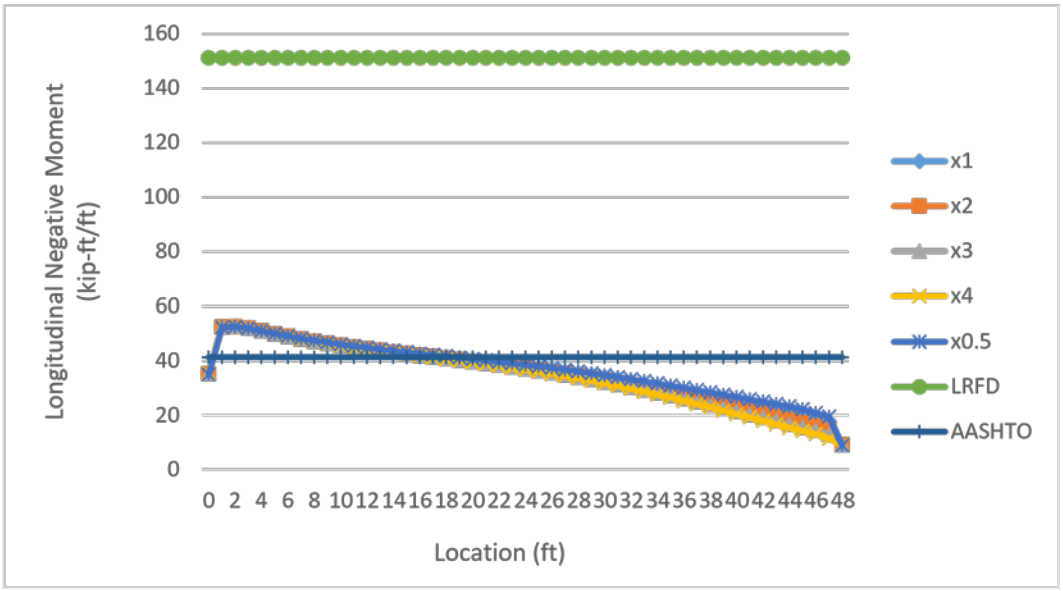

Table 23.4: Longitudinal Negative Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 46ft, Deck width = 48ft, Two Railings with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	35.9	151.3	35.9	151.3	35.8	151.3	35.8	151.3	35.9	151.3	41.4
1	40.9	151.3	33.5	151.3	28.7	151.3	25.4	151.3	46.4	151.3	41.4
2	40.7	151.3	34	151.3	29.8	151.3	26.8	151.3	45.7	151.3	41.4
3	40.1	151.3	33.3	151.3	29	151.3	26	151.3	45.1	151.3	41.4
4	39.7	151.3	33.4	151.3	29.3	151.3	26.5	151.3	44.4	151.3	41.4
5	39.4	151.3	33.4	151.3	29.6	151.3	26.9	151.3	43.8	151.3	41.4
6	39.1	151.3	33.5	151.3	30	151.3	27.5	151.3	43.3	151.3	41.4
7	38.9	151.3	33.7	151.3	30.4	151.3	28.1	151.3	42.9	151.3	41.4
8	38.8	151.3	33.9	151.3	30.8	151.3	28.6	151.3	42.5	151.3	41.4
9	38.7	151.3	34.1	151.3	31.2	151.3	29.2	151.3	42.1	151.3	41.4
10	38.6	151.3	34.4	151.3	31.6	151.3	29.7	151.3	41.8	151.3	41.4
11	38.5	151.3	34.6	151.3	32	151.3	30.3	151.3	41.5	151.3	41.4
12	38.4	151.3	34.7	151.3	32.4	151.3	30.7	151.3	41.2	151.3	41.4
13	38.4	151.3	34.9	151.3	32.7	151.3	31.2	151.3	40.9	151.3	41.4
14	38.3	151.3	35	151.3	33	151.3	31.5	151.3	40.7	151.3	41.4
15	38.2	151.3	35.1	151.3	33.2	151.3	31.9	151.3	40.4	151.3	41.4
16	38	151.3	35.2	151.3	33.4	151.3	32.2	151.3	40.1	151.3	41.4
17	37.9	151.3	35.2	151.3	33.5	151.3	32.4	151.3	39.9	151.3	41.4
18	37.7	151.3	35.2	151.3	33.6	151.3	32.5	151.3	39.6	151.3	41.4
19	37.5	151.3	35.2	151.3	33.7	151.3	32.6	151.3	39.3	151.3	41.4

20	37.3	151.3	35.1	151.3	33.6	151.3	32.6	151.3	38.9	151.3	41.4
21	37	151.3	34.9	151.3	33.5	151.3	32.6	151.3	38.6	151.3	41.4
22	36.7	151.3	34.7	151.3	33.4	151.3	32.5	151.3	38.2	151.3	41.4
23	36.3	151.3	34.4	151.3	33.2	151.3	32.3	151.3	37.8	151.3	41.4
24	35.9	151.3	34.1	151.3	32.9	151.3	32	151.3	37.3	151.3	41.4
25	35.5	151.3	33.7	151.3	32.5	151.3	31.7	151.3	36.9	151.3	41.4
26	35.1	151.3	33.3	151.3	32.1	151.3	31.3	151.3	36.4	151.3	41.4
27	34.6	151.3	32.8	151.3	31.7	151.3	30.9	151.3	35.9	151.3	41.4
28	34	151.3	32.3	151.3	31.1	151.3	30.4	151.3	35.3	151.3	41.4
29	33.4	151.3	31.7	151.3	30.6	151.3	29.8	151.3	34.7	151.3	41.4
30	32.8	151.3	31	151.3	29.9	151.3	29.1	151.3	34.1	151.3	41.4
31	32.1	151.3	30.3	151.3	29.2	151.3	28.4	151.3	33.4	151.3	41.4
32	31.4	151.3	29.6	151.3	28.4	151.3	27.6	151.3	32.7	151.3	41.4
33	30.7	151.3	28.8	151.3	27.6	151.3	26.8	151.3	32	151.3	41.4
34	29.9	151.3	28	151.3	26.7	151.3	25.9	151.3	31.3	151.3	41.4
35	29.1	151.3	27.1	151.3	25.8	151.3	24.9	151.3	30.5	151.3	41.4
36	28.3	151.3	26.2	151.3	24.9	151.3	23.9	151.3	29.8	151.3	41.4
37	27.4	151.3	25.2	151.3	23.9	151.3	22.9	151.3	29	151.3	41.4
38	26.5	151.3	24.3	151.3	22.8	151.3	21.8	151.3	28.2	151.3	41.4
39	25.6	151.3	23.3	151.3	21.8	151.3	20.7	151.3	27.4	151.3	41.4
40	24.8	151.3	22.3	151.3	20.7	151.3	19.6	151.3	26.5	151.3	41.4
41	23.9	151.3	21.3	151.3	19.7	151.3	18.5	151.3	25.7	151.3	41.4
42	23	151.3	20.3	151.3	18.6	151.3	17.4	151.3	24.9	151.3	41.4
43	22.1	151.3	19.3	151.3	17.5	151.3	16.3	151.3	24.1	151.3	41.4
44	21.2	151.3	18.3	151.3	16.5	151.3	15.2	151.3	23.2	151.3	41.4
45	20.3	151.3	17.3	151.3	15.4	151.3	14	151.3	22.3	151.3	41.4

46	19.1	151.3	16.3	151.3	14.4	151.3	13.1	151.3	21	151.3	41.4
47	17.9	151.3	15	151.3	13	151.3	11.6	151.3	19.7	151.3	41.4
48	9.7	151.3	10	151.3	10.2	151.3	10.4	151.3	9.3	151.3	41.4

Figure 23.4: Longitudinal Negative Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 46ft, Deck width = 48ft, Two Railings with Edge Loading.

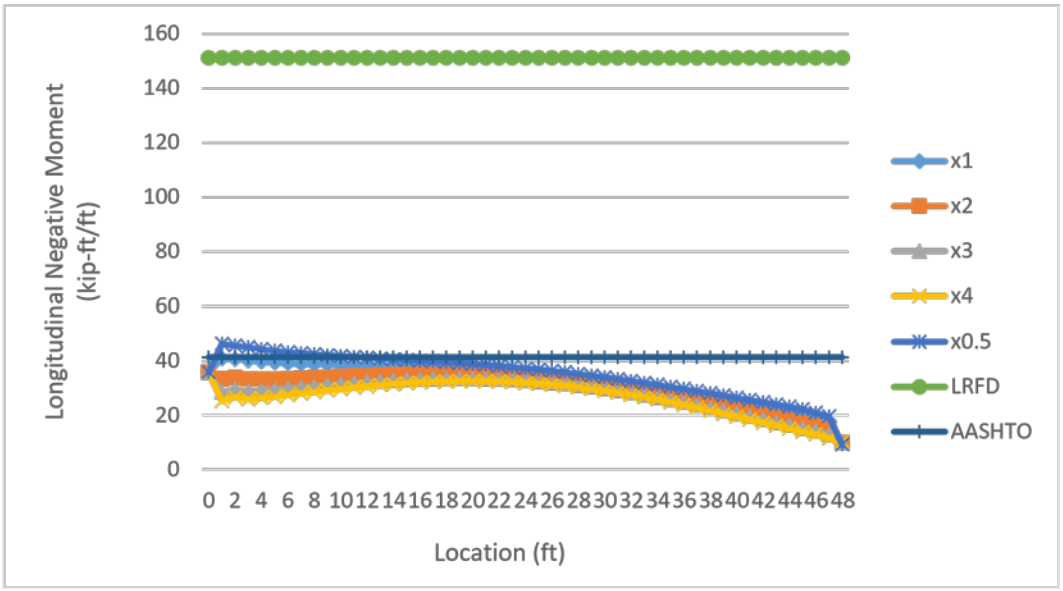

Table 24.1: Longitudinal Positive Moment Distribution at Critical Section for Four-Lane Lane Two Span Bridge Deck Span = 46ft, Deck width = 48ft, No Railing with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	47.7	158.5	47.7	158.5	47.7	158.5	47.7	158.5	47.7	158.5	41.4
1	49	158.5	49	158.5	49	158.5	49	158.5	49	158.5	41.4
2	45.3	158.5	45.3	158.5	45.3	158.5	45.3	158.5	45.3	158.5	41.4
3	43.8	158.5	43.8	158.5	43.8	158.5	43.8	158.5	43.8	158.5	41.4
4	43	158.5	43	158.5	43	158.5	43	158.5	43	158.5	41.4
5	42.8	158.5	42.8	158.5	42.8	158.5	42.8	158.5	42.8	158.5	41.4
6	43.4	158.5	43.4	158.5	43.4	158.5	43.4	158.5	43.4	158.5	41.4
7	45.8	158.5	45.8	158.5	45.8	158.5	45.8	158.5	45.8	158.5	41.4
8	43	158.5	43	158.5	43	158.5	43	158.5	43	158.5	41.4
9	42.1	158.5	42.1	158.5	42.1	158.5	42.1	158.5	42.1	158.5	41.4
10	42.4	158.5	42.4	158.5	42.4	158.5	42.4	158.5	42.4	158.5	41.4
11	44.5	158.5	44.5	158.5	44.5	158.5	44.5	158.5	44.5	158.5	41.4
12	41.5	158.5	41.5	158.5	41.5	158.5	41.5	158.5	41.5	158.5	41.4
13	40.2	158.5	40.2	158.5	40.2	158.5	40.2	158.5	40.2	158.5	41.4
14	39.7	158.5	39.7	158.5	39.7	158.5	39.7	158.5	39.7	158.5	41.4
15	39.7	158.5	39.7	158.5	39.7	158.5	39.7	158.5	39.7	158.5	41.4
16	40.4	158.5	40.4	158.5	40.4	158.5	40.4	158.5	40.4	158.5	41.4
17	42.7	158.5	42.7	158.5	42.7	158.5	42.7	158.5	42.7	158.5	41.4
18	40.1	158.5	40.1	158.5	40.1	158.5	40.1	158.5	40.1	158.5	41.4
19	39.2	158.5	39.2	158.5	39.2	158.5	39.2	158.5	39.2	158.5	41.4

20	39.5	158.5	39.5	158.5	39.5	158.5	39.5	158.5	39.5	158.5	41.4
21	41.7	158.5	41.7	158.5	41.7	158.5	41.7	158.5	41.7	158.5	41.4
22	38.5	158.5	38.5	158.5	38.5	158.5	38.5	158.5	38.5	158.5	41.4
23	37.2	158.5	37.2	158.5	37.2	158.5	37.2	158.5	37.2	158.5	41.4
24	36.7	158.5	36.7	158.5	36.7	158.5	36.7	158.5	36.7	158.5	41.4
25	36.5	158.5	36.5	158.5	36.5	158.5	36.5	158.5	36.5	158.5	41.4
26	37.1	158.5	37.1	158.5	37.1	158.5	37.1	158.5	37.1	158.5	41.4
27	39.5	158.5	39.5	158.5	39.5	158.5	39.5	158.5	39.5	158.5	41.4
28	36.7	158.5	36.7	158.5	36.7	158.5	36.7	158.5	36.7	158.5	41.4
29	35.7	158.5	35.7	158.5	35.7	158.5	35.7	158.5	35.7	158.5	41.4
30	35.8	158.5	35.8	158.5	35.8	158.5	35.8	158.5	35.8	158.5	41.4
31	37.9	158.5	37.9	158.5	37.9	158.5	37.9	158.5	37.9	158.5	41.4
32	34.6	158.5	34.6	158.5	34.6	158.5	34.6	158.5	34.6	158.5	41.4
33	33.1	158.5	33.1	158.5	33.1	158.5	33.1	158.5	33.1	158.5	41.4
34	32.4	158.5	32.4	158.5	32.4	158.5	32.4	158.5	32.4	158.5	41.4
35	32	158.5	32	158.5	32	158.5	32	158.5	32	158.5	41.4
36	32.4	158.5	32.4	158.5	32.4	158.5	32.4	158.5	32.4	158.5	41.4
37	34.4	158.5	34.4	158.5	34.4	158.5	34.4	158.5	34.4	158.5	41.4
38	31.1	158.5	31.1	158.5	31.1	158.5	31.1	158.5	31.1	158.5	41.4
39	29.5	158.5	29.5	158.5	29.5	158.5	29.5	158.5	29.5	158.5	41.4
40	28.5	158.5	28.5	158.5	28.5	158.5	28.5	158.5	28.5	158.5	41.4
41	27.8	158.5	27.8	158.5	27.8	158.5	27.8	158.5	27.8	158.5	41.4
42	27.2	158.5	27.2	158.5	27.2	158.5	27.2	158.5	27.2	158.5	41.4
43	26.7	158.5	26.7	158.5	26.7	158.5	26.7	158.5	26.7	158.5	41.4
44	26.3	158.5	26.3	158.5	26.3	158.5	26.3	158.5	26.3	158.5	41.4
45	26	158.5	26	158.5	26	158.5	26	158.5	26	158.5	41.4

46	25.7	158.5	25.7	158.5	25.7	158.5	25.7	158.5	25.7	158.5	41.4
47	25.6	158.5	25.6	158.5	25.6	158.5	25.6	158.5	25.6	158.5	41.4
48	25.5	158.5	25.5	158.5	25.5	158.5	25.5	158.5	25.5	158.5	41.4

Figure 24.1: Longitudinal Positive Moment Distribution at Critical Section for Four-Lane Lane Two Span Bridge Deck Span = 46ft, Deck width = 48ft, No Railing with Edge Loading.

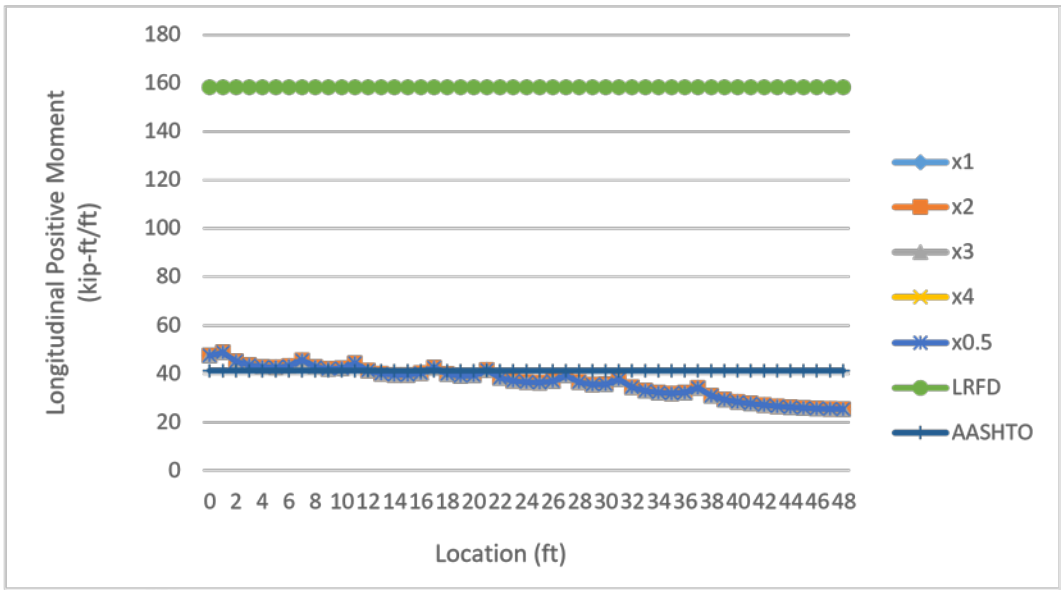

Table 24.2: Longitudinal Positive Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 46ft, Deck width = 48ft, One Left Railing with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	36.6	158.5	30.6	158.5	26.6	158.5	23.7	158.5	41	158.5	41.4
1	37.3	158.5	31.1	158.5	27.1	158.5	24.1	158.5	41.8	158.5	41.4
2	35.4	158.5	29.8	158.5	26.1	158.5	23.4	158.5	39.5	158.5	41.4
3	34.6	158.5	29.3	158.5	25.7	158.5	23.2	158.5	38.4	158.5	41.4
4	34.6	158.5	29.6	158.5	26.3	158.5	23.8	158.5	38.2	158.5	41.4
5	35	158.5	30.3	158.5	27.1	158.5	24.8	158.5	38.3	158.5	41.4
6	36	158.5	31.6	158.5	28.6	158.5	26.4	158.5	39.2	158.5	41.4
7	38.8	158.5	34.6	158.5	31.8	158.5	29.7	158.5	41.8	158.5	41.4
8	36.5	158.5	32.6	158.5	29.9	158.5	27.9	158.5	39.3	158.5	41.4
9	36	158.5	32.3	158.5	29.7	158.5	27.9	158.5	38.7	158.5	41.4
10	36.6	158.5	33.1	158.5	30.7	158.5	28.9	158.5	39.1	158.5	41.4
11	39	158.5	35.7	158.5	33.4	158.5	31.7	158.5	41.4	158.5	41.4
12	36.3	158.5	33.2	158.5	31	158.5	29.4	158.5	38.5	158.5	41.4
13	35.4	158.5	32.4	158.5	30.4	158.5	28.9	158.5	37.5	158.5	41.4
14	35.2	158.5	32.3	158.5	30.4	158.5	29	158.5	37.2	158.5	41.4
15	35.4	158.5	32.7	158.5	30.9	158.5	29.5	158.5	37.2	158.5	41.4
16	36.3	158.5	33.8	158.5	32	158.5	30.8	158.5	38	158.5	41.4
17	39	158.5	36.6	158.5	35	158.5	33.8	158.5	40.7	158.5	41.4
18	36.5	158.5	34.2	158.5	32.6	158.5	31.5	158.5	38	158.5	41.4
19	35.8	158.5	33.7	158.5	32.2	158.5	31.1	158.5	37.3	158.5	41.4

20	36.2	158.5	34.2	158.5	32.8	158.5	31.8	158.5	37.6	158.5	41.4
21	38.4	158.5	36.5	158.5	35.2	158.5	34.3	158.5	39.7	158.5	41.4
22	35.6	158.5	33.8	158.5	32.6	158.5	31.7	158.5	36.9	158.5	41.4
23	34.5	158.5	32.8	158.5	31.6	158.5	30.8	158.5	35.7	158.5	41.4
24	34.1	158.5	32.5	158.5	31.4	158.5	30.5	158.5	35.2	158.5	41.4
25	34.1	158.5	32.6	158.5	31.5	158.5	30.8	158.5	35.2	158.5	41.4
26	34.8	158.5	33.4	158.5	32.4	158.5	31.7	158.5	35.8	158.5	41.4
27	37.4	158.5	36	158.5	35.1	158.5	34.4	158.5	38.3	158.5	41.4
28	34.6	158.5	33.3	158.5	32.4	158.5	31.8	158.5	35.5	158.5	41.4
29	33.7	158.5	32.5	158.5	31.7	158.5	31	158.5	34.6	158.5	41.4
30	34	158.5	32.8	158.5	32	158.5	31.4	158.5	34.8	158.5	41.4
31	36.1	158.5	35	158.5	34.2	158.5	33.7	158.5	36.9	158.5	41.4
32	32.9	158.5	31.9	158.5	31.1	158.5	30.6	158.5	33.7	158.5	41.4
33	31.6	158.5	30.6	158.5	29.9	158.5	29.4	158.5	32.2	158.5	41.4
34	30.9	158.5	29.9	158.5	29.3	158.5	28.8	158.5	31.5	158.5	41.4
35	30.6	158.5	29.7	158.5	29.1	158.5	28.6	158.5	31.2	158.5	41.4
36	31	158.5	30.1	158.5	29.5	158.5	29.1	158.5	31.6	158.5	41.4
37	33.2	158.5	32.3	158.5	31.8	158.5	31.3	158.5	33.7	158.5	41.4
38	29.9	158.5	29.1	158.5	28.5	158.5	28	158.5	30.4	158.5	41.4
39	28.3	158.5	27.6	158.5	27.1	158.5	26.7	158.5	28.9	158.5	41.4
40	27.4	158.5	26.7	158.5	26.2	158.5	25.8	158.5	27.9	158.5	41.4
41	26.7	158.5	26	158.5	25.5	158.5	25.1	158.5	27.2	158.5	41.4
42	26.1	158.5	25.4	158.5	25	158.5	24.6	158.5	26.6	158.5	41.4
43	25.7	158.5	25	158.5	24.6	158.5	24.2	158.5	26.1	158.5	41.4
44	25.3	158.5	24.7	158.5	24.2	158.5	23.9	158.5	25.7	158.5	41.4
45	25	158.5	24.4	158.5	24	158.5	23.7	158.5	25.5	158.5	41.4

46	24.8	158.5	24.2	158.5	23.8	158.5	23.5	158.5	25.2	158.5	41.4
47	24.7	158.5	24.1	158.5	23.7	158.5	23.4	158.5	25.1	158.5	41.4
48	24.6	158.5	24.1	158.5	23.7	158.5	23.4	158.5	25	158.5	41.4

Figure 24.2: Longitudinal Positive Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 46ft, Deck width = 48ft, One Left Railing with Edge Loading.

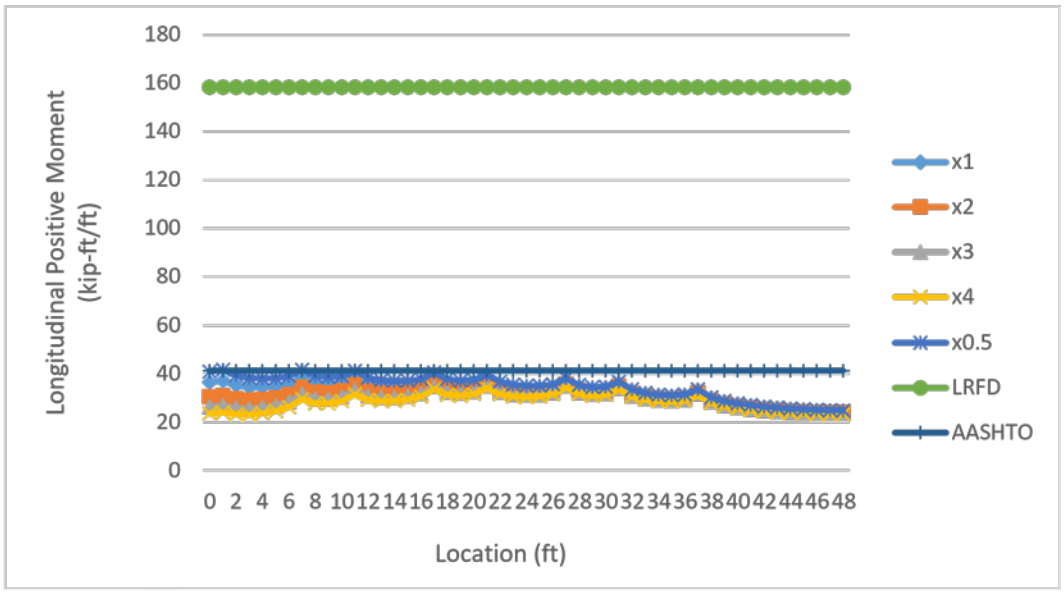

Table 24.3: Longitudinal Positive Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 46ft, Deck width = 48ft, One Right Railings with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	47.1	158.5	46.8	158.5	46.5	158.5	46.4	158.5	47.4	158.5	41.4
1	48.3	158.5	47.9	158.5	47.7	158.5	47.7	158.5	48.7	158.5	41.4
2	44.7	158.5	44.4	158.5	44.1	158.5	43.9	158.5	45	158.5	41.4
3	43.2	158.5	42.8	158.5	42.5	158.5	42.3	158.5	43.4	158.5	41.4
4	42.4	158.5	42	158.5	41.7	158.5	41.5	158.5	42.7	158.5	41.4
5	42.2	158.5	41.8	158.5	41.5	158.5	41.3	158.5	42.5	158.5	41.4
6	42.7	158.5	42.3	158.5	42	158.5	41.8	158.5	43	158.5	41.4
7	45.1	158.5	44.7	158.5	44.4	158.5	44.2	158.5	45.4	158.5	41.4
8	42.3	158.5	41.8	158.5	41.5	158.5	41.3	158.5	42.6	158.5	41.4
9	41.4	158.5	40.9	158.5	40.6	158.5	40.3	158.5	41.7	158.5	41.4
10	41.6	158.5	41.1	158.5	40.8	158.5	40.5	158.5	42	158.5	41.4
11	43.6	158.5	43.1	158.5	42.7	158.5	42.5	158.5	44	158.5	41.4
12	40.6	158.5	40.1	158.5	39.7	158.5	39.4	158.5	41	158.5	41.4
13	39.3	158.5	38.8	158.5	38.4	158.5	38.1	158.5	39.7	158.5	41.4
14	38.8	158.5	38.2	158.5	37.8	158.5	37.5	158.5	39.2	158.5	41.4
15	38.7	158.5	38.1	158.5	37.7	158.5	37.3	158.5	39.1	158.5	41.4
16	39.3	158.5	38.7	158.5	38.2	158.5	37.9	158.5	39.8	158.5	41.4
17	41.8	158.5	41.1	158.5	40.6	158.5	40.3	158.5	42.3	158.5	41.4
18	38.9	158.5	38.2	158.5	37.7	158.5	37.4	158.5	39.4	158.5	41.4
19	38	158.5	37.3	158.5	36.8	158.5	36.4	158.5	38.5	158.5	41.4

20	38.2	158.5	37.4	158.5	36.9	158.5	36.5	158.5	38.8	158.5	41.4
21	40.3	158.5	39.5	158.5	38.9	158.5	38.5	158.5	40.9	158.5	41.4
22	37	158.5	36.2	158.5	35.6	158.5	35.1	158.5	37.7	158.5	41.4
23	35.7	158.5	34.8	158.5	34.1	158.5	33.7	158.5	36.4	158.5	41.4
24	35.1	158.5	34.1	158.5	33.4	158.5	32.9	158.5	35.8	158.5	41.4
25	34.9	158.5	33.8	158.5	33.1	158.5	32.6	158.5	35.6	158.5	41.4
26	35.4	158.5	34.3	158.5	33.5	158.5	33	158.5	36.1	158.5	41.4
27	37.6	158.5	36.4	158.5	35.6	158.5	35	158.5	38.4	158.5	41.4
28	34.7	158.5	33.5	158.5	32.7	158.5	32	158.5	35.6	158.5	41.4
29	33.6	158.5	32.3	158.5	31.5	158.5	30.8	158.5	34.5	158.5	41.4
30	33.6	158.5	32.3	158.5	31.3	158.5	30.7	158.5	34.6	158.5	41.4
31	35.6	158.5	34.1	158.5	33.1	158.5	32.4	158.5	36.6	158.5	41.4
32	32.2	158.5	30.6	158.5	29.6	158.5	28.8	158.5	33.2	158.5	41.4
33	30.5	158.5	28.9	158.5	27.8	158.5	27	158.5	31.7	158.5	41.4
34	29.7	158.5	28	158.5	26.8	158.5	25.9	158.5	30.8	158.5	41.4
35	29.1	158.5	27.3	158.5	26.1	158.5	25.2	158.5	30.4	158.5	41.4
36	29.3	158.5	27.4	158.5	26.1	158.5	25.1	158.5	30.6	158.5	41.4
37	31.1	158.5	29	158.5	27.7	158.5	26.7	158.5	32.5	158.5	41.4
38	27.7	158.5	25.6	158.5	24.1	158.5	23.1	158.5	29.2	158.5	41.4
39	25.9	158.5	23.7	158.5	22.2	158.5	21.1	158.5	27.5	158.5	41.4
40	24.8	158.5	22.4	158.5	20.8	158.5	19.6	158.5	26.4	158.5	41.4
41	23.8	158.5	21.3	158.5	19.6	158.5	18.3	158.5	25.5	158.5	41.4
42	22.9	158.5	20.3	158.5	18.5	158.5	17.2	158.5	24.8	158.5	41.4
43	22.2	158.5	19.4	158.5	17.6	158.5	16.2	158.5	24.2	158.5	41.4
44	21.6	158.5	18.7	158.5	16.7	158.5	15.2	158.5	23.6	158.5	41.4
45	21	158.5	17.9	158.5	15.8	158.5	14.3	158.5	23.2	158.5	41.4

46	20.5	158.5	17.3	158.5	15.1	158.5	13.5	158.5	22.8	158.5	41.4
47	20	158.5	16.5	158.5	14.2	158.5	12.4	158.5	22.4	158.5	41.4
48	19.9	158.5	16.5	158.5	14.2	158.5	12.5	158.5	22.3	158.5	41.4

Figure 24.3: Longitudinal Positive Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 46ft, Deck width = 48ft, One Right Railings with Edge Loading.

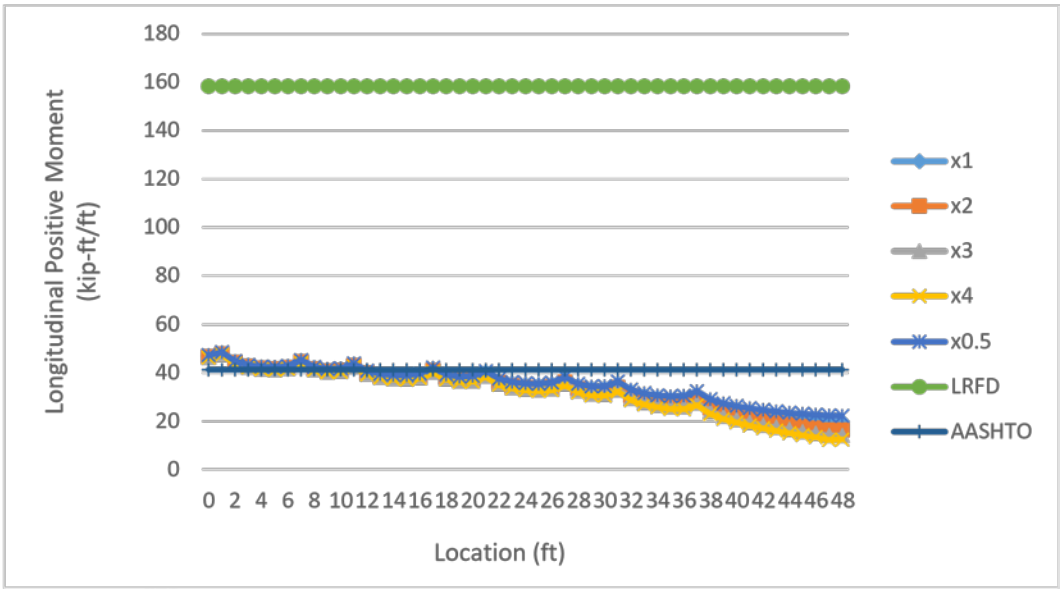

Table 24.4: Longitudinal Positive Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 46ft, Deck width = 36ft, Two Railings with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	36.2	158.5	30	158.5	26	158.5	23.1	158.5	40.7	158.5	41.4
1	36.9	158.5	30.6	158.5	26.5	158.5	23.6	158.5	41.6	158.5	41.4
2	35	158.5	29.2	158.5	25.4	158.5	22.7	158.5	39.2	158.5	41.4
3	34.1	158.5	28.6	158.5	25	158.5	22.4	158.5	38.1	158.5	41.4
4	34.1	158.5	28.9	158.5	25.5	158.5	23	158.5	37.8	158.5	41.4
5	34.4	158.5	29.5	158.5	26.2	158.5	23.9	158.5	38	158.5	41.4
6	35.5	158.5	30.9	158.5	27.7	158.5	25.4	158.5	38.9	158.5	41.4
7	38.3	158.5	33.8	158.5	30.9	158.5	28.8	158.5	41.4	158.5	41.4
8	35.9	158.5	31.7	158.5	28.8	158.5	26.8	158.5	38.9	158.5	41.4
9	35.4	158.5	31.3	158.5	28.6	158.5	26.7	158.5	38.3	158.5	41.4
10	36	158.5	32.1	158.5	29.5	158.5	27.6	158.5	38.7	158.5	41.4
11	38.4	158.5	34.7	158.5	32.3	158.5	30.5	158.5	41.1	158.5	41.4
12	35.6	158.5	32	158.5	29.7	158.5	28	158.5	38.1	158.5	41.4
13	34.6	158.5	31.2	158.5	28.9	158.5	27.3	158.5	37	158.5	41.4
14	34.3	158.5	31.1	158.5	28.9	158.5	27.3	158.5	36.7	158.5	41.4
15	34.5	158.5	31.3	158.5	29.2	158.5	27.7	158.5	36.7	158.5	41.4
16	35.3	158.5	32.4	158.5	30.3	158.5	28.8	158.5	37.5	158.5	41.4
17	38	158.5	35.1	158.5	33.1	158.5	31.7	158.5	40.1	158.5	41.4
18	35.4	158.5	32.5	158.5	30.7	158.5	29.3	158.5	37.4	158.5	41.4
19	34.7	158.5	31.9	158.5	30.1	158.5	28.8	158.5	36.6	158.5	41.4

20	35	158.5	32.4	158.5	30.6	158.5	29.3	158.5	36.9	158.5	41.4
21	37.3	158.5	34.7	158.5	33	158.5	31.8	158.5	39.2	158.5	41.4
22	34.3	158.5	31.8	158.5	30.1	158.5	28.8	158.5	36.1	158.5	41.4
23	33.1	158.5	30.6	158.5	28.9	158.5	27.7	158.5	34.9	158.5	41.4
24	32.6	158.5	30.1	158.5	28.5	158.5	27.3	158.5	34.3	158.5	41.4
25	32.5	158.5	30.1	158.5	28.5	158.5	27.3	158.5	34.2	158.5	41.4
26	33.1	158.5	30.8	158.5	29.2	158.5	28	158.5	34.8	158.5	41.4
27	35.6	158.5	33.2	158.5	31.7	158.5	30.5	158.5	37.3	158.5	41.4
28	32.7	158.5	30.4	158.5	28.8	158.5	27.7	158.5	34.4	158.5	41.4
29	31.8	158.5	29.4	158.5	27.8	158.5	26.7	158.5	33.5	158.5	41.4
30	31.9	158.5	29.5	158.5	28	158.5	26.8	158.5	33.6	158.5	41.4
31	33.8	158.5	31.4	158.5	29.9	158.5	28.8	158.5	35.5	158.5	41.4
32	30.6	158.5	28.2	158.5	26.6	158.5	25.5	158.5	32.3	158.5	41.4
33	29.1	158.5	26.7	158.5	25	158.5	23.9	158.5	30.8	158.5	41.4
34	28.3	158.5	25.8	158.5	24.2	158.5	23	158.5	30	158.5	41.4
35	27.8	158.5	25.3	158.5	23.6	158.5	22.5	158.5	29.6	158.5	41.4
36	28.1	158.5	25.5	158.5	23.8	158.5	22.6	158.5	29.9	158.5	41.4
37	29.9	158.5	27.3	158.5	25.7	158.5	24.5	158.5	31.8	158.5	41.4
38	26.6	158.5	23.9	158.5	22.1	158.5	20.9	158.5	28.4	158.5	41.4
39	24.9	158.5	22.1	158.5	20.3	158.5	19	158.5	26.9	158.5	41.4
40	23.8	158.5	20.9	158.5	19	158.5	17.7	158.5	25.8	158.5	41.4
41	22.8	158.5	19.9	158.5	17.9	158.5	16.5	158.5	24.9	158.5	41.4
42	22	158.5	19	158.5	17	158.5	15.5	158.5	24.2	158.5	41.4
43	21.4	158.5	18.2	158.5	16.1	158.5	14.6	158.5	23.6	158.5	41.4
44	20.8	158.5	17.5	158.5	15.3	158.5	13.8	158.5	23.1	158.5	41.4
45	20.2	158.5	16.8	158.5	14.6	158.5	13	158.5	22.7	158.5	41.4

46	19.8	158.5	16.3	158.5	13.9	158.5	12.3	158.5	22.3	158.5	41.4
47	19.3	158.5	15.6	158.5	13.1	158.5	11.4	158.5	22	158.5	41.4
48	19.3	158.5	15.6	158.5	13.2	158.5	11.5	158.5	21.9	158.5	41.4

Figure 24.4: Longitudinal Positive Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 46ft, Deck width = 36ft, Two Railings with Edge Loading.

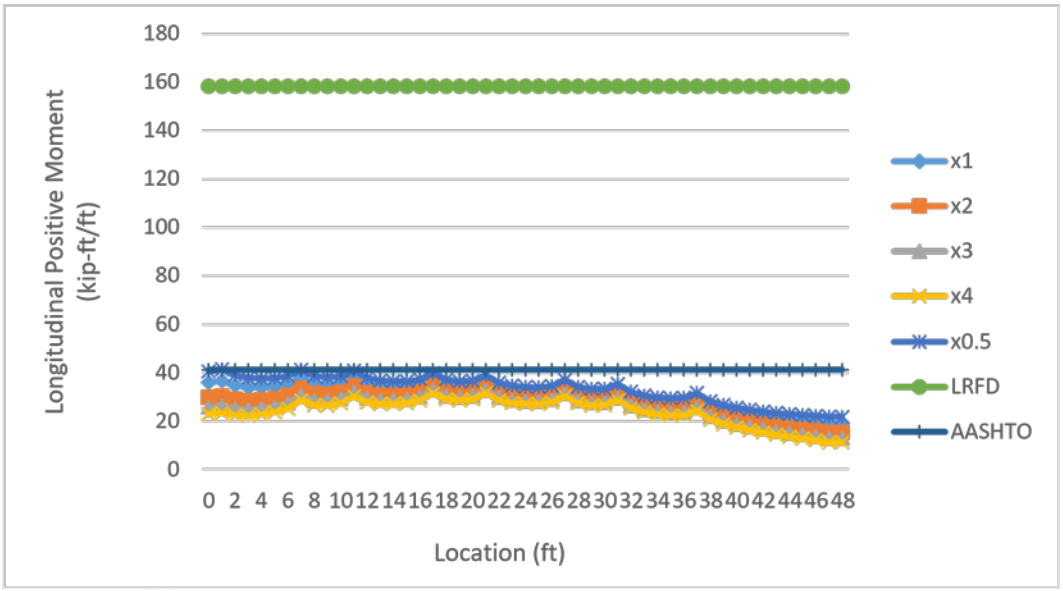

Table 25.1: Longitudinal Negative Moment Distribution at Critical Section for One-Lane Two 28Span Bridge Deck Span = 54ft, Deck width = 14ft, No Railing with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	36.3	64.9	36.3	64.9	36.3	64.9	36.3	64.9	36.3	64.9	50.2
1	53.3	64.9	53.3	64.9	53.3	64.9	53.3	64.9	53.3	64.9	50.2
2	53.2	64.9	53.2	64.9	53.2	64.9	53.2	64.9	53.2	64.9	50.2
3	52.4	64.9	52.4	64.9	52.4	64.9	52.4	64.9	52.4	64.9	50.2
4	51.1	64.9	51.1	64.9	51.1	64.9	51.1	64.9	51.1	64.9	50.2
5	49.8	64.9	49.8	64.9	49.8	64.9	49.8	64.9	49.8	64.9	50.2
6	48.6	64.9	48.6	64.9	48.6	64.9	48.6	64.9	48.6	64.9	50.2
7	47.4	64.9	47.4	64.9	47.4	64.9	47.4	64.9	47.4	64.9	50.2
8	46.2	64.9	46.2	64.9	46.2	64.9	46.2	64.9	46.2	64.9	50.2
9	45	64.9	45	64.9	45	64.9	45	64.9	45	64.9	50.2
10	43.6	64.9	43.6	64.9	43.6	64.9	43.6	64.9	43.6	64.9	50.2
11	41.8	64.9	41.8	64.9	41.8	64.9	41.8	64.9	41.8	64.9	50.2
12	39.1	64.9	39.1	64.9	39.1	64.9	39.1	64.9	39.1	64.9	50.2
13	34.2	64.9	34.2	64.9	34.2	64.9	34.2	64.9	34.2	64.9	50.2
14	15.2	64.9	15.2	64.9	15.2	64.9	15.2	64.9	15.2	64.9	50.2

Figure 25.1: Longitudinal Negative Moment Distribution at Critical Section for One-Lane Two 28Span Bridge Deck Span = 54ft, Deck width = 14ft, No Railing with Edge Loading.

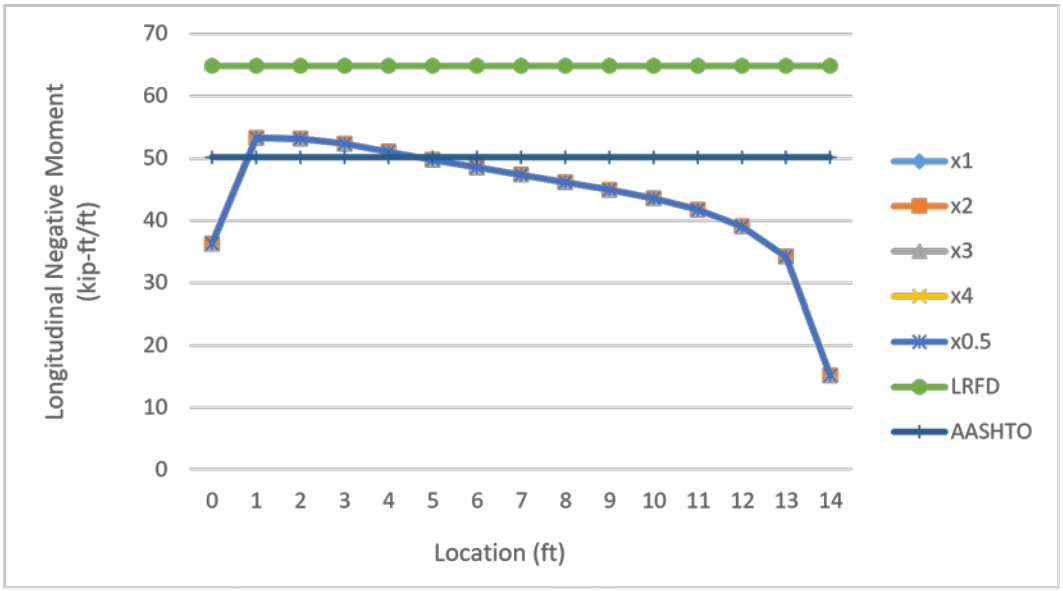

Table 25.2: Longitudinal Negative Moment Distribution at Critical Section for One-Lane Two Span Bridge Deck Span = 54ft, Deck width = 14ft, One Left Railing with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	35.1	64.9	34	64.9	33.2	64.9	32.7	64.9	35.9	64.9	50.2
1	42.2	64.9	34.7	64.9	29.7	64.9	26.1	64.9	47.5	64.9	50.2
2	41.4	64.9	34.4	64.9	29.8	64.9	26.5	64.9	46.5	64.9	50.2
3	40.4	64.9	33.4	64.9	28.7	64.9	25.4	64.9	45.5	64.9	50.2
4	39.5	64.9	32.8	64.9	28.3	64.9	25.1	64.9	44.4	64.9	50.2
5	38.7	64.9	32.2	64.9	27.9	64.9	24.9	64.9	43.4	64.9	50.2
6	38	64.9	31.8	64.9	27.7	64.9	24.8	64.9	42.5	64.9	50.2
7	37.3	64.9	31.4	64.9	27.5	64.9	24.7	64.9	41.6	64.9	50.2
8	36.7	64.9	31.1	64.9	27.4	64.9	24.7	64.9	40.7	64.9	50.2
9	36	64.9	30.7	64.9	27.2	64.9	24.7	64.9	39.8	64.9	50.2
10	35.5	64.9	30.3	64.9	27.1	64.9	24.7	64.9	38.8	64.9	50.2
11	34.3	64.9	29.8	64.9	26.8	64.9	24.6	64.9	37.5	64.9	50.2
12	32.6	64.9	28.7	64.9	26.1	64.9	24.2	64.9	35.4	64.9	50.2
13	29.3	64.9	26.4	64.9	24.4	64.9	23	64.9	31.4	64.9	50.2
14	14.6	64.9	14.1	64.9	13.9	64.9	13.7	64.9	14.9	64.9	50.2

Figure 25.2: Longitudinal Negative Moment Distribution at Critical Section for One-Lane Two Span Bridge Deck Span = 54ft, Deck width = 14ft, One Left Railing with Edge Loading.

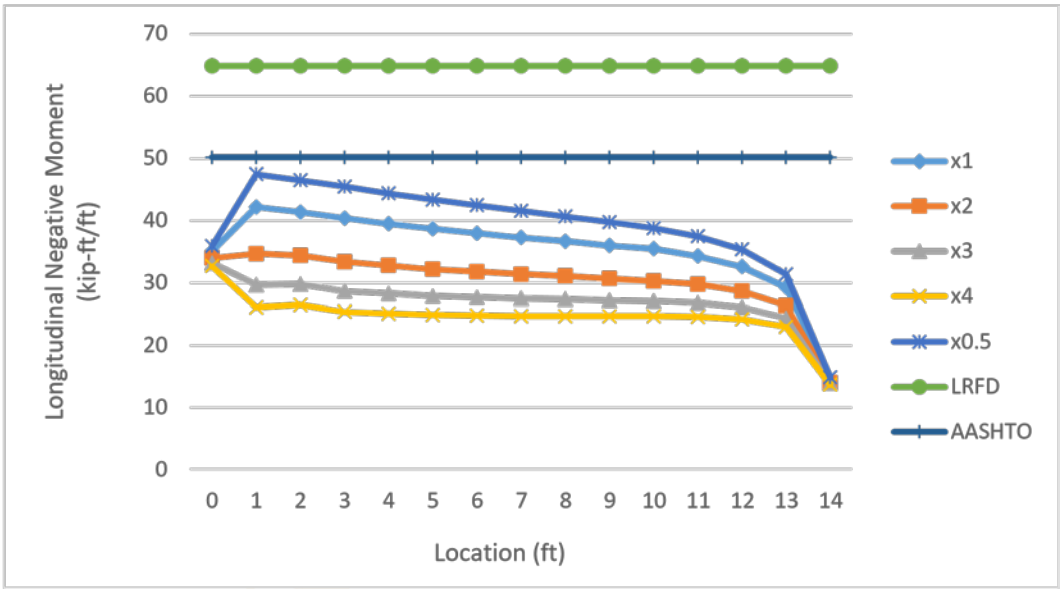

Table 25.3: Longitudinal Negative Moment Distribution at Critical Section for One-Lane Two Span Bridge Deck Span = 54ft, Deck width = 14ft, One Right Railings with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	35.4	64.9	34.9	64.9	34.6	64.9	34.4	64.9	35.8	64.9	50.2
1	49.1	64.9	46.7	64.9	45	64.9	43.9	64.9	50.9	64.9	50.2
2	47.8	64.9	44.6	64.9	42.5	64.9	40.9	64.9	50.1	64.9	50.2
3	46.3	64.9	42.7	64.9	40.2	64.9	38.5	64.9	48.9	64.9	50.2
4	44.5	64.9	40.6	64.9	37.9	64.9	36	64.9	47.3	64.9	50.2
5	42.8	64.9	38.6	64.9	35.8	64.9	33.8	64.9	45.8	64.9	50.2
6	41.3	64.9	36.9	64.9	33.9	64.9	31.8	64.9	44.4	64.9	50.2
7	39.8	64.9	35.2	64.9	32.1	64.9	29.9	64.9	43.1	64.9	50.2
8	38.4	64.9	33.6	64.9	30.5	64.9	28.2	64.9	41.8	64.9	50.2
9	37.1	64.9	32.2	64.9	28.9	64.9	26.5	64.9	40.5	64.9	50.2
10	35.7	64.9	30.7	64.9	27.3	64.9	24.9	64.9	39.2	64.9	50.2
11	34.3	64.9	29.2	64.9	25.8	64.9	23.3	64.9	37.8	64.9	50.2
12	32.4	64.9	27.5	64.9	24.1	64.9	21.7	64.9	35.6	64.9	50.2
13	30.5	64.9	25.7	64.9	22.2	64.9	19.7	64.9	33.4	64.9	50.2
14	15	64.9	14.3	64.9	13.8	64.9	13.4	64.9	15.4	64.9	50.2

Figure 25.3: Longitudinal Negative Moment Distribution at Critical Section for One-Lane Two Span Bridge Deck Span = 54ft, Deck width = 14ft, One Right Railings with Edge Loading.

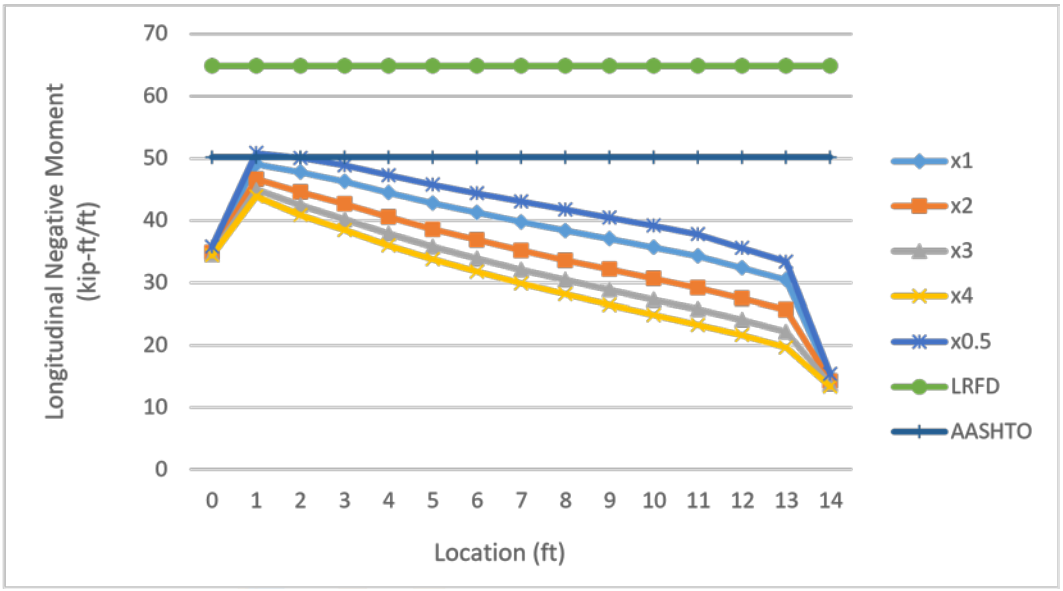

Table 25.4: Longitudinal Negative Moment Distribution at Critical Section for One-Lane Two Span Bridge Deck Span = 54ft, Deck width = 14ft, Two Railings with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	34.4	64.9	33.1	64.9	32.4	64.9	31.9	64.9	35.4	64.9	50.2
1	38.7	64.9	30.4	64.9	25.3	64.9	21.9	64.9	45.2	64.9	50.2
2	37.5	64.9	29.6	64.9	24.8	64.9	21.6	64.9	43.8	64.9	50.2
3	36.1	64.9	27.9	64.9	23	64.9	19.8	64.9	42.6	64.9	50.2
4	34.9	64.9	26.9	64.9	22.1	64.9	18.9	64.9	41.3	64.9	50.2
5	33.8	64.9	25.9	64.9	21.2	64.9	18.1	64.9	40.1	64.9	50.2
6	32.8	64.9	25	64.9	20.4	64.9	17.4	64.9	39	64.9	50.2
7	31.8	64.9	24.2	64.9	19.7	64.9	16.8	64.9	38	64.9	50.2
8	31	64.9	23.5	64.9	19.1	64.9	16.2	64.9	37	64.9	50.2
9	30.1	64.9	22.8	64.9	18.5	64.9	15.6	64.9	36.1	64.9	50.2
10	29.3	64.9	22.1	64.9	17.9	64.9	15.1	64.9	35	64.9	50.2
11	28.5	64.9	21.5	64.9	17.3	64.9	14.6	64.9	34	64.9	50.2
12	27.2	64.9	20.8	64.9	16.9	64.9	14.3	64.9	32.3	64.9	50.2
13	26	64.9	19.8	64.9	16	64.9	13.5	64.9	30.6	64.9	50.2
14	14.5	64.9	13.7	64.9	13.2	64.9	12.8	64.9	15.1	64.9	50.2

Figure 25.4: Longitudinal Negative Moment Distribution at Critical Section for One-Lane Two Span Bridge Deck Span = 54ft, Deck width = 14ft, Two Railings with Edge Loading.

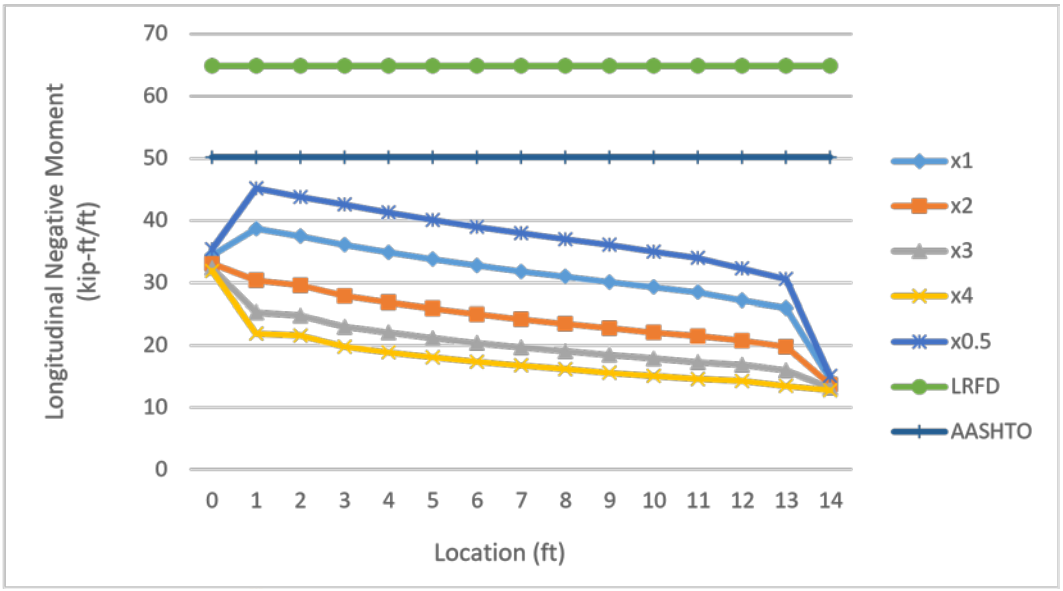

Table 26.1: Longitudinal Positive Moment Distribution at Critical Section for One-Lane Two Span Bridge Deck Span = 54ft, Deck width = 14ft, No Railing with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	44.9	60	44.9	60	44.9	60	44.9	60	44.9	60	50.2
1	46.3	60	46.3	60	46.3	60	46.3	60	46.3	60	50.2
2	42.6	60	42.6	60	42.6	60	42.6	60	42.6	60	50.2
3	41	60	41	60	41	60	41	60	41	60	50.2
4	40.3	60	40.3	60	40.3	60	40.3	60	40.3	60	50.2
5	40	60	40	60	40	60	40	60	40	60	50.2
6	40.4	60	40.4	60	40.4	60	40.4	60	40.4	60	50.2
7	42.6	60	42.6	60	42.6	60	42.6	60	42.6	60	50.2
8	39.5	60	39.5	60	39.5	60	39.5	60	39.5	60	50.2
9	38.1	60	38.1	60	38.1	60	38.1	60	38.1	60	50.2
10	37.2	60	37.2	60	37.2	60	37.2	60	37.2	60	50.2
11	36.7	60	36.7	60	36.7	60	36.7	60	36.7	60	50.2
12	36.3	60	36.3	60	36.3	60	36.3	60	36.3	60	50.2
13	36.1	60	36.1	60	36.1	60	36.1	60	36.1	60	50.2
14	35.9	60	35.9	60	35.9	60	35.9	60	35.9	60	50.2

Figure 26.1: Longitudinal Positive Moment Distribution at Critical Section for One-Lane Two Span Bridge Deck Span = 54ft, Deck width = 14ft, No Railing with Edge Loading.

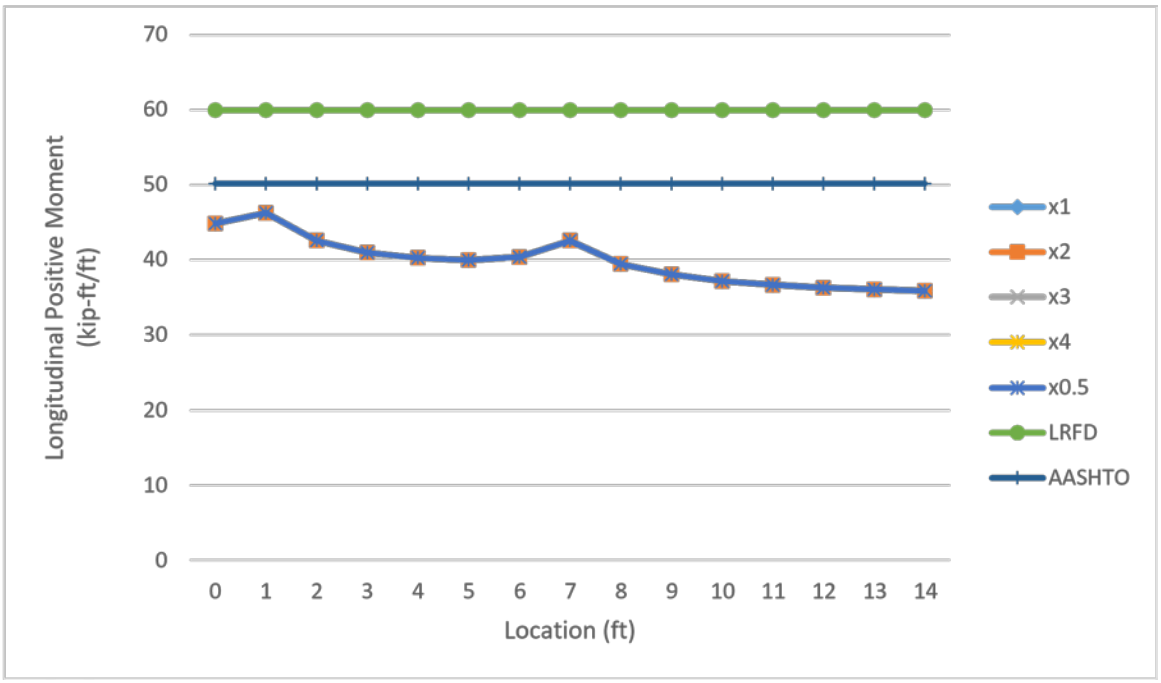

Table 26.2: Longitudinal Positive Moment Distribution at Critical Section for One-Lane Lane Two Span Bridge Deck Span = 54ft, Deck width = 14ft, One Left Railing with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	34.4	60	28.6	60	24.6	60	21.8	60	38.7	60	50.2
1	35.3	60	29.3	60	25.3	60	22.5	60	39.7	60	50.2
2	33	60	27.4	60	23.6	60	20.9	60	37	60	50.2
3	31.8	60	26.4	60	22.7	60	20.1	60	35.7	60	50.2
4	31.5	60	26.3	60	22.7	60	20.1	60	35.3	60	50.2
5	31.6	60	26.5	60	23	60	20.5	60	35.2	60	50.2
6	32.3	60	27.3	60	23.9	60	21.4	60	35.8	60	50.2
7	34.7	60	29.8	60	26.5	60	24.1	60	38.1	60	50.2
8	31.7	60	26.9	60	23.7	60	21.3	60	35.1	60	50.2
9	30.5	60	25.8	60	22.6	60	20.3	60	33.8	60	50.2
10	29.8	60	25.2	60	22	60	19.8	60	33	60	50.2
11	29.4	60	24.8	60	21.7	60	19.4	60	32.5	60	50.2
12	29.1	60	24.6	60	21.5	60	19.3	60	32.2	60	50.2
13	28.9	60	24.4	60	21.4	60	19.2	60	32	60	50.2
14	28.8	60	24.4	60	21.4	60	19.2	60	31.9	60	50.2

Figure 26.2: Longitudinal Positive Moment Distribution at Critical Section for One-Lane Lane Two Span Bridge Deck Span = 54ft, Deck width = 14ft, One Left Railing with Edge Loading.

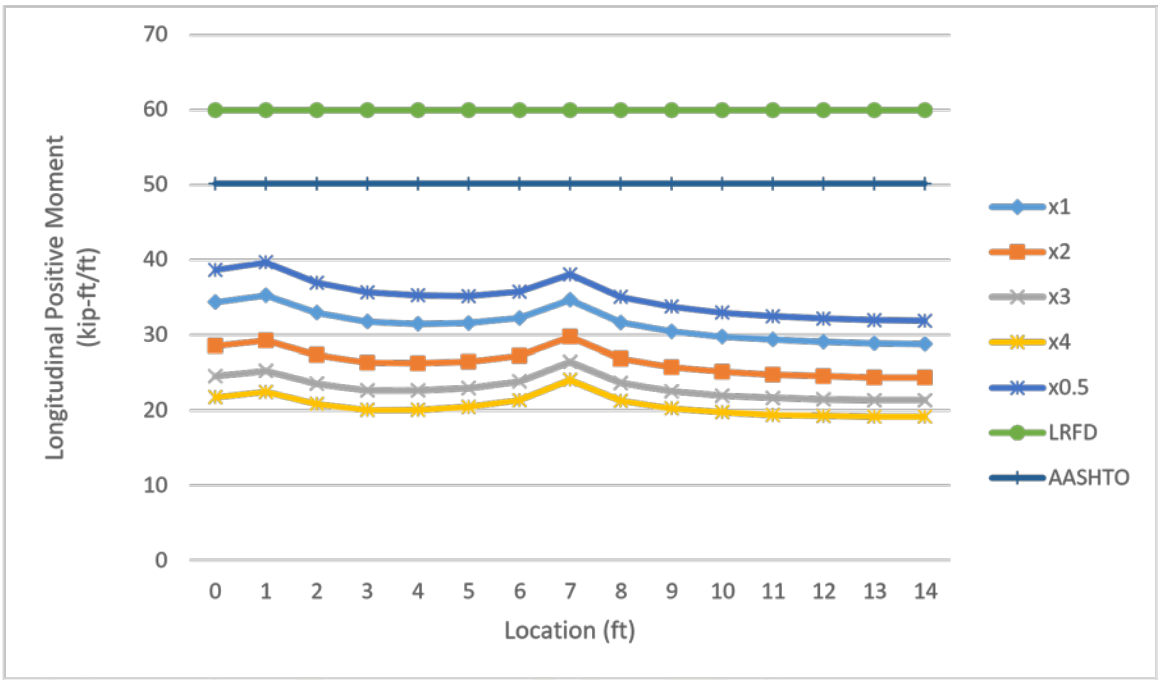

Table 26.3: Longitudinal Positive Moment Distribution at Critical Section for One-Lane Two Span Bridge Deck Span = 54ft, Deck width = 14ft, One Right Railings with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	38.5	60	34.6	60	31.9	60	29.9	60	41.3	60	50.2
1	39.8	60	35.8	60	33.1	60	31.1	60	42.6	60	50.2
2	36.1	60	32	60	29.3	60	27.3	60	38.9	60	50.2
3	34.5	60	30.4	60	27.6	60	25.6	60	37.3	60	50.2
4	33.6	60	29.5	60	26.6	60	24.6	60	36.5	60	50.2
5	33.2	60	29	60	26.1	60	24.1	60	36.1	60	50.2
6	33.5	60	29.2	60	26.3	60	24.2	60	36.5	60	50.2
7	35.6	60	31.3	60	28.3	60	26.2	60	38.7	60	50.2
8	32.3	60	27.9	60	24.8	60	22.6	60	35.4	60	50.2
9	30.8	60	26.2	60	23.1	60	20.9	60	33.9	60	50.2
10	29.8	60	25.1	60	22	60	19.7	60	33	60	50.2
11	29	60	24.3	60	21	60	18.7	60	32.3	60	50.2
12	28.4	60	23.6	60	20.3	60	17.9	60	31.8	60	50.2
13	27.9	60	22.8	60	19.4	60	16.9	60	31.4	60	50.2
14	27.8	60	22.8	60	19.4	60	17	60	31.3	60	50.2

Figure 26.3: Longitudinal Positive Moment Distribution at Critical Section for One-Lane Two Span Bridge Deck Span = 54ft, Deck width = 14ft, One Right Railings with Edge Loading.

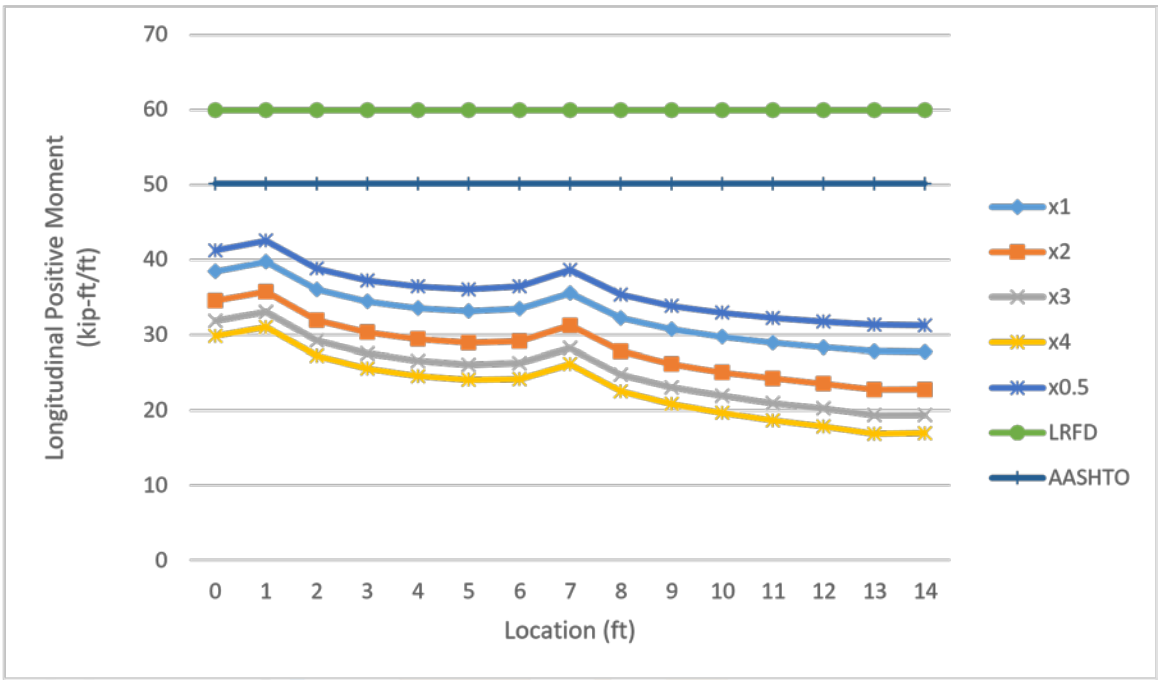

Table 26.4: Longitudinal Positive Moment Distribution at Critical Section for One-Lane Two Span Bridge Deck Span = 54ft, Deck width = 14ft, Two Railings with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	30.3	60	23.7	60	19.8	60	17.3	60	35.9	60	50.2
1	31.2	60	24.4	60	20.4	60	17.8	60	36.8	60	50.2
2	28.7	60	22.3	60	18.5	60	16	60	34.1	60	50.2
3	27.5	60	21.2	60	17.4	60	15	60	32.8	60	50.2
4	27.1	60	20.9	60	17.2	60	14.8	60	32.3	60	50.2
5	27	60	20.9	60	17.3	60	14.9	60	32.1	60	50.2
6	27.6	60	21.5	60	17.9	60	15.6	60	32.6	60	50.2
7	29.9	60	23.9	60	20.3	60	18	60	34.9	60	50.2
8	26.8	60	20.8	60	17.2	60	14.9	60	31.8	60	50.2
9	25.4	60	19.4	60	15.9	60	13.5	60	30.4	60	50.2
10	24.6	60	18.6	60	15	60	12.7	60	29.6	60	50.2
11	24	60	17.9	60	14.4	60	12	60	29	60	50.2
12	23.5	60	17.4	60	13.9	60	11.5	60	28.5	60	50.2
13	23	60	16.9	60	13.3	60	10.9	60	28.1	60	50.2
14	23	60	16.9	60	13.4	60	11	60	28.1	60	50.2

Figure 26.4: Longitudinal Positive Moment Distribution at Critical Section for One-Lane Two Span Bridge Deck Span = 54ft, Deck width = 14ft, Two Railings with Edge Loading.

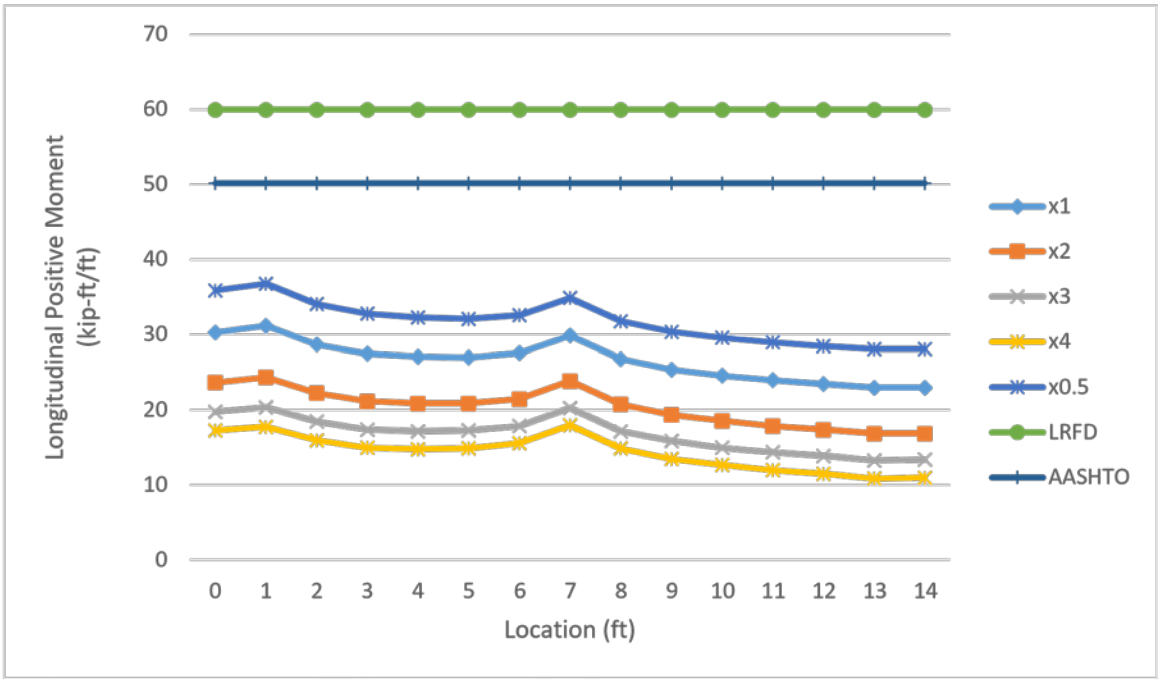

Table 27.1: Longitudinal Negative Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 54ft, Deck width = 24ft, No Railing with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	42.7	120.2	42.7	120.2	42.7	120.2	42.7	120.2	42.7	120.2	50.2
1	63.5	120.2	63.5	120.2	63.5	120.2	63.5	120.2	63.5	120.2	50.2
2	63.9	120.2	63.9	120.2	63.9	120.2	63.9	120.2	63.9	120.2	50.2
3	63.3	120.2	63.3	120.2	63.3	120.2	63.3	120.2	63.3	120.2	50.2
4	62	120.2	62	120.2	62	120.2	62	120.2	62	120.2	50.2
5	60.7	120.2	60.7	120.2	60.7	120.2	60.7	120.2	60.7	120.2	50.2
6	59.4	120.2	59.4	120.2	59.4	120.2	59.4	120.2	59.4	120.2	50.2
7	58.2	120.2	58.2	120.2	58.2	120.2	58.2	120.2	58.2	120.2	50.2
8	57.1	120.2	57.1	120.2	57.1	120.2	57.1	120.2	57.1	120.2	50.2
9	56.1	120.2	56.1	120.2	56.1	120.2	56.1	120.2	56.1	120.2	50.2
10	55.1	120.2	55.1	120.2	55.1	120.2	55.1	120.2	55.1	120.2	50.2
11	54.2	120.2	54.2	120.2	54.2	120.2	54.2	120.2	54.2	120.2	50.2
12	53.4	120.2	53.4	120.2	53.4	120.2	53.4	120.2	53.4	120.2	50.2
13	52.5	120.2	52.5	120.2	52.5	120.2	52.5	120.2	52.5	120.2	50.2
14	51.7	120.2	51.7	120.2	51.7	120.2	51.7	120.2	51.7	120.2	50.2
15	51	120.2	51	120.2	51	120.2	51	120.2	51	120.2	50.2
16	50.2	120.2	50.2	120.2	50.2	120.2	50.2	120.2	50.2	120.2	50.2
17	49.5	120.2	49.5	120.2	49.5	120.2	49.5	120.2	49.5	120.2	50.2
18	48.7	120.2	48.7	120.2	48.7	120.2	48.7	120.2	48.7	120.2	50.2
19	47.8	120.2	47.8	120.2	47.8	120.2	47.8	120.2	47.8	120.2	50.2

20	46.8	120.2	46.8	120.2	46.8	120.2	46.8	120.2	46.8	120.2	50.2
21	45.3	120.2	45.3	120.2	45.3	120.2	45.3	120.2	45.3	120.2	50.2
22	42.9	120.2	42.9	120.2	42.9	120.2	42.9	120.2	42.9	120.2	50.2
23	38.1	120.2	38.1	120.2	38.1	120.2	38.1	120.2	38.1	120.2	50.2
24	18.2	120.2	18.2	120.2	18.2	120.2	18.2	120.2	18.2	120.2	50.2

Figure 27.1: Longitudinal Negative Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 54ft, Deck width = 24ft, No Railing with Edge Loading.

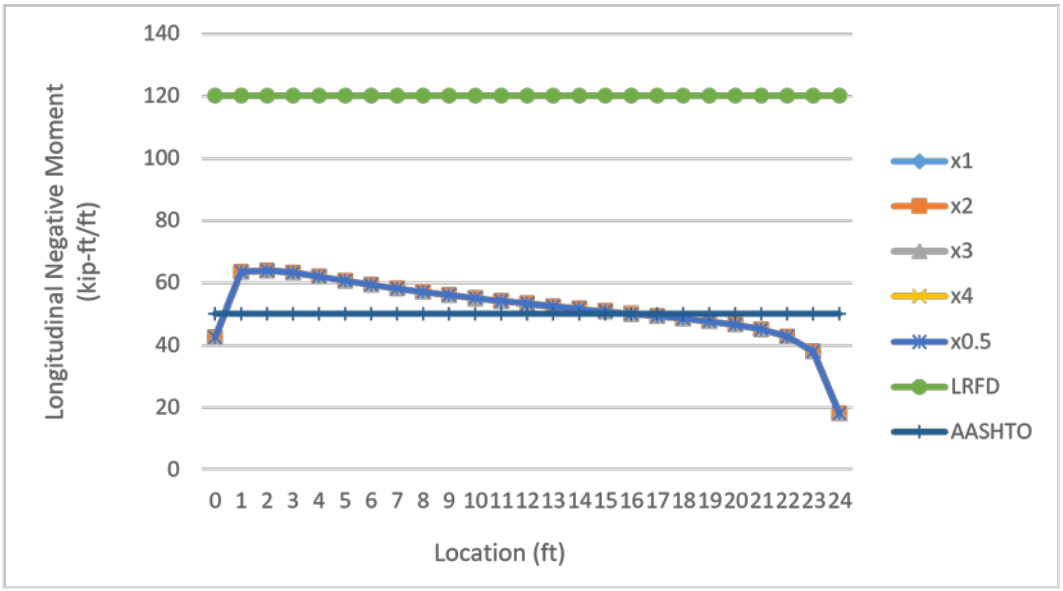

Table 27.2: Longitudinal Negative Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 54ft, Deck width = 24ft, One Left Railing with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	43	120.2	42.8	120.2	42.6	120.2	42.5	120.2	43.1	120.2	50.2
1	53.4	120.2	45.5	120.2	39.9	120.2	35.7	120.2	58.6	120.2	50.2
2	52.7	120.2	45.4	120.2	40.3	120.2	36.5	120.2	57.7	120.2	50.2
3	51.8	120.2	44.4	120.2	39.2	120.2	35.4	120.2	56.8	120.2	50.2
4	50.9	120.2	43.9	120.2	39	120.2	35.3	120.2	55.8	120.2	50.2
5	50.2	120.2	43.4	120.2	38.7	120.2	35.2	120.2	54.8	120.2	50.2
6	49.5	120.2	43.1	120.2	38.6	120.2	35.3	120.2	53.8	120.2	50.2
7	48.8	120.2	42.8	120.2	38.6	120.2	35.4	120.2	52.9	120.2	50.2
8	48.3	120.2	42.5	120.2	38.5	120.2	35.6	120.2	52.1	120.2	50.2
9	47.7	120.2	42.3	120.2	38.6	120.2	35.7	120.2	51.4	120.2	50.2
10	47.3	120.2	42.2	120.2	38.6	120.2	35.9	120.2	50.7	120.2	50.2
11	46.8	120.2	42	120.2	38.6	120.2	36.1	120.2	50	120.2	50.2
12	46.4	120.2	41.8	120.2	38.6	120.2	36.3	120.2	49.4	120.2	50.2
13	46	120.2	41.7	120.2	38.7	120.2	36.4	120.2	48.9	120.2	50.2
14	45.6	120.2	41.6	120.2	38.7	120.2	36.6	120.2	48.3	120.2	50.2
15	45.2	120.2	41.4	120.2	38.8	120.2	36.8	120.2	47.7	120.2	50.2
16	44.8	120.2	41.3	120.2	38.8	120.2	37	120.2	47.2	120.2	50.2
17	44.5	120.2	41.2	120.2	38.9	120.2	37.2	120.2	46.7	120.2	50.2
18	44.1	120.2	41.1	120.2	39	120.2	37.4	120.2	46.1	120.2	50.2
19	43.7	120.2	40.9	120.2	39	120.2	37.5	120.2	45.5	120.2	50.2

20	43.1	120.2	40.6	120.2	38.9	120.2	37.6	120.2	44.7	120.2	50.2
21	42.2	120.2	40.2	120.2	38.7	120.2	37.6	120.2	43.6	120.2	50.2
22	40.6	120.2	39	120.2	37.9	120.2	37	120.2	41.6	120.2	50.2
23	37	120.2	36.3	120.2	35.7	120.2	35.3	120.2	37.5	120.2	50.2
24	19.9	120.2	20.6	120.2	21.2	120.2	21.5	120.2	19.4	120.2	50.2

Figure 27.2: Longitudinal Negative Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 54ft, Deck width = 24ft, One Left Railing with Edge Loading.

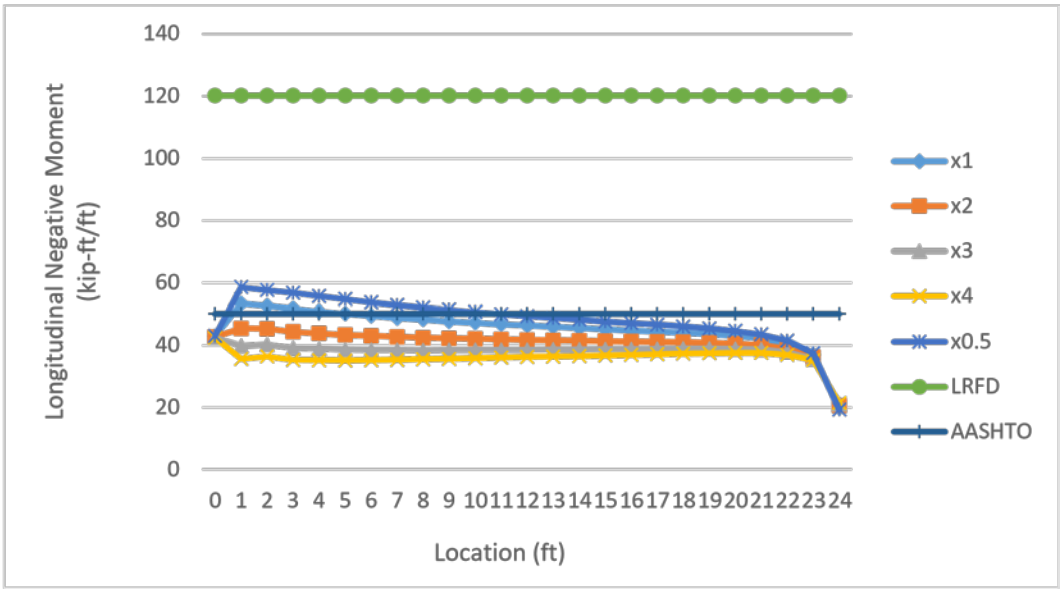

Table 27.3: Longitudinal Negative Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 54ft, Deck width = 24ft, One Right Railings with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	43	120.2	43.6	120.2	43.9	120.2	44.2	120.2	42.7	120.2	50.2
1	62.5	120.2	61.8	120.2	61.4	120.2	61	120.2	62.9	120.2	50.2
2	62	120.2	60.8	120.2	59.9	120.2	59.2	120.2	62.8	120.2	50.2
3	60.8	120.2	59.2	120.2	58.1	120.2	57.2	120.2	61.9	120.2	50.2
4	59.1	120.2	57.3	120.2	55.9	120.2	54.9	120.2	60.4	120.2	50.2
5	57.5	120.2	55.4	120.2	53.9	120.2	52.8	120.2	58.9	120.2	50.2
6	55.9	120.2	53.6	120.2	52	120.2	50.8	120.2	57.5	120.2	50.2
7	54.5	120.2	52	120.2	50.2	120.2	48.9	120.2	56.1	120.2	50.2
8	53.1	120.2	50.4	120.2	48.6	120.2	47.2	120.2	54.9	120.2	50.2
9	51.8	120.2	49	120.2	47	120.2	45.5	120.2	53.7	120.2	50.2
10	50.6	120.2	47.6	120.2	45.5	120.2	43.9	120.2	52.6	120.2	50.2
11	49.4	120.2	46.2	120.2	44	120.2	42.3	120.2	51.5	120.2	50.2
12	48.3	120.2	44.9	120.2	42.6	120.2	40.8	120.2	50.5	120.2	50.2
13	47.2	120.2	43.7	120.2	41.2	120.2	39.3	120.2	49.6	120.2	50.2
14	46.2	120.2	42.5	120.2	39.8	120.2	37.9	120.2	48.6	120.2	50.2
15	45.1	120.2	41.3	120.2	38.5	120.2	36.4	120.2	47.7	120.2	50.2
16	44.1	120.2	40.1	120.2	37.2	120.2	35	120.2	46.8	120.2	50.2
17	43.2	120.2	38.9	120.2	35.9	120.2	33.6	120.2	46	120.2	50.2
18	42.2	120.2	37.7	120.2	34.6	120.2	32.2	120.2	45.1	120.2	50.2
19	41.2	120.2	36.6	120.2	33.3	120.2	30.8	120.2	44.2	120.2	50.2

20	40.1	120.2	35.4	120.2	32	120.2	29.5	120.2	43.2	120.2	50.2
21	39	120.2	34.2	120.2	30.7	120.2	28.1	120.2	42.1	120.2	50.2
22	37.4	120.2	32.8	120.2	29.4	120.2	26.8	120.2	40.2	120.2	50.2
23	35.7	120.2	31.1	120.2	27.6	120.2	24.9	120.2	38.2	120.2	50.2
24	19.3	120.2	19.4	120.2	19.5	120.2	19.5	120.2	19.2	120.2	50.2

Figure 27.3: Longitudinal Negative Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 54ft, Deck width = 24ft, One Right Railings with Edge Loading.

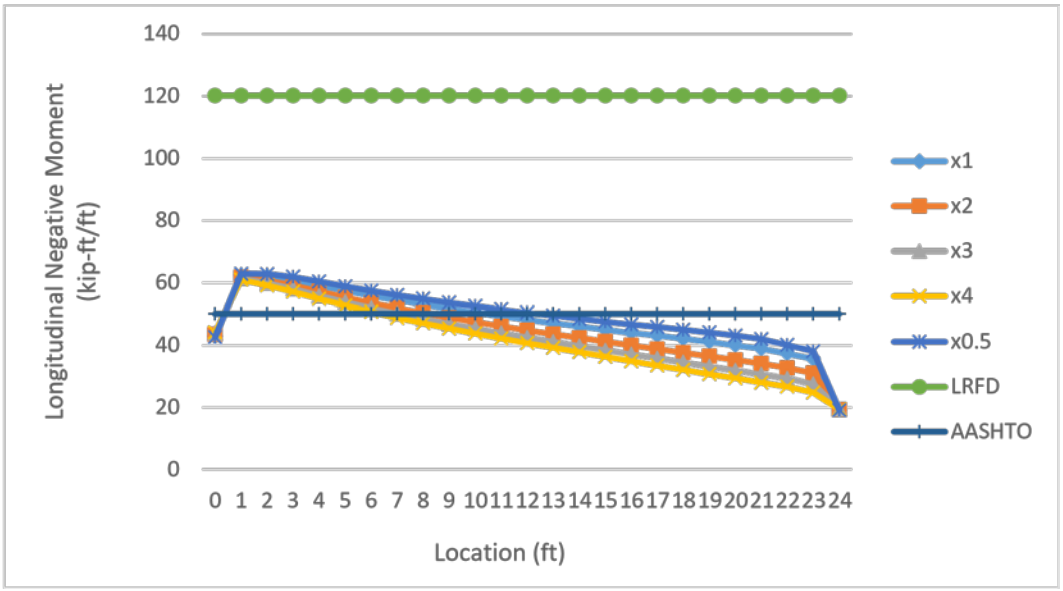

Table 27.4: Longitudinal Negative Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 54ft, Deck width = 24ft, Two Railings with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	43.5	120.2	43.7	120.2	43.8	120.2	43.9	120.2	43.3	120.2	50.2
1	52	120.2	43.4	120.2	37.5	120.2	33.3	120.2	57.8	120.2	50.2
2	51	120.2	42.8	120.2	37.4	120.2	33.5	120.2	56.6	120.2	50.2
3	49.6	120.2	41.3	120.2	35.6	120.2	31.6	120.2	55.6	120.2	50.2
4	48.5	120.2	40.3	120.2	34.9	120.2	31	120.2	54.3	120.2	50.2
5	47.4	120.2	39.5	120.2	34.2	120.2	30.4	120.2	53.1	120.2	50.2
6	46.5	120.2	38.7	120.2	33.6	120.2	29.9	120.2	52	120.2	50.2
7	45.6	120.2	38.1	120.2	33.1	120.2	29.5	120.2	51	120.2	50.2
8	44.8	120.2	37.5	120.2	32.6	120.2	29.1	120.2	50.1	120.2	50.2
9	44	120.2	36.9	120.2	32.1	120.2	28.7	120.2	49.2	120.2	50.2
10	43.3	120.2	36.3	120.2	31.6	120.2	28.3	120.2	48.4	120.2	50.2
11	42.6	120.2	35.7	120.2	31.1	120.2	27.9	120.2	47.6	120.2	50.2
12	41.9	120.2	35.2	120.2	30.7	120.2	27.4	120.2	46.8	120.2	50.2
13	41.3	120.2	34.6	120.2	30.1	120.2	27	120.2	46.1	120.2	50.2
14	40.6	120.2	34	120.2	29.6	120.2	26.5	120.2	45.4	120.2	50.2
15	40	120.2	33.4	120.2	29	120.2	25.9	120.2	44.7	120.2	50.2
16	39.4	120.2	32.8	120.2	28.5	120.2	25.4	120.2	44	120.2	50.2
17	38.7	120.2	32.2	120.2	27.9	120.2	24.8	120.2	43.4	120.2	50.2
18	38.1	120.2	31.6	120.2	27.3	120.2	24.5	120.2	42.7	120.2	50.2
19	37.5	120.2	31	120.2	26.7	120.2	23.7	120.2	42	120.2	50.2

20	36.8	120.2	30.5	120.2	26.2	120.2	23.2	120.2	41.2	120.2	50.2
21	36.1	120.2	29.9	120.2	25.6	120.2	22.6	120.2	40.4	120.2	50.2
22	35	120.2	29.2	120.2	25.3	120.2	22.4	120.2	38.9	120.2	50.2
23	33.9	120.2	28.3	120.2	24.3	120.2	21.4	120.2	37.3	120.2	50.2
24	20.4	120.2	21	120.2	21.4	120.2	21.6	120.2	19.8	120.2	50.2

Figure 27.4: Longitudinal Negative Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 54ft, Deck width = 24ft, Two Railings with Edge Loading.

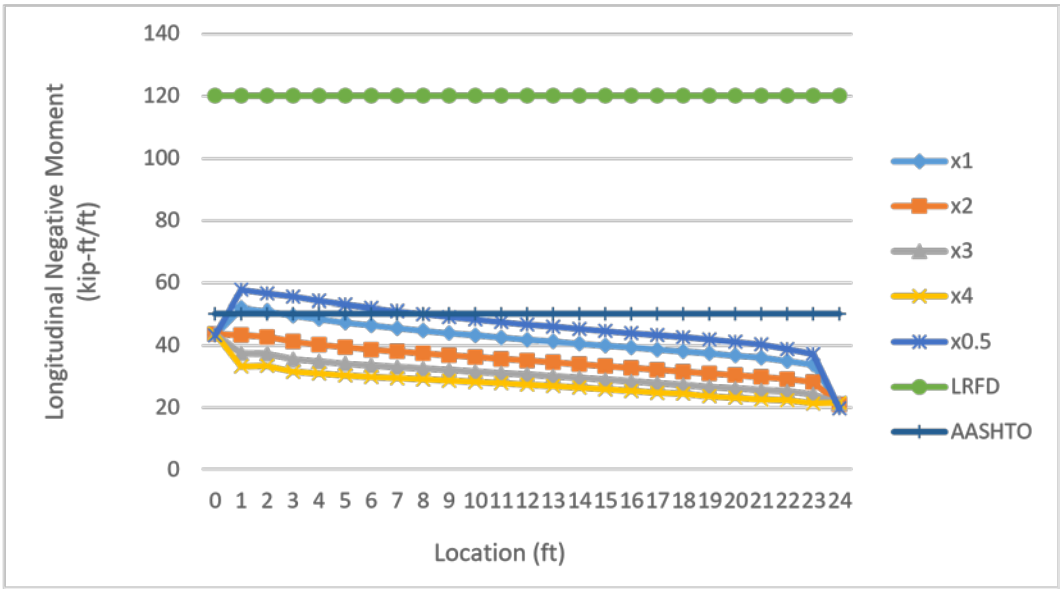

Table 28.1: Longitudinal Positive Moment Distribution at Critical Section for Two-Lane Lane Two Span Bridge Deck Span = 54ft, Deck width = 24ft, No Railing with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	53.2	114.4	53.2	114.4	53.2	114.4	53.2	114.4	53.2	114.4	50.2
1	54.5	114.4	54.5	114.4	54.5	114.4	54.5	114.4	54.5	114.4	50.2
2	50.8	114.4	50.8	114.4	50.8	114.4	50.8	114.4	50.8	114.4	50.2
3	49.2	114.4	49.2	114.4	49.2	114.4	49.2	114.4	49.2	114.4	50.2
4	48.5	114.4	48.5	114.4	48.5	114.4	48.5	114.4	48.5	114.4	50.2
5	48.2	114.4	48.2	114.4	48.2	114.4	48.2	114.4	48.2	114.4	50.2
6	48.8	114.4	48.8	114.4	48.8	114.4	48.8	114.4	48.8	114.4	50.2
7	51.2	114.4	51.2	114.4	51.2	114.4	51.2	114.4	51.2	114.4	50.2
8	48.3	114.4	48.3	114.4	48.3	114.4	48.3	114.4	48.3	114.4	50.2
9	47.4	114.4	47.4	114.4	47.4	114.4	47.4	114.4	47.4	114.4	50.2
10	47.6	114.4	47.6	114.4	47.6	114.4	47.6	114.4	47.6	114.4	50.2
11	49.6	114.4	49.6	114.4	49.6	114.4	49.6	114.4	49.6	114.4	50.2
12	46.5	114.4	46.5	114.4	46.5	114.4	46.5	114.4	46.5	114.4	50.2
13	45.2	114.4	45.2	114.4	45.2	114.4	45.2	114.4	45.2	114.4	50.2
14	44.5	114.4	44.5	114.4	44.5	114.4	44.5	114.4	44.5	114.4	50.2
15	44.3	114.4	44.3	114.4	44.3	114.4	44.3	114.4	44.3	114.4	50.2
16	44.8	114.4	44.8	114.4	44.8	114.4	44.8	114.4	44.8	114.4	50.2
17	47.1	114.4	47.1	114.4	47.1	114.4	47.1	114.4	47.1	114.4	50.2
18	44	114.4	44	114.4	44	114.4	44	114.4	44	114.4	50.2
19	42.6	114.4	42.6	114.4	42.6	114.4	42.6	114.4	42.6	114.4	50.2

20	41.9	114.4	41.9	114.4	41.9	114.4	41.9	114.4	41.9	114.4	50.2
21	41.4	114.4	41.4	114.4	41.4	114.4	41.4	114.4	41.4	114.4	50.2
22	41	114.4	41	114.4	41	114.4	41	114.4	41	114.4	50.2
23	40.8	114.4	40.8	114.4	40.8	114.4	40.8	114.4	40.8	114.4	50.2
24	40.7	114.4	40.7	114.4	40.7	114.4	40.7	114.4	40.7	114.4	50.2

Figure 28.1: Longitudinal Positive Moment Distribution at Critical Section for Two-Lane Lane Two Span Bridge Deck Span = 54ft, Deck width = 24ft, No Railing with Edge Loading.

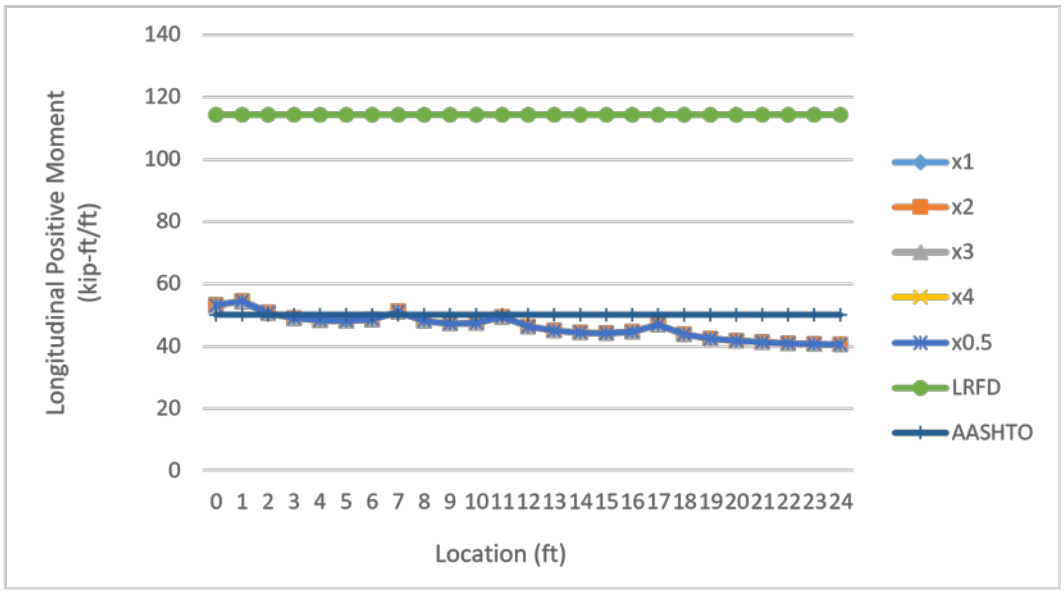

Table 28.2: Longitudinal Positive Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 54ft, Deck width = 24ft, One Left Railing with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	43.4	114.4	37.4	114.4	33.1	114.4	29.8	114.4	47.5	114.4	50.2
1	44.2	114.4	38	114.4	33.6	114.4	30.3	114.4	48.4	114.4	50.2
2	41.9	114.4	36.2	114.4	32.1	114.4	29	114.4	45.7	114.4	50.2
3	40.8	114.4	35.4	114.4	31.4	114.4	28.4	114.4	44.5	114.4	50.2
4	40.6	114.4	35.4	114.4	31.6	114.4	28.7	114.4	44.1	114.4	50.2
5	40.8	114.4	35.8	114.4	32.1	114.4	29.3	114.4	44.1	114.4	50.2
6	41.7	114.4	36.9	114.4	33.3	114.4	30.7	114.4	44.8	114.4	50.2
7	44.4	114.4	39.7	114.4	36.4	114.4	33.8	114.4	47.4	114.4	50.2
8	41.8	114.4	37.3	114.4	34	114.4	31.5	114.4	44.7	114.4	50.2
9	41.1	114.4	36.8	114.4	33.6	114.4	31.2	114.4	43.9	114.4	50.2
10	41.5	114.4	37.3	114.4	34.2	114.4	31.9	114.4	44.2	114.4	50.2
11	43.8	114.4	39.8	114.4	36.8	114.4	34.5	114.4	46.5	114.4	50.2
12	40.8	114.4	36.9	114.4	34	114.4	31.8	114.4	43.4	114.4	50.2
13	39.7	114.4	35.8	114.4	33	114.4	30.9	114.4	42.1	114.4	50.2
14	39.2	114.4	35.5	114.4	32.7	114.4	30.6	114.4	41.6	114.4	50.2
15	39.1	114.4	35.5	114.4	32.9	114.4	30.8	114.4	41.5	114.4	50.2
16	39.8	114.4	36.2	114.4	33.6	114.4	31.6	114.4	42.1	114.4	50.2
17	42.2	114.4	38.7	114.4	36.2	114.4	34.2	114.4	44.4	114.4	50.2
18	39.2	114.4	35.8	114.4	33.3	114.4	31.4	114.4	41.3	114.4	50.2
19	37.9	114.4	34.6	114.4	32.2	114.4	30.3	114.4	40	114.4	50.2

20	37.2	114.4	34	114.4	31.6	114.4	29.8	114.4	39.3	114.4	50.2
21	36.8	114.4	33.6	114.4	31.3	114.4	29.5	114.4	38.9	114.4	50.2
22	36.5	114.4	33.4	114.4	31.1	114.4	29.3	114.4	38.6	114.4	50.2
23	36.4	114.4	33.3	114.4	31	114.4	29.3	114.4	38.4	114.4	50.2
24	36.4	114.4	33.3	114.4	31.1	114.4	29.4	114.4	38.3	114.4	50.2

Figure 28.2: Longitudinal Positive Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 54ft, Deck width = 24ft, One Left Railing with Edge Loading.

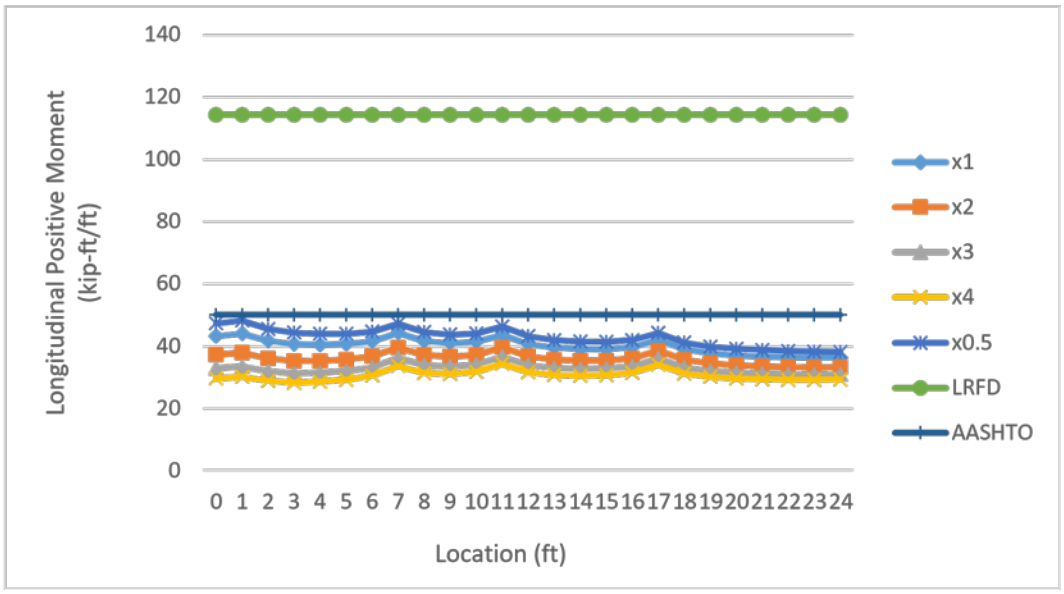

Table 28.3: Longitudinal Positive Moment Distribution at Critical Section for Tow-Lane Two Span Bridge Deck Span = 54ft, Deck width = 24ft, One Right Railings with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	49.5	114.4	46.9	114.4	45	114.4	43.6	114.4	51.2	114.4	50.2
1	50.7	114.4	48.1	114.4	46.2	114.4	44.7	114.4	52.4	114.4	50.2
2	47	114.4	44.3	114.4	42.4	114.4	40.9	114.4	48.7	114.4	50.2
3	45.3	114.4	42.6	114.4	40.6	114.4	39.1	114.4	47.1	114.4	50.2
4	44.5	114.4	41.8	114.4	39.7	114.4	38.2	114.4	46.3	114.4	50.2
5	44.2	114.4	41.4	114.4	39.3	114.4	37.7	114.4	46	114.4	50.2
6	44.6	114.4	41.8	114.4	39.7	114.4	38.1	114.4	46.5	114.4	50.2
7	47	114.4	44	114.4	41.9	114.4	40.2	114.4	48.8	114.4	50.2
8	44	114.4	41	114.4	38.8	114.4	37.1	114.4	45.9	114.4	50.2
9	42.9	114.4	39.9	114.4	37.6	114.4	35.9	114.4	44.9	114.4	50.2
10	43	114.4	39.9	114.4	37.6	114.4	35.8	114.4	45.1	114.4	50.2
11	45	114.4	41.8	114.4	39.4	114.4	37.6	114.4	47.1	114.4	50.2
12	41.7	114.4	38.4	114.4	35.9	114.4	34.1	114.4	43.9	114.4	50.2
13	40.2	114.4	36.8	114.4	34.3	114.4	32.4	114.4	42.5	114.4	50.2
14	39.5	114.4	35.9	114.4	33.3	114.4	31.4	114.4	41.7	114.4	50.2
15	39.1	114.4	35.5	114.4	32.8	114.4	30.7	114.4	41.5	114.4	50.2
16	39.4	114.4	35.7	114.4	32.9	114.4	30.8	114.4	41.9	114.4	50.2
17	41.5	114.4	37.6	114.4	34.8	114.4	32.6	114.4	44	114.4	50.2
18	38.2	114.4	34.2	114.4	31.2	114.4	29	114.4	40.8	114.4	50.2
19	36.6	114.4	32.5	114.4	29.4	114.4	27.1	114.4	39.3	114.4	50.2

20	35.6	114.4	31.3	114.4	28.1	114.4	25.7	114.4	38.4	114.4	50.2
21	34.8	114.4	30.4	114.4	27.1	114.4	24.6	114.4	37.8	114.4	50.2
22	34.3	114.4	29.6	114.4	26.3	114.4	23.7	114.4	37.3	114.4	50.2
23	33.7	114.4	28.8	114.4	25.2	114.4	22.5	114.4	36.9	114.4	50.2
24	33.7	114.4	28.9	114.4	25.3	114.4	22.7	114.4	36.8	114.4	50.2

Figure 28.3: Longitudinal Positive Moment Distribution at Critical Section for Tow-Lane Two Span Bridge Deck Span = 54ft, Deck width = 24ft, One Right Railings with Edge Loading.

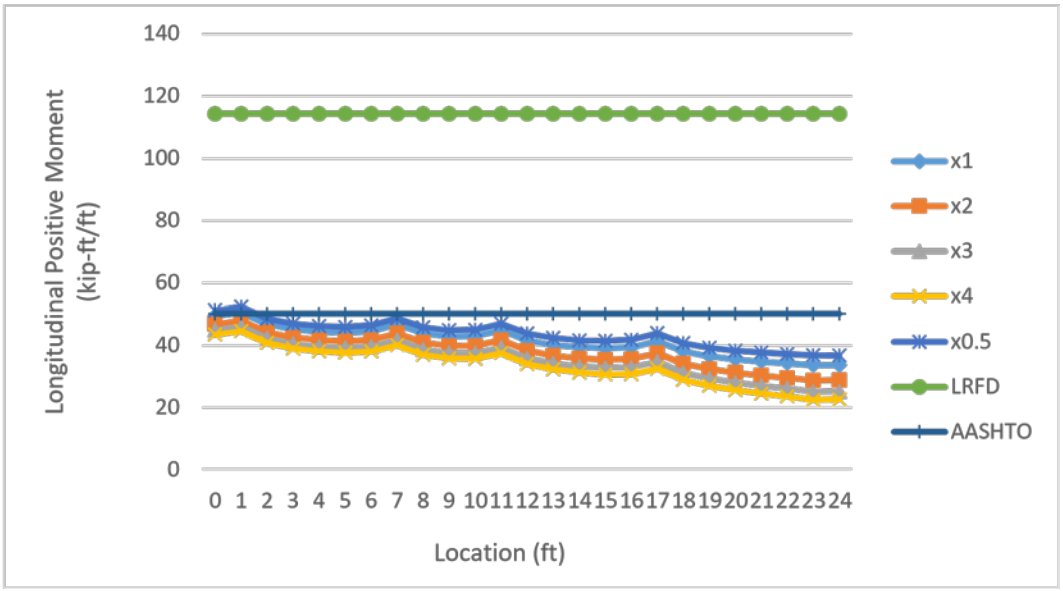

Table 28.4: Longitudinal Positive Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 54ft, Deck width = 24ft, Two Railings with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	40.6	114.4	33.6	114.4	29	114.4	25.7	114.4	45.8	114.4	50.2
1	41.4	114.4	34.2	114.4	29.5	114.4	26.1	114.4	46.6	114.4	50.2
2	39	114.4	32.3	114.4	27.8	114.4	24.5	114.4	43.9	114.4	50.2
3	37.9	114.4	31.3	114.4	26.9	114.4	23.8	114.4	42.6	114.4	50.2
4	37.6	114.4	31.2	114.4	26.9	114.4	23.8	114.4	42.2	114.4	50.2
5	37.7	114.4	31.4	114.4	27.2	114.4	24.2	114.4	42.1	114.4	50.2
6	38.5	114.4	32.3	114.4	28.2	114.4	25.3	114.4	42.8	114.4	50.2
7	41.1	114.4	35	114.4	31	114.4	28.1	114.4	45.4	114.4	50.2
8	38.4	114.4	32.4	114.4	28.4	114.4	25.6	114.4	42.6	114.4	50.2
9	37.6	114.4	31.7	114.4	27.7	114.4	24.9	114.4	41.7	114.4	50.2
10	37.8	114.4	32	114.4	28.1	114.4	25.3	114.4	42	114.4	50.2
11	40	114.4	34.3	114.4	30.4	114.4	27.6	114.4	44.2	114.4	50.2
12	36.9	114.4	31.2	114.4	27.3	114.4	24.6	114.4	41	114.4	50.2
13	35.6	114.4	29.9	114.4	26.1	114.4	23.3	114.4	39.7	114.4	50.2
14	35	114.4	29.3	114.4	25.5	114.4	22.7	114.4	39.1	114.4	50.2
15	34.8	114.4	29.1	114.4	25.2	114.4	22.5	114.4	38.9	114.4	50.2
16	35.2	114.4	29.5	114.4	25.7	114.4	23	114.4	39.3	114.4	50.2
17	37.5	114.4	31.7	114.4	27.9	114.4	25.1	114.4	41.6	114.4	50.2
18	34.3	114.4	28.5	114.4	24.6	114.4	21.9	114.4	38.4	114.4	50.2
19	32.8	114.4	27	114.4	23.1	114.4	20.3	114.4	37	114.4	50.2

20	31.9	114.4	26	114.4	22.1	114.4	19.3	114.4	36.2	114.4	50.2
21	31.3	114.4	25.3	114.4	21.3	114.4	18.5	114.4	35.6	114.4	50.2
22	30.8	114.4	24.7	114.4	20.7	114.4	17.9	114.4	35.1	114.4	50.2
23	30.3	114.4	24.1	114.4	20	114.4	17.1	114.4	34.8	114.4	50.2
24	30.3	114.4	24.2	114.4	20.2	114.4	17.3	114.4	34.8	114.4	50.2

Figure 28.4: Longitudinal Positive Moment Distribution at Critical Section for Two-Lane Two Span Bridge Deck Span = 54ft, Deck width = 24ft, Two Railings with Edge Loading.

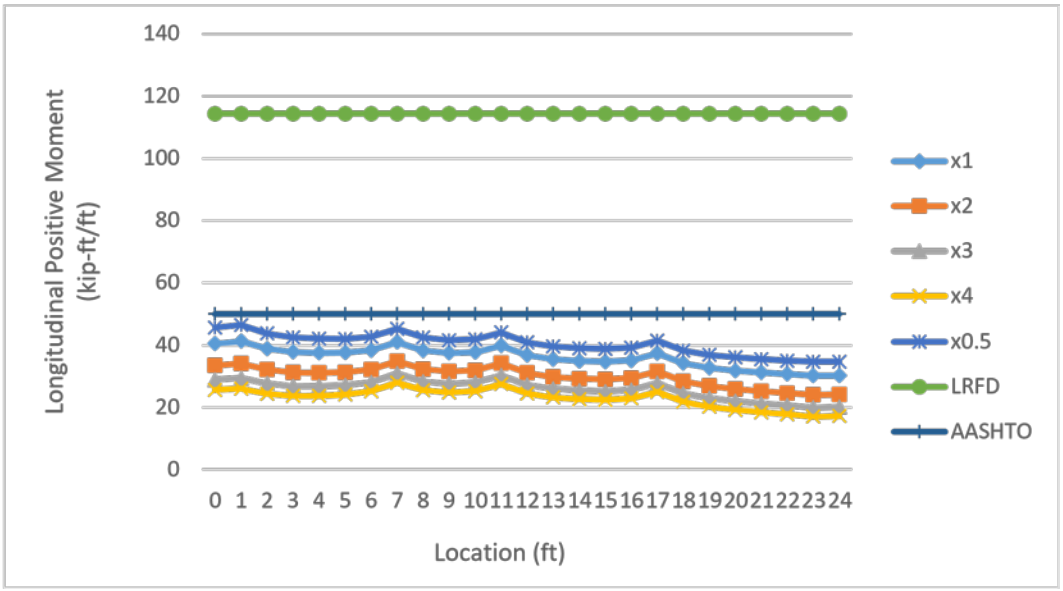

Table 29.1: Longitudinal Negative Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 54ft, Deck width = 36ft, No Railing with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	45.1	160.4	45.1	160.4	45.1	160.4	45.1	160.4	45.1	160.4	50.2
1	67.7	160.4	67.7	160.4	67.7	160.4	67.7	160.4	67.7	160.4	50.2
2	68.3	160.4	68.3	160.4	68.3	160.4	68.3	160.4	68.3	160.4	50.2
3	67.7	160.4	67.7	160.4	67.7	160.4	67.7	160.4	67.7	160.4	50.2
4	66.4	160.4	66.4	160.4	66.4	160.4	66.4	160.4	66.4	160.4	50.2
5	65.1	160.4	65.1	160.4	65.1	160.4	65.1	160.4	65.1	160.4	50.2
6	63.8	160.4	63.8	160.4	63.8	160.4	63.8	160.4	63.8	160.4	50.2
7	62.5	160.4	62.5	160.4	62.5	160.4	62.5	160.4	62.5	160.4	50.2
8	61.4	160.4	61.4	160.4	61.4	160.4	61.4	160.4	61.4	160.4	50.2
9	60.3	160.4	60.3	160.4	60.3	160.4	60.3	160.4	60.3	160.4	50.2
10	59.3	160.4	59.3	160.4	59.3	160.4	59.3	160.4	59.3	160.4	50.2
11	58.3	160.4	58.3	160.4	58.3	160.4	58.3	160.4	58.3	160.4	50.2
12	57.4	160.4	57.4	160.4	57.4	160.4	57.4	160.4	57.4	160.4	50.2
13	56.6	160.4	56.6	160.4	56.6	160.4	56.6	160.4	56.6	160.4	50.2
14	55.8	160.4	55.8	160.4	55.8	160.4	55.8	160.4	55.8	160.4	50.2
15	55	160.4	55	160.4	55	160.4	55	160.4	55	160.4	50.2
16	54.2	160.4	54.2	160.4	54.2	160.4	54.2	160.4	54.2	160.4	50.2
17	53.5	160.4	53.5	160.4	53.5	160.4	53.5	160.4	53.5	160.4	50.2
18	52.7	160.4	52.7	160.4	52.7	160.4	52.7	160.4	52.7	160.4	50.2
19	52	160.4	52	160.4	52	160.4	52	160.4	52	160.4	50.2

20	51.3	160.4	51.3	160.4	51.3	160.4	51.3	160.4	51.3	160.4	50.2
21	50.5	160.4	50.5	160.4	50.5	160.4	50.5	160.4	50.5	160.4	50.2
22	49.8	160.4	49.8	160.4	49.8	160.4	49.8	160.4	49.8	160.4	50.2
23	49.1	160.4	49.1	160.4	49.1	160.4	49.1	160.4	49.1	160.4	50.2
24	48.3	160.4	48.3	160.4	48.3	160.4	48.3	160.4	48.3	160.4	50.2
25	47.6	160.4	47.6	160.4	47.6	160.4	47.6	160.4	47.6	160.4	50.2
26	46.9	160.4	46.9	160.4	46.9	160.4	46.9	160.4	46.9	160.4	50.2
27	46.2	160.4	46.2	160.4	46.2	160.4	46.2	160.4	46.2	160.4	50.2
28	45.5	160.4	45.5	160.4	45.5	160.4	45.5	160.4	45.5	160.4	50.2
29	44.7	160.4	44.7	160.4	44.7	160.4	44.7	160.4	44.7	160.4	50.2
30	43.9	160.4	43.9	160.4	43.9	160.4	43.9	160.4	43.9	160.4	50.2
31	42.9	160.4	42.9	160.4	42.9	160.4	42.9	160.4	42.9	160.4	50.2
32	41.8	160.4	41.8	160.4	41.8	160.4	41.8	160.4	41.8	160.4	50.2
33	40.3	160.4	40.3	160.4	40.3	160.4	40.3	160.4	40.3	160.4	50.2
34	37.8	160.4	37.8	160.4	37.8	160.4	37.8	160.4	37.8	160.4	50.2
35	33.3	160.4	33.3	160.4	33.3	160.4	33.3	160.4	33.3	160.4	50.2
36	15.5	160.4	15.5	160.4	15.5	160.4	15.5	160.4	15.5	160.4	50.2

Figure 29.1: Longitudinal Negative Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 54ft, Deck width = 36ft, No Railing with Edge Loading.

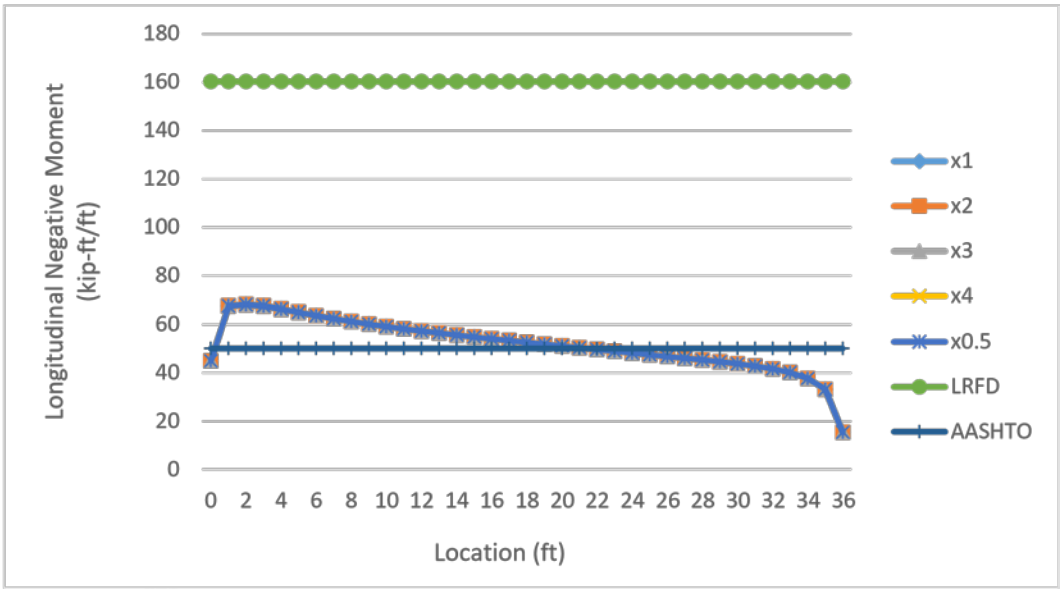

Table 29.2: Longitudinal Negative Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 54ft, Deck width = 36ft, One Left Railing with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	46	160.4	46.2	160.4	46.4	160.4	46.5	160.4	45.9	160.4	50.2
1	57.5	160.4	49.5	160.4	43.7	160.4	39.3	160.4	62.7	160.4	50.2
2	57	160.4	49.6	160.4	44.3	160.4	40.4	160.4	61.9	160.4	50.2
3	56.3	160.4	48.8	160.4	43.5	160.4	39.5	160.4	61.4	160.4	50.2
4	55.3	160.4	48.2	160.4	43.2	160.4	39.4	160.4	60.1	160.4	50.2
5	54.5	160.4	47.8	160.4	43	160.4	39.4	160.4	59	160.4	50.2
6	54	160.4	47.6	160.4	43.1	160.4	39.7	160.4	58.3	160.4	50.2
7	53.2	160.4	47.3	160.4	43	160.4	39.8	160.4	57.2	160.4	50.2
8	52.7	160.4	47.1	160.4	43.1	160.4	40.1	160.4	56.4	160.4	50.2
9	52.3	160.4	47	160.4	43.3	160.4	40.4	160.4	55.8	160.4	50.2
10	51.7	160.4	46.8	160.4	43.2	160.4	40.6	160.4	55	160.4	50.2
11	51.2	160.4	46.6	160.4	43.3	160.4	40.8	160.4	54.3	160.4	50.2
12	50.9	160.4	46.6	160.4	43.5	160.4	41.2	160.4	53.8	160.4	50.2
13	50.4	160.4	46.3	160.4	43.4	160.4	41.3	160.4	53.1	160.4	50.2
14	50	160.4	46.2	160.4	43.5	160.4	41.4	160.4	52.5	160.4	50.2
15	49.7	160.4	46.1	160.4	43.6	160.4	41.7	160.4	52	160.4	50.2
16	49.1	160.4	45.8	160.4	43.5	160.4	41.7	160.4	51.3	160.4	50.2
17	48.7	160.4	45.6	160.4	43.4	160.4	41.7	160.4	50.8	160.4	50.2
18	48.4	160.4	45.5	160.4	43.4	160.4	41.9	160.4	50.3	160.4	50.2
19	47.9	160.4	45.2	160.4	43.2	160.4	41.7	160.4	49.6	160.4	50.2

20	47.4	160.4	44.9	160.4	43.1	160.4	41.7	160.4	49.1	160.4	50.2
21	47	160.4	44.7	160.4	43	160.4	41.7	160.4	48.6	160.4	50.2
22	46.5	160.4	44.3	160.4	42.7	160.4	41.5	160.4	47.9	160.4	50.2
23	45.9	160.4	43.9	160.4	42.4	160.4	41.3	160.4	47.3	160.4	50.2
24	45.6	160.4	43.7	160.4	42.3	160.4	41.2	160.4	46.8	160.4	50.2
25	45.1	160.4	43.3	160.4	42	160.4	41	160.4	46.2	160.4	50.2
26	44.4	160.4	42.8	160.4	41.6	160.4	40.7	160.4	45.5	160.4	50.2
27	44	160.4	42.5	160.4	41.4	160.4	40.6	160.4	45	160.4	50.2
28	43.5	160.4	42.1	160.4	41.1	160.4	40.4	160.4	44.4	160.4	50.2
29	42.8	160.4	41.6	160.4	40.7	160.4	40	160.4	43.6	160.4	50.2
30	42.3	160.4	41.2	160.4	40.4	160.4	39.8	160.4	43	160.4	50.2
31	41.6	160.4	40.7	160.4	40	160.4	39.5	160.4	42.2	160.4	50.2
32	40.6	160.4	39.9	160.4	39.3	160.4	38.9	160.4	41.1	160.4	50.2
33	39.6	160.4	39.1	160.4	38.7	160.4	38.4	160.4	40	160.4	50.2
34	37.6	160.4	37.4	160.4	37.2	160.4	37	160.4	37.8	160.4	50.2
35	33.4	160.4	33.6	160.4	33.7	160.4	33.8	160.4	33.3	160.4	50.2
36	17.2	160.4	18	160.4	18.6	160.4	19	160.4	16.6	160.4	50.2

Figure 29.2: Longitudinal Negative Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 54ft, Deck width = 36ft, One Left Railing with Edge Loading.

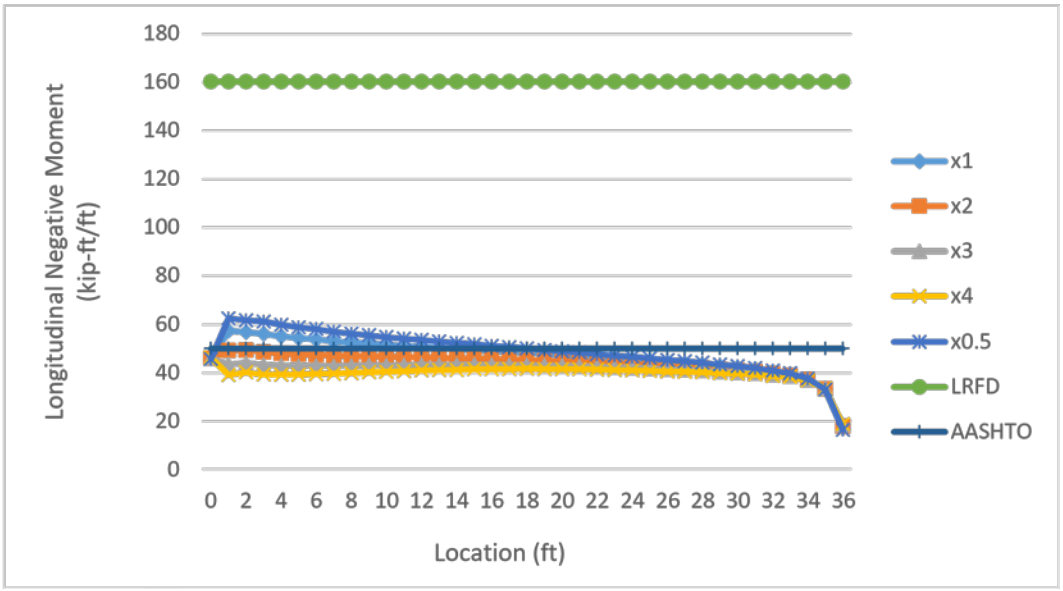

Table 29.3: Longitudinal Negative Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 54ft, Deck width = 36ft, One Right Railings with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	45.6	160.4	46.1	160.4	46.5	160.4	46.8	160.4	45.3	160.4	50.2
1	67.8	160.4	67.9	160.4	68	160.4	68	160.4	67.8	160.4	50.2
2	68	160.4	67.8	160.4	67.7	160.4	67.6	160.4	68.1	160.4	50.2
3	67.1	160.4	66.8	160.4	66.5	160.4	66.3	160.4	67.4	160.4	50.2
4	65.6	160.4	65.1	160.4	64.8	160.4	64.5	160.4	66	160.4	50.2
5	64.1	160.4	63.5	160.4	63.1	160.4	62.7	160.4	64.5	160.4	50.2
6	62.7	160.4	62	160.4	61.5	160.4	61.1	160.4	63.2	160.4	50.2
7	61.3	160.4	60.5	160.4	59.9	160.4	59.5	160.4	61.9	160.4	50.2
8	60.1	160.4	59.2	160.4	58.5	160.4	58	160.4	60.7	160.4	50.2
9	58.9	160.4	57.9	160.4	57.2	160.4	56.6	160.4	59.5	160.4	50.2
10	57.7	160.4	56.7	160.4	55.9	160.4	55.3	160.4	58.4	160.4	50.2
11	56.7	160.4	55.5	160.4	54.7	160.4	54	160.4	57.4	160.4	50.2
12	55.6	160.4	54.4	160.4	53.5	160.4	52.8	160.4	56.4	160.4	50.2
13	54.6	160.4	53.3	160.4	52.4	160.4	51.6	160.4	55.5	160.4	50.2
14	53.7	160.4	52.3	160.4	51.2	160.4	50.5	160.4	54.6	160.4	50.2
15	52.7	160.4	51.2	160.4	50.1	160.4	49.3	160.4	53.7	160.4	50.2
16	51.8	160.4	50.2	160.4	49	160.4	48.1	160.4	52.9	160.4	50.2
17	50.9	160.4	49.2	160.4	47.9	160.4	47	160.4	52	160.4	50.2
18	50	160.4	48.2	160.4	46.8	160.4	45.8	160.4	51.2	160.4	50.2
19	49.1	160.4	47.1	160.4	45.7	160.4	44.6	160.4	50.4	160.4	50.2

20	48.2	160.4	46.1	160.4	44.6	160.4	43.4	160.4	49.5	160.4	50.2
21	47.2	160.4	45	160.4	43.4	160.4	42.2	160.4	48.7	160.4	50.2
22	46.3	160.4	44	160.4	42.3	160.4	41	160.4	47.9	160.4	50.2
23	45.4	160.4	42.9	160.4	41.1	160.4	39.7	160.4	47	160.4	50.2
24	44.4	160.4	41.8	160.4	39.9	160.4	38.4	160.4	46.2	160.4	50.2
25	43.5	160.4	40.7	160.4	38.6	160.4	37.1	160.4	45.3	160.4	50.2
26	42.5	160.4	39.6	160.4	37.4	160.4	35.8	160.4	44.5	160.4	50.2
27	41.6	160.4	38.4	160.4	36.2	160.4	34.4	160.4	43.6	160.4	50.2
28	40.6	160.4	37.3	160.4	34.9	160.4	33.1	160.4	42.8	160.4	50.2
29	39.7	160.4	36.2	160.4	33.6	160.4	31.7	160.4	41.9	160.4	50.2
30	38.7	160.4	35	160.4	32.4	160.4	30.4	160.4	41	160.4	50.2
31	37.7	160.4	33.9	160.4	31.1	160.4	29	160.4	40.1	160.4	50.2
32	36.6	160.4	32.7	160.4	29.8	160.4	27.6	160.4	39.1	160.4	50.2
33	35.5	160.4	31.5	160.4	28.5	160.4	26.2	160.4	37.9	160.4	50.2
34	33.8	160.4	30	160.4	27.1	160.4	24.9	160.4	36	160.4	50.2
35	32.1	160.4	28.4	160.4	25.4	160.4	23	160.4	34	160.4	50.2
36	16.5	160.4	16.9	160.4	17.1	160.4	17.2	160.4	16.3	160.4	50.2

Figure 29.3: Longitudinal Negative Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 54ft, Deck width = 36ft, One Right Railings with Edge Loading.

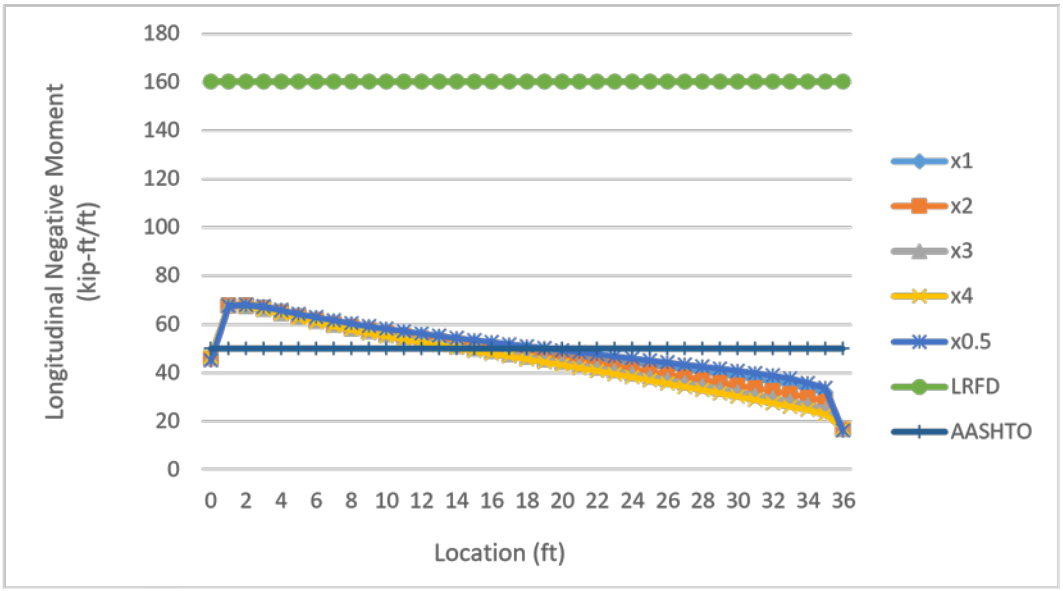

Table 29.4: Longitudinal Negative Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 54ft, Deck width = 36ft, Two Railings with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	46.7	160.4	47.3	160.4	47.7	160.4	48	160.4	46.3	160.4	50.2
1	57.6	160.4	49.3	160.4	43.4	160.4	38.9	160.4	63	160.4	50.2
2	56.8	160.4	49.1	160.4	43.7	160.4	39.6	160.4	62	160.4	50.2
3	55.7	160.4	47.8	160.4	42.3	160.4	38.1	160.4	61	160.4	50.2
4	54.7	160.4	47.2	160.4	41.8	160.4	37.9	160.4	59.8	160.4	50.2
5	53.8	160.4	46.5	160.4	41.4	160.4	37.6	160.4	58.7	160.4	50.2
6	53	160.4	46	160.4	41.2	160.4	37.6	160.4	57.7	160.4	50.2
7	52.2	160.4	45.6	160.4	41	160.4	37.5	160.4	56.7	160.4	50.2
8	51.6	160.4	45.3	160.4	40.8	160.4	37.5	160.4	55.9	160.4	50.2
9	51	160.4	44.9	160.4	40.7	160.4	37.5	160.4	55.1	160.4	50.2
10	50.4	160.4	44.6	160.4	40.5	160.4	37.5	160.4	54.3	160.4	50.2
11	49.8	160.4	44.2	160.4	40.3	160.4	37.4	160.4	53.5	160.4	50.2
12	49.2	160.4	43.9	160.4	40.2	160.4	37.4	160.4	52.8	160.4	50.2
13	48.7	160.4	43.6	160.4	39.9	160.4	37.3	160.4	52.2	160.4	50.2
14	48.1	160.4	43.2	160.4	39.7	160.4	37.1	160.4	51.5	160.4	50.2
15	47.6	160.4	42.8	160.4	39.4	160.4	36.9	160.4	50.8	160.4	50.2
16	47	160.4	42.3	160.4	39	160.4	36.6	160.4	50.2	160.4	50.2
17	46.4	160.4	41.9	160.4	38.7	160.4	36.3	160.4	49.5	160.4	50.2
18	45.8	160.4	41.4	160.4	38.2	160.4	35.9	160.4	48.9	160.4	50.2
19	45.2	160.4	40.8	160.4	37.7	160.4	35.4	160.4	48.2	160.4	50.2

20	44.6	160.4	40.2	160.4	37.2	160.4	34.9	160.4	47.5	160.4	50.2
21	43.9	160.4	39.6	160.4	36.6	160.4	34.3	160.4	46.8	160.4	50.2
22	43.2	160.4	38.9	160.4	35.9	160.4	33.7	160.4	46.1	160.4	50.2
23	42.5	160.4	38.2	160.4	35.2	160.4	33	160.4	45.4	160.4	50.2
24	41.8	160.4	37.5	160.4	34.5	160.4	32.2	160.4	44.7	160.4	50.2
25	41	160.4	36.7	160.4	33.7	160.4	31.4	160.4	44	160.4	50.2
26	40.3	160.4	35.9	160.4	32.8	160.4	30.6	160.4	43.2	160.4	50.2
27	39.5	160.4	35.1	160.4	32	160.4	29.7	160.4	42.5	160.4	50.2
28	38.7	160.4	34.3	160.4	31.1	160.4	28.8	160.4	41.7	160.4	50.2
29	37.9	160.4	33.4	160.4	30.2	160.4	27.9	160.4	41	160.4	50.2
30	37.1	160.4	32.6	160.4	29.3	160.4	26.9	160.4	40.2	160.4	50.2
31	36.3	160.4	31.7	160.4	28.4	160.4	26	160.4	39.4	160.4	50.2
32	35.5	160.4	30.9	160.4	27.6	160.4	25.1	160.4	38.4	160.4	50.2
33	34.6	160.4	30	160.4	26.7	160.4	24.2	160.4	37.5	160.4	50.2
34	33.2	160.4	29	160.4	25.8	160.4	23.5	160.4	35.7	160.4	50.2
35	31.8	160.4	27.7	160.4	24.5	160.4	22	160.4	34	160.4	50.2
36	17.7	160.4	18.7	160.4	19.3	160.4	19.8	160.4	16.9	160.4	50.2

Figure 29.4: Longitudinal Negative Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 54ft, Deck width = 36ft, Two Railings with Edge Loading.

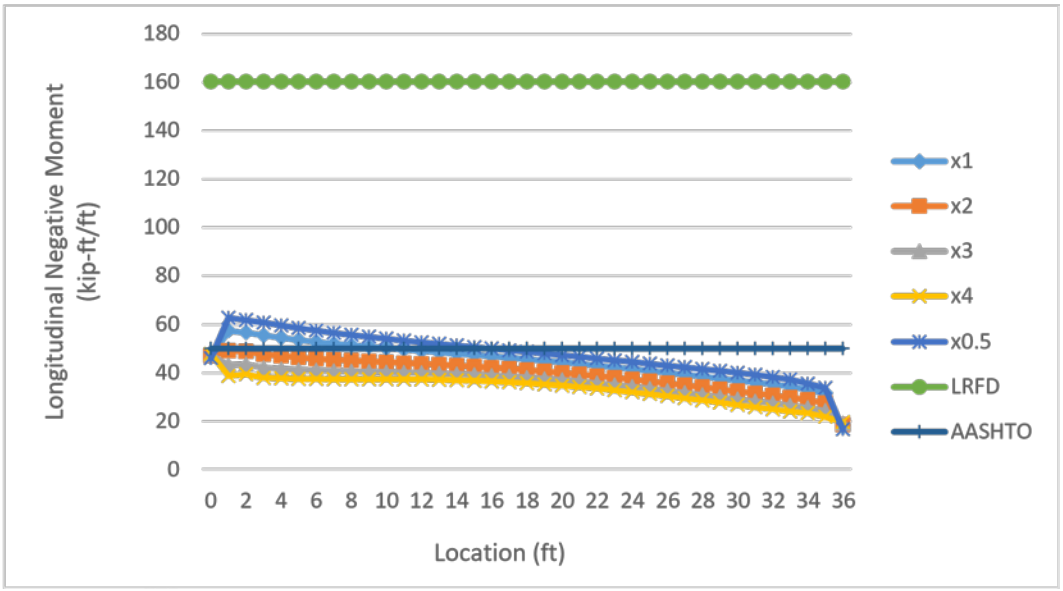

Table 30.1: Longitudinal Positive Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 54ft, Deck width = 36ft, No Railing with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	56	154.5	56	154.5	56	154.5	56	154.5	56	154.5	50.2
1	57.2	154.5	57.2	154.5	57.2	154.5	57.2	154.5	57.2	154.5	50.2
2	53.5	154.5	53.5	154.5	53.5	154.5	53.5	154.5	53.5	154.5	50.2
3	51.9	154.5	51.9	154.5	51.9	154.5	51.9	154.5	51.9	154.5	50.2
4	51.1	154.5	51.1	154.5	51.1	154.5	51.1	154.5	51.1	154.5	50.2
5	50.8	154.5	50.8	154.5	50.8	154.5	50.8	154.5	50.8	154.5	50.2
6	51.3	154.5	51.3	154.5	51.3	154.5	51.3	154.5	51.3	154.5	50.2
7	53.7	154.5	53.7	154.5	53.7	154.5	53.7	154.5	53.7	154.5	50.2
8	50.8	154.5	50.8	154.5	50.8	154.5	50.8	154.5	50.8	154.5	50.2
9	49.9	154.5	49.9	154.5	49.9	154.5	49.9	154.5	49.9	154.5	50.2
10	50.1	154.5	50.1	154.5	50.1	154.5	50.1	154.5	50.1	154.5	50.2
11	52.2	154.5	52.2	154.5	52.2	154.5	52.2	154.5	52.2	154.5	50.2
12	49	154.5	49	154.5	49	154.5	49	154.5	49	154.5	50.2
13	47.7	154.5	47.7	154.5	47.7	154.5	47.7	154.5	47.7	154.5	50.2
14	47.1	154.5	47.1	154.5	47.1	154.5	47.1	154.5	47.1	154.5	50.2
15	46.9	154.5	46.9	154.5	46.9	154.5	46.9	154.5	46.9	154.5	50.2
16	47.5	154.5	47.5	154.5	47.5	154.5	47.5	154.5	47.5	154.5	50.2
17	50	154.5	50	154.5	50	154.5	50	154.5	50	154.5	50.2
18	47.1	154.5	47.1	154.5	47.1	154.5	47.1	154.5	47.1	154.5	50.2
19	46.1	154.5	46.1	154.5	46.1	154.5	46.1	154.5	46.1	154.5	50.2

20	46.3	154.5	46.3	154.5	46.3	154.5	46.3	154.5	46.3	154.5	50.2
21	48.4	154.5	48.4	154.5	48.4	154.5	48.4	154.5	48.4	154.5	50.2
22	45.2	154.5	45.2	154.5	45.2	154.5	45.2	154.5	45.2	154.5	50.2
23	43.8	154.5	43.8	154.5	43.8	154.5	43.8	154.5	43.8	154.5	50.2
24	43.1	154.5	43.1	154.5	43.1	154.5	43.1	154.5	43.1	154.5	50.2
25	42.8	154.5	42.8	154.5	42.8	154.5	42.8	154.5	42.8	154.5	50.2
26	43.2	154.5	43.2	154.5	43.2	154.5	43.2	154.5	43.2	154.5	50.2
27	45.4	154.5	45.4	154.5	45.4	154.5	45.4	154.5	45.4	154.5	50.2
28	42.2	154.5	42.2	154.5	42.2	154.5	42.2	154.5	42.2	154.5	50.2
29	40.7	154.5	40.7	154.5	40.7	154.5	40.7	154.5	40.7	154.5	50.2
30	39.8	154.5	39.8	154.5	39.8	154.5	39.8	154.5	39.8	154.5	50.2
31	39.2	154.5	39.2	154.5	39.2	154.5	39.2	154.5	39.2	154.5	50.2
32	38.7	154.5	38.7	154.5	38.7	154.5	38.7	154.5	38.7	154.5	50.2
33	38.3	154.5	38.3	154.5	38.3	154.5	38.3	154.5	38.3	154.5	50.2
34	38.1	154.5	38.1	154.5	38.1	154.5	38.1	154.5	38.1	154.5	50.2
35	37.9	154.5	37.9	154.5	37.9	154.5	37.9	154.5	37.9	154.5	50.2
36	37.8	154.5	37.8	154.5	37.8	154.5	37.8	154.5	37.8	154.5	50.2

Figure 30.1: Longitudinal Positive Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 54ft, Deck width = 36ft, No Railing with Edge Loading.

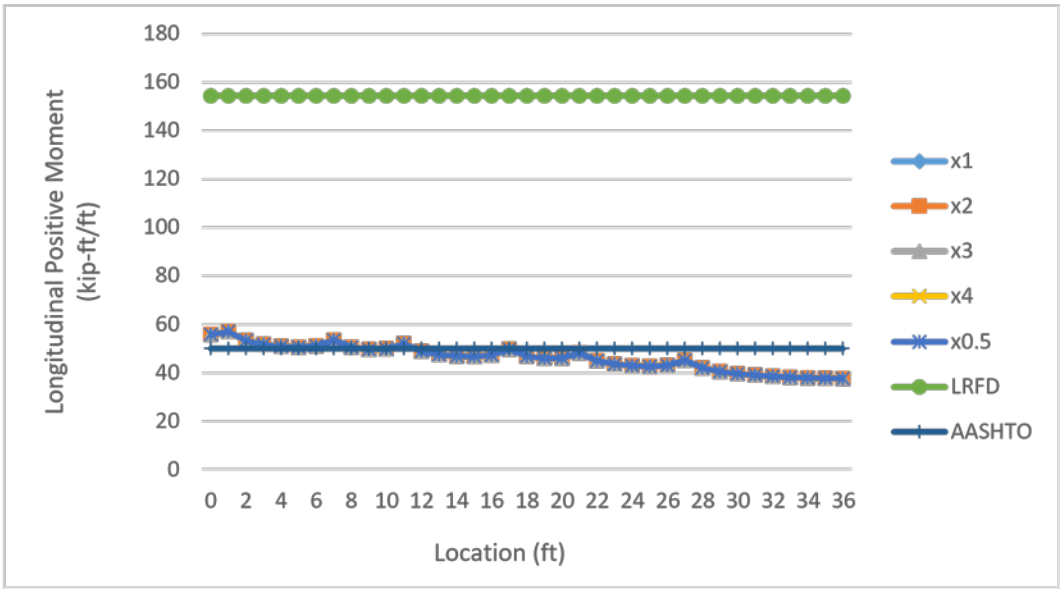

Table 30.2: Longitudinal Positive Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 54ft, Deck width = 36ft, One Left Railing with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	46.6	154.5	40.7	154.5	36.4	154.5	33	154.5	50.6	154.5	50.2
1	47.3	154.5	41.3	154.5	36.8	154.5	33.4	154.5	51.4	154.5	50.2
2	45.1	154.5	39.5	154.5	35.4	154.5	32.2	154.5	48.7	154.5	50.2
3	44	154.5	38.7	154.5	34.8	154.5	31.7	154.5	47.5	154.5	50.2
4	43.8	154.5	38.8	154.5	35	154.5	32.1	154.5	47	154.5	50.2
5	44	154.5	39.2	154.5	35.6	154.5	32.8	154.5	47	154.5	50.2
6	44.8	154.5	40.3	154.5	36.9	154.5	34.2	154.5	47.8	154.5	50.2
7	47.6	154.5	43.2	154.5	39.9	154.5	37.4	154.5	50.3	154.5	50.2
8	45	154.5	40.8	154.5	37.7	154.5	35.2	154.5	47.6	154.5	50.2
9	44.3	154.5	40.3	154.5	37.3	154.5	35	154.5	46.8	154.5	50.2
10	44.7	154.5	40.9	154.5	38	154.5	35.8	154.5	47.1	154.5	50.2
11	47.1	154.5	43.4	154.5	40.7	154.5	38.5	154.5	49.4	154.5	50.2
12	44.1	154.5	40.6	154.5	38	154.5	35.9	154.5	46.3	154.5	50.2
13	43	154.5	39.6	154.5	37.1	154.5	35.1	154.5	45.1	154.5	50.2
14	42.6	154.5	39.4	154.5	37	154.5	35.1	154.5	44.6	154.5	50.2
15	42.6	154.5	39.6	154.5	37.2	154.5	35.4	154.5	44.6	154.5	50.2
16	43.4	154.5	40.4	154.5	38.2	154.5	36.4	154.5	45.3	154.5	50.2
17	46	154.5	43.2	154.5	41	154.5	39.3	154.5	47.8	154.5	50.2
18	43.3	154.5	40.6	154.5	38.5	154.5	36.8	154.5	45	154.5	50.2
19	42.5	154.5	39.9	154.5	37.9	154.5	36.3	154.5	44.2	154.5	50.2

20	42.8	154.5	40.3	154.5	38.3	154.5	36.8	154.5	44.4	154.5	50.2
21	45	154.5	42.6	154.5	40.7	154.5	39.2	154.5	46.6	154.5	50.2
22	41.9	154.5	39.5	154.5	37.7	154.5	36.3	154.5	43.4	154.5	50.2
23	40.6	154.5	38.3	154.5	36.6	154.5	35.2	154.5	42.1	154.5	50.2
24	40	154.5	37.8	154.5	36.1	154.5	34.8	154.5	41.4	154.5	50.2
25	39.9	154.5	37.7	154.5	36.1	154.5	34.8	154.5	41.2	154.5	50.2
26	40.4	154.5	38.3	154.5	36.7	154.5	35.5	154.5	41.7	154.5	50.2
27	42.6	154.5	40.6	154.5	39.1	154.5	37.9	154.5	43.9	154.5	50.2
28	39.5	154.5	37.5	154.5	36.1	154.5	34.9	154.5	40.7	154.5	50.2
29	38.1	154.5	36.2	154.5	34.8	154.5	33.6	154.5	39.3	154.5	50.2
30	37.3	154.5	35.4	154.5	34	154.5	32.9	154.5	38.4	154.5	50.2
31	36.7	154.5	34.9	154.5	33.5	154.5	32.4	154.5	37.8	154.5	50.2
32	36.3	154.5	34.5	154.5	33.2	154.5	32.1	154.5	37.4	154.5	50.2
33	36	154.5	34.2	154.5	32.9	154.5	31.9	154.5	37	154.5	50.2
34	35.8	154.5	34.1	154.5	32.8	154.5	31.8	154.5	36.8	154.5	50.2
35	35.7	154.5	34	154.5	32.8	154.5	31.8	154.5	36.7	154.5	50.2
36	35.6	154.5	34	154.5	32.8	154.5	31.8	154.5	36.6	154.5	50.2

Figure 30.2: Longitudinal Positive Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 54ft, Deck width = 36ft, One Left Railing with Edge Loading.

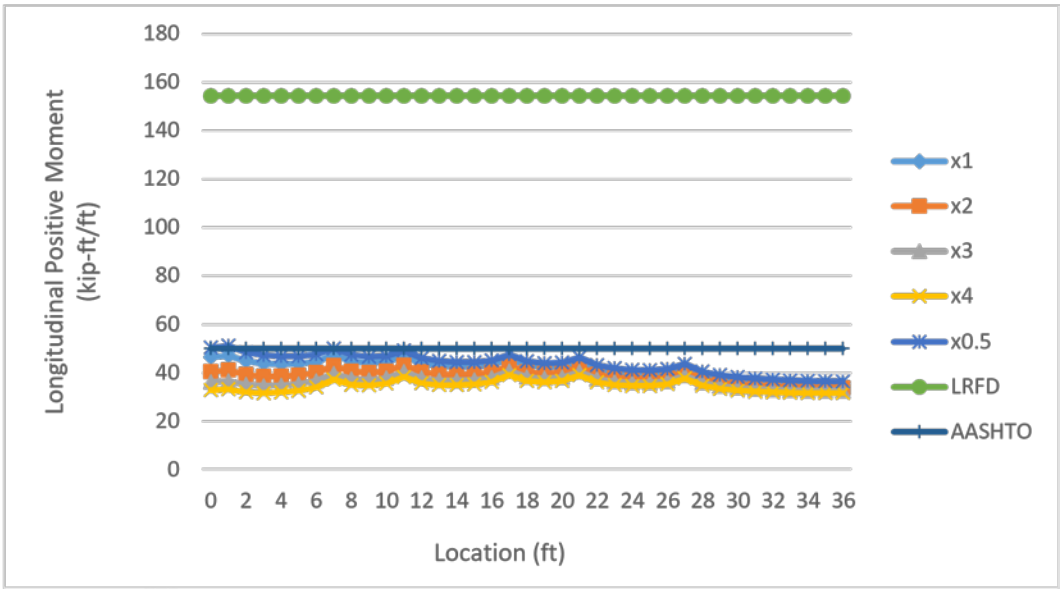

Table 30.3: Longitudinal Positive Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 54ft, Deck width = 36ft, One Right Railings with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	54.3	154.5	53.1	154.5	52.2	154.5	51.4	154.5	55.1	154.5	50.2
1	55.5	154.5	54.3	154.5	53.2	154.5	52.6	154.5	56.3	154.5	50.2
2	51.7	154.5	50.5	154.5	49.5	154.5	48.7	154.5	52.6	154.5	50.2
3	50.1	154.5	48.8	154.5	47.8	154.5	47	154.5	50.9	154.5	50.2
4	49.3	154.5	47.9	154.5	46.9	154.5	46.1	154.5	50.1	154.5	50.2
5	48.9	154.5	47.6	154.5	46.5	154.5	45.7	154.5	49.8	154.5	50.2
6	49.4	154.5	48	154.5	46.9	154.5	46.1	154.5	50.3	154.5	50.2
7	51.7	154.5	50.3	154.5	49.1	154.5	48.4	154.5	52.6	154.5	50.2
8	48.8	154.5	47.3	154.5	46.2	154.5	45.3	154.5	49.7	154.5	50.2
9	47.8	154.5	46.3	154.5	45.1	154.5	44.2	154.5	48.7	154.5	50.2
10	47.9	154.5	46.3	154.5	45.1	154.5	44.2	154.5	48.9	154.5	50.2
11	49.9	154.5	48.3	154.5	47	154.5	46.2	154.5	51	154.5	50.2
12	46.7	154.5	45	154.5	43.8	154.5	42.8	154.5	47.7	154.5	50.2
13	45.3	154.5	43.6	154.5	42.3	154.5	41.3	154.5	46.4	154.5	50.2
14	44.6	154.5	42.8	154.5	41.5	154.5	40.4	154.5	45.7	154.5	50.2
15	44.4	154.5	42.6	154.5	41.2	154.5	40.1	154.5	45.6	154.5	50.2
16	44.9	154.5	43	154.5	41.5	154.5	40.4	154.5	46.1	154.5	50.2
17	47.2	154.5	45.2	154.5	43.7	154.5	42.6	154.5	48.5	154.5	50.2
18	44.3	154.5	42.2	154.5	40.6	154.5	39.4	154.5	45.6	154.5	50.2
19	43.2	154.5	41.1	154.5	39.4	154.5	38.2	154.5	44.5	154.5	50.2

20	43.2	154.5	41	154.5	39.3	154.5	38	154.5	44.6	154.5	50.2
21	45.2	154.5	42.9	154.5	41	154.5	39.8	154.5	46.7	154.5	50.2
22	41.8	154.5	39.4	154.5	37.6	154.5	36.2	154.5	43.4	154.5	50.2
23	40.3	154.5	37.8	154.5	35.9	154.5	34.4	154.5	41.9	154.5	50.2
24	39.5	154.5	36.9	154.5	34.9	154.5	33.3	154.5	41.1	154.5	50.2
25	39	154.5	36.3	154.5	34.3	154.5	32.7	154.5	40.7	154.5	50.2
26	39.3	154.5	36.4	154.5	34.3	154.5	32.6	154.5	41.1	154.5	50.2
27	41.3	154.5	38.3	154.5	36	154.5	34.4	154.5	43.2	154.5	50.2
28	37.3	154.5	34.8	154.5	32.5	154.5	30.7	154.5	39.8	154.5	50.2
29	36.2	154.5	33	154.5	30.6	154.5	28.7	154.5	38.3	154.5	50.2
30	35.1	154.5	31.8	154.5	29.3	154.5	27.3	154.5	37.3	154.5	50.2
31	34.3	154.5	30.8	154.5	28.2	154.5	26.1	154.5	36.5	154.5	50.2
32	33.6	154.5	29.9	154.5	27.2	154.5	25	154.5	35.9	154.5	50.2
33	33	154.5	29.2	154.5	26.3	154.5	24.1	154.5	35.4	154.5	50.2
34	32.5	154.5	28.6	154.5	25.6	154.5	23.3	154.5	35	154.5	50.2
35	32	154.5	27.8	154.5	24.7	154.5	22.2	154.5	34.7	154.5	50.2
36	32	154.5	27.9	154.5	24.8	154.5	22.3	154.5	34.7	154.5	50.2

Figure 30.3: Longitudinal Positive Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 54ft, Deck width = 36ft, One Right Railings with Edge Loading.

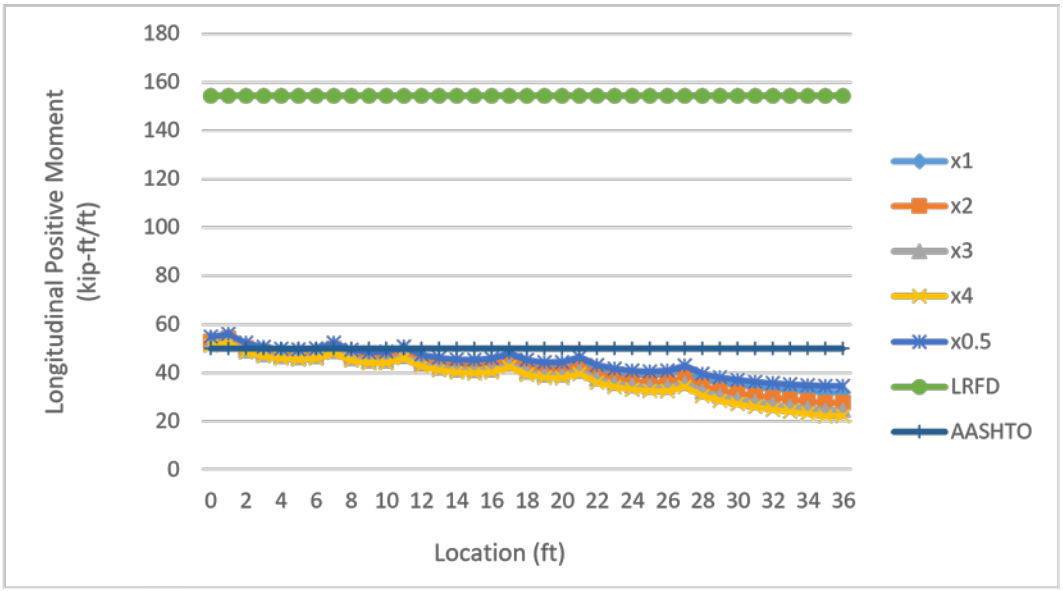

Table 30.4: Longitudinal Positive Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 54ft, Deck width = 36ft, Two Railings with Edge Loading.

Longitudinal Positive Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	45.3	154.5	38.8	154.5	34.2	154.5	30.7	154.5	49.7	154.5	50.2
1	46	154.5	39.3	154.5	34.6	154.5	31.1	154.5	50.6	154.5	50.2
2	43.7	154.5	37.4	154.5	33	154.5	29.7	154.5	47.9	154.5	50.2
3	42.5	154.5	36.6	154.5	32.3	154.5	29.1	154.5	46.6	154.5	50.2
4	42.3	154.5	36.5	154.5	32.4	154.5	29.3	154.5	46.1	154.5	50.2
5	42.4	154.5	36.8	154.5	32.9	154.5	29.8	154.5	46.1	154.5	50.2
6	43.2	154.5	37.9	154.5	34	154.5	31.1	154.5	46.8	154.5	50.2
7	45.8	154.5	40.6	154.5	36.8	154.5	34	154.5	49.3	154.5	50.2
8	43.2	154.5	38.2	154.5	34.5	154.5	31.8	154.5	46.6	154.5	50.2
9	42.5	154.5	37.6	154.5	34	154.5	31.3	154.5	45.8	154.5	50.2
10	42.9	154.5	38	154.5	34.6	154.5	31.9	154.5	46.1	154.5	50.2
11	45.1	154.5	40.3	154.5	37	154.5	34.4	154.5	48.2	154.5	50.2
12	42.1	154.5	37.5	154.5	34.2	154.5	31.6	154.5	45.2	154.5	50.2
13	40.9	154.5	36.4	154.5	33.1	154.5	30.6	154.5	43.9	154.5	50.2
14	40.4	154.5	36	154.5	32.8	154.5	30.3	154.5	43.4	154.5	50.2
15	40.4	154.5	36	154.5	32.8	154.5	30.4	154.5	43.3	154.5	50.2
16	41.5	154.5	36.7	154.5	33.6	154.5	31.2	154.5	43.9	154.5	50.2
17	43.5	154.5	39.2	154.5	36.1	154.5	33.8	154.5	46.4	154.5	50.2
18	40.7	154.5	36.4	154.5	33.4	154.5	31.1	154.5	43.5	154.5	50.2
19	39.8	154.5	35.6	154.5	32.5	154.5	30.3	154.5	42.6	154.5	50.2

20	40.1	154.5	35.8	154.5	32.8	154.5	30.5	154.5	42.9	154.5	50.2
21	42.1	154.5	37.9	154.5	34.9	154.5	32.6	154.5	44.9	154.5	50.2
22	38.8	154.5	34.6	154.5	31.6	154.5	29.3	154.5	41.6	154.5	50.2
23	37.4	154.5	33.2	154.5	30.2	154.5	27.9	154.5	40.3	154.5	50.2
24	36.7	154.5	32.5	154.5	29.4	154.5	27.2	154.5	39.5	154.5	50.2
25	36.4	154.5	32.1	154.5	29.1	154.5	26.8	154.5	39.2	154.5	50.2
26	36.7	154.5	32.4	154.5	29.4	154.5	27.1	154.5	39.6	154.5	50.2
27	38.9	154.5	34.5	154.5	31.4	154.5	29.1	154.5	41.8	154.5	50.2
28	35.5	154.5	31.1	154.5	28	154.5	25.7	154.5	38.5	154.5	50.2
29	34	154.5	29.5	154.5	26.3	154.5	24	154.5	36.9	154.5	50.2
30	33	154.5	28.4	154.5	25.2	154.5	22.8	154.5	36	154.5	50.2
31	32.1	154.5	27.5	154.5	24.3	154.5	21.8	154.5	35.2	154.5	50.2
32	31.5	154.5	26.8	154.5	23.5	154.5	21	154.5	34.7	154.5	50.2
33	31	154.5	26.2	154.5	22.8	154.5	20.3	154.5	34.2	154.5	50.2
34	30.6	154.5	25.7	154.5	22.2	154.5	19.7	154.5	33.9	154.5	50.2
35	30.2	154.5	25.1	154.5	21.5	154.5	18.9	154.5	33.6	154.5	50.2
36	30.2	154.5	25.2	154.5	21.7	154.5	19.1	154.5	33.6	154.5	50.2

Figure 30.4: Longitudinal Positive Moment Distribution at Critical Section for Three-Lane Two Span Bridge Deck Span = 54ft, Deck width = 36ft, Two Railings with Edge Loading.

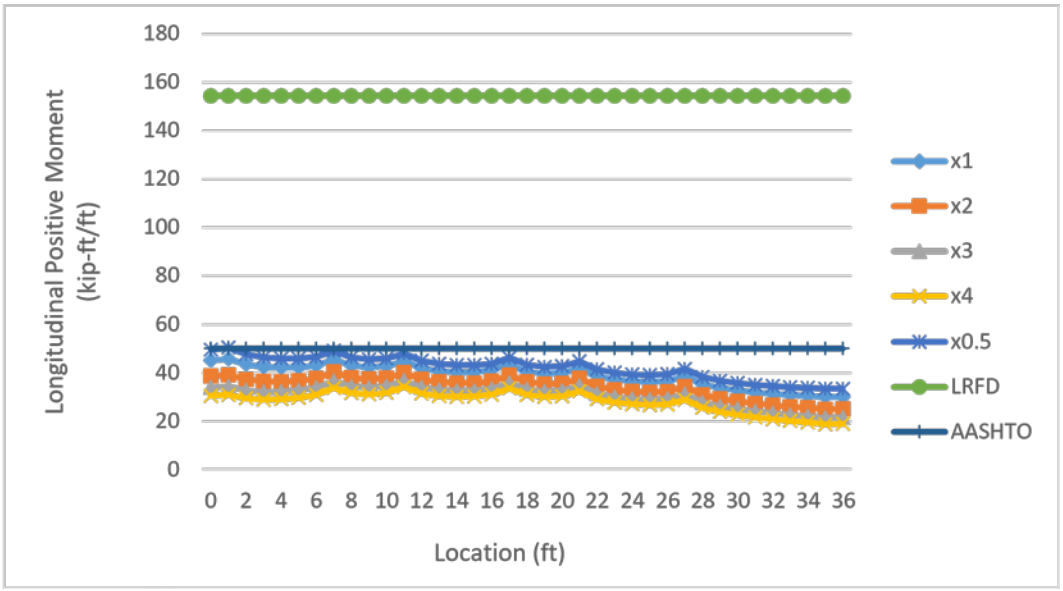

Table 31.1: Longitudinal Negative Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 54ft, Deck width = 48ft, No Railing with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	45.5	207.4	45.5	207.4	45.5	207.4	45.5	207.4	45.5	207.4	50.2
1	69.7	207.4	69.7	207.4	69.7	207.4	69.7	207.4	69.7	207.4	50.2
2	70.7	207.4	70.7	207.4	70.7	207.4	70.7	207.4	70.7	207.4	50.2
3	70.4	207.4	70.4	207.4	70.4	207.4	70.4	207.4	70.4	207.4	50.2
4	69.2	207.4	69.2	207.4	69.2	207.4	69.2	207.4	69.2	207.4	50.2
5	68	207.4	68	207.4	68	207.4	68	207.4	68	207.4	50.2
6	66.8	207.4	66.8	207.4	66.8	207.4	66.8	207.4	66.8	207.4	50.2
7	65.7	207.4	65.7	207.4	65.7	207.4	65.7	207.4	65.7	207.4	50.2
8	64.7	207.4	64.7	207.4	64.7	207.4	64.7	207.4	64.7	207.4	50.2
9	63.7	207.4	63.7	207.4	63.7	207.4	63.7	207.4	63.7	207.4	50.2
10	62.8	207.4	62.8	207.4	62.8	207.4	62.8	207.4	62.8	207.4	50.2
11	62	207.4	62	207.4	62	207.4	62	207.4	62	207.4	50.2
12	61.2	207.4	61.2	207.4	61.2	207.4	61.2	207.4	61.2	207.4	50.2
13	60.4	207.4	60.4	207.4	60.4	207.4	60.4	207.4	60.4	207.4	50.2
14	59.7	207.4	59.7	207.4	59.7	207.4	59.7	207.4	59.7	207.4	50.2
15	59	207.4	59	207.4	59	207.4	59	207.4	59	207.4	50.2
16	58.4	207.4	58.4	207.4	58.4	207.4	58.4	207.4	58.4	207.4	50.2
17	57.7	207.4	57.7	207.4	57.7	207.4	57.7	207.4	57.7	207.4	50.2
18	57.1	207.4	57.1	207.4	57.1	207.4	57.1	207.4	57.1	207.4	50.2
19	56.5	207.4	56.5	207.4	56.5	207.4	56.5	207.4	56.5	207.4	50.2

20	55.9	207.4	55.9	207.4	55.9	207.4	55.9	207.4	55.9	207.4	50.2
21	55.3	207.4	55.3	207.4	55.3	207.4	55.3	207.4	55.3	207.4	50.2
22	54.6	207.4	54.6	207.4	54.6	207.4	54.6	207.4	54.6	207.4	50.2
23	54	207.4	54	207.4	54	207.4	54	207.4	54	207.4	50.2
24	53.4	207.4	53.4	207.4	53.4	207.4	53.4	207.4	53.4	207.4	50.2
25	52.7	207.4	52.7	207.4	52.7	207.4	52.7	207.4	52.7	207.4	50.2
26	52	207.4	52	207.4	52	207.4	52	207.4	52	207.4	50.2
27	51.4	207.4	51.4	207.4	51.4	207.4	51.4	207.4	51.4	207.4	50.2
28	50.7	207.4	50.7	207.4	50.7	207.4	50.7	207.4	50.7	207.4	50.2
29	50	207.4	50	207.4	50	207.4	50	207.4	50	207.4	50.2
30	49.2	207.4	49.2	207.4	49.2	207.4	49.2	207.4	49.2	207.4	50.2
31	48.5	207.4	48.5	207.4	48.5	207.4	48.5	207.4	48.5	207.4	50.2
32	47.7	207.4	47.7	207.4	47.7	207.4	47.7	207.4	47.7	207.4	50.2
33	46.9	207.4	46.9	207.4	46.9	207.4	46.9	207.4	46.9	207.4	50.2
34	46.1	207.4	46.1	207.4	46.1	207.4	46.1	207.4	46.1	207.4	50.2
35	45.3	207.4	45.3	207.4	45.3	207.4	45.3	207.4	45.3	207.4	50.2
36	44.5	207.4	44.5	207.4	44.5	207.4	44.5	207.4	44.5	207.4	50.2
37	43.7	207.4	43.7	207.4	43.7	207.4	43.7	207.4	43.7	207.4	50.2
38	42.8	207.4	42.8	207.4	42.8	207.4	42.8	207.4	42.8	207.4	50.2
39	42	207.4	42	207.4	42	207.4	42	207.4	42	207.4	50.2
40	41.1	207.4	41.1	207.4	41.1	207.4	41.1	207.4	41.1	207.4	50.2
41	40.3	207.4	40.3	207.4	40.3	207.4	40.3	207.4	40.3	207.4	50.2
42	39.3	207.4	39.3	207.4	39.3	207.4	39.3	207.4	39.3	207.4	50.2
43	38.3	207.4	38.3	207.4	38.3	207.4	38.3	207.4	38.3	207.4	50.2
44	37	207.4	37	207.4	37	207.4	37	207.4	37	207.4	50.2
45	35.5	207.4	35.5	207.4	35.5	207.4	35.5	207.4	35.5	207.4	50.2

46	33	207.4	33	207.4	33	207.4	33	207.4	33	207.4	50.2
47	28.4	207.4	28.4	207.4	28.4	207.4	28.4	207.4	28.4	207.4	50.2
48	11.8	207.4	11.8	207.4	11.8	207.4	11.8	207.4	11.8	207.4	50.2

Figure 31.1: Longitudinal Negative Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 54ft, Deck width = 48ft, No Railing with Edge Loading.

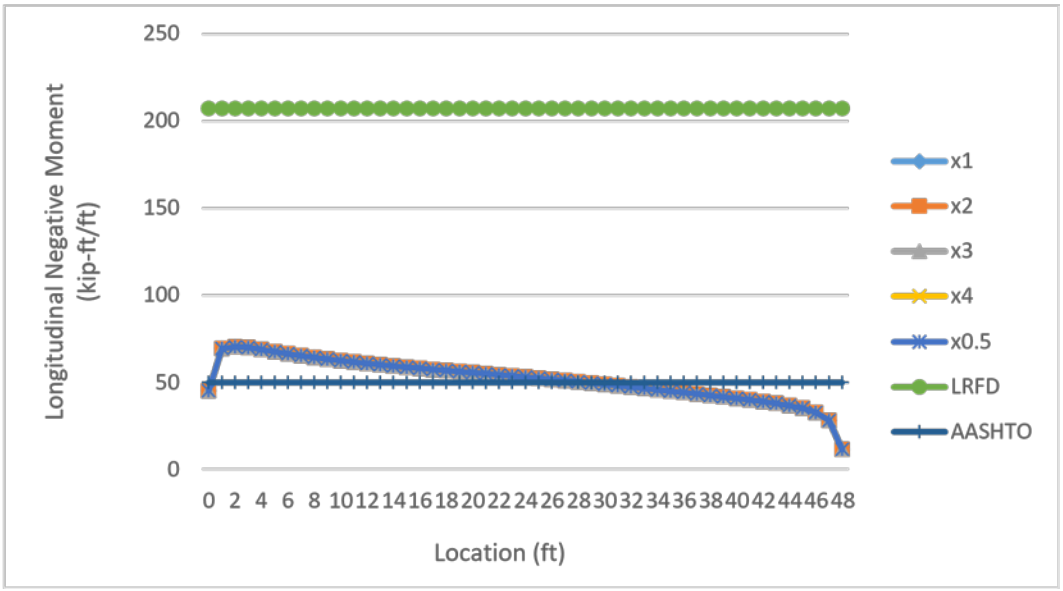

Table 31.2: Longitudinal Negative Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 54ft, Deck width = 48ft, One Left Railing with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	46.9	207.4	47.2	207.4	47.4	207.4	47.5	207.4	46.7	207.4	50.2
1	60.1	207.4	51.9	207.4	45.9	207.4	41.4	207.4	65.3	207.4	50.2
2	59.6	207.4	52	207.4	46.6	207.4	42.6	207.4	64.6	207.4	50.2
3	58.9	207.4	51.2	207.4	45.7	207.4	41.6	207.4	64	207.4	50.2
4	58.2	207.4	50.9	207.4	45.7	207.4	41.8	207.4	63	207.4	50.2
5	57.5	207.4	50.6	207.4	45.7	207.4	42	207.4	62.1	207.4	50.2
6	56.9	207.4	50.4	207.4	45.8	207.4	42.3	207.4	61.3	207.4	50.2
7	56.4	207.4	50.3	207.4	46	207.4	42.7	207.4	60.5	207.4	50.2
8	56	207.4	50.3	207.4	46.2	207.4	43.1	207.4	59.8	207.4	50.2
9	55.6	207.4	50.3	207.4	46.4	207.4	43.5	207.4	59.2	207.4	50.2
10	55.3	207.4	50.3	207.4	46.7	207.4	44	207.4	58.6	207.4	50.2
11	54.9	207.4	50.3	207.4	46.9	207.4	44.4	207.4	58	207.4	50.2
12	54.6	207.4	50.3	207.4	47.1	207.4	44.8	207.4	57.5	207.4	50.2
13	54.3	207.4	50.3	207.4	47.3	207.4	45.1	207.4	57	207.4	50.2
14	54.1	207.4	50.3	207.4	47.5	207.4	45.5	207.4	56.6	207.4	50.2
15	53.8	207.4	50.2	207.4	47.7	207.4	45.8	207.4	56.1	207.4	50.2
16	53.5	207.4	50.2	207.4	47.8	207.4	46	207.4	55.7	207.4	50.2
17	53.2	207.4	50.2	207.4	47.9	207.4	46.3	207.4	55.2	207.4	50.2
18	52.9	207.4	50.1	207.4	48	207.4	46.5	207.4	54.8	207.4	50.2
19	52.6	207.4	50	207.4	48	207.4	46.6	207.4	54.3	207.4	50.2

20	52.3	207.4	49.8	207.4	48	207.4	46.7	207.4	53.9	207.4	50.2
21	51.9	207.4	49.6	207.4	48	207.4	46.7	207.4	53.4	207.4	50.2
22	51.5	207.4	49.4	207.4	47.9	207.4	46.7	207.4	52.9	207.4	50.2
23	51.1	207.4	49.1	207.4	47.7	207.4	46.6	207.4	52.4	207.4	50.2
24	50.7	207.4	48.9	207.4	47.5	207.4	46.5	207.4	51.9	207.4	50.2
25	50.2	207.4	48.5	207.4	47.3	207.4	46.4	207.4	51.3	207.4	50.2
26	49.7	207.4	48.2	207.4	47	207.4	46.2	207.4	50.8	207.4	50.2
27	49.2	207.4	47.8	207.4	46.7	207.4	45.9	207.4	50.2	207.4	50.2
28	48.7	207.4	47.3	207.4	46.4	207.4	45.6	207.4	49.6	207.4	50.2
29	48.1	207.4	46.9	207.4	46	207.4	45.3	207.4	48.9	207.4	50.2
30	47.5	207.4	46.4	207.4	45.5	207.4	44.9	207.4	48.3	207.4	50.2
31	46.9	207.4	45.8	207.4	45.1	207.4	44.5	207.4	47.6	207.4	50.2
32	46.3	207.4	45.3	207.4	44.6	207.4	44	207.4	46.9	207.4	50.2
33	45.6	207.4	44.7	207.4	44	207.4	43.5	207.4	46.2	207.4	50.2
34	44.9	207.4	44.1	207.4	43.5	207.4	43	207.4	45.5	207.4	50.2
35	44.2	207.4	43.4	207.4	42.9	207.4	42.4	207.4	44.7	207.4	50.2
36	43.5	207.4	42.8	207.4	42.3	207.4	41.9	207.4	43.9	207.4	50.2
37	42.8	207.4	42.1	207.4	41.7	207.4	41.3	207.4	43.2	207.4	50.2
38	42	207.4	41.5	207.4	41	207.4	40.7	207.4	42.4	207.4	50.2
39	41.3	207.4	40.8	207.4	40.4	207.4	40.1	207.4	41.6	207.4	50.2
40	40.5	207.4	40.1	207.4	39.7	207.4	39.5	207.4	40.8	207.4	50.2
41	39.7	207.4	39.3	207.4	39.1	207.4	38.8	207.4	40	207.4	50.2
42	38.9	207.4	38.6	207.4	38.4	207.4	38.2	207.4	39.1	207.4	50.2
43	38	207.4	37.7	207.4	37.6	207.4	37.4	207.4	38.1	207.4	50.2
44	36.9	207.4	36.7	207.4	36.6	207.4	36.5	207.4	36.9	207.4	50.2
45	35.4	207.4	35.4	207.4	35.4	207.4	35.4	207.4	35.5	207.4	50.2

46	33.1	207.4	33.3	207.4	33.3	207.4	33.4	207.4	33.1	207.4	50.2
47	28.8	207.4	29.2	207.4	29.4	207.4	29.6	207.4	28.6	207.4	50.2
48	12.6	207.4	13.2	207.4	13.6	207.4	13.9	207.4	12.2	207.4	50.2

Figure 31.2: Longitudinal Negative Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 54ft, Deck width = 48ft, One Left Railing with Edge Loading.

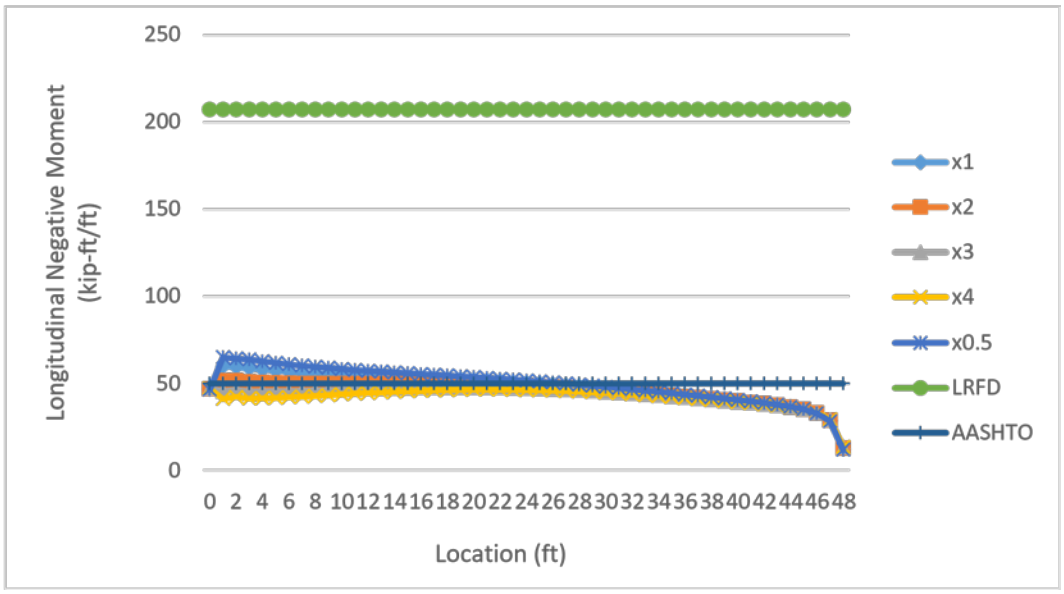

Table 31.3: Longitudinal Negative Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 54ft, Deck width = 48ft, One Right Railings with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	46	207.4	46.3	207.4	46.5	207.4	46.6	207.4	45.8	207.4	50.2
1	69.9	207.4	70.1	207.4	70.2	207.4	70.3	207.4	69.8	207.4	50.2
2	70.8	207.4	70.8	207.4	70.9	207.4	70.9	207.4	70.7	207.4	50.2
3	70.3	207.4	70.3	207.4	70.3	207.4	70.2	207.4	70.3	207.4	50.2
4	69.1	207.4	70	207.4	68.9	207.4	68.9	207.4	69.1	207.4	50.2
5	67.8	207.4	67.7	207.4	67.6	207.4	67.5	207.4	67.9	207.4	50.2
6	66.6	207.4	66.4	207.4	66.2	207.4	66.1	207.4	66.7	207.4	50.2
7	65.4	207.4	65.2	207.4	65	207.4	64.9	207.4	65.5	207.4	50.2
8	64.3	207.4	64	207.4	63.8	207.4	63.7	207.4	64.5	207.4	50.2
9	63.3	207.4	63	207.4	62.8	207.4	62.6	207.4	63.5	207.4	50.2
10	62.3	207.4	62	207.4	61.7	207.4	61.6	207.4	62.5	207.4	50.2
11	61.4	207.4	61.1	207.4	60.8	207.4	60.6	207.4	61.7	207.4	50.2
12	60.6	207.4	60.2	207.4	59.9	207.4	59.7	207.4	60.8	207.4	50.2
13	59.8	207.4	59.3	207.4	59	207.4	58.8	207.4	60.1	207.4	50.2
14	59	207.4	58.5	207.4	58.2	207.4	57.9	207.4	59.3	207.4	50.2
15	58.3	207.4	57.8	207.4	57.4	207.4	57.1	207.4	58.6	207.4	50.2
16	57.6	207.4	57	207.4	56.6	207.4	56.3	207.4	57.9	207.4	50.2
17	56.9	207.4	56.3	207.4	55.8	207.4	55.5	207.4	57.3	207.4	50.2
18	56.2	207.4	55.5	207.4	55	207.4	54.7	207.4	56.6	207.4	50.2
19	55.5	207.4	54.8	207.4	54.3	207.4	53.9	207.4	55.9	207.4	50.2

20	54.8	207.4	54	207.4	53.5	207.4	53	207.4	55.3	207.4	50.2
21	54.1	207.4	53.3	207.4	52.7	207.4	52.2	207.4	54.6	207.4	50.2
22	53.4	207.4	52.5	207.4	51.8	207.4	51.4	207.4	53.9	207.4	50.2
23	52.6	207.4	51.7	207.4	51	207.4	50.5	207.4	53.2	207.4	50.2
24	51.9	207.4	50.9	207.4	50.1	207.4	49.6	207.4	52.5	207.4	50.2
25	51.1	207.4	50	207.4	49.2	207.4	48.6	207.4	51.8	207.4	50.2
26	50.3	207.4	49.2	207.4	48.3	207.4	47.7	207.4	51.1	207.4	50.2
27	49.5	207.4	48.3	207.4	47.4	207.4	46.7	207.4	50.3	207.4	50.2
28	48.7	207.4	47.4	207.4	46.4	207.4	45.6	207.4	49.6	207.4	50.2
29	47.8	207.4	46.4	207.4	45.4	207.4	44.6	207.4	48.8	207.4	50.2
30	47	207.4	45.4	207.4	44.3	207.4	43.5	207.4	48	207.4	50.2
31	46	207.4	44.4	207.4	43.2	207.4	42.3	207.4	47.1	207.4	50.2
32	45.1	207.4	43.4	207.4	42.1	207.4	41.1	207.4	46.3	207.4	50.2
33	44.2	207.4	42.3	207.4	40.9	207.4	39.9	207.4	45.4	207.4	50.2
34	43.2	207.4	41.2	207.4	39.7	207.4	38.6	207.4	44.5	207.4	50.2
35	42.2	207.4	40.1	207.4	38.5	207.4	37.3	207.4	43.6	207.4	50.2
36	41.2	207.4	38.9	207.4	37.3	207.4	36	207.4	42.7	207.4	50.2
37	40.2	207.4	37.8	207.4	36	207.4	34.7	207.4	41.7	207.4	50.2
38	39.1	207.4	36.6	207.4	34.7	207.4	33.3	207.4	40.8	207.4	50.2
39	38.1	207.4	35.4	207.4	33.4	207.4	31.9	207.4	39.9	207.4	50.2
40	37.1	207.4	34.2	207.4	32.1	207.4	30.6	207.4	38.9	207.4	50.2
41	36	207.4	33	207.4	30.8	207.4	29.2	207.4	38	207.4	50.2
42	35	207.4	31.8	207.4	29.5	207.4	27.8	207.4	37	207.4	50.2
43	34	207.4	30.6	207.4	28.2	207.4	26.4	207.4	35.9	207.4	50.2
44	32.7	207.4	29.4	207.4	26.9	207.4	25	207.4	34.8	207.4	50.2
45	31.5	207.4	28.2	207.4	25.6	207.4	23.6	207.4	33.6	207.4	50.2

46	29.7	207.4	26.5	207.4	24.1	207.4	22.2	207.4	31.6	207.4	50.2
47	28	207.4	24.9	207.4	22.3	207.4	20.3	207.4	29.5	207.4	50.2
48	13.2	207.4	13.5	207.4	13.7	207.4	13.8	207.4	12.9	207.4	50.2

Figure 31.3: Longitudinal Negative Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 54ft, Deck width = 48ft, One Right Railings with Edge Loading.

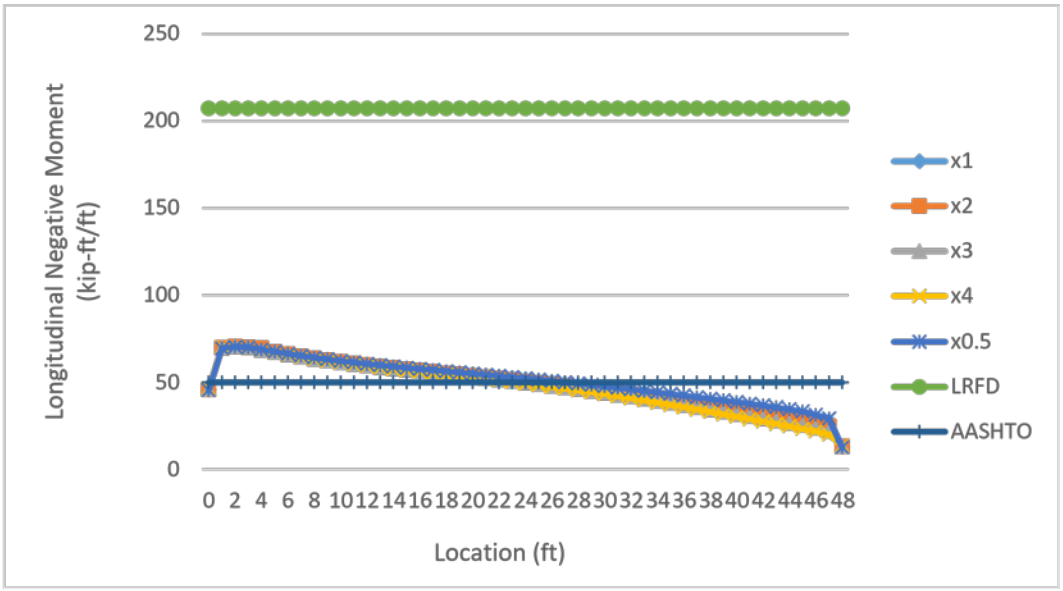

Table 31.4: Longitudinal Negative Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 54ft, Deck width = 48ft, Two Railings with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	47.3	207.4	47.8	207.4	48.2	207.4	48.5	207.4	46.9	207.4	50.2
1	60.1	207.4	51.9	207.4	45.9	207.4	41.3	207.4	65.4	207.4	50.2
2	59.6	207.4	52	207.4	46.5	207.4	42.4	207.4	64.6	207.4	50.2
3	58.8	207.4	51	207.4	45.4	207.4	41.3	207.4	64	207.4	50.2
4	58	207.4	50.6	207.4	45.3	207.4	41.4	207.4	62.9	207.4	50.2
5	57.3	207.4	50.2	207.4	45.2	207.4	41.4	207.4	62	207.4	50.2
6	56.7	207.4	50	207.4	45.2	207.4	41.6	207.4	61.1	207.4	50.2
7	56.1	207.4	49.8	207.4	45.3	207.4	41.9	207.4	60.3	207.4	50.2
8	55.6	207.4	49.7	207.4	45.4	207.4	42.2	207.4	59.6	207.4	50.2
9	55.2	207.4	49.6	207.4	45.5	207.4	42.5	207.4	58.9	207.4	50.2
10	54.8	207.4	49.5	207.4	45.7	207.4	42.8	207.4	58.3	207.4	50.2
11	54.4	207.4	49.4	207.4	45.8	207.4	43.1	207.4	57.7	207.4	50.2
12	54.1	207.4	49.3	207.4	46	207.4	43.4	207.4	57.2	207.4	50.2
13	53.7	207.4	49.3	207.4	46	207.4	43.6	207.4	56.7	207.4	50.2
14	53.4	207.4	49.2	207.4	46.1	207.4	43.8	207.4	56.2	207.4	50.2
15	53	207.4	49	207.4	46.2	207.4	44	207.4	55.7	207.4	50.2
16	52.7	207.4	48.9	207.4	46.2	207.4	44.1	207.4	55.2	207.4	50.2
17	52.3	207.4	48.7	207.4	46.1	207.4	44.2	207.4	54.7	207.4	50.2
18	52	207.4	48.5	207.4	46.1	207.4	44.2	207.4	54.3	207.4	50.2
19	51.6	207.4	48.3	207.4	45.9	207.4	44.1	207.4	53.8	207.4	50.2

20	51.2	207.4	48	207.4	45.7	207.4	44	207.4	53.3	207.4	50.2
21	50.7	207.4	47.7	207.4	45.5	207.4	43.9	207.4	52.7	207.4	50.2
22	50.3	207.4	47.3	207.4	45.2	207.4	43.6	207.4	52.2	207.4	50.2
23	49.8	207.4	46.9	207.4	44.9	207.4	43.3	207.4	51.6	207.4	50.2
24	49.2	207.4	46.4	207.4	44.4	207.4	42.9	207.4	51.1	207.4	50.2
25	48.7	207.4	45.9	207.4	44	207.4	42.5	207.4	50.5	207.4	50.2
26	48.1	207.4	45.4	207.4	43.5	207.4	42	207.4	49.8	207.4	50.2
27	47.4	207.4	44.8	207.4	42.9	207.4	41.4	207.4	49.2	207.4	50.2
28	46.8	207.4	44.1	207.4	42.2	207.4	40.8	207.4	48.5	207.4	50.2
29	46.1	207.4	43.4	207.4	41.5	207.4	40.1	207.4	47.8	207.4	50.2
30	45.3	207.4	42.7	207.4	40.8	207.4	39.3	207.4	47	207.4	50.2
31	44.5	207.4	41.9	207.4	40	207.4	38.5	207.4	46.3	207.4	50.2
32	43.7	207.4	41	207.4	39.1	207.4	37.6	207.4	45.5	207.4	50.2
33	42.9	207.4	40.1	207.4	38.2	207.4	36.7	207.4	44.7	207.4	50.2
34	42	207.4	39.2	207.4	37.2	207.4	35.7	207.4	43.8	207.4	50.2
35	41.1	207.4	38.3	207.4	36.2	207.4	34.7	207.4	43	207.4	50.2
36	40.2	207.4	37.3	207.4	35.2	207.4	33.6	207.4	42.1	207.4	50.2
37	39.3	207.4	36.3	207.4	34.1	207.4	32.5	207.4	41.2	207.4	50.2
38	38.3	207.4	35.2	207.4	33	207.4	31.3	207.4	40.3	207.4	50.2
39	37.4	207.4	34.2	207.4	31.9	207.4	30.2	207.4	39.5	207.4	50.2
40	36.4	207.4	33.1	207.4	30.8	207.4	29	207.4	38.6	207.4	50.2
41	35.5	207.4	32.1	207.4	29.6	207.4	27.8	207.4	37.6	207.4	50.2
42	34.5	207.4	31	207.4	28.5	207.4	26.6	207.4	36.7	207.4	50.2
43	33.5	207.4	30	207.4	27.4	207.4	25.4	207.4	35.7	207.4	50.2
44	32.4	207.4	28.9	207.4	26.3	207.4	24.2	207.4	34.7	207.4	50.2
45	31.4	207.4	27.8	207.4	25.1	207.4	23	207.4	33.5	207.4	50.2

46	29.7	207.4	26.4	207.4	23.9	207.4	21.9	207.4	31.6	207.4	50.2
47	28.1	207.4	24.9	207.4	22.3	207.4	20.3	207.4	29.6	207.4	50.2
48	13.9	207.4	14.7	207.4	15.3	207.4	15.7	207.4	13.3	207.4	50.2

Figure 31.4: Longitudinal Negative Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 54ft, Deck width = 48ft, Two Railings with Edge Loading.

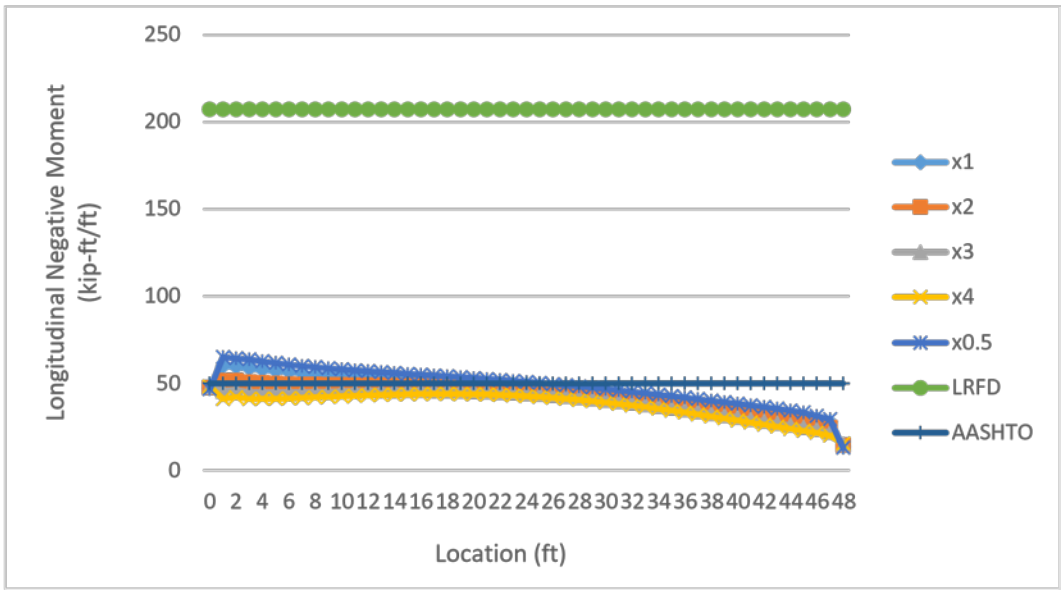

Table 32.1: Longitudinal Positive Moment Distribution at Critical Section for Four-Lane Lane Two Span Bridge Deck Span = 54ft, Deck width = 48ft, No Railing with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	58.3	201	58.3	201	58.3	201	58.3	201	58.3	201	50.2
1	59.5	201	59.5	201	59.5	201	59.5	201	59.5	201	50.2
2	55.8	201	55.8	201	55.8	201	55.8	201	55.8	201	50.2
3	54.2	201	54.2	201	54.2	201	54.2	201	54.2	201	50.2
4	53.4	201	53.4	201	53.4	201	53.4	201	53.4	201	50.2
5	53.1	201	53.1	201	53.1	201	53.1	201	53.1	201	50.2
6	53.6	201	53.6	201	53.6	201	53.6	201	53.6	201	50.2
7	56	201	56	201	56	201	56	201	56	201	50.2
8	53.2	201	53.2	201	53.2	201	53.2	201	53.2	201	50.2
9	52.2	201	52.2	201	52.2	201	52.2	201	52.2	201	50.2
10	52.4	201	52.4	201	52.4	201	52.4	201	52.4	201	50.2
11	54.6	201	54.6	201	54.6	201	54.6	201	54.6	201	50.2
12	51.4	201	51.4	201	51.4	201	51.4	201	51.4	201	50.2
13	50.1	201	50.1	201	50.1	201	50.1	201	50.1	201	50.2
14	49.6	201	49.6	201	49.6	201	49.6	201	49.6	201	50.2
15	49.5	201	49.5	201	49.5	201	49.5	201	49.5	201	50.2
16	50.1	201	50.1	201	50.1	201	50.1	201	50.1	201	50.2
17	52.4	201	52.4	201	52.4	201	52.4	201	52.4	201	50.2
18	49.7	201	49.7	201	49.7	201	49.7	201	49.7	201	50.2
19	48.8	201	48.8	201	48.8	201	48.8	201	48.8	201	50.2

20	49.1	201	49.1	201	49.1	201	49.1	201	49.1	201	50.2
21	51.2	201	51.2	201	51.2	201	51.2	201	51.2	201	50.2
22	48	201	48	201	48	201	48	201	48	201	50.2
23	46.7	201	46.7	201	46.7	201	46.7	201	46.7	201	50.2
24	46.1	201	46.1	201	46.1	201	46.1	201	46.1	201	50.2
25	45.9	201	45.9	201	45.9	201	45.9	201	45.9	201	50.2
26	46.5	201	46.5	201	46.5	201	46.5	201	46.5	201	50.2
27	48.9	201	48.9	201	48.9	201	48.9	201	48.9	201	50.2
28	46	201	46	201	46	201	46	201	46	201	50.2
29	45	201	45	201	45	201	45	201	45	201	50.2
30	45.1	201	45.1	201	45.1	201	45.1	201	45.1	201	50.2
31	47.1	201	47.1	201	47.1	201	47.1	201	47.1	201	50.2
32	43.8	201	43.8	201	43.8	201	43.8	201	43.8	201	50.2
33	42.4	201	42.4	201	42.4	201	42.4	201	42.4	201	50.2
34	41.6	201	41.6	201	41.6	201	41.6	201	41.6	201	50.2
35	41.2	201	41.2	201	41.2	201	41.2	201	41.2	201	50.2
36	41.6	201	41.6	201	41.6	201	41.6	201	41.6	201	50.2
37	43.6	201	43.6	201	43.6	201	43.6	201	43.6	201	50.2
38	40.3	201	40.3	201	40.3	201	40.3	201	40.3	201	50.2
39	38.7	201	38.7	201	38.7	201	38.7	201	38.7	201	50.2
40	37.7	201	37.7	201	37.7	201	37.7	201	37.7	201	50.2
41	37	201	37	201	37	201	37	201	37	201	50.2
42	36.4	201	36.4	201	36.4	201	36.4	201	36.4	201	50.2
43	35.9	201	35.9	201	35.9	201	35.9	201	35.9	201	50.2
44	35.5	201	35.5	201	35.5	201	35.5	201	35.5	201	50.2
45	35.2	201	35.2	201	35.2	201	35.2	201	35.2	201	50.2

46	35	201	35	201	35	201	35	201	35	201	50.2
47	34.8	201	34.8	201	34.8	201	34.8	201	34.8	201	50.2
48	34.7	201	34.7	201	34.7	201	34.7	201	34.7	201	50.2

Figure 32.1: Longitudinal Positive Moment Distribution at Critical Section for Four-Lane Lane Two Span Bridge Deck Span = 54ft, Deck width = 48ft, No Railing with Edge Loading.

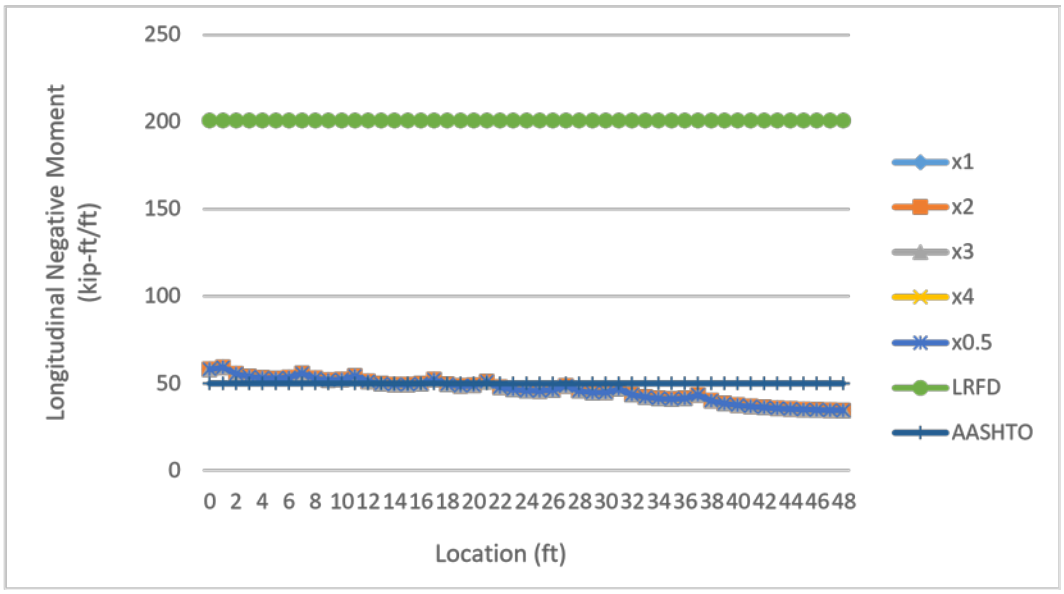

Table 32.2: Longitudinal Positive Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 54ft, Deck width = 48ft, One Left Railing with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	48.8	201	42.7	201	38.3	201	34.8	201	52.8	201	50.2
1	49.4	201	43.2	201	38.7	201	35.1	201	53.5	201	50.2
2	47.3	201	41.6	201	37.4	201	34.1	201	50.9	201	50.2
3	46.2	201	40.9	201	36.9	201	33.7	201	49.7	201	50.2
4	46.1	201	41	201	37.2	201	34.2	201	49.3	201	50.2
5	46.3	201	41.4	201	37.8	201	35	201	49.3	201	50.2
6	47.2	201	42.6	201	39.1	201	36.4	201	50.1	201	50.2
7	49.7	201	45.4	201	42.1	201	39.5	201	52.5	201	50.2
8	47.3	201	43.2	201	40.1	201	37.5	201	50	201	50.2
9	46.7	201	42.8	201	39.8	201	37.4	201	49.2	201	50.2
10	47.2	201	43.4	201	40.6	201	38.3	201	49.6	201	50.2
11	49.6	201	46	201	43.2	201	41.1	201	51.9	201	50.2
12	46.7	201	43.2	201	40.6	201	38.6	201	48.8	201	50.2
13	45.6	201	42.3	201	39.8	201	37.9	201	47.7	201	50.2
14	45.3	201	42.1	201	39.8	201	37.9	201	47.2	201	50.2
15	45.4	201	42.4	201	40.1	201	38.3	201	47.2	201	50.2
16	46.2	201	43.3	201	41.2	201	39.4	201	48	201	50.2
17	48.8	201	46.1	201	44	201	42.4	201	50.5	201	50.2
18	46.1	201	43.5	201	41.6	201	40	201	47.8	201	50.2
19	45.4	201	43	201	41.1	201	39.6	201	47	201	50.2

20	45.8	201	43.4	201	41.6	201	40.2	201	47.3	201	50.2
21	47.9	201	45.6	201	43.9	201	42.5	201	49.3	201	50.2
22	45	201	42.8	201	41.2	201	39.9	201	46.4	201	50.2
23	43.9	201	41.8	201	40.2	201	39	201	45.1	201	50.2
24	43.4	201	41.4	201	39.9	201	38.7	201	44.6	201	50.2
25	43.3	201	41.5	201	40	201	38.9	201	44.5	201	50.2
26	44	201	42.2	201	40.8	201	39.7	201	45.1	201	50.2
27	46.4	201	44.6	201	43.3	201	42.3	201	47.4	201	50.2
28	43.7	201	42.1	201	40.8	201	39.8	201	44.8	201	50.2
29	42.8	201	41.2	201	40	201	39.1	201	43.8	201	50.2
30	43	201	41.5	201	40.4	201	39.4	201	44	201	50.2
31	45.1	201	43.7	201	42.6	201	41.7	201	46	201	50.2
32	41.9	201	40.5	201	39.5	201	38.6	201	42.8	201	50.2
33	40.5	201	39.2	201	38.2	201	37.3	201	41.4	201	50.2
34	39.8	201	38.5	201	37.6	201	36.8	201	40.6	201	50.2
35	39.5	201	38.3	201	37.3	201	36.6	201	40.3	201	50.2
36	39.9	201	38.7	201	37.8	201	37.1	201	40.7	201	50.2
37	41.8	201	40.7	201	39.8	201	39.1	201	42.6	201	50.2
38	38.7	201	37.6	201	36.8	201	36.1	201	39.4	201	50.2
39	37.3	201	36.2	201	35.3	201	34.7	201	37.9	201	50.2
40	36.3	201	35.3	201	34.5	201	33.8	201	37	201	50.2
41	35.6	201	34.6	201	33.8	201	33.2	201	36.2	201	50.2
42	35.1	201	34.1	201	33.3	201	32.7	201	35.7	201	50.2
43	34.6	201	33.7	201	32.9	201	32.3	201	35.2	201	50.2
44	34.3	201	33.3	201	32.6	201	32.1	201	34.8	201	50.2
45	34	201	33.1	201	32.4	201	31.9	201	34.6	201	50.2

46	33.8	201	32.9	201	32.3	201	31.7	201	34.4	201	50.2
47	33.7	201	32.8	201	32.1	201	31.6	201	34.2	201	50.2
48	33.6	201	32.8	201	32.1	201	31.6	201	34.1	201	50.2

Figure 32.2: Longitudinal Positive Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 54ft, Deck width = 48ft, One Left Railing with Edge Loading.

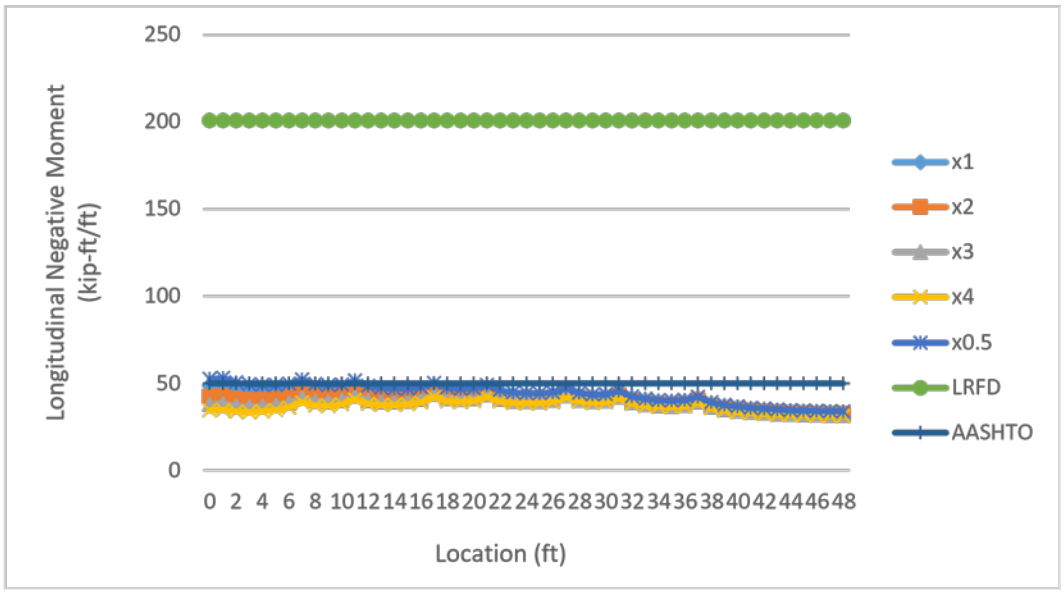

Table 32.3: Longitudinal Positive Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 54ft, Deck width = 48ft, One Right Railings with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	57.5	201	56.9	201	56.5	201	56.1	201	57.8	201	50.2
1	58.7	201	58.1	201	57.7	201	57.3	201	59.1	201	50.2
2	55	201	54.4	201	53.9	201	53.5	201	55.3	201	50.2
3	53.3	201	52.7	201	52.2	201	51.8	201	53.7	201	50.2
4	52.5	201	51.9	201	51.4	201	51	201	52.9	201	50.2
5	52.2	201	51.6	201	51.1	201	50.7	201	52.6	201	50.2
6	52.7	201	52.1	201	51.5	201	51.1	201	53.1	201	50.2
7	55.1	201	54.4	201	53.9	201	53.5	201	55.5	201	50.2
8	52.2	201	51.5	201	50.9	201	50.5	201	52.6	201	50.2
9	52.2	201	50.5	201	49.9	201	49.5	201	51.7	201	50.2
10	51.4	201	50.7	201	50.1	201	49.6	201	51.9	201	50.2
11	53.5	201	52.7	201	52.1	201	51.7	201	53.8	201	50.2
12	50.3	201	49.5	201	48.9	201	48.4	201	50.8	201	50.2
13	49	201	48.2	201	47.5	201	47	201	49.5	201	50.2
14	48.4	201	47.5	201	46.9	201	46.3	201	48.9	201	50.2
15	48.2	201	47.3	201	46.6	201	46.1	201	48.8	201	50.2
16	48.8	201	47.9	201	47.2	201	46.6	201	49.4	201	50.2
17	51.2	201	50.3	201	49.5	201	48.9	201	51.7	201	50.2
18	48.4	201	47.3	201	46.6	201	45.9	201	49	201	50.2
19	47.4	201	46.3	201	45.5	201	44.9	201	48.1	201	50.2

20	47.5	201	46.4	201	45.6	201	44.9	201	48.2	201	50.2
21	49.6	201	48.5	201	47.6	201	46.9	201	50.2	201	50.2
22	46.4	201	45.2	201	44.3	201	43.5	201	47.1	201	50.2
23	45	201	43.7	201	42.8	201	42	201	45.7	201	50.2
24	44.3	201	43	201	42	201	41.2	201	45.1	201	50.2
25	44.1	201	42.7	201	41.6	201	40.8	201	44.9	201	50.2
26	44.5	201	43.1	201	42	201	41.1	201	45.4	201	50.2
27	46.8	201	45.3	201	44.2	201	43.3	201	47.7	201	50.2
28	43.8	201	42.3	201	41.1	201	40.1	201	44.8	201	50.2
29	42.7	201	41.1	201	39.9	201	38.9	201	43.8	201	50.2
30	42.8	201	41	201	39.7	201	38.7	201	43.8	201	50.2
31	44.7	201	42.9	201	41.5	201	40.4	201	45.7	201	50.2
32	41.3	201	39.4	201	37.9	201	36.8	201	42.4	201	50.2
33	39.7	201	37.7	201	36.2	201	35	201	40.9	201	50.2
34	38.8	201	36.7	201	35.1	201	33.9	201	40.1	201	50.2
35	38.3	201	36.1	201	34.5	201	33.2	201	39.6	201	50.2
36	38.5	201	36.2	201	34.5	201	33.1	201	39.9	201	50.2
37	40.4	201	38	201	36.2	201	34.8	201	41.8	201	50.2
38	36.9	201	34.5	201	32.6	201	31.1	201	38.5	201	50.2
39	35.2	201	32.6	201	30.6	201	29.1	201	36.8	201	50.2
40	34	201	31.3	201	29.3	201	27.6	201	35.7	201	50.2
41	33.1	201	30.3	201	28.1	201	26.4	201	34.9	201	50.2
42	32.3	201	29.3	201	27.1	201	25.3	201	34.2	201	50.2
43	31.6	201	28.5	201	26.2	201	24.3	201	33.6	201	50.2
44	31	201	27.8	201	25.3	201	23.4	201	33.1	201	50.2
45	30.5	201	27.1	201	24.6	201	22.5	201	32.7	201	50.2

46	30.1	201	26.6	201	23.9	201	21.8	201	32.3	201	50.2
47	29.6	201	25.9	201	23	201	20.8	201	32	201	50.2
48	29.6	201	25.9	201	23.1	201	20.9	201	32	201	50.2

Figure 32.3: Longitudinal Positive Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 54ft, Deck width = 48ft, One Right Railings with Edge Loading.

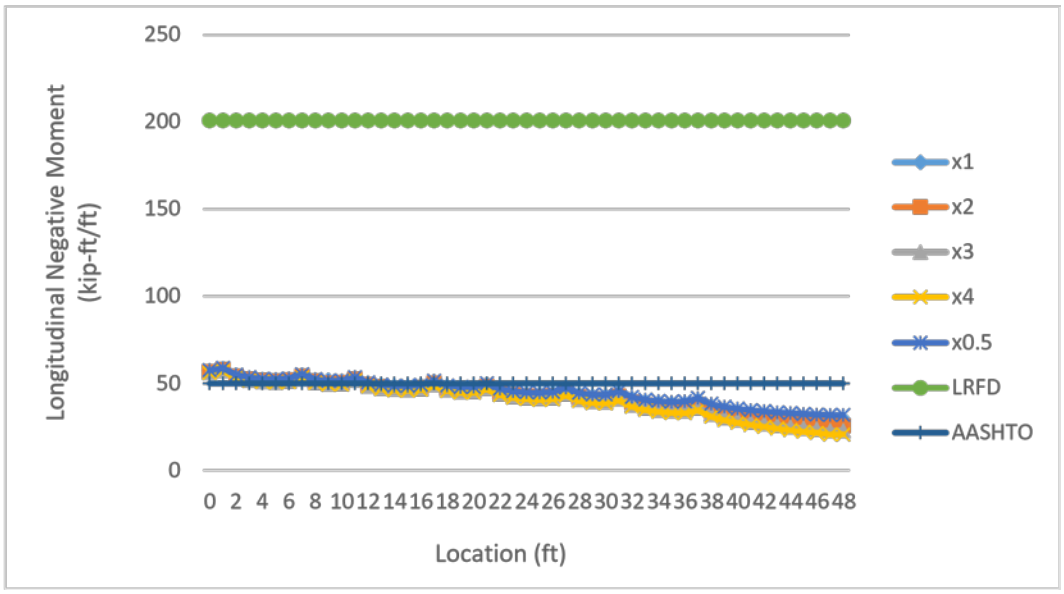

Table 32.4: Longitudinal Positive Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 54ft, Deck width = 36ft, Two Railings with Edge Loading.

Longitudinal Negative Moment at Critical Section (kip.ft/ft)											
Location (ft)	Stiffness										AASHTO Moment (kip.ft/ft)
	x1		x2		x3		x4		X0.5		
	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	FEA	LRFD	
0	48.2	201	41.8	201	37.2	201	33.7	201	52.4	201	50.2
1	48.8	201	42.3	201	37.5	201	33.9	201	53.2	201	50.2
2	46.6	201	40.6	201	36.2	201	32.8	201	50.5	201	50.2
3	45.5	201	39.8	201	35.6	201	32.3	201	49.3	201	50.2
4	45.3	201	39.9	201	35.8	201	32.7	201	48.9	201	50.2
5	45.5	201	40.3	201	36.4	201	33.4	201	48.9	201	50.2
6	46.4	201	41.4	201	37.6	201	34.8	201	49.6	201	50.2
7	49	201	44.1	201	40.6	201	37.8	201	52.1	201	50.2
8	46.5	201	41.8	201	38.4	201	35.7	201	49.5	201	50.2
9	45.8	201	41.4	201	38	201	35.5	201	48.7	201	50.2
10	46.3	201	41.9	201	38.7	201	36.2	201	49	201	50.2
11	48.5	201	44.3	201	41.2	201	38.8	201	51.1	201	50.2
12	45.7	201	41.6	201	38.6	201	36.3	201	48.3	201	50.2
13	44.6	201	40.7	201	37.7	201	35.5	201	47.1	201	50.2
14	44.2	201	40.4	201	37.6	201	35.4	201	46.6	201	50.2
15	44.2	201	40.5	201	37.8	201	35.7	201	46.6	201	50.2
16	45	201	41.4	201	38.7	201	36.6	201	47.3	201	50.2
17	47.4	201	43.9	201	41.3	201	39.3	201	49.7	201	50.2
18	44.9	201	41.5	201	38.9	201	37	201	47.1	201	50.2
19	44.1	201	40.7	201	38.2	201	36.3	201	46.2	201	50.2

20	44.4	201	41.1	201	38.7	201	36.8	201	46.5	201	50.2
21	46.6	201	43.4	201	41	201	39.2	201	48.7	201	50.2
22	43.5	201	40.3	201	38	201	36.2	201	45.6	201	50.2
23	42.2	201	39.1	201	36.8	201	35	201	44.2	201	50.2
24	41.7	201	38.6	201	36.3	201	34.6	201	43.7	201	50.2
25	41.6	201	38.5	201	36.3	201	34.5	201	43.6	201	50.2
26	42.2	201	39.1	201	36.9	201	35.1	201	44.1	201	50.2
27	44.6	201	41.6	201	39.3	201	37.6	201	46.5	201	50.2
28	41.7	201	38.7	201	36.4	201	34.7	201	43.6	201	50.2
29	40.7	201	37.7	201	35.4	201	33.7	201	42.6	201	50.2
30	40.8	201	37.8	201	35.5	201	33.8	201	42.7	201	50.2
31	42.8	201	39.8	201	37.5	201	35.8	201	44.7	201	50.2
32	39.4	201	36.4	201	34.1	201	32.4	201	41.4	201	50.2
33	38	201	34.9	201	32.6	201	30.8	201	39.9	201	50.2
34	37.1	201	34	201	31.7	201	29.9	201	39.1	201	50.2
35	36.7	201	33.5	201	31.2	201	29.4	201	38.8	201	50.2
36	37	201	33.7	201	31.4	201	29.6	201	39	201	50.2
37	39	201	35.7	201	33.3	201	31.5	201	41.1	201	50.2
38	35.5	201	32.2	201	29.7	201	27.9	201	37.7	201	50.2
39	33.9	201	30.5	201	28	201	26.1	201	36.1	201	50.2
40	32.8	201	29.3	201	26.7	201	24.8	201	35	201	50.2
41	31.9	201	28.3	201	25.7	201	23.7	201	34.2	201	50.2
42	31.1	201	27.4	201	24.8	201	22.7	201	33.5	201	50.2
43	30.5	201	26.7	201	24	201	21.9	201	32.9	201	50.2
44	30	201	26.1	201	23.3	201	21.1	201	32.5	201	50.2
45	29.5	201	25.5	201	22.6	201	20.4	201	32.1	201	50.2

46	29.1	201	25	201	22	201	19.8	201	31.7	201	50.2
47	28.7	201	24.4	201	21.3	201	18.9	201	31.4	201	50.2
48	28.7	201	24.5	201	21.4	201	19.1	201	31.4	201	50.2

Figure 32.4: Longitudinal Positive Moment Distribution at Critical Section for Four-Lane Two Span Bridge Deck Span = 54ft, Deck width = 36ft, Two Railings with Edge Loading.