

SECTION 4
STRUCTURAL ANALYSIS AND EVALUATION

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SECTION 4 **STRUCTURAL ANALYSIS AND EVALUATION**

4.1 STRUCTURAL ANALYSIS

4.1.1 Methods of Analysis [4.4]

All new, existing and temporary bridges, and bridges during all phases of construction, shall be analyzed in accordance with **LRFD** [4.4]. Bridges with straight members and supports skewed greater than 30 degrees, and bridges with horizontally curved girders shall be analyzed by refined methods in accordance with **LRFD** [4.6.3]. For bridges with horizontally curved girders meeting the requirements of **LRFD** [4.6.1.2.4b or 4.6.1.2.4c], members may be analyzed as an individual straight girders.

*Commentary: The requirements for the methods of analysis are consistent with the **BLRM**.*

4.2 DISTRIBUTION OF LOADS TO SUPERSTRUCTURE COMPONENTS [4.6.2.2]

4.2.1 Distribution of Loads on Butted Prestressed Box Members with Varying I

If prestressed box members with different moments of inertia are used in the same superstructure, the dead loads and pedestrian live load applied after the members are interconnected, shall be distributed in proportion to each member's moment of inertia according to the following:

$$DL_k = DL_{Total} * \frac{I_k}{(I_1 + I_2 + I_3 + \dots I_n)}$$

Where:

DL_k = Dead load on member "k"

DL_{Total} = Total dead loads, excluding member weight, applied to the superstructure, such as deck, sidewalks, railings, parapets, overlay, etc.

I_k = moment of inertia of member "k"

$(I_1 + I_2 + I_3 + \dots I_n)$ = Total moment of inertia of all members

4.3 DEFLECTION CRITERIA AND SPAN-TO DEPTH RATIOS [2.5.6.2]

4.3.1 Criteria for Deflection

For all highway and pedestrian bridges, the criteria for deflection in **LRFD** [2.5.2.6.2] and [3.6.1.3.2] is mandatory.

4.3.2 Criteria for Span to Depth Ratios

For all highway and pedestrian bridges, the criteria for span to depth ratios in **LRFD** [2.5.2.6.3] is mandatory.

4.3.3 Railway Structures

The analysis and design of members and components for railway structure shall be in accordance with the **AREMA**.