Index 450-199 Prestressed I-Beams Build-Up & Deflection Data

Design Criteria

AASHTO LRFD Bridge Design Specifications; ***Structures Detailing Manual (SDM)***; ***Structures Design Guidelines (SDG)***

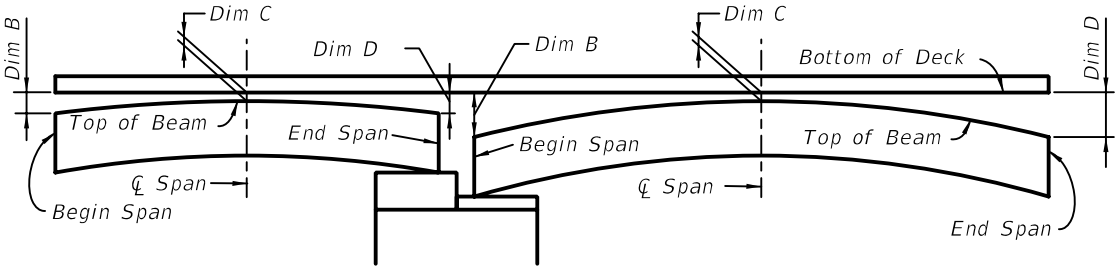
Design Assumptions and Limitations

Use this standard in conjunction with Indexes 450-010, 450-036, 450-045, 450-054, 450-063, 450-072, 450-078, 450-084, 450-096 and 450-120.

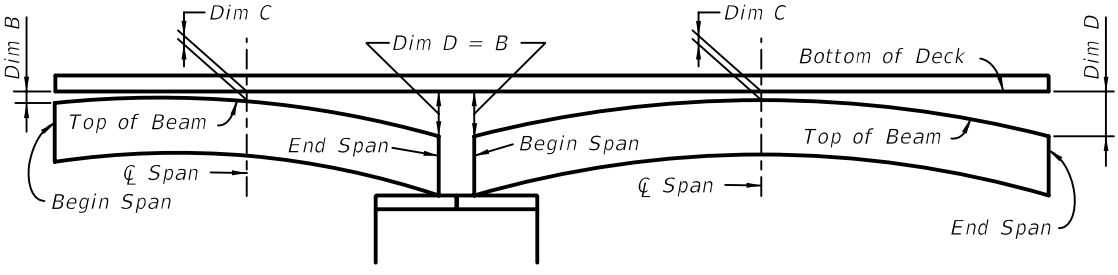
Unless otherwise required as a design parameter, beam camber for computing the theoretical build-up must be based on 120-day old beam concrete.

Consider the effects of horizontal curvature with bridge deck cross slope when determining the minimum theoretical build-up over the tip of the inside flange. Consider that the vertical curve geometry is along the effective alignment along a chord at the centerline of the beam, which may be different from the alignment parallel to the Profile Grade Line.

For a given size and type of beam, beam camber and associated Dim B and Dim D will vary due to span lengths and beam spacings. Dim B and Dim D will also vary from span to span along the length of a bridge due to deck geometry. To provide for better aesthetics and potentially easier detailing of the supporting pedestals, where possible adjust the values of Dim B and Dim D over equal height beams in adjacent spans so as to allow the beam bottom flanges to line up. Dim B and Dim D do not necessarily have to be the same value for a single beam. See the following sketch:



AVOID WHEN POSSIBLE



PREFERRED

BUILD-UP DETAIL SHOWING ADJACENT NON-EQUAL SPANS WITH DIFFERENT BEAM CAMBERS

Plan Content Requirements

Complete the following "Build-Up and Deflection Data Table for AASHTO Type II and Florida-I Beams" and include it on the superstructure detail sheets. See Introduction I.3 for more information regarding use of Data Tables.

BUILD-UP & DEFLECTION DATA TABLE FOR PRESTRESSED I-BEAMS								Table Date 07/01/17
LOCATION		REQUIRED THEORETICAL BUILD-UP OVER ℄ BEAM			NET BEAM CAMBER (PRESTRESS - DEAD LOAD OF BEAM) @ RELEASE	NET BEAM CAMBER (PRESTRESS - DEAD LOAD OF BEAM) @ 120 DAYS	DEAD LOAD DEFLECTION DURING DECK POUR @ 120 DAYS DIM A	BUILD-UP CASE NO.
SPAN NO.	BEAM NO.	AT BEGIN SPAN DIM B	AT ℄ SPAN DIM C	AT END SPAN DIM D				

NOTES: Work this sheet with Standard Plans Index 450-199.

Payment

Include estimated build-up concrete quantities with the estimated deck concrete quantities. Do not break out estimated build-up concrete quantities.

In the absence of more refined calculations, the following method to calculate estimated concrete build-up quantities may be used:

For Case 1, 2 & 3:
$$V = \frac{LW\left[C + \left(\frac{B + D - 2C}{6}\right)\right]}{27}$$

For Case 4:
$$V = \frac{LW\left[\left(\frac{B+D}{2}\right) + \left(\frac{2}{3}\left(C - \frac{B+D}{2}\right)\right)\right.}{27}$$

Where:

V = Total Volume of build-up per beam (CY)

L = Beam Length (ft)

W = Width of beam top flange (ft)

B; C; D = Build-up Thickness (ft)