Index 450-299 Florida-U 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 450-210, 450-248, 450-254, 450-263 and 450-272.

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:
Plan Content Requirements

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

<table>
<thead>
<tr>
<th>SPAN NO.</th>
<th>BEAM NO.</th>
<th>LOCATION</th>
<th>REQUIRED THEORETICAL BUILD-UP OVER Q, LEFT FLANGE</th>
<th>REQUIRED THEORETICAL BUILD-UP OVER Q, RIGHT FLANGE</th>
<th>NET BEAM CAMBER (PRESTRESS - DEAD LOAD OF BEAM) @ RELEASE</th>
<th>NET BEAM CAMBER (PRESTRESS - DEAD LOAD OF BEAM) @ 120 DAYS DEFLECTION DURING DECK POUR</th>
<th>DEAD LOAD DEFLECTION DURING DECK POUR @ 120 DAYS</th>
<th>BUILD-UP CASE NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT BEGIN SPAN B</td>
<td>AT Q SPAN B</td>
<td>AT END SPAN B</td>
<td>AT BEGIN SPAN C</td>
<td>AT Q SPAN C</td>
<td>AT END SPAN C</td>
<td>AT Q SPAN D</td>
<td>AT END SPAN D</td>
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</tbody>
</table>

Notes: Work this sheet with Standard Plan Index 450-299.

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

\[ V = \text{Left Flange} + \text{Right Flange} = \frac{LW}{27} \left[ C + \left( \frac{B + D - 2C}{6} \right) \right] + \frac{LW}{27} \left[ C + \left( \frac{B+D-2C}{6} \right) \right] \]

For Case 4

\[ V = \text{Left Flange} + \text{Right Flange} = \frac{LW}{27} \left[ \frac{B+D}{2} + \left( \frac{2}{3} \left( \frac{B+D}{2} \right) \right) \right] + \frac{LW}{27} \left[ \frac{B+D}{2} + \left( \frac{2}{3} \left( \frac{B+D}{2} \right) \right) \right] \]

Where:

\[ V = \text{Total Volume of build-up per beam (CY)} \]
\[ L = \text{Beam Length (ft)} \]
\[ W = \text{Width of beam top flange (ft)} \]
\[ B; C; D = \text{Build-up Thickness (ft)} \]