Index 450-120 AASHTO Type II Beams

Design Criteria

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

Design Assumptions and Limitations

Index 450-120 is the standard for the AASHTO Type II Beam. Use this standard with  
Indexes 450-199, 400-510, and 450-511 or 450-512.

This standard must be supplemented with project specific information including a Table  
of Beam Variables, Strand Pattern Details and a Strand Debonding Legend which must  
be completed and included in the Structures Plans. This standard and the supplemental  
project specific information that is included in the plans provides sufficient information to  
permit beam fabrication without the submittal of shop drawings.

Data tables for associated Indexes 450-199, 400-510 and 450-511 or 450-512 must  
also be completed and included in the plans.

A Framing Plan is required for bridges meeting the criteria stated in the *SDM.*

The use of End Diaphragms is not preferred on simple span, pretensioned, I-Beam  
structures. In lieu of End Diaphragms, the preferred detail is a Thickened Slab End at all  
locations of slab discontinuity. Where End Diaphragms are required by design or for  
widening projects, partial depth diaphragms are preferred. See SDM Chapter 15 for  
suggested details.

Except for widening projects where special details may be required, squared beam ends  
are preferred on all pretensioned I-Beam structures.

The prestressed beams in these Standards are generally assumed to act as simple  
spans under both Dead Load and Live Load even where the deck is detailed to be  
continuous across the intermediate supports or back-to-back diaphragms are present.  
For detailing purposes, Prestressed I-Beams are assumed to be erected plumb.

When the total initial tensioning force of the fully bonded strands required by design  
exceeds the value shown below, shield additional strands at the end of the beam when  
possible. The end reinforcement may only be redesigned to accommodate an increased  
vertical splitting force when approved by the State Structures Design Office. If approval  
is granted, Index 450-120 must then be modified for inclusion in the contract documents  
and signed and sealed by the EOR.

To limit vertical splitting forces in the webs of beams, the maximum prestress force at  
the beam ends from fully bonded strands must be limited to the following:

<table>
<thead>
<tr>
<th>Index No.</th>
<th>Beam Type</th>
<th>Max. Bonded Prestress Force</th>
<th>Last Revision Date</th>
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<tbody>
<tr>
<td>450-120</td>
<td>AASHTO Type II</td>
<td>755 Kips</td>
<td>07/01/05 or later</td>
</tr>
</tbody>
</table>
Do not apply losses when calculating the Bonded Prestress Force.

If the beam grade exceeds 2%, provide Embedded Bearing Plates and Beveled Bearing Plates at each end of the beam as shown on Index 450-511 or 450-512.

See additional instructions in the SDG.

**Plan Content Requirements**

In the Structures Plans:

Complete the appropriate "TABLE OF BEAM VARIABLES" and include it in the plans. Use additional sheets when the actual number of beams or strand patterns exceeds the capacity of a single plan sheet using the standard table. Supplemental details and modifications are permitted if special conditions require dimensions, details or notes. However, the "TABLE OF BEAM VARIABLES" itself should not be modified. See Introduction I.3 for more information regarding use of Data Tables.

Report elastic and time dependent shortening effects (DIM R) at the top of the beam @ 120 days. The average of the calculated values for the top and bottom of the beam may be used.

Report DIM P for beams placed on grade if the calculated value is equal or greater than 1" using ¼" increments.

Show strands in the outermost positions of the lowest row to support Bars D.

Round Angle Φ up to the nearest degree.

Specify shear stirrup spacings V1, V2 and V3 for Bars 4K or 5K to the nearest inch.

Prepare a Framing Plan for bridges meeting the criteria stated in the SDM.

When intermediate diaphragms are required by design, show them on the Framing Plan. Tabulate insert locations with respect to the beam ends and beam faces. Include length adjustments for beams placed on grade and for elastic and time dependent shortening effects. Show Type 33 No. 8 reinforcing bars with 3" thread lengths for attachment to the inserts on the intermediate diaphragm details. Include these bars in the Superstructure Reinforcing Bar list.

For bridge widenings where beam ends are encased in full height diaphragms and the diaphragms are to be extended, modify Index 450-120 and include it in the plans as follows:

- Modify the Standard Plans in accordance with Method 1, Method 2 or Method 3 as defined in the Terms Of Use for the Borderless DGNs provided in the Standard Plans eBooklet.
- Remove all notes, call-outs and details regarding cutting the strands and coating the ends of the beams with epoxy.
- Insert all notes, call-outs and details to ensure proper placement of Bars 4L as shown in the 2010 Design Standards Index 20120. Detail the number of bars, bar locations and bar bending diagrams.
Standard Plans Instructions
Index 450-120  AASHTO Type II Beams

Payment

<table>
<thead>
<tr>
<th>Item number</th>
<th>Item Description</th>
<th>Unit Measure</th>
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<tbody>
<tr>
<td>450-2-AAA</td>
<td>Prestressed Beams: Florida-I Beam</td>
<td>LF</td>
</tr>
</tbody>
</table>

Design Aids

AASHTO Type II and Florida-I Beam Estimated Maximum Span Lengths
*Extremely Aggressive Environment, FDOT Limits with 8.5 ksi Concrete*

Chart Design Assumptions:
- Florida-I Beam design
- Extremely aggressive corrosive conditions
- Beam concrete strength: 8.5 ksi @ final
- Deck concrete strength: 4.5 ksi @ final
- 6 in. Beams in bridge stanchion
- 2-3/8" T Shape barriers applied and distributed evenly over all beams
- 8 in. composite bridge deck with additional non-structural 1/2" sacrificial surface
- W36 x 140 from straight applied
  - 1 inch structural buck-up applied
    - (min. rebar size required for 2% cross-slab)
- 0.5 ksi LF (per HBE) or 0.025 lbs/ft for Type II Beams for additional load, dead loads including build-up
- HBE.03 live load applied
- FDOT Standard splitting/bursting reinforcement used
- All new FDOT FDOT 2000-001 design criteria regarding splitting, debonding, and stress limits and followed
- Spans shown are bearing to bearing
- 0.0720K Low Lau Strands used
**Section Properties**

<table>
<thead>
<tr>
<th>Beam</th>
<th>Area (in.²)</th>
<th>Ixx (in.⁴)</th>
<th>Iyy (in.⁴)</th>
<th>yt (in.)</th>
<th>yb (in.)</th>
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<tbody>
<tr>
<td>AASHTO Type II</td>
<td>369</td>
<td>50,979</td>
<td>5,333</td>
<td>20.17</td>
<td>15.83</td>
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</table>

* These section properties are based on gross section properties and neglect the 3/4" chamfers on the bottom flanges.