PRECAST PRESTRESSED SLAB
PRELIMINARY DESIGN CURVES

PRECAST PRESTRESSED SLAB W/ASPHALT OVERLAY

Section Properties and maximum span length curves for the precast prestressed slabs are included in this Article. The maximum span length curves should only be used as an aid in preliminary design. The curves on based on the following design parameters:

- AASHTO LRFD Design Specifications using refined losses
- Simple Span lengths are centerline-centerline bearing
- All beams are parallel
- 44'-0” out-out bridge width
- 42” Single Slope Concrete parapet
- Girder f’c = 8 ksi
- 0.6”Ø 270 ksi strand
- Total wearing surface = 9 psf (PPC Overlay)
- HL93 live load
### Precast Prestressed Slab Section Properties

<table>
<thead>
<tr>
<th>Depth</th>
<th>Area</th>
<th>Top</th>
<th>Bottom</th>
<th>Moment of Inertia</th>
<th>Top</th>
<th>Bottom</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>12&quot; Solid</td>
<td>561.188</td>
<td>6.055</td>
<td>5.945</td>
<td>6782</td>
<td>1120</td>
<td>1141</td>
<td>585</td>
</tr>
<tr>
<td>15&quot; Solid</td>
<td>705.188</td>
<td>7.573</td>
<td>7.427</td>
<td>13223</td>
<td>1746</td>
<td>1780</td>
<td>735</td>
</tr>
<tr>
<td>15&quot; Void</td>
<td>646.283</td>
<td>7.579</td>
<td>7.421</td>
<td>13131</td>
<td>1733</td>
<td>1770</td>
<td>673</td>
</tr>
<tr>
<td>18&quot; Void</td>
<td>698.391</td>
<td>9.103</td>
<td>8.897</td>
<td>22233</td>
<td>2442</td>
<td>2499</td>
<td>728</td>
</tr>
<tr>
<td>21&quot; Void</td>
<td>757.568</td>
<td>10.622</td>
<td>10.378</td>
<td>34798</td>
<td>3276</td>
<td>3353</td>
<td>789</td>
</tr>
<tr>
<td>26&quot; Void</td>
<td>879.758</td>
<td>13.144</td>
<td>12.856</td>
<td>63943</td>
<td>4865</td>
<td>4974</td>
<td>917</td>
</tr>
</tbody>
</table>

*All units in inches except weight*

**All slabs are 48" wide**
MAXIMUM SPAN RANGE
VOIDED SLAB W/PPC OVERLAY & 42'' SINGLE SLOPE PARAPET
Refined Losses

<table>
<thead>
<tr>
<th>SPAN LENGTH - FEET</th>
<th>GIRDER DEPTH - INCHES</th>
</tr>
</thead>
<tbody>
<tr>
<td>32</td>
<td>12'' Solid</td>
</tr>
<tr>
<td>41</td>
<td>15'' Solid</td>
</tr>
<tr>
<td>41</td>
<td>15'' Voided</td>
</tr>
<tr>
<td>51</td>
<td>18'' Voided</td>
</tr>
<tr>
<td>62</td>
<td>21'' Voided</td>
</tr>
<tr>
<td>81.5</td>
<td>26'' Voided</td>
</tr>
</tbody>
</table>

8 ksi & 0.6'' strand
NOTES TO DESIGNER FOR PRECAST PRESTRESSED SLAB

The Standard Drawings for precast prestressed slabs are shown in Appendix B for Section 5.

The following criteria shall be used in developing details for projects utilizing precast prestressed slabs:

PRESTRESSING STEEL
Prestressing steel shall be designed as straight strand. Strand shall not be debonded.

TIE RODS
Tie rods spacing shall be as follows:
- SPAN ≤ 40' at centerline span
- SPAN > 40' at 1/3 points
Tie rods shall be oriented as follows:
- skew angle < 20° parallel to centerline bearing
- skew angle > 20° perpendicular to slab centerline

When tie rod lengths greater than 20' are required, specify heavy-duty sleeve nuts to obtain the required length.

BEARING PADS
Bearing pads should be designed in accordance with Article 14.7.5 of the Bridge Design Manual.

The beam seat shall be parallel to the bottom of the beams.

MEMBRANE SEAL
A waterproof membrane seal shall be applied to the top surface of the slabs when an asphalt wearing surface is used. The membrane seal shall be a spray-applied waterproofing membrane that conforms to Section 511. A 0.2’ asphalt wearing surface should be used at initial construction. The height of the 42” single slope concrete parapet does not needs to be increased for the 0.2’ overlay at initial construction.

When a PPC overlay is used, no asphalt future wearing surface is used.
Revisions:

July 2009    Corrected references on page 3 to Section 511 and System Type D.

Feb 2012    Added maximum span chart based upon refined losses.

Mar 2015    Revised maximum span curves for using 0.4’ total asphalt pavement.

Jan 2016    Revised maximum span curves for using 0.2’ total asphalt pavement and 2014 live load distribution factors and resistance factors.

Oct 2017    Revised maximum span curves for using 0.4’ total asphalt pavement.

Nov 2019    Revised 18” Voided Slab section properties due to changing the center of the voids from 8½” to 9” to meet the requirements of AASHTO Article 5.12.3.2.2. Revised 15” Voided Slab section properties due to changing the center of the voids from 7” to 7½” to meet the requirements of AASHTO Article 5.12.3.2.2. Clarified design assumptions for total asphalt wearing surface to be 0.2’ initial and nothing in the future. Revised Maximum Span Range curves for 9 psf PPC overlay and 42: single slope parapet.