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 are 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
- Concrete parapet with 3” added height for 0.2’ asphalt overlay
- Girder f’c = 8 ksi
- 0.6”Ø 270 ksi strand
- Total wearing surface = 56 psf (0.2’ at initial construction & 0.2’ future)
- HL93 live load
## PRECAST PRESTRESSED SLAB SECTION PROPERTIES

<table>
<thead>
<tr>
<th>DEPTH</th>
<th>AREA</th>
<th>CENTER OF GRAVITY</th>
<th>SECTION MODULUS</th>
<th>WEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>TOP</td>
<td>BOTTOM</td>
<td>MOMENT OF INERTIA</td>
</tr>
<tr>
<td>12&quot; SOLID</td>
<td>561.188</td>
<td>6.055</td>
<td>5.945</td>
<td>6782</td>
</tr>
<tr>
<td>15&quot; SOLID</td>
<td>705.188</td>
<td>7.573</td>
<td>7.427</td>
<td>13223</td>
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<tr>
<td>15&quot; VOID</td>
<td>646.283</td>
<td>7.534</td>
<td>7.466</td>
<td>13121</td>
</tr>
<tr>
<td>18&quot; VOID</td>
<td>698.391</td>
<td>8.995</td>
<td>9.005</td>
<td>22208</td>
</tr>
<tr>
<td>21&quot; VOID</td>
<td>757.568</td>
<td>10.622</td>
<td>10.378</td>
<td>34798</td>
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<tr>
<td>26&quot; VOID</td>
<td>879.758</td>
<td>13.144</td>
<td>12.856</td>
<td>63943</td>
</tr>
</tbody>
</table>

*ALL UNITS IN INCHES EXCEPT WEIGHT*

All slabs are 48” wide
MAXIMUM SPAN RANGE
VOIED SLAB W/ ASPHALT OVERLAY
Refined Losses

<table>
<thead>
<tr>
<th>Girder Depth - Inches</th>
<th>Span Length - Feet</th>
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</thead>
<tbody>
<tr>
<td>12&quot; Solid</td>
<td>32</td>
</tr>
<tr>
<td>15&quot; Solid</td>
<td>41</td>
</tr>
<tr>
<td>15&quot; Voided</td>
<td>41</td>
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<tr>
<td>18&quot; Voided</td>
<td>50</td>
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<tr>
<td>21&quot; Voided</td>
<td>60</td>
</tr>
<tr>
<td>26&quot; Voided</td>
<td>80.5</td>
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</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**
Premising 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 the special provisions. A 0.2’ asphalt wearing surface should be used at initial construction and an additional 0.2’ future overlay should be assumed in the design. The height of the lip of the concrete parapet needs to be increased 3” for the 0.2’ overlay at initial construction.
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.