**INTERIOR DIAPHRAGMS**

1. **Provide Exterior Diaphragms @ Points for Spans 21 & 24 alternating.**

**Definitions**

- **Cheekwall:** A reinforced concrete wall which accomplishes the functions of shear block and curtain wall.

**Communication of Pennsylvania Department of Transportation**

**Standard Requirements for Tendons, Dowels, Shear Blocks, Diaphragms, Shear Limitations and Backwalls**

**P/S Concrete I-Beam, Pa Bulb-Tee Beam and Box Beam Bridges**

**Sharpend Skew Detail**

**Commonwealth of Pennsylvania**

**Director, Bureau of Design**

**Chief Bridge Engineer**

*BD-651M*

*September 20, 2010*

*Recommended RECOMMENDED SHEET 1 OF 2*
### Tendon and Diaphragm Requirements for Adjacent Box Beam Bridges

(Simple and Continuous Span Bridges)

**Note:**
- Diaphragms are shown perpendicular, but may be cast on skew. See BC-775M for detail.
- See Appendix IV for detail.

#### Spans Up to 27,000 (90')

<table>
<thead>
<tr>
<th>Metric Units</th>
<th>U.S. Customary Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Side of Span</td>
<td>U.S. Customary Units</td>
</tr>
<tr>
<td>Length</td>
<td></td>
</tr>
</tbody>
</table>

#### Spans Greater Than 27,000 (90')

<table>
<thead>
<tr>
<th>Metric Units</th>
<th>U.S. Customary Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Side of Span</td>
<td>U.S. Customary Units</td>
</tr>
<tr>
<td>Length</td>
<td></td>
</tr>
</tbody>
</table>

**Add Diaphragm & Tendon at 1/6 of Span for Spans Less than 80'.**

### Dowel and Shear Block Requirements for Composite Adjacent Box Beams

(Simple and Continuous Span Bridges)

**Fixed End**

<table>
<thead>
<tr>
<th>Dowel</th>
<th>Shear Block</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/16</td>
<td>1/16</td>
</tr>
</tbody>
</table>

**Expansion End**

<table>
<thead>
<tr>
<th>Dowel</th>
<th>Shear Block</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/16</td>
<td>1/16</td>
</tr>
</tbody>
</table>

**Notes:**
- Investigate the adequacy of dowels and shear blocks when bridge is subject to inundation during flood conditions (100 year minimum).
- Use Grade 420 (60) Epoxy Coated Steel Dowels.
- For multi-span bridges (non-continuous), without backwalls, abutments are to be fixed.
- If a cheekwall is to be used as a shear block, it is to be designed accordingly.

### Shear Block Requirements for Integral Abutment Bridges

<table>
<thead>
<tr>
<th>No. of Spans</th>
<th>Span Length, L</th>
<th>Minimum SKEW</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>L ≤ 27,000</td>
<td>45'</td>
</tr>
<tr>
<td>2</td>
<td>27,000 &lt; L ≤ 50,000</td>
<td>90'</td>
</tr>
<tr>
<td>3</td>
<td>L &gt; 50,000</td>
<td>90'</td>
</tr>
</tbody>
</table>

**Notes:**
- Either all metric or all English values must be used on plans. Metric and English values shown may not be mixed.

### Standard Requirements for Tendons, Dowels, Shear Blocks, Diaphragms, Skew Limitations, and Backwalls

- PA Concrete I-Beam
- PA Bulb-Tee Beam and Box Beam Bridges

**Recommended:**
- Sept. 20, 2010
- Sept. 20, 2010

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