Deck Panel Research at Virginia Tech
Matt Swenty

Research Areas
- Grout Specifications
- Horizontal Shear Connectors
- Panel to Panel Joints
- Time Dependent Behavior

Specification for Haunch and Pocket Grout
- Compressive and Tensile Strength
- Low Shrinkage
- Good Flow
- Good Cohesion
- Evaluate through ASTM and mock-up tests

Horizontal Shear Connectors - Push Off Tests
Examined a wide variety of connector details and grout types
AASHTO equation for horizontal shear strength of smooth surfaces was best design equation

Lab Mockup
- 5 Precast deck panels
- Pocket spacing
- 3 Post-tensioning ducts
- 2 AASHTO Type II girders
- Grouted female-female joints and epoxied male-female joints
**Time Dependent Behavior**

- Deck panels are post-tensioned and then connected to girders (steel or concrete).
- Over time, the deck wants to creep and shrink but is restrained by the girders.
- Self-equilibrating stresses develop over time, along with restraint stresses in continuous systems.
- Deck loses precompression over time.

### Design Recommendations

<table>
<thead>
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<th>Girdar Type</th>
<th>Number of Spans</th>
<th>Initial P'T (psi)</th>
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</thead>
<tbody>
<tr>
<td>Steel</td>
<td>1</td>
<td>200</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>650</td>
</tr>
<tr>
<td></td>
<td>3 or more</td>
<td>500</td>
</tr>
<tr>
<td>PCBT</td>
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<td>200</td>
</tr>
<tr>
<td></td>
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<tr>
<td></td>
<td>3 or more</td>
<td>200</td>
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<tr>
<td>AASHTO</td>
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<td>200</td>
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<td></td>
<td>3 or more</td>
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</tr>
</tbody>
</table>

### Panel to Panel Connections

- Female-female narrow keyed grouted post-tensioned joint.
- Wide cast-in-place joint with interlocking hairpin reinforcement.
- Narrow non-prestressed joint with drop-in rebar.

### Woodrow Wilson Bridge Inspection
Continuing and Future Work

- Panel-to-panel joint evaluation
- Shear stud pocket performance
- Field implementation and testing

Thank You