LARGE BARS SPLICED IN UHPC

Christina Freeman
PRECAST BRIDGE ELEMENTS AND SYSTEMS

FDOT Transportation Innovation Challenge
The Department invites you to share your thoughts on ways we can challenge ourselves to be innovative, efficient and exceptional at our Invitation to Innovation website.

We also invite you to review our Design Office Innovations listed in the links below. Additional innovations will be added as they are identified and developed. If you have any questions, details and contact information are included within the information for each innovation web site.

Structures Design Office
Curved Precast Spliced U-Girder Bridges
Fiber Reinforced Polymer Reinforcing
Geosynthetic Reinforced Soil Integrated Bridge System
Geosynthetic Reinforced Soil Wall
Prefabracted Bridge Elements and Systems
Segmental Block Walls

Source: www.fdot.gov, FHWA EDC-4 Summary and Baseline Report
UHPC MATERIAL

- Fiber Reinforced (2%)
- Portland Cement Product
- Water to cementitious ratio < 0.25
- Compressive Strength > 21.7 ksi
- Tensile Strength > 0.72 ksi
- Enhanced Durability
UHPC CONNECTION USE

Source: www.fhwa.dot.gov
MIXING
MIXING
TESTING AND PLACEMENT
CONNECTION POSSIBILITIES
CONNECTION POSSIBILITIES
Start test series for one bar size: #8, #9, #10 or #11 and cover: 1.75" or 3.75"

Guess Splice Length

Test 2 different spacings for the previously selected bar size, splice length and cover: contact splice and 6" c-c (7 tests, 1 strip)

Was 75 ksi bar stress or rupture achieved?

Yes

Decrease splice length by 2db

No

Increase splice length by 2db

Test 2 different spacings for the previously selected bar size and splice length and cover: contact splice and 6" c-c (7 tests, 1 strip)

Was 75 ksi bar stress or rupture achieved?

Yes

Determine minimum design splice length

No

Is 75 ksi bar stress or rupture achieved?

Yes

Test at spacing equal to 3.5" c-c (approx. 2db), 8.5" c-c and splice length (12 tests, approx. 3 strips)

Stop
RESULTS PROCESSING

- As-Built Dimensions
- Concrete Compressive Strength
- Tensile Properties per ASTM C1609
- Failure Mode
- Maximum and Cracking Loads
- Maximum Bar Strain and Stress
- Bar Slip
- Bond Stress per Equations from Literature
### Required Embedment Length (M, D) in Terms of Bar Diameters

<table>
<thead>
<tr>
<th>Bar Size</th>
<th>No. 8 (Per FHWA)</th>
<th>No. 9</th>
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</thead>
<tbody>
<tr>
<td>Cover</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.75 inch</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>3.75 in</td>
<td>8</td>
<td>8</td>
</tr>
</tbody>
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ANY QUESTIONS?

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