UHPC for repair of steel piles

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Background
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Steel HP piles used for abutment foundations
Steel HP piles used in conjunction with sheet piles

(FL Turnpike – Deerfield Beach)
Corroded Piles
Corroded piles

- 700 bridges need pile maintenance
- 300 have pile section loss (80 severe to limit loads)

One of the 49 Corrosion-damaged piles in I-70/I-270 interchange (St. Louis, MO) that were repaired with this technique.
Failed piles
Assessment of corroded piles
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Repair of corroded piles
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[Graph showing bond stress (Psf) vs. displacement (mm) and bond stress (MPa) vs. displacement (inch) with a label C10 (2P-8HS-1W).]
Repair of corroded piles
## Repair of corroded piles

<table>
<thead>
<tr>
<th>w/c*</th>
<th>Cement Type III</th>
<th>Slag</th>
<th>Fine Sand</th>
<th>HRWR</th>
<th>Water</th>
<th>Steel Fiber</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.2</td>
<td>945 (1,593)</td>
<td>220  (371)</td>
<td>1,008 (1,699)</td>
<td>43.8 (73.8)</td>
<td>200 (337)</td>
<td>157 (265)</td>
</tr>
</tbody>
</table>

kg/m³ (lb/yd³)
Conclusions

➢ UHPC was developed using locally available material in Missouri

➢ UHPC plates were able to provide the full strength of H-piles
Acknowledgement

MoDOT

Mid-America Transportation Center

Skyline Steel

FYFE Co. LLC

Tyfo® Fibrwrap® Systems

QuakeWrap®
THANK YOU