

ABC-UTC 2023 In-Depth Web Training: Precast Substructures

#	Questions	Responses
	Module 6: ABC-UTC Research Outputs Ready for Implementation – Precast Substructures	
1	Do you foresee the use of precast substructures becoming more and more frequent in the future? And if so or if not, why?	Yes, the future use of precast substructures is promising and will be more frequently used, especially for larger projects with multiple piers.
2	In your opinion, what percentage of bridge substructure construction will be in precast 10 years from now?	This is hard to answer. The technology and design/construction specifications are available now. Contractors' familiarity and increased cost could be obstacles to deal with, but will get competitive with more usage. My guess would be around 10%.
3	What makes precast concrete unique from other types of concrete?	Precast concrete is plant produced with higher quality, strength, and durability. Precast concrete is structurally efficient and allows for accelerated bridge construction.
	Questions during Module 6	
4	What kind of surface preparation is needed prior to jacketing an existing deteriorated concrete column with a UHPC jacket? Can the retrofit be considered to provide structural strengthening if done under live load?	Sand blasting surface preparation is recommended for all column and pile repair and retrofit. Other surface roughening techniques to an amplitude of 0.25-inch could also be used. Live load was not addressed in the research, but column retrofit could be done under live load.
5	Is there a placement height limit per UHPC pour, to control pressure on the forms and shrinkage cracking?	The UHPC shell is a relatively thin layer and controlling the height of the form was not of any concerns. Fibers in the UHPC mix keep shrinkage cracking under control.
6	Are there any non-proprietary UHPC mix designs that you would recommend?	There are a few non-proprietary UHPC mix designs that have been used, such as Washington State University's UHPC research project. Please note that the non-proprietary UHPC mix designs are based on local materials and cannot be used elsewhere unless qualification material tests are provided.
7	The rebar development length in the UHPC you specified was for deck closure pours. Is this also applicable to substructure column repairs using UHPC, or it is different?	The bar development length in the UHPC should be applicable to other cases as well. The location and loading condition do not affect the development length.

8	What was the ductility of the retrofitted columns using the UHPC repair?	Ductility values of 5 to 8 were observed for different specimens in accordance with the table shown.	<table border="1"> <thead> <tr> <th>Specimen ID</th> <th>Maximum drift</th> <th>Displacement ductility</th> </tr> </thead> <tbody> <tr> <td>S-1</td> <td>8.5 %</td> <td>8</td> </tr> <tr> <td>S-2</td> <td>5.3 %</td> <td>5</td> </tr> <tr> <td>S-3</td> <td>6.4%</td> <td>6</td> </tr> <tr> <td>S-4</td> <td>6.5%</td> <td>5</td> </tr> </tbody> </table>	Specimen ID	Maximum drift	Displacement ductility	S-1	8.5 %	8	S-2	5.3 %	5	S-3	6.4%	6	S-4	6.5%	5
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