ABC-UTC 2023 In-Depth Web Training: Precast Substructures		
#	**Questions**	**Responses**
	Module 4: Alabama’s I-59/20 Birmingham Central Business District Precast Substructure	
1	Under what conditions are precast substructures more cost-effective than cast-in-place concrete substructures?	My personal experience is that precast substructures are most cost-effective when there is a consideration of the time savings component. There is sometimes a marginal material savings in the precast elements, but there is also an upfront cost in setup of a casting facility and formwork that can add some additional cost. The more repetition and quantity that can be precast, the less the upfront costs factor into the overall cost of the project. However, overall, the savings in onsite labor and schedule savings typically push the precast option to be more cost-effective under the right project conditions.
2	What constraints do precast substructures alleviate?	In the case of our project, the constraint was time and physical construction space. To form and pour all of the columns in place in the allotted schedule duration would have required multiple forming, rebar tying, and pouring/finishing crews (with associated cranes) to be located within a very constrained project site. This made the cast-in-place option less desirable.
3	What are the main, including logistical, challenges to implement precast substructures?	Generally, the challenge is to locate a site that is large enough to accommodate a precasting operation with enough storage space to store the precast elements until they are erected onsite. There is also the challenge of transporting the precast elements (either by truck, rail, or barge) to the project site and then lifting, turning, and handling the large precast elements as needed to get them from the precast yard and erected on the site. The designer of the precast system needs to consider these factors early in the design to ensure that the element dimensions and weights can be handled, transported, and erected with reasonably available equipment.

	Questions during Module 4	
4	Was the skin friction between the micropile casing and soil modeled in FB-Pier?	We effectively neglected the skin friction between the micropile casing and the soil by setting the axial skin friction parameter to 1.0 psf over the height of the casing. Axial load was assumed to be carried 100% by the rock socket and was verified in the field using load testing.
5	Do you have more information on the couplers? Will the couplers develop the #11 bars used in the connection?	Yes, the couplers used on this project were the NMB Splice Sleeve System (www.splicesleeve.com). The system has a series of different sized couplers that will develop a #3 bar through a #14 bar.
6	Do you know how the state came up with the incentive and disincentive of $250,000 / day?	I am not sure how the dollars were established, but they were large enough to allow for consideration of innovative ABC methods to reduce the project schedule and the impact of the interstate closure on the traveling public.
7	How did the micropile testing program originate?	Micropile specifications require both a verification test (loaded to nominal geotechnical capacity) and proof tests (loaded to the factored applied load). We performed the verification testing using a static load frame with reaction piles. Traditional micopile proof load tests are performed using a static load frame with reaction piles at a frequency of one test per production footing (12 micropiles). To improve the speed of construction, our team proposed a drop weight, dynamic load test using PDA (Pile Driving Analyzer) testing methods in lieu of the static load test. The dynamic load test was performed on four micropiles per footing in half the time it would have taken to perform a traditional static proof test.