June 2022 ABC-UTC Monthly Webinar: New Mexico's Precast, UHPC, ABC Bridge: NM 50 over Glorieta Creek		
#	**Questions**	**Responses**
	Design	
1	What were the main factors to determine the use of UHPC instead of traditional concrete precast structural segments?	UHPC was chosen for the speed at which we could carry on with critical path tasks and for the short rebar development and splice lengths it provided.
2	Were the abutments on piles?	Drilled shafts were used for the abutments.
	Construction	
3	How successful was the Contractor in achieving the design strength for the UHPC in the joints between the precast units?	The Contractor had no issues achieving UHPC strength. Seven-day strength requirements were achieved in four days, and 28-day strengths were well in excess of 21 ksi.
4	Were there any issues encountered during construction that altered the schedule? If so, how were these handled?	The Precaster abruptly lost a large number of employees after fabrication began, so they struggled to meet their schedule. Also, rain in the project area was saturating the backfill, so the Contractor had to do some extra work to dry out that soil before they could put in the abutment backfill.
5	What issues, if any, did you run into with the precasting of several components of the bridge and having to move them on site?	Again, the Precaster experienced some staff shortages during fabrication. We did have some pieces with flaws: one of the approach slab header curbs had a strange sag in it that we had to bush-hammer and refill with UHPC. On the approach slab, some of the bolt projections for the metal rail anchorage were insufficient, and we ended up having to weld the nuts on as a corrective measure. As mentioned in the presentation, we were getting our precast inspection program back up and running at the same time this project was being fabricated. Finally, limited space at the construction site necessitated that the trucks delivering the precast components had to drive backwards down NM 50 for over a mile to get to the bridge site.

6	What was the biggest engineering challenge the contractor had to overcome that wasn't designed by the EOR (Engineer of Record)?	The Contractor engineered the demolition plan. They were also responsible for learning to work with the UHPC (mixing, forming, and placing).
7	What are the lessons learned for this project?	The lessons learned were provided on Slides 39 and 40 of the presentation.
	Cost	
8	What was the cost of the UHPC, and were there any issues with the contractor being able to supply it?	The unit bid price for UHPC was $18,494/CY for a total cost of $123,910. Just prior to letting, there was concern about availability of the steel fibers, but LaFarge had a sufficient quantity of fiber in stock for this project.
	Questions during Webinar	
9	How was it that ABC designed projects were able to be revised (post letting) to conventional construction? Was this done through value engineering?	After the projects were let, the Contractor completed value engineering to change the construction approach to reduce the risk of not making the completion date.
10	How did you get buy-in participation from non-bridge design NMDOT personnel for the workshop? How long did the workshop last? Have you noticed a change of ABC attitude on the construction side?	The Bridge Bureau management advocated to upper management the benefits of doing more ABC construction and expressed how more education was needed in other Sections of the Department to move ABC forward on future NMDOT projects. The workshop was a half day in length. There has been a shift in attitude of completing bridge construction using ABC since completing the internal workshop.
11	Can you provide an explanation of how you performed vibration monitoring of the old building?	Vibration monitoring devices were placed along the perimeter of the old building when work was being performed and were monitored by the the consultant for activity.
12	What is length of the drilled shaft for the project?	Drilled shafts were between 25 and 30 feet long.

13	Was a straddle bent considered (drilled shafts outside the existing roadway limits) for the bridge?	Yes, it was considered but ultimately not advanced due to the need to stay within the very narrow easement, the need to limit precast piece weight so the crane could operate entirely from the west end of the bridge, and the attractiveness of keeping the existing abutments in place to preserve the historic look and feel of the site.
14	Why was it not considered to keep provisions for a future widening if required?	Travel demand forecasting does not support the need for future widening on this route.
15	Since this is an ABC project, what were the early strengths of UHPC within hours or days of placement?	The early strengths of the UHPC were 2510 psi @ 24 hrs, and greater than 14 ksi @ 4 days. UHPC strength gains can be very temperature dependent. During the placement period, daytime temperatures averaged 90°F and often reached 95°F.
16	Can you explain why the UHPC was used in this particular project?	UHPC was chosen for the speed at which we could carry on with critical path tasks and for the short rebar development and splice lengths it provided.
17	Why was the UHPC joint so narrow? It obviously was a challenge for pouring of the UHPC.	Pour pockets were provided every 10 ft along the narrow joints. Elsewhere, the joints were kept narrow to save material. UHPC allows the engineer to decrease the splice lengths, thereby decreasing the joint width. The decreased joint width as well as UHPC's mechanical characteristics work togother to minimize differential displacement which can lead to crack propagation in deck overlays and shear keys. This in turn decreases the potential joint failure due to freeze/thaw damage and rebar corrosion resulting from moisture and deicing chemical infiltration. Also, the narrower joint width is easier to work with when pouring the UHPC. WIder joints require much more work to seal, and are more prone to leaking and failing completely.
18	With the use of UHPC, what was the rebar consideration: 60 ksi, 80 ksi, or 100 ksi? Was corrosion resistant rebar a consideration as well?	On the precast prestressed slabs, which were also the driving surface of the bridge, we used 100 ksi ChromX rebar. On the remaining precast pieces, we used 60 ksi black rebar.

19	What would you do differently with the precast approach slabs?	A different bridge site with different constraints might lend itself to a less complicated design for the approach slabs. For this project's site constraints, a potential simplification would be to use the more traditional approach with a sleeper footer design rather than the buried approach.