	IBT/ABC-UTC 2025 September Vantage Bridge	
#	**Questions**	**Responses**
1	Were stainless steel rebars (SSRs) used in any of the precast deck panels?	No. Epoxy-coated bar was specified. But the project switched to continuously galvanized bar during the contract at the contractor's request.
2	How would future partial and full-depth deck repairs done?	Conventional deck patching methods are anticipated if needed. UHPC is not expected to need future deck repair.
3	Was any foundation anaylses done for this project?	No, the new work is essentially weight-neutral.
4	What is the contractor learning curve for precast decks?	The contractor did gain efficiency over the first few cycles of work.
5	Having precast decks, does it save time and does it save money?	Precast decking was selected to minimize dead load imbalance on the bridge and because it is less sensitive to vibration/deflection. No direct cost comparison was done between precast and CIP concrete for this project.
6	What are primary differences between UHPC pour strip and conventional cast-in-place concrete pour strips?	UHPC closure strips are much narrower, and they gain strength faster. The narrow joints were essential to stage the work with traffic on the bridge.
7	Have you noticed if precast deck panels work better on steel girders or concrete girders?	WSDOT has not constructed enough precast decks to develop a policy stance on this.
8	Was live load vibration considered for the UHPC closure pour casting? Is there any concern with rebar development due to the movement of the bars during curing?	Yes, vibration was a concern. Traffic was shifted from lanes adjacent to closure pours, and traffic speeds were reduced. The splice lengths are slightly longer than the minimum required by code. No evidence of
9	How have de-icing chemicals and freeze-thaw cycles affected the performance of the ABC connections over time?	No deterioration of UHPC has been noted on the few bridges WSDOT has built. Most UHPC in service is protected by a deck overlay.
10	What is the cost of UHPC compared to conventional concrete?	UHPC was bid at $8,000/CY by the low-bidder on this job.
11	Is there an approximate cost for all of the temporary support framing that was needed?	Temporary steel was bid at $2,300,000 by the low-bidder on this job
12	Could you discuss the cost to build these bridges in 2026 USA dollars?	Low bid was $57.7M in January of 2024.
13	If you did not have elevations matched, how did you handle the difference in elevation, especially given the fact that the closure joint width was small?	Elevations between adjacent deck panels have been within the specified tolerance of +/- 1/8"
14	Did you have perfect elevation match when you connected the Phase I to Phase II segments?	Elevations between adjacent deck panels have been within the specified tolerance of +/- 1/8"
15	Test data shows that even "non-Composite " beams act as composite until the bottom flange of the steel beam reach its yield point. Did you consider this and does it make any difference?	No composite behavior was assumed in the design. However, some composite behavior was sought to minimize vibration and deflection by requiring grout and UHPC to be placed progressively with the deck panel work.
16	What was the maximum batch size you prepared using each mixer?	0.136 CY
17	Did you have holes to prevent air from getting trap below formwork?	Yes, the top forms have sealable vents.
18	How many cubic yard of UHPC are estimated to be used for the entire project?	Likely over 320 CY
19	Did the UHPC supplier provided the mixer and do the placement?	UHPC supplier provided mixers and oversaw the placement. The contractor performed the labor.
20	What did the $8000 per cubic yard of UHPC cost include?	This is an in-place cost (i.e. materials, temporary works, and labor)
21	What type of steel fiber was used in the UHPC mix?	Sumiden
21	What company was the supplier/contractor for the UHPC pour?	ceEntek
22	Why is the deck and UHPC non-composite with the girders?	Composite behavior could not have been reliably predicted given the complex progressive staging of the deck replacement work.
23	How are the UHPC pours disconnected from the steel girders?	The only connection is adhesion and shear friction provided by rivet heads from the top flange cover plates. No bond breaker was provided.
24	Are there any challenges with elevation differences between the two stages if they don't line up?	Elevations between adjacent deck panels have been within the specified tolerance of +/- 1/8"
25	What was the size of the precast panels compared to the bridge width? How many total panels are on the bridge?	Each panel is approximately 30 feet, which corresponds to half of the bridge width. 614 panels total.
26	How did the design and construction team handle the girder deflections and diaphragm connections during the deck removal?	Girder deflections were not significantly effected by deck removal. Cross frame connections were evaluated for loads during various construction stages, and strengthened as needed.
27	What was the benefit of using galvanized bars rather than epoxy coated bars?	Galvanized bars provide better bond and development that epoxy-coated bars.
28	Are the Grade 80 reinforcing bars A615 or A706?	ASTM A706.
29	Were cross frames in the center bay disconnected to allow for the girder spans to rebound?	No, cross frames were strengthened as needed to resist anticipated loads during construction.
30	The width of the PC deck panel varies depending on the contractor preference. The width of the PC deck panel could affect the UHPC quanitity. How was this handled on the engineering estimated and actual UHPC quantities after the bid?	The bid documents included quantities from a presumed panel size.
31	What was your favorite part of the design?	Rehabilitation projects present unique challenges that require out-of-the box thinking.
32	Why were shear studs not proposed to make a composite deck?	Composite behavior would have been difficult to predict and design for given the progressive nature of construction, particularly since the actual sequence was left to the contractor to determine.
33	Do you conducted a coupon test to determine the strength of the steel and metallurgical chemistry to assess the feasibility of welding shear studs?	No evaluation was performed. Shear studs were not preferred.
34	Can you provide more details on the analysis conducted to determine the sequence of deck removal?	The actual sequence was left to the contractor. However, the plans specified specific deck work areas and their sizes. The design analysis considered the combination of traffic loads and construction equipment operating on several representative configurations of bridge deck work, and bridge deck boundary conditions.

35	What was the dimension of the joints which were poured by UHPC?	The longitudinal joints were 9" wide in the approach spans (10" deck) and 7" wide in the main spans (8" deck). The transverse joints were 6" wide.
36	Did the bars in the UHPC joint non-contact lap slices?	Yes, non-contact lap splices were used, with an average space between bars of 3".
37	What material was used to transition the ramp?	Hot-mix asphalt was eventually settled on.
38	How many more years do you expect this bridge to be in service?	The expectation would be to outlast the original deck, which was in service for over 60 years.
39	Were the bridge barriers replaced as well?	Yes, an Oregon 3-tube metal bridge railing was used replace the original concrete parapet (that had been retrofitted with a thrie-beam system).
40	Were there any problems with using UHPC in the field?	No major problems. Some curb closures were not filled entirely to the top. This may have been caused by settlement and or leakage.
41	Sometimes the steel girders do not rebound their camber and require adjustment for panel setting. Are leveling rods used, and if so was a torque criteria used to establish uniformity in girder bearing to prevent deck cracking?	Levelling rods were used to fine-tune panel grades. Panels were replaced one-at-a-time to minimize dead load imbalance. No camber/rebound issues have been observed. The levelling bolts bear directly on the top flange surface, so no torque is required.
42	What is the estimated construction duration for the project?	Contract was awarded in 1/2024. Deck replacement work began Summer 2024. Expected completion Summer/Fall 2027.
43	Was the temporary bracing that prevents lateral torsional buckling kept in place for added saftey against that type of failure?	The temporary bracing will be removed as the deck provides effective bracing in the final condition.
44	Did the cost and schedule vary from preconstruction estimates? And what were the causes for those variations?	The construction cost was 25% above the engineer's estimate, but bidding occurred during a period of significant cost escalation in the industry.
45	How many expansion joints are there on the bridge?	There large steel finger joints, and several smaller panels joints in the main spans.
46	Since the compression flange of the main girder is not laterally supported in the final condition, what effect did this have on the allowable capacity of the member?	The top compression flanges were supported in the final condition by UHPC fillet haunches in the transverse joints and shear friction in the girder haunches. No reduction in member capacity was required.
47	Were there any steel maintenance interventions to extend the structural / fatigue life of the superstructure?	No.
48	Is the work being performed during a single shift (10 hours per hours) or double shift (20 hours per day)?	Single shifts.
49	Is the splice length for galvanized bars different than the splice length for epoxy coated bars?	Yes, splice lengths for galvanized bars are equal to that of uncoated black bar.
50	Was there any concern about the difference in color/appearance of the panels concrete and the UHPC? Or is this resolved by the final deck grinding?	This was not a concern. But final deck grinding should provide for a more uniform appearance.
51	How did you get the deck to be lighter, did you use lightweight concrete? If so what was the weight of the concrete?	The concrete was normal weight. Weight reduction was mostly from the lighter steel railings.
52	Are there any seismic considerations? Can the finger joints accommodate transverse movements?	No seismic evaluation was performed or required.
53	Were the temp barriers bolted down through the new deck panels?	Yes, anchoring was needed in the new deck panels given the roadway width constraints.
54	Is the deck exposed to de-icing salts in the winter? Does WSDOT waterproof bridge decks typically?	The deck will be exposed to deicers. WSDOT does not have plans to waterproof this deck, but the deck is made from a concrete mix with low chloride permeability.
55	What was the final break strength for your UHPC?	The strengths were in-line with the manufacturer's values of 21 ksi at 28 days.
56	What was the delivery method for this contract?	Design-Bid-Build
57	Have you evaluated reducing vehicle speeds as a strategy to mitigate live load vibrations, aside from temporary work zone speed limits?	The speed limit was reduced from 60mph to 40mph on the bridge.
58	Is it possible to provide more details on the efforts applied to minimize vibrations? Was the traffic speed lowered?	The speed limit was reduced from 60mph to 40mph on the bridge.
59	Who did the testing for UHPC?	AAR Testing and Inspection
60	Does the UHPC supplier have a representative on site during the pour?	Yes, a manufacturer's representative was on site for initial placements and material testing.
61	How soon did the UHPC achieve its design strength?	The mix typically achieved it's design strength of 14 ksi after a day or day-and-a-half.
62	What were the curing requirements for the UHPC?	2 days or 14 ksi. No freezing until 10 ksi.
63	The new deck is lighter than the original failing deck and still spanning 16-ft. Other than using 80ksi rebar, what improvements were included to make this possible?	The original deck included a 1.5" non-structural bonded concrete overlay. The total deck thickness (including overlay) matched, but the new panels had a greater structural depth. Concrete strength is greater as well, but the effect is small.
64	Was there a crack sealing criteria for cracks in the precast panels? Was epoxy injection or simply chasing cracks done before opening to traffic?	No deck cracking has been observed.
65	Was the load of the concrete barrier between the open lanes and work zone a concerning load on the bridge?	Yes, the gravity load was considered, and having two separate barriers was not feasible from a weight standpoint. The potential collision loads were addressed be anchoring the concrete barrier to the deck. The final bridge will have an anchored barrier down the center.
66	What was the benefit for the contractor proposing continuously galvanized bar instead of epoxy coated bars?	Galvanized bars provide better bond and development that epoxy-coated bars.
67	How was the finger joint incorporated into the precast panels?	The finger joints were anchored into CIP concrete headers using a high early strength concrete.
68	Were there any special considerations for grouting or other operations during high temperatures in summer?	Nothing beyond following the manufacturer's recommended practices.
69	What grout product was used for the haunches?	Five Star Hybrid Grout
70	Were there any issues at the joint interfaces, like cracking?	None observed so far.