September 2020 ABC-UTC Webinar Featured Presentation: Innovative Contracting Project to Accelerate Replacement of Multi-County Bridges in Iowa		
#	**Webinar Questions**	**Responses**
	Contracting Method	
1	Can you discuss situations where project bundling is not recommended?	Bundling projects need to be large enough to be effective. Economy of scale is the objective.
2	Did the contractors using the previously procured materials have any liability concerns with using these materials?	Contractors are only responsible for damage that occurs after taking possession of the procured materials. As long as the previously procured components are incorporated into construction per plans and specifications, contractors do not incur any liability.
3	Do you recommend Construction Manager General Contractor (CMGC) for ABC?	Project delivery methods that are appropriate for ABC include CMGC, but project specific requirements and local laws may prohibit the use of alternate delivery methods such as CMGC and Design Build (DB). Unfortunately, in some states like Iowa, CMGC and DB are not allowed by law. All projects in Iowa have to be Design-Bid-Build.
4	How were the contracts awarded to contractors if some materials were to be already supplied? Were they still low bid?	Each bridge was advertised for letting and awarded to the low bidder per state laws.
	Design & Construction	
5	Were steel bridges considered for this project?	A feasibility study (refer to slides 14 and 15) was conducted to determine the type of superstructure needed. Based on the project criteria, a concrete box girder type bridge was determined to be the most appropriate. Unlike steel beams, concrete box girders can be fabricated by local forces during the winter season and do not require special equipment. Also, due to the short span configuration and simple geometry, concrete box beams were determined to be the most economical. Keep in mind, the standards start at a span length of 30 ft.

6	What special ABC design was used to expedite construction, e.g., box beams along with a cast deck on top of beams?	Construction was expedited by the use of prefabricated elements, such as the girders and abutments, along with the fact that the concrete box girders did not need additional concrete casting or wearing surface. If a cast-in-place concrete abutment option is chosen, a high-strength fast-curing concrete mix was specified. Contractors were also allowed to use maturity curves for determining strength. See design details at https://iowadot.gov/bridge/standards/english/b24-16.pdf for more information (link included in Monthly Webinar Archives).
7	Was a minimum amplitude called out for the keyway exposed aggregate surface to receive ultra-high-performance concrete (UHPC)? How long were surfaces pre-wet?	Concrete surface profile 6, pre-wet to meet surface saturated condition, was used. See design details at https://iowadot.gov/bridge/standards/english/b24-16.pdf for more information (link included in Monthly Webinar Archives).
8	Can you discuss, on a generic basis, how Change Orders (CO) or Change of Plans (COP) were addressed in the field under tight construction schedules?	Most of the change orders occurred before or during beam fabrication and were dealt with promptly and did not impact the schedule.
	Maintenance	
9	In the bridges built to date, has longitudinal cracking occurred at the longitudinal joints?	No longitudinal cracking has been observed at the longitudinal joints to date.
	Cost	
10	How does the unit cost for work performed compare to conventional construction?	It is difficult to compare cost with the traditional approach because each project has its own requirements. However, a comparison of one bridge that was let traditionally just prior to this project using the same design shows some cost reduction - refer to Slide # 27.
11	Can you quantify the savings for this approach versus the traditional bridge replacement approach used by the counties?	It is difficult to compare cost with the traditional approach because each project has its own requirements. However, a comparison of one bridge that was let traditionally just prior to this project using the same design shows some cost reduction - refer to Slide # 27.
	Questions during Webinar	

12	What was the cost comparison between the different alternatives? Did you consider the steel option for reducing weight and using lighter equipment?	Cost was one of many factors considered during the feasibility study. See the response to Question #5 for more information.
13	What type of UHPC mix did you use, proprietary or generic with local materials?	Although the contractor chose to use Ductal UHPC on this project, a performance-based generic mix was specified. See design details at https://iowadot.gov/bridge/standards/english/b24-16.pdf for more information (link included in Monthly Webinar Archives).
14	Box beams have historically shown service life problems. Were you concerned about building box beam bridges using the new UHPC joints?	The design of the concrete box beams was based on the latest research and FHWA recommendations using UHPC joints with proper surface preparation. Lessons learned from past experiences were also considered in the design.
15	Were there any camber growth issues since the beams were manufactured well in advance?	Differential camber was not an issue.
16	What goes into the UHPC cost?	The UHPC cost covers supplying the UHPC.
17	Did you have any problem with adjacent beams not having the same elevation because of creep and shrinkage?	There were no elevation problems with the beams due to creep and shrinkage.
18	Were the UHPC joints ground after curing? What equipment was used to grind the joints smooth?	UHPC joints were ground using standard surface grinding equipment and as specified in the plans. See design details at https://iowadot.gov/bridge/standards/english/b24-16.pdf for more information (link included in Monthly Webinar Archives).
19	Was the foam in the girders left inside permanently?	Yes, the foam in the girders was left inside permanently.
20	What crash rating (TL-level) are the railings designed for? It appears the railings are anchored to the beam fascias.	The railing was designed for crash level TL-2.

21	Does the UHPC joint pour aesthetically affect the structure? Is it considered a problem?	No, after the joints were ground, appearance was not an issue. Also, these bridges are located on low-volume gravel roads, so the joints were mostly covered with gravel.
22	Did the contractors get better/faster working with UHPC as they worked on more bridges?	UHPC joint installation was not done by a single contractor since each bridge was contracted separately. It is expected that contractors would become more efficient over time.
23	Prefabricated steel bridges were mentioned as a possible solution early in the presentation. What was the selection process that led to only using precast concrete, and what were the factors that led to that decision?	A feasibility study was conducted to determine the type of superstructure needed. Based on the project criteria shown in Slide #15, a concrete box girder type bridge was determined to be the most appropriate. Unlike steel beams, concrete box girders can be fabricated by local forces during the winter season and do not require special equipment. Also, due to the short span configuration and simple geometry, concrete box beams were determined to be the most economical. Keep in mind the standards start at a span length of 30 ft.
24	Do you have the specs for the UHPC used in the joints?	The UHPC specifications can be accessed at https://iowadot.gov/bridge/standards/english/b24-16.pdf (link included in Monthly Webinar Archives).
25	Did the $204 to $413 cost per square ft include the donated beams and UHPC? What would be the cost range without donated materials?	Costs presented are for total cost. Materials were not donated; they were contracted through a supply contract that was funded by the AID grant.
26	We have a longitudinal cracking issue with adjacent box beams, even with 5-inch slabs. Was there any consideration for this type of issue for these projects?	The design of the concrete box beams was based on the latest research and FHWA recommendations using UHPC joints with proper surface preparation. Lessons learned from past experiences were also considered in the design.
27	How much would the cost have been reduced if the UHPC industry representative had not been required?	This cost was not itemized in the bid. I believe the cost of having the UHPC supplier representative on site is offset by reducing risk to both the owner and the contractor. Timely resolution of field problems is very important to have a cost-effective project.

28	Adjacent concrete box beams are generally heavy and cumbersome to handle. Why not use precast tee beams or steel beams?	During the feasibility study, other beam types were evaluated. Concrete box beams were determined to be the best option for this project. Also, see response to Question #5.
29	Are the cracks shown in slide 34 in the UHPC closure pour? What is the cause, and how would those cracks be mitigated?	No, the hairline cracks were noted in the box near the change in the section where the foam blockout for the box interior ended. Nothing definite, but a possible cause for the cracks includes the elimination of some prestressing strands in the corners of the top flange to accommodate precast facility limitations (requested by the precaster), thus increasing tension in the top flange (the design still meets AASHTO specifications). We believe introducing a gradual transition (taper) from the solid section to the non-solid section has addressed this issue.
30	Where were the steel fibers that were used in the UHPC manufactured?	The steel fibers were manufactured in the USA.
31	Regarding the maturity method applied for the UHPC, did it provide insight beyond the compression tests?	Acceptance of UHPC was based on the testing requirements stated on the plans (https://iowadot.gov/bridge/standards/english/b24-16.pdf - link included in Monthly Webinar Archives). The maturity method was not used for UHPC.