October 2021 ABC-UTC Monthly Webinar: Montana's ABC Clark Fork River Bridge Rehabilitation near Trout Creek		
#	**Questions**	**Responses**
1	Does Montana use any stainless steel reinforcement in their bridge decks? If not on this project, what is the main factor for not using stainless steel reinforcement?	Yes, Montana does use stainless steel reinforcement on certain projects where the highest level of corrosion resistance is required helping to offset the higher initial cost. On this project, we specified ASTM A1035 type CS, also referred to as MMFX or ChromX, to provide an upgraded level of corrosion resistance for the panels while reducing the overall expense as compared to the SS (stainless steel) options.
2	What treatments were used for the bridge deck panel joints for long-term durability? Was post-tensioning used in the bridge deck for joint closure?	Post-tensioning was not used in this design, rather the long term durability was based on many design aspects, such as the joint design itself, the 1 1/2" latex-modified concrete overlay, the use of the MMFX corrosion resistant reinforcement, as well as a sealer applied to the final deck surface.
3	Can you comment on the original deck connection to the steel girders and the new deck? Also, can you comment on the new deck/girder connection? Was the new construction designed as a composite section?	The original deck connection was made up simply of the girders embedded in the deck at the haunch regions. The new deck/girder connection was made fully composite at the main girders, using shear studs. The stringers only had shear studs at bracing locations and were still considered noncomposite in the final design.
4	Was there any streambed protection under the structure, and what materials and sizing were used? Also, how was the sizing of the opening determined?	This project was a rehabilitation and the substructure and streambed protection was deemed adequate over the reservoir.
5	After construction, is stormwater runoff kept out of the reservoir? Was it kept out of the reservoir during construction?	The rehabilitation project perpetuated the existing stormwater runoff conditions, only improving by reducing water on the bridge surface during an event. Construction debris was kept out of the reservoir by utilizing the temporary scaffolding hung beneath the bridge.
6	Can you discuss Claims from the Contractor, if any, for this project?	There were no claims on this project.

7	How has CM/GC (Construction Manager/General Contractor) compared to other design/construction processes?	The CM/GC contracting method worked extremely well for this project, and would likely be a good option for other difficult, complex, or accelerated projects that benefit from early contractor interaction. The innovations in this project really proved to be a clear benefit of the process.
8	Was lightweight concrete considered in the rehabilitation of the superstructure?	Lightweight concrete was considered for the project but wasn't required.
9	What would you like to see in deck formwork from this project?	Deck panels and a formless joint were used in this project, minimizing the need for large scale deck formwork.
	Questions during Webinar	
10	For slide # 6, was the General Contractor in the planning phase the same as involved during the construction phase?	Yes the general contractor in the preconstruction phase (as shown in slide #6) was the same contractor involved during the construction phase.
11	Do you know the cost difference between MMFX rebar and the grade 60 rebar?	For this project the Grade 60 epoxy-coated reinforcement was approximately 25% higher than the MMFX steel (specified as ASTM A1035 type CS). Other projects in Montana in 2020 showed a similar trend with the Grade 60 epoxy steel being higher than the MMFX, although the difference was much less (averaging around 3% difference).
12	Why was epoxy-coated steel used for curbs while MMFX bars were used in the deck panels?	Epoxy-coated rebar was used for the curbs to keep the design intent of the Mash rail system that is crash tested. MMFX was used in the deck panels for the additional corrosion resistance, especially at the joints.
13	Did you take advantage of the higher strength of MMFX bars in the design of the slab?	Yes, when necessary, such as in the deck overhang when considering crash loading on the barriers.
14	Did you consider a polyester polymer concrete overlay for this project?	Yes, we considered many overlay options, and the team finally decided on the 1 1/2" latex-modified concrete overlay to reduce the panel weight as well as to help smooth out any inconsistencies between panels, etc.
15	Was 3D modeling used by either the designer or the contractor for the panel rebar detailing?	Yes, the fabricator did use 3D modeling when designing the panels and formwork.

16	How was the crane trestle attached to the existing beams?	The crane trestle did not have a positive connection to the existing steel members but there were guides to prevent excessive transverse movements. (per the contractor submittal)
17	What is the unit cost per square foot for this rehabilitation project?	The unit cost per square foot of driving surface was $412.31 for the entire project. It is worth noting that the precast deck panels were $112 per square foot for this project.
18	What maximum aggregate size was used for the joint concrete?	The maximum aggregate size used for the joint concrete was 3/8".
19	Were the leveling screws used in any way to make sure the tributary dead load to the stringers and girders were controlled and, if yes, how was this done?	Yes, the screws had a maximum torque limit, with the idea being that the leveling devices would share the load across the two main girders and stringers by not overtightening any one location too much. This seemed simple, yet effective.
20	Was there any cross slope build into the panels?	Yes, the cross slope was built into the panels.
21	Was any work necessary to be done on the steel substructure?	Bearings were upgraded, as well as some beam seat improvements to the concrete substructure. The steel superstructure was cleaned and spot painted as deemed appropriate.
22	Were the girders/stringers composite originally? Also, were the panels considered composite in the negative bending regions and, if so, how did you detail the panel reinforcement that is required across the joints?	Neither the girders or stringers were composite on the original design. The precast panels were considered composite in the negative moment regions with the longitudinal reinforcement made continuous across the joint with overlapping hooked bars.
23	Regarding slide # 35, would you recommend using a number of smaller studs instead of the equivalent larger studs?	Yes, we would recommend avoiding the larger 1 1/4" shear studs, but as mentioned, there is a balance between the size of the shear stud pockets with a larger number of smaller studs. Thus, each design and project will need to determine the balance between pocket size and number of shear studs.
24	What was the AASHTO TL (Test Level, TL-1 to TL-6) bridge barrier rating for this project?	The AASHTO TL (Test Level) for this project was MASH TL-4.
25	Did you pick up any live load capacity by using composite action and maybe a lighter slab?	Yes, there was some additional capacity gained with the composite design.

26	How was the longitudinal profile maintained along the bridge during the deck placement?	The dead load weight of the new panels was relatively similar to the existing deck that was removed, so little issues were expected. Thus the leveling devices and overlay were expected to accommodate any issues. The profile was checked throughout the construction process to make sure these design assumptions were correct.
27	Was the original riveted plate girder composite?	The original riveted plate girder was not composite.
28	Can you explain how the concrete deck panels were placed on the shear studs? Were the shear studs existing or new?	The deck panels had shear stud blockouts, and after panel placement, new shear studs were added to the two main girders in the block out locations. All the shear studs were new.
29	Were there any issues, especially tolerance issues, in the closure joint at the bottom of the deck panels?	Nothing that wasn't considered in design. There was enough room for the haunch concrete to flow, easy to form the joint, and the leveling devices and 1 1/2" overall adequately provided adjustments for other tolerances.
30	Was there any maintenance required for the top flanges of the steel girders/stringers after deck demolition?	Yes, some of the tops of stringers required some cleaning and spot painting, which was part of the risk mitigation plan put in place during preconstruction.
31	Was the overlay that was placed on the precast panels a latex-modified overlay or just a normal concrete overlay?	A latex-modified concrete overlay was used for the project.
32	How was continuity maintained in the top longitudinal deck steel? The top mat #5 bars appear to terminate at the face of the joint and tie bars are added to the joint in the field. How is the lap splice developed for this top steel?	The longitudinal deck steel formed a hoop at the edge of the panel as noted in the question and then enough ties were placed to make capacity across the joint.