November 2020 ABC-UTC Webinar Featured Presentation: Rapid Replacement of CSX's Bayou Sara Bridge Swing Span in Alabama		
#	**Webinar Questions**	**Responses**
	Design	
1	What asset management-related choices were used on the project, e.g., long-term maintenance, life-cycle costs, etc.?	The approach to asset management was implicit to the design approach: Address resiliency issues with optimal alternatives (enclosed (hydraulic) machinery, metallized superstructure, elevated equipment...).
2	Was AREMA (American Railway Engineering and Maintenance-of-Way Association) the primary code used by the steel fabricator?	Yes, AREMA was the primary code used for the project.
3	Since the substructure was re-used, what was done to ensure future load-carrying capacity and adequate life span?	Soil borings and concrete cores were obtained to confirm that the material properties of the foundations are adequate to support the new span.
4	What loading condition for the swing bridge controlled the design?	DL+LL+Imp (Dead Load + Live Load + Impact) governs girders/floorbeams/stringers at maximum moment and shear locations. Swing span-specific cases govern for end lift and center wedge capacity and stroke (as applicable). DL+W (Dead Load + Wind) governs operational (span open) situations, and balance wheels.
5	What concrete strength was used?	The minimum concrete strength requirement was 4,000 psi. A high-early-strength mix was used to accelerate return to rail service.
6	What grade of steel was used in the replacement, and what corrosion protection was used for the bridge?	ASTM A709 Grade 50 Structural Steel was used. Stainless steel rebar was used for its resilience with respect to corrosion in the aggressive environment.
7	Has high-strength rebar that has been researched to provide the best crack control in cast-in-place and precast concrete ever been considered?	High-strength rebar was not used. Stainless steel rebar was used for its resilience with respect to corrosion in this aggressive environment.

8	Why was the decision made to use a similar replacement, rather than raising the profile and eliminating the need for a "swing" bridge (as in build taller)?	Grade limits would dictate extensive approaches, using embankment fill or retaining walls, either of which would trigger environmental impact and permitting requirements, significant cost, and protracted railway outage.
	Construction	
9	Was there a work-zone issue during the coronavirus pandemic and, if so, how did the contractor navigate through it?	Construction was completed before Covid-19 emerged.
10	Were temporary modes of operation needed for marine use before removal of the existing bridge and/or after float-in of the new bridge?	The primary (pre-existing and replacement) operating mechanical systems were used immediately before and after the marine closure. However, immediately after closure, a temporary control box was used for the HPU (hydraulic power unit) and the diesel motor component prior to final electrical checkout.
11	Was the ring gear and main drive machinery also replaced in the 14-hour window?	Yes, these were mounted to the support "grillage" frame, which was suspended from the swing span, all floated in together. Rack gear and drive machinery were final aligned after float-in, during the 2-week marine closure.
	Contracting and Cost	
12	What type of construction contract was used?	The contract was Hard Bid / Lump Sum; conventional design/bid/build arrangement.
13	How were Contractor Claims, if any, addressed through Change of Plan and Change Orders in a timely manner?	There were no claims on the project. Changes in scope were handled through change orders and were resolved in a timely manner.
14	What contract type was used for the letting, e.g., bonus/penalty for the closure window?	The contract was hard bid, with liquidated damages for going over the allotted closure window. The project was done in the allotted time, with no liquidated damages.

15	Can you discuss the cost difference adjusted if a rail line was not located here, compared to the rail involvement cost?	Although the authors (design consultant and construction contractor) are not privy to any economic study of the suggested scale, there is not a nearby "detour" track owned by CSX or otherwise, and converting to roadway freight would presumably be less economical, to say nothing of the sunken cost of abandoning their existing infrastructure track and other bridges along the line.
	Questions during Webinar	
16	What is a float-in?	A "float-in" is the Accelerated Bridge Construction (ABC) technique of floating the prefabricated span into position, similar to the "Slide-in" technique, albeit involving in-water barges.
17	Are the end bearings oriented in the wrong direction? Orange interlock blocks look like they prevent the bridge from sliding laterally open.	The picture showed the end wedges in the engaged position, in which global span swinging would indeed be prevented. When these wedges are retracted out of the wedge seats, this apparent interference is eliminated, and the span is then allowed to swing.
18	The timber fender system looks fairly delapidated. Was a new fender system installed as part of this project, or soon after?	A new fender system was installed as part of the project. A specialty installer was hired directly by CSX, so Brasfield & Gorrie was not involved in this aspect of the project.
19	Did you test rotate the bridge at the yard?	No. Sufficient rigidity for pivot bearing support was not established (span was supported on intermediate bearings near midspan locations between pivot and ends).
20	What was the wind design criteria used for this location?	AREMA calls for a minimum lateral wind force resulting from 30 psf (pounds per square foot) on structure (projected 1.5 times actual projection on girders), and 300 plf (pounds per linear foot) on train.
21	What was the cost of metalizing?	Cost was not itemized out, although it was a notable challenge for the labor and schedule for the effort required to achieve metallizing.
22	What is the locking mechanism on both ends when the swing bridge is closed to boat navigation?	There are center latches at the rest piers, mechanisms typically used for this function, which must be retracted for the bridge to swing. Additionally, the end wedges have guides which resist bridge swing unless the wedges are retracted.

23	What were the tolerances for the dowels to match the holes for grillage?	Typical tolerances for structural anchorages were assumed in design. The contractor's approach was to drill these holes with grillage in place, so the clearances were more than required with this method.
24	Were the existing piles inspected for suitability and structural integrity?	The piles were buried. Boring and coring were performed on the soil and the pier concrete, respectively, but the piles were analyzed using assumed material properties, on as-built document details, to confirm sufficient capacity.
25	Can you give a little more information on the setup/load path of the new superstructure member?	All dead load passes through the center pivot bearing. When closed, lifting of end wedges sheds some load to the span ends. Live load is conveyed through the end and center wedges only (not through the pivot bearing). In the open position, wind is resolved by balance wheels riding on the top surface of the circular rack gear element.
26	Was a full-size template considered for matching anchor locations to grillage?	Anchors were drilled and grouted with the actual grillage in place (predrilling was not practical since the cut pier surface was covered until immediately before the new span was placed). For the dowel rods across the interface between the existing and new pier concrete, locations were established during the float-in using a robotic surveying instrument.
27	Are steel tension members fracture-critical members? Also, where is the hydraulic power unit (HPU) located?	Nonredundant steel tension members are fracture-critical. So, the girders, floorbeams, and stringers are fracture-critical in this project.
28	How active is this bridge?	The number of on-demand span openings ranges from about 6 to 10 per day in the summer, reducing to 1 to 2 openings per week in the winter. Rail traffic is 9 to 15 trains per day.
29	Traction and braking forces have increased significantly from when this bridge was originally designed. Were the foundations of the center pivot pier found to be adequate for the current design longitudinal loading?	The foundations were adequate for current lateral forces. The pivot pier is supported on 97 piles, and the rest pier foundations contribute to lateral loads as well, as the longitudinal forces are conveyed through (at least one of) the rest piers via wedge action.