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## Webinar Q&A Documentation
## Slide In Bridge Construction (SIBC) Construction/Contractor Perspective - June 12, 2014

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| 1 | Were there permit requirements for demo and dumping in the river? Dredging required? | All of the work on this job was permitted under the Corps of Engineers 404 Permit and both Kentucky and Indiana Department of Environmental Management permits, DNR permits, and we had to keep the Coast Guard very happy at all times. So yes, all the work was permitted. In this case, there was no dredging necessary in the project. |
| 2 | Were the permits to allow the bridge to be demolished in place and dumped into the river secured before the bid? | No. Although the USACE, USCG, IDEM, & INDNR permits were part of the contract documents, Walsh had to submit modification letters to the agencies for items not covered in the issued permits. The request to drop the spans into the river was included in our modification letters. |
| 3 | Old bridge was dropped into the river; did the pieces ultimately have to be removed from the river bottom? | Yes, the Corps of Engineer and the Coast Guard both approved dropping in the truss into the river but it had to be completely removed and proved it was removed through sidescan sonar and there were time restraints given for that removal especially in the channel itself.<br><br>The initial USACE, USCG, and IDEM permits were issued to INDOT and included in the contract documents. Any changes to those permits had to be secured by the contractor through "modification letters". |

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| 4 | Was river traffic restricted at all during any of the operations? (aside from the demolition, obviously) | The first two restrictions were during the truss strand jacking. During the lifting of Span 2, the river below the span was closed to all boats. During the lifting of Span 3 the nav channel could be closed for up to 24 hours. The Coast Guard takes care of that. They put out notices to mariners and let them know when the closure begins and when it will be over. Then we have to meet that window. So the first two were for the lifting of the two truss spans, the third was during the demolition of the old truss, and then the last one was dro the slide. Once we had to stop the first day, and we could explain to the Coast Guard representatives that the bridge was secure in its current location, they allowed river traffic to clear and then they reclosed it the next morning until the bridge was onto the piers. All that was controlled by the Coast Guard. |
| 5 | Did the proposed steel truss provide the ability to slide a bridge compared to a tied arch bridge or other type of bridge? | Yes, this method could be used in different types of structures on a tied arch depending on how it is configured. One of the challenges could be the tie downs, if there's any uplift that some of the end piers. It is difficult to maintain a tie down while your sliding it, so I think this type of sliding is best suited for cases where you always have compression on the bearings on the growth groove compression and then you can actually slide it pretty much anything this way. |
| 6 | Is the lateral sway system more robust than normal? | No. |

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| 7 | Was the number of incentive days capped by the DOT? | There were no incentive days. Originally, this job was under a design contract as a design-bid-build contract. Indiana and the Commonwealth of Kentucky were trying to raise enough funds to build a project, but were falling short. Part of the ARRA Program from Washington stepped up and brought in a $20 million tiger grant which closed the gap enough to get the project built, but it came with the requirement that the job had to go to design/build and they could only have a closure period of 365 days maximum without penalty.<br><br>You could only show a maximum of 365 days in your B portion of the bid. If you went longer than the 365 days, liquidated damages of $25,000 would be assessed. |
| 8 | What was the maximum number of days of incentive payment allowed in the contract? | There were no incentive days included in the contract. |
| 9 | Were you the only proposal that included a bridge slide for this project? | Yes. |
| 10 | Were there any contract modifications during construction and if so, what were they? | Yes, a few. The ferry was eliminated since the bridge was only to be closed for two 5 day periods. This included eliminating an intermediate completion date that was tied to the ferry. Changes in INDOT Standard Specifications were made to allow the use of Disktron Truss Bearings, a non-standard finger joint system, and non-standard roadway and sidewalk stringer bearings. |
| 11 | What was the additional cost of the slide versus standard construction? | It would be kind of difficult for us to answer that without having something to compare it to and it also becomes difficult when you try to compare the other bids against ours, because they had a ferry cost in theirs, where we didn't. We had 10 days ferry cost but they didn't have temporary works in theirs.<br><br>Sometimes we try to ask how people calculate road user cost and we never get a straight answer. $25,000 a day for closure is pretty typical in this area. |

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| 12 | Was there a great cost differential between the temp bridge (ACRO or similar) on the side and approach roadway to detour the traffic, vs the sliding mechanism/operation? or the sliding was the requirement of the RFP? | The original contract scope of service had the contractor running a ferry system for a maximum 365 days while the bridge was closed. Walsh was the only contractor to propose a bridge slide in order to eliminate the need for the ferry. Since Walsh only bid the project using the lateral slide method, we have no way of accurately calculating a cost differential. |
| 13 | How much was the absolute cost for the slide system (including design, materials, and construction)? | No response. |
| 14 | How much was the construction cost on this project? | We were the low bid when you combine the two, at just under $104 million. The next bid was at around $111 million, and went as high as $137 million. |
| 15 | How was the bridge secured in-place after the slide? | 3" thick masonry plates were cast into the tops of the pier caps, each with an array of nelson studs on the underside. Once all the bearings were positioned exactly in their final location, they were welded down to the masonry plates with a full-perimeter 3/8" fillet weld. It is worth noting that the welded plate was added to the bearing assembly, and will stay in place for the life of the structure. The rest of the bearing assembly, which can be removed, is bolted to the welded plate.<br><br>Permanent wind shoes for transverse and longitudinal wind loads are installed atop the pier caps. Once the slide was complete it took 2-3 days to fully install all the permanent restraints. In the interim, the truss was always restrained transversely and longitudinally. |
| 16 | Early-on, were any other systems like rollers considered as potential alternatives to the sliding plate arrangement that was used? | Yes, it was but it really isn't cost effective because the structure is still 15,000 tons and then when you start looking to all those, the design becomes really cumbersome and prohibitive, and we've done previous slides again in similar ways, steel plates on Teflon, polished or stainless on Teflon, and typically this sort of method is much more cost effective compared to rollers. |

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| 17 | They mentioned a 25mm max differential movement between piers allowed, 1) was that based on analysis or just a rule of thumb, and 2) did the differential movement reach that threshold or what was the max differential movement? | I believe the 25 mm requirement was based on the deck. The concrete deck governed that.<br><br>So one thing to mention here is that our deck is continuous, 2,400 feet and the deck actually consists of steel stringers sitting on the four beams of the steel floor of the truss and the concrete on top of the stringers is continuous from one end to the other. So what we did was, the stringers are guided on top of the floor beams so there's lots of restraints, and what that means is that if the truss forms in plan, the deck has to follow that formation. And then by calculation we found over a span, that span 500 to 700 feet, and how much the formation is needed to crack the deck. It was more than 25 mm that was required to crack but we actually limited down so that we were really far away from any potential from cracking.<br><br>I think one of the take aways is that not something that automatically is a fill in for tolerances. It really is driven by the deflections, deck cracking itself. That particular tolerance will vary from slide to slide. |
| 18 | How was the sliding length/min (22 in/4 sec) set? | The equipment utilized had a piston stroke of 22 in. The cycle time was approximately 4-5 minutes. |
| 19 | Did anyone do the calculations after the wind moving the bridge and what forces and friction were evident? We find the load and movement interesting. | No calculations were performed after the wind incident. During that portion of the slide VSL calculated .5 % to 1.5 % co-efficient of friction. |
| 20 | What level of design effort was required by the engineer of record to account for the bridge slide? | There was no additional truss design effort to account for the slide. |
| 21 | Was there any change in the condition of the deck after the move? | No. We were required to do a pre-slide survey of the deck and the truss and then a post slide not only for the deck but for other considerations, and there were no indications of any change at all. |

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| 22 | Were the existing piers rehabilitated and reutilized or were they replaced with new construction? | The three river piers, there were four existing, one was demolished completely. The three main piers you saw in the slides sat on unreinforced pneumatic caissons. The caissons were reinforced by coring 4" and 5" holes up to 70' deep and grouting either a cluster of 3 #11 bars or 3 #14 bars into the holes. Because of new barge impact requirements and the heavier loads that were going to be placed on the piers, we poured a new jacket of high performance concrete around the 3 existing river pier stems. It started out 2 feet thick and because of the shape of the old pier stem, ended up 6 feet thick by the time we got to the top of the pier stem portion. There's a brand new pier on the Indiana side. The new truss is actually longer than the old truss. And pier 2, which is the pier on the Kentucky shore did not have the caisson reinforcement like the three river piers and only a short section of the stem had a 2 foot jacket poured on it and from that point up it was all new construction. |