2011 â?? I-44 Bridge over Gasconade River

Description

Meta Fields

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Project Summary : 670-ft-long six-span lateral slide
Project Location : over Gasconade River along the northern border of Mark Twain National Forest, east of the town of Lebanon
Mobility Impact Time :

- ABC: 20-day bridge closure; 10-hr slide-in
- Conventional: 2-month closure

Impact Category : Tier 4 (within 1 month)
Dimensions : 670-ft long and 36.67-ft wide six-span (57 ft - 120 ft - 150 ft - 150 ft â?? 120 ft - 67 ft) composite steel plate girder bridge slide-in; 2,050-ton self-weight
Average Daily Traffic At Time Of Construction : 12216
Traffic Management : extended use of eastbound bridge for both eastbound and westbound traffic (one lane open in each direction)
Existing Bridge Description : The existing two-lane six span riveted plate girder bridge was 670 ft long and 34 ft wide. Built in 1955, it was deteriorated and required replacement of the superstructure and repairs to the substructure caps.
Replacement Or New Bridge : The replacement bridge has two 12-ft-wide traffic lanes and two 5-ft-wide shoulders. The superstructure end spans are simple spans and the middle four spans are a continuous unit. The superstructure cross-section consists of four Grade 50W steel plate girders at 9.67-ft spacing with an 8.5-inch-thick composite concrete deck. The girders in the end spans are 3.5 ft deep, and the girders in the middle unit are 6 ft deep.
Construction Method : The contractor built the replacement bridge and the temporary substructure adjacent to the existing bridge using conventional construction while both traffic lanes remained open on the existing bridge. The bridge was constructed at the same elevation as the existing bridge, supported on sliding bearings to eliminate the need for bearing transitions. The top of the temporary substructure was cast at a constant elevation to facilitate the slide-in. On May 5, after the new bridge was completed, westbound traffic was shifted to the eastbound bridge. The existing westbound bridge was demolished and substructure repaired. On May 16, the lateral move began at 9 am. A standard stainless steel and Teflon sliding surface was used between sliding bearings and top of cap. The replacement bridge was slid 45 ft into place using a 70-ton 3-ft-stroke hydraulic jack placed at each substructure, with all jacks interconnected to control the differential rate of movement. The slide-in was completed at 7 pm, requiring a total of 10 hours. After the bridge was in its final location, it was lifted slightly by six jacks in unison at each substructure to transfer bearing from the temporary sliding bearings to permanent bearings. No overlay was applied. On May 23, one lane of the replacement bridge was opened to traffic. Both lanes were opened on May 24. The contract was for conventional construction and required a maximum closure of 60 days to minimize impact to the traveling public. It also included an incentive of $40,000 per day, with a maximum of 15 days, if the bridge was opened in less than the number of days specified by the contractor in the awarded contract. The contractor that was awarded the project proposed the slide-in with a total bridge closure of 35 days at no change to cost. MODOT accepted the contractorâ??s proposal to change the method of construction, and obtained the same bridge as in the original plans in significantly less time. The actual closure was 20 days. The contractor received the maximum incentive of $600,000.
Stakeholder Feedback : The main lesson learned by MoDOT is that this is a viable option for working in areas with high ADT that require short closures. We know we have contractors in Missouri willing to do this kind of work and we will look to use it in the right situations going forward.
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Costs : The engineerâ??s estimate for the project was $2.131 million and 60 road closure days. The total payout with incentives was $3.153 million and 20 road closure days ($1.022 million – 48% higher than engineerâ??s estimate). There were six bidders. The cost per square foot of bridge was $128 compared to $87 for conventional construction in this region in 2011. ABC techniques saved 40 road closure days and an estimated $1.6 million in delay-related user costs. The net savings on the project

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