

**ABC-UTC January 2023 Monthly Webinar:  
California's Jacoby Creek Bridge Replacement Jack & Slide (101 SB, Left Bridge)**

#	Questions	Responses
	<b>Design</b>	
1	Were any design considerations given to a seismic event before the constructed bridge was slid into the final location?	Considerations given to a seismic event before the constructed bridge was slid into the final location were: (1) temporary shear keys placed on the end of the abutments to reduce transverse movement, and (2) seat abutments with backwalls to restricted longitudinal movement.
2	Were there any issues that arose during the design process with detouring traffic, or was there any pushback from the public regarding the detour?	<p>Issues that arose during the design process with detouring traffic included the following: (1) Traffic volumes were too high (18,000 vehicles per day) to construct the bridge one-half at a time. (2) We could have permanently left the bridge in the detoured condition; however, geometry was quite a bit lower than our standards and we wanted to preserve the tangent alignment. (3) Building the new bridge and moving it was expected to be less expensive than building a temporary bridge and replacing the existing bridge.</p> <p>We aren't aware of any pushback from the public regarding the detour since jack and slide was always part of the plan. The detour was a similar distance, closures were at night, and traffic was open during commute hours.</p>
3	Was the slide bridge active before the move? How was traffic handled during the move?	Yes, the bridge was open to traffic prior to the move. Traffic was detoured to Highway 255 on the nights of the bridge move.
4	What was the final alignment for the project?	Final alignment is the existing Highway 101 SB corridor.
5	What factors did you consider to determine that this project had to be built using an ABC method?	By using an ABC method, the traffic interruption was reduced to a minimum: the traffic would only be interrupted during the bridge moving. By using the detour bridge as the permanent bridge, the cost saving was significant.

	<b>Construction</b>	
6	Can you discuss lessons learned regarding contract specification improvements?	Some of the lessons learned were: (1) Always double check dimensions in the special provisions to ensure they match those shown on the plans. (2) Consider allowing more lenience to the amount of time required between a trial move and a final move based on jobsite contraits including, but not limited to, tidal flows, traffic closure restrictions, etc.
7	When utilizing the Jack and Slide method, what load factor was applied to the structure being lifted, or what impact load from the jack was applied to the structure?	The contractor chose to upsize the jack capacities rather than apply a load factor to the structure. No impact loads were applied to the structure, but there was an assumed friction factor of 5% dead load which ended up being closer to 15% to 20%.
8	What are your main lessons learned from the bridge slide?	The main lesson learned was: post-tensioning ducts can be compromised during the longitudinal keyway grouting between individual box girders. You should ensure that couplers are grout tight before placing longitudinal keyway grout.
	<b>Cost</b>	
9	What was the cost of the bridge slide?	The Bid Item, Bridge Superstructure Move, was \$75,000; however, the whole structure scope was approximately \$3.5 million, all within an \$8.1 million project.
10	Can you discuss ways to reduce schedule duration, improved quality control, initial construction cost savings, and reduced future maintenance?	Other than mistakes in the field, the only way to reduce schedule duration and initial construction cost savings on this project would be to work more closely with environmental agencies to limit environmental contraits to bare minimums. The contractor performed appropriate quality control. To reduce future maintenance, the design of the bridge allows for it to be raised, as needed, to accommodate any sea level rise.
	<b>Questions during Webinar</b>	

11	Can you elaborate on your involvement in the 'Jack and Slide' method and design considerations/assumptions and equipment/moving load factor (x1.35 or x1.6) and if any jacking load was applied to the substructure due to the moving load?	Contract plans specified a sliding method was to be used, the contractor was responsible for the slide design, and Caltrans checked the contractor's design.  Yes, jacking load was applied to the substructure due to the moving load.
12	What was the price per foot for the CISS (Cast-in-Steel-Shell) piles furnished and installed?	The price per foot for the piles was: (1) Furnish 36" CISS Concrete Piling: \$608,360.00/1,846 ft = \$329.56/ft; and (2) Drive 36" CISS Concrete Piling: \$420,000.00/1,846 ft = \$227.52/ft.
13	By having keyways on top of girders and overlay concrete, why were the tie rods needed?	The keyways were filled with non-shrink grout which has relatively low tension capacity. Without the transverse post-tension rods, the bridge deck would likely sustain longitudinal cracks at each of the 8 keyways due to independent deflections of the individual box girders when subject to non-uniform, dynamic traffic loading. The tension rods pull the separate box girders together to act monolithically.
14	Did you consider using a few balancing strands in the top flange of the prestressed box beam sections to control tension stresses in the top flange at release?	No, only #8 rebar was added in the top flange of the box during the design phase.  The solution offered by the fabricator to debond sections of select strands was adequate.
15	Were there any concerns for damage to the post-tensioned rod due to the high-pressure water cleaning of the grout that got into the coupler? Did you do UT-testing (Ultrasonic Testing) on the rod to ensure there were no micro-deficiencies present in the rod?	There was concern primarily with minor rusting. The jet grouting is typically used to fix voids/soil inclusions in CIDH (Cast-In-Drilled-Hole) piles with regular success. Fixes were based on visible inspection. No Ultrasonic Testing was considered.
16	Are the purple epoxy-coated rebars widely used for cast-in-place concrete structures in California? Is there any difference between the purple-coated and the typical green-coated epoxy bars?	Yes, the purple epoxy-coated bars are widely used in California. Regarding the second question on the difference between the two colors, the purple-coated bars may not be bent once they are coated, and the green-coated bars may be bent like uncoated bars once coated. However, the green coating needs to be repaired if damaged.

17	Was the corbel designed considering the moving load as a "Live Load" or "Moving Load"? What load factor was applied to the self-weight of the bridge considering LRFD?	The load acting on the corbel was considered as a dead load, and 1.25 load factor was used in the corbel design.
18	What was used for the deck concrete? Was any consideration given to the use of UHPC (ultra-high performance concrete) for the deck?	Polymer-fiber reinforced concrete was used for the deck concrete. UHPC was not considered for keeping the precast box girders together since it would not have been able to handle the jacking force.
19	Was there any consideration or discussion about removing the fallen tree in the channel before moving the bridge to its final location?	There was no consideration or discussion about removing the fallen tree in the channel, as plenty of clearance was available during and after the move.
20	For the bridge move, what was the issue with the design jacking system that had to be replaced by the pushing method proposed by the contractor?	The main issue was that the transverse tie rods did not align perfectly with the block-out placed in the eastern, temporary shear key. The tie rod could not be attached to the east side of the bridge to be pulled back, so it was pushed. This was all decided by the contractor through their means-and-methods with concurrence by Caltrans.
21	For substructure elements, was consideration given to using a stub abutment to potentially save cost?	No consideration was given to using a stub abutment at this bridge site due to seismic loading. Caltrans design standard is to not use stub abutments.
22	Was the temporary substructure in the median left in place, or was it removed?	The backwalls were removed, but the abutment seat and below were left in place in anticipation of replacing the northbound 101 bridge.
23	What was the vertical load factor in sliding?	The contractor used 5% in design for friction. The actual loads were approximately 15% to 20% vertical load.
24	Was there any correlation of the hydro-acoustic monitoring to the tides?	All driving occurred at low tide, per environmental permit restrictions, so a correlation could not be determined.