

## ABC Innovative Projects

<b>Elk Creek Bridge (Crossing No. 3)</b>					
<b>Location</b>	Oregon Route 38 at Milepost 39.64 over Elk Creek in Douglas County between the towns of Drain and Elkton				
<b>State</b>	Oregon				
<b>Owner</b>	State				
<b>Year ABC Built</b>	2008				
<b>State ID #</b>	20584				
<b>NBI #</b>	20584				
<b>Coordinates</b>	<b>Latitude:</b> 43.6536		<b>Longitude:</b> -123.5111		
<b>Contact Person</b>	Bruce V. Johnson, P.E. State Bridge Engineer Oregon Department of Transportation Phone: 503-986-3344 Email: bruce.v.johnson@odot.state.or.us				
<b>Mobility Impact Time</b>	<b>ABC:</b> one weekend per bridge replacement		<b>Conventional:</b> two years for conventional staged construction with one lane open, for bridges #3 and #4		
<b>Impact Category</b>	<i>Tier 1</i>	<i>Tier 2</i>	<i>Tier 3</i>	<i>Tier 4</i>	<i>Tier 5</i>
		X			
<b>Primary Driver(s)</b> [select as appropriate]	<ul style="list-style-type: none"> <li>reduced traffic impacts – logging trucks and commercial vehicles; long detour route</li> <li>reduced onsite construction time</li> <li>improved work-zone safety</li> <li>improved site constructability – close proximity of tunnel prevented construction of detour bridge</li> <li>improved material quality and product durability</li> <li>minimized environmental impacts – spotted owl nesting and roosting habitat</li> </ul>				
<b>Description</b>	<ul style="list-style-type: none"> <li>320.5-ft long and 38.2-ft wide three-span (56.5 ft – 207.5 ft – 56.5 ft) steel girder bridge; 18° skew (average) and 2162.5-ft radius curve for Crossing No. 3.</li> <li>Rural location</li> <li>Average Daily Traffic count: 3,900 (2004)</li> <li>Traffic management alternative, if constructed conventionally: extended use of 50-mile detour</li> </ul> <p><b>Existing Bridge:</b> This Oregon Highways for LIFE project consisted of replacing five structurally deficient and functionally obsolete bridges on an 11.5-mile stretch of OR 38. Crossing #3 was one of those five bridges. The existing two-lane six-span reinforced concrete deck girder bridge with steel truss was 340-ft long and 30-ft wide with pile bent substructure. It had two 12-ft-wide traffic lanes and no shoulders. Built in 1932, the bridge was deteriorated and required replacement.</p> <p><b>Replacement Bridge:</b> The replacement bridge has two 12-ft-wide traffic lanes and two 6-ft-wide shoulders. The cross-section consists of three 7.5-ft-deep steel I-beams spaced at 14.61 ft, with a 10.75-inch-thick cast-in-place concrete deck. The deck was cast with traffic railing. The</p>				

	<p>substructures were cast-in-place concrete caps and columns founded on drilled shafts.</p> <p><b>Construction Methods:</b>  The bridge was located approximately 70 ft from the west entrance of the Elk Creek Tunnel, making construction of a detour bridge impossible. To overcome this limitation, the replacement superstructure was built adjacent to the existing bridge and laterally slid into position over a weekend.</p> <p>Precast elements consisted of girders, wingwalls, sleeper slabs, and approach slabs. All precast elements were fabricated at the contractor’s yard and transported to the site for installation.</p> <p>With traffic maintained on the existing bridge, the construction sequence was to:</p> <ul style="list-style-type: none"> <li>• construct a new substructure for the replacement bridge under the existing bridge while traffic was maintained (cast-in-place drilled shafts, columns, and caps),</li> <li>• construct a temporary substructure for the existing superstructure on one side of the existing bridge,</li> <li>• construct a temporary substructure for the replacement superstructure on the other side of the existing bridge, and</li> <li>• construct the replacement structure complete with railing.</li> </ul> <p><i>Friday evening</i>  The existing bridge was closed to traffic at 8 pm, with traffic detoured for the two-day closure. Preliminary work included removing the asphalt overlay, bridge railings, and approach slabs.</p> <p><i>Saturday - Sunday</i>  The old superstructure was lifted and slid laterally onto temporary supports using hydraulic jacks mounted on sliding rails. Similarly, the replacement bridge was slid laterally onto the original alignment. The moves took about four hours to complete. Backfill was placed. Precast wingwalls, sleeper slabs, and approach slabs were installed. Finish work required prior to opening the bridge was completed.</p> <p><i>Monday morning</i>  The bridge was opened to traffic at 5:00 am.</p> <p>Subsequently the old superstructure was demolished and the temporary supports were dismantled.</p> <p>The contract included incentive / disincentive clauses of \$20,000 for each day the bridge was opened in less than 30 days, with a maximum of \$600,000 for crossings 3 and 4. The contractor was awarded the maximum incentive.</p> <p><b>Stakeholder Feedback:</b>  ABC over a weekend closure was the way to go for a corridor with a shortest detour route of 50 miles. The public outreach was outstanding as it involved the Elkton community to provide full support for the weekend closure of the facility for rapid construction and project delivery.</p>
<p><b>High Performance Materials</b></p>	<ul style="list-style-type: none"> <li>• High-performance concrete (HPC) bridge decks</li> </ul>

<b>Photos</b>  <a href="#">Additional photos</a>				
<b>Project Planning</b>	<b>Decision-Making Tools</b> <ul style="list-style-type: none"> <li>State process</li> </ul>	<b>Site Procurement</b> <ul style="list-style-type: none"> <li>Early environmental clearance &amp; permitting</li> </ul>	<b>Procurement</b> <ul style="list-style-type: none"> <li>Design-build</li> </ul>	<b>Contracting</b> <ul style="list-style-type: none"> <li>Full lane closure</li> <li>Incentive / disincentive clauses</li> </ul>
<b>Geotechnical Solutions</b>	<b>Foundations &amp; Walls</b> <ul style="list-style-type: none"> <li>CIP substructure under traffic</li> </ul>		<b>Rapid Embankment</b> <ul style="list-style-type: none"> <li></li> </ul>	
<b>Structural Solutions</b>	<b>Prefabricated Bridge Elements &amp; Systems</b>			<b>Construction</b>
	<b>Elements</b> <ul style="list-style-type: none"> <li>Precast wingwalls</li> </ul>	<b>Systems</b> <ul style="list-style-type: none"> <li>Full-width decked beam unit (FDcBs)</li> </ul>	<b>Miscellaneous</b> <ul style="list-style-type: none"> <li>CIP reinforced concrete closure joints</li> <li>Precast approach slabs</li> <li>Other – sleeper slabs</li> </ul>	<ul style="list-style-type: none"> <li>Transverse skids</li> </ul>
<b>Costs</b>	<p>The cost for all five bridges on this design-build project was \$50.8 million, of which this bridge cost \$12.3 million. ODOT realized a total cost savings of \$2.4 million (5% of total project cost) over conventional construction practices due to reduced construction duration, mobilization costs, reduced delay cost, and the use of innovative bridge removal and replacement techniques.</p> <p>ABC techniques saved an estimated \$500,000 in delay-related user costs.</p>			
<b>Funding</b>	<i>Federal only</i>	<i>State only</i>	<b>Federal and State</b>	<i>Other</i>
			X	
<b>Incentive Program (\$)</b>	<b>Highways for LIFE</b> \$1 million	<i>IBRD</i>	<i>SHRP2</i>	<i>Other</i>
<b>Contract Plans</b>	<b>Complete Set:</b>		<b>ABC *:</b> <a href="#">Drawings</a> (link to pdf)	
<b>Specifications</b>	<b>Complete Set:</b> Not available.		<b>ABC *:</b>	
<b>Bid Tabs</b>	<a href="#">Budget</a> (link to pdf)			
<b>Schedule</b>	<b>Engineer's:</b> Not available.	<b>Actual:</b>		
<b>Other Related Information</b>	<p><a href="#">"Turning challenges into community connections," Structural Engineer, April 2012</a> [http://www.gostructural.com/magazine-article-gostructural.com-4-2012-turning_challenges_into_community_connections-8814.html]</p> <p><a href="#">May 2010 Highways for LIFE Draft Final Report</a> [http://www.fhwa.dot.gov/hfl/summary/or/]</p> <p><a href="#">August/September 2008 FHWA Highways for LIFE Innovator</a> [http://www.fhwa.dot.gov/hfl/innovator/issue08.cfm]</p> <p><a href="#">ODOT Bridge Engineering Website</a> [http://www.oregon.gov/ODOT/HWY/BRIDGE/]</p>			
<b>Photo Credits</b>	Oregon Department of Transportation			

\* Specific to the ABC used in the project.