

DESIGN-BUILD DATELINE

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BUILT FOR SPEED

OREGON'S 10-YEAR BRIDGE PROJECT

INSIDE:

◆ STEEL PREVIEW

◆ D-B AND UNIONS

◆ TRANSPORTATION COVERAGE

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March 2001, Ford's Bridge on Interstate 5 in southern Oregon was declared unsafe and in need of emergency repairs. The resulting detour sent large volumes of traffic — especially truck traffic — through the towns of Canyonville and Riddle for 20 days. With streets not designed for such high traffic volumes, the travel delays associated with the detour and the disruption it caused to these two communities highlighted the seriousness of Oregon's highway bridge conditions.

In fact, regular bridge inspections by the Oregon Department of Transportation (ODOT) in 2001 showed that the state's bridges were weakening, and many required immediate weight restrictions, detours and emergency repairs. By 2003, ODOT placed weight restrictions on 140 bridges statewide.

In response, the Oregon Legislature enacted the third Oregon Transportation Investment Act (OTIA III) that same year to overhaul the state's crumbling road infrastructure. The 10-year, \$2.46 billion package includes \$1.3 billion for the repair and replacement of state highway bridges and those on major corridors throughout Oregon. In addition, OTIA III funds city and county road maintenance, interchange expansion and adds new capacity to Oregon's highway system to curb freight bottlenecks statewide.

Enhanced Efficiency

About 30 percent of the program budget is allocated to design-build projects, and the agency is already seeing benefits. Innovative management and delivery practices, such as design-build, have accelerated delivery while controlling costs for the bridge program. Design-build contracts are giving contractors the latitude to propose a variety of creative solutions.

For example, one early project allowed the contractor's use of seven precast concrete single-span beams — 162.5 feet in length and weighing 135,000 pounds apiece — which saved time and increased mobility on a critical stretch of U.S. Highways 26 and 97 between Portland and central Oregon.

In another instance, a firm reused an entire detour bridge at multiple sites instead of building temporary structures at each site, saving both money and natural resources. The Oregon Department of Fish and Wildlife entered the picture when it partnered with a design-build team to transplant 300 trees from the construction site to the Umpqua River basin to improve the river's ability to host salmon.

More recently, two bridges on a busy stretch of I-5 were replaced in conjunction with re-paving of the interstate outside Portland. ODOT is using design-build on this particular bundle to reduce design and construction time. And farther south on the interstate near Eugene is the first design-build project to incorporate new specifications for bridge aesthetics, taking into account community and environmental concerns as well as economic priorities. All five bridges in this bundle, including the highly visible McKenzie River Bridge, will be rebuilt with features such as arched girders and relief treatment of the abutment walls.

River Crossing The Spores Bridge over the McKenzie River on I-5 is one of several projects that are part of Oregon's 10-year, \$2.5 billion transportation investment project that began in 2003.

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An aerial photograph showing a multi-lane highway interchange with several cars. The highway is surrounded by lush green trees and a river. In the background, there are fields and a residential area.

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DESIGN-BUILD CUTS CONSTRUCTION TIME IN OREGON

BY JANE LEE

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Design-Build and Economy

Over the life of the bridge program, the project will sustain about 2,500 jobs each year — most for Oregonians. But the economic ripples go much farther, including local businesses across the state. Material and equipment suppliers are seeing an increase in trade, while local hotels, restaurants, grocery stores and other businesses frequented by construction workers are also thriving.

And with a variety of contract sizes ODOT's contractor pool is large and quite diverse. For example, Staton Industries in Eugene, owned by Jeanne Staton, was hired to demolish 28 bridges under a \$1.46 million contract. Staton, in turn, hired four full-time employees and spent \$600,000 on excavators from Triad Machinery in Coburg. The variety of bridge program projects has also resulted in the purchase of nearly \$4 million in structural steel from Fought Inc., in Tigard, which enabled the company to hire more than 10 welders.

After more than 40 years of doing business in Oregon, OBEC Consulting Engineers can point to many milestones of increasing success: It has expanded from its original office in Springfield to four offices in western Oregon, and in the past four years it has grown from 55 to 121 employees.

"The size of the bridge program allowed for good partnerships between consultants and contractors on design-build projects," says Kevin Boyle, OBEC office manager. "OBEC prides itself on its ability

to work together with contractors to reach a solution that meets everyone's needs."

Environmental Components

An important part of the bridge program is to ensure local communities provide meaningful input into the design and construction of their bridges, and ODOT wants community input on everything from aesthetic and historical to cultural, economic and environmental aspects of the bridge project.

For example, at the McKenzie River, Hamilton Construction Co. has built a temporary work bridge to support heavy equipment — the cranes and drills needed to build the new bridge — as well as to protect the water below. The work bridge's draining system collects all rainwater that falls to the bridge and ferries it to shore for treatment. A double layer of Visqueen lies under the plywood surface as a vapor barrier to collect any spills before they reach the water below.

In addition, when Hamilton drills its 30 to 40 foot shafts into the river bottom, it collects the muck forced upward, puts it in steel containers and transports it to a garbage site. For the drilled shafts themselves, the company uses a permanent steel casing that contains the concrete and keeps the water clean.

The most technological and eco-friendly innovation, however, is the "bubble curtain." ODOT and its contractor use a ring at the bottom of the river that discharges air, forcing bubbles upward to isolate sound waves and muffle



Time Saver Pre-cast single span beams (above) reduced construction time and traffic delays on U.S. 97 near Chemult, Ore. Fish Friendly Workers (below) activate a "bubble curtain" around a bridge piling to muffle construction.

noises that could disturb fish and other river wildlife.

Route Considerations and Enormity

Despite these innovations, ODOT must continue to find routes for displaced drivers. The agency is working to minimize traffic impacts, help drivers plan their trips using alternate routes and keep travelers informed about delays where they exist.

Strong mobility planning is helping ensure that traffic keeps moving relatively smoothly during construction work. As a result, bridge repairs are being grouped into logical bundles along each highway corridor. Bundling reduces costs by allowing contractors to achieve an economy of scale in doing design work, ordering materials and mobilizing equipment and resources. It also helps traffic engineers to make better plans to keep traffic moving during construction.

Oregonians have not seen an investment of this magnitude in highway and bridge construction since the state's interstate freeway system was built in the 1950s and '60s. The sheer size of the bridge program meant that ODOT had to change how it does business. Were ODOT to take on the work itself, it would require a massive expansion of the agency, followed by a dramatic downsizing once the work was complete. Instead, ODOT is making a historic shift from an agency that designs and constructs projects to one that manages the transportation system — and design-build is an integral part.

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