Rising to the Top

Traylor Bros. used a creative approach to construct the twin 3044-ft-long precast concrete segmental Sailboat Bridge in Grove, Okla. Photo: Oklahoma Department of Transportation.

Traylor Bros.' focus on complicated projects that leverage an extensive array of marine- and land-based equipment keeps clients returning as techniques and delivery methods evolve

by Craig A. Shutt

Since it was founded in 1946, Traylor Bros. Inc. has made a name for itself by building complex bridges over waterways throughout the United States. Aided by its four precasting plants and a host of marine- and land-based equipment, the company based in Evansville, Ind., has established a reputation for taking on complicated, difficult assignments.

"We're a large, somewhat specialized civil construction firm, with complex bridges and infrastructure projects in and over waterways as our forte," says Scott Turnpaugh, a division engineer with the firm's National Heavy Civil Division. That reputation has been enhanced by the company's capabilities and equipment, notes Scott Armstrong, a project manager. "We have a large fleet of marine equipment that makes us uniquely suited to marine work," he says. "We also have a large fleet of cranes that can work on land or water."

Innovative Waterline Work

Traylor's success comes from its innovative approaches as well as specialized equipment. For instance, on the Sailboat Bridge across the Grand Lake O' the Cherokees in Grove, Okla., the Oklahoma Department of Transportation expanded the existing bridge into twin 3044-ft-long precast concrete segmental bridges. To contain costs and accelerate construction in the 90-ft-deep waterway, the foundations of the existing bridge were reused by wire sawing the piers at the waterline and removing the superstructure.

Traylor set up a casting yard near the site for the 41-ft-wide, 7.2-ft-deep segments and also used it to cast concrete tubs that were permanently tied into the tops of the cutoff piers. The tubs were then dewatered so crews could work inside them, below the waterline, to connect the new footings to the existing structure.

"It was a unique approach, and it saved a lot of time due to the depth of the water," explains Skylar Lee, manager in the National Heavy Civil Division and the project manager. "It would have been difficult to build cofferdams or other support systems. We wanted to create permanent elements that ensured we could work in the dry."

Another creative solution was used for the Interstate 45 Galveston Causeway bridge-replacement project in Galveston, Tex. There, the shallow waters of the Intracoastal Canal to Galveston Island were crossed by twin 8592-ft-long structures with three cast-in-place concrete twin-cell segmental main spans. These main spans were constructed using four overhead form-traveler systems for the balanced-cantilever construction. Once the deepest portions were reached, cranes on floating barges were used to finish construction. The remaining 57 spans feature 72-in.-deep prestressed concrete girders.

Procurement Approaches

In recent years, Traylor's creative approaches have involved new delivery methods, including design-build, public-private partnerships (P3), and construction manager at risk (CMAR)—where the construction manager agrees to deliver the project within a guaranteed maximum price. "We're in favor of being part of a P3 team but prefer a teaming structure that includes a separate entity to handle financing," says Armstrong. "We also have done some CMAR projects and continually look for more, as they're fairly similar to design-build projects in the way we participate."

Fifty-seven spans on the Interstate 45 Galveston Causeway bridge feature 72-in.-deep prestressed concrete girders. The frame on the pier cap is part of a system for erecting the girders. Photo: Traylor Bros. Inc.

These new approaches often require more involvement of staff and may cost more, notes Lee. "They create a bigger commitment of resources up front to pursue them, before we learn where the job will go," he says. "But we expect that, as costs to pursue the projects come down, more owners will favor these approaches, which opens more avenues to find funding. But they need to put the risk in the right places."

Traylor served as the subcontractor to design-build manager Fluor on the Conway Bypass project in Myrtle Beach, S.C., the state's first P3 and largest design-build project. This project was part of the state's Partners-in-Progress program designed to accelerate the completion of five significant structures.

Two phases of construction were completed to build 34 concrete bridges over shallow wetland areas. Traylor built its own casting yard and produced more than four thousand 18-in.-thick prestressed concrete flat-slab panels. The company also fabricated more than three thousand seven hundred 18-in.-square prestressed concrete piles at four locations during the project.

"The distance and multiple sites made managing safety and health a difficult task," says Robert DeLouche, project manager. Project management met to discuss safety on a daily basis, creating a proactive stance to stop accidents before they could occur, he adds.

Today, most of the company's projects are delivered through design-build format of some kind, notes Turnpaugh, although the firm also pursues design-bid-build projects. "We like design-build approaches because the earlier we are involved in the process, the more we can help shape the projects through constructability reviews using our technical expertise."

Traylor aims to exercise its unique expertise and abilities when alternative design options are available. "Convincing owners to make changes usually comes down to economics in materials or time," says Turnpaugh. "If we can show an approach provides savings, we'll bring it up. It can be hard to overcome established mindsets, but, as we get more experience around the country, we can apply that knowledge in other states and get an opportunity to advance techniques."

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Constructability Reviews

At Traylor, constructability reviews are the driving force for introducing new ideas, notes Lee. "We are always looking at every material to find the best option from a constructability standpoint. What sets us apart is that our people, the estimators and planners who work with designers, have worked closely on designs and have hands-on experience with all the options, so we can anticipate most of the issues that arise and how to meet them."

Typically, he notes, constructability choices come down to two options, whether they involve foundations, substructures, or superstructures.

Traylor served as the subcontractor to design-build manager Fluor on the Conway Bypass project in Myrtle Beach, S.C., the state's first private-public partnership project. Photo: Rob Thompson, South Carolina Department of Transportation.

"Every time, it shakes out that one of two ideas offers the best option, so we work through them to find the [one that is] most effective. In some cases, later decisions make us review earlier choices so that, ultimately, we find the best combination for the entire project, not just for each section."

For example, on the Galveston bridge, Traylor value-engineered several items, including the concrete segment lengths, says Turnpaugh. "We saw an opportunity to optimize the design and create efficiencies by making the segments slightly longer. We could cast them without a problem, and it eliminated a few segments from the total length."

On the Sailboat Bridge, Traylor's team redesigned the type of expansion joint from a rigid one to a steel-finger joint with an elastomeric mortar seal behind the plate connected to the concrete. The new design "created more flexibility and prevented cracking in the concrete," Lee explains.

The ability to perform in-depth constructability reviews depends on the project's schedule, notes DeLouche. "All owners want us to have an opportunity to value-engineer the project to find efficiencies and lower costs," he says. "They almost always offer that chance, but how much can be done depends on the time allotment—and many projects are time-sensitive today." What can be done varies significantly by bridge, owner, and location, he adds. "Soil is different in every state, as is access to the site. Factors vary every time and include desired aesthetics, often based on location, along with longevity and budget."

Traylor's ability to leverage specialized equipment creates a key route to more efficiency. "Equipment capabilities provide a specific constructability 'technique' that goes beyond material or method changes and often make us unique," DeLouche points out. "Each company has its own specialties and expertise, and equipment access is one of ours. When we're involved early in the design process, we can point out these efficiencies to designers. They're often more focused on aesthetics and design issues for the bridge's environment than on efficiencies in constructability."

Speed has become a key issue for all owners, leading Traylor to evaluate a variety of accelerated bridge construction (ABC) methods. "Schedule is always king on projects, especially with P3s that are revenue-generating projects," says Lee. "We always look to minimize overhead and exposure, and ABC techniques help with that. We are very much geared to the faster pace of construction today."

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"We've used a variety of ABC methods," agrees Armstrong. "They don't always produce the most economical approach, but they can provide a shorter construction schedule, which may be the top priority."

Precast Concrete Facilities Aid Projects

The company's own precast concrete facilities, as well as components it purchases from precast concrete producers, often speed up schedules, Armstrong notes. "Precast concrete helps because it creates a parallel track, where the components can be cast while site work is underway. It also removes some of the labor congestion from the site. We often can generate better productivity with our own precast [concrete] factory in that environment."

The company-owned facilities do not drive the firm to default to precast concrete, the project managers agree. "We look at each project with the design team to find the best fit," Turnpaugh says. "Having our own plants gives us more control of the product when precast does turn out to be the best choice." DeLouche agrees. "It depends entirely on the project if our precast plants can help us. We study the situation and what resources are available and if our plants best fill the bill."

Traylor does not use its own products exclusively. "We always cast our own segmental pieces, because those are

The Louisiana Highway LA1 relocation project Phase 1B has a 4-mile-long, high-level bridge featuring prestressed concrete piles, cast-in-place substructures, Type III and BT-78 prestressed concrete girders, precast concrete deck panels, and a cast-in-place concrete deck. Photo: Traylor Bros. Inc.

custom, one-off designs we can produce efficiently," Turnpaugh explains. But standard precast concrete girders and other traditional components often are purchased from local precasters. "The setup costs can be so high that we outsource them to others already producing them efficiently."

In-house and outsourced components combined for the Louisiana Highway LA1 relocation project, in which phase 1B consisted of constructing a 4-mile-long, high-level bridge with connecting ramps and interchanges. The structure consisted of 16-, 24-, and 30-in.-square prestressed concrete pile foundations, cast-in-place substructures, Type III and BT-78 prestressed concrete girders, precast concrete deck panels, and a cast-in-place concrete deck.

The girders were purchased from a local precaster, while Traylor set up a plant 5 miles from the site to produce ready-mix concrete for the cast-in-place concrete. "We always look at the balance between controlling the process versus the risk of outsourcing," explains DeLouche, the project manager. "We look at whether local companies can be more efficient, reliable, and capable of supplying product on time at the needed quantity."

Many federal projects require use of local subcontractors, he notes, and hiring local precast concrete producers helps meet that requirement effortlessly. "We weigh every factor in finding the most efficient approach."

New Techniques

As demands for better, faster, and more economical bridges increase, Traylor evaluates new approaches to concrete design. "Owners want to extend service lives to 100 years in general, and even to 125 years in some cases," says Lee. "We look to additives like silica fume and slag; we do more early tests to determine durability; and we are increasing concrete cover."

Some owners, more-so in the northeastern United States, require stainless steel reinforcement, and the New York Thruway requires galvanized steel. "There definitely is a shift to more corrosion-resistant reinforcement overall," adds Lee. Concrete adds inherent benefits because it resists adverse weather conditions and does not need to be painted, DeLouche notes. "It also can withstand heat and fire very well, which can be a significant factor." DeLouche is also a fan of precast concrete panels for driving surfaces.

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"We're seeing them used more often, with some states virtually requiring them now," he says. "Others don't like them, possibly due to a past experience, but they have become reliable and popular. I expect their use will grow, as they offer a durable option."

Traylor's History

Traylor Bros. Inc. was founded in 1946 by William F. Traylor, who had experience inspecting a compressed-air tunnel for the City of Evansville, Ind., and worked in the Navy's Pacific Theater Construction Battalion in World War II. His son, Thomas W. Traylor, succeeded him as president, and the company now is led by Thomas' two sons, copresidents Christopher and Michael Traylor.

The firm is based in Evansville, with additional offices in Alexandria, Va., and Long Beach, Calif. It also owns four precast concrete plants, in Tacoma, Wash., Houston, Tex., Littlerock, Calif., and Stockton, Calif. It maintains a fleet of marine-based equipment and a variety of cranes that can be barge-mounted or operated from land.

The privately held firm was ranked 60th in the top design-build firms by *Engineering News Record* (ENR) in 2016, and was ranked 202nd in ENR's 2015 Top 400 Contractors listing, with revenues estimated at $318 million.

Traylor will continue to seek new ideas and present owners and designers with new options. "Our earlier involvement with projects provides the opportunity to introduce new ideas and present those options, and we'll continue to look for them," says DeLouche. "We have a lot of professionals with great expertise, and we will continue to tap into that resource to create more efficiencies."

On the Interstate 45 Galveston Causeway replacement project in Galveston, Tex., Traylor Bros. built three cast-in-place concrete, twin-cell segmental main spans using four overhead form-traveler systems for the balanced-cantilever construction method. Photo: Traylor Bros. Inc.