

Staying the Course

As Williams Brothers Construction prepares for a new generation of leadership, the company maintains its focus on competitive bidding on Texas Department of Transportation highways and bridges

by Craig A. Shutt



Williams Brothers built the Veteran's Memorial Bridge in Jefferson County, Tex. in 1991, which features a 640-ft main span of precast concrete segments supported by cables streaming from towers on either side of the river. All Photos: Williams Brothers Construction.

Doug Pitcock has seen many changes to the bridge industry since he helped found Williams Brothers Construction Co. in 1955. Now, at 89, he is turning over the reins to a new generation of leaders who will continue the company's skills in competitive bidding, ensuring constructability, and rolling with changes to build strong relationships.

Through the years, the Houston, Texas-based company has performed most of its work under the open, competitive-bid process, with 95% of that business commissioned by its principal client, the Texas Department of Transportation (TxDOT). It has completed more than 400 projects with a value of more than \$12 billion, making it one of the largest highway contractors in the country and the largest in Texas.

Along the way, it has constructed a number of challenging, complex concrete bridges, including

- the Veteran's Memorial Bridge over the Neches River, opened in 1991 as the first cable-stayed suspension, segmental concrete bridge in the state and Texas' first design-build project; and
- the Interstate 10 (I-10) Trinity River Bridge, twin structures using cast-in-place concrete segmental main spans and precast concrete beam approaches.

Foremost a Bridge Builder

"Williams Brothers is first and foremost a bridge builder," says Pitcock. "We have an unprecedented history of constructing many of Texas's exotic and complex bridge structures."

Although Williams Brothers made its name on hard-bid projects, its construction of the state's first design-build project indicates its ability to adapt to change. "Hard-bid projects



The Interstate 10 Trinity River Bridge between Houston and Beaumont, Tex., was the first bridge in the state to include an integral wearing surface. The twin bridges feature cast-in-place concrete segmental box girder main span units and precast, prestressed concrete I-beam approach spans.

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are definitely giving way to design-build and even P3 [public-private partnership] methods," he says. "They change the ball game from the contractor working from the DOT's design to designers working for the contractor. That creates new relationships that lead to more efficient designs." However, the firm has steered clear of P3 projects. "We don't want to be involved in financing or those long-term contracts."

That first design-build project, which evolved to a contractor-proposed alternative, the Veteran's Memorial Bridge, was completed using 10-ft-long by 57-ft-wide precast concrete segments supported by cables streaming from towers on either side of the river. The towers for the 9440-ft-long structure reach 272 ft in height and hold 14 pairs of cables. The 640-ft-long center span, flanked by side spans of 280 and 140 ft, clears the river by 143 ft, 5 ft more than the minimum clearance required at the time.

When the company works on design-build projects, the team focuses on constructability issues and efficiency rather than value-engineering the design itself. "We don't involve ourselves in design issues, but we make suggestions that will enhance

construction techniques and efficiency of construction."

Bridge Types Evolving

In recent years, its project types have changed noticeably, Pitcock says. "Owners needs haven't changed in what they want from us, but the types of projects that predominate our procurement have changed. We went through an era of building a lot of new bridges, especially over waterways, but that's slowed. Today, most of our work is elevated freeway interchanges, overpasses, and ramps. We jump at chances to bid on water crossings, but there are few new ones available."

Replacement of bridges also has been down, he adds. The ones that are replaced aren't done due to deterioration. "Most bridges are replaced to expand their capacity," he says. "We're a growing state with more vehicles all the time, and many bridges weren't designed to accommodate the amount of traffic they carry today."

About 95% of the bridge projects Williams Brothers builds today use concrete girders, he notes. "It's typically up to the designer, but we can bid concrete designs very efficiently." Many of the longer bridges use segmental concrete designs, which have led to signature designs.

"Segmental concepts were pioneered in the United States and brought to Texas by Figg & Muller Engineers, and they gained a lot of attention here," he says. "It was a popular concept. TxDOT was using steel for longer spans because there wasn't another choice."

Segmental designs provided the alternative they needed. "Segmental concrete options created a more economical and competitive design than structural steel. Concrete is more cost effective and faster to build than steel in almost all cases. That made it a top choice, and it's become the prevailing mindset with the DOT."

Segmental designs have added other benefits too, he says. "As the segmental designs have gotten longer and deeper, they've created more aesthetically pleasing designs, too. We now can produce prettier bridges than were possible in the past, and the designers are taking advantage of that."

One of their projects using a segmental design was the Quintana Beach Bridge in Freeport, Tex. The \$10.7 million structure, completed in 2003, crosses the Gulf Intracoastal Waterway with a 350-ft main span using cast-in-place concrete segments constructed using the balanced-cantilever method. The single-cell box girder has a deck width of 51 ft and was cast using form travelers. The total segmental length was 740 ft (195, 350, and 195 ft, respectively, in three center spans), with the remaining portions of the 26-span bridge consisting of 142-ft-long AASHTO Type VI Modified prestressed concrete girders.

Deck Wearing Surfaces

The use of a highly durable wearing surface has become more popular in the state, especially on segmental bridges, Pitcock notes. "The wearing surface smooths out the joints and creates a more comfortable ride. Some designers



The second Texas bridge to feature an integral wearing surface, the Interstate Highway 10 Bridge over the Neches River in Orange County, Tex., features cast-in-place concrete segmental box-girder main-span units built using the balanced-cantilever method and precast, prestressed concrete I-beam approach spans to create a widened structure to handle higher traffic volume.

don't like to use it because it adds cost, but it is well worth it in the long run, in my opinion." An example of this type of wearing surface was for the Fred Hartman Bridge in Baytown, Tex., where the 8 in. of structural concrete deck was covered with a 4-in.-thick wearing surface that was specified by TxDOT for protection against an accident involving a burning petroleum truck.

Williams Brothers has been involved with several bridges using integral wearing surfaces, including the first in the state for the I-10 Trinity River Bridge between Houston and Beaumont, Tex. The project consists of twin 3636-ft-long bridges featuring a 990-ft three-span cast-in-place concrete segmental box girder main span unit, erected using the balanced-cantilever method, and a total of 2646 ft of precast, prestressed concrete I-beam approach spans.

These twin bridges feature 3 in. of clear cover to the top mat of reinforcing steel in the deck, providing a maximum of 1 in. available for grinding to obtain the final surface profile and grading. The segmental superstructure called for a design concrete compressive strength of 6 ksi at 28 days.

The second such integral wearing surface was used on the I-10 Bridge over the Neches River in Orange County, Tex. Ninety percent complete in 2017, the twin 3896-ft-long bridges feature TxDOT 70-in.-deep (Tx70) precast, prestressed concrete beams supported on reinforced concrete bents and precast, prestressed concrete piles on concrete footings for the approach spans. The main span for each bridge is a 680-ft-long cast-in-place concrete segmental box girder with a 320-ft-long main span that is flanked by two 180-ft-long back spans. The depth of the box-girder units varies between

18 ft at the piers and 7 ft at midspan. The same 4-in.-thick integral wearing surface was used for these bridges as for the Trinity River Bridge.

Williams Brothers competitively bids these projects with any type of girders desired, thanks in part to its in-house precast/prestressed plant, Valley Prestress, which casts components at four locations throughout the state. The company is one of the largest precast/prestressed concrete fabricators in the state. "We don't produce products for other contractors, but owning these facilities helps us keep costs down to provide any shape or size of precast concrete piece," Pitcock says. "It makes us more economical, because we're not factoring in a middleman's profit. TxDOT is one of the best in the U.S. in creating new designs as needed for special challenges, and we cast the girders that are called for."

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In recent years, the impact of alkali-silica reaction (ASR) on fine and coarse aggregates has caused TxDOT to create prescriptive specifications to mitigate ASR, which complement specifications for high-performance concrete. The prescriptive approach provides mixture proportion options for contractors without the need for additional material testing.

On the Trinity Bridge project, Williams Brothers provided several concrete mixtures, with the majority featuring Class F fly ash contents of 25% and 30% for the total cementitious materials to comply with TxDOT's ASR-mitigation requirements. These mixtures produced concrete with compressive strengths greater than 9 ksi. The additional strength was not required by the design but was desired to keep the casting and stressing operations on schedule, TxDOT officials explained.

Construction Accelerates
Williams Brothers also has focused attention on increasing the pace of

construction activities, but it has been skeptical of techniques specified as accelerated bridge construction (ABC). "It depends on how ABC is defined as to whether we use it or not," Pitcock says. "We don't think that precasting concrete components off site meets the definition, but we complete projects as quickly as possible."

About 10 years ago, two overpasses on I-10 and Interstate 45 were demolished and replaced with new precast, prestressed concrete structures with conventional cast-in-place substructures and bridge decks in only 10 days using traditional construction methods. "I don't think it would be possible to replace them faster than that, no matter what techniques you use."

Compressed schedules have become a key factor in building bridges, he notes. "Owners want bridges built faster, and we have created processes that ensure that happens." The company works 24-hours-a-day, 7-days-a-week schedules on projects, especially on high-traffic sites. That ensures the

projects are completed more quickly and reassures the traveling public. "We believe if travelers are being held up by lane closures, they should see people working to get the job done," he says. "The only thing worse than seeing a site with no one working is seeing one where people are standing around doing nothing. We make sure neither of those happens."

'Safety is less about holding meetings and more about conveying a mindset of being aware at all times.'

Safety isn't compromised with the focus on increased speed, he adds. "Accidents are a sign of inefficiency." The company holds daily safety meetings on projects and monthly meetings of all superintendents to review processes. "Safety is less about holding meetings and more about conveying a mindset of

A New Generation

Williams Brothers Construction Co. was founded in Houston, Tex., in 1955 by J.K. Williams, C.K. Williams, and Doug Pitcock, and thrived as the Interstate Highway Act was signed into law the next year. The Williams brothers were bought out in 1964 (J.K.) and 1984 (C.K.), leaving Pitcock the sole shareholder.

In 1998, the firm began to convert to an employee-owned corporation. The company now is transitioning to a management team of five executives as Pitcock cuts his workload. The company, with 2000 employees, had \$536 million in revenues in 2016, making it no. 155 on *Engineering News-Record's* Top 400 Contractors list.

being aware at all times," he explains. "We're not unique in our systems, but we focus on them at all times."

Safety procedures are aided by the company's founding membership in a captive group casualty insurance company, American Contractor Insurance Group, based in Dallas. "By self-insuring our employees, it ensures our focus remains on safety and reducing claims and instituting policies that reduce incidents throughout our business."

The company's self-performing policy ensures continuity as the industry changes, and Pitcock is doing his part to ensure that on-going success. "For me to be a success with this business requires people behind me who are ready to take over in a methodical, smooth transition," he says. To that end, he has a management team of "five superstars" that is comprised of President Bob Lanham and Vice Presidents Jesse Khangura, Randy Rogers, Seth Schulgen, and David Casteel.

Pitcock, however, has no intention of leaving the business behind. "I probably never will get out altogether, I wouldn't know what to do with myself," he says. "I'm just trying to keep my mouth shut more often these days." 



The Interstate Highway 10 Bridge over the Neches River in Orange County, Tex., consists of twin 3896-ft-long bridges with approach spans constructed using Tx70 precast, prestressed concrete beams supported on reinforced concrete bents and precast, prestressed concrete piles on concrete footings.