Restoring the Interstate System through Innovative Contracting

By John Horsley

During this year when the transportation industry will be celebrating the 50th Anniversary of the Interstate Highway System, one of the biggest issues facing state DOTs is how we can accelerate the time it takes to modernize the system and minimize disruption to the traveling public. "Innovative Contracting" has proven an exciting tool which is providing solutions in several states.

Utah DOT used a "design-build" contract to complete the $1.5 billion rebuild of Interstate 15 through the heart of Salt Lake City, doing in four years what would normally take eight. Colorado DOT is using a similar technique on its $1.6 billion T-REX project modernizing I-25 and I-225 in Denver plus extending a portion of light-rail transit service. Design-build may allow the highway portion to open in 2006 rather than 2008. Oklahoma DOT used an "A+B" (A+B contracting is sometimes referred to as cost plus time contracting) incentive contract to restore traffic on the Interstate 40 bridge spanning the Arkansas River in 64 days after a barge accident caused a 580-foot section to collapse. A "Hyperfix" contract in Indiana made possible the reconstruction of Interstate 65 and Interstate 70 in 55 days. Finally, toll-supported public private ventures in Oregon, Georgia, Virginia, Washington State, Texas and elsewhere are allowing major projects to proceed, which otherwise would languish for decades.

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Our traditional contracting technique of "design-bid-build" has served states well and will likely continue to be the approach taken in the majority of projects. In certain cases, however, "innovative contracting," has proven its ability to accomplish objectives which go beyond what traditional contracting can achieve.

Innovative contracting involves deploying meaningful carrot-and-stick approaches for contractors to complete construction projects in the quickest time possible without sacrificing safety, cost-effectiveness, and quality. It came in 1991, when the Federal Highway Administration (FHWA) issued a guidance allowing states more flexibility in pursuing that approach.

I-15 in Utah

A high-profile example of that involves Utah DOT's reconstruction project for Interstate 15, the main north-south artery in the Salt Lake City region. UDOT decided in 1996 to go with the design-build method for that project, which involved reconstructing approximately 17 miles of I-15. The specific components of the project included widening the corridor from 6 to 12 lanes; building 144 new bridges; creating a new downtown interstate interchange; reconstructing 13 freeway interchanges, three interstate junctions, and three railroad grade separations; making frontage road improvements; and installing an advanced traffic management system throughout that metropolitan area.

UDOT's goals for the project entailed completing it in time for the 2002 Winter Olympics in Salt Lake City while also minimizing costs and traffic disruptions for area businesses and the traveling public.

The design-build method was agreed upon for those reasons and in particular because of the time savings it helped ensure. It could have taken an estimated eight years to perform all the work on I-15 as a standard design-bid-build project, but just about half that time using innovative contracting. A key reason for this was that, without a design-build mechanism in place, UDOT would likely have been burdened with coordinating on a

piecemeal basis dozens if not hundreds of individual must-do tasks in a heavily populated urban environment.

UDOT's design-build undertaking was approved by FHWA as an experimental project, thereby permitting deviations from customary federal-aid requirements for the selection of contractors and consultants. Utah's own procurement laws were modified so that the contract for the project could be awarded to the firm providing a "best value" proposal even if other candidates bid lower costs.

The design-build contract was given in March 1997 to Wasatch Contractors, a team led by Kiewit Pacific, Granite Construction, and Washington Construction. The regional project, which cost $1.5 billion, was Utah's maiden design-build effort and proved to be successful. The work on it was completed six months ahead of schedule, in plenty of time for the Winter Olympics.

T-REX in Denver, Colorado

Another example of the design-build methodology in action can be seen in the Denver, Colorado, metropolitan area. The Transportation Expansion (T-REX) project showcases the benefits that design-build can have on a wide-ranging multimodal effort.

That project involves improving approximately 17 miles of highway along Interstates 25 and 225 and adding about 19 miles of a light rail transit line. Colorado DOT asked for and received legislation in 1999 authorizing it to use a "best value" procurement process for design-build contracts. CDOT used that selection process for the first time in 2001 when it awarded a $1.186 billion design-build contract to Southeast Corridor Constructors (SECC) for the T-REX project.

Given the project's complexities, CDOT wanted a contracting approach that would provide room for creative solutions to get the work finished in an abbreviated timeframe. The special appeal of design-build was that SECC was empowered to begin construction while also completing the design.

A leading challenge throughout the project's duration has involved curtailing disruptions in traffic as much as possible. That is why a good deal

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of the construction has been done at night and also the reason that SECC must customarily keep three lanes open in each direction on both I-25 and I-225 during peak afternoon drive hours (Monday through Friday, 5:30-8:00). On occasions when the interstate routes need to be shut down completely, those closures are well-publicized in advance and detours clearly marked.

Another successful element of T-REX's community-centered strategy has been the board of directors set up to oversee the project. That board, which includes representatives from the various stakeholders (CDOT, SECC, FHWA, Regional Transportation District), welcomes and takes into consideration feedback on the project from local residents, their elected representatives, businesses, and those who travel through the area.

Thanks to the efforts to mitigate potential traffic snarls and weigh community concerns, the T-REX project has made significant progress to date. Originally slated for completion by June 2008, it now appears that the work will be done instead this year – highway construction should be finished in September and light rail service is scheduled to start a couple of months thereafter. CDOT anticipates completing the project so far ahead of schedule that it will result in even further cost savings.

The Utah and Colorado experiences illustrate how innovative contracting can help push forward major regionwide projects in a speedy yet satisfactory way. A tragic bridge accident in Oklahoma showed how innovative contracting can likewise help in emergency situations.

I-40 Bridge in Oklahoma

On May 26, 2002, at Webbers Fall in the eastern part of Oklahoma, a barge slammed into the Interstate 40 Bridge that spans the Arkansas River. Fourteen died in that accident and a 580-foot-long section of the bridge collapsed. Oklahoma DOT officials, appreciating how that now-shattered bridge was a vital east-west transportation link for the state, realized that immediate action was needed to replace the structure. This was all the more imperative because rerouting traffic away from the site meant time-consuming detours of 57 miles eastbound and 12 miles westbound. The bridge closure cost the public an estimated $430,000 per day.

Wasting little time, ODOT put into effect a cost-plus-time (A+B) bidding method for handling the project as quickly as possible. A cost-plus contract – with provisions for an hourly rate rather than a lump sum — was approved on June 3 for the contractor Jensen Construction Company to handle demolition efforts at the site.

At around the same time, ODOT had contracted with the designer Poe and Associates, Inc., to prepare reconstruction plans for the bridge. The contract gave that firm 16 days to have biddable plans ready. In addition, the contract provided Poe and Associates with an incentive of $5,000 for every day the firm beat that deadline and a disincentive of $2,400 for every day it went beyond the agreed-upon timeframe. Poe and Associates had the plans ready in 12 days, which proved to be a considerable time-saver.

With the demolition work done and the final design in hand, ODOT then proceeded to the next stage of the process. On June 8, the agency – in a departure from the usual practice – held an on-site, pre-bid meeting that all interested candidates were required to attend. The maximum acceptable bid would complete the work in 65 days or 1,553 hours.

The bids were opened four days later at 11:00 a.m., with the state transportation commission awarding the reconstruction contract at 2:00 that afternoon to Gilbert Central Corporation.

To get the job done on an accelerated schedule, Gilbert Central employed several innovative practices. The company built the bridge for the most part out of concrete since it was easier to pour concrete than to bring steel to the site. Other innovations included using computer chips to help monitor potential irregularities in the concrete.

Throughout the project, ODOT worked closely with other government agencies to likewise ensure that Gilbert Central could get the job done quickly. FHWA provided technical assistance in contract administration and the Cherokee Nation – which controlled the land around the site –

made the work areas easily accessible to Gilbert Central and other involved parties.

As it turned out, Gilbert Central earned $1.5 million in incentives by beating the deadline stipulated in the contract by 10 days. The amount of money spent to repair the bridge was significantly less than what it would have cost to keep that structure closed. The I-40 Bridge was open for business only 64 days after the collapse. That was about half the time previously thought to be the minimum.

I-35 Trans-Texas Corridor

In 2002, Texas state officials unveiled a proposal for a multi-faceted network of transportation facilities that would incorporate new and existing highways, rail routes, and utility rights-of-way.

Plans for the Trans-Texas Corridor (TTC), to be completed in phases over the next 50 years, call for separate lanes for passenger vehicles and large trucks; freight as well high-speed commuter railways; upgraded infrastructure for utilities; and transmission lines for electricity, broadband, and other telecommunications services. TTC's overall aim is to anticipate the future transportation needs of the Lone Star State based on likely increases in population and freight traffic.

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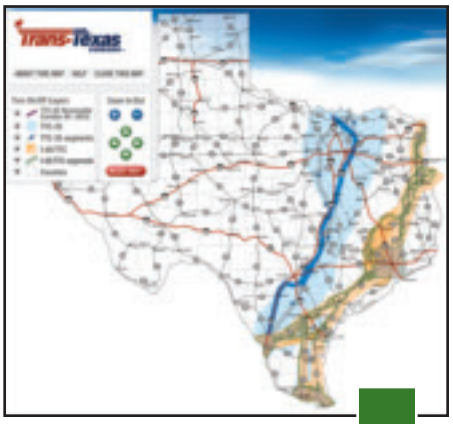
As articulated by state officials, the guiding principles for the Trans-Texas Corridor include expediting improvements, soliciting public feedback, and drawing on the creativity of the private sector. In addition, while TxDOT has oversight of the project's planning, construction, and maintenance, private vendors have responsibility for most of the daily operations.

TTC is fueled by Texas-sized ambitions, and the starting point for its implementation can be found at and around Interstate 35 between the Oklahoma and Mexico borders. That section of the state is a prime candidate for the first stage of that project for two reasons. One is that, thanks to the NAFTA-driven boom, I-35 has great potential as a mega-trade corridor between the United States and Mexico. The other reason is because that route is one of the most



heavily congested highways in all of Texas. Approximately 9.5 million people – 45 percent of all Texans – live within 50 miles of it. Something clearly had to be done to help alleviate that congestion for the surrounding communities and business affected by it.

The TTC component for I-35 entails building a parallel corridor along that route. TTC-35, it has been emphasized by TxDOT and others, would help alleviate the current level of congestion while enhancing long-range safety and mobility needs.

Last year, TxDOT formalized a partnership with Cintra-Zachry – an international group of engineering, constructing, and financial firms – to work on the 800-mile-long TTC-35 effort. That consortium, hired for its "best value" proposal for TTC-35, is believed to constitute the largest-ever private sector involvement in a U.S. surface transportation project in the automobile era.

The Cintra-Zachry proposal, which is still in the pre-development agreement phase, brings anything but a business-as-usual approach to the table. Above all else, the proposal seeks to maximize private investment and lessen the need for public funds. It also aims to speed up project delivery by relying not on the traditional federal funding from gasoline taxes but rather a blend of tolls and private money. The Cintra-Zachry proposal specifies a private investment of $6 billion by the consortium for the design, construction, and operation of a four-lane toll road between Dallas and San Antonio for up to 50 years as the initial segment of TTC-35. In exchange for the long-term right to build and operate that initial segment as a toll facility, the consortium has also proposed paying the state an additional $1.2 billion. The funds for that long-term right, in turn, can be used by the state to finance improvements in commuter and high-speed projects along that corridor.

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As with other projects under the TTC umbrella, this particular one will rely on such aspects as a design plan, preliminary cost estimates, toll feasibility studies, and a

plan for environmental requirements. The development of TTC has also been characterized by numerous public meetings for those affected by the construction.

The expectation for TTC-35 is that it could generate around $135 billion for Texas over the next half-century and bring in new industries by offering more efficient shipping routes. As noted by Texas economist Ray Perryman, "Any time we can do something better, faster and cheaper, it's going to give us an advantage."

Indiana Hyperfix Project

The Hyperfix project was the Indiana Department of Transportation's creative response to the problems confronting the inner loop in Indianapolis where Interstates 65 and Interstate 70 meet. That heavily traveled section, the gateway to Indiana's capital, was in desperate need of repair by 2002. Everything from the aging infrastructure to rough bridge decks arguably made that interchange a disaster waiting to happen.

A chief concern about performing needed repairs, however, revolved around the large-scale traffic disruptions and expenses it could cause. A rehabilitation effort on that three-and-a-half-mile section, using such conventional methods as partial closures, would take 180 to 200 workdays. In addition, an estimated $1 million per day could be lost in productive time for the many highway users who travel through that area.

That is why the Hyperfix project was put into action. While that effort would include completely shutting down the section for repairs, it also involved extensive community outreach on what was being done and an accelerated completion schedule. The project got underway in May 2003 when INDOT and FHWA completely closed the impacted area for repairs to be done primarily by Walsh Construction Company. The $30 million project entailed rehabilitating 33 bridge decks and almost 35 lane miles of concrete pavement.

Thanks to that complete closure, Walsh Construction was able to work on the project 24/7 and even repair up to 20 bridge structures at the same time. The company was given 85 days to complete the work, and it did so in about 55 days. That earned Walsh Construction $3.6 million in incentives for the 30-day early finish.

The ahead-of-schedule completion also disproved skepticism that the work could be done that quickly and with such relatively little traffic disruption. The area – now also safer and considerably less congested because of new travel and merge lanes added there – was reopened for use on July 20, 2003.

New Tacoma Narrows Bridge

Washington State's Tacoma Narrows Bridge is yet another example of a design-build project. That project, launched in 2002, entails creating a new suspension bridge parallel to and south of the existing one. The new structure, in addition to enhancing safety at that location, is also being set up to help alleviate both current and anticipated congestion there. At present, approximately 85,000 to 90,000 vehicles travel through that region each day; that number is expected to jump to 120,000 in 2020.

The new bridge will have a separated path for pedestrians and bicyclists and also two general-purpose lanes and an HOV one for eastbound traffic. In addition, the project encompasses upgrading and retrofitting the existing bridge. That bridge will be reconfigured to provide two general-purpose lanes and an HOV lane for westbound traffic.

The project, which is the first public-private partnership of its kind in the history of Washington State, also involves improvements to 3.4 miles of State Route 16 from the Jackson Avenue interchange in Tacoma to a new one at 24th and 36th streets. To help recoup the costs for the entire project, estimated at $849 million, a toll will be added to the new bridge.

Washington Department of Transportation has contracted the project to Tacoma Narrows Constructors. The timeline for the project's completion is five-and-a-half years. The new

bridge is slated to open in 2007, and upgrades to the existing structure should be finished in 2008. At this writing, the total project is 76 percent completed.

Post-Katrina Restoration of I-10

We still remember vividly the huge amount of destruction that Hurricane Katrina left in its wake in 2005. An especially memorable media image from that time was that of the two shattered spans of the Interstate-10 bridge over Lake Pontchartrain near New Orleans.

Those spans were not just everyday damaged infrastructure; they constitute a vital transportation link between New Orleans and the city of Slidell. The fact that Hurricane Katrina had knocked the bridge out of service threatened to make a horrible situation even worse. A high priority was therefore given to repairing that part of the Interstate System as soon as possible.

Only 11 days after the storm had hit, Louisiana issued a request for competitive bids on the reconstruction project. Very little time elapsed before a $30.9 million contract was awarded to Boh Brothers Construction.

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Despite some considerable post-storm hardships of its own, the New Orleans-based Boh Brothers proceeded to take on the project and comply with the demands of the contract for it. The company would get $75,000 for each day prior to October 31 for completing the first span, and incur an equivalent penalty fee for each day after the deadline that the work remained undone.

Phase 1 of the project entailed taking still-intact concrete segments from the more damaged westbound span and moving them to the other one to make two-way traffic possible there as soon as possible. The inspiration for that concrete-moving plan, coincidentally, could be traced to what happened at another I-10 bridge the previous year. The engineering company Volkert Construction Services had taken similar action with undamaged pavement slabs on the Escambia Bay Bridge near Pensacola, Florida, in the aftermath of Hurricane Ivan.

Volkert Construction Services was also hired as a consultant for the Lake Pontchartrain project.

While that creative solution to what could have been a time-consuming process helped Boh Brothers move faster with the effort, Hurricane Rita became a potential setback. Despite the delay of about one week posed by that storm, Boh Brothers managed to beat the deadline for Phase 1 of the project by 16 days. The company consequently received a bonus of $1.1 million, which was the maximum amount allowed under the contract. The cost for that phase of the project came to around $31 million, which was approximately $20 million less than the state's original estimate.

Innovative contracting has grown rapidly as a viable option when a more constrained, prolonged, and cookie-cutter way of doing business hinders rather than helps how soon a project can be completed.

Phase 2 of the project, begun concurrently, involved shifting the remaining undamaged pavement slabs on the westbound span to one end of it. The rest of that structure was then repaired with prefabricated sections of hot-dipped galvanized steel. The two lanes of that span were reopened for traffic on December 30, eight days ahead of schedule.

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Conclusion

Innovative contracting is not a solution in every situation. But the examples above show what can be achieved when innovative contracting is applied to a project. Innovative contracting has grown rapidly as a viable option when a more constrained, prolonged, and cookie-cutter way of doing business hinders rather than helps how soon a project can be completed.

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Design-Build Critical to New Tollroad Financings

By Karen J. Hedlund

John Horsley demonstrates how important design-build contracting has been to accelerating the delivery of critical transportation projects. Design-build contracting has also proven to be an essential component of toll-based revenue bond financing of new stand-along tollroads. Without the guarantees that these contracts provide that a project will be finished by a date certain and within budget, the bond markets would likely rate these projects too risky to finance.

This was first proven true in connection with the financing in 1993 of the $1.1 billion San Joachin Hills Toll Road in Orange County, California, one of the earliest uses of design-build on a highway project. Early on the Orange County Transportation Corridor Agencies received indications from financial markets that their projects would be financeable as an entirety only if they could obtain fixed price design/build contracts with limited opportunities for cost increases.

The rating agency, Fitch, subsequently highlighted the design-build contract terms in its February 26, 1993 assessment of the credit worthiness of the San Joachin bonds. "The construction risks in a project of this scope are considerable," Fitch noted. "However, the design/build contract's liquidated damages and attendant builder's risk insurance policy should contain costs adequately and assure timely opening of the roadway."

Design-build in the form of "EPC" (engineer, procure and construct) contracts had previously been a key component of the project revenue financings of power and alternative energy projects in the 1980s. The San Joachin Hills transaction took the financial techniques developed in the energy project finance area and applied it to tollroads.

Since 1993, design-build contracts have been used to support toll revenue financings of Colorado's E-470, Orange County's Eastern Tollroad, SR-125 in San Diego, Virginia's Pocahontas Parkway and the $3.9 billion Central Texas Turnpike Project. As Mr. Horsley notes, numerous other tollroad projects are in the development stage in Texas, Virginia, Oregon, Georgia, Maryland, Minnesota and elsewhere.

In a project financing where there is no existing revenue stream, a portion of the bond proceeds are used to finance interest accrued during the estimated construction period. Following that date, the bondholders rely on toll revenues from the completed project to service the debt. As a result, bondholders want to have a high level of confidence that the project will be completed on time. The design-builder contractors can guarantee that the project will be completed by a date certain, a promise backed by substantial liquidated damages if they miss the deadline. Generally, the amount of liquidated damages is set to equal the interest that accrues after the Guaranteed Completion Date until the actual completion date. As an example, the liquidated damages under the San Joaquin contract were set at $225,000 per day for late completion.

Project financings are also based on projections of revenues that will be sufficient to pay the original amount of debt issued, plus a cushion. If additional debt is required to be issued as a result of unexpected cost increases, the bondholder's security is diluted. In a worst case situation, a tollroad owner might not be able to access the bond market for required additional funds, and the project might be left uncompleted, a disaster scenario for bond investors. Design-build contracts provide a high degree of certainty as to total cost. The contractor cannot seek a change order because of a need to redesign the project because the contractor is also responsible for the final design. (Claims of design defects are what frequently lead to cost over-runs in conventional design-bid-build contracts.)

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