CENTER FOR TRANSPORTATION RESEARCH
THE UNIVERSITY OF TEXAS AT AUSTIN

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Project 0-2129: *Innovative Project Delivery Methods Available for Immediate Implementation in TxDOT*
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PROJECT SUMMARY REPORT

Project Delivery Methods and Contracting Approaches Available for Implementation by TxDOT

What We Did...

As highways play an increasing role in the economic development of Texas, benefits can be achieved from techniques that improve the speed and effectiveness of construction delivery. While other public entities are utilizing alternative project delivery methods and contracting approaches with increasing frequency, current state law limits the Texas Department of Transportation (TxDOT) to the design-bid-build (DBB) project delivery method, and few innovative contracting approaches have been extensively used. The goal of this research was to identify the available project delivery methodologies and contracting approaches, evaluate their strengths and weaknesses, and determine when and where they should be applied. This research project included the development of a design-build (D-B) implementation guide because both TxDOT and the Texas legislature have shown an interest in the process as a result of proven success by the public building sector in Texas and other state departments of transportations (DOTs).

The objectives of this research investigation were to identify and determine the benefits of innovative project delivery methods and contracting approaches, evaluate and summarize the current legal climate in terms of choosing these strategies, develop draft procedures for implementing the methods that are currently available or under development for use, and prepare project documentation, including recommendations and guidelines as needed. For this research, a project delivery method equates to a procurement approach and defines the relationships, roles, and responsibilities of project team members and the sequence of activities required to complete a project. A contracting approach is a specific procedure used under the larger umbrella of a procurement method to target specific activities or objectives of a project.

The research team performed an extensive literature review and attended industry forums and conferences to determine current practices related to project delivery methods and contracting approaches. A legal and regulatory status review was performed to determine the permissible procurement tools for TxDOT. A series of interviews were conducted with experts from the construction industry, the legal community, and academia to assess the current status and availability of delivery methods and contracting approaches, with particular attention to D-B.

What We Found...

Traditional Project Procurement Methods

The traditional project delivery method for highway construction projects in Texas and throughout the United States has been DBB. This method separates design and construction by both sequence and contract. Using this method, state DOTs normally contract with design and engineering firms, and once the designs and specifications are completed, the project is ready for bid solicitation and construction is awarded to the qualified bidder with the lowest price. Because the steps are followed sequentially, firm costs can usually be established and the design and contractor selection is simplified.

TxDOT is legally limited to DBB and competitive bidding is required for highway improvement contracts, an approach originally intended to protect public funds from graft and favoritism. In addition to the legal requirements for DBB, federal-aid regulations and the Texas Transportation Code require engineering and design service contracts to be awarded on the basis of qualifications. This approach intends to address public safety issues and protect the quality of these critically important services, as well as the independence of the designers. The conflict between qualification-based selection procedures for engineers and the sealed bid selection for constructors is a major factor influencing why procurement methods other than DBB are illegal under state procurement and licensing statutes.

The Texas legislature controls the ability of TxDOT to deploy project delivery methods by any other means than the traditional DBB system. Recently interest to accelerate project procurement has focused on D-B, with unsuccessful attempts made in the past two

legislative sessions to grant TxDOT D-B authority. Looking past the exclusive use of DBB has given reasons to investigate procurement innovations.

Although a proliferation of construction project delivery methods and contracting approaches exist, there is considerable confusion about their application and use. Clarification of their differences is critical to understanding how they can best be utilized to enhance the procurement process and leverage in-house expertise and project funding.

Innovative Project Delivery Methods And Contracting Approaches

Innovative project delivery methods such as D-B and CM-at-risk can improve cycle-time performance on both public and private projects, and their use has steadily increased in all construction sectors over the past two decades. Acceptance of innovative project delivery methods for highway projects in the United States has also gained momentum in the past few years and D-B, which is the most widely used method, has been implemented in twenty-four states. In Texas, alternative delivery methods have been legislatively authorized for school districts and institutions of higher education for buildings and facilities, and this authority has recently been extended to the Texas General Service Commission, as well as cities and counties. The Texas Turnpike Authority also has a broader range of procurement methods available through the use of exclusive development agreements.

A matrix of the most relevant project delivery methods for highway projects and their various attributes was developed and is available on the web at www.utexas.edu/depts/ctr/2129.pdf . The matrix allows for a simplified cross-comparison of the pros and cons of each method, responsibilities of the parties involved, general assumptions concerning which projects each is best and least suited for, and generalizations on how each method impacts quality, schedule, cost-control, and legal liability.

In recent years, state DOTs have increasingly used contracting strategies to supplement project delivery methods for added long-term benefits and contracting approaches such as constructability reviews, incentives/disincentives, performance-related specification, transfer of quality control, and warranties are available regardless of the project delivery method used. On a limited basis, TxDOT has combined contracting approaches such as A + B contracting, partnering, and lane rental with DBB.

The Transportation Research Board (TRB), the Federal Highway Administration, and American Association of State Highway and Transportation Officials have all begun to explore the benefits of innovative contracting delivery methods and contracting approaches as ways to optimize and improve project quality and effectiveness. TxDOT should build upon the work of TRB's National Cooperative Highway Research Program and others to develop comprehensive guidelines for implementing non-traditional contracting approaches for highway construction.

The Researchers Recommend...

D-B has been used successfully for many years on building construction projects and has been increasingly tested and adapted by various state DOTs as a viable alternative to DBB. D-B has the potential to benefit TxDOT as an alternative form of delivering highway construction projects and a supplement to DBB. For TxDOT to gain the benefits of D-B, it needs to understand, assess, and allocate the associated risks as well as determine a process to implement the methodology.

Based on the literature review and interviews conducted for this research, the primary reason D-B contracting is selected by public and private owners is to shorten the duration on specific projects by melding the design and construction processes. Quality, cost-effectiveness, and a single point of responsibility are also cited as reasons to pursue D-B. Furthermore, D-B can allow owners to better establish cost and schedule, promote innovation, reduce claims, and foster a team approach that encourages communication. Early collaboration on projects between designers and contractors usually enhances their relationship and often results in change orders avoidance because the process encourages the contractor to point out problems in the design or constructability issues early in the bidding process. Many of the state DOTs deploying D-B use a two-step best value selection process (Figure 1) that gives consideration to qualifications and price.

However, D-B can limit competition during the bidding process. With D-B, an owner puts the project out to bid and design-builders may be reluctant to develop proposals without the benefit of complete plans. Comparison of projects proposals can be difficult because each of the proposers is responding to limited guidance and final solutions can vary widely. Problems also arise when an owner has an ill-prepared project and equally ill-defined D-B selection criteria.

Although TxDOT and the Texas legislature have shown interest in using D-B for highway construction, it is legally unavailable at present, as are any delivery methods other than DBB. In anticipation that D-B is made legally available for highway construction, example guidelines, procedures, and process maps were provided in the accompanying guidebook to assist TxDOT in the transition to achieve proficiency with D-B, and in summary TxDOT must:

1. Develop D-B process guidelines and a delivery process (planning, scope, RFP, selection, management, etc.). D-B is a unique, distinct project delivery method and the associated guidance documents need to be developed specifically for this procurement method.
2. Assess the availability of the skills required for the use of D-B in the organization. Experience with D-B contracting enhances the chances for success and limits the risk to the parties involved. If TxDOT lacks the necessary skills and experience to undertake D-B, consideration should be given to obtaining professional services from experienced firms.
3. Train selected members of the organization in the use of the D-B project delivery system. D-B contracting requires a different skill set than administrating traditional

DBB contracts for highway construction.

4. Optimize communication among the parties involved within TxDOT. D-B projects require more coordination at the onset of the project-planning phase and will require TxDOT Divisions to integrate and coordinate on a grander scale than currently exists.
5. Optimize the pre-project planning process. TxDOT must develop the skills to create a detailed scope package for D-B and develop reasonable submission requirements.
6. Select pilot D-B projects that have a relatively certain scope and contain well-known processes and technologies. TxDOT should select projects with which it has adequate experience for the initial phase of the pilot program.
7. Ensure selection of qualified D-B contractors. A balanced evaluation process should be used to determine final competitors that have adequate experience and financial resources.
8. Develop succinct criteria specifications. Project requirements in the RFP should be in performance terms rather than prescriptive.
9. Develop a systematic way to evaluate project results to determine if existing D-B procedures and approval processes are adequate, and respond to legislative requirements.

Determining when it is appropriate to use D-B, and on what type of projects, are critical steps in gaining the advantages that the process can provide. In general, projects in which speed is desirable to reduce the impact to the traveling public, or when innovation is desired from the design team, are often good candidates for D-B.

Senate Bill 298 proposed D-B authorization for TxDOT in 2001. Non-passage of D-B authority during the 77th Texas legislative session can be viewed as an opportunity for TxDOT to identify the limitations of DBB, analyze other project delivery and contracting approaches, and gain the required knowledge, skills, etc., needed to successfully implement D-B. In anticipation that D-B authorization will be reconsidered during the 2003 legislative session, TxDOT should pursue the knowledge needed to develop a comprehensive approach of incorporating project delivery methods and contracting approaches to improve highway acquisition and maximize public resources.

The following recommendations are to assist TxDOT in identifying the factors that can inhibit efforts to improve project quality, cost, and schedule.

- Alternative project delivery methods require different skills than administrating traditional DBB contracts for highway construction. TxDOT employees involved with innovative project delivery methods and contracting approaches need adequate training to understand and perform these duties.
- Implementing innovative project delivery methods and contracting approaches are process changes that require a commitment from staff and senior management.
- The sharing of risk is a critical element when selecting project delivery methods. TxDOT should undertake a risk assessment appropriate to a project's size and complexity, and risks should be assigned to those best suited to undertake them.
- When the D-B project delivery method is used, overall project delivery time can be reduced. However, overall staff time commitments typically remain nearly the same as those for traditional projects.
- Caution and care should be taken in selecting the projects for the initial phase of the D-B pilot program. Although D-B can be used on all types of highway-related construction, TxDOT should select projects that it has considerable experience and knowledge about for the initial phase of the pilot program.
- TxDOT should develop a systematic method for capturing project performance data that can be used to monitor the impacts on implemented changes and respond to legislative reporting requirements.

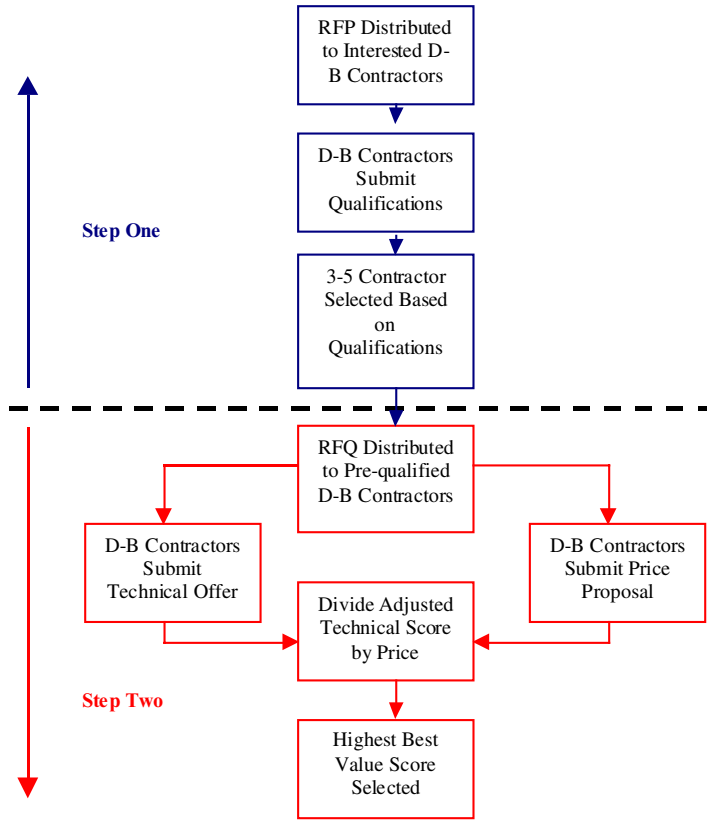

Figure 1: Example Design-Build Two-Step Best Value Selection Process (adapted from Molenaar and Gransberg, 2001)

For More Details...

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The research is documented in the following reports:

2129-1 *Project Delivery Methods and Contracting Approaches Available for Implementation by the Texas Department of Transportation* October 2001

To obtain copies of a report: CTR Library, Center for Transportation Research,
(512) 232-3138, email: ctrlib@uts.cc.utexas.edu

TxDOT Implementation Status November 2003

The full research report for this project was completed in 2001. The report provides a brief overview of the project delivery processes and assesses the benefits of their use and compliance with current laws. The report is available by contacting TxDOT's Research and Technology Implementation Office. It can also be obtained electronically through the University of Texas' Center for Transportation Research Library at: www.utexas.edu/research/ctr/pdf_reports/2129_1.pdf

For more information, please contact Andrew Griffith, P.E., Research and Technology Implementation Office (512) 465-7908 or email at agriffi@dot.state.tx.us.

Your Involvement Is Welcome!

Disclaimer

This research was performed in cooperation with the Texas Department of Transportation and the U. S. Department of Transportation, Federal Highway Administration. The contents of this report reflect the views of the authors, who are responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official view or policies of the FHWA or TxDOT. This report does not constitute a standard, specification, or regulation, nor is it intended for construction, bidding, or permit purposes. Trade names were used solely for information and not for product endorsement. The engineer in charge was G. Edward Gibson, Jr., P.E. (Texas No. 72760).

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