



Project Summary

Texas Department of Transportation

0-6011: Evaluations of Ways and Procedures to Reduce Construction Costs and Increase Competition

Background

In recent years, a number of state transportation agencies including the Texas Department of Transportation (TxDOT) have experienced steadily increasing construction costs. While some of this increase can be attributed to soaring costs of fuel and other construction materials, large variations in the costs of bid items for different projects and among different districts indicate that the problem is complex. Hence, the purpose of this research was to investigate these factors and identify methods that can reduce or contain construction costs without jeopardizing quality.

More specifically, the goal of this research was to develop a set of guidelines to help TxDOT reduce the costs of construction and control cost increases. In context of this larger goal, the research objectives were:

- identification of the factors affecting cost increases of bid items and methods that can help reduce the costs,
- qualitative assessment of the performance of the identified methods, and
- development of comprehensive guidelines on how to modify projects to reduce initial construction costs while maintaining equal or better performance.

What the Researchers Did

The figure on page 2 illustrates the research framework adopted in this project. Literature review, interviews with engineers, and fact-finding workshops revealed a number of factors affecting the increase in construction costs and methods to address them. While some of these factors can potentially be controlled by TxDOT through implementation of appropriate cost-reduction methods, the effects of other, less controllable, factors can only be mitigated. This research identified both internal and external factors influencing increases in construction costs and proposed methods that can potentially reduce their effects.

Delphi analysis assessed potential impacts of the identified methods on adopted performance indicators such as cost-reduction potential, schedule, quality, and safety. Methods were classified based on criteria that identified each method as project-specific or focused on changes in administrative policies of the department – that is, program-wide. While the Delphi study discussed and considered both project-specific and program-wide methods, the method application guidelines focused on project-specific methods that do not require changes in department policies.

Research Performed by:

Texas Transportation Institute (TTI),
The Texas A&M University System

Research Supervisor:

Ivan Damjanovic, TTI

Researchers:

Stuart Anderson, TTI
Devanshu Pandit, TTI
Kenneth Reinschmidt, TTI
Andrew Wimsatt, TTI

Project Completed:

1-31-08

What They Found

Results from qualitative assessment of the methods' performance showed that cost-reduction methods that occur in early phases of project development are perceived to be more effective in reducing or containing construction costs, a finding consistent with the behavior of theoretical cost-influencing curves. A total of 56 cost-reduction methods are identified in this research, with 21 methods having applicability at the program level. For these

program-wide methods to be implemented, TxDOT would need to make policy changes at the program level. The top five methods, ranked by the experienced engineers, in the program-wide category are:

1. standardization of designs and provision of more design repetitions,
2. education and training of designers, consultants, and contractors,
3. evaluation and easing of restrictions on imported materials,
4. creation of material sources by TxDOT, and
5. evaluation of local market conditions for availability of resources to effectively plan construction lettings.

On the other hand, 35 methods have potential to reduce construction costs on a project-specific level. In other words, TxDOT can implement these methods without any policy change as the project moves from one phase of project development to the next. The top five ranked methods in this category are:

1. taking time to develop sound designs using appropriate design criteria and technical information,
2. collecting and incorporating pavement evaluation and geotechnical and utility data in designs,
3. providing an option to use alternative materials in specifications,
4. coordinating lettings based on the availability and capacity of contractors in the region, and
5. better defining and optimizing the project scope initially, along with controlling scope creep by accountable authority.

What This Means

The research team has found that some cost-increase factors can be addressed using cost-reduction methods. In selecting such methods it is important to consider cost-saving potential versus impacts on performance measures including schedule, quality, and safety. To maximize their effects, these methods should be applied systematically from very early stages of project development to post-letting.

For More Information:

Research Engineer - German Claros, TxDOT, 512-465-7403
Project Director - Duane Schwarz, TxDOT, 254-867-2770
Research Supervisor - Ivan Damjanovic, TTI, 979-862-6616

Technical reports when published are available at:
<http://library.ctr.utexas.edu/index.html>

www.txdot.gov
keyword: research

This research was performed in cooperation with the Texas Department of Transportation and the 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.

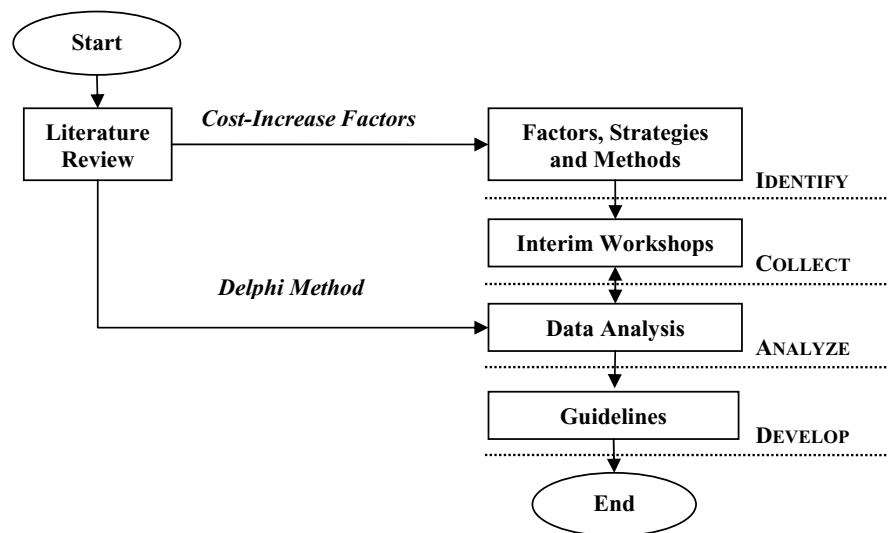


Figure. Research Framework

