



Project Summary

Texas Department of Transportation

0-4997: Effectiveness of Combined Utility Relocation/Highway Construction Projects

Background

With highway projects frequently located in congested, interference-prone environments, timely utility adjustments are more critical than ever. The aim of this research was to investigate the effective implementation of a utility adjustment approach that puts utility adjustment work into the highway contractor's project scope, theoretically reducing many of its associated challenges and risks. This approach, referred to in this research as the Combined Transportation and Utility Construction (CTUC) approach, has been used sporadically by the Texas Department of Transportation (TxDOT) for more than fifteen years.

What the Researchers Did

The key components of this research were to document CTUC advantage-disadvantage trade-offs, better understand the project circumstances in which the benefits of the CTUC approach can be leveraged, and gain insight into how utility owners' CTUC-related concerns can be most effectively addressed. To accomplish the research goal, a decision support model was designed that could represent the various opinions of experts from both TxDOT and the utility industry, and the CTUC Decision Support Tool (CTUC DST) was developed to help both parties select the best contracting approach for a given utility adjustment. Researchers:

- Identified TxDOT and non-TxDOT agents' sources of information or past experience with the CTUC approach, including major Texas utility authorities and companies.
- Conducted interviews with TxDOT and utility personnel and characterized CTUC implementation successes, best practices, limitations, implementation challenges, lessons learned, circumstances for leveraging benefits, utility companies' barriers (both real and perceived) to CTUC participation, and both parties' ideas on coordinated solutions.
- Designed a process model governing implementation of the CTUC approach, based on the TxDOT San Antonio District Coordination Process, the TxDOT Utility Manual, and the work product of TxDOT Research Project 0-4617.
- Designed a CTUC decision support model that could contain decision drivers representing relevant issues in CTUC decision making and provide the knowledge base to store the opinions of both parties' experts. The CTUC decision drivers assessment form was then developed and served as a data gathering tool for collecting experts' opinions.

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- Conducted 6 CTUC decision drivers assessment workshops with 28 experts from TxDOT's San Antonio, Houston, and Dallas districts, and 24 experts from the utility industry. The assessment results were then analyzed, documented, and incorporated into the CTUC knowledge base.
- Constructed a CTUC DST that provided an interactive decision support environment so that not only TxDOT decision makers but also utility representatives could easily enter data related to their utility adjustments. The CTUC DST was constructed to isolate significant issues pertaining to the given utility adjustment and display the corresponding opinions from both TxDOT and utility experts in order to facilitate communication and coordination between both parties.
- Demonstrated the CTUC DST to selected TxDOT districts and to several utility companies.

What They Found

There are two major categories of findings in this research: CTUC benefits and challenges, and TxDOT and utility experts' rankings of CTUC decision drivers by impact level. Identification of CTUC decision drivers was the key to building the CTUC DST. Briefly, a CTUC decision driver expresses a unique utility adjustment circumstance requiring either the conventional or the CTUC approach. In other words, CTUC decision drivers are causal factors that trigger the use of either approach on a given utility adjustment. The results of the CTUC decision drivers assessment formed the knowledge base embedded in the CTUC DST.

What This Means

From the information gathered during the researching of the CTUC approach and the demonstration of the CTUC DST, the following recommendations may be made to TxDOT:

- The use of the CTUC DST is recommended for every utility adjustment involved in TxDOT's projects to ensure that the appropriate contracting technique is consistently selected.
- TxDOT can use the CTUC benefits identified in this research to promote the CTUC approach to hesitant utility owners. By leveraging the CTUC benefits, and addressing the identified CTUC challenges, TxDOT will increase utility interest and participation in the CTUC approach.
- Developing a centralized knowledge base is recommended to continuously collect both TxDOT and utility experts' opinions on the CTUC approach. In addition, implementing a web-based, lessons-learned system to educate and further enable the sharing of information between the more experienced districts and the less experienced ones can help TxDOT realize the full benefits of the CTUC approach.

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