

PROJECT SUMMARY REPORT

0-7182: Determine Effectiveness of Construction Management Plans (CMPs)

Background

Highway construction projects require proactive project management strategies to ensure successful delivery. At letting, projects can have clear or unclear certifications. To be considered a clear project, all certifications must be clear before letting. These include certifications for the project conflicts related to right-of-way (ROW) acquisition, ROW encroachments, ROW relocation, utility (UTL) conflicts, state-owned utility conflicts, railroad agreements, and/or environmental conflicts. Although all conflicts are expected to be cleared before letting, TxDOT considers projects “sufficiently cleared” if construction can begin without delay with remaining conflicts expected to be fully resolved within three months after letting.

A Construction Management Plan (CMP) must be completed for every project with unclear certification(s) that will be cleared after letting to ensure compliance with 23 CFR §635.309. TxDOT introduced CMPs in Fiscal Year 2019. In such projects, the responsible district must submit a CMP that outlines specific information and provides a schedule for clearing conflicts. The CMP allows construction to proceed while unresolved issues are concurrently addressed under a structured plan.

Now that CMPs have been in use for several years, this study aims to evaluate their effectiveness by examining their impact on highway construction project performance, particularly with respect to change orders, cost increases, and schedule delays related to conflict clearance. Additionally, the study seeks to provide practical recommendations to improve the consistency, implementation, and overall effectiveness of CMPs across TxDOT districts.

What the Researchers Did

The research team conducted a comprehensive analysis of CMPs by collecting and analyzing data from TxDOT highway projects. These included CMP documents, conflict clearance records, and change orders, as well as project cost and schedule information.

The study began with a detailed review of CMP content and structure to identify standardized elements and key characteristics of CMP projects, including conflict categorization and quantification. Using the compiled data, the team analyzed trends in change orders before and after CMP implementation to assess their impact on project performance, particularly in terms of cost increases and time adjustments from change orders. Advanced statistical methods were then applied to examine correlations between CMP-related variables and change orders, along with other factors influencing project performance. Based on these findings, the research team developed practical, data-driven recommendations to enhance the preparation, review, and use of CMPs as a proactive tool for conflict clearance management.

What They Found

The researchers found that CMPs were predominantly applied to larger and more complex highway projects, which typically involve multiple unclear certifications. Consequently, CMP projects exhibited significantly higher average contract values and longer construction durations compared to non-CMP projects. From 09/01/2018 to 09/30/2024, the average amount of CMP contracts was \$70.8 million, while the

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maximum exceeded \$600 million. By contrast, the average contract amount of non-CMP projects was just \$6.3 million. Although CMP projects were few, they accounted for 38% of the statewide construction amount in this period.

CMPs were considered effective since the number and impact of CMP-related change orders were low, and also because both the number of change orders and the project cost variation rate due to changes orders was calculated as the total change order amount divided by the total contract amount for all projects in each period. Projects completed before TxDOT introduced CMPs (i.e. projects let from 01/01/2010 to 08/31/2018) had project cost variation of 5.13% due to change orders. The cost variation on completed projects let after CMP implementation (i.e. projects let from 09/01/2018 to 09/30/2024) was 2.70%.

Among conflict types, utility conflicts were the most frequent and had the greatest overall impact, accounting for the highest number of conflicts, as well as the most frequent cost and schedule adjustments due to change orders.

CMP projects exhibited correlations between conflict clearance delays and change orders. These indicated opportunities for improvement and the need for more proactive conflict clearance management on CMP projects.

Correlations were identified between ROW certification clearance and both schedule delays and change order number, highlighting the procedural challenges associated with right-of-way acquisitions. Similarly, a moderate correlation was found between railroad certification clearance and cost growth due to change orders, emphasizing the impact of coordination delays in these areas.

What This Means

The findings from this research confirm that CMPs function as an effective and valuable strategic management tool for managing conflict clearance. CMPs have proven particularly beneficial in the delivery of larger and more complex TxDOT projects. Importantly, the use of CMPs did not lead to an increase in the relative number or cost of change orders. Statistically significant correlations between certification clearance delays and key project performance metrics demonstrated the need for proactive certification management.

This research also enhances the understanding of frequently occurring conflict types and the underlying causes of change orders related to unclear certifications. It highlights the potential for expedited project delivery and cost savings opportunities through early identification and resolution of conflicts during the planning phase, as well as the importance of proactive certification clearance management during execution.

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