DRISI

CALTRANS DIVISION OF RESEARCH, INNOVATION AND SYSTEM INFORMATION

TRANSFORMING IDEAS INTO SOLUTIONS

Research Notes

Performance Review and Improvement Metrics for Evaluating Project Delivery Methods

Construction Manager General Contractor (CMGC) delivery methods.

Design

May 2025

Project Title: Performance Review and Improvement Metrics for Evaluating Project Delivery Methods

Task Number: 4439

Start Date: July 1, 2025

Completion Date: June 30, 2028

Task Manager:
Akber Ali
Transportation Engineer (Civil)
akber.ali@dot.ca.gov

WHAT IS THE NEED?

Caltrans is conducting this research to address the growing need for more effective project delivery methods that can improve the performance of infrastructure projects. The traditional Design-Bid-Build (DBB) method, though widely used, has several limitations, particularly in managing complex projects. Issues such as increased change orders, cost overruns, and project delays have made it necessary to explore alternative delivery methods, such as Construction Manager/General Contractor (CM/GC). CM/GC offers significant advantages, including early contractor involvement, improved constructability, and potential for cost and time savings.

Current literature compares project delivery methods like DBB and CM/GC using cost, time, quality, risk, and flexibility metrics. However, comprehensive comparisons are hindered by inconsistent data and a lack of longitudinal studies (utilizing historical data and continuous performance evaluation of a project over time) on long-term performance and sustainability. There is a need for standardized performance benchmarks and holistic evaluation frameworks that integrate multiple dimensions (cost, time, quality, risk, sustainability) and advanced decision support systems tailored to project-specific criteria. Such comparisons are particularly challenging as counterfactuals remain unavailable.

WHAT ARE WE DOING?

We are developing a comprehensive performance assessment framework for Caltrans to evaluate and forecast the effectiveness of alternative delivery methods (ADMs) such as Construction Manager/General Contractor (CM/GC) in comparison to the traditional Design-Bid-Build (DBB) method. Our research involves analyzing historical data from Caltrans

Caltrans

DRISI provides solutions and knowledge that improves California's transportation system.

projects to identify key performance metrics, including cost, time, quality, risk, and sustainability. These metrics will be used to assess the long-term benefits and challenges associated with CM/GC and DBB methods. Additionally, qualitative insights from stakeholder interviews will be integrated with the quantitative data to provide a holistic view of project performance.

The project will also incorporate cutting-edge Artificial Intelligence (AI) techniques, such as generative AI models, to predict future project outcomes. These models will leverage historical data and stakeholder feedback to forecast project performance in terms of cost savings, timeliness, and quality improvements. By developing an AI-based framework, we aim to provide Caltrans with a robust decision-support tool that will optimize the use of ADMs, leading to better project planning and execution in the future.

WHAT IS OUR GOAL?

We will develop a comprehensive performance assessment framework and an accompanying tool for Caltrans' ADM projects, specifically using CM/GC method. This tool will enable the reporting and predicting actual project performance against expected benefits, such as cost savings, cost increase avoidance, and timeliness.

WHAT IS THE BENEFIT?

The primary benefit of this research is the development of a reliable, data-driven framework that will enable Caltrans to make informed decisions on the most effective project delivery methods, leading to improved infrastructure performance. By utilizing advanced AI models and integrating both quantitative and qualitative data, the framework will allow for accurate forecasting of project outcomes, including cost savings, time efficiency, and quality improvements. This will enable Caltrans to optimize project delivery strategies, reduce risks, and avoid costly delays or overruns.

In the long term, this research will help establish standardized performance benchmarks for evaluating delivery methods, providing Caltrans with the tools to continually assess and improve the effectiveness of its projects. Ultimately, this will result in more efficient use of resources, better project outcomes, and enhanced infrastructure resilience across the state.

WHAT IS THE PROGRESS TO DATE?

Pending contract execution.