

## Project Information

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## Research Administration

### Principal Investigators

Keith Molenaar, Professor

Cristina Torres-Machi, Asst. Professor

University of Colorado Boulder

428 UCB

Boulder, CO 80309

[Keith.Molenaar@colorado.edu](mailto:Keith.Molenaar@colorado.edu)

[Cristina.TorresMachi@colorado.edu](mailto:Cristina.TorresMachi@colorado.edu)

Phone: 303-492-5071

## Steering Committee

### Members:

Chris Gaskins, Chairman

Judy Hundley

Claude Ipock

Ben McKinney

Jae Mattox

Brad Reynolds

Terry Swygert

Barbara Wessinger

Merrill Zwanka

Thaddeus Kitowicz, FHWA

## Please contact us for additional information:

Research Unit

803-737-1969 | [HeapsMW@scdot.org](mailto:HeapsMW@scdot.org)

SCDOT Research Website:

<http://www.scdot.scltap.org/>

This final report is available online at:

<http://www.scdot.scltap.org/projects/completed/>

## Efficiency Study of Design-Build Program

This report summarizes a two-year study of the SCDOT Design-Build Program. The research examined design-build project selection, cost estimating procedures and overall project performance. The study benchmarked the SCDOT Design-Build Program against other state DOT programs through interviews, past project data collection and case studies. The research team concluded that SCDOT, which has been performing design-build projects for 20 years, has one of the more mature programs in the country. SCDOT is following best practices in project selection and working closely with FHWA to standardize procedures at the national level. SCDOT design-build projects are performing as well as, or better than, comparable SCDOT design-bid-build and national design-build projects across all performance metrics in this study with the exception of schedule growth.



Design-build combines the design and construction of a project in one agreement. In 2002, the FHWA published the Design-Build Contracting rule under 23 CFR 636, which moved design-build from experimental to full authorization for state use. SCDOT has used design-build since the 1990s and has awarded over 40 projects. This history provides an opportunity to examine program performance and suggest improvements.

The objective of this research is to evaluate the effectiveness of SCDOT's design-build program, review project selection processes, identify best practices, identify cost estimating procedures, and develop future effectiveness measuring processes.

## Research

To achieve this overall objective, the University of Colorado Boulder addressed the following sub-objectives:

- Identified effective design-build tools/processes/best practices along with how and when they are incorporated into the design-build procurement process.
- Identified and suggested improvements to SCDOT's cost estimating process.
- Evaluated SCDOT's project selection process that determines if design-build is the most appropriate method for delivery of a project.
- Developed a performance measurement process for SCDOT to evaluate the effectiveness of design-build projects upon completion.

The outcome of this research is an analysis and benchmarking of SCDOT's design-build program performance and a documentation lessons learned.



## Results

The following is a summary of this study's findings, which are described in detail within the full research report. SCDOT has been a leader in design-build project delivery since the mid-1990s. It is one of the most mature programs in the country.

When benchmarked against average project performance in a recent FHWA national study and internal SCDOT design-bid-build projects, the research team found that the SCDOT projects outperformed these projects in all but one performance metric.

- **Award Growth** is a measure of estimating accuracy. On average, SCDOT design-build projects outperformed SCDOT design-bid-build projects in the average award growth. SCDOT follows the national trend of having a negative average award growth for design-bid-build projects. This means that the engineer's estimate is higher than the award amount, implying a conservative practice in cost estimating.
- **Cost Growth** is a measure contract cost increase. SCDOT design-build projects experience lower cost growth from award to project completion when compared to both SCDOT design-bid-build projects and national design-build projects.
- **Schedule Growth** is a measure of contract schedule increase. SCDOT

schedule growth is higher than desirable. Schedule growth is the one metric where SCDOT design-build projects are not performing as well as the national average. Average schedule growth for SCDOT design-build projects is high for both best-value (33%) and low-bid (17%). This is at least double the national average for design-build projects. However, SCDOT design-build projects are performing better than their design-bid-build counterparts. The average schedule growth for the design-bid-build sample is 29% and the average of best-value and low bid design-build projects is 24%. Design-bid-build projects are performing better than design-build best-value projects but not design-build low bid projects.

- **Intensity** is a measure of the rate of work put in place over time. SCDOT project intensity performance is relatively similar to national design-build projects and SCDOT design-bid-build projects. On average, SCDOT's project intensity is lower than national practice for design-build/best-value and higher for design-build/low bid. Conversely, when compared to SCDOT's design-bid-build average project intensity, it is higher for design-build/best-value and lower for design-build/low bid.

Through this research, SCDOT has benchmarked its practices against national practices in the areas of information exchange with design-builders, requests for qualification processes, best-value procurement approaches, risk allocation, quality assurance, design-management issues, levels of bonding and insurance, construction engineering inspection and project management resource allocation. SCDOT is performing at a high level of efficiency in these areas.

- SCDOT is following best practices in project selection and working closely with FHWA on standardizing the procedures at the national level.
- SCDOT is leading best practices for documenting and applying alternative technical concepts (ATCs).

While the research study provided an opportunity to thoroughly evaluate the design-build program performance, the research team recommends the following areas for further study to continuously improve the program.

- Strive to more closely tie the stated project goals to the evaluation criteria in best-value procurements and carefully examine the weighting between cost and non-cost selection criteria on each project.
- Move towards an Oversight Quality Assurance Organization model where SCDOT's role is to ensure that both the designer and contractor QA plans are effective at meeting the agency's quality requirements (stipulated in the contract) and that the plans are being implemented.
- Continuing to improve its risk-based cost estimating approach will likely yield more accurate cost estimates.

## Value & Benefit

This research study has verified that SCDOT's performance is equal to, or better than, SCDOT design-bid-build and national design-build projects in all areas except for schedule growth. The use of design-build on appropriate projects will continue to deliver value to the traveling public. The recommendations for cost estimating, risk analysis, best-value selection and quality assurance approaches have the potential to further improve the process. Additional investigation is needed concerning the causes of schedule growth and how it can be mitigated.

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