

Challenges and Opportunities for Expediting Delivery of Design-Build Projects

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Overview

- Introduction to Design-Build
- History of Design-Build in Transportation
- Problem Statement
- Research Objectives
- Research Methodology
- Summary of Research Findings

Introduction to Design-Build

■ Overview of Design-Build

- Design-Build is a Project Delivery System under which one entity, the Design-Build Team, is contractually responsible for both design and construction phases of the project (FHWA 2011)
- Design-Build provides the Design-Build Team with increased flexibility to be innovative, along with greater responsibility and risk
- Design-Build vs. Design-Bid-Build (EDC 2012)

Design-Bid-Build

Preliminary Design

Final Design

Bid

Construction

Design-Build

Preliminary Design

Procurement

Final Design

Construction

History of Design-Build in Transportation

- FHWA established the Special Experimental Project Number 14 (SEP-14) in 1990 (FHWA 2006)
 - Between 1990 and 2002 about 300 projects representing \$14 billion were proposed for Design-Build in 32 States, the District of Columbia, and the Virgin Islands
- In 1998, the Transportation Equity Act for the 21st Century (TEA-21) became the new authorization legislation for Design-Build (FHWA 2006)
 - Design-Build Contracting: Final Rule was published in the Federal Register in 2002 and became effective in 2003

History of Design-Build in Transportation (Cont'd)

- In 2012, the Moving Ahead for Progress in the 21st Century Act (MAP-21) was signed into law by President Obama.
 - MAP-21 has specific focus on accelerated project delivery. More specifically, Title I (C) of Division A, is dedicated to accelerated project delivery in federal-aid highway programs:
 - ♦ *“(A)...to accelerate project delivery and reduce costs*
 - ♦ *“(B)...to ensure that the planning, design, engineering, construction, and financing of transportation projects is done in an efficient and effective manner”* (H. R. 4348—123, Division A, Title I, Subtitle C, 2012)

Problem Statement

- **Challenges to Efficient Project Delivery**
 - Although design-build enables fast-tracking and overlapping project phases, still there is a need to expedite delivery of design-build projects and achieve higher level of efficiency
 - Projects take long to complete for the following reasons:
 - ♦ Several major project steps require actions, approvals or input from a number of federal, state, and other stakeholders
 - ♦ Lack of resources and professional workforce in the public sector to finalize flawless design on schedule (AASHTO 2005)
- **The major problem is to identify and understand critical barriers and bottlenecks in the Design-Build project development process**

Research Objectives

- The overall objectives of this research project are two-fold:
 1. Identify challenges in critical areas of the project development process and propose opportunities for efficiency enhancement and document solutions in each critical area
 2. Develop a best-practices guidebook to expedite delivery of design-build projects and enhance efficiency of the Georgia DOT in utilizing resources for delivery of design-build projects

Research Methodology

- **Following tasks were done to achieve the objectives:**
 - Conduct a comprehensive literature review regarding the Design-Build Project Delivery System
 - Review the current practice of Design-Build Project Delivery System in State DOTs across the U.S.
 - Scan and interview Design-Build programs in 7 State DOTs
 - Perform content analysis of design-build solicitation documents (RFQs/RFPs), interim reports, and project reports
 - Identify challenges and opportunities to enhance efficiency of the state DOT in delivery of design-build projects in seven critical areas
 - Perform follow-up interviews with Design-Build programs in 7 State DOTs
 - Conduct a training workshop in collaboration with the Georgia DOT to facilitate adoption of Design-Build contracting in the State of Georgia

Summary of Research Findings

- Challenges and opportunities are identified in the following critical areas of the project development process:
 - Design-Build Project Selection
 - Procurement Process
 - Environmental Analysis and Permitting
 - Right-of-Way Acquisition
 - Utilities Coordination and Relocation
 - Alternative Technical Concepts (ATCs)
 - Design Acceptance and Oversight and Quality Management

Design-Build Project Selection

	State DOT	Colorado	Florida	Michigan	North Carolina	Utah	Virginia	Washington State
Challenges	Complexity of influential factors in Design-Build decision-making	Hi	LOW	LOW	-	MID	-	MID
	Presence of subjective opinion in decision-making	Hi	LOW	MID	-	MID	-	MID
	Shortage of resources and experienced staff	Hi	HI	HI	-	MID	-	NO
	Challenges in risk allocation (mitigating, sharing, or transferring risk)	Hi	HI	HI	-	HI	-	MID
Opportunities	Develop, maintain, use, and update a systematic design-build selection tool	REG	N/A	N/A	-	N/A	-	N/A
	Develop, maintain, use, and refine a proper risk identification and assessment tool	REG	REG	N/A	-	REG	-	REG
	Develop, maintain, use, and refine proper risk allocation matrices	REG	REG	N/A	-	REG	-	REG
	Incorporate flexibility in the preliminary design package	N/A	REG	REG	-	N/A	-	REG

HI = High
 LOW = Low
 MID = Medium
 N/A = Not Applicable
 NO = Never used/experinced
 REG = Regularly Used

Procurement Process

	State DOT	Colorado	Florida	Michigan	North Carolina	Utah	Virginia	Washington State
Challenges	Determining the basis of award (price-based or price and non-price based)	LOW	MID	-	-	-	LOW	LOW
	Evaluate added-value of best-value proposals	LOW	MID	-	-	-	LOW	MID
	Determining the selection process (single-phase or two-phase selection)	HI	NO	-	-	-	HI	HI
	Perform rigorous evaluation of procurement methods available for the state DOT	HI	MID	-	-	-	HI	HI
	Avoiding the use of prescriptive specification in the project RFP	N/A	N/A	-	-	-	N/A	N/A
Opportunities	Balance the need between innovation and competitive bidding	REG	REG	-	-	-	REG	NO
	Consideration of price and non-price factors in proposals evaluation	REG	REG	-	-	-	REG	NO
	Balance the need between qualifications evaluation and single-phase selection	REG	REG	-	-	-	REG	REG
	Develop and use standard contract templates for RFQ/RFP processes	REG	REG	-	-	-	REG	REG
	Use adjectival and pass/fail scoring instead of point scoring for evaluation of proposals	REG	REG	-	-	-	N/A	N/A
	Consider paying stipends to unsuccessful proposers when shortlisting	N/A	N/A	-	-	-	REG	REG

Environmental Analysis and Permitting

	State DOT	Colorado	Florida	Michigan	North Carolina	Utah	Virginia	Washington State
Challenges	Concerns from regulatory agencies (staffing and involvement)	HI	-	MID	MID	MID	MID	MID
	Proper identification of resources	HI	-	MID	MID	NO	MID	MID
	Managing impact of environmental permits to the project schedule	MID	-	HI	MID	MID	MID	HI
	Overly prescriptive NEPA documents	MID	-	NO	NO	NO	HI	MID
	Post-Award Re-Evaluations	HI	-	NO	MID	NO	MID	MID
	Post-Award Permit Modifications	NO	-	MID	NO	HI	NO	MID
Opportunities	Partnering with regulatory agencies	REG	-	REG	REG	REG	REG	REG
	Establish programmatic agreements with regulatory agencies	REG	-	REG	N/A	NO	REG	REG
	Allow flexibility in the NEPA document (clearing a corridor vs. a preferred alternative)	REG	-	REG	REG	REG	REG	REG
	Advertising and awarding the project prior to completion of NEPA	NO	-	NO	NO	NO	NO	NO
	Coordinating utility relocations with ROW and NEPA impacts	REG	-	REG	REG	REG	REG	REG
	Requiring the Design-Build team to perform the NEPA Re-Eval, if required	REG	-	REG	REG	NO	REG	REG
	Requiring the Design-Build team to acquire any and all permits	NO	-	REG	NO	REG	REG	REG

ROW Acquisition

	State DOT	Colorado	Florida	Michigan	North Carolina	Utah	Virginia	Washington State
Challenges	Identifying ROW Impacts based on approximately 30% design plans	MID	-	-	-	MID	MID	MID
	ROW needs being impacted by utility relocations and/or environmental mitigation measures	MID	-	-	-	NO	MID	NO
	ROW acquisition as the critical path to the project schedule	HI	-	-	-	MID	NO	HI
	Managing ROW acquisition when a large number of parcels need to be acquired	NO	-	-	-	MID	HI	HI
Opportunities	Coordinating ROW needs with utility and mitigation requirements	REG	-	-	-	REG	N/A	NO
	Utilizing ROW management tools	REG	-	-	-	REG	REG	REG
	Utilizing advance acquisitions	REG	-	-	-	NO	NO	NO
	Choosing the best acquisition strategy to expedite project delivery	NO	-	-	-	REG	REG	REG
	Acquiring all ROW in advance of advertising and awarding the Design-Build contract	REG	-	-	-	N/A	REG	REG
	Transferring ROW acquisition responsibility to the Design-Build team	N/A	-	-	-	REG	REG	REG

Utilities Coordination and Relocation

	State DOT	Colorado	Florida	Michigan	North Carolina	Utah	Virginia	Washington State
Challenges	Accurately identifying existing utilities and associated impacts	-	-	LOW	MID	MID	High	-
	Managing utility relocations impact on the project schedule	-	-	MID	MID	NO	High	-
	Managing utility impacts on ROW needs and environmental resources	-	-	HI	MID	MID	MID	-
	Determining responsibilities for utility relocations	-	-	NO	NO	NO	LOW	-
	Utility owner reluctance to work with design-build teams	-	-	NO	MID	NO	HI	-
	Clearly identifying relocation responsibilities in the design-build contract	-	-	LOW	NO	HI	NO	-
Opportunities	Conducting SUE pre-bid	-	-	REG	REG	REG	REG	-
	Developing MOUs or MUAs with utility companies pre-bid	-	-	REG	N/A	NO	REG	-
	Requiring the design-build team to perform utility coordination	-	-	REG	REG	REG	REG	-
	Encouraging the design-build team to partner with utility owners	-	-	NO	NO	NO	NO	-
	Coordinating utility relocations with ROW and NEPA impacts	-	-	REG	REG	REG	REG	-
	Requiring the design-build team to perform utility relocations	-	-	REG	REG	NO	REG	-

Alternative Technical Concepts

	State DOT	Colorado	Florida	Michigan	North Carolina	Utah	Virginia	Washington State
Challenges	Maintaining confidentiality and fairness (unbiased evaluation) among the bidders	MID	-	-	-	-	LOW	MID
	Proposing an “equal or better” design solution in comparison to base design	HI	-	-	-	-	MID	MID
	Reviewing ATCs by the state DOT may require excessive resources	HI	-	-	-	-	HI	LOW
	Significant impacts on NEPA permits, ROW, utilities, and other critical areas	MID	-	-	-	-	NO	NO
	Conflicts with Title 23 CFR 636.209(b) (supplement not substitute base proposals)	LOW	-	-	-	-	NO	MID
	Protecting intellectual property of Design-Build teams	MID	-	-	-	-	MID	NO
Opportunities	Utilize innovative design solutions and realize added-value on the project	REG	-	-	-	-	REG	REG
	ATCs can help achieve efficiencies in project cost, schedule, and time	REG	-	-	-	-	REG	N/A
	State DOTs should maintain confidentiality while reviewing ATCs	REG	-	-	-	-	REG	REG
	State DOTs should hold one-on-one meetings with design-build teams	NO	-	-	-	-	NO	NO
	State DOTs should request detailed description of the ATC and deviations from the project RFP	REG	-	-	-	-	REG	REG

Design Acceptance and Quality Management

	State DOT	Colorado	Florida	Michigan	North Carolina	Utah	Virginia	Washington State
Challenges	The loss of control over design and limited ability to monitor the design details	LOW	MID	-	-	MID	-	-
	Lack of flexibility and the slow shift in the culture of the contract parties	LOW	MID	-	-	MID	-	-
	Staff cutbacks and lack of resources within the state DOT	N/A	HI	-	-	MID	-	-
	lack of professional review workforce within the state DOT	N/A	HI	-	-	MID	-	-
	Failure to identify proper design QA/QC procedures in the project RFQ/RFP	MID	MID	-	-	LOW	-	-
	Time-consuming reviews after contract award that hinders innovation and expedited delivery	MID	LOW	-	-	LOW	-	-
Opportunities	Facilitating the cultural shift to the design-build environment within the state DOT	REG	REG	-	-	REG	-	-
	Accepting that design is the responsibility of the design-build team	REG	REG	-	-	REG	-	-
	Accepting that design-build is a learning experience not a threat	REG	REG	-	-	REG	-	-
	Co-locating the design team, the contractor, and the personnel of the state DOT	REG	REG	-	-	REG	-	-
	Stipulating the required quality management plan in the project RFQ/RFP	REG	REG	-	-	REG	-	-
	Utilizing efficient over-the-shoulder reviews	REG	REG	-	-	REG	-	-

Looking for Next Generation

- Achieve greater efficiency and expedite project delivery through effective and efficient implementation of Design-Build
- The proper use of Design-Build can help the Georgia DOT enhance its image as a public agency that is accountable and constantly uses innovative solutions to maximize the utilization of tax payer's dollars particularly in challenging times

Questions and Discussions

Thank you for your attention.

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