

Project Delivery Systems: Pro vs. Con Design-Bid-Build vs. CM @ Risk vs. Design-Build

The careful choice of Project Delivery System (PDS) can help overcome many project challenges. A project delivery system is, simply, the contractual structure (exclusive of the financial arrangements) for how the final project is produced and provided, i.e. delivered, to the owner. The various types of project delivery systems are often consolidated down to three basic approaches:

- Design-bid-build (DBB)
- Construction Manager at Risk (CM@R)
- Design-build (DB)

The appropriateness of any given project delivery system varies, depending upon the project goals, time constraints, cost constraints, party at risk, and existing site conditions. Prudent airport project owners should investigate each alternative, and its potential for success or failure, on a case-by-case basis.

Project owners generally want the same things: construction at the lowest cost, of the highest quality, and done within the shortest period of time. Some goals, however, may take precedent over others. The speed of implementation, for example, may be more important than cost on certain projects. For others, maintainability and low life-cycle costs may be more important than initial cost. Owner control of the design and/or construction may be important for some, while, for others, limiting the risk of costly changes is paramount. Goals to consider include:

- Lowest cost consistent with quality and performance objectives
- Initial cost versus life-cycle cost
- Shortest schedule for overall project delivery
- High quality
- Comply with technical specifications
- Meet overall expectations
- Promotes innovation and value engineering
- Limit the cost of design changes
- Limit the risk of cost and schedule growth
- Control over design decisions
- Control over construction quality
- Limit impact on current operations, safety, security
- Limit construction 'aggravation'
- Limit demands on owner resources

- Limit number of contractual entities/points of responsibility
- Limit claims for additional cost

When selecting an appropriate project delivery system, first define the goals and objectives for the project, and define any unique issues that could significantly impact it. Then rank these goals, objectives and issues in order of priority and importance, and match them to the strengths and attributes of the various project delivery systems. For example, some projects may be challenged by frequent design changes or by other potential disruptions. The selection of a project delivery system should take these issues into account. Also, project owners must recognize the various trade-offs relating to cost, time, quality, control and risk, and select a PDS approach that provides the proper balance.

The selection process should strive to match PDS strengths to the project goals and match PDS attributes to the important issues which must be effectively addressed and managed to enhance successful project delivery. The analysis is not so much a question of advantages versus disadvantages but rather to select the PDS whose strengths and attributes best match or align with the goals and needs of the project. A PDS may have attributes viewed as a disadvantage for one specific project while those same attributes may prove advantageous for a different project.

The primary strengths, considerations, and advantages of the alternate project delivery systems are summarized below.

Design-Bid-Build (DBB)

Advantages	Considerations
Owner controls design and construction	Requires significant owner expertise and resources
Design changes easily accommodated prior to start of construction	Shared responsibility for project delivery
Design is complete prior to construction award	Owner at risk to contractor for design errors
Construction cost is fixed at contract award	Design and construction are sequential, typically resulting in longer schedules
Low bid cost, maximum competition	Construction cost unknown until contract award
Relative ease of implementation	No contractor input in design, planning or value engineering (VE).
Owner controls design/construction quality	

Construction Manager at Risk (CM@R)

Advantages	Considerations
Transfer of responsibility for construction, and some risk, from owner to CM	Reduced owner control of construction

Construction cost known and fixed during design	Design changes after construction begins are costly
CM has total control of construction and all subcontractors	Potentially conflicting interests as both CM and contractor
Construction may start before design completion, reducing project schedule	

Design-Build (DB)

Advantages	Considerations
Single entity responsible for design and construction	Minimal owner control of both design and construction quality
Construction often starts before design completion reducing project schedule	Requires a comprehensive and carefully prepared performance specification
Construction cost known and fixed during design, price certainty	Design changes after construction begins are costly
Transfer of design and construction risk from owner to the DB entity	Potentially conflicting interests as both designer and contractor
Emphasis on cost control	No party responsible to represent owner's interests
Requires less owner expertise and resources	Use may be restricted by regulation
	High bid costs/fewer bidders

Once the selection of a delivery system is made, it is important that the owner take additional and continuing steps to maximize the chances of its success:

- Effectively communicate to the various team members (architects, engineers, CMs, contractors and consultants) the goals, objectives and issues that drove the selection of project delivery system. It is important they understand and commit to the owner's expectations.
- Ensure that the terms and conditions of the various contracts reflect the goals, objectives, issues and expectations for the project, and memorialize all related agreements. For example, if changes during construction are anticipated, be sure that the contract language defines how those changes will be managed and their cost and schedule impact minimized.
- Consider legal assistance experienced in construction matters for crafting the contract language.
- Commit to the appropriate level of owner involvement, e.g. active involvement with timely and informed decision-making so as to not delay or impact the project. Conversely, avoid imposing owner changes or controls on DB contracts.
- Assess potential risks and plan how to manage the overall program, e.g., internally or via a program management consultant.
- Finally, recognize that disputes over scope, quality and other issues may still arise. Define how such disputes will be handled so that disruption and cost/schedule impact are minimized. Consider using alternate dispute

resolution (ADR) approaches such as Project Neutral®, dispute review boards, or similar alternatives.

No project delivery system is faultless. But, choosing the system that best works for your specific project, and actively ensuring that it is properly implemented, can mean the difference between the success and failure of your next project.

Editor's Note: For an unabridged version of this article, which includes a detailed analysis of each delivery system, the risk impact, related research studies on risk, and the connection between project delivery systems and contract types, contact us via e-mail at info@hillintl.com.

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