

SWIM and Horizon 2020 Support Mechanism

Working for a Sustainable Mediterranean, Caring for our Future

Project Delivery Methods (PDMs)

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Presentation outline

- **Overview of methods**
- **Examples of Typical Project Delivery Structures**
- **Advantages- Disadvantages**
- **Evaluating the best method**

Choosing a Project Delivery Method (1/2)

Project Delivery is a comprehensive process including planning, design and construction required to execute and complete any type of project. Choosing a project delivery method is one of the fundamental decisions owners make while developing their acquisition strategy.



Project Delivery Systems	Procurement Methods	Contract Formats
Construction Management at Risk (CMR) also known as CM/GC	Best Value (BVS)	Cost Plus Fee
Design-Bid-Build (DBB)	Low Bid	Guaranteed Maximum Price (GMP)
Design-Build (DB)	Negotiated	Lump Sum (or Fixed Price)
Multi-Prime (MP)	Qualifications-Based (QBS)	Target Price
	Sole Source (or Direct Select)	Unit Price

Choosing a Project Delivery Method (2/2)

- **Determining the project delivery method is one of the most important decisions made by every owner embarking on a construction project.**
- **Choosing the best method for any project must start with a good understanding of choices available. In all delivery systems, there is always a minimum of three parties involved: owner, designer and contractor.**
- **Project considerations have fundamental impacts on the delivery method selected. These considerations include a realistic budget, a schedule that includes a reasonable performance period, a responsive and quality design process, a risk assessment with allocation of risks to the appropriate parties and a recognition of the level of expertise within the owner's organization.**

Project Delivery Methods

- **Design-Bid-Build (DBB) or traditional**
- **Construction Management at Risk (CMAR)**
- **Design-Build (DB)**
- **Design-Build-Operate (DBO) Project Structure**
- **Design-Build-Finance-Operate (DBFO) Project Structure**
- **The JV Option**

Each of these delivery methods establishes different relationships among the parties involved and, subsequently, different levels of risk.

Design-Bid-Build (DBB) (1/4)

- In the traditional public sector DBB method, the local government (owner) is responsible for the design, construction and operation of the project
- The owner has two contractual relationships: one with the design engineer who designs the facility and one with the construction contractor who builds the facility
- The design engineer and the owner collaborate to establish the project framework and develop the design basis
- The design engineer prepares the engineering design
- and assists with the subsequent bidding and construction process. There is no involvement of the
- construction contractor during the design stage

Design-Bid-Build (DBB) (2/4)

- Bids are solicited from contractors based on contract documents developed by the owner and the design engineer
- Contract is then typically awarded to the responsive bidder who has the lowest bid
- Following procurement through the bidding process, a separate contractor constructs the project
- The contractor works to a defined scope of work for a fixed price
- Once the project's construction phase is complete and the plant has passed an acceptance test, the construction contractor has no remaining connection with the project beyond the warranty period (typically one or two years) and the owner is responsible for the ongoing operation and maintenance

Design-Bid-Build (DBB) (3/4)

Advantages:

- **DBB is well understood and is a widely used method for public agency projects.**
- **Agencies typically have developed standard contracts and procedures based on experiences from many projects and are comfortable with the DBB approach**
- **The owner maintains a high level of control during the design phase**
- **There is typically a large pool of contractors who are familiar with completing public sector projects using this method**
- **The advantages of this approach include owner and contractor familiarity with the process, ability to attract competition and the ability to spread work among several contractors**

Design-Bid-Build (DBB) (4/4)

Disadvantages:

- DBB requires the longest time for design and construction because design and construction are sequential steps with no overlap
- There is a lack of emphasis on life cycle costs
- Firm construction costs are not known until the design and bidding process is complete
- Bids greater than the estimated costs can cause project delays while the construction documents are redone to reduce costs
- Design documents often are more detailed and costly than necessary because of concerns that the low-bid contractor may be marginally qualified
- The owner retains the risk for design errors

Construction Management at Risk (CMR) (1/4)

- CMAR evolved from traditional DBB as a method to overlap the design and construction phases and to obtain significant constructability input during the design phase
- In CMAR, the owner contracts separately with a designer and a construction manager/general contractor (CM/GC)
- The designer is contracted by the owner using a qualifications based submittal process and is responsible for the design
- The CM/GC is also selected using a qualifications based submittal process
- The CM/GC provides coordination services in lieu of a general contractor and provides design phase input and assistance
- The CM/GC self performs portions of the construction and selects qualified subcontractors for the remaining portions
- Although under separate contracts, the designer and CM/GC work together as a team during design through construction

Construction Management at Risk (CMR) (2/4)

- **CMAR provides for input from the construction contractor throughout design including involvement of the CM/GC in value engineering during design**
- **The owner, designer and CM/GC are involved during the preparation of project cost estimates based on intermediate design milestones such as the 30% and 60% designs**
- **At some point in the design (often around the 60-75% design point), the CM/GC negotiates a Guaranteed Maximum Price (GMP) for the project**
- **The GMP is not exceeded unless the owner issues a change order**
- **Any savings in costs under the GMP can be shared by the owner and the CM/GC or retained in full by the owner**
- **Following acceptance of the project, the responsibility for project operation and maintenance transfers to the owner subject to the basic warranties of construction**

Construction Management at Risk (CMR) (3/4)

Key Considerations:

- The procurement process for CMAR allows the owner to consider the qualifications of the party that will construct the project rather than being required to select the low bidder if DBB were used
- This allows the owner to evaluate the CM/GC's personnel to be assigned to the project, previous experience on similar projects, financial resources and the CM/GC's approach to the project
- This provides the owner greater control over the quality of the constructor of the project
- CMAR enables collaboration between the designer and the constructor throughout design and construction
- The input from the CM/GC in design can avoid problems when construction begins
- In DBB, the construction contractor has no opportunity to identify constructability issues during design

Construction Management at Risk (CMR) (4/4)

- **The collaboration between the designer and the constructor throughout design and construction reduces the potential for Requests for Information (RFIs) and change orders during construction**
- **CMAR offers potential to compress schedules. Getting the construction contractor involved in the design has the potential to reduce construction time**
- **After the GMP is negotiated and the detailed design is completed for critical elements of the project, selected stand-alone elements of the project can be put on a fast track for construction**
- **The team can selectively complete designs and bid packages to accelerate project completion**

Design-Build (DB) (1/4)

- In DB, the owner contracts with a private entity to design and build the project
- The operation of the resulting facility is transferred to the owner after it is completed
- Owners execute a single, fixed-fee contract for both engineering services and construction
- The DB entity may be a single firm, consortium, joint venture or other organization assembled for the project
- The construction member of the team usually leads the DB team with the design engineer as a subcontractor
- The design-builder is selected based on the overall value of the proposal, considering factors such as qualifications, performance guarantees, the quality of the proposed design, as well as price, rather than price alone

Design-Build (DB) (2/4)

- **The typical DB contract requires the design-builder to design and construct a project in accordance with a basic set of design requirements and to demonstrate that the project can achieve a defined set of performance standards through the successful completion of an acceptance test**
- **Design and construction services are carried out concurrently, saving time**
- **Following acceptance of the project, the responsibility for project operation and maintenance transfers to the owner, subject to basic warranties of construction**

Design-Build (DB) (3/4)

- A critical function of the DB contract is the transfer of design liability to the design-builder
- The design-builder proposes the preliminary design for the project as part of the procurement process and, once the DB contract is signed, develops the detailed plans and specifications for the project in a manner consistent with the contractual design requirements
- The design-builder is fully responsible for the design of the project and bears all risk associated with design errors or defects

Design-Build (DB) (4/4)

- **A well-drafted DB contract establishes the design-builder as the single point of responsibility for all aspects of design and construction with the sole responsibility for resolving disputes between design subcontractors and construction subcontractors**
- **The DB contracting method enables the owner to transfer risks associated with design liability and disputes between design subcontractors and construction subcontractors to the design-builder**
- **This is in contrast to the traditional DBB method of contracting where the owner enters into separate contracts for design and construction**

Design-Build-Operate (DBO) Project Structure (1/2)

- **The public sector finances the project and sets performance objectives**
- **A private partner, the DBO contractor, is engaged to design, construct, maintain and operate the facility**
- **The DBO contractor serves as the single point of responsibility for all aspects of design, construction and operation for the term of the service contract that is typically 15 to 20 years following project acceptance**
- **The primary purpose for combining design, construction and operations into a single contract is to integrate all three areas of expertise and responsibility during every phase of the project**

Design-Build-Operate (DBO) Project Structure (2/2)

- A typical service contract incorporates the DB contract provisions discussed earlier and also requires the DBO contractor to operate and maintain the facility for the term in accordance with carefully defined performance guarantees
- An owner considers similar factors in developing the project description as considered under the DB method
- In addition to the transfer of design liability and the risk of disputes between various subcontractors, the DBO method enables the owner to transfer significant operating risks to the DBO contractor

DESIGN BUILD FINANCE OPERATE (DBFO)

- **The private sector designs, finances, constructs, maintains and operates the facility**
- **Ownership of the assets remains with the local government**
- **The DBFO team member that provides the financing typically leads the DBFO team with the designer, builder and operator as subcontractors**
- **DBFO retains the advantages described for DB and DBO plus increased value through transfer of risk to the equity holders in addition to the risk transfer to the designer, builder and operator**

The JV option

- **The owner may contribute to the long-term equity capital of the Special Project Vehicle (SPV) in exchange of shares. In such a case, the SPV is established as a joint venture company between the public and private sectors and the owner acquires equal rights and equivalent interests to the assets within the SPV as other private sector shareholders.**
- **The main reasons for such direct involvement may include:**
 - To hold interest in strategic assets;
 - To address political sensitivity and fulfil social obligations;
 - To ensure commercial viability of the project;
 - To provide greater confidence to lenders; and
 - To have better insight to protect public interest.

Factors affecting Delivery Methods Efficiency (1/2)

There is normally an efficiency gain from the use of an alternative project delivery method when compared to the traditional DBB approach. Cost savings can result from several factors:

- Not all of the information generated during the DBB process is needed to construct the project. The designer often assumes that the least qualified contractor will build the project and the designer will go to extremes to make certain that the most basic information is available
- The designer may have to account for multiple equipment choices and “or equal” considerations instead of designing for a specific piece of equipment

Factors affecting Delivery Methods Efficiency (2/2)

- **Routing of piping, conduits, HVAC is often designed twice – once by the designer and once by the detailers responsible for preparing the fabrication and material ordering documentation**
- **Technical specifications are often quite detailed to include protective language and to completely describe material and equipment**
- **Redesign often results from changes to selected equipment or details provided during the shop drawing process**

Owner considerations (1/2)

Summary of owner considerations:

Owner Control

- Desire to control design details.
- Desire to control project outcome.
- Desire to have control of all prime contractors.
- Desire to empower more innovative project solutions.
- Desire for design excellence.

Owner Relationships

- Desire to have direct relationship with designer.
- Willingness to establish a more professional relationship with contractor.
- Desire to avoid adversarial relationships.
- Ability to enhance project coordination.
- Ability to reduce project claims.
- Desire to integrate the “voice” of the contractor in the planning process.

Project Budget

- Adversity to change orders.
- Need to establish budget at earliest possibility.
- Best value for funds invested.

Owner considerations (2/2)

Project Schedule

- **Timing to establish definitive project scope.**
- **Timing to establish definitive construction cost.**
- **Ability to fast track a project.**
- **Total project duration.**
- **Desire to avoid delays due to disputes or claims.**

Owner Risk

- **Adversity to change orders.**
- **Owner's ability to make timely key decisions.**
- **Ability to reduce gaps between services.**
- **Liability for the success or failure of the design.**

When these factors are properly evaluated, a good decision can be made on the selection of a project delivery method that best fits the goals and requirements of the owner and the project.

Critical success factors of the PDMs

- **Excellent project team communication**
- **High ability to prequalify team**
- **Excellent subcontractor experience with the type of facility being built**
- **High ability to restrain the contractor pool**
- **Excellent contractor experience with the type of facility being built**