Yıldız Technical University
Civil Engineering Department
Construction Management Division

Project Delivery Systems and Contract Management

Project Delivery Systems

- is a way of organizing the building and management of a construction project.
- There are several project delivery systems for handling construction process.
- Each system add new characters to the traditional participants, including the owner, the designer and the contractor, and the roles of these parties expand depending on the system used.

Project delivery system

- The decision of the project delivery method affects the relationships and risk allocation on a construction project.

- There is no perfect project delivery method for every building project type.

- The best method should be chosen after careful evaluation of the needs of the customer, project characteristics, along with project team member's qualifications and experiences.

Types of project delivery systems

- The choice of a particular style of project delivery systems will depend on many factors
  - Ease of design
  - Desire for design flexibility during construction
  - Availability of suitable contractors/project managers
  - Political considerations
  - Budget constraints vs performance of completed projects

Types of project delivery systems

- Design-Bid-Build
- Design-Build
- Construction management
- Build operate transfer
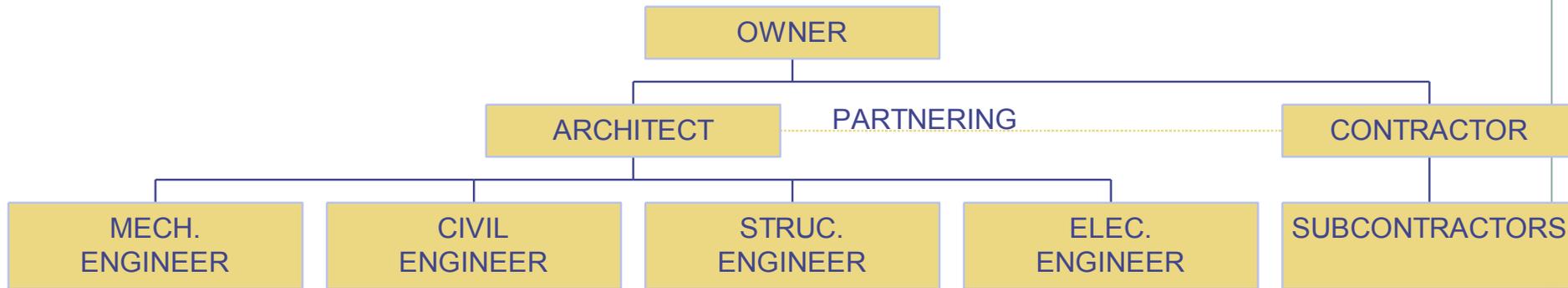
Design bid build

- For many years, DBB has been the most common method of project delivery for public projects, and for many private projects as well.

- Design Bid-Build is effective on projects
  - where the owner needs both professional design services and construction services
  - where the designer does not require detailed knowledge of the means and methods of construction.

Design bid build

- An owner contracts with a designer to design the project, and separately contracts with a general contractor for the construction of the project.
- The design bid build system places the owner "at the center of the universe" as the result of separate contractual relationships with both the design entity and contractor.
- In this arrangement, the owner warrants to the contractor that the plans and specifications are buildable.

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    ARCHITECT ------ PARTNERING ------  CONTRACTOR
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 MECH.    CIVIL    STRUC.    ELEC.      SUBCONTRACTORS
ENGINEER ENGINEER ENGINEER ENGINEER
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Design bid build

- DBB provides the owner with a high degree of control. That's why it is the preferred project delivery system for owners who:
  - Wish to closely monitor projects
  - Are public owners and must account in detail for expenditures.
  - Are obligated by statute to procure professional design services by qualifications-based selection (QBS) regulations and constructors by competitive bidding.

Design bid build

Design-Bid-Build Linear Approach

No contractor involvement

Design | Bid | Build

No overlap of design and construction

Design bid build

- The owner defines project goals and objectives, secures the financing, and specifies the standards and contract terms.

- The owner may perform planning, conceptual design and full design, or may engage an outside design professional (designer) for some or all of these tasks.

- During this planning and preliminary stage, owner and designer work as a team to obtain required permits and conduct necessary site investigations.

Design bid build

- The designer prepares the construction bid documents to reflect the owner's project goals and objectives, the project's site conditions, and sound engineering practices.

- Prospective contractors prepare their bids from these complete and specific bid documents.

- The bidders submit their proposals to the owner (often w/ designer) , who determines the most responsive (typically the lowest) bid meeting project requirements.

- In certain circumstances, owner may be justified in selecting a contractor outright and negotiating contract terms directly.
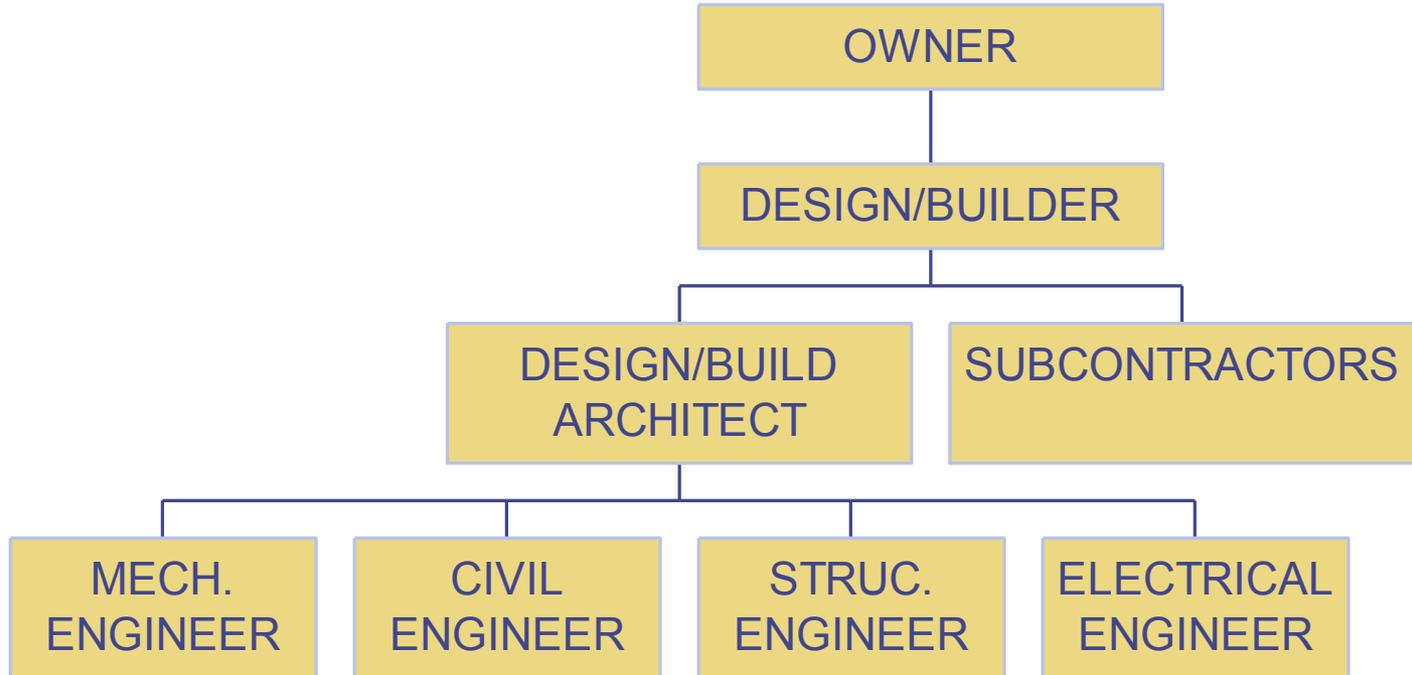
Design bid build

- Disadvantages:
  - Potential for conflict
  - Hindering communication among the parties
  - Time consumption
  - Potential for schedule creep or cost escalation.
  - Potential for claims

Design build

- With the design-build project delivery, owners are no longer at the center of the universe.

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DESIGN-BUILD

- The owner contracts with a single entity to provide the design and to construct the project according to that design.

- The contract might be negotiated with a single design-builder or result from competitive proposals.

- The selection can be based on low price or on a set of value criteria (experience, staff, bonding capacity, etc.).

DESIGN-BUILD (cont.)

- Design-build provides the owner with a single point of contact for project responsibilities, eliminating the need to assist in resolving designer-contractor disputes.

- With the contractor playing a major role in design, costs are typically defined and maintained to a greater degree, and the coordination of fast-track management to achieve early completion is greatly simplified.

- The design-builder makes many decisions that owner would make under design bid build, due to delegation of greatly increased authority.
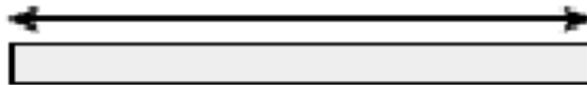
DESIGN-BUILD (cont.)

- For many owners, delegation of responsibilities leads to satisfactory projects. However, if the parties are inexperienced and do not cooperate, the transfer of control and risk can be disappointing.

- The owner may need to restructure his/her internal procedures to accommodate design-build approach.

- Compared to design bid build, this involves a significantly different set of requirements and expectations for process, timelines and communications.

- A clear understanding and documentation of design-build processes enhances the quality of design-build projects.

DESIGN-BUILD (cont.)

Design-Build Integrated Approach
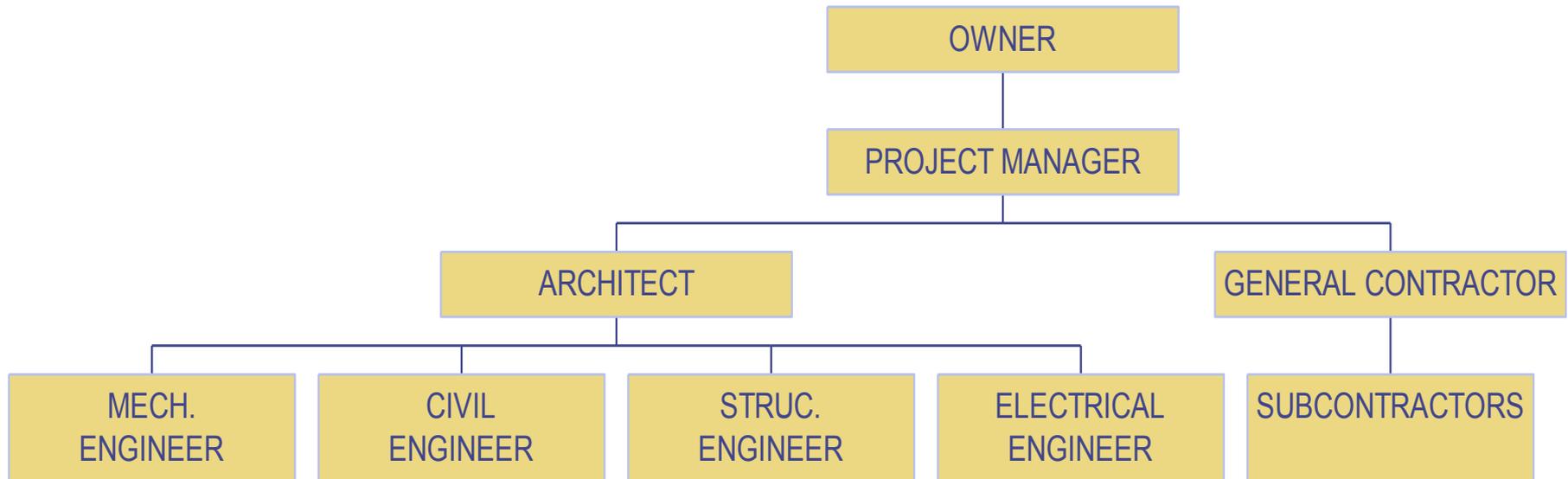
Extensive contractor involvement

Design

Build

Overlapped design and construction

Construction management

- Many owners engage construction managers (CMs) to assist in developing bid documents and overseeing project construction.

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- CM:
  - Is a professional or a firm trained in the management of construction processes.
  - Is generally interposed between the owner and some or all of the other participants.
- There are two general types of CM:
  - Agency Construction Managers (ACM)
  - Construction managers-at-risk (CM-at-risk)

Construction management

- ACM acts as an agent of the owner and extends the owner's internal capabilities in performing traditional owner responsibilities.

- The level of service by the ACM can range from on-call advice to full project management.

- In some cases, the owner hires the ACM before design begins and ACM may participate in the selection of and contracting with the designer or might even be the designer.
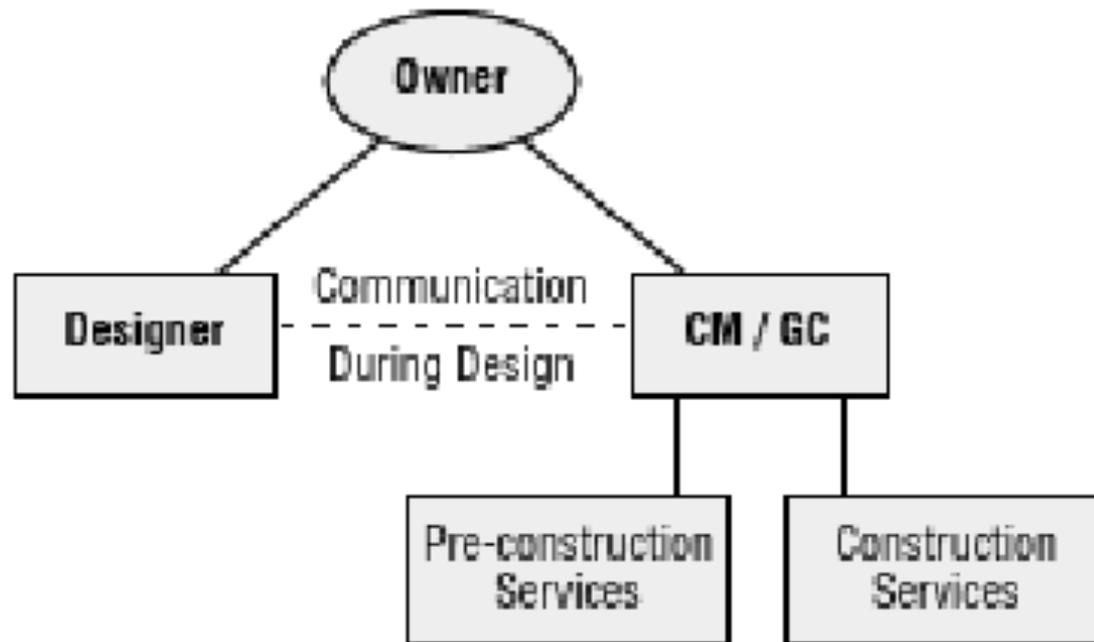
Construction management
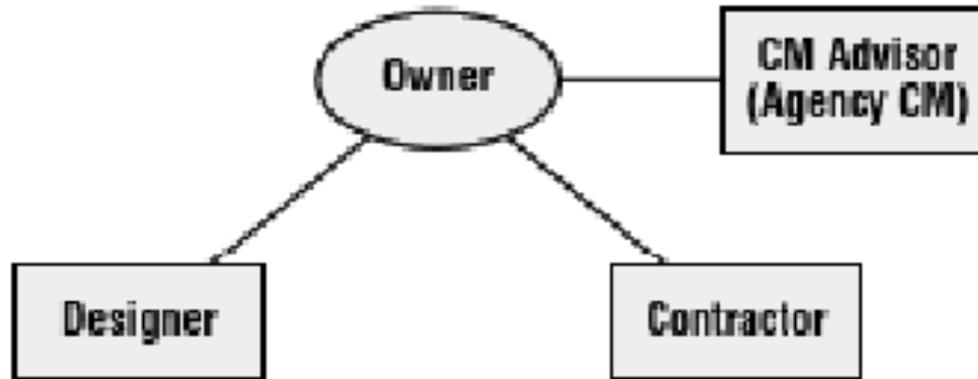
Construction management

- CM-at-risk arrangement increases significantly owner's delegation of control and risk.
- CM-at-risk typically contracts with the owner in two stages.
- First, CM-at-risk manages and undertakes services during conceptual & preliminary design phases with the design professional.
- When design is complete, owner and CM-at-risk then agree on a price and schedule for the completion of the construction work.
- CM-at-risk is popular for owners of private projects.

Construction management

Construction management

- Construction management creates two basic effects
  - To cut markup by the general contractor's fee on the work of subcontractors.
  - A direct contractual relationship is formed between the owner and each contracting party to the project.
- The construction management approach also has the advantage of a single party being responsible for the entire project.

Build operate transfer

- This delivery system is developed specifically as a way of involving the private sector in provision of new infrastructure.

- Under it, a private consortium undertakes to finance and construct an item of infrastructure required by government.

- The consortium owns, operates and carries end user risk.

- The consortium operates the facility for a period under a concession or franchise awarded by the government, and in this way derives revenue from the operation of facility.

- Ownership of the facility is transferred to the government at the end of the concession period.

Build operate transfer

- Basic elements:
  - Treaty and legislation:
  - Concession:
  - Special purpose of company
  - Lease
  - Project finance
  - Construction
  - Operation

Build operate transfer

- Disadvantages
  - Preparing a consortium to tender for a BOT project is a difficult task, and the number of construction contractors of financial standing sufficient to attempt this task is limited.
  - Transferal of ownership in infrastructure from the public to private sector detracts from the government's ability to deal flexibly with the facility.
  - The commercial outcome of a BOT structure is unstable, and depends fundamentally on accurate cost benefit analysis. Such analysis is difficult and complex and has been found on several occasions to result in a lower rate of profit anticipated.

Choice of project delivery systems

- Factors
  - The need for strict cost control
  - The need for flexibility in what it is to be constructed throughout the construction process
  - The complexity of what is to be constructed
  - The in-house resources of the owner
  - The expertise of the tenderers
  - Particular budget constraints
  - Schedule requirements
  - Financing considerations

Contract

- Is a document or set of documents that expresses the expectations and responsibilities of the parties involved in a project and protects each party's rights regarding the project.

- Although it is legally binding, the real essence of any contract is that it is an expression of trust between the parties.

- Contract should be in clear, concise language, clearly defines responsibilities of the parties and aims at achieving a quality project.

General types of contracts

- Unit price

- Lump sum – Fixed fee

- Turnkey

- Negotiated

- Cost plus

Unit price

- Costs are calculated by multiplying quantities by unit prices which are published every year by the Ministry of Public works.

Example; The contractor performed A m^3 excavation, B m^3 concrete, C m^3 stone wall in a payment period and the unit costs of these activities are a,b, and c, respectively. K is the payment which the contractor will receive.

K = (A x a) + (B x b) + (C x c)

- Unit price contracts are desirable when plans and specifications are not completed at the time of bidding, although there is obligation to start construction.

- Furthermore, it is a steady and guaranteed system for the contractor who is covered against any fluctuations in the market.

Lump sum

- These contracts are used when plans and specifications are ready.

- A price is agreed upon by the client(owner) and the contractor.

- The risks due to market fluctuations belong to the client.

- The sooner the job is completed, the sooner the contractor gets money.

- However, in this system, plans and specifications must be elaborate, precise, detailed and complete.

- A complete control must be kept on the job site since the contractor may use the cheap material.

Turnkey

- In this contract type, the client and contractor negotiate on the total cost of the project.

- The contractor guarantee to complete the project according to the specifications and contracts with any claim.

- The contract states how much payment will be paid at different stages of the project.

Example; After completion of the foundation activities, 10% of total cost is paid, after construction of the walls, 12% of the total cost is paid and so on. These are stated in the contract.

Negotiated

- Is one in which parameters are stated but specific details are left to be resolved at a later stage by agreed upon means.

- The obvious advantages of a negotiated contract are that it allows a project to start without delays for preparation of detailed contract documents and allows the parties to negotiate terms according to actual project conditions.

- The disadvantages are uncertainty of the profitability for both parties at the time the contract is signed. Also, it relies heavily on the good faith of the contract parties and on favourable job conditions. Consequently, conflicts are likely to arise.

Cost plus

- Cost-plus fixed fee, cost plus percentage fee.

- The total bid is determined by adding the percentage of the total cost or a fixed cost to the total cost of the project.

- Example: The profit percentage is stated as 15% and the cost of the project is calculated as 10000 TL, then the payment made to the contractor is calculated as;

- 10.000 + (10.000 x %15) = 11.500 TL

- The advantages of this contract type are:

  - To owner:
    - The project can commence prior to availability of a set of plans and drawings, and changes are easy to incorporate as the project progresses.
    - Flexibility for the owner to make changes.

  - To contractor
    - Flexibility for the contractor in accommodating changes made by the owner
    - Minimum financial risk for the contractor.

Cost plus

- The other disadvantage of this contract type is the level of effort it takes to administer the contract reviews as well as the coordination required to make awards.

- Since the profit based on cost plus percentage fee, the contractor can try to increase its profit by increasing the total cost, therefore a formula is provided for determining the fair price of the work as it is done and often sets a guaranteed maximum price for the project. As a result, both the contractor and the project owner are protected.

Construction contract documents

- Definition of parties
- Identification of applicable law
- Addenda issued before bid submittal
- Constructor's bid
- Notice of award
- Effective date of contract
- Definition of uncommon terms
- Scope of work
- Plans and specifications for facilities to be constructed

Construction contract documents

- Contractual milestone dates/completion dates
- Assignment of authority and responsibility between parties
- Risks and liabilities assumed by each party
- Terms and methods of payment
- Insurance and bonds
- Contract change-order procedure
- Settlement of disputes
- Contract termination conditions
- Indemnifications
- Warranties/ guarantees