



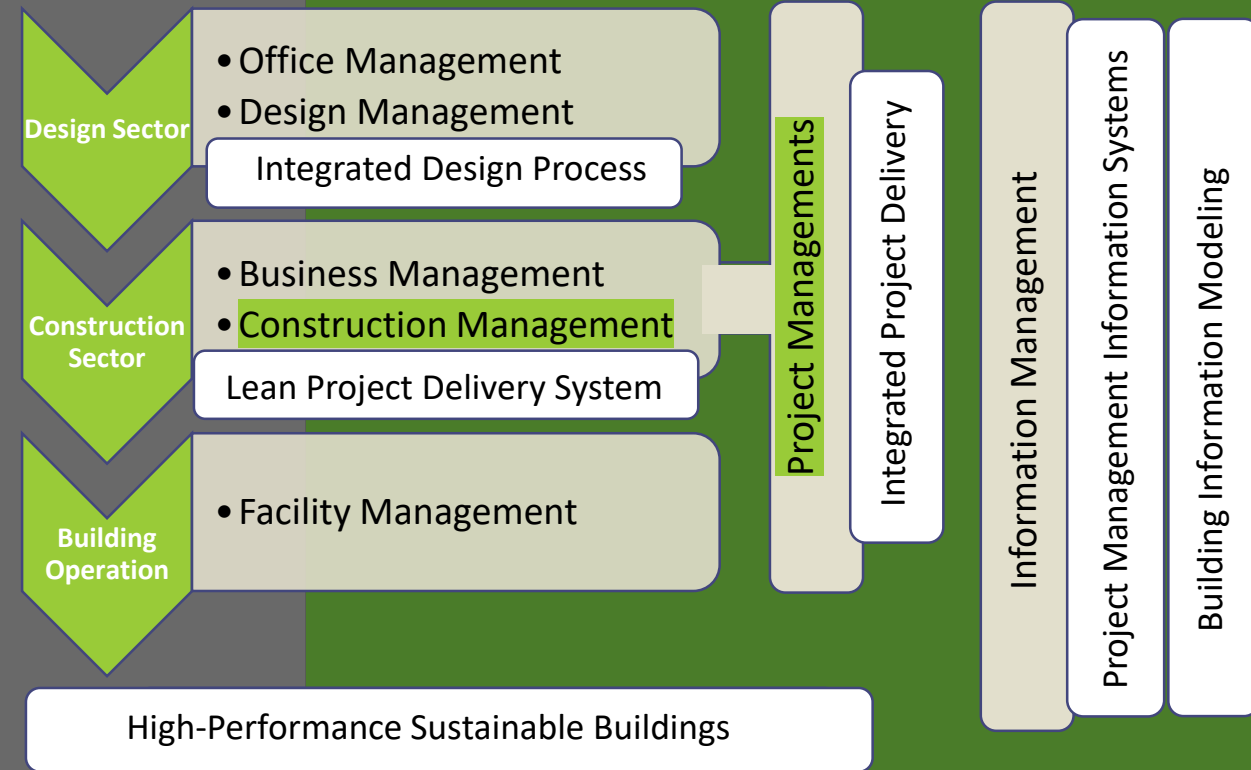
دانشگاه علم و صنعت ایران

Advanced Design & Construction Management Techniques- Project Planning Concepts

جلسه سوم، قسمت اول- اسفند ماه 1397- مدیریت پروژه

By: Hoda Homayouni Ph.D.

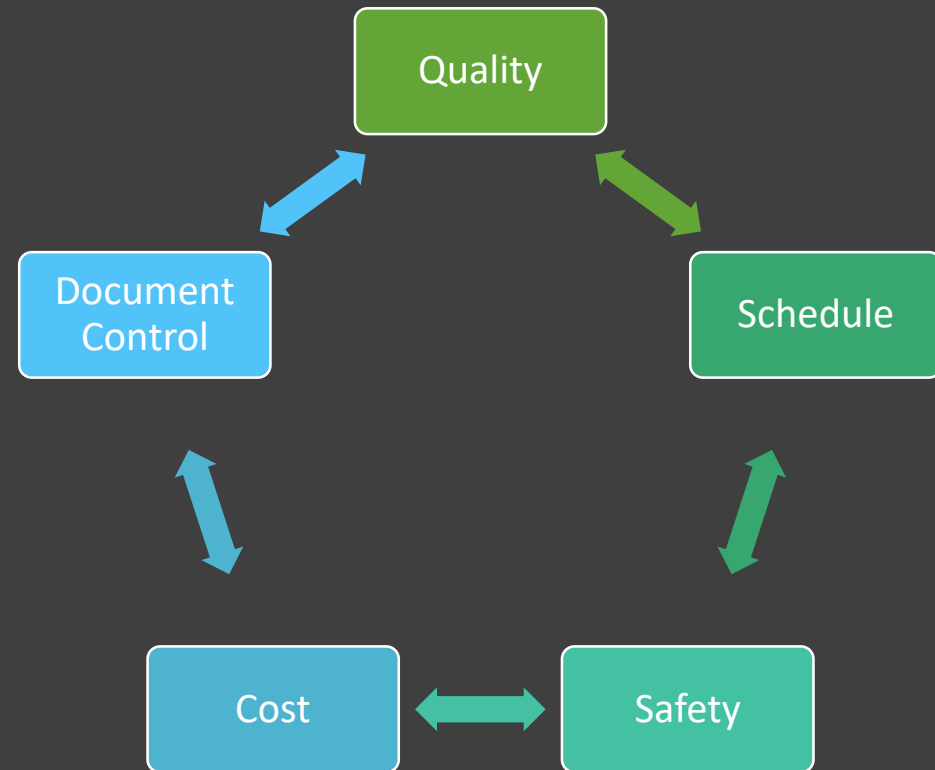
Introduction



- Management of Construction Projects**
- Major phases of Construction Projects**
- Project Delivery Methods**
- Project Cost Acquisition Methods**

Project Management Concept

- Project management is the application of knowledge, skills, tools, and techniques to the many activities required to complete a project successfully.
- What defines success in Construction Projects?
- There is no compromise regarding safety & proper documentation.



Major Phases of Construction Projects:



Project Planning



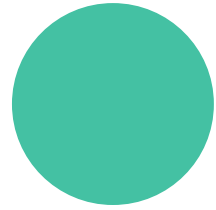
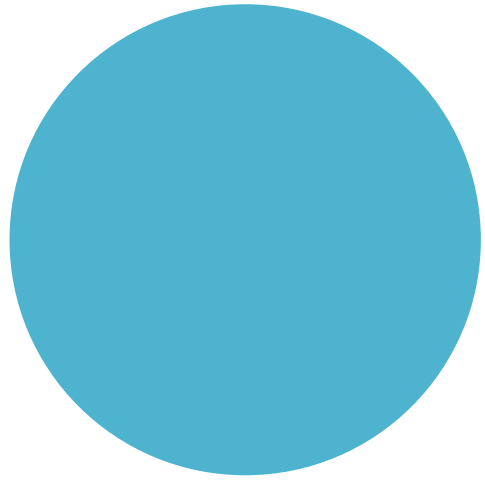
Design (Discovery, Design,
Documentation)



Construction (Planning, Start-up, Control,
Close-out)



Occupancy, Operation, & Performance
feedback



Project Planning

Developing the
organizational structure
and Communication
Strategies

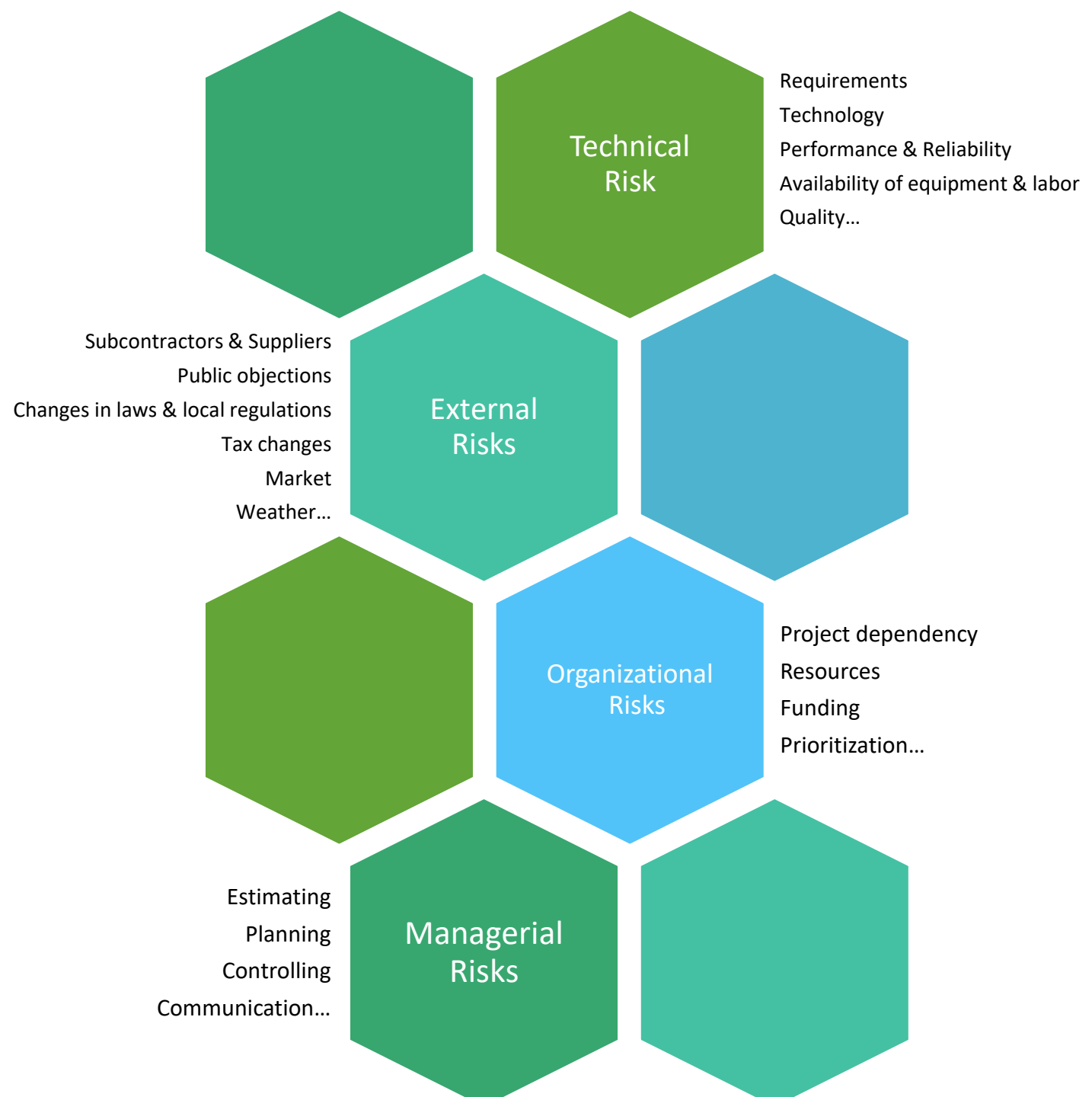
Risk Management

1- Identify risk

2-Evaluate level of risk and potential consequences

3-Select risk management strategy (avoid, accept, or transfer)

4-Monitor



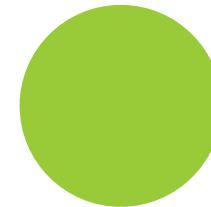
Owners select project delivery method based on:

- 1- The amount of risk they are willing to assume;
- 2- the size and experience of their own contract management staff.

Contracting Methods

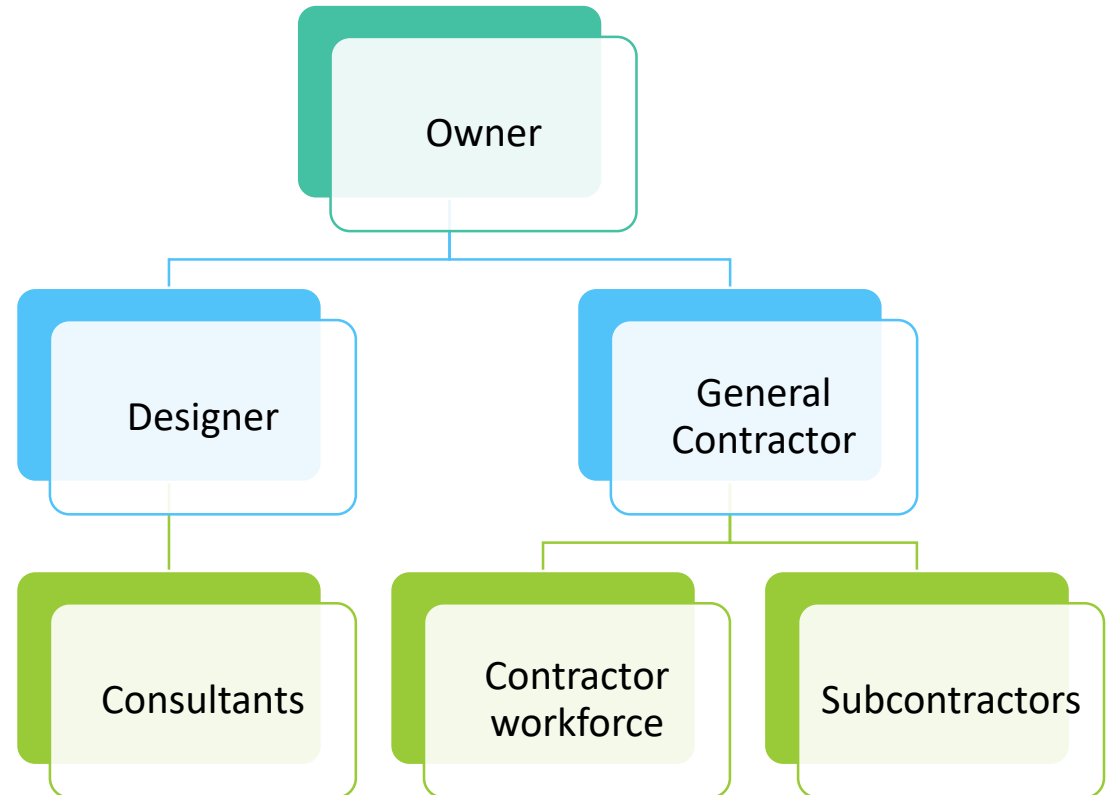
- Design then Build
- Agency Construction Management
- GC/CM
- Design Build
- IPD

Project Delivery Methods



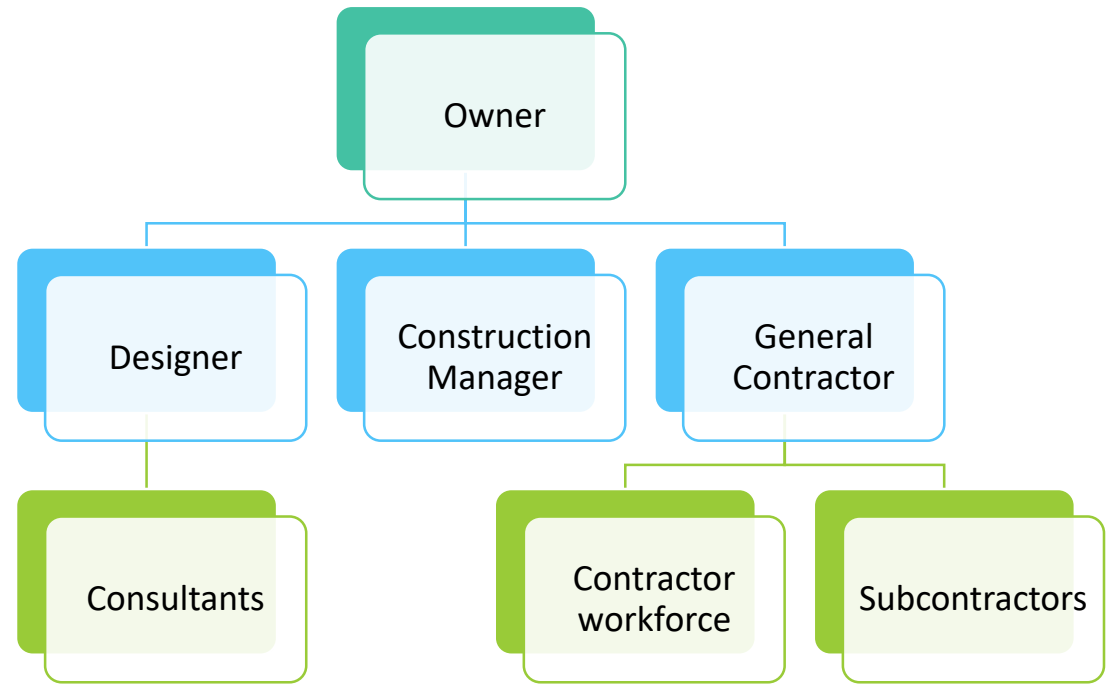
Traditional Delivery Method

- The owner has two separate contracts.
- There is no contractual relationship between the designer & the GC.
- The design is typically completed before the GC is hired.
- The GC is responsible for developing a cost estimate & project schedule, establishing a project management system.



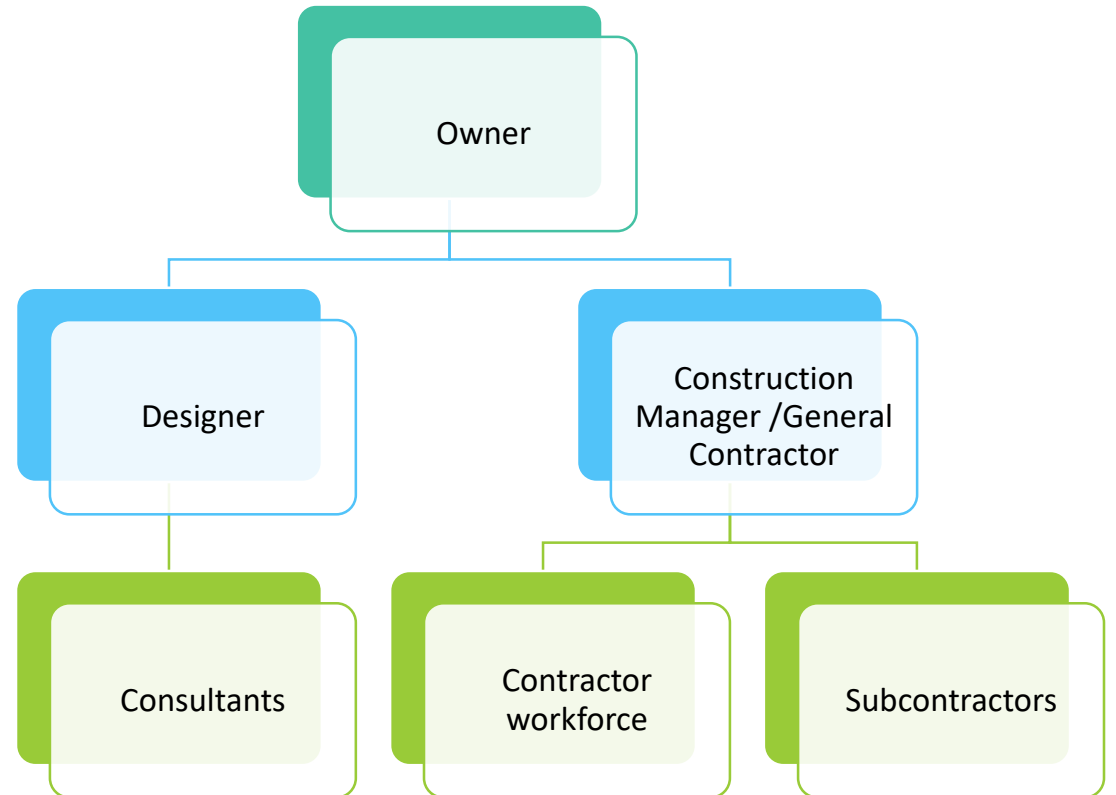
Agency Construction Management delivery Method

- The owner has three separate contracts.
- CM acts as the owner's agent & coordinates design & construction issues.
- CM is the first contract awarded.
- CM is involved in hiring Designer and GC.
- The design is typically completed before the GC is hired.
- The GC is responsible for developing a cost estimate & project schedule, establishing a project management system.



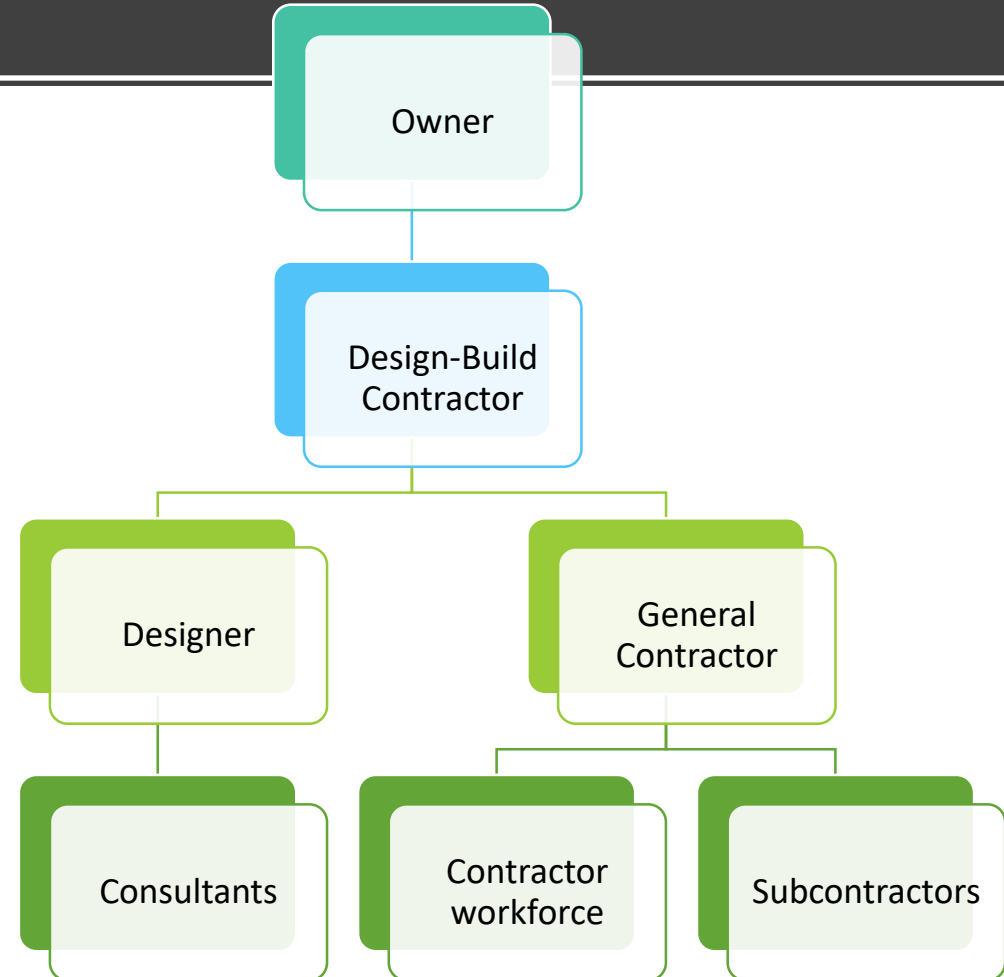
Construction-Manager-at-Risk Delivery Method (GC/CM)

- The owner has two separate contracts.
- Designer is hired first.
- GC/CM is hired early in the Design Development to perform **preconstruction services** i.e:
 - Cost estimating
 - Constructability analysis
 - Value engineering
- In some cases project construction maybe initiated before the entire design is completed.
- The GC/CM manages the execution of preconstruction tasks.
- Once construction starts, the GC's responsibilities are similar to those in the traditional method.



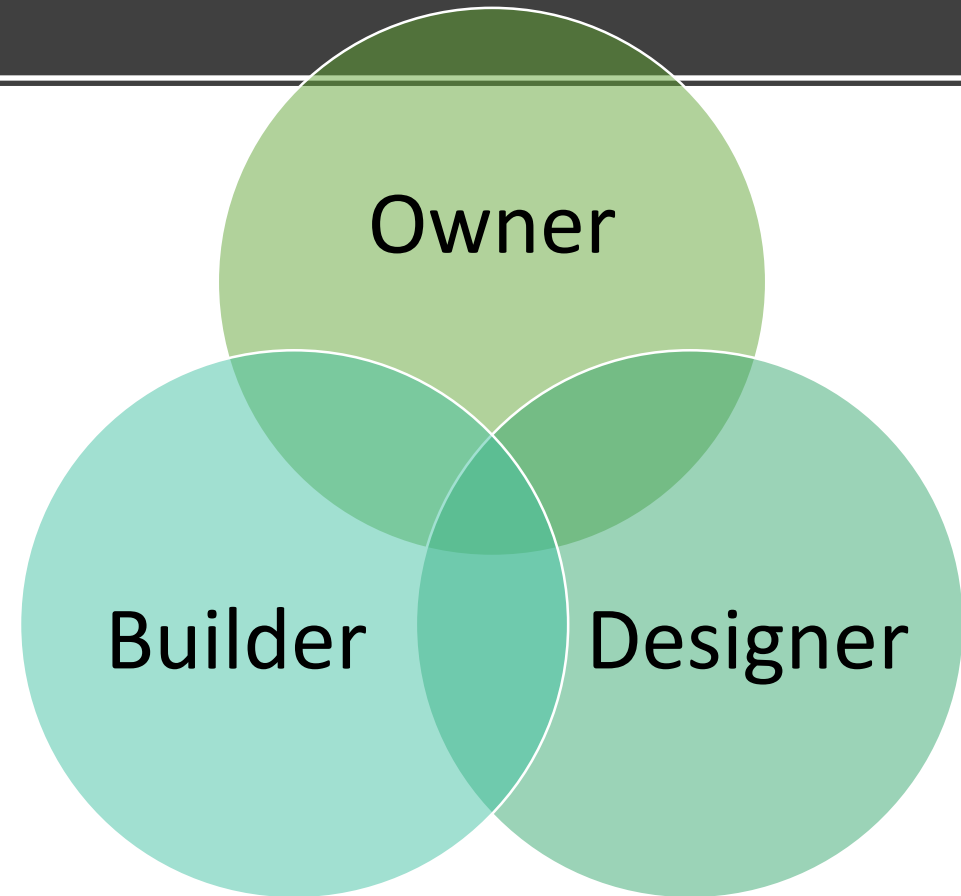
Design-Build Delivery Method

- The owner has a single contracts.
- The Design-Build Contractor may:
 - Have a design capability within its own organization
 - May choose to enter into a joint venture with a design firm
 - May hire a design firm
- In some cases the design firm may hire the construction firm.
- Construction may be initiated early in the design process.
- Design-Build contractor is responsible for interfacing with the owner and managing both design and construction tasks.
- A variation to this method is Design-Build-Operate-Maintenance (often used for utilities projects)



Integrated Project Delivery Method

- Relational Contract as opposed to transactional Contract.
- Risks & rewards are shared.
- The project is managed by the management group composed of senior representative of owner, builder & designer.





Contract Pricing Methods

- Lump sum
- Unit Price
- Cost Plus
- Time & Material

Contract Pricing Methods

- The owner chooses a method based on how much risk to assume and how much to impose on the contractor.
- Contractors want compensation for risk they assume.

Lump-Sum Contracts (fixed-price)



The scope of work can be defined.



The contractor is responsible for determining all the material, labor, equipment, and subcontract costs to establish the project cost.



The initial contract price may be modified by change orders.



Can be used for design-build projects as well (based on given criteria)

Unit Price Contract



Exact quantities of work are not known.



Designer estimates quantities required



Contractor establishes unit prices



Unit price includes both direct & indirect costs.



Total contract price can not be determined until completion of the work.

Work Items	Unit	Estimated Quantity	Unit Price	Bid Amount
Soil Excavation	Cubic yards	12,000	\$6.00	\$72,000
12" Concrete pipe	Linear feet	1,000	\$18.00	\$18,000
Crushed rock fill	Cubic yards	3,000	\$24.00	\$72,000
Compacted fill	Cubic yards	9,000	\$15.00	\$135,000
TOTAL				\$297,000

Cost-Plus Contracts



The scope of work cannot be defined.



All specified contractor's project related costs are reimbursed by the owner, and a **fee** is added to cover **profit** and company **overhead**.



Fee is based on:

Risk

Size of project

complexity of project

Contractor's reputation



Variations:

Cost-plus-fixed-fee

Cost-plus-percentage-fee

Cost-plus-incentive-fee

Cost-plus-award-fee

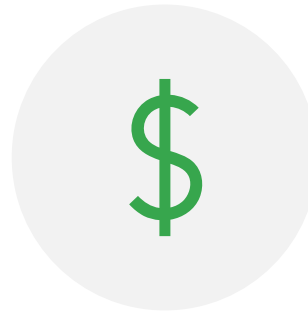
Guaranteed Maximum Price Contracts



A VARIATION OF COST-PLUS
CONTRACT WITH A PRE-
ESTABLISHED MAXIMUM PRICE



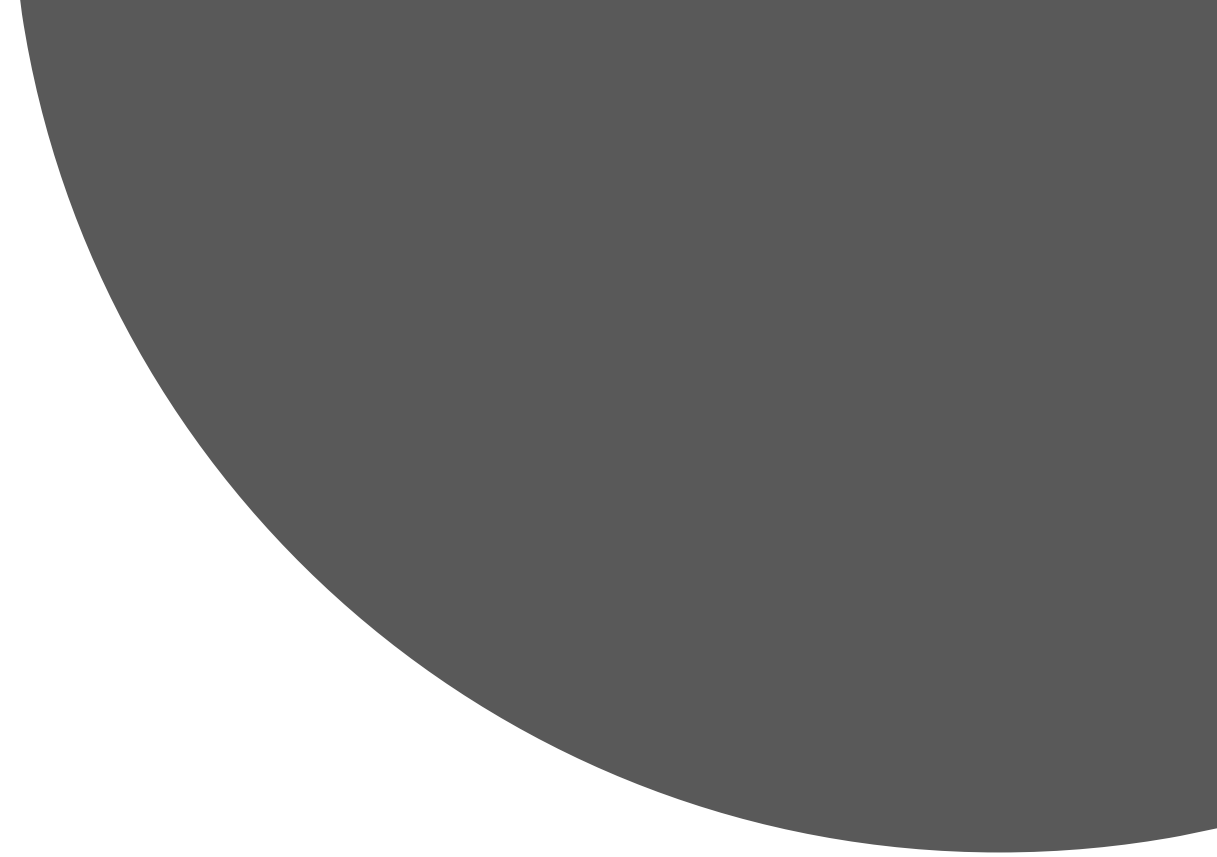
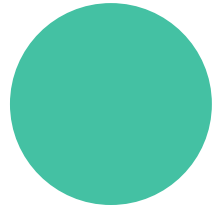
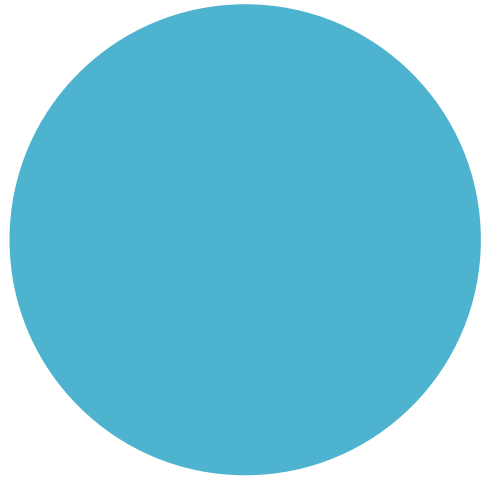
CONTRACTOR GUARANTEES THE
OWNER A MAXIMUM (NOT-
TO_EXCEED) PRICE.



CONTRACTOR ABSORBS ANY
COST OVERRUN ABOVE
GUARANTEED PRICE



SAVINGS TO THE OWNER
UNLESS THERE IS A COST
SAVINGS SHARING PROVISION.



Which cost-acquisition method is
best for integrated projects?

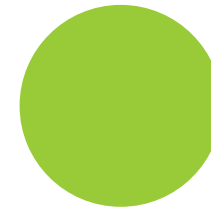


- Work can begin before project scope is completely defined=> Reducing project time.
- Quicker Response to Design Changes & Unforeseen Conditions
- Owner can Participate in all major construction decisions & control outcome
- Owner can utilize Contractor's expertise during design, in Constructability Studies, during Value Engineering Studies, and in Estimating Construction Costs.
- Can achieve better projects by prequalifying contractors & subs.
- With Guaranteed Maximum Price Option, Owner may pass some of the risk to the contractor.

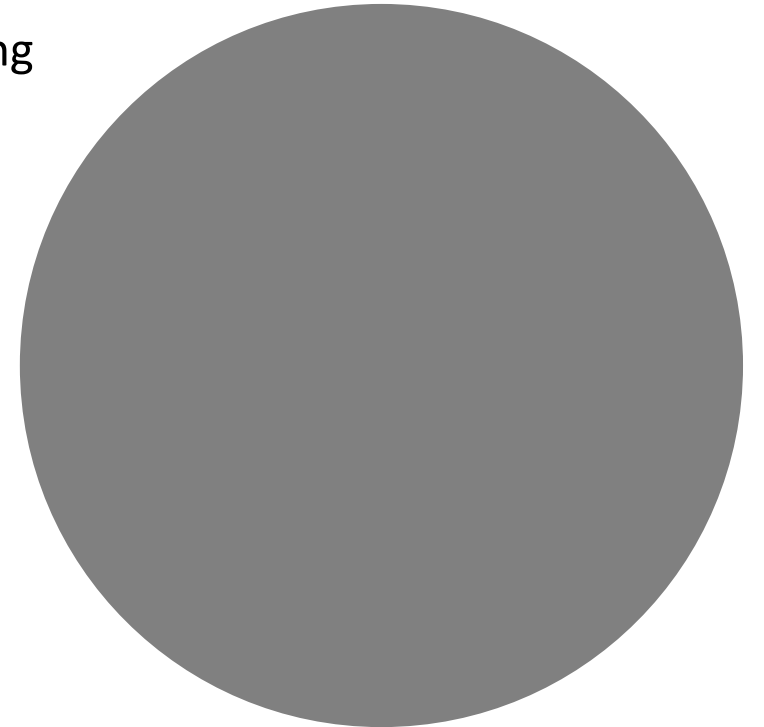
Cost-Plus Contract Advantages (Owner Perspective)

- May not be the most cost effective method particularly in competitive construction environment.
- Contractor can take advantage if the Owner is unsophisticated and does not have knowledgeable personnel to monitor the project.
- Owner's & designer's involvement are greater due to need for additional project controls for expenditure, Schedules approvals, etc.
- Definition of project elements which involve reimbursable and non-reimbursable items will require special attention during negotiations:
 - Tools & equipment
 - Home office expenses vs. project expenses
 - Number of overhead personnel at the job site vs. use of home office staff.

Cost-Plus Contracts Disadvantages (owner's Perspective)



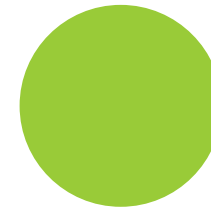
- Contractor can reduce or eliminate the risk of Lump Sum Contracting by accepting a guaranteed fixed profit.
- Contractor will reduce her/his cost of bidding lump sum projects.
- If contractor performs well, s/he may obtain future work without expensive bidding costs.
- Contractor can staff job site to cover all required work under reimbursable costs vs. use of home office staff.
- Contractor can benefit from use of rented equipment & tools.



Cost-Plus Contract Advantages (Contractor Perspective)

- Negotiated profit can be minimal as compared to lump sum contracting profit potential in areas of contractor expertise.
- Planning & control of project will become difficult if extensive changes requiring fast response occur.
- In Guaranteed Maximum Price Contracts Contractor may assume risk not under her/his control.
- Contractors not familiar with cost plus contracting might resent Owner's day-to-day involvement in Project decision making.
- Contractor's reputation will suffer if schedule delays or cost overruns and Owner's involvement affect project outcome.

Cost-Plus Contracts disadvantages (Contractor Perspective)



Questions to
Consider for
writing the
Reflections:



1- WHAT ARE SOME OTHER
DELIVERY METHODS USED IN OUR
COUNTRY? WHAT ARE THEIR PROS
& CONS?

Preparation Reading for Next Class:

Subject:

Partnering & Team Building in Construction
Projects; Commercial Terms in IPD projects

