Strategic Selection of Delivery Systems: Selection Process, Design-Build, Fast-Tracking, Partnering

401.649 Cost Planning for Construction Projects

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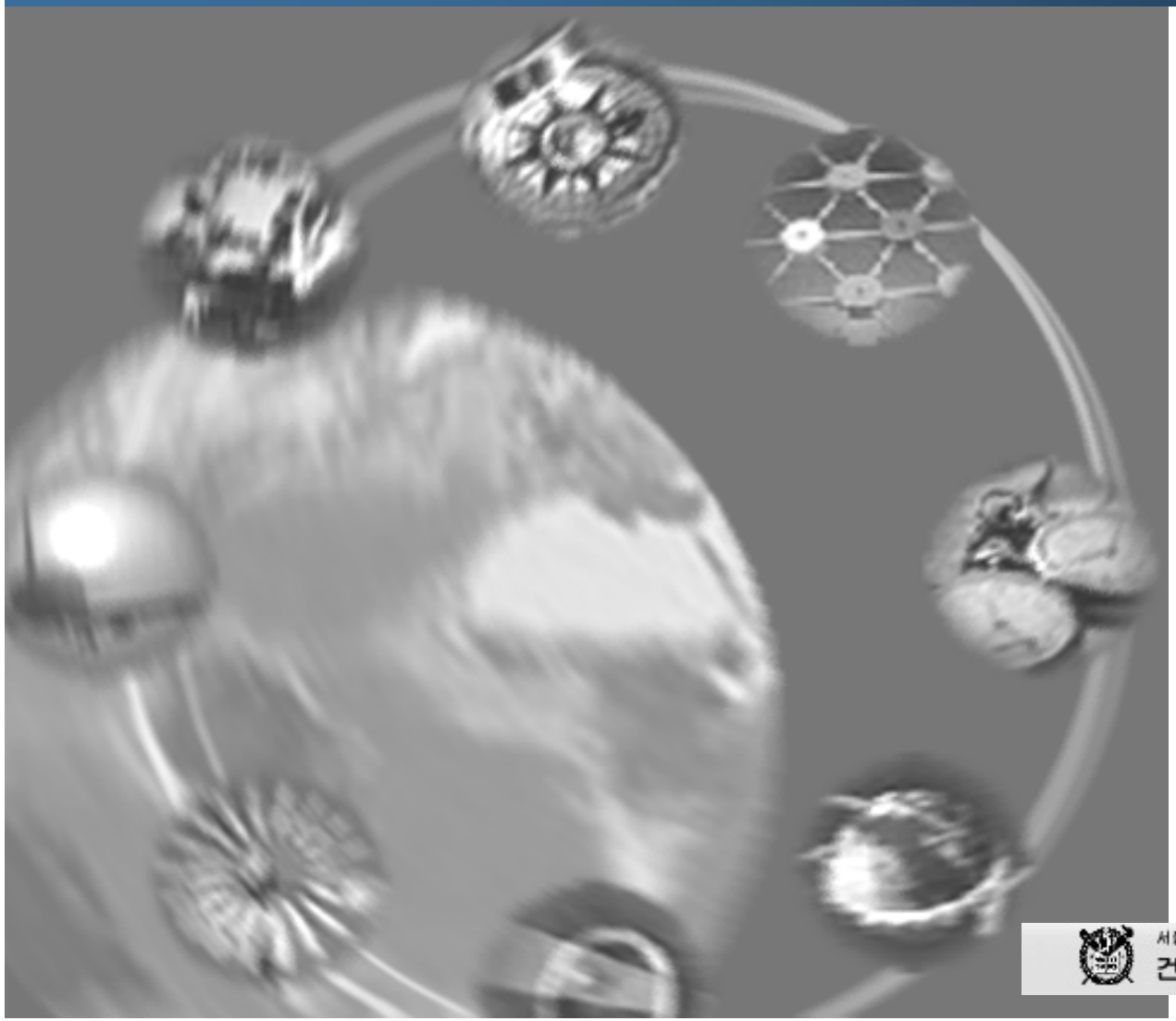

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Lecture Outline

- **Delivery System Selection Process**

  Organization Selection

  Contract Selection

  Award Selection

- **Emerging Delivery Systems**

  Fast-Tracking

  Design-Build

  Partnering

Delivery System Selection Process

- An ‘art’ rather than a ‘science’
- A ‘process of elimination’ approach
- Requires an initial understanding of the project such as rough cost estimates, schedule needs, and design parameters
- Selection Process consists of:
  - Organization Selection
  - Contract Selection
  - Award Selection

Organization Selection

- Choosing an appropriate organization to conduct the project, taking into account three types of following characteristics:
  - Project Drivers
  - Owner Drivers
  - Market Drivers

Project Drivers

- Time Constraints
- Financial Constraints
- Flexibility Needs
- Pre-construction Service Needs
- Design Process Interactions

Project Drivers

Drivers	GC-FP	GC-R	CM	MP	T-FP	T-R	BOT
Fast-track schedule		v	v	v	v	v	v
Sequential schedule	v	v	v	v	v	v	v
More flexibility		v	v	v		v	
Less flexibility	v	v	v	v	v	v	v
Pre-construction service needed		v	v		v	v	v
No pre-construction service needed	v	v	v	v	v	v	v
Design interaction	v	v	v	v		v	
Less design interaction	v	v	v	v	v	v	v
Construction financing needed					v	v	v
Permanent financing needed							v
Owner financing	v	v	v	v			

Project Drivers vs. Organization Matrix

An Example of Selection Process

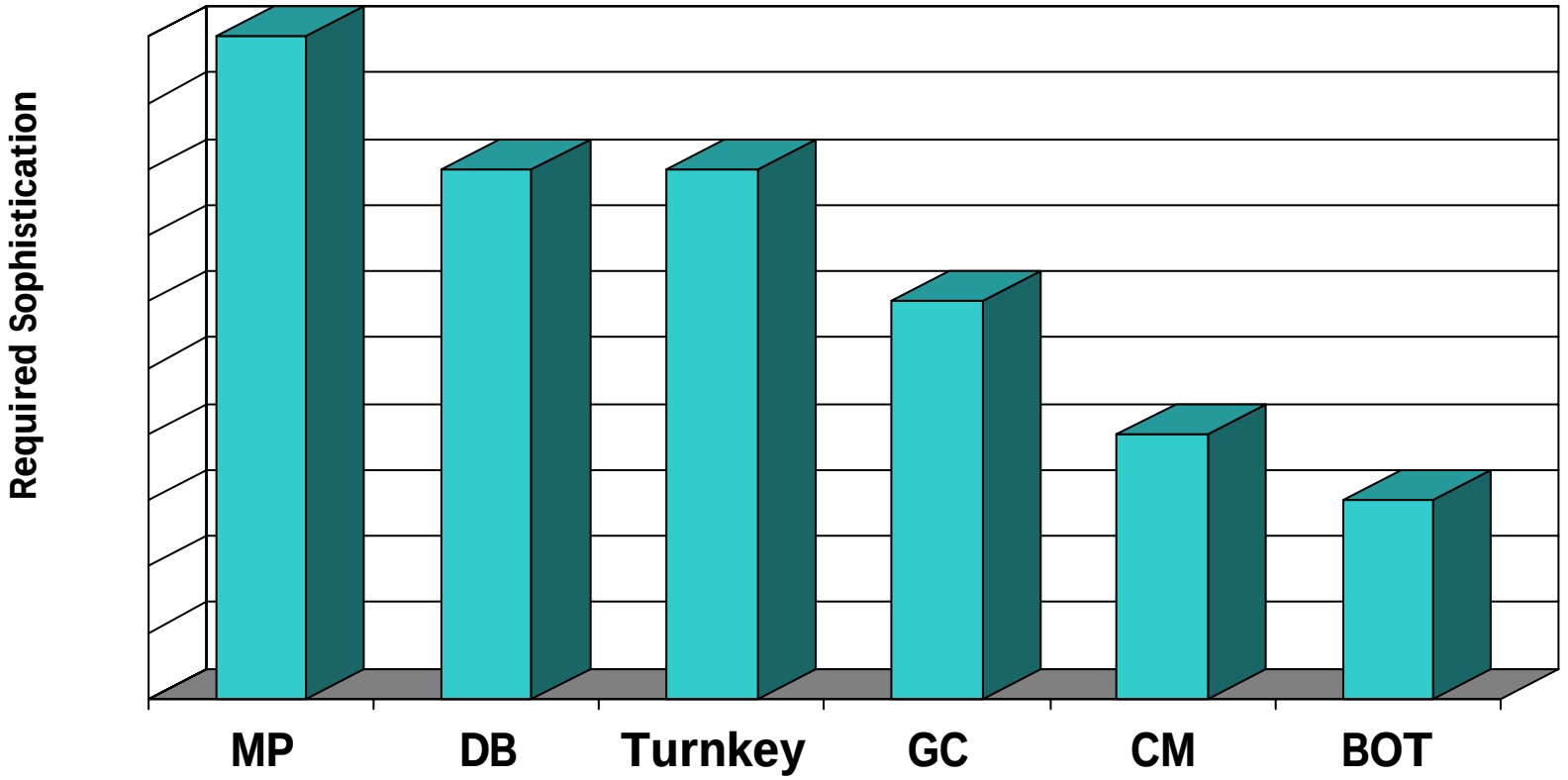
Drivers	GC-FP	GC-R	CM	MP	T-FP	T-R	BOT
Fast-track schedule		v	v	v	v	v	v
Sequential schedule	v	v	v	v	v	v	v
More flexibility		v	v	v		v	
Less flexibility	v	v	v	v	v	v	v
Pre-construction service needed		v	v		v	v	v
No pre-construction service needed	v	v	v	v	v	v	v
Design interaction	v	v	v	v		v	
Less design interaction	v	v	v	v	v	v	v
Construction financing needed					v	v	v
Permanent financing needed							v
Owner financing	v	v	v	v			

Project Drivers vs. Organization Matrix

Owner Drivers

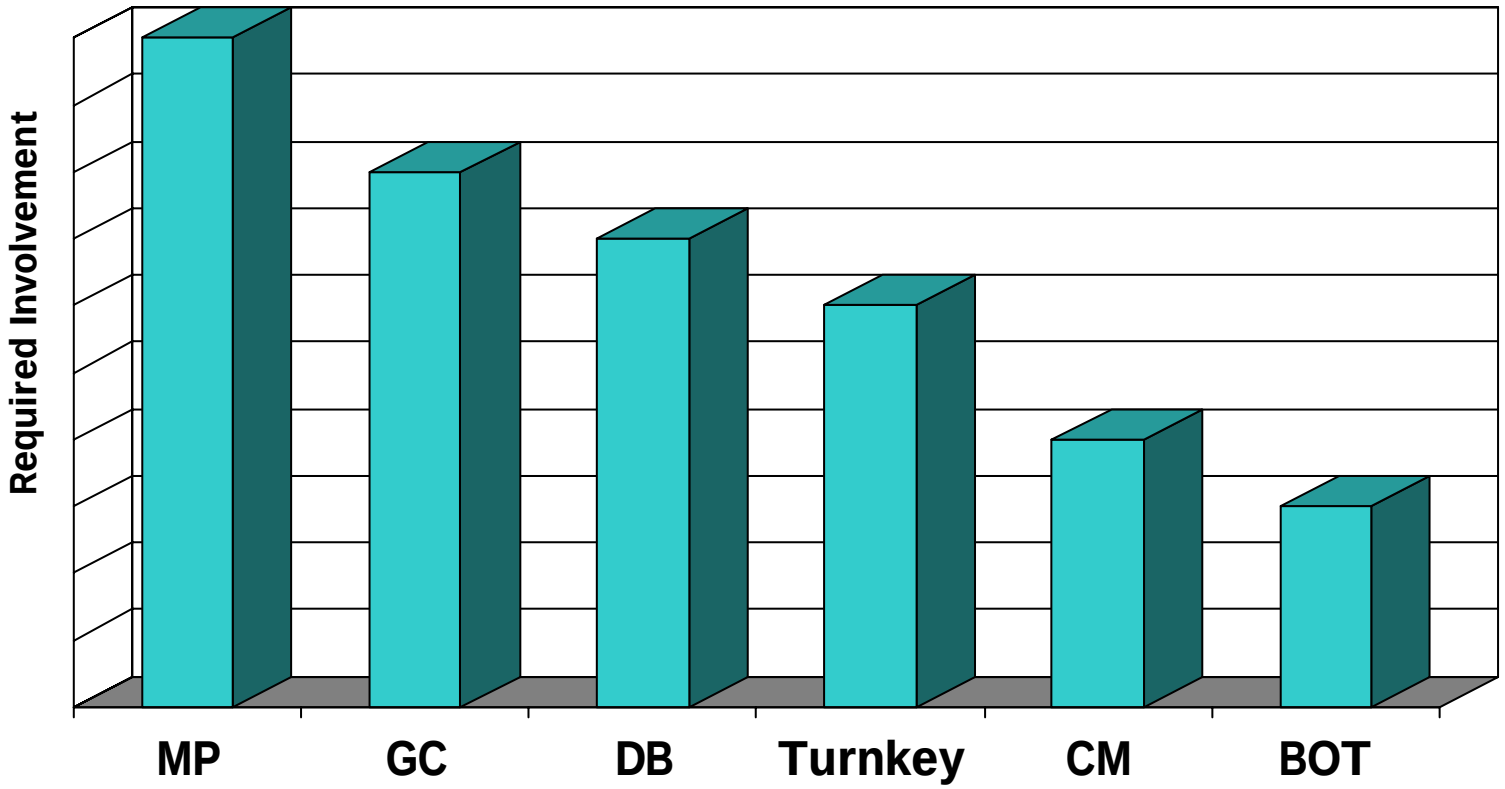
- Construction Sophistication
- Current Capabilities
- Risk Aversion
- Restrictions on Methods
- Other External Factors

Owner Sophistication



Owner Sophistication Graph
(dimensionless)

Owner Involvement



Owner Involvement Graph (dimensionless)

An Example of Selection Process

Drivers	GC-FP	GC-R	CM	MP	T-FP	T-R	BOT
Fast-track schedule		v	v	v	v	v	v
Sequential schedule	v	v	v	v	v	v	v
More flexibility		v	v	v		v	
Less flexibility	v	v	v	v	v	v	v
Pre-construction service needed		v	v		v	v	v
No pre-construction service needed	v	v	v	v	v	v	v
Design interaction	v	v	v	v		v	
Less design interaction	v	v	v	v	v	v	v
Construction financing needed					v	v	v
Permanent financing needed							v
Owner financing	v	v	v	v			

Owner Drivers vs. Organization Matrix

Market Drivers

- Availability of Appropriate Contractors
- Current State of the Market
- Packaging Size of the Project

An Example of Selection Process

Drivers	GC-FP	GC-R	CM	MP	T-FP	T-R	BOT
Fast-track schedule		v	v	v	v	v	v
Sequential schedule	v	v	v	v	v	v	v
More flexibility		v	v	v		v	
Less flexibility	v	v	v	v	v	v	v
Pre-construction service needed		v	v		v	v	v
No pre-construction service needed	v	v	v	v	v	v	v
Design interaction	v	v	v	v		v	
Less design interaction	v	v	v	v	v	v	v
Construction financing needed					v	v	v
Permanent financing needed							v
Owner financing	v	v	v	v			

Market Drivers vs. Organization Matrix

Contract Selection

- Determining how the owner will pay the contractor for work performed.
  - Fixed Price (확정계약) : lump sum (총액계약) , unit prices (단가계약), 총액단가, (순수)내역입찰
  - Reimbursable (개산계약) : cost-plus (실비정산보수가산) / a fixed fee, a percentage, etc
  - Hybrid: a guaranteed maximum price (GMP: 최대공사비 보증가격)
- Contract decision needs to revolve around risk (mainly financial risks) allocation. An appropriate contract type can be selected by properly assess risks involved, allocating the risks, and ensuring that each party can properly manage the risks allocated to them.

Assessing Risks

- Need to scrutinize the characteristics of the proposed project, in order to identify potential risks involved.

- Lack of final and/or complete information at the time of award can create the financial risk.

  e.g., unknown sub-surface conditions (unbalanced subsidence of the building), fast-tracking (awarding a contract based on incomplete drawings)

- Thus, the finality of construction documents and flexibility required during construction would be the most critical issues.

Allocating Risks

- Risk allocation should be balanced between the owner and the contractor or designer so that each party can utilize the incentive value of bearing risks, while minimizing a contingency charged for accepting the risks.

- A group's efficiency in handling risks is determined by 1) its power to control the risks, 2) potential rewards for controlling the risks, and 3) its financial position to assume the risks.

Allocating Risks

- Thus, the owner should select a contract that most effectively allocate the financial risks of the proposed project to parties.

- Two Extremes: one contractor with a lump sum price (well defined projects), pure cost-plus (when the owner is confident of their ability to control costs or when price does not matter)

Managing Risks

- Once parties have agreed what risk will bear through contracting, they need to prepare how to manage the allocated risks.

- Examples include:
  - Setting up a knowledgeable organization to monitor the project.
  - Motivating the contractor by including incentives in contracts.

Award Selection

- The method used to select the contractor and/or the price
  - Two Extremes: lump sum competitive bidding, single-source negotiation
  - Common Variations: bidding with prequalification of contractors, competitive negotiation

- Challenges
  - Competitive Bidding: Incapable contractors, low quality work
  - Negotiation: hard to determine the market price, vulnerable to favoritism or corruption

Key to a Successful Award

- Different perceptions of construction as either a *commodity* or *a service*

- Isolate the two types of products
  - Commodities: e.g., materials and some labor available on the market
  - Services: e.g., technical expertise and management abilities (less able to be bought on a price-only basis)
- Award each in an appropriate way
  - Commodities: bidding
  - Services: negotiation or multiparameter bidding

An Example of Selection Process

- Construction Management
- Contract Type (with Subcontractors): GMP
- Award Type (Contract with Subcontractors): Bidding among pre-qualified contractors

Delivery System Selection Steps

Scrutinize Project Drivers to Eliminate Inappropriate Organizations

- Time Constraints
- Design Process Interaction
- Pre-Construction Service Needs
- Flexible Needs
- Financial Constraints

Scrutinize Owner Drivers to Further Eliminate Inappropriate Organizations

- Construction Sophistication
- Restrictions on Methods
- Risk Aversion
- Current Capabilities
- Other External Factors

Scrutinize Market Drivers to Eliminate Inappropriate Methods

- Availability of Appropriate Contractors
- Packaging Size of the Project
- Current State of the Market

Consider Risk Allocation and Project, Owner, and Market Drivers to Choose Contract Type

Use Commodity vs. Service Analysis to Choose Contract Award Method

Use Judgment and Experience to Create the Final Contracting Method from Remaining Options

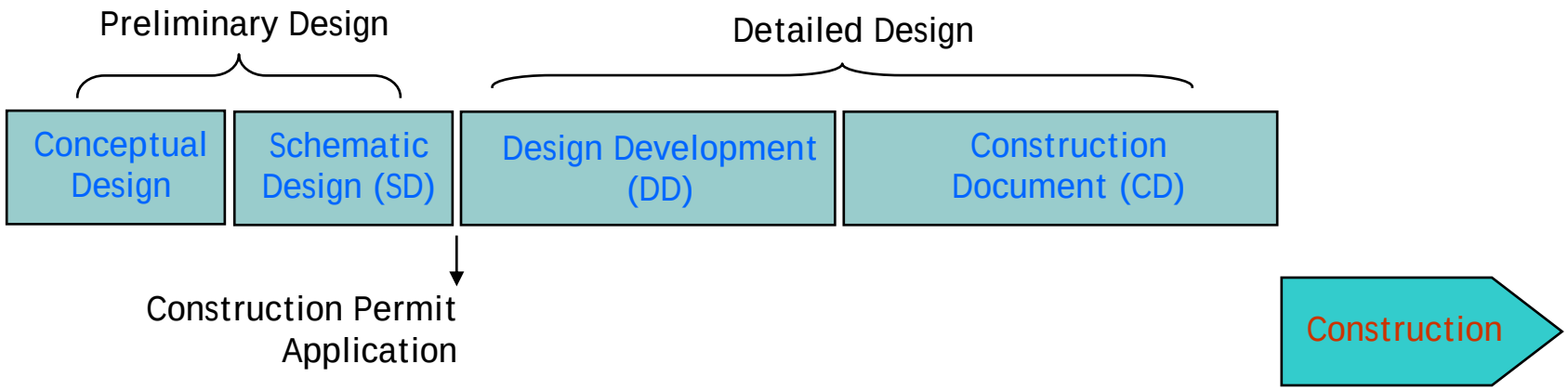
Lecture Outline

- ✓ **Delivery System Selection Process**
  - Organization Selection
  - Contract Selection
  - Award Selection

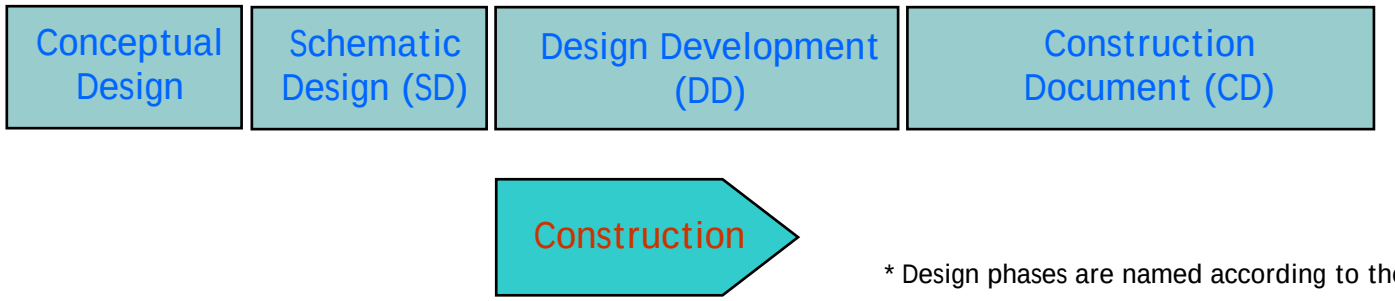
- **Emerging Delivery Systems**
  - Fast-Tracking
  - Design-Build
  - Partnering

Fast-Tracking

Sequential Delivery



Fast-Tracking

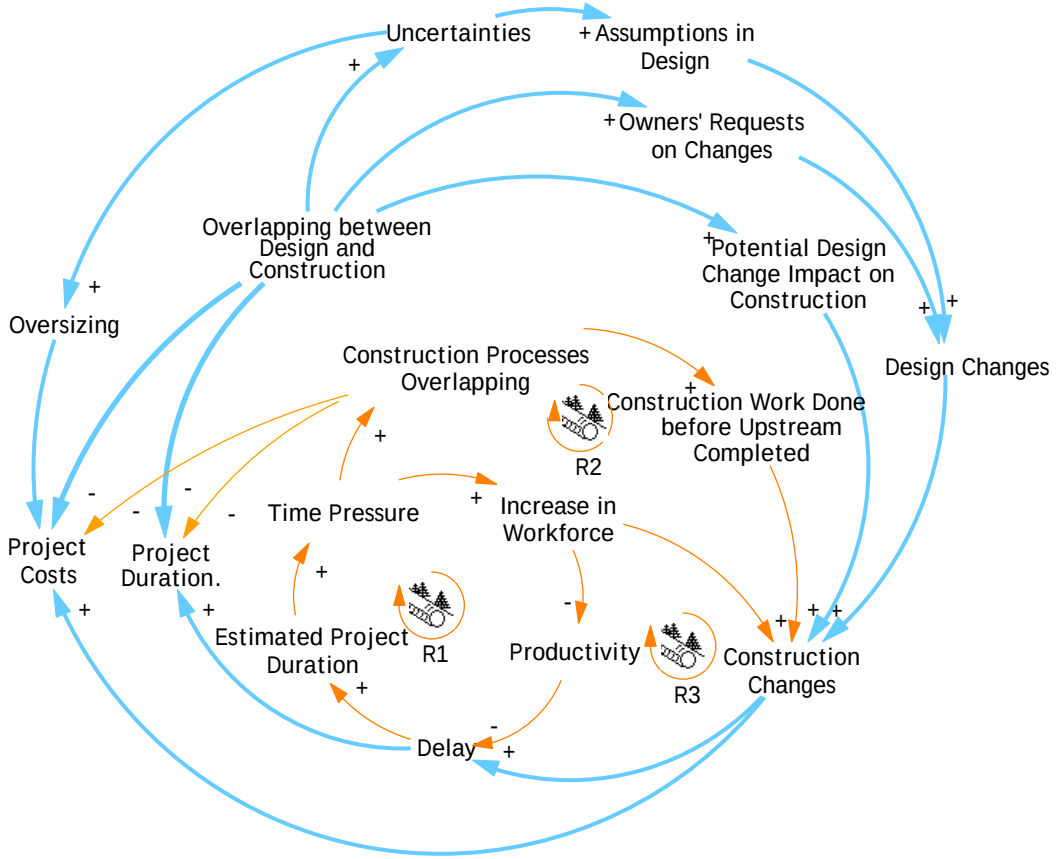


* Design phases are named according to the AIA Standard.

Potential Risk of Fast-Tracking

- Fast-tracking has received considerable attention over the last decade.
- Despite its promise of speed, fast-tracking also has greater potential to impact the project development process than the traditional more sequential method.
- In reality, often results in unexpected costs and does not necessarily lead to the expected shorter project duration [Fazio et al., 1988].

Potential Risk of Fast-Tracking



Design-Build

To be successful,…

- **End Users**
  - A thorough understanding of needs
  - Clear input to project

- **Client**
  - Comprehensive pretender site investigation
  - Clear understanding of scope
  - Pre-qualifying potential tenders
  - Establishing a capability to manage D&B team

- **Contractor**
  - Strong design management expertise
  - Project management capability
  - Choosing appropriate construction methods

- **Designer**
  - Developing a cost-effective design on time
  - A good grasp of buildability

Partnering

Objectives

"Partnering, through improved communication, aims to help parties to be less protective and to find a better way for whole project".

Background

- The structure of construction projects is getting more complex and their management becomes more difficult.
- Project participants rarely understand their obligations under the contract, resulting in an increase in disputes and project costs.
- These industry environments increased the need for additional process steps to assure that potential problems are discussed and evaluated clearly by all parties.

As a process architecture

- Used to encourage and allow for inter-disciplinary exchange of ideas and identification of project risks.
- Neutral facilitators play a central role in the success of partnering.
- It is voluntary process and not legally-binding, and it does not alter the contractual obligations.

Discussion

Bidding (입찰)

- Competitive Bid (경쟁입찰)
  - General Open Bid (일반/공개 경쟁입찰)
  - Limited Open bid (제한 경쟁입찰): 군 (群)제한입찰, 지역제한입찰, PQ
  - Nominated bid (지명 경쟁입찰)

- Negotiated Contract/ Contract Ad-libitum (수의계약)

Bond/Security (보증)

선계약후생산 계약체계하에서 보증채권자 (obligee: 발주자)에 대한 주채무자 (principal: 도급자)의 계약 이행 의무를 제3자인 보증인 (surety: 보증회사)가 담보하는 제도

- Bid bond/Security (입찰보증: 입찰금액 5% 이상)
- Contract Security/Performance bond (계약보증/이행보증)
- Retention money bond (유보금보증, 하자보수보증금)
- Liquidated Damage (지체보상금)

감리

구 분		감리대상범위	감리자격	감리대가기준	감리 및 감독방법	감리원배치기준	관계 법령
공공부문	토목	100억원 이상 공사	감리전문회사	-	책임감리	건설공사 감리원 배치 기준에 따라 배치	건설기술 관리법
		100억원 미만 공사	소속 공무원	-	공사감독	공사규모에 따라 인원 배치	
	건축	100억원 이상 공사	감리전문회사	-	책임감리 (전면/부분)	건설공사 감리원 배치 기준에 따라 배치	건설기술 관리법
		100억 미만 공사	건축사	-	공사감리	건축물 규모에 의한 상주 또는 비상주배치	건축법
공동주택		300세대 이상	감리전문회사 (건축/종합)	-	공사감리	주택법시행령에 따라 배치 (감리 제외공종 미포함)	주택법
		20세대 ~ 300세대 미만	건축사				
다중이용 건축물		. 연면적5000㎡이상 다중이용시설물 . 16층이상 건축물	감리전문회사 건축사	-	공사감리	건설공사 감리원 배치기준에 따라 배치	건축법
주상복합건물		. 주택 300세대 이상	감리전문회사	-	공사감리	주택법시행령에 따라 배치 (감리 제외공종 미포함)	주택법
		. 주택 300세대 미만	감리전문회사 / 건축사	-	공사감리	건설공사 감리원 배치 기준에 따라 배치	건축법
민간부문	토목	민간 발주공사	엔지니어링 활동 주체	엔지니어링 사업대가기준	공사감리	-	엔지니어링 기술진흥법
	건축	공공부문의 건축공사 및 다중이용건축물을 제외한 민간 발주공사	건축사	-	공사감리	건축물 규모에 의한 상주 또는 비상주 배치	건축법
공통	소방	소방설비공사	소방감리 등록업체	엔지니어링 사업대가기준	소방감리	-	소방법
	전기	전기공사	전력시설감리 등록업체	전력기술용역 대가 및 공사감리원 배치기준	전기감리	공사감리원 배치기준에 따라 배치	전력기술 관리법
	정보통신	정보통신공사	정보통신감리 등록업체	정보통신설비 공사감리대가 표준품셈	통신감리	감리원의 배치기준에 따라 배치	정보통신 공사업법

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