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PROJECT MANAGEMENT 2

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ARUP

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WHAT IS A PROJECT?

Organization of resources into activities

Implementation of the activities in a logical sequence
WHAT ARE RESOURCES?

Materials
Equipment
Technology
People
Time
Money
NATURE OF THE CONSTRUCTION INDUSTRY

Like Manufacturing industry – Involves the production of a physical product

Like Service industry – Does not accumulate large amount of capital
– Many small businesses
Like Manufacturing industry – Involves the production of a physical product

Like Service industry – Does not accumulate large amount of capital
– Many small businesses

Success or failure is highly dependent on the qualities of the people rather than
Technologies protected by patent
or
Availability of capital facilities
CONSTRUCTION INDUSTRY IS HIGHLY CUSTOM ORIENTED

Desire for Uniqueness of Product
(not Mass Production)

Organization structure is highly specialized
and layered

Complex interlocking of interests and traditions
- Architecture
CONSTRUCTION INDUSTRY IS HIGHLY INCENTIVE ORIENTED

Advances tend to develop from innovations or “better ideas”

Cannot be protected by laws of secrecy or patents

Ideas disseminate quickly

Benefit Competitors

Lack incentive for investment in R&D
INTEREST GROUPS

**Owner** wants to achieve best value for their investment

**Contractors** desire to bid low enough to win but high enough to realize profit on investment

**Workers** hope to achieve better living standards and working conditions
INTEREST GROUPS

**Owner** wants to achieve best value for their investment

**Contractors** desire to bid low enough to win but high enough to realize profit on investment

**Workers** hope to achieve better living standards and working conditions

**Architect and Engineers** are not directly associated with the above groups

*Professional achievement more attractive*
LIFE CYCLE OF A PROJECT

Seven Phases

Concept and Feasibility Studies
Preliminary Engineering and Design
Detailed Engineering and Design
Procurement
Construction
Start-up and Implementation
Operation or Utilization
1. Concept and Feasibility Studies

Forecast Future Demand
Location
Availability of Resources
Accessibility to transportation

Political and Institutional Factors
Sociological and Economic Impact on Community
Environmental Impact

Overall Technical and Economic Feasibility
2. Preliminary Engineering and Design

- Architectural concepts
- Evaluation of technological process alternatives
- Size and capacity of facility
- Comparative economic studies

- Reviews by regulatory bodies for compliance
  - Zoning regulations
  - Building codes
  - Licensing procedures
  - Safety standards
  - Environmental impact

- Public Hearing

- Funding cycles in Legislative and Executive Bodies
3. Detailed Engineering and Design

- Design of Architectural Elements
- Design of Structural Elements
- Site Investigation
- Foundation Design
- Mechanical, Electrical and Plumbing Design
- Preparation of Specifications and Drawings
- Preparation of Contract Documents
3. Detailed Engineering and Design

- Design of Architectural Elements
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- Foundation Design
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- Preparation of Specifications and Drawings
- Preparation of Contract Documents

Field Construction Methods
Cost Knowledge
4. Procurement

Services
Equipment
Materials
4. Procurement

- Services
- Equipment
- Materials

- Lump Sum Contract
- Cost Plus Fee Contract
- Negotiated Contract
5. Construction

Process whereby the Designer’s Plans and Specifications are converted into Physical Structures and Facilities

Co-ordination of all resources to complete the project
On Schedule
Within Budget
According to Specified Standard of Quality and Performance
6. Start-up and Implementation

Testing of Components
Warranty Period
7. Operation and Utilization

Regular Maintenance of Facilities
DESIGN TEAM

- Architect
- Interior Designer
- Landscape Architect
- Civil Engineer
- Environmental Engineer
- Electrical Engineer
- Mechanical Engineer
- Chemical Engineer
- Geologist
- Environmental Scientist
- Economist
CONSTRUCTION TEAM

- General Contractor
- Land Surveyor
- Formwork Carpenters
- Steel Fabricators
- Concreters
- Bricklayers
- Plant and Equipment Operators
- Specialist subcontractors
- Suppliers
**Construction Contracts**

*American Institute of Architects*

**Documents**

- **A101** Standard Form of Agreement between Owner and Contractor – Stipulated Sum
- **A111** Standard Form of Agreement between Owner and Contractor – Cost of the Work Plus a Fee
- **A201** General Conditions of Contract for Construction
- **B141** Standard form of Agreement between Owner and Architect
- **A132** Performance Bond and Payment Bond
Elements of a Construction Contract

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Architect/Engineer → Owner

Owner → General Contractor
ORGANIZATIONAL RELATIONSHIPS

Architect/Engineer <-> Owner

Owner -> General Contractor

General Contractor

Subcontractor Subcontractor Subcontractor

2nd Tier Subcontractor

3rd Tier Subcontractor
ORGANIZATIONAL RELATIONSHIPS

Architect/Engineer → Owner

General Contractor

Subcontractor  Subcontractor  Subcontractor

2nd Tier Subcontractor

3rd Tier Subcontractor

Supplier
ORGANIZATIONAL RELATIONSHIPS

- Owner
  - Construction Manager
    - Subcontractor
      - 2nd Tier Subcontractor
        - 3rd Tier Subcontractor
          - Supplier
  - Specialists
  - Architect/Engineer
ORGANIZATIONAL RELATIONSHIPS

Architect/Engineer

Owner

Specialists

Construction Manager

General Contractor

Subcontractor Subcontractor Subcontractor

2nd Tier Subcontractor

3rd Tier Subcontractor

Supplier
ORGANIZATIONAL RELATIONSHIPS

- Owner
- Architect/Engineer
  - Specialists
  - Design Builder
    - Subcontractor
      - Subcontractor
        - 2nd Tier Subcontractor
        - Subcontractor
          - 3rd Tier Subcontractor
          - Supplier
ORGANIZATIONAL RELATIONSHIPS

Architect/Engineer  Owner

Specialists

Subcontractor  Subcontractor  Subcontractor

2nd Tier Subcontractor

3rd Tier Subcontractor

Supplier
ORGANIZATIONAL RELATIONSHIPS

Beneficiary

Principal

Owner

General Contractor

Subcontractor Subcontractor Subcontractor

2nd Tier Subcontractor

3rd Tier Subcontractor

Supplier

Performance Bond

Surety
Insurance
Requirements under AIA A201 Contract Documents

- Contractor’s Liability Insurance
- Owner’s Liability Insurance
- Property Insurance
- Loss of Use Insurance
- Workmen Compensation
- Disability Benefits
OWNERS RESPONSIBILITY

Make Financial Arrangements to fulfill his obligations

Furnish Accurate Contract Specifications and Drawings for the Contractor’s work

Right to Stop Work

Right to Change Work

Right to Terminate Contract if Contractor Defaults
Architect’s Responsibility

Architect is the Owner’s Representative

Architect is the Administrator of the Contract

Visit site at appropriate stages of construction to familiarize himself generally with the progress and quality of the Work and to determine whether Work is proceeding in accordance with Contract Documents.

Advice the Owner on Work Progress

Guard the Owner against Defects and Deficiencies in the Work of the Contractor

Reviews Contractor’s Claims and Approves Amount to be paid to the Contractor

Architect is not responsible for Methods of Construction or Site Safety
Contractor’s Responsibility

- Review Contract documents for Errors and Inconsistencies
- Supervise and Co-ordinate all Construction Work
- Provide full time Superintendent on Site
- Responsible for Site Safety
- Indemnify the Owner against any Claims by third parties
Handling Disputes

Contract is signed between Owner and Contractor

Architect acts as Interpreter of the Contract between Owner and Contractor

Architect acts as Judge of the Performance of the Owner and Contractor

All disputes between Owner and Contractor shall be decided by Architect

Architect shall not show Partiality

Architect’s Decision on Artistic Effects is Final

Arbitration
Basic Management Activities

Scoping
Planning
Organizing
Controlling
SCOPING
Establishing Realistic and Specific Objectives
State in advance the Desired Results

PLANNING
Programming
Costing
Scheduling
ORGANIZING

Design of the Organization Structure

Delegation of Responsibilities

Working Relationships between Individuals and Groups

System of Communication to keep everyone informed

Provide Leadership

Feedback Loop
CONTROLLING

Awareness of Current Status of Cost, Schedule and Quality Performance compared to Project Goals

Regular Inspection and Supervision

Formulate Procedures to Identify Errors in time for Remedial Works to be made

Manage Disputes
Project Management - Summary

- Know Your Scope of Works
- Understand Your Contractual Obligations
- Plan Activities in Detail
- Resolve Problems Quickly
- Manage Subcontractors
- Manage Cash Flow
To Be A Good Project Manager
To Be A Good Project Manager

KNOW YOUR STUFF

&

KEEP COOL