

Course Outline of Construction Project Management



Compiled by:

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Fundamentals of Construction Project Management	
1.1. Project Management Fundamentals	
1.2. Construction Project Management.....	
1.2.1. Role of Project Managers.....	
1.2.2. Project Management Objectives	
1.2.3. Project Management Process	
1.2.4. Characteristics of Projects.....	
1.2.5. Scope.....	
1.2.6. Schedule.....	
1.2.7. Budget.....	
1.2.8. Health and Safety	
1.2.9. Key Points	
1.2.10. Knowledge Review	
1.3. Project Initiation Phase	
1.3.1. Introduction.....	
1.3.2. Role of the Owner/Agency in Project Initiation	
1.3.3. Project Requirements Definition.....	
1.3.4. Capability and Capacity Assessment	
1.3.5. Project Delivery Strategy	
1.3.6. Project Management Plan	
1.3.7. Supporting Management Plans	
1.3.7.1. <i>Quality Management Plan</i>	
1.3.7.2. <i>Risk Management Plan</i>	
1.3.7.3. <i>Contract Management Plan</i>	
1.3.7.4. <i>Contract Procurement Plan</i>	
1.3.7.5. <i>Contract Administration Plan</i>	
1.3.7.6. <i>Environmental Management Plan</i>	
1.3.7.7. <i>Health and Safety Management Plan</i>	
1.3.7.8. <i>Resource Management Plan</i>	
1.3.8. Key Points	
1.3.9. Knowledge Review	
1.4. Project Design Phase.....	
1.4.1. Introduction.....	
1.4.2. Role of the Owner/Agency in Project Design.....	
1.4.3. Role of Designer	

1.4.4.	Phases of Design	
1.4.4.1.	<i>Project Scope</i>	
1.4.4.2.	<i>Conceptual Design and Preliminary Engineering</i>	
1.4.4.2.1.	<i>Design Criteria</i>	
1.4.4.2.2.	<i>Alternative Analysis</i>	
1.4.4.2.3.	<i>Conceptual design</i>	
1.4.4.2.4.	<i>Preliminary Engineering</i>	
1.4.4.3.	<i>Final Design</i>	
1.4.5.	Design Reviews.....	
1.4.5.1.	<i>In-Progress Preliminary Submittal</i>	
1.4.5.2.	<i>Preliminary Engineering Submittal (30-percent Review)</i>	
1.4.6.	Third Party Coordination	
1.4.7.	Value Engineering.....	
1.4.8.	Constructability Reviews	
1.4.9.	Risk Management	
1.4.10.	Quality Assurance in Design.....	
1.4.11.	Quality Control in Design	
1.5.	Project Bidding Phase	
1.6.	Project Construction Phase	
1.5.1.	Introduction.....	
1.5.2.	Role of the Owner/Agency in Construction.....	
1.5.3.	Role of the Construction Manager	
1.5.4.	Role of Designer in Construction.....	
1.5.5.	Role of the Construction Contractor in Construction	
1.5.6.	Contract Management and Administration	
1.7.	Project Closeout and Termination Phase	
1.6.1.	Role of Owner/Agency	
1.6.2.	Role of Consultants and Contractors.....	
1.8.	Key Points.....	
1.9.	Knowledge Review	
	2.0 Cost Estimating and Scheduling of Construction Projects	
	2.a Work Breakdown Structure	
2.1.	Introduction to Cost Estimating and Scheduling of Construction Projects.....	
2.1.1.	Scope Management	
2.1.2.	Time Management	

2.1.3.	Cost Management	
2.2.	Defining Project Deliverable	
2.1.4.	Project Deliverables	
2.1.5.	Work Packages.....	
2.1.6.	Defining Deliverables through Decomposition	
2.1.7.	Identifying Deliverable’s Component.....	
2.3.	Work Breakdown Structure	
	2.b Construction Project Scheduling by Precedence Diagram Method.....	
2.4.	Sequencing Project Work.....	
2.4.1.	Logic Diagrams.....	
2.4.2.	Activity Sequencing Templates	
2.4.3.	Activity Relationships for Precedence Diagramming Methods	
2.4.4.	Precedence Diagramming Method.....	
2.4.5.	Guidelines to Estimation.....	
2.4.6.	Activity Resource Requirements	
2.5.	Schedule Development	
2.5.1.	Developing a Project Schedule	
2.5.2.	Critical Path Method	
2.5.3.	Leads and Lags.....	
2.5.4.	Compressing Schedule.....	
2.5.5.	Leveling of Resources.....	
2.5.6.	Schedule Baselines.....	
2.5.7.	Key Points	
2.5.8.	Knowledge Review	
	2.c Cost Estimating and Budgeting of Construction Projects.....	
	Introduction.....	
2.6.	Resource Planning	
2.6.1.	Inputs to Resource Planning	
2.6.1.1.	<i>The Work Breakdown Structure</i>	
2.6.1.2.	<i>Historical Information</i>	
-	<i>Manpower Utilization</i>	
-	<i>Material Utilization</i>	
-	<i>Equipment Utilization</i>	
2.6.1.3.	<i>Scope Statement</i>	
2.6.2.	Tools and Techniques to Resource Planning	

- 2.6.2.1. *Expert Judgement*.....
- 2.6.2.2. *Alternatives Identification*.....
 - *Brainstorming*
 - *Value Engineering*
- 2.6.3. *Outputs from Resource Planning*
- 2.6.3.1. *Resource Requirements*.....
 - *Choice of Equipment*.....
 - *Labor Requirements*.....
 - *Supplies and Materials*.....
- 2.7. *Cost Estimating*.....
 - 2.7.1. *Inputs to Cost Estimating*.....
 - 2.7.1.1. *Resource Rates*.....
 - 2.7.1.2. *Activity Duration Estimates*
 - 2.7.1.3. *Chart of Accounts*.....
 - *Project Number*.....
 - *Area Code*
 - *Work Type Code*.....
 - *Distribution Code*.....
 - 2.7.2. *Tools and Techniques for Cost Estimating*
 - 2.7.2.1. *Analogous Estimating*
 - 2.7.2.2. *Exponential Method*.....
 - 2.7.2.3. *Factorial Method*
 - 2.7.2.4. *Parametric Modeling Estimates*.....
 - 2.7.2.5. *Bottom-up Estimating*
 - 2.7.2.6. *Computerized Tools*
 - 2.7.3. *Outputs from Cost Estimating*.....
 - 2.7.3.1. *Direct Cost*
 - *Material Cost*
 - *Equipment Cost*.....
 - *Labor Cost*
 - 2.7.3.2. *Indirect Cost*.....
 - *Field Cost*.....
 - *Taxes*
 - *Jobsite Overhead Cost*
 - *Home Office Overhead Cost*

- *Risk Cost*
- *Risk Mitigation Cost*
- *Contingency*
- 2.7.3.3. *Supporting Details*
- 2.8. Cost Budgeting.....
- 2.8.1. Inputs to Cost Budgeting.....
- 2.8.1.1. *Work Breakdown Structure (See earlier topic on WBS)*
- 2.8.1.2. *Cost Estimates (See earlier topic on Cost Estimates)*
- 2.8.1.3. *Project Schedule (See 3.0 Project Scheduling by PDM)*
- 2.8.2. Tools and Techniques for Cost Budgeting (*same T & T for Cost Estimating*)
- 2.8.3. Outputs of Cost Budgeting.....
- 2.8.3.1. *Cost Baseline*
- *Project Cash Flow*
- *S-Curve*
- 3.0 Quality Assurance and Quality Control in Construction Projects**.....
- 3.1. Management of Quality in Construction Project
- 3.1.1. Quality in Construction.....
- 3.1.2. Quality Assurance vs Quality Control
- 3.1.3. Quality Control for Construction
- 3.1.4. Quality Manual
- 3.1.5. Quality Plan
- 3.1.6. Cost of Quality in Construction
- 3.1.7. Measurement of the Price of Non-Conformance (PONC).....
- 3.2. Control of Quality in Construction Sites.....
- 3.2.1. Project Quality Plan
- 3.2.2. Elements of a Quality Plan.....
- 3.2.3. Procedure
- 3.2.4. Method Statement
- 3.2.5. Inspection and Testing
- 3.2.6. Technical Specifications, Standards and Construction Tolerances.....
- 3.2.7. Shop Drawings and Materials Submittals.....
- 3.2.8. Non Conformance Report (NCR)
- 3.2.9. Quality Records.....
- 4.0 Construction Project Contract Administration, Site Supervision and Control**.....
- 4.1. Contract Administration.....

4.1.1.	Contract Management	
4.1.2.	Management of Civil Works Contract	
4.1.3.	Types of Construction Contract	
4.1.4.	Format of Contracts	
4.1.5.	Conditions of Contract	
4.1.5.1.	<i>General Conditions</i>	
4.1.5.2.	<i>Special Conditions</i>	
4.2.	Construction Project Site Supervision	
4.2.1.	Introduction	
4.2.2.	Organizing the Team.....	
4.2.3.	Roles of Project Team Members.....	
4.2.3.1.	<i>Role of the Owner/Owner/Agency in Construction</i>	
4.2.3.2.	<i>Role of the Project Manager</i>	
4.2.3.3.	<i>Role of the Construction Manager</i>	
4.2.3.4.	<i>Role of the Design Team</i>	
4.2.3.5.	<i>Role of the Contractor in Construction</i>	
4.2.3.6.	<i>Role of the Sub-Contractor and Suppliers</i>	
4.2.3.7.	<i>Role of Government Regulatory Bodies</i>	
4.2.4.	Site Handover to the Contractor.....	
4.2.5.	Organizing the Site (Mobilization)	
4.2.4.1.	<i>Site Layout</i>	
4.2.4.2.	<i>Access and Delivery</i>	
4.2.4.3.	<i>Storage and Laydown Areas</i>	
4.2.4.4.	<i>Site Offices</i>	
4.2.4.5.	<i>Workshop and Warehouses</i>	
4.2.4.6.	<i>Temporary Utilities (water, power, etc)</i>	
4.2.4.7.	<i>Sanitary Facilities</i>	
4.2.4.8.	<i>Medical and First Aid Facilities</i>	
4.2.4.9.	<i>Security and Signages</i>	
4.2.4.10.	<i>Bunkhouses and Mess Hall</i>	
4.2.6.	Preconstruction Conference	
4.2.7.	Monitoring and Control	
4.2.7.1.	<i>Introduction</i>	
4.2.7.2.	<i>Schedule Control</i>	
4.2.7.3.	<i>Cost and Change Control</i>	

4.2.7.4.	<i>Cost and Schedule Baselines to Control Projects</i>	
4.2.7.5.	<i>Project Performance Measurement</i>	
4.2.7.6.	<i>Tracking Progress by Earned Value Analysis</i>	
4.2.7.7.	<i>Forecasting Project Completion</i>	
4.2.7.8.	<i>Process Control</i>	
4.2.7.9.	<i>Resource Management (Manpower, Materials, Machine/Equipment)</i>	
4.2.7.10.	<i>Documentation and Communication</i>	
4.2.7.11.	<i>Progress Reports and Progress Payment</i>	
4.2.7.12.	<i>Schedule, Contract Time and Liquidated Damages</i>	
4.2.7.13.	<i>Changes</i>	
4.2.7.14.	<i>Delays</i>	
4.2.7.15.	<i>Value Engineering</i>	
4.2.7.16.	<i>Claims and Disputes</i>	
4.2.7.17.	<i>Contract Termination</i>	
4.2.8.	<i>Control of Quality</i>	
4.2.9.	<i>Environment, Health and Safety (EHS) Control</i>	
4.2.9.1.	<i>Role of the Owner/Agency in Safety</i>	
4.2.9.2.	<i>Roles of the Contractor in Safety</i>	
4.2.9.3.	<i>Sanitation at Site</i>	
4.2.9.4.	<i>Noise</i>	
4.2.9.5.	<i>Solid Waste Disposal</i>	
4.2.9.6.	<i>Mud and Dust</i>	
4.2.9.7.	<i>Air Pollution</i>	
4.2.10.	<i>Site Inspection</i>	
4.2.10.1.	<i>Introduction</i>	
4.2.10.2.	<i>Quality and Progress</i>	
4.2.10.3.	<i>Environmental, Health and Safety (EHS)</i>	
4.2.10.4.	<i>Construction Engineering</i>	
4.3.	<i>Testing, Commissioning and Handover</i>	
4.3.1.	<i>Introduction</i>	
4.3.2.	<i>Role of Owner/Agency</i>	
4.3.3.	<i>Role of Consultants and Contractors</i>	
4.3.4.	<i>The Commissioning Plan</i>	
4.3.5.	<i>Testing</i>	
4.3.6.	<i>Commissioning</i>	

- 4.3.7. Owner/Agency Furnished Equipment.....
- 4.3.8. Operational and Maintenance Manuals.....
- 4.3.9. Training and Transition to Operations
- 4.3.10. As-Built Documentation
- 4.3.11. Clear Points.....
- 4.3.12. Project Close-out.....
 - 4.3.12.1. Introduction.....
 - 4.3.12.2. Role of the Owner/Agency in Project Completion
 - 4.3.12.3. Contractual Closeout**
 - 4.3.12.3.1. Punchlist.....
 - 4.3.12.3.2. Clean Up
 - 4.3.12.3.3. Final Inspection
 - 4.3.12.3.4. Resolve Outstanding Change/Claims and Disputes.....
 - 4.3.12.3.5. Surety Bond.....
 - 4.3.12.3.6. Certificates
 - 4.3.12.3.7. Records of As-Built Drawings.....
 - 4.3.12.3.8. Keying Schedule
 - 4.3.12.3.9. Closing the Site Office.....
 - 4.3.12.3.10. Occupancy Permit.....
 - 4.3.12.3.11. Final Release or Waiver of Liens.....
 - 4.3.12.3.12. Final Payment, Defects Liability Period and Release of Retention
 - 4.3.12.4. Administrative Closeout**
 - 4.3.12.4.1. Demobilization
 - 4.3.12.4.2. Disposition of Project Records
 - 4.3.12.4.3. Project Evaluation
 - 4.3.12.4.4. Stakeholder Closure