

Introduction to Construction Planning and Scheduling

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Key concepts, phases, tools, and best practice tips

1. What Is Construction Planning & Scheduling?

Term	Definition
Construction Planning	The process of defining what work must be done, how it will be performed, when resources are needed, and who is responsible. It creates the blueprint for the entire project lifecycle.
Construction Scheduling	The time-based component of planning. It translates the plan into a chronological sequence of activities, showing start/finish dates, dependencies, and resource allocation.
Goal	Deliver the project on time, within budget, and to the required quality and safety standards.

2. Core Planning Phases

Phase	Main Objectives	Typical Outputs
2.1 Project Initiation	Define scope, objectives, constraints, and stakeholder expectations.	Project charter, stakeholder register, high-level scope statement.
2.2 Feasibility & Conceptual Design	Assess site conditions, regulatory requirements, and preliminary cost estimates.	Site analysis report, concept drawings, rough order of magnitude (ROM) estimate.
2.3 Detailed Design & Engineering	Develop complete design documents, specifications, and constructability reviews.	Construction drawings, technical specifications, bill of quantities (BOQ).
2.4 Procurement Planning	Determine material, equipment, and labor needs; decide on buying vs. renting.	Procurement schedule, vendor shortlist, contract strategy.

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Phase	Main Objectives	Typical Outputs
2.5 Execution Planning	Break the project into manageable work packages; assign responsibilities.	Work breakdown structure (WBS), responsibility assignment matrix (RACI), risk register.
2.6 Closeout Planning	Define handover, commissioning, and documentation procedures.	Punchlist template, as-built drawings, warranty register.

3. Scheduling Fundamentals

3.1 Activity Definition

- **Activity** – the smallest unit of work that can be scheduled (e.g., “Excavate foundation”).
- **Activity attributes:** ID, description, duration, required resources, predecessor/successor relationships.

3.2 Work Breakdown Structure (WBS)

- Hierarchical decomposition of the project scope.
- Levels:
 1. **Level 1** – Project
 2. **Level 2** – Major phases (e.g., Site Work, Superstructure)
 3. **Level 3+** – Packages, sub-packages, individual activities.

3.3 Network Diagrams

Type	Description	Typical Use
Activity-on-Arrow (AOA)	Nodes represent activities; arrows show logical relationships.	Most modern software (Primavera P6, MS Project).
Activity-on-Arrow (AOA)	Arrows represent activities; nodes are events/milestones.	Useful for teaching critical path concepts.

3.4 Logical Relationships (Precedence)

Symbol	Relationship	Meaning
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FS (Finish?Start) A ? B B cannot start until A finishes (most common).

SS (Start?Start) A ? B B cannot start until A starts

FF (Finish?Finish) A ? B B cannot finish until A finishes.

SF (Start?Finish) A ? B B cannot finish until A starts.

3.5 Critical Path Method (CPM)