

Introduction to Construction Scheduling

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Key concepts, terminology, and best-practice steps for planning and controlling construction projects.

1. Why Construction Scheduling Matters

Benefit	Description
Time Management	Sets realistic start/finish dates, avoids overruns.
Cost Control	Links activities to budgets; identifies cash-flow needs.
Resource Allocation	Optimizes labor, equipment, and material usage.
Risk Mitigation	Highlights critical path, potential bottlenecks, and contingency needs.
Communication	Provides a visual roadmap for owners, designers, subcontractors, and regulators.

2. Core Terminology

Term	Definition	Typical Use
Activity / Task	A discrete piece of work (e.g., “Excavate foundation”).	Building block of the schedule.
Duration	Planned length of an activity (days, weeks, etc.).	Input for sequencing.
Predecessor / Successor	Activities that must finish before another can start (FS, SS, FF, SF relationships).	Defines logical order.
Critical Path	Longest continuous chain of dependent activities; determines project finish date.	Focus for schedule monitoring.
Float / Slack	Time an activity can be delayed without affecting the project end date.	Helps prioritize resources.
Milestone	Zero-duration event marking a significant point (e.g., “Permit approved”).	Tracking progress checkpoints.

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Baseline	Approved version of the schedule used for performance comparison.	Earned Value Management (EVM) reference.
Look?Ahead Schedule	Short?term (typically 2–4 weeks) detailed plan derived from the master schedule.	Guides weekly field execution.
Resource Histogram	Graphic showing demand for labor, equipment, or material over time.	Detects overallocation.
Lag / Lead	Intentional delay (lag) or overlap (lead) between activities.	Fine?tunes sequencing.

3. Scheduling Methodologies

Method	Characteristics	When to Use
Critical Path Method (CPM)	Calculates earliest/latest start/finish dates; identifies critical path.	Most commercial/industrial projects; complex logic.
Program Evaluation & Review Technique (PERT)	Uses optimistic, most?likely, pessimistic durations to compute expected time ($\bar{t} = (O+4M+P)/6$).	Projects with high activity? duration uncertainty.
Line?of?Balance (LOB)	Tracks repetitive units (e.g., floor slabs) using a time?area chart.	High?rise, housing, or modular construction.
Gantt Chart	Bar?type visual representation of activities over calendar time.	Communication with non? technical stakeholders; simple projects.
4?D BIM Scheduling	Links 3?D model elements to schedule data for visual simulation.	Projects leveraging BIM for clash detection & client presentations.

4. Step?by?Step Workflow

1. Define Scope & Work Breakdown Structure (WBS)

- Break project into deliverables ? sub?deliverables ? activities.
- Assign unique codes (e.g., 1.2.3) for traceability.

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2. Identify Activities & Durations

- Use historical data, productivity rates, and expert judgment.
- Document assumptions (e.g., crew size, equipment).

3. Establish Logical Relationships

- Determine FS (Finish?Start) as default; add SS, FF, SF where needed