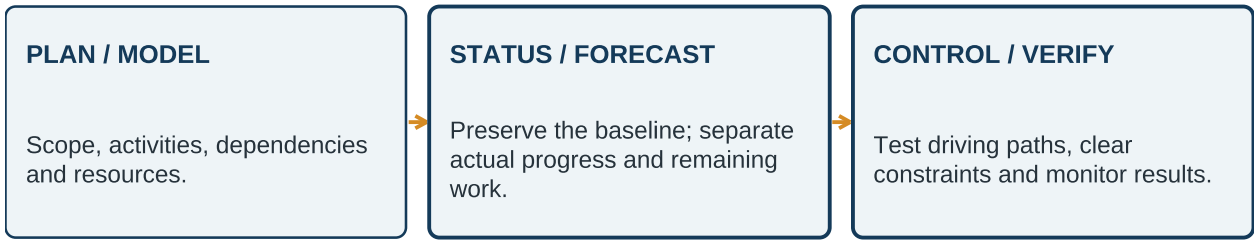
PE

PROFESSIONAL ENGINEERING CONTINUING EDUCATION

Construction Scheduling

Critical Path Method (CPM)

Self-Paced Course Study Guide



A practical framework for schedule planning, model control and verified forecasting.

COURSE	CREDIT / CATEGORY	INSTRUCTOR
ENG-014	2 CEH / PDH · Pertinent to Engineering Construction & Project Delivery	John W. Adcox, Jr., Ed.D., CPC

Superior Learning, LLC d/b/a BuilderCE

Professional-engineering edition. Not approved for CILB credit.

CONSTRUCTION SCHEDULING & CRITICAL PATH METHOD

2 CEH

PERTINENT

ENGINEERING

Course overview

Construction Scheduling & Critical Path Method (CPM) is a two-hour course on developing, reading, updating, and evaluating construction schedules as management and project-control tools. The course begins with the distinction between project planning and scheduling, then translates scope into a work breakdown structure, measurable activities, durations, milestones, calendars, and logical relationships. Learners use modern Precedence Diagram Method (PDM) logic and Critical Path Method (CPM) concepts to understand early and late dates, total and free float, longest-path and near-critical work, schedule constraints, and the effect of resource limits.

The course then shifts from schedule development to project control. It explains baseline preservation, data/status dates, progress updates, remaining-duration forecasting, out-of-sequence progress, procurement and submittal integration, schedule-quality review, resource loading and leveling, recovery planning, and the schedule consequences of changes and delays. The course is software-neutral. Oracle Primavera P6, Microsoft Project, and other scheduling platforms may be referenced as implementation examples, but the instructional focus is on schedule logic, field reality, and management decisions rather than a particular product.

Course purpose

Provide contractors, engineers, construction managers, superintendents, estimators, and project-control personnel with a defensible framework for turning project scope into a usable schedule model, maintaining that model as work progresses, and using schedule information to coordinate resources, identify risk, forecast completion, evaluate changes, and communicate timely project decisions.

This course does not replace project-specific contract scheduling requirements, provide forensic delay-claim opinions, or authorize legal conclusions concerning entitlement to time or money.

Learning objectives

After completing this course, the learner should be able to:

- Distinguish project planning from scheduling and explain the purposes of baseline, current/update, look-ahead, and recovery schedules.
- Translate scope into a work breakdown structure and measurable activities with appropriate durations, milestones, calendars, and predecessor/successor logic.
- Use PDM finish-to-start, start-to-start, finish-to-finish, and limited start-to-finish relationships without creating artificial logic.
- Explain forward-pass and backward-pass CPM calculations and interpret early dates, late dates, total float, free float, longest path, critical and near-critical activities.
- Recognize how constraints, calendars, lags, open ends, excessive activity durations, and poor progress status can distort a schedule model.
- Update a baseline schedule using actual starts/finishes, remaining durations, data/status date, changed logic, and documented field conditions.
- Integrate procurement, submittals, inspections, owner decisions, and resource limitations into the schedule rather than treating them as external notes.
- Use schedule-quality and variance checks to identify unreliable or non-actionable schedule information.
- Evaluate recovery, resequencing, acceleration, and resource options without assuming that adding manpower or overtime automatically shortens the project.
- Document prospective schedule impacts from changes and delays while distinguishing schedule analysis from contractual/legal entitlement.

Study plan and navigation

MODULE	MINUTES	FOCUS
1	20	Planning, scheduling and schedule models
2	25	WBS, activities and schedule logic
3	30	CPM calculations, critical path and float
4	20	Baselines, status and progress measurement
5	15	Resources, schedule quality and risk
6	10	Changes, recovery and applied control

Planned instructional time: 120 minutes, exclusive of the final examination. Individual study time may vary.

How to complete this course

Read all modules in this course. No separate module acknowledgement is required. When you have finished reading, select Continue at the bottom of the BuilderCE lesson page to begin the 10-question final examination. If you are reading the PDF, return to that webpage first. A score of at least 70% is required to pass. Retakes are permitted.

Worked CPM calculation and duration revision · Sources

Course scope

The actual contract, specifications, approved baseline, project calendars, owner requirements, permit/inspection processes, and current law govern the real project. Schedule terminology can vary among specifications and software. The course teaches current principles and repeatable controls; it does not impose one universal schedule specification or claims methodology.

MODULE 1 | 20 MINUTES

Planning, scheduling and the schedule model

1.1 Planning Versus Scheduling

Planning and scheduling are closely related but not synonymous. Planning asks what must be accomplished, how the work can be performed, who or what resources are needed, what alternatives exist, and what risks or constraints may affect the work. Scheduling converts that plan into a time-based model. John Adcox's legacy course described a schedule as a management plan using time; that remains a useful way to think about it. A schedule is not merely a printed bar chart. It is a model of the current plan for executing the project.

For a contractor, scheduling begins before mobilization. During pursuit and estimating, the team considers overall duration, major phases, lead times, manpower, subcontractor availability, owner milestones, and bid dates. After award, those high-level assumptions must be converted into a more detailed schedule that can coordinate field work, procurement, design information, inspections, owner decisions, and payment milestones.

1.2 Why the Schedule Is a Project-Control Tool

A useful schedule supports forward planning, communication, coordination, progress monitoring, forecasting, and decision-making. It should tell the project team not only when work is planned, but why work is planned in that sequence, which predecessor conditions must be satisfied, which activities are driving completion, what flexibility exists, and what decisions or resources are needed next.

Different participants view time differently. The owner may focus on occupancy or phased turnover. The contractor may focus on sequence, subcontractor coordination, production, cash flow, and completion. Suppliers focus on release and delivery dates. Subcontractors focus on mobilization windows, access, predecessor completion, and resource commitments. A coherent project schedule gives those perspectives a common time framework.

1.3 Schedule Types and Levels of Detail

Bar or Gantt schedules remain useful for communicating major phases and near-term work because they are easy to read. Their weakness is that a static bar chart may not reveal relationships, criticality, or the effect of changes. Network schedules add logical relationships so the effect of movement in one activity can propagate through successors. Modern scheduling platforms typically display network logic and a time-scaled bar chart together.

The appropriate level of detail depends on project complexity and contract requirements. An executive milestone schedule may be useful for leadership but too coarse for field control. A schedule with thousands of micro-activities can be technically detailed but operationally unusable. The schedule should contain enough detail to measure progress, coordinate handoffs, identify driving work, and support required reporting without becoming a data-entry exercise detached from the project.

1.4 Baseline, Current Schedule, Data Date, and Look-Ahead

SCHEDULE PRODUCT	DISTINCT PURPOSE
Baseline	Preserved accepted plan for performance comparison.
Current / update	Recorded progress and forecast remaining work.
Look-ahead	Near-term executable field plan linked to the current schedule.
Recovery	Feasible changed execution plan addressing a threatened milestone.

The baseline schedule records the accepted or approved plan at a defined point in time. It should be preserved so later performance can be compared to that plan. The current or update schedule records actual progress through a status or data date and forecasts the remaining work. A look-ahead schedule extracts near-term work at a level useful to the superintendent and trades. A recovery schedule or recovery plan addresses a projected delay or milestone problem and should explain how the plan differs from the current schedule.

These schedule products are related but should not be confused. Rewriting the baseline every month eliminates the ability to measure variance. Using a three-week look-ahead as the only project schedule can hide long-lead procurement and downstream milestone risk. The project-control system should preserve each schedule's purpose.

WBS, activities and schedule logic

2.1 From Scope to Work Breakdown Structure

LEVEL	ILLUSTRATIVE SCOPE DECOMPOSITION
Project / deliverable	Completed building systems.
Area / system / work package	Mechanical plant / chilled-water system / pump installation.
Measurable activity / milestone	Set pump, connect piping, inspect, test; define the completion event.

A schedule cannot be better than the scope model behind it. The Work Breakdown Structure (WBS) organizes the project into manageable components. Adcox's legacy material described the WBS as subdividing the project like an upside-down organizational chart. Modern practice uses the same core idea: start with the whole project, divide it into major deliverables or areas, and continue until the work can be planned, assigned, measured, and controlled.

A useful WBS is not simply a cost-code list. It should support the way the project will be planned and reported. Depending on the job, the structure may combine phase, building, floor, area, system, discipline, or contract package. The WBS creates an organizing framework; activities then describe the measurable work inside that framework.

2.2 Defining Activities and Milestones

An activity is a task or work component with a defined start and finish. Good schedule activities are measurable and specific enough that the team can decide whether they have started, how much work remains, and when they are complete. Vague activities such as 'interior work' hide the sequence. Extremely small activities create administrative burden without improving decisions.

Milestones represent events rather than durations: notice to proceed, permit release, dry-in, permanent power, substantial completion, owner turnover, or other contractual and management points. Milestones should have clear meaning. A milestone named 'Phase 2 complete' is weak unless the team agrees what completion requires.

2.3 Durations: Estimate the Work, Not the Desired Date

Activity durations should reflect the planned quantity, production rate, crew, work calendar, access, and known constraints. Historical data, estimator assumptions, subcontractor input, vendor lead times, and field experience can all inform duration. The schedule should not back-solve every activity to make a desired completion date appear achievable. If the realistic plan does not meet the required milestone, management needs to see that gap so alternatives can be evaluated.

Long activities can hide performance. A 90-day activity may need to be split by area, phase, production segment, or measurable handoff. Conversely, unnecessary fragmentation can make status subjective and logic cumbersome. The goal is control, not maximum activity count.

2.4 Precedence Diagram Method Relationships

RELATIONSHIP	CONDITION WITH ZERO LAG
Finish-to-start (FS)	Successor start cannot precede predecessor finish.
Start-to-start (SS)	Successor start cannot precede predecessor start.
Finish-to-finish (FF)	Successor finish cannot precede predecessor finish.
Start-to-finish (SF)	Successor finish cannot precede predecessor start; uncommon in routine construction logic.

Modern CPM schedules commonly use Precedence Diagram Method (PDM), where activities are represented as nodes and relationships connect them. The most common relationship is finish-to-start (FS): the successor cannot start until the predecessor finishes. Start-to-start (SS) allows a successor to begin after the predecessor starts. Finish-to-finish (FF) links completion. Start-to-finish (SF) exists but is rarely needed in ordinary construction schedules and should not be used merely because software permits it.

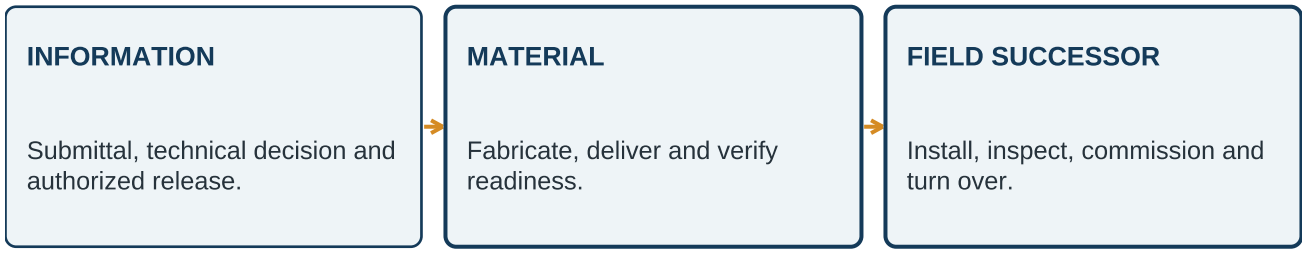
Each relationship should represent a real project dependency. A useful field test is to ask: What must happen before this activity can start? What must be true before it can finish? What successor depends on it? If the answer is only 'because the schedule needs a link,' the logic may be artificial.

2.5 Leads, Lags, and Date Constraints

Lags can represent a legitimate waiting period, such as curing or review time, but large or poorly documented lags can hide work that should be modeled as activities. Leads or negative lags can create difficult-to-explain overlaps and are often restricted by schedule specifications. Date constraints can also override network logic. Some constraints are legitimate - a contractual milestone, permit restriction, owner access date, or seasonal window - but excessive constraints can make the schedule appear stable while severing cause-and-effect logic.

A schedule reviewer should be able to distinguish logic-driven dates from constraint-driven dates. When a hard constraint is used, the narrative or schedule notes should explain why.

2.6 Procurement, Submittals, and External Decisions Are Schedule Activities



Information and material readiness belong in the schedule when they can drive installation and turnover.

Long-lead equipment, shop drawings, samples, design decisions, permits, inspections, owner-furnished items, and utility coordination can drive completion as surely as concrete or framing. They should be modeled when they can control field work. A typical procurement chain may include prepare submittal, submit, review, revise/resubmit if needed, approve, release for fabrication, fabricate, ship, deliver, inspect, and install.

If the schedule begins at 'install equipment' and omits the six months needed to procure it, the model cannot provide early warning. Project control improves when information flow and material flow are connected to field activities.

MODULE 3 | 30 MINUTES

CPM calculations, critical path and float

3.1 What CPM Calculates

Critical Path Method uses activity durations and network relationships to calculate the timing flexibility of the schedule model. Software performs the calculations on real projects, but managers should understand the logic well enough to recognize unreasonable results. The calculations answer questions such as: What is the earliest this work can occur under the current logic? What is the latest it can occur without delaying a defined completion? Which path is currently driving the finish?

3.2 Forward Pass: Early Dates

The forward pass moves through the network from the start toward completion. For a simple activity with a known early start, early finish is calculated from early start plus duration under the schedule's date convention. When an activity has multiple predecessors, its early start is controlled by the predecessor condition that finishes last. That rule is the mathematical expression of a practical construction fact: a successor cannot begin until all required predecessors are satisfied.

Example: Mobilize is 2 working days, layout is 2 days, excavate footings is 3 days, and footing inspection/pour is 2 days in a simple finish-to-start chain. Ignoring calendar nuances, the earliest completion is 9 working days. If material approval is a parallel predecessor to the pour and finishes on day 12, the pour cannot start on day 7; the later predecessor drives the early date.

3.3 Backward Pass: Late Dates

The backward pass works from the required or calculated finish toward the start. It determines the latest dates an activity can occur without delaying the modeled completion, again subject to calendars and constraints. Where multiple successors exist, the controlling late date comes from the successor condition that allows the least flexibility.

Late dates are not permission to postpone work casually. They describe schedule flexibility within the current model. Using all available float on one activity can make downstream work critical and remove options for later problems.

3.4 Total Float and Free Float

Total float is the amount of time an activity can move, under the schedule's current logic and constraints, before affecting the relevant project completion or constrained milestone. Free float is the amount an activity can move without delaying the early start of a successor. These are calculated properties of the model, not a separate pool of days stored outside the logic.

Float can be positive, zero, or negative. Negative float often indicates that calculated completion is later than a required constraint or milestone. High positive float can be legitimate, but unexpectedly large float may also indicate missing logic. Contract language may address ownership or use of float; this course does not impose a legal rule on float ownership.

3.5 Critical Path, Longest Path, and Near-Critical Work

Legacy CPM teaching often defines the critical path as the path of zero-float activities. That definition is useful in an unconstrained simple network, but modern schedules may contain constraints, multiple calendars, or other conditions that cause zero or negative float on activities that are not on the true

driving sequence. For management purposes, the longest path or otherwise defined driving path should be evaluated together with total float and network logic.

Near-critical work also matters. A path with two days of float on a six-month project may become critical after one missed inspection or delayed delivery. Project teams should monitor the critical path and a reasonable band of near-critical work rather than wait for a path to reach zero float.

3.6 Worked CPM Mini-Network

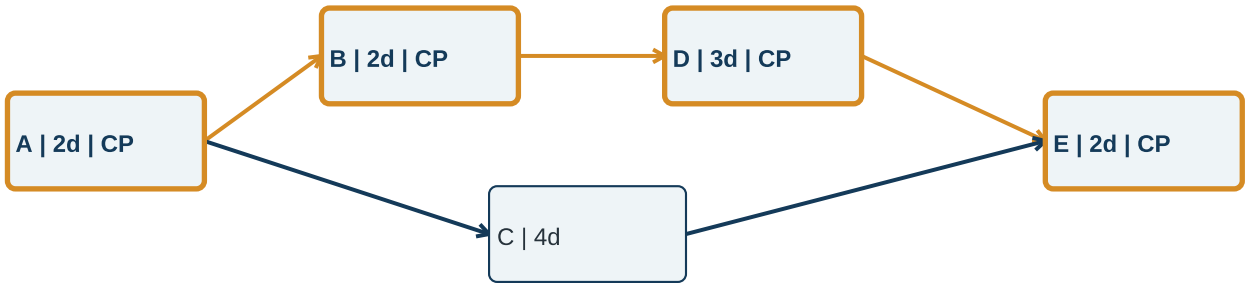
Consider five activities: A - mobilize, 2 days; B - layout, 2 days after A; C - order reinforcing steel, 4 days after A; D - excavate and form footing, 3 days after B; E - inspect and pour footing, 2 days after both C and D. The A-B-D path reaches E after 7 days. The A-C path reaches E after 6 days. Therefore D controls the early start of E, and the earliest project completion through E is day 9. The C path has one day of flexibility relative to E's early start. If C increases from 4 to 6 days, the procurement path becomes the driver and project completion moves unless other logic or duration is changed.

This simple example illustrates why CPM is more than arithmetic. The important management question is what condition controls the successor and how a change in one predecessor shifts the driving path.

Worked CPM calculation: a change in the driving path

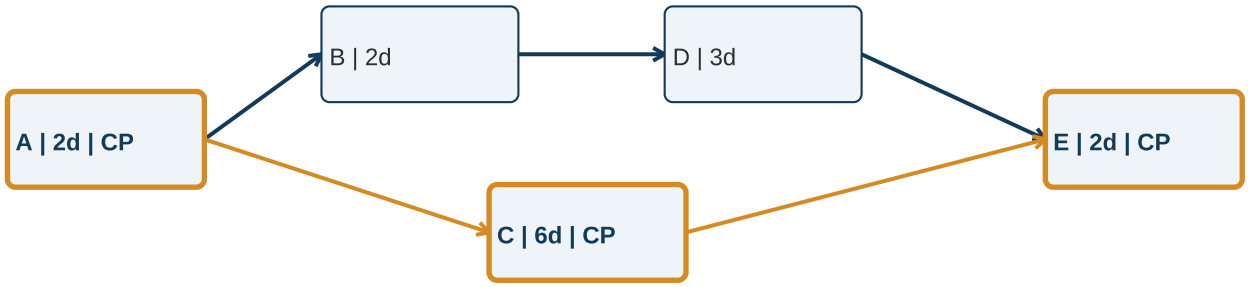
Use the five activities introduced above with a day-zero convention, one common working-time calendar, finish-to-start links, no lags or imposed finish constraint, and no resource restriction. The example compares a baseline model with a revised activity duration before execution; it is not a progress update or a documented field delay. Every required predecessor must finish before its successor starts.

BASELINE: C = 4 DAYS



Critical path A–B–D–E = 9 days

DURATION REVISION: C = 6 DAYS



Critical path A–C–E = 10 days

The marked CP activities and gold links show the driving sequence. C gains two days of duration, uses its one day of float, and moves project completion by one day. Both the path and the finish are recalculated.

Baseline calculation: C = 4 days

ACTIVITY / DAYS / PREDECESSOR	ES	EF	LS	LF	TF
A / 2 / none	0	2	0	2	0
B / 2 / A	2	4	2	4	0
C / 4 / A	2	6	3	7	1
D / 3 / B	4	7	4	7	0
E / 2 / C and D	7	9	7	9	0

Revised calculation: C = 6 days

ACTIVITY / DAYS / PREDECESSOR	ES	EF	LS	LF	TF
A / 2 / none	0	2	0	2	0
B / 2 / A	2	4	3	5	1
C / 6 / A	2	8	2	8	0
D / 3 / B	4	7	5	8	1
E / 2 / C and D	8	10	8	10	0

ES = early start; EF = early finish; LS = late start; LF = late finish; TF = total float = LS − ES. Dates are model working days, not calendar dates or contractual entitlements.

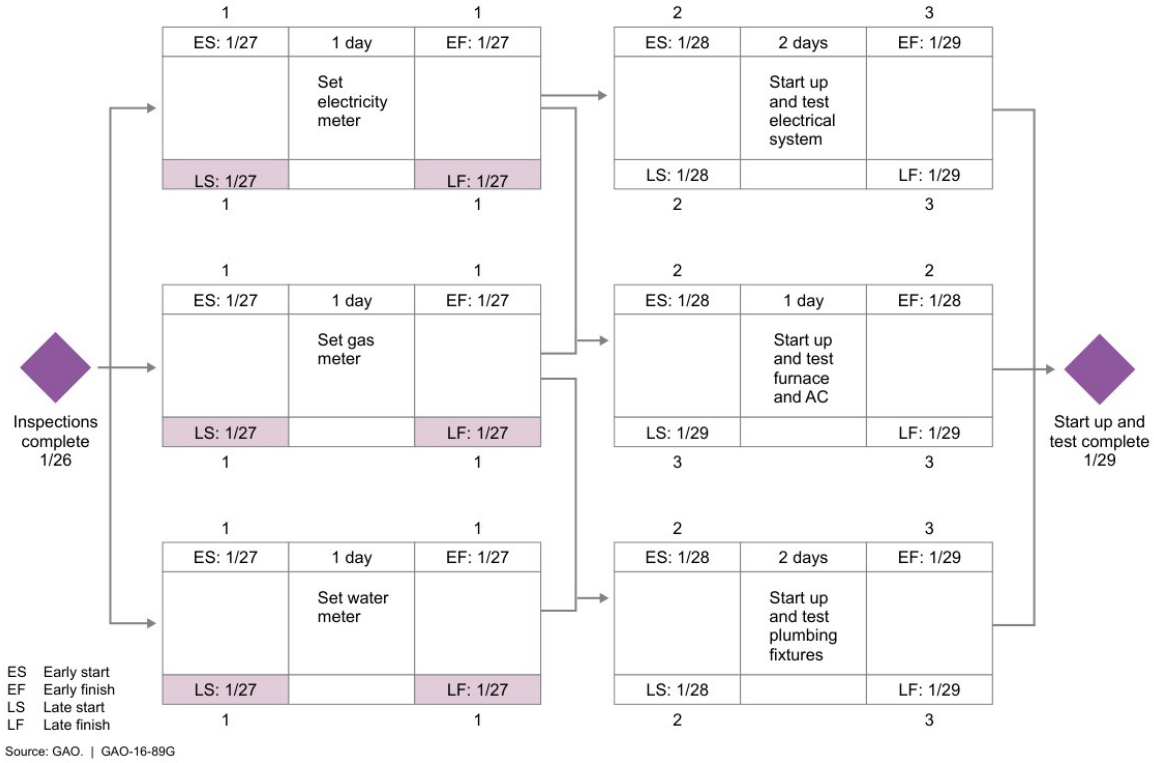
Forward pass. A finishes at 2. B then finishes at 4 and D at 7; baseline C finishes at 6. E therefore starts at max(6, 7) = 7 and finishes at 9. With C revised to six days, C finishes at 8 and E starts at max(8, 7) = 8, finishing at 10. A–B–D–E drives the baseline; A–C–E drives the revised model.

Backward pass. In the baseline, E must start at 7 to finish at 9. D must finish by 7 and start by 4; C must finish by 7 and start by 3. B must finish by D's late start of 4, so B's late start is 2. A's late finish is the minimum successor late start, min(2, 3) = 2. Subtracting early from late starts gives one day of float for C and zero for the driving activities. Repeat the backward pass from day 10 in the revised model: B and D each have one day of total float, while A, C and E have zero.

> **Recovery interpretation.** Reducing C from six to five days returns E's finish to day 9; C and D then both finish on day 7, so both paths are critical. Shortening D alone while C still finishes at 8 cannot recover the lost project day. A viable recovery must address the current controlling condition.

Primary-source example: auditable early and late dates

Figure 56: Early and Late Dates of a Start-Up and Testing Network



GAO-16-89G, Figure 56, printed page 178 (PDF page 192): original startup and testing network, including early / late dates, durations and source legend. This is a separate published example, not the A–E model above.

In GAO's network, the successor with the tighter late-start requirement controls a predecessor's late finish. Keeping the early and late dates visible makes the float calculation auditable. Apply the same reasoning to the original A–E calculations rather than substituting an unexplained software criticality flag.

Primary source:GAO Schedule Assessment Guide, Figure 56

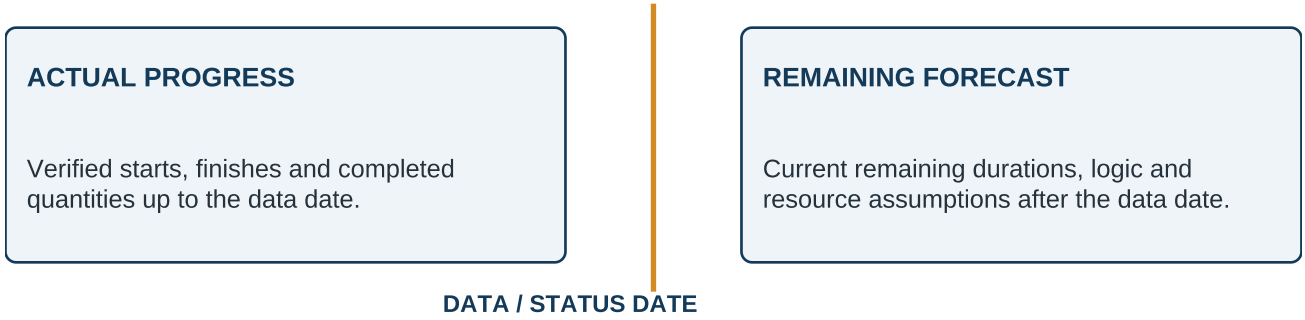
MODULE 4 | 20 MINUTES

Baselines, updating and progress measurement

4.1 Preserve the Baseline

The accepted baseline is the reference plan against which later performance is measured. It should be preserved. If the team overwrites the baseline every update, it loses the ability to distinguish original assumptions from actual changes. Approved contract modifications may justify a formal revised baseline or added activities, depending on project requirements, but those changes should be controlled and documented.

4.2 The Data or Status Date



The data date separates verified actual progress from the model of remaining work. A date label alone does not validate status.

Each update should have a clear data or status date separating the recorded past from the forecast future. Actual starts and finishes on or before that date should reflect field records. Remaining durations and successor logic after that date should reflect the current plan. A schedule update that contains future actual dates, missing actuals, or status inconsistent with the field cannot be relied upon simply because software produced it.

4.3 Actual Starts, Actual Finishes, and Remaining Duration

Status should be based on observable project information. Actual start means meaningful work began under the project's status rules, not that someone opened a submittal or mobilized a small amount of labor unless the schedule definition allows that. Actual finish means the activity's defined scope is complete. Remaining duration should be a forecast of work still required, not merely original duration minus elapsed time.

Percent complete can be useful, but it is often subjective unless tied to measurable quantities or milestones. For schedule forecasting, remaining duration and successor readiness are generally more informative than a single percent-complete number.

4.4 Out-of-Sequence Progress

Out-of-sequence progress occurs when actual work does not follow the planned relationship logic. Construction often requires practical resequencing, but the schedule must be updated in a controlled way so the forecast reflects what is actually happening. Different software settings can treat out-of-sequence progress differently. The scheduler should understand the chosen calculation behavior and document material changes in sequencing.

4.5 Update Narratives and Change Control

A useful update narrative explains significant variance and revision. It may identify critical-path changes, new constraints, major logic revisions, changed durations, delayed procurement, owner/design decisions, weather or access impacts, recovery actions, and forecast completion movement. The narrative should not substitute for the schedule model, but it helps reviewers understand why the model changed.

Material logic changes deserve explanation. If an activity moved from a finish-to-start relationship to a start-to-start overlap, the team should know whether the field plan actually changed or the link was edited only to improve the calculated completion date.

4.6 Look-Ahead Planning Connects the Master Schedule to the Field

The master CPM schedule should drive near-term planning, but the field team often needs greater detail for the next two to six weeks. A look-ahead can identify specific work areas, crews, access, inspections,

submittal releases, deliveries, and constraints. The best look-aheads are derived from the current schedule and feed field reality back into the next update.

A look-ahead that is disconnected from the CPM schedule can create two competing plans. The superintendent may believe one sequence is current while the project manager submits another sequence in the official update. Reconciliation between the two is a core project-control task.

MODULE 5 | 15 MINUTES

Resources, schedule quality and risk

5.1 CPM Logic Does Not Create Unlimited Resources

A pure logic network can assume that every activity starts as soon as predecessors permit. Real projects have finite labor, equipment, access, material, supervision, workspace, inspection capacity, and cash. Resource planning tests whether the logically possible schedule is operationally achievable.

Resource loading can assign labor, equipment, cost, or other resources to activities. Resource histograms help management see peaks and identify whether the plan requires more crews or equipment than are available. The detail should be proportional to the decision need; not every schedule needs full cost and resource loading.

5.2 Resource Leveling and Allocation

Resource leveling adjusts activity timing to resolve over-allocation, commonly using available float before delaying project completion. Resource allocation or constrained scheduling may extend duration when the necessary resources simply are not available. The important management point is that resource constraints can change the driving path and completion forecast.

Adding resources is not always an effective recovery strategy. Work areas can become congested, productivity can decline, supervision can become diluted, or predecessor conditions can prevent additional crews from working. The schedule should reflect constructible production assumptions.

5.3 Schedule Quality: Logic First

Schedule-quality review asks whether the model is logically complete and useful. Common warning signs include activities with missing predecessors or successors, excessive hard constraints, long unexplained lags, very long activities, excessive float, negative float without explanation, large numbers of activities with the same dates, and updates that do not match field progress.

A schedule can be mathematically calculable and still be poor. If activities are linked primarily to force a desired date, the calculated critical path has little management value. Quality review should test whether the logic represents the intended means, sequence, information flow, and handoffs.

5.4 Calendars and Working-Time Assumptions

Project, activity, and resource calendars define when work can occur. Weekends, holidays, shutdowns, permit restrictions, shift work, seasonal limitations, owner occupancy, and special access windows can all affect dates. Multiple calendars can also affect float and critical-path interpretation. Reviewers should know which calendar applies to major driving activities.

5.5 Constraints and Negative Float

Constraints can be legitimate but should not substitute for logic. A required completion milestone may create negative float when the calculated finish is late. That is useful information: it quantifies schedule tension. The wrong response is to add arbitrary constraints or remove logic merely to make the negative float disappear. Management should identify the actual driving causes and evaluate recovery options.

5.6 Schedule Risk and Near-Critical Monitoring

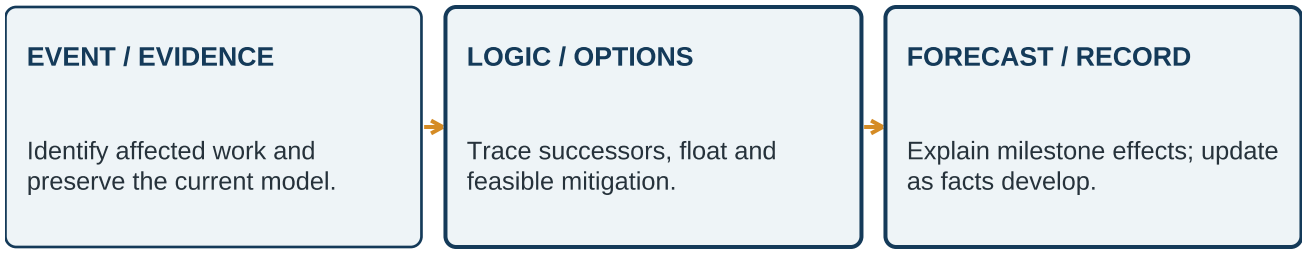
CPM usually uses deterministic activity durations, but actual work contains uncertainty. Weather, inspections, design decisions, production rates, procurement, and subcontractor performance can shift durations and sequence. The project team should monitor not only the current critical path but also near-critical paths, high-risk procurement, and activities with limited recovery options.

On very complex projects, quantitative schedule-risk methods such as Monte Carlo simulation may be appropriate. This course focuses on practical contractor controls rather than teaching probabilistic schedule analysis, but the underlying lesson is that a single calculated finish date should not be mistaken for certainty.

MODULE 6 | 10 MINUTES

Changes, recovery and applied control

6.1 Changes Affect Logic, Duration, and Decisions



Prospective change evaluation follows the affected work through current logic, available flexibility and credible mitigation.

Changes can originate with the owner, designer, contractor, supplier, authority having jurisdiction, or unforeseen conditions. The first schedule question is not automatically 'how many delay days are owed?' It is: What activity or decision changed, when did the project learn about it, what work or procurement does it affect, and how does that effect propagate through the current schedule?

A prospective change evaluation uses the best current information before or as the change occurs. It identifies the affected activity or path, required design or procurement steps, available float, mitigation options, and potential milestone consequences. The schedule should then be updated as actual facts develop.

6.2 Contemporaneous Schedule Records

Schedule analysis is stronger when the project preserves regular updates, narratives, look-aheads, daily reports, correspondence, delivery records, and authorization dates. Adcox's legacy course emphasized comparing original and actual durations and identifying why delays occurred. Modern practice extends that principle: preserve the contemporaneous schedule model and the field records that explain why it changed.

This is not forensic delay-claim training. Entitlement, concurrency, compensability, notice, and legal responsibility depend on contracts and law. The course teaches the project-control record needed to make timely management decisions and support qualified analysis when disputes arise.

6.3 Recovery Planning

When the current forecast misses a required milestone, recovery planning should target the driving work. Options may include resequencing, changing means and methods, adding shifts, increasing crews or equipment, expediting procurement, splitting work areas, prefabrication, temporary systems, or obtaining earlier decisions. Each option should be tested for safety, quality, cost, access, supervision, and downstream consequences.

A recovery schedule should not merely shorten activity durations until the finish date looks acceptable. It should reflect a credible changed plan and identify the assumptions that make the shorter duration possible.

6.4 Acceleration

Acceleration means increasing the pace of work relative to the current plan. It can be directed or voluntarily undertaken as mitigation. Overtime, double shifts, extra crews, premium freight, and resequencing are common techniques, but they can also reduce efficiency, increase congestion, increase safety exposure, and create quality risk. Schedule compression should therefore be evaluated as a management decision rather than a mathematical edit.

6.5 Short-Interval Control and Constraint Removal

Near-term schedule performance often improves when the team actively manages constraints before crews arrive. A constraint log may track design decisions, RFIs, submittals, material delivery, permits, inspections, access, predecessor completion, equipment, and owner-furnished items. The look-ahead should identify what must be cleared each week to make planned activities executable.

This is where project controls become operational. The CPM model identifies what should happen and when; short-interval planning turns that forecast into specific field commitments and removes obstacles.

6.6 Applied Scenario - Long-Lead Equipment

A project requires an air-handling unit for mechanical-room completion. The baseline shows submittal approval by day 30, fabrication from day 31 through day 100, delivery day 105, installation day 110, startup day 120, and turnover day 135. At the day-45 update, the submittal remains unresolved because an owner-requested capacity change is under design review.

A controlled schedule response is to status the submittal activity accurately, forecast the expected design/approval date, obtain a current manufacturer lead time, identify whether fabrication can begin partially, evaluate whether startup is on the current longest/near-critical path, and communicate the authorization date needed to protect turnover. The team should not leave the original procurement dates in place and hope the schedule recovers automatically.

6.7 Applied Scenario - Out-of-Sequence Interior Work

A floor was planned as overhead rough-in, inspection, drywall, ceiling grid, then finishes. To maintain progress while one inspection is delayed, the superintendent starts drywall in unaffected rooms and moves other crews. The schedule update should record actual progress and revise logic or activity segmentation to match the field plan. If the official schedule still assumes the entire floor is waiting on one inspection, it no longer represents reality. If the update simply deletes the inspection logic, it may hide a real remaining constraint. The solution is a controlled model of the changed sequence.

6.8 Final Contractor Schedule-Control Checklist

- Current accepted baseline is preserved and identifiable.
- Every update has a clear data/status date and actual progress matches field records.
- Activities have meaningful predecessors/successors; open ends and artificial logic are minimized.
- Driving and near-critical paths are reviewed, not only a zero-float filter.
- Long-lead procurement, submittals, inspections, owner decisions, and utilities are modeled when they can drive work.
- Calendars, constraints, and lags are intentional and documented.
- Remaining durations reflect current production expectations.
- Resource conflicts and access constraints are evaluated.
- Look-ahead planning is reconciled with the master schedule.
- Material logic/duration changes are explained in the update narrative.
- Potential changes and delays are evaluated prospectively and linked to contemporaneous records.
- Recovery actions target the actual driving path and are operationally credible.

Course summary

Construction scheduling is most valuable when it connects planning, logic, field status, resources, procurement, and management decisions. The schedule is a living model of how the project is intended to reach completion. It is only useful when its inputs and relationships reflect the real project.

Principal references and source links

- GAO-16-89G, Schedule Assessment Guide, December 2015; Appendix IV, Figure 56, printed page 178. Open source
- UFGS 01 32 01.00 10, Project Schedule, August 2026 revision. A federal guide specification requiring project tailoring; incorporated contract provisions control actual obligations. Open source
- PMI, Practice Standard for Scheduling, Third Edition, June 2019. Scheduling practice reference; apply the relevant edition and project requirements. Open source
- AACE Recommended Practice 26R-21, Developing or Revising a Scheduling Specification, revision June 6, 2025. Scheduling specification reference; project-specific requirements and responsibilities control. Open source
- FHWA FP-24, Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects, Section 155. Contract-specific federal example, not a universal float-ownership rule. Open source

Public sources checked November 15, 2026. Examples distinguish engineering judgment, contractual requirements and mandatory rules. Actual project documents, employer programs, current regulations and qualified professional decisions control implementation.

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> **Study guide complete.** Return to the BuilderCE lesson page and select Continue to begin the final examination. A score of at least 70% is required to pass. Retakes are permitted.