

Purpose

This checklist is intended to:

1. **Assist** the contractor to build a Critical Path Method (CPM) baseline schedule and subsequent monthly schedule updates and revisions.
2. Present the minimum expectations from the owner's perspective, for a schedule submittal. It is imperative that the contractor's scheduler has a thorough knowledge of the full CPM methodology and project specifications, prior to commencing the development of the construction schedule. The following are only a few guidelines selected from scheduling best practice guides (i.e. GAO-16-89G, PMBOK Guide, and AACEi) to focus on.

Baseline Schedule

The CPM baseline schedule should comply with major elements in the scheduling best practice (GAO-16-89G), specification (project phasing and milestones), overall logic, duration and critical path method rules. The following items should be considered:

- ❑ Use the entire contract time in the schedule, starting from the NTP to contractual completion date.
- ❑ Include any intermediate milestones (if the project specs require).
- ❑ Ensure all activities have relationships and reasonable durations (No zeros or fractions of a day).
- ❑ Avoid constraints as much as possible. If used, provide a legitimate rationale and/or justification in the narrative, for any constraints or restraints on activities in the electronic file of the schedule.
- ❑ Ensure the Critical Path is clearly defined as a continuous path of activities, with zero float and red bars on the bar chart in any printout or report from the schedule.
- ❑ Except for long lead items, estimate adequate activity durations for work activities with no duration exceeding the total duration of the updating cycle itself (i.e. one month / 20 working days).
- ❑ Place submittal and owner approval activities in a separate group/WBS and ensure they have adequate duration according to the specifications or requirements for each submittal.
- ❑ Ensure there are no activities with Actual Start or Actual Finish dates in the baseline schedule.
- ❑ If not relying on the scheduling software numbering system, create a consistent system for activity IDs and their numbering in the schedule that can be manageable. For instance, the number of characters and digits in the activity IDs string, should follow a consistent pattern, where characters and digits can be used in different combinations in same structure as needed for all of the activities in the whole project (i.e XYZ-12345 : this scheme alone is enough for more than a 1,500 activities schedule).
- ❑ Utilize activity codes to identify different attributes of the activities (i.e. phases, locations, etc.).

- ❑ Create an easy to read report or printouts from the schedule for stakeholders that might not have access to the scheduling software to review the major milestones and key activities in the electronic files of the schedule.
- ❑ Link properly the procurement activities to their corresponding submittal, approval and construction activities.
- ❑ Eliminate unnecessary logic that can add to the complexity of the schedule without a meaningful outcome in the construction plan of work (i.e. avoid: redundant relationships in a string of activities, too many predecessors/successors to one activity, uncommon relationship types like SF, negative lags, excessive positive lags, etc.).
- ❑ Plan for inclement weather conditions according to the NOAA and historical records of precipitations and storms, in the geographical area where the project resides.
- ❑ Plan an adequate time for Punch-List work.
- ❑ Create and print schedule of values (SOV) of the project, showing correlation between each value in SOV and activities in the schedule representing work of such value.

Monthly Schedule Updates

CPM Schedule Updates submissions should be enforced as per specifications. Per definition, a schedule update does not contain any revisions or changes to the main logic, durations and calendars of baselined plan. It only updates the activities' actual dates, resources and accrued cost items during the updating period. A schedule submission that makes any other changes is considered a schedule revision, which is explained in a different section (See Page 3). The following elements are dedicated and should be considered in creating a monthly schedule update:

- ❑ Capture all the progress of started and finished activities on site during the updating period by updating the actual start, actual finish dates, and percent complete of corresponding activities
- ❑ Update the actual cost of the progressed activities according to the agreed-upon values in the payment application of the updating period.
- ❑ Make necessary corrections according to previous reviews and recommendations.
- ❑ Include in the narrative the progress of the work in the updating period and notes of any delays.
- ❑ If/when changed from previous monthly update, describe and print the longest path and critical activities in the schedule.
- ❑ Record in a narrative, any delays to interim milestones and their impact if any, to the substantial completion milestone in the schedule.
- ❑ Identify any out-of-sequenced progress (actual date of activities that have non-started predecessors), and provide reasons that led to such change of plans in a narrative.
- ❑ Ensure that no actual dates are after the Data Date/ Status Date in the schedule regardless of date the schedule is being submitted for review (i.e. If on August 10th, submitting a schedule update for month of July, with Data Date July 31st, then this update should still not include any actual dates of those 10 days in August).

Schedule Revisions

Recovery Schedules

A schedule recovery is a special case of a schedule update, with revisions made to mitigate a forecasted delay, therefore, it requires additional changes when creating and submitting proposed recovery for review and approval. These changes should be listed and include the following:

- ❑ Original duration changes (Compression) of not-started activities, which need to be made wisely and be documented in a narrative. If a duration is dramatically decreased, an explanation is needed for such reduction, and/or a plan to achieve such accelerated productivity.
- ❑ Logical relationship changes between construction activities (Fast-Tracking), which should be kept at minimum to avoid loops and redundant relationships in the schedule. Changing a lot of relationships in a recovery schedule gets out of its functionality and objective of getting back on track to original plan of work.
- ❑ Name changes (Removed Scope) of working activities, which should be listed for documentation purposes.
- ❑ Resource changes (Productivity Increase) of crews, and/or subcontractor's assignments, to construction activities working on site.
- ❑ Cost/Pay Items changes, should be listed to correlate with pay applications.
- ❑ If the schedule update has more than 20 working days of negative float, recovery schedule revisions should be submitted within 5 business days of submitting the schedule update with such delay.
- ❑ Easy to read report or printouts from the schedule, for stakeholders that might not have access to the scheduling software to review the major milestones and key activities in the electronic files of the schedule.

Revised Baseline Schedule

The need for a revised baseline schedule usually arises around 50% or 75% of the project life-cycle, if/when the whole project plan in the baseline schedule is no more applicable on site. The revised baseline schedule should include items below:

- ❑ All items mentioned in the first section of this document for creating the baseline schedule, in addition to actual dates in most recent monthly schedule update.
- ❑ Contractor's or Engineer's decision for a need of revised baseline, which could be that a regular recovery schedule would include too many changes from the original plan, therefore, it would be more efficient to rebuild the whole plan in a revised baseline schedule instead.
- ❑ Categorizing or grouping system for archiving activities with actual dates that happened in the past, without impacting future activities in the new plan presented in the revised baseline schedule (i.e. a separate WBS with no relationships to other future activities in new plan).

Schedule Accessories (Optional)

Written Narrative

If the schedule submittal requires a Written Narrative (WN), the narrative's main function is to describe the work plan. The narrative should examine the detail and ensure it covers the following:

- ❑ If a delay is recovered in the schedule, the narrative should be describing the changes made in the original schedule update, to recover the delay/negative float to be within 0-14 calendars days only. It should also list the contractor's plan on site (increase labor, working double shifts, etc.) to accomplish such recovery.
- ❑ Project Calendar
- ❑ Holidays and non-work days
- ❑ WBS Structure
- ❑ Original critical path description
- ❑ Sequence of work plan
- ❑ Activities identified by location and trade
- ❑ Abbreviations explained
- ❑ Subcontractors and/or vendors identified

Multiple Calendars

If the schedule contains more than one calendar, they need to differentiate between activities with different work conditions (outdoors, indoors, winter only work, etc.). The calendars should meet the following:

- ❑ Classify which calendar is for what type of work (asphalt, roadway, bridge etc.).
- ❑ Mark holidays according to activity owner policy in **each** calendar.
- ❑ Estimate non work days for inclement weather conditions on **each** calendar as appropriate. (Note: indoor calendars may not have as many non-work days as the roadwork or roofing calendar.)
- ❑ Define assignment criteria of each calendar to its appropriate activities.
- ❑ Include a printout listing all calendars used in the software and/or list them in a narrative.

Cost Loading (SOV Correlation)

If the schedule submittal requires a Schedule of Values (SOV) to be submitted accordingly, the expectation is to correlate the line items in the SOV with the activities in the schedule for monthly payment applications. Such correlation should examine the detail, and ensure it covers the following:

- ❑ Guided by the SOV, cost load the schedule, by distributing total budgeted value (awarded contract value) of the project over the construction activities in the schedule, using direct cost-loading technique (Direct Cost items over Task Dependent activities), and/or level of effort technique (Indirect Cost items over Hammock activities).

- ❑ Utilize a costing feature in the scheduling software (i.e. Expenses, UDF, Res, etc.) and dedicate it for corresponding line item(s) in the SOV.
- ❑ Create a column in the SOV table, and dedicate it for corresponding activity(ies) in the schedule.
- ❑ No cost should be assigned to submittal or administrative activities.

Resource Loading (Crews/Subs on site)

If the schedule submittal requires to be resource loaded, the expectation is to demonstrate the activities usage of main resources contract planned, to be on-site. Such usage should examine the detail and ensure it covers the following:

- ❑ Labor Resources assigned to their corresponding activities in the schedule to represent at minimum, the key trades of work planned in the project (i.e. Painting Crew, Roofing Crew, Structural Steel Crew, etc.). The exact number of labor inside each crew, and crew details (size, names, rates, etc.) can vary or left blank as place holders at the early stage of planning, until more information is available to be altered as needed, and when updating the schedule for monthly schedule updates.
- ❑ Subcontractor's activities identified
- ❑ Number of crews per sub or trade
- ❑ Number of shifts per day
- ❑ Number of hours per shift