



تدوین و تایید برنامه زمان بندی به روز شده (Update Schedule)

اصول + نکات حیاتی + چکلیست
(بر اساس سندی از AACE)

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What we will learn?

- ☐ Purpose
- ☐ Overview
- ☐ Applicability
- ☐ Recommended practice
- ☐ Overarching principles
- ☐ Schedule update submittal
 - ❖ Components of and deliverables of an update submittal
 - ✓ Schedule narrative
 - ✓ Printed reports
 - ✓ Schedule input data file
 - ❖ Schedule update process
 - ❖ Schedule status
 - ❖ Activity suspension

What we will learn?

- ❑ Schedule update review process
 - ❖ Reviewer's role and responsibilities
 - ❖ Review process overview
 - ❖ Acceptance versus approval
 - ❖ Schedule update review items
 - ❖ Actual date revisions
 - ❖ Rules for acceptance of constraints
- ❑ Additional topics
 - ❖ Resource leveled schedules as a submittal
 - ❖ As-built schedules as a submittal

Reference



Primary reference

aace
International

AACE International Recommended Practice No. 53R-06

**SCHEDULE UPDATE REVIEW – AS APPLIED IN
ENGINEERING, PROCUREMENT, AND CONSTRUCTION**
TCM Framework: 9.2 – Progress and Performance Measurement,
10.3 – Change Management

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AACE International Recommended Practices

What are the purposes of this guideline?

Purpose



Purpose of This RP

- ☐ This Recommended Practice for Schedule **Update Review** is intended to provide a guideline, **not** to establish a **standard**.
- ☐ As a recommended practice of AACE International, this document provides guidelines for the project scheduler to
 1. Create a professional schedule update or
 2. Assess the reasonableness of changes to be made in a schedule due to a change of project status and progress.

Overview



Who could use this RP?

- ❑ This recommended practice provides guidelines to **assist**
 1. Construction entities submitting the schedule updates (the **contractor**) and
 2. Entity reviewing the schedule submittal (the **owner or client**) to respond to the submittal in a fair and reasonable manner.
 - ❖ The use of the term “**owner**” also includes the work performed by **their agents** such as construction management.
 3. Also included is the recommended process to be followed by the **schedule reviewer (reviewer.)**

When schedule update occurs?

❑ A **schedule update** occurs when a contractor

1. Assesses the **status** of the project that they are **currently working on**,
2. Enters that **status** into a **previously prepared schedule**, and then
3. Submits (shares) this updated schedule with the owner of the project.

❑ **Schedule updates** are an important aspect of
timely project completion and

this is a major reason that most **construction contracts** for large projects require them.

Who should update the schedule?



Schedule update

- ☐ The schedule update should be a reflection of the contractor's **intent to reach project completion.**

Because of this, it is created and updated by the **contractor**.

- ☐ The owner indicates their willingness to use the schedule update as a means of communication and negotiation by accepting the schedule update.

- ❑ Reaching **agreement** on the status of the project schedule is often difficult, frequently requiring **negotiation** and **perseverance**.

Why does it matter to reach agreement?

❑ **Failure to arrive** at a quick, accurate, and timely agreement of project status can cause

confusion, uncertainty, and potential **loss** of time and/or money on many projects.

❑ **A lack of timely agreement** on the project schedule status could result in

1. Contractor acceleration,
2. Cost overruns,
3. Late project delivery, and
4. Disputes

Applicability



When to use this RP?

- ☐ This recommended practice is oriented to **critical path method (CPM) schedule analysis** and is **applicable only to schedule update reviews** that take place during execution of the work.
- ☐ **Baseline schedule reviews** prior to the start of execution differ greatly and require different review techniques than used in schedule update reviews.



When to use this RP?

❑ A baseline schedule review is different from an update schedule review for the following reasons:

- ❖ Focus on quality
- ❖ Review factors
- ❖ Constraints
- ❖ Negative float
- ❖ Early project completion
- ❖ Focus on changes
- ❖ Project completion is a projection of status



When to use this RP?

- ☐ This process is applicable across all contract types.

Prepared by Dr. Alavipour
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Recommended Practice



How it is organized?

- ❑ This recommended practice is organized into two phases;
 1. The preparation of the schedule update submittal by the contractor, and
 2. The review of this submittal by the owner.



How it is organized?

□ The following topics are outlined as follows:

- OVERARCHING PRINCIPLES
 - Timeliness
 - Fairness
 - Interpretation
 - Enforceability
- SCHEDULE UPDATE SUBMITTAL
 - Components and Deliverables of an Update Submittal
 - Schedule Narrative
 - Printed Reports
 - Schedule Input Data File
 - Schedule Update Process
 - Schedule Status
 - Activity Suspension
- SCHEDULE UPDATE REVIEW PROCESS
 - Reviewer's Role and Responsibilities
 - Review Process Overview
 - Acceptance versus Approval
 - Schedule Update Review Items
 - Actual Date Revisions
 - Rules for Acceptance of Constraints
- ADDITIONAL TOPICS
 - Resource Leveled Schedules as a Submittal
 - As-Built Schedule Submittal

Overarching Principles

- ☐ **Contractually**, if the **owner requires** the contractor to submit a schedule update, then the **owner** of the project has a responsibility to review and comment on any required schedule update submittal in a **timely manner**.
- ☐ **Comments** from the owner (if any) should be made in writing and returned to the contractor.

- ☐ The **timely submittal**, review and approval of schedule updates are of major importance to the construction project.
- ☐ For the **owner to receive full value** of the schedule submittal, it should be **delivered** within the specified time.
- ☐ Because the **contractor requires the owner's comments** from the previous schedule update in order to prepare the next schedule update submittal, the owner's comments should be returned within the agreed upon time.

What if the owner fails to comment?



Timeliness

- ❑ Because **failure to comment** generally implies acceptance of the schedule, it is in the **owner's interest** to review and **formally** comment and/or accept the submitted schedule update.

What if the contract does not specify time period?

- ❑ In the **absence** of a specified “turn around time” (or complete submittal review cycle),
 - ❑ the **schedule** should be **submitted or delivered** to the owner or owner's representative
within a time period of **one fourth ($\frac{1}{4}$)** of the update cycle
after the **schedule status (“data”)** date.

- ❑ Conversely, the **owner** should provide **review comments and approval**
within **one fourth ($\frac{1}{4}$)** of the update cycle
after the **schedule submittal** is received.

*This timing is both fair and reasonable as it **allows time** for a **re-submittal**
prior to the **next update cycle**.*

- ☐ Schedule submittals should be tracked and responded to in a **timely manner**.
- ☐ It is recommended to keep a **log of all submittals** to include **dates submitted** and **returned** and the status of the review.

- ☐ The contract and the specifications accompanying that contract **bind both parties** to use it **solely as the standard** for the creation and appraisal of schedule update submittals.
- ☐ The **schedule submittal** should either be accepted as satisfying the requirements of the contract and specifications or be rejected for not meeting those requirements.
- ☐ Schedule submittals may be **provisionally accepted** by the owner with the stipulation that the **contractor will correct** the noted deficiencies or shortcomings with the **next schedule update submittal**.

Is conditional acceptance acceptable practice?

- ☐ **Conditional owner acceptance** of schedule update submittals is an accepted industry practice and allows for corrections while **minimizing disruption** and **expense** to the project.

What if deficiencies not corrected in the next update?

☐ If these items are **not corrected** with the next schedule update, the **owner** has the **option** of

1. Again **requiring their correction** by the subsequent submitted update,
2. **Rejecting** the current update submittal, or
3. **Rejecting** the current and the prior update submittals and **requiring** resubmittals.

- ❑ The **current forecast status** of the schedule should be realistic.
 - ❖ Typically, it is **not reasonable** to require schedule update submittals to indicate on-time milestone or project completion **unless** this is actually the case.
- ❑ A **recovery (or work around) schedule** may be required, but this recovery schedule is usually required by the contract specification as a separate submittal and **distinctly different** from the periodic schedule update.

When to reject?

- ☐ The reviewer should **not reject** a schedule update submittal **unless** the submittal contains errors that **invalidate the accuracy** of the schedule.
1. It is reasonable (and a normal part of most schedule reviews) to **note discrepancies** that are not a reason for rejection of the schedule.
 2. Conversely, it is **permissible to reject** a schedule update when there are so many minor discrepancies or errors in the schedule that, in the **reviewer's professional opinion**, the aggregate of the errors severely limits the schedule's credibility and usefulness to **predict future progress**.

Should we stop reviewing if some major issues exist?

- ☐ Even when there is an **observed issue** that is significant enough to **reject the schedule** update,
the **reviewer** should **continue the review** to its completion.

- ☐ The entire schedule review should be **completed and all comments** should be included in the recommendation for rejection,
even if some of the comments are not about issues severe enough to reject the schedule by themselves.

- ☐ If the **schedule specification** allows or prohibits a particular CPM practice, then that **practice is allowed or prohibited** (as the case may be) regardless of other considerations.
- ☐ The **contractor may request** that any specific schedule practice be waived and if such waiver is granted, may **disregard** that particular practice.

- ❑ **Not all** scheduling **specifications** are worth the “cost” of enforcing them.
- ❑ The **owner may choose** to ignore selected contractual variances for the sake of **project success**.
 - ❖ Because of this, specific schedule **specifications are often waived** by the owner.

Schedule Update Submittal



Components of and deliverables of an update submittal

- ❑ **At a minimum**, the schedule status update submittal consists of a schedule narrative and a copy of the schedule's native electronic database in a form consistent for archiving and transference to other project participants such as the owner.

- ❑ **Additional schedule submittal** components may also include
 - ❖ Printed CPM reports and graphics,
 - ❖ Data tables to substantiate the claimed progress,
 - ❖ Early/actual/late progress and budget curves (s-curves), and
 - ❖ Related progress and resource graphics,
as required by the contract.



Components of and deliverables of an update submittal

- ❑ Typically the **schedule update submittal** consists of the following components:
 - ❖ A written narrative describing **changes** made to the schedule and the **overall impacts** to the project.
 - ❖ A complete **electronic copy** of the schedule update database.
 - ❖ **Printed reports**, as required by scheduling specification.
 - ❖ **Graphics**, as required by scheduling specification.
 - ❖ Any other contractually specified documents or inclusions such as a time impact analysis (TIA) or recovery schedule.



Components of and deliverables of an update submittal – Schedule narrative

- ☐ The schedule update narrative adds and **supports understanding** of the schedule update.
- ☐ The narrative describes **changes** made to the schedule, **current issues, problems**, and **related schedule notifications** to the owner.
- ☐ It is a universally important document as the narrative is understandable by **all project shareholders**, not just the scheduler.
- ☐ A **good narrative** both
 1. Informs the owner and
 2. Reserves the rights of the contractor



Components of and deliverables of an update submittal – Schedule narrative

- ❑ A **narrative** may include the **following items**, as appropriate:
 - ❖ **Identification** of significant schedule progress during the reporting period.
 - ❖ **Progress** against contractual milestones this period.
 - ❖ A **list** of **significant activities** started or completed during the reporting period.
 - ❖ **Explanation** of any lack of progress on **critical path activities** **planned** to be performed during the **previous reporting period**.
 - ❖ The **status** of major project material and equipment procurement.



Components of and deliverables of an update submittal – Schedule narrative

- ❑ A narrative may include the following items, as appropriate:
 - ❖ **Identification** of constraints to **progress (delays)** encountered during the reporting period.
 - ❖ **Identification** of proposed schedule change orders submitted during the last reporting period.
 - ❖ **Explanation** of any **significant** schedule variances from the baseline (target) schedule plan.
 - ❖ A **list** of all changes made to the **logic or planned durations** this update period.



Components of and deliverables of an update submittal – Schedule narrative

- ❑ A narrative may include the following items, as appropriate:
 - ❖ **Explanation** of any schedule changes, including changes to the **logic sequence** or to **activity durations** and the impacts to the overall project.
 - ❖ Project **risk analyses**.
 - ❖ Project **schedule concerns and issues**.
 - ❖ **Recovery plans** (if required by the contract/specification.)

How important this document at court?



Components of and deliverables of an update submittal – Schedule narrative

- ☐ If the **project is on schedule**, then the **narrative** should state this fact.
- ☐ Some **court cases** have hinged on the issue of whether or not the **participants understood** that a problem existed at a certain point in time.

*The fact that the **narrative written at the time of a delay** did **not contain even a mention** of an obvious delay condition was later **used to question the validity** of an **analysis created after the project was completed**.*

should the contractor wait for this document to inform the owner for delays?



Components of and deliverables of an update submittal – Schedule narrative

- ☐ The **contractor** should not wait for the narrative submittal to **inform** the owner of possible delays to the project.
- ☐ Notice of **potential** delays should be **transmitted separately** and **as soon as** practical **after observing** a delay issue that
 1. Impacts the owner and
 2. As mandated by the terms of the contract.
- ☐ The **narrative** should contain confirmation (and perhaps elaboration) of any previously transmitted delay notice.

Printed or electronic version?



Components of and deliverables of an update submittal – Printed reports

- ❑ **Printed schedules** can pose **serious problems** for the reviewer.
- ❑ While the preparer is always responsible for the accuracy of all submittals, printed schedule reports may contain inconsistent or contradictory information from that presented in the electronic version of the schedule for the same status date.
- ❑ Printed material is **incapable** of being re-formatted to match reports from earlier submittals and is **much harder and error-prone** to review than using electronic versions with the proper **comparison software**.
- ❑ In addition, a **single printed report** is usually **incapable of printing** all activity, relationship, cost, resource, log, code, workday calendars, and administrative settings that may be contained in the electronic version of the CPM schedule.

What considerations taken while printed version submitted?



Components of and deliverables of an update submittal – Printed reports

☐ If **printed reports or graphics** are to be submitted by the **contractor**, then it is important that

the title information, format, filters, groupings, and sorts be agreed upon before the **first report submittal** and **not be changed** without consent from the owner.

Characteristics of input data file?



Components of and deliverables of an update submittal – Schedule input data file

- ❑ **Contract specifications** normally require the submission of an **electronic import (or input)** file in a format and medium

that can be used by the owner using their **own copy** of the CPM scheduling software and computer to **re-create the same scheduling database** for their **own use**.

Let's see the process of how to update the schedule



Schedule update process

- ❑ Once a **baseline schedule submittal** is established and **accepted**, then a **schedule update** should be made on the **next periodic schedule update** cycle date.
- ❑ **Schedule update submittals** should show the **status** of the entire project **scheduled** as of a single date specified (for example, “**on the 20th of each month**”) or on a particular, reoccurring date as determined by **contractual frequency** requirements.
- ❑ Many projects **time the schedule update status** to **coincide** with the payment application time period in order to provide **documented backup** of the project status.

What considerations should be taken for status date?



Schedule update process

- ☐ Schedule updates should be adjusted to show a status date also known as the “**data date**.”
- ☐ Once the **activity status** is entered, the **CPM calculations** are performed consistent with the **status date**.
 - ❖ **No unfinished work** should be found in the schedule to occur prior to the **status date**, and
 - ❖ **No completed work** should be found in the schedule to occur later than or on the **status date**.

What considerations should be taken for internal settings of software?



Schedule update process

- ❑ Most **CPM scheduling software** contains **internal settings** that determine the specific manner in which the CPM calculations are produced.
 - ❖ An example of this would be **whether float** is calculated using the calculated start dates or the finish dates.

What if there is a need to change rules?



Schedule update process

- ❑ **None of the software calculation rules** affecting how the CPM was calculated should be **changed** from those used in the **previous approved schedule update (or baseline schedule if appropriate)**

unless the CPM **rule change and reason** for that change is documented in the **schedule narrative** and **not prohibited** by specification.

- ❖ If the owner does not approve of the CPM rule change,
then this rule should be **returned to the previously approved** setting.

Could we change update after CPM calculations?



Schedule update process

- ❑ After the **CPM calculations** have been performed and saved,
no changes should be made to the **schedule update**
without repeating the CPM calculation process.

What if the owner is in disagreement of activity status?



Schedule update process

❑ If the **owner** is in **disagreement** with the assessment of activity status in a schedule update,

then the **exact issues** in question should be stated clearly in writing in a **prompt manner**.

❖ The **stated status** in a schedule is the sole reflection of the contractor's assessment.

❖ The **owner may accept** a schedule update with status assessments that they disagree with

but these specific disagreements should be documented.

**So, what if they still disagree?
Remember delay analysis course?**



Schedule update process

- ❑ If the **contractor agrees** to change their status in response to a request by the owner, then a separate corrected schedule should be **re-submitted** by the contractor.
- ❖ It is **not good practice** to just agree to the change(s) **without submitting a revised electronic document** that reflects the change(s).

When to document schedule status?



Schedule status

☐ **Schedule status** should be noted and documented

as soon as possible **after** the **activity** has started and finished.

- ❖ This allows for the most accurate assessments and also provides the scheduler with the best opportunity to verify the accuracy of these dates and progress.



Schedule status

- ❑ The **schedule status** should be observed, documented, and entered into the scheduling software as **it is physically observed**.
- ❖ It is **not an acceptable practice** to have the scheduling software automatically enter actual date status as it was planned (e.g. via an automatic update.)

What to document for actual start of activities?



Schedule status

☐ Actual start dates should reflect

1. Substantial and
2. Effective

start of the work and **not just** the start of some minor, inconsequential preparatory work.

Example?



Schedule status

❑ For example,

*activities may have a **proper actual start date** while **not showing any evidence** of actual work **in place**,*

*if actual work is being **accomplished elsewhere** that **contributes** and is included in the work plan for that activity.*

❖ This sort of work is often reflected in **shop preparation and prefabrication** in off-site or remote areas.

This is one of the reasons **why it is very difficult to reject actual date assessments** made by the contractor.

Solution?



Schedule status

1. Such **off-site critical** work should be **described** in the narrative and
2. The **owner** should be **kept informed** of its existence and progress.

Significant off-site work should be **identified as separate activities** from on-site work wherever practicable.

What to do for in-progress activities?



Schedule status

- ❑ Activities that are **in-progress** should be statused by **estimating** the remaining duration of an activity,

NOT BY ESTIMATING A PERCENT COMPLETE.

- ❑ **Remaining duration** should be based upon the time necessary to complete the work
 1. Logically holding-up the **substantial start** of the successor activity and
 2. Allowing that activity to continue to **substantial completion without interruption**.

Why percent complete should not be used?



Schedule status

- ❑ There are several reasons for **not using percent complete** as a status assessment.
 1. In **some cases**,
percent complete is an **assessment** of **relative earned value** and
not an estimate of the **remaining time durations**.
 2. Due to **progress payment considerations**,
the **activity percentage earned value** may reflect non-linear assessments such
as major equipment procurement receipt and delivery,
which is usually accounted at the **start of the installation** activity process
and
not distributed evenly across the entire activity duration.



Schedule status

- ❑ There are several reasons for **not using percent complete** as a status assessment.
 - ❖ Finally, it is generally **far more accurate** to estimate **remaining duration** than it is to **Actual finish dates** should reflect **substantial completion** of the activity **that allows** the defined **successor work** to start without delay.

<https://m.youtube.com/watch?v=Sg996e-SAf8>

**What if assessment vary widely
from absolute completion?**



Schedule status

- ❑ Should that **completion assessment** vary widely from the **absolute completion** of the activity (and **especially if the activity** has a float value very close to the critical value),
then the **narrative** should **include an explanation** for such a completion assessment.
- ❑ **Activities** that remain short of **absolute completion** for a sustained period of time should be **incorporated** into a project-wide punchlist that is made **available to both parties**.

What about as-built logic change?



Schedule status

- ☐ Schedule status may also **contain** the **as-built logic changes** depicting the actual causes for timing and work flow used during the last update period.
- ☐ In CPM schedules, the **status of actual and planned logic** is an important aspect of the entire status process.

Could we modify the duration of activities?



Schedule status

1. Schedule specifications may **require** the contractor to modify activities durations and logic of the schedule update
to show planned work for planned activities to match the current plan.
2. Some **other specifications** may forbid changing the schedule **without a formal review**.

**What actions the contractor
should taken here?**



Schedule status

- ❑ If the contractor is not allowed to document the status of changed activities **without a formal review**, then this review process should be accomplished on
 1. Short notice with quick resolution or
 2. The **owner** might be held responsible for delaying and disrupting the status update process

*All significant changes to activities and logic should be **documented** in the schedule narrative to explain the reasons for the changes.*

As-built logic is just as important to document as are as-built dates.



Schedule status

- ☐ Some reviewers try to **separate** the **documentation** of
 1. Status (the addition of actual start and finish dates and percent complete for existing activities) from
 2. Schedule modifications (the addition, deletion, or modification of activities or logic) when reviewing the schedule.

Is this a good practice?

This is difficult if not impossible to do.

- ☐ Activity status without proper durations and logic is **just a bar chart and not a CPM schedule.**
- ☐ **Schedule status** that does not reflect the logic planned and actually used
 1. Does **not create a meaningful representation** of future planned work,
 2. Nor does it properly indicate the project's critical path.

Should the contract insert new activities in the update schedule?



Schedule status

- ❑ It is acceptable and advisable for the contractor to **unilaterally** insert new activities with actual dates into the schedule update **depicting delays** that occurred during the last update period, providing that **logic ties** are **not also included**.

Such insertions should be addressed in the narrative.

What if the owner objects to it?



Schedule status

- ☐ If the **owner objects** to prejudicial wording of the activity, they may do **so in their review** without needing to resort to schedule **rejection**.

Does it need to be approved before insertion?



Schedule status

- ❑ Others **feel** that before an activity may be inserted in the schedule update, it **must first** be submitted and approved as a time impact analysis component.
 - ❖ The **main problem** with this approach is that this requirement
 1. **Greatly delays** the introduction of this information into the schedule and
 2. **Deprives** the owner of **timely notice** of these **scheduling issues**.

*Tolerance for the unilateral insertion of delay activities into the CPM schedule is **not** currently a widely held practice amongst the scheduling community.*



Activity suspension

- ❑ There are several acceptable techniques used to **show work suspensions** in a schedule.

If the **suspension** of work was caused by actions or inactions of parties not under the contractor's control then **further issues** should be considered.

The **following suggestions** are examples and do **not constitute the entirety** of the actions needed.



Activity suspension

- ❑ Activities that have started but were not actively worked on during the update period can sometimes be **split** or **converted** into **two activities** with connecting logic to indicate this **period of inactivity**, provided the **specifications** do not prohibit it.
- ❑ If this is done, then original durations and budgeted resources and costs should also be **properly allocated** between the two activities to **total** the **original quantities**.



Activity suspension

- ❑ It is also **permissible** to not split the suspended activity provided that a **statement of inactivity** during the last reporting period is placed in the narrative.
- ❑ If the activity is not split into multiple activities, then **some scheduling software** allows the scheduler to designate a suspend date and later a resume date for the activity.
 - ✓ This is not always the best option as **most scheduling software** only allows for **one** such suspend/resume cycle to be listed per activity.

Best approach?



Activity suspension

- ❑ Another “activity suspension” technique used in lieu of the above is
1. **Creation of a new activity workday calendar** that shows Period(s) of inactivity as non-work (holiday) periods and
 2. Assign this calendar to the **described activity**.

Once done, **some scheduling software** will then be able to indicate this **period of inactivity** in the bar chart view by “necking” the bar during the **inactive periods**.

Schedule Update Review Process



Reviewer's role and responsibilities

- ☐ The reviewer is usually either the owner's representative or a member of the owner's staff.
- ☐ As a staff specialist, the reviewer should be working toward the **best interests of the owner** as well as the successful completion of the project.
- ☐ The reviewer needs to be fair and objective in the **overall review process**.

What to observe while reviewing?



Review process overview

- ❑ A schedule update review is **performed** by observing the changes made to the schedule
since the last accepted schedule update (or the baseline schedule if no previous updates have been submitted and accepted) and
evaluating the appropriateness and impacts of the changes.
- ❑ For the purposes of discussion, a “**change**” here includes status updates
as well as activity, logic, resource, coding, or other alteration to the schedule.
 - ❖ **Reviewable changes** do **not include** formatting issues such as activity groupings, filters, or sorts used for presentation and schedule organization.

What resources should be considered?



Review process overview

- ❑ The schedule update should be **evaluated** using the following criteria:
 - ❖ **Requirements** included in the contract specifications.
 - ❖ **Physical dimensioning** and **instructions** found in the contract plans.
 - ❖ **Resource** availability.
 - ❖ **Professional** scheduling practices and guidelines **generally accepted** for use by professional scheduling practitioners.

How to find changes in large projects?



Review process overview

- ❑ Because it is so important that the **owner be made aware** of all changes in the schedule,

it is recommended that some sort of **automated “assist”** be used in the course of identifying these changes.
- ❑ This **automated process** of identifying changes may be provided by developing internal schedule export routines based in
 1. **Spreadsheets or databases**, or
 2. By utilizing **commercial software designed** for this purpose
 3. Some professional CPM schedule software systems contain **add-on or built-in routines** designed for identifying these changes.

So, what reviewer does then?



Review process overview

❑ The **interpretation** of the significance and acceptability of **schedule changes**

remains the **responsibility of the reviewer**,

but these **automated processes** can make the change identification
process more efficient.

Could we reject the update if professional
practices are not considered?



Review process overview

❑ Other than schedule status changes,

the reviewer should **not require additional changes** to the schedule submittal that are not **directly supported** by

1. Contract specifications or
2. Other contract documents.

❖ **Although** the reviewer may recommend additions or changes as enhancements or **improved professional practices**,

the **failure to comply** with these types of requests should not be a cause for schedule **rejection**

if the recommendation is **not required** by the contract documents.

Who is responsible for the accuracy of the schedule update?



Acceptance versus approval

- ❑ The accuracy and viability of the **submitted schedule update** is the responsibility of the **contractor**.
- ❑ The schedule should be the contractor's assessment of current project status and their plan for future progress.
- ❑ The **owner** does not take responsibility for the **contractor's actions** by either accepting or approving the schedule update **submittal**.
 - ❖ The **owner merely indicates** whether or not they accept the submitted schedule update as **meeting** the scheduling specifications and standard scheduling practices.
- ❑ In the **context** of schedule update submittals,
the term **“approval”** means the same thing as **“acceptance”** and
does **not constitute any shift** in the responsibility of scheduled work from
the **contractor to the owner**.



Schedule update review items

- ☐ **Activity IDs** are the “tags” that uniquely **identify each activity** regardless of other changes.
- ☐ **Once deleted** from a schedule, that same activity ID should never be re-used for another activity in that schedule
unless it is a direct reinstatement of the **original activity** without modifications.
- ☐ **All changed items** in the schedule should be considered and **not just changes** on the **critical path**.



Schedule update review items

❑ At a **minimum**, the schedule update review should include any changes in the following items:

❖ Scheduling software system checks:

- ✓ **Project** start, status, and other imposed project dates.
- ✓ Check to verify that the project start date and calendar start dates have **not changed**, as this will **modify** the **work day numbers**.
- ✓ Changing the **required completion date** will change the project float.
- ✓ Changing the **schedule time units** from days to hours may also **confuse automated schedule** checking software.



Schedule update review items

❑ At a **minimum**, the schedule update review should include any changes in the following items:

❖ **Scheduling software system checks:**

✓ **Project calendars.**

- **Changes** to the **calendar** in the past (before the current status date) should **not affect forecast dates**.
- Documenting **approved non-work days** (sometimes called “weather days”)



Schedule update review items

❑ At a **minimum**, the schedule update review should include any changes in the following items:

❖ **Work breakdown structure (WBS):**

- Deleted/added/modified WBS levels in the structure.



Schedule update review items

❑ At a **minimum**, the schedule update review should include any changes in the following items:

❖ **Activity data:**

- ✓ Deleted/added/modified activities.
- ✓ Changes to internal activity settings such as:
 - Activity type.
 - Activity calendar.
 - Activity description.
 - Original duration.



Schedule update review items

❑ At a **minimum**, the schedule update review should include any changes in the following items:

❖ Activity data:

✓ **Date analysis:**

- New dates added.
- Changed actual dates that had been reported earlier.
- New actual dates for a time period earlier than the start of this reporting period.
- Invalid actual dates in the future.
- Missing actual dates.
- Suspended/resume dates.
- Progress with suspended activities.



Schedule update review items

❑ At a **minimum**, the schedule update review should include any changes in the following items:

❖ Activity data:

✓ **Progress analysis:**

- Progress but no actual start date.
- Actual start with no progress.
- Completion without an actual finish date.
- Active activities with no progress.
- Newly completed activities.
- In-progress activities.
- Unstarted but able to start activities.
- Total float change greater than the reporting period.



Schedule update review items

❑ At a **minimum**, the schedule update review should include any changes in the following items:

❖ **Activity data:**

✓ **Activity codes & activity ID codes:**

- Change of activity code definitions.
- Deleted/added/modified activity codes.



Schedule update review items

❑ At a **minimum**, the schedule update review should include any changes in the following items:

❖ **Activity data:**

❖ **Activity constraints:**

- Deleted/added/modified constraints.
- Out-of-date expected finishes before the status date.



Schedule update review items

❑ At a **minimum**, the schedule update review should include any changes in the following items:

❖ Relationships:

- ✓ Deleted/added/modified relationships.
- ✓ Newly “orphaned” activities without successor relationships.
- ✓ Invalid added relationships.
- ✓ Modified relationship lags.
- ✓ Interruptible activities.
- ✓ Activities without a predecessor relationship.
- ✓ Active activities without a successor relationship.
- ✓ Activities that started out-of-sequence.



Schedule update review items

❑ At a **minimum**, the schedule update review should include any changes in the following items:

❖ **Activity logs, memos, or notebooks.**

- ✓ **Activity logs** are sometimes considered a **notification of project conditions** from the contractor to the owner and should be reviewed for changes at every update.
- ✓ This is an **excellent place** to include delay and disruption information to maintain a **contemporaneous record** of project events.
- ✓ Using the **activity logs** for this purpose has the added advantage of **making it clear to all** just what schedule work was **affected by the impact**.



Schedule update review items

❑ At a **minimum**, the schedule update review should include any changes in the following items:

❖ **Overall review items:**

- ✓ Critical path versus longest path.
- ✓ Compare progress on the critical path from previous schedule update.
- ✓ Activities starting later than necessary.
- ✓ Activities starting earlier than logically allowed.



Schedule update review items

❑ At a **minimum**, the schedule update review should include any changes in the following items:

❖ **Activity resources:**

- ✓ Change in resource definitions.
- ✓ Deleted/added/modified activity resources.
- ✓ Changes to internal relationship settings.



Schedule update review items

❑ At a **minimum**, the schedule update review should include any changes in the following items:

❖ **Activity costs or values:**

- ✓ Change in cost definitions.
- ✓ Budgeted costs.
- ✓ Earned value.
- ✓ Actual costs.



Actual date revisions

- ☐ It is **important** that **previously reported actual information** remain constant in **subsequent schedule submittals**.
- ☐ From a **project documentation perspective**, it is **not good practice** to change or delete historical activity information (including logic relationships) in **subsequent schedules submittals** that were **previously reported** in earlier schedule submittals.

What to do in this case?



Actual date revisions

- ☐ The **reviewer** should request that the deleted or changed historical schedule information
be **re-inserted** in the current schedule
before the **schedule submittal** can be accepted.

What if the contractor refuse to do that?



Actual date revisions

☐ If such a request is **refused by the contractor**,

then the **reviewer** should ask for a written statement as to

1. Why the change to the previously reported dates is necessary and
2. What the impact was to the **critical path** in the older schedules by making this change in this schedule update.



Actual date revisions

- ☐ More commonly observed **than** activity or logic deletions is the **changing** of **previously reported actual** start and finish dates.
- ☐ Dates and status should be **corrected** when the **contractor** is made **aware** that an error was previously made in the schedule assessment.
 - ❖ The **status changes** should be made in the
 1. Next schedule update submitted and
 2. Schedule narrative that accompanies the schedule update should identify these corrections and explain the circumstances for the previous reporting **error**.

What happens to the TIA then?



Actual date revisions

- ☐ Any previously accepted time impact analysis showing a **different result** from the changed actual dates should be resubmitted for re-evaluation.



Rules for acceptance of constraints

- ☐ **Constraints** may change or modify the CPM calculations.
- ☐ As constraints hide the **pure-logical relationships** between activities, their use is discouraged.
- ☐ Some **schedulers** incorrectly use constraints to make activities fall in time-periods as if they were preparing a bar chart schedule.
- ☐
- ☐ **Constraints** should be used to reflect contractual requirements and **not used just** to make the early start date of an activity equal to the planned start.



Rules for acceptance of constraints

- ☐ Adding **non-contractual constraints** reduces activity float that may later become “critical” due to the actions of the owner when **no real project delay** is manifested.
- ☐ If the **reviewer** feels that the non-contractual constraint may be **left in the schedule**, then it is **advisable to include a comment** in the review report that such addition must be removed prior to performing **any delay analysis**.
- ☐ If the **contractor wishes** to show a scheduling intent, then they should **state this in the narrative** and not through the use of constraints.

Additional Topics



Resource leveled schedules as a submittal

- ❑ Resource leveling is accomplished after the CPM calculation is made and is used as a forecasting tool by the contractor to better plan requirements.
- ❑ A **resource leveled** schedule results in activity changes that are either manually adjusted, automatically adjusted through software routines, or a combination of both.
 - ❖ Note: in this section of the RP, we refer to “**resource leveling**” as **delaying or constraining the scheduled start of activities** for resource considerations without the use of logic.
 - ❖ **Most project scheduling specifications** do not discuss the application of resource leveling after completing critical path method calculations.



Resource leveled schedules as a submittal

- ❑ Ordinarily, the **first action** that a reviewer performs after **loading the schedule** is to **recalculate the schedule** using the status “**as of**” **status date** (which is usually already set in the schedule software parameters.)
- ❖ This is done to **ensure that** no latent information **contradicting** the CPM calculations exists **before reviewing**.



Resource leveled schedules as a submittal

- ❑ The **exception** to this rule is when the **reviewer** is analyzing resource-leveled schedules.
 - ❖ In this case, the CPM **calculations** should **not be made** on the original schedule.
 - ❖ Unwittingly re-calculating the CPM and then reviewing a resource leveled schedule might result in the **acceptance of a schedule** that might otherwise have **been rejected**.
 - ✓ Many **reviewers**
 1. **Create a copy** of the resource leveled schedule,
 2. Perform the CPM calculation on the copy and
 3. Compare the two schedules.



As-built schedules as a submittal

- ☐ The **contractor** is responsible for the **accuracy** of the dates, status and CPM network logic shown in the **as-built schedule**.
- ☐ The **contractor** should review and compare **all actual dates** to the **project documentation dates** as a part of the process of submitting a certified as-built schedule.
- ☐ The **final**, contractually submitted as-built schedule is generally considered the “**certified as-built schedule**” and should report **actual schedule performance** as accurately as possible.



As-built schedules as a submittal

- ☐ **All parties** have the **right** to depend upon this as-built information as correct and not subject to later revision.
- ☐ The **owner may elect** to accept later revisions to an as-built schedule, but only when a reasonable explanation is provided by the **contractor**.
- ☐ In **cases of disputes**, the **last as-built schedule submitted** by the contractor that was accepted by the owner is the **first schedule** that should be considered for use to **analyze delays**, should a final accepted as-built schedule submittal not exist.
- ☐ This makes a **thorough review of the periodic as-built schedule** submittal very important to both parties.

موسسه مهندسی و مدیریت ساخت علوی پور (ACEMI)

دفتر آموزش



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