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ACE

# Time Impact Analysis

## Effective Techniques for Analyzing Construction Schedule Delays

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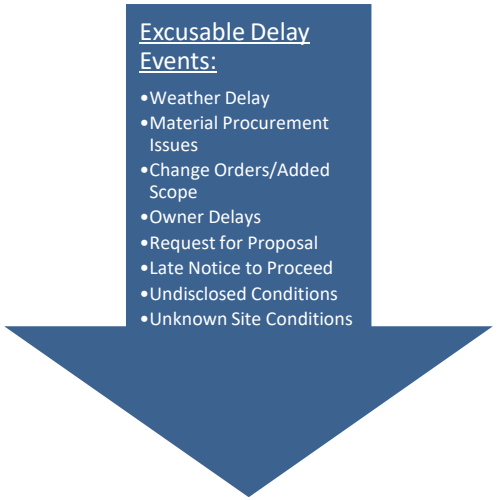
# Delay Review Agenda

1. Analysis of Progress Schedule
2. Preparation of Delay Schedule
3. Proper Cadence of Creating Delay Schedule
4. Understanding CPM Schedule Delay

# Construction Delays

We have a construction delay now what?

Understanding the delay and when the delay was realized.




**Time Impact Analysis**


**Recovery Schedule**

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# Required Actions Before Starting….

1. Need a schedule that has **correct logic and sequencing** corresponding to what is happening in the field prior to delay.
2. Need a schedule that has been **updated monthly** with correct actual start and finish dates.
3. **Documentation & timeline of the delay event in detail**.
   - Dates in chronological order of everything that happened
     - The 3 D's…. Documentation, Documentation, & Documentation
   - RFI's, PCO's, RFP's, related to delay if any with dates submitted and approved/answered.
   - Scope of work for delay or change in detail with sequencing to input into the schedule to show delay if add scope etc.
   - How the delay is related to activities in the original schedule in order to tie logic to the delay fragnet.
     - Ie. Roof delay is causing the slab on grade to not be poured because of the roof not being dried in.

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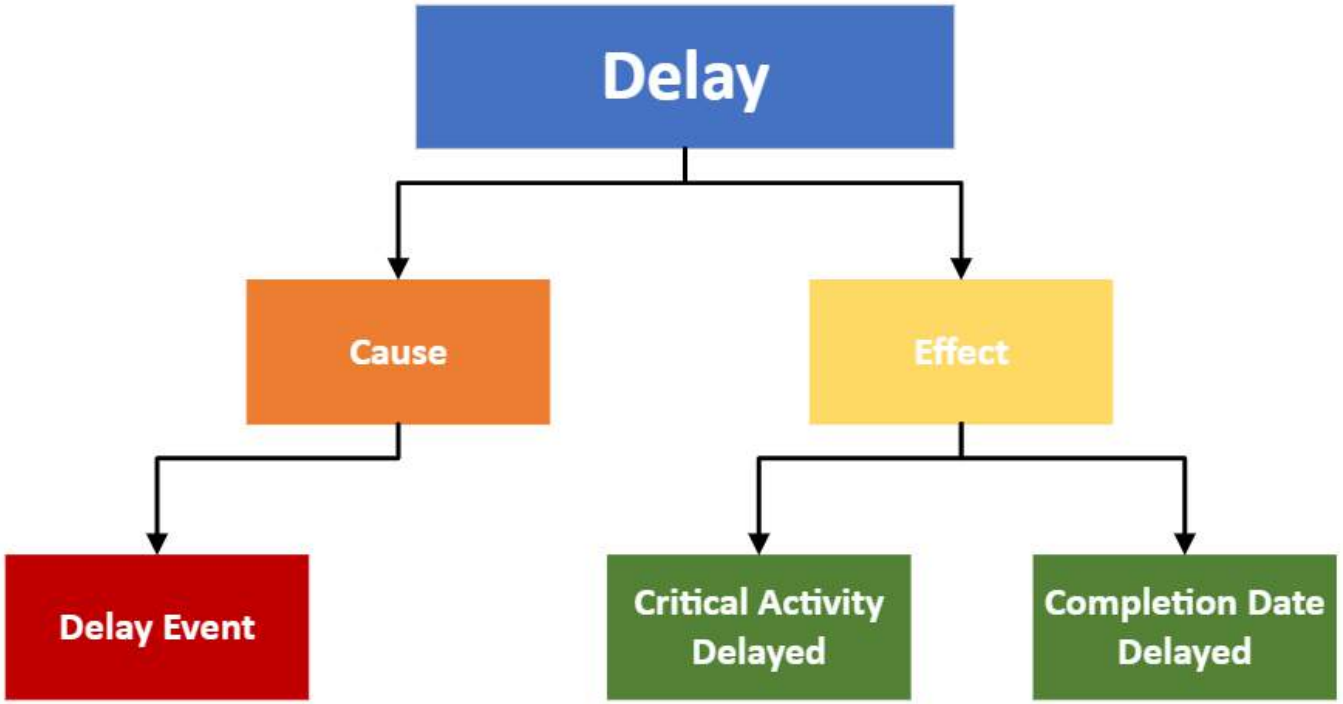
# Time Impact Analysis

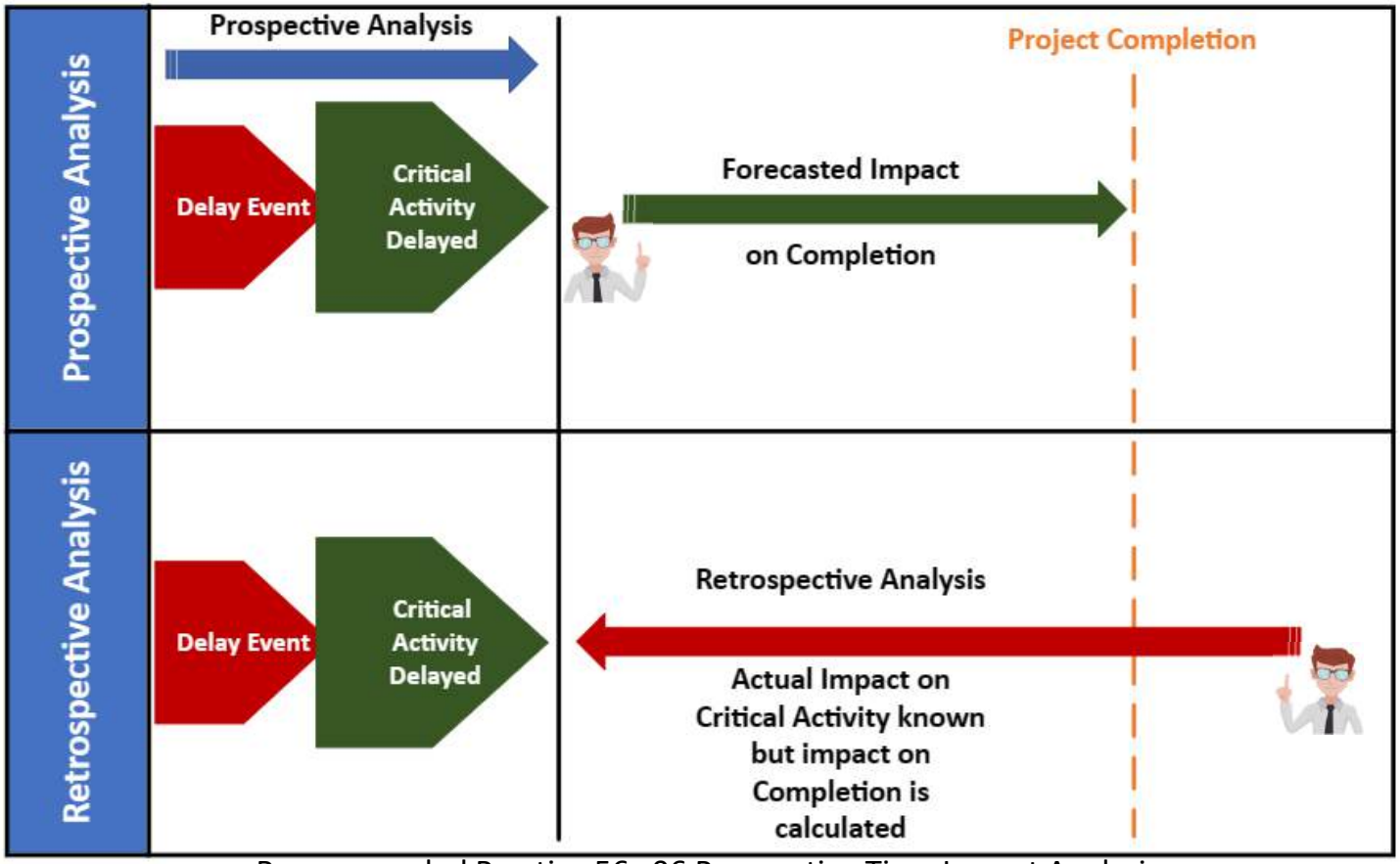
"The TIA is a 'forward looking', prospective schedule analysis technique that adds a modeled delay to an accepted contract schedule to determine the possible impact of that delay to project completion."

*- AACE International Recommended Practice No. 52R-06*

# Delay Event


Delay
Cause
Effect
Delay Event
Critical Activity Delayed
Completion Date Delayed

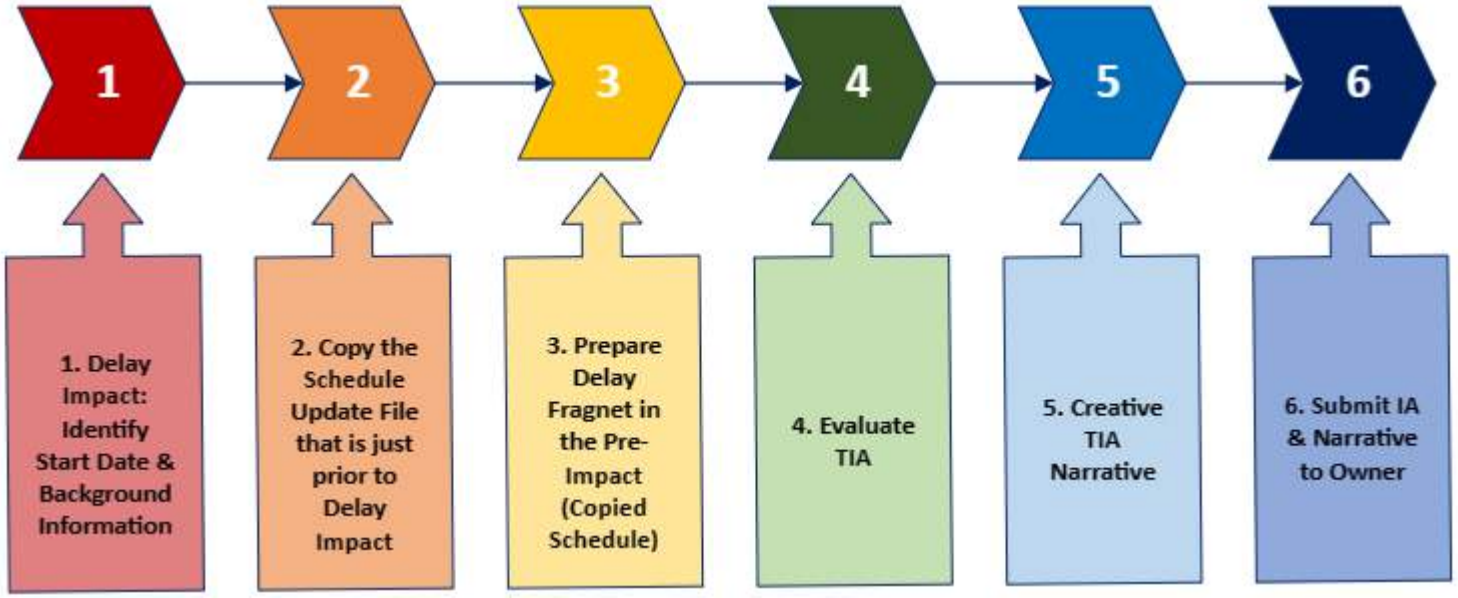
# Delay Analysis – Time of Application




Recommended Practice 56r-06 Prospective Time Impact Analysis

Recommended Practice 29r-03 Forensic Schedule

# Time Impact Analysis Process

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# Preparing & Analyzing a Time Impact Analysis

# Prospective Analysis

**Contemporaneous Prospective**

1. Performed to “look-ahead” during project.
2. Performed at moment of start of impact.
3. Called Contemporaneous Time Impact  Analysis (TIA)
4. Compare the predicted completion of the schedule just prior to the date of the “delay event” to the predicted completion of the schedule after inserting a fragnet of impact activities into the schedule.

# Retrospective Analysis

**Forensic(Retrospective Analysis)**

1. Performed after the project or delay event.
2. Typically used in delay analysis in claims.
3. No industry standard name.
4. Retrospective, backward-looking.
5. Sometimes also called Contemporaneous TIA since analysis is done from the beginning of the impact even though it is analyzed after the fact.

# Reasons for Use

- Occasionally mandated by specification.
- Best way to evaluate expected impacts resulting from changed conditions.
- Supports negotiation of time extensions due to changed conditions.
- Enables sharing of risk.
- Keeps project on track with accurate schedule.

# Golden Rules

SCHEDULES MUST REMAIN **DYNAMIC**.

IMPACTS ARE EVALUATED **CHRONOLOGICALLY**.

THE SUM OF ALL IMPACTS ARE **CUMULATIVE**.

PROSPECTIVE **(FORWARD LOOKING)** ANALYSIS.

THE PROJECT'S **CRITICAL PATH MUST BE IMPACTED,** AND THE PROJECT COMPLETION DATE MUST BE DELAYED TO BE ENTITLED TO A TIME EXTENSION.

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# Required Actions Before Starting the TIA

1. Baseline or Initial Progress schedule that is reasonable and approved/accepted by the owner.
2. The contractor must perform regular progress updates to the schedule, which accurately reflect work on the project.
3. Facts pertaining to the changed condition or impact are available.

# Steps for Preparing a TIA

## 1. Verify Schedule (Current Schedule)

- Test for reasonableness.
- Ensure schedule logic models the actual project  sequencing.

## 2. Check for Constraints

- If constraints exist, establish methodology.
- Remove the constraints, if possible.
- Insert logic to replace constraints.
- Verify accuracy of changes.
- Document use of methodology.

# Preparing a TIA

## 3. Update the Current Schedule

- Use update data through the date that will reflect the situation immediately prior to the beginning of the changed condition.
- **Please Note: Do not make any logic changes after the update.

## 4. Calculate the Schedule

- Set Data Date immediately prior to the beginning of the changed condition (match update data).

# Preparing a TIA

## 5. Document the Completion Date

- Use a common activity such as Substantial Completion (preferable), or an Interim Milestone, as necessary.
- Use Early Finish of the entire project.
- Be consistent in choosing the comparison activity.

## 6. Identify the Reason for Preparing a TIA

- Changed condition.
- Potential delay situation.
- Other actions beyond Contractor's control.

# Preparing a TIA

## 7. Create Copy of the Reference Schedule for Use in the Analysis

- Done so that the reference schedule can be used as a target.

## 8. Determine Scope of Work Required to Deal with Changed Condition

- List Assumptions:
  - Scope of Work
  - Manpower and Resources
  - Sequencing Rationale

**Note any questionable assumptions.

# Preparing a TIA

## 9. Create Fragnet of Activities

- Estimate durations and document.
- Determine appropriate connection points between predecessors and successor.
- (Which activities are affected by the changed condition?)
  - Insert fragnet with new logic connections.
  - AACE Recommended Practice – “Set the duration of the delay activities to zero and recalculate the CPM.”

## 10. Provide Narrative – Detailing how the work will be done

## 11. Recalculate Project

## 12. Compare Results to Updated Schedule Completion Dates Prior to Insertion

# Preparing a TIA

## 13. Review Critical Path Changes and Shifts

- Identify CP in schedule prior to TIA insertion
- Identify CP in schedule after TIA insertion
- Compare and review changes

## 14. Write Up Conclusions

## 15. Be Prepared to Discuss and Defend

# After the TIA

## After TIA submittal and review:

1. Negotiate time extension, if any.
2. Document the decision.
3. If justified, incorporate TIA into schedule.
4. Publish revised schedule with new completion dates.
5. Provide change order showing settlement.
6. Ideally, TIA resolution should conclude any known delay issues or impacts to date.

# Benefits of TIA's

## Benefits to Owner

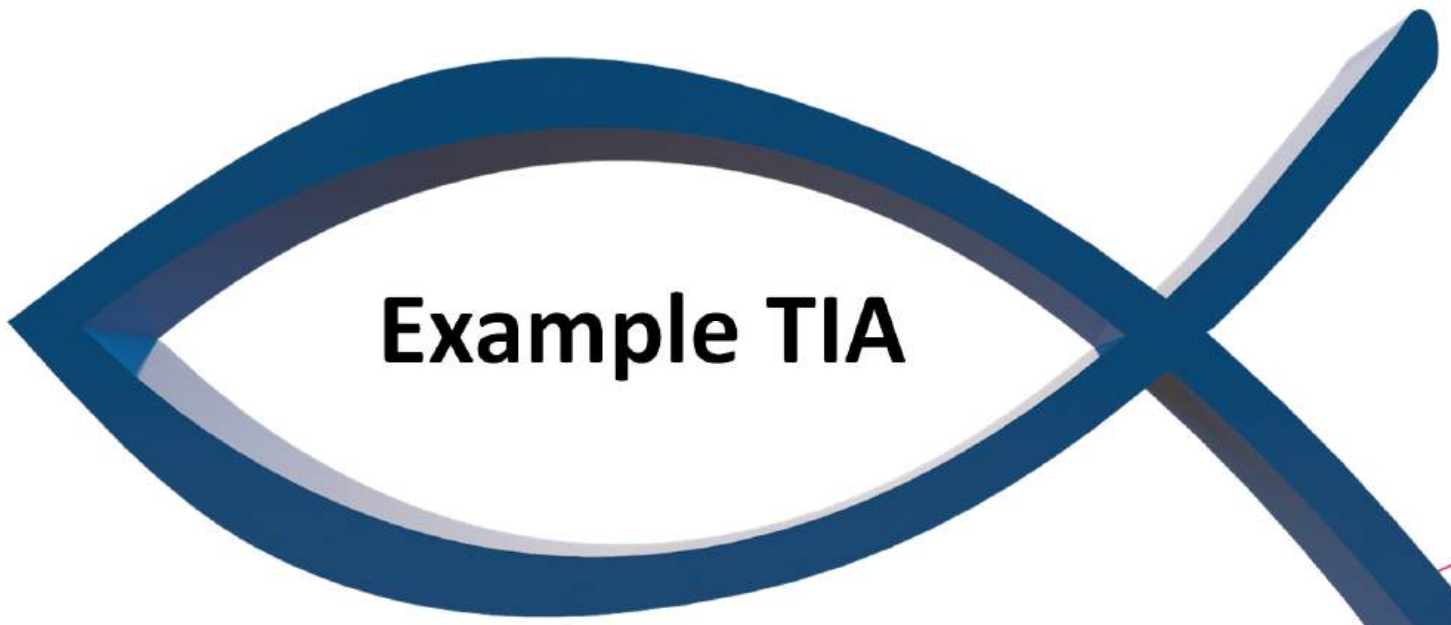
- Participates in decisions that affect budget and completion.
- Can negotiate requests for time and costs prior to work.
- Encourages cooperation.
- No lingering potential claims issues.
- Budget and completion information always current and reasonably accurate.
- Allows Owner to take advantage of pacing opportunities.
- Reduce or eliminate need for unilateral modifications.
- Shares performance and cost risk.

# Benefits of TIA's

## Benefits to Contractor

- Relatively simple analyses when compared to claims.
- Receives timely time extensions.
- Builds good documentation, even if rejected.
- Allows negotiation prior to spending money or doing work.
- Minimal memory problems compared to old issues.
- Allows for pacing other trades.
- Costs for TIA effort should be reimbursable.
- Fair preparation of TIA builds credibility.
- Builds in understanding of risk in pricing.

# Example TIA



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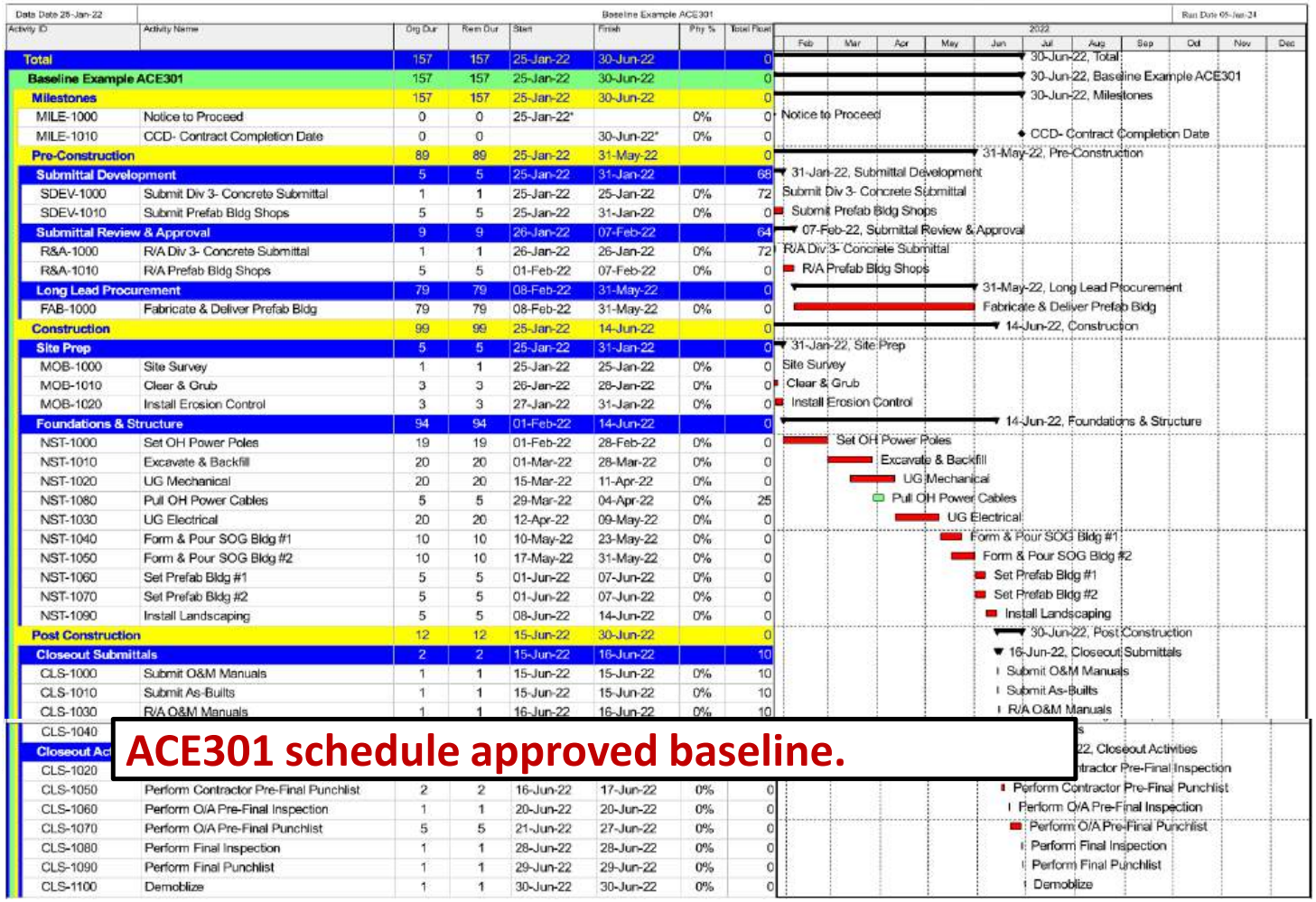
# Example Problem ACE301 Prefab Building

Typical construction project.

Work includes erection of prefabricated buildings on concrete foundations, electrical, mechanical and landscaping.

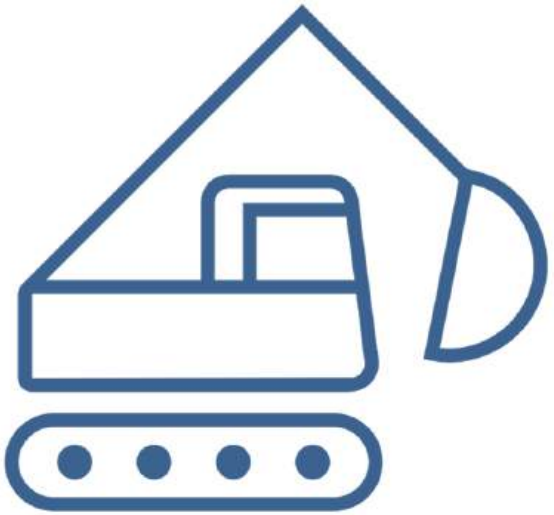
Contractor has an approved Baseline Schedule and submits regular schedule updates with the pay estimates.

# Baseline Schedule



| Activity ID | Activity Name | Orig Dur | Rem Dur | Start | Finish | Phy % | Total Float |
|---|---|---|---|---|---|---|---|
| Total | | 157 | 157 | 25-Jan-22 | 30-Jun-22 | | 0 |
| Baseline Example ACE301 | | 157 | 157 | 25-Jan-22 | 30-Jun-22 | | 0 |
| Milestones | | 157 | 157 | 25-Jan-22 | 30-Jun-22 | | 0 |
| MILE-1000 | Notice to Proceed | 0 | 0 | 25-Jan-22* | | 0% | 0 |
| MILE-1010 | CCD- Contract Completion Date | 0 | 0 | | 30-Jun-22* | 0% | 0 |
| Pre-Construction | | 89 | 89 | 25-Jan-22 | 31-May-22 | | 0 |
| Submittal Development | | 5 | 5 | 25-Jan-22 | 31-Jan-22 | | 68 |
| SDEV-1000 | Submit Div 3- Concrete Submittal | 1 | 1 | 25-Jan-22 | 25-Jan-22 | 0% | 72 |
| SDEV-1010 | Submit Prefab Bldg Shops | 5 | 5 | 25-Jan-22 | 31-Jan-22 | 0% | 0 |
| Submittal Review & Approval | | 9 | 9 | 26-Jan-22 | 07-Feb-22 | | 64 |
| R&A-1000 | R/A Div 3- Concrete Submittal | 1 | 1 | 26-Jan-22 | 26-Jan-22 | 0% | 72 |
| R&A-1010 | R/A Prefab Bldg Shops | 5 | 5 | 01-Feb-22 | 07-Feb-22 | 0% | 0 |
| Long Lead Procurement | | 79 | 79 | 08-Feb-22 | 31-May-22 | | 0 |
| FAB-1000 | Fabricate & Deliver Prefab Bldg | 79 | 79 | 08-Feb-22 | 31-May-22 | 0% | 0 |
| Construction | | 99 | 99 | 25-Jan-22 | 14-Jun-22 | | 0 |
| Site Prep | | 5 | 5 | 25-Jan-22 | 31-Jan-22 | | 0 |
| MOB-1000 | Site Survey | 1 | 1 | 25-Jan-22 | 25-Jan-22 | 0% | 0 |
| MOB-1010 | Clear & Grub | 3 | 3 | 26-Jan-22 | 28-Jan-22 | 0% | 0 |
| MOB-1020 | Install Erosion Control | 3 | 3 | 27-Jan-22 | 31-Jan-22 | 0% | 0 |
| Foundations & Structure | | 94 | 94 | 01-Feb-22 | 14-Jun-22 | | 0 |
| NST-1000 | Set OH Power Poles | 19 | 19 | 01-Feb-22 | 28-Feb-22 | 0% | 0 |
| NST-1010 | Excavate & Backfill | 20 | 20 | 01-Mar-22 | 28-Mar-22 | 0% | 0 |
| NST-1020 | UG Mechanical | 20 | 20 | 15-Mar-22 | 11-Apr-22 | 0% | 0 |
| NST-1080 | Pull OH Power Cables | 5 | 5 | 29-Mar-22 | 04-Apr-22 | 0% | 25 |
| NST-1030 | UG Electrical | 20 | 20 | 12-Apr-22 | 09-May-22 | 0% | 0 |
| NST-1040 | Form & Pour SOG Bldg #1 | 10 | 10 | 10-May-22 | 23-May-22 | 0% | 0 |
| NST-1050 | Form & Pour SOG Bldg #2 | 10 | 10 | 17-May-22 | 31-May-22 | 0% | 0 |
| NST-1060 | Set Prefab Bldg #1 | 5 | 5 | 01-Jun-22 | 07-Jun-22 | 0% | 0 |
| NST-1070 | Set Prefab Bldg #2 | 5 | 5 | 01-Jun-22 | 07-Jun-22 | 0% | 0 |
| NST-1090 | Install Landscaping | 5 | 5 | 08-Jun-22 | 14-Jun-22 | 0% | 0 |
| Post Construction | | 12 | 12 | 15-Jun-22 | 30-Jun-22 | | 0 |
| Closeout Submittals | | 2 | 2 | 15-Jun-22 | 16-Jun-22 | | 10 |
| CLS-1000 | Submit O&M Manuals | 1 | 1 | 15-Jun-22 | 15-Jun-22 | 0% | 10 |
| CLS-1010 | Submit As-Builts | 1 | 1 | 15-Jun-22 | 15-Jun-22 | 0% | 10 |
| CLS-1030 | R/A O&M Manuals | 1 | 1 | 16-Jun-22 | 16-Jun-22 | 0% | 10 |
| CLS-1040 | | | | | | | |
| Closeout Ac | | | | | | | |
| CLS-1020 | | | | | | | |
| CLS-1050 | Perform Contractor Pre-Final Punchlist | 2 | 2 | 16-Jun-22 | 17-Jun-22 | 0% | 0 |
| CLS-1060 | Perform O/A Pre-Final Inspection | 1 | 1 | 20-Jun-22 | 20-Jun-22 | 0% | 0 |
| CLS-1070 | Perform O/A Pre-Final Punchlist | 5 | 5 | 21-Jun-22 | 27-Jun-22 | 0% | 0 |
| CLS-1080 | Perform Final Inspection | 1 | 1 | 28-Jun-22 | 28-Jun-22 | 0% | 0 |
| CLS-1090 | Perform Final Punchlist | 1 | 1 | 29-Jun-22 | 29-Jun-22 | 0% | 0 |
| CLS-1100 | Demoblize | 1 | 1 | 30-Jun-22 | 30-Jun-22 | 0% | 0 |

**ACE301 schedule approved baseline.**



# Example Problem
# ACE301 Prefab Building

**Impact:**

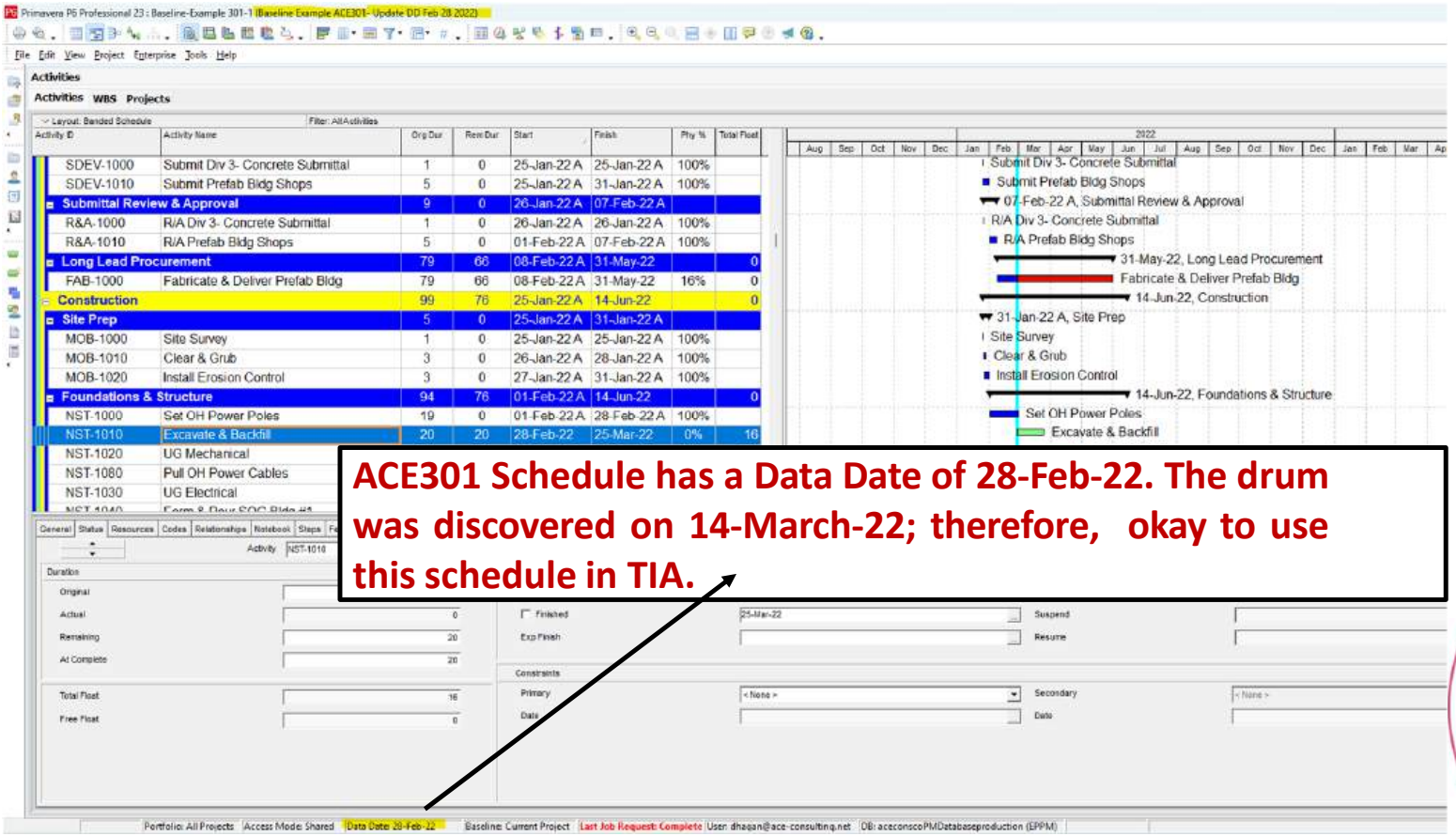
- The contractor discovered a 55-gallon barrel with unknown contents on March 14 while excavating the building foundation.

# Step 1 – Schedule Selection

**Select the appropriate schedule to be impacted.**

- Use the last updated schedule *prior* to the impact (reference the data date).
- If the time frame between previous schedule update and the impact is too great, progress the last schedule up to the point of impact.

# Step 1 – Schedule Selection




**ACE301 Schedule has a Data Date of 28-Feb-22. The drum was discovered on 14-March-22; therefore, okay to use this schedule in TIA.**

# Step 2 – Delay Fragnet Insertion

**Prepare a schedule fragnet that models the delay or impact.**

- The contractor is responsible for preparing the fragnet.
- The final fragnet must be approved or accepted by the government.

# Definition of a Fragnet

A ***fragnet*** is defined as a sequence of new activities and/ or activity revisions that are proposed to be added to the existing schedule.

Their purpose is to demonstrate the influence of delay and the method for incorporating delays and impacts into the schedule as they are encountered.

# Preparing a Fragnet

1. Determine the scope and extent of the impact encountered, either alleged or directed.
2. Identify possible corrective actions and select the best option.
3. Identify all impacted activities in the schedule.
4. Prepare a fragnet that best represents the total scope of the impact and corrective action.
5. Keep the fragnet simple.

# Preparing a Fragnet

- 55-gallon barrels was discovered March 14, 2022.
- Activity NST1010, Excavate & Backfill is impacted. Successor Activities are NST-1020 UG Mechanical and NST-1030 UG Electrical.
- The owner requires 10 days to review and approve the plan before a NTP can be issued.
- Testing the contents of the drum will take 10 days.
- It will take the contractor 5 days to remove and dispose of the drums.

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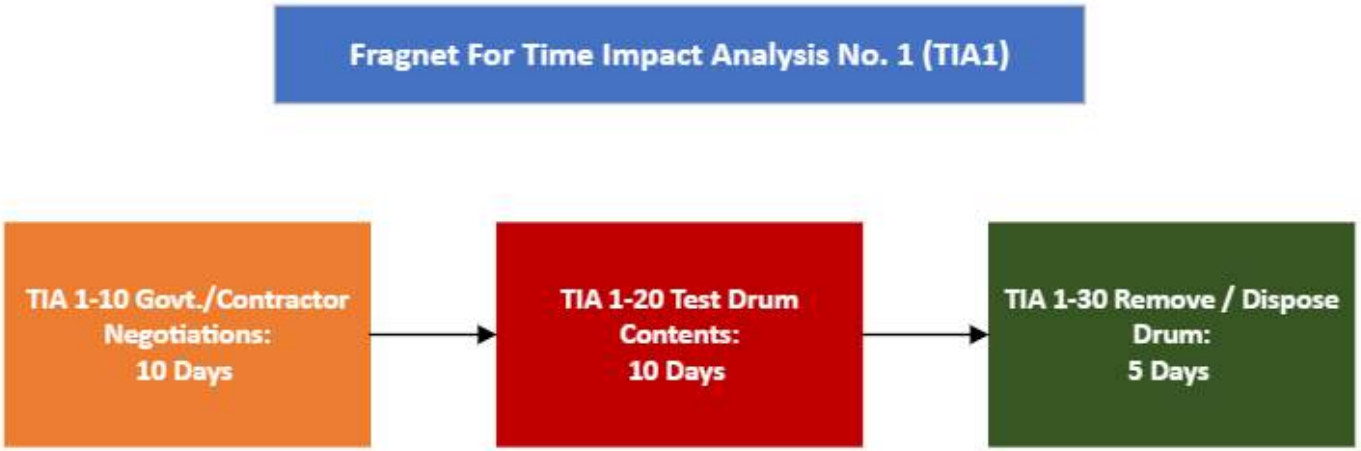
# Preparing a Fragnet

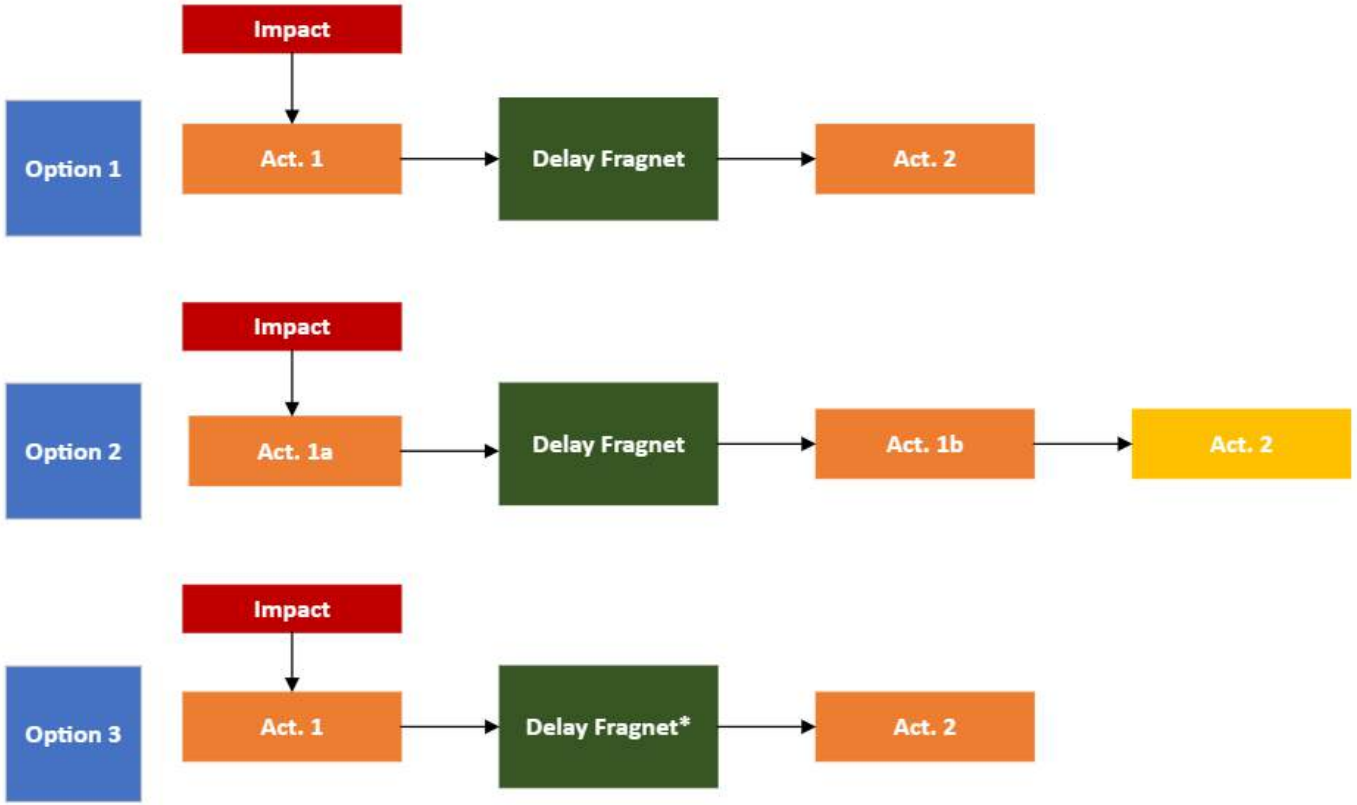


# Step 3 – Insert Fragnet & Tie Logic

**Insert the fragnet into the appropriate schedule.**

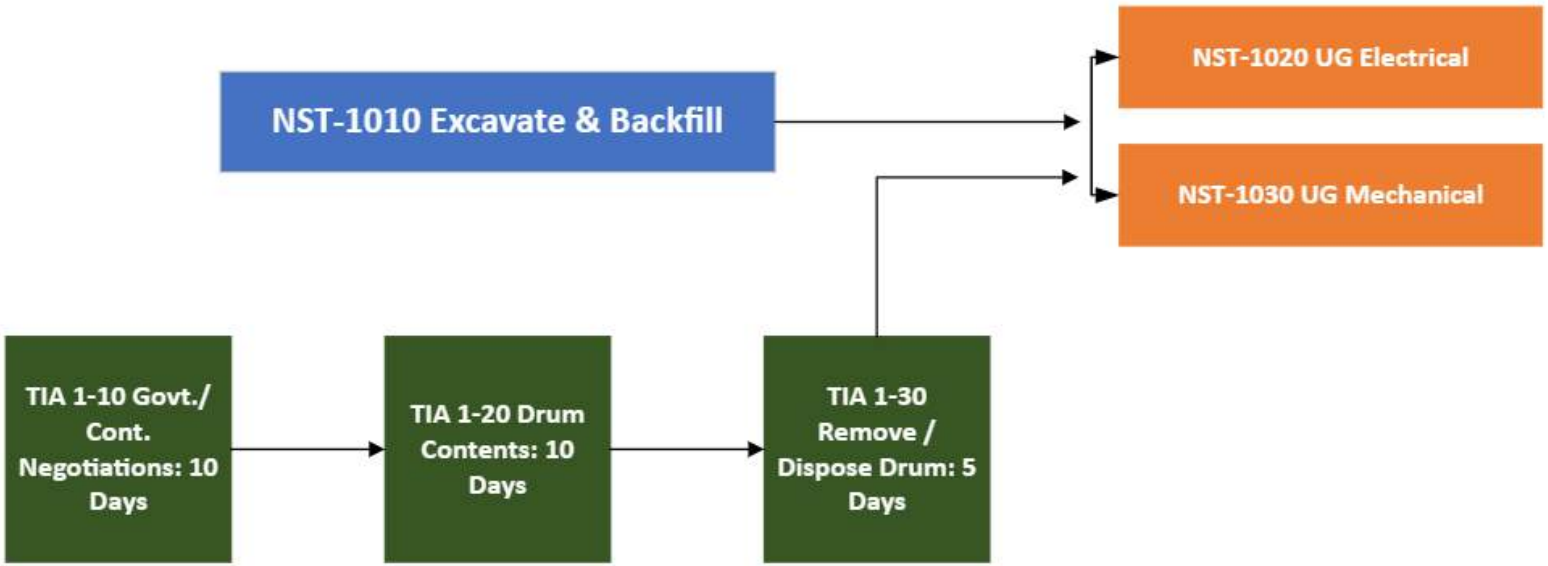
- Select method for inserting the fragnet into the schedule.
- Assign settings, resources, codes, WBS, calendars, durations and predecessor/ successor logic.

# Inserting the Fragnet into the Schedule



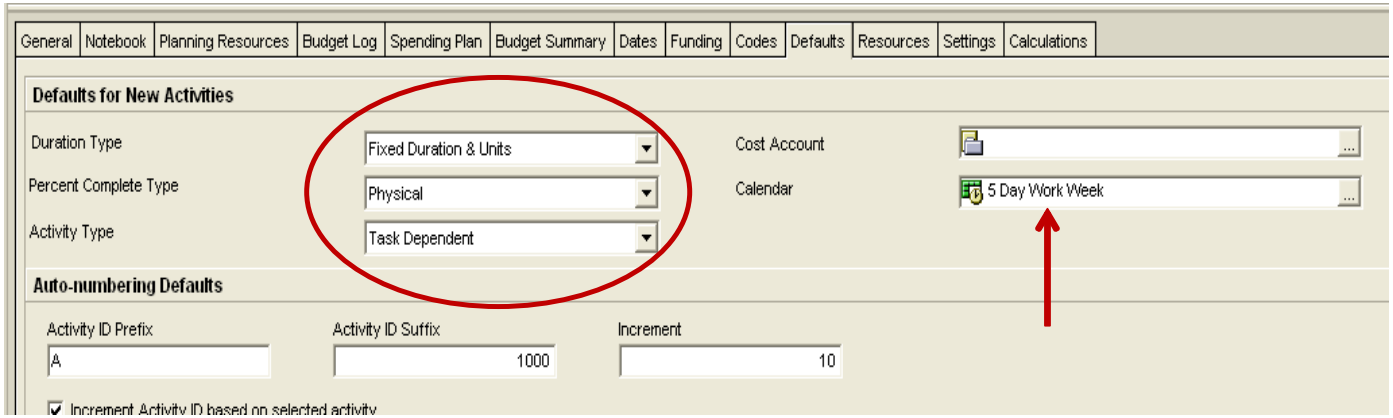

*Constrained Start Date

# Example Problem ACE301 Prefab Building

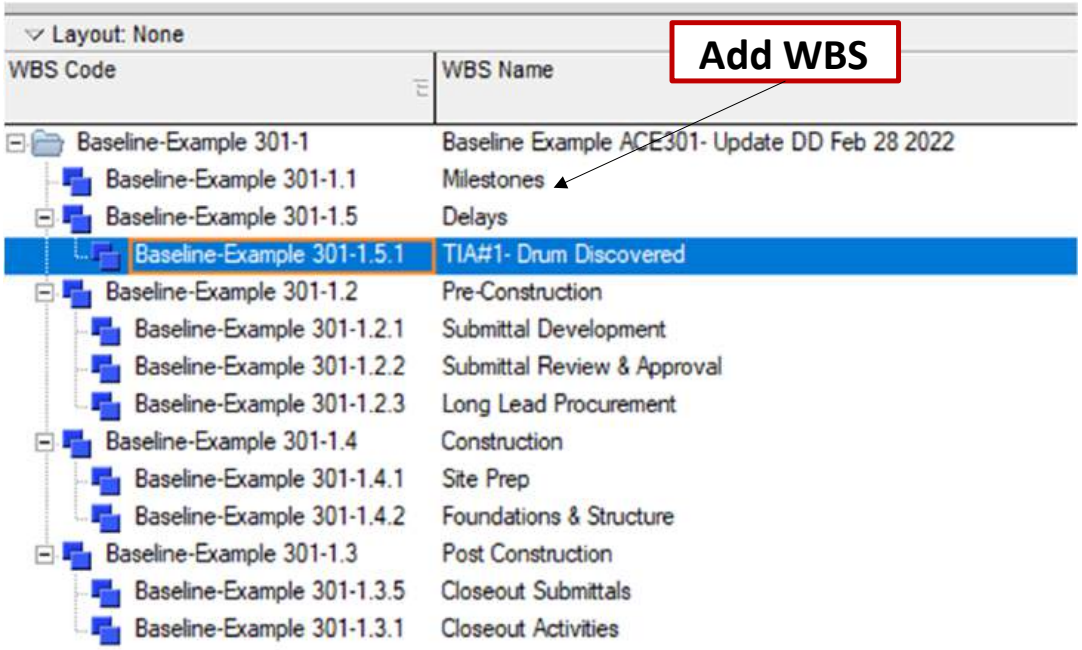


# Check Default Calendars

- As you add new activities, the default calendar will be assigned to them.
- Ensure the 5 Day Work Week Project Level Calendar is the Default* or applicable calendar.
- Check Default Settings and for activities



# Create WBS for Fragnet



# Create Activities for Fragnet & Tie Logic

| Activity ID | Activity Name | Org Dur | Rem Dur | Start | Finish | Phy % | Total Float |
|---|---|---|---|---|---|---|---|
| Baseline Example ACE301- Update DD Feb 28 2022 TIA#1 | | 175 | 141 | 25-Jan-22 A | 18-Jul-22 | | -18 |
| Milestones | | 175 | 0 | 25-Jan-22 A | 18-Jul-22 | | -18 |
| MILE-1000 | Notice to Proceed | 0 | 0 | 25-Jan-22 A | | 100% | |
| MILE-1010 | CCD- Contract Completion Date | 0 | 0 | | 18-Jul-22* | 0% | -18 |
| Delays | | 25 | 25 | 14-Mar-22 | 15-Apr-22 | | -11 |
| TIA#1- Drum Discovered | | 25 | 25 | 14-Mar-22 | 15-Apr-22 | | -11 |
| TIA-10 | Govt/Cont. Negotiations - Drum Discovery | 10 | 10 | 14-Mar-22* | 25-Mar-22 | 0% | -11 |
| TIA-20 | Test Drum Contents | 10 | 10 | 28-Mar-22 | 08-Apr-22 | 0% | -11 |
| TIA-30 | Remove/Dispose of Drum | 5 | 5 | 11-Apr-22 | 15-Apr-22 | 0% | -11 |

1. As you add new activities, the default calendar and settings will be added to each of the new activities.
2. As you add activities, edit the durations to match the duration provided.
3. Tie out the logic relationships, as seen above.

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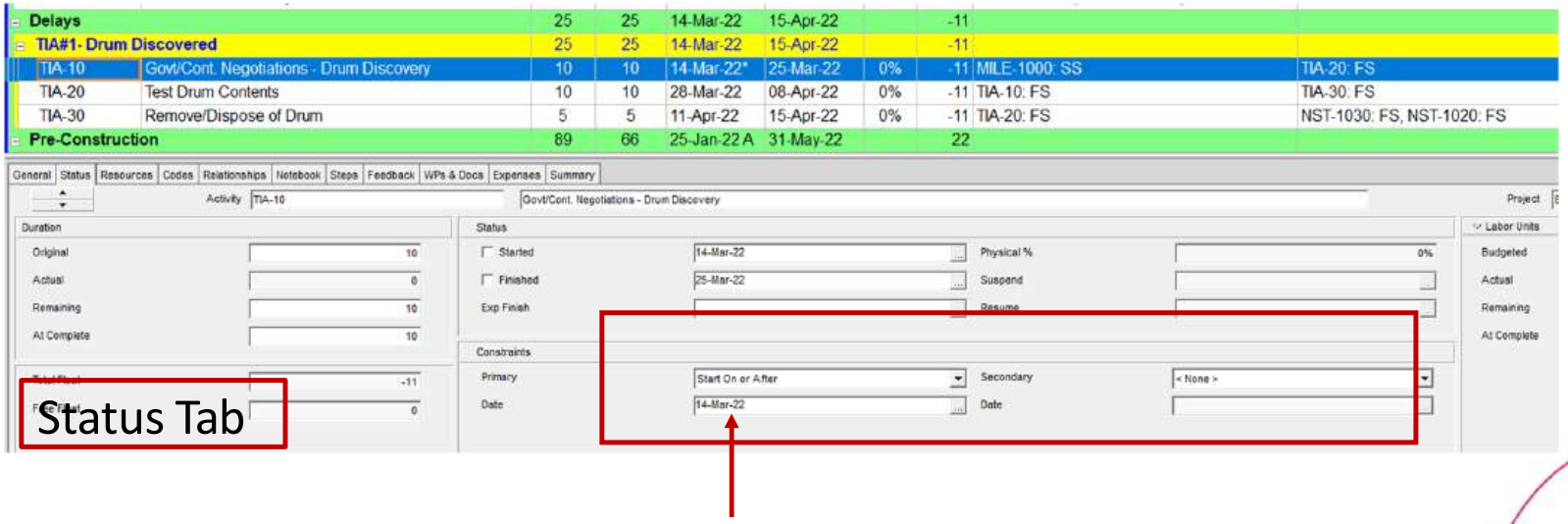
# Constrained Start of Delay



| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Delays | | 25 | 25 | 14-Mar-22 | 15-Apr-22 | | -11 | | |
| TIA#1- Drum Discovered | | 25 | 25 | 14-Mar-22 | 15-Apr-22 | | -11 | | |
| TIA-10 | Govt/Cont. Negotiations - Drum Discovery | 10 | 10 | 14-Mar-22* | 25-Mar-22 | 0% | -11 | MILE-1000: SS | TIA-20: FS |
| TIA-20 | Test Drum Contents | 10 | 10 | 28-Mar-22 | 08-Apr-22 | 0% | -11 | TIA-10: FS | TIA-30: FS |
| TIA-30 | Remove/Dispose of Drum | 5 | 5 | 11-Apr-22 | 15-Apr-22 | 0% | -11 | TIA-20: FS | NST-1030: FS, NST-1020: FS |
| Pre-Construction | | 89 | 66 | 25-Jan-22 A | 31-May-22 | | 22 | | |

General | Status | Resources | Codes | Relationships | Notebook | Steps | Feedback | WPs & Docs | Expenses | Summary

Activity TIA-10 — Govt/Cont. Negotiations - Drum Discovery — Project

Duration: Original 10; Actual 0; Remaining 10; At Complete 10

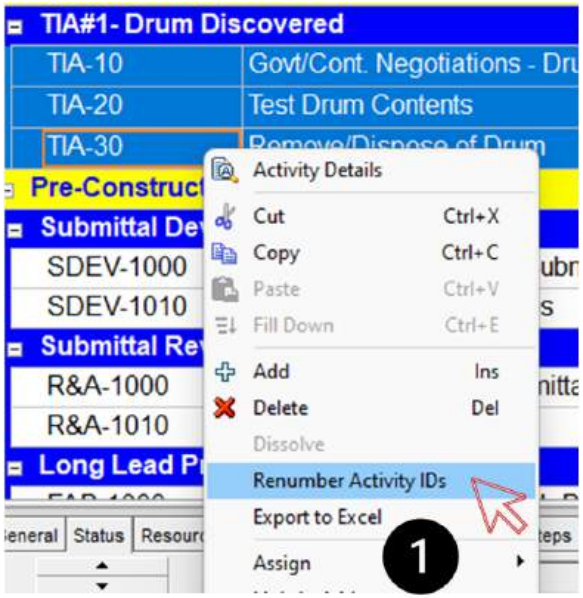
Status: Started 14-Mar-22; Finished 25-Mar-22; Exp Finish; Physical % 0%; Suspend; Resume

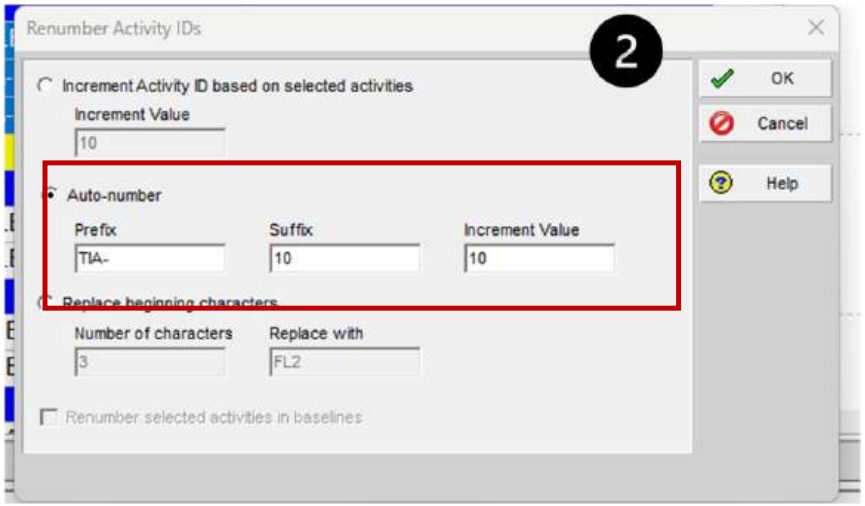
Constraints: Primary — Start On or After; Date 14-Mar-22; Secondary — < None >; Date

Labor Units: Budgeted; Actual; Remaining; At Complete

Status Tab

# Renumber Activity ID's



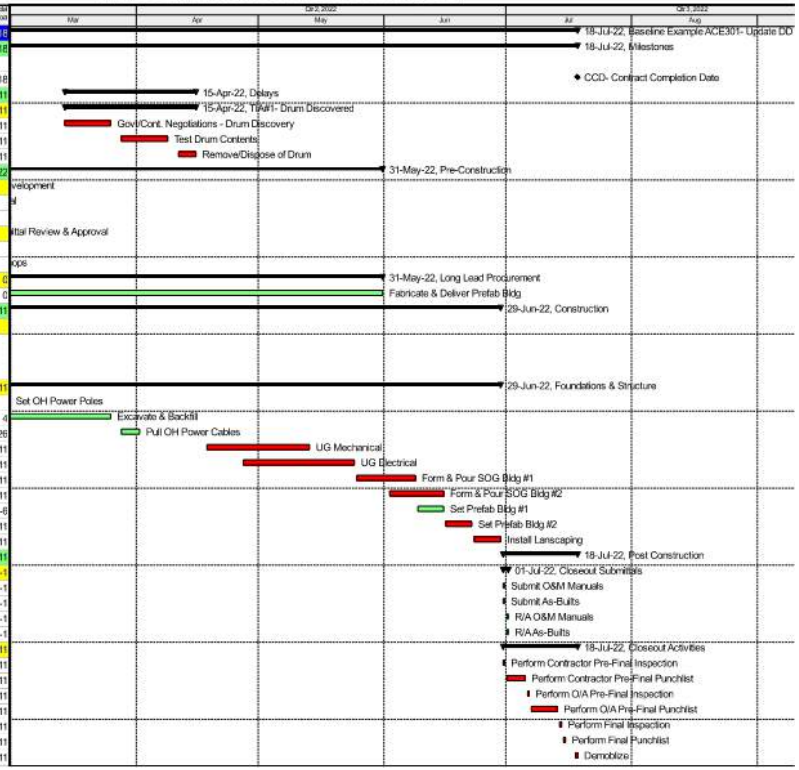

1. As you add new activities, the default ID # will be assigned.
2. Update the Activity ID to be unique to the delay.
   - Ie. TIA-10

# Fragnet Schedule After Insertion

Data Date 28-Feb-22

Baseline Example ACE301- Update DD Feb 28 2022 TIA#1

| Activity ID | Activity Name | OrigDur | RemDur | Start | Finish | Phy% | Total Float |
|---|---|---|---|---|---|---|---|
| **Baseline Example ACE301- Update DD Feb 28 2022 TIA#1** | | 175 | 141 | 25-Jan-22 A | 18-Jul-22 | | -18 |
| **Milestones** | | 175 | 0 | 25-Jan-22 A | 18-Jul-22 | | -18 |
| MILE-1000 | Notice to Proceed | 0 | 0 | 25-Jan-22 A | | 100% | |
| MILE-1010 | CCD- Contract Completion Date | 0 | 0 | | 18-Jul-22* | 0% | -18 |
| **Delays** | | 25 | 25 | 14-Mar-22 | 15-Apr-22 | | -11 |
| **TIA#1- Drum Discovered** | | 25 | 25 | 14-Mar-22 | 15-Apr-22 | | -11 |
| TIA-10 | Govt/Cont. Negotiations - Drum Discovery | 10 | 10 | 14-Mar-22* | 25-Mar-22 | 0% | -11 |
| TIA-20 | Test Drum Contents | 10 | 10 | 28-Mar-22 | 08-Apr-22 | 0% | -11 |
| TIA-30 | Remove/Dispose of Drum | 5 | 5 | 11-Apr-22 | 15-Apr-22 | 0% | -11 |
| **Pre-Construction** | | 89 | 66 | 25-Jan-22 A | 31-May-22 | | 22 |
| **Submittal Development** | | 5 | 0 | 25-Jan-22 A | 31-Jan-22 A | | |
| SDEV-1000 | Submit Div 3- Concrete Submittal | 1 | 0 | 25-Jan-22 A | 25-Jan-22 A | 100% | |
| SDEV-1010 | Submit Prefab Bldg Shops | 5 | 0 | 25-Jan-22 A | 31-Jan-22 A | 100% | |
| **Submittal Review & Approval** | | 9 | 0 | 26-Jan-22 A | 07-Feb-22 A | | |
| R&A-1000 | R/A Div 3- Concrete Submittal | 1 | 0 | 26-Jan-22 A | 26-Jan-22 A | 100% | |
| R&A-1010 | R/A Prefab Bldg Shops | 5 | 0 | 01-Feb-22 A | 07-Feb-22 A | 100% | |
| **Long Lead Procurement** | | 79 | 66 | 08-Feb-22 A | 31-May-22 | | 0 |
| FAB-1000 | Fabricate & Deliver Prefab Bldg | 79 | 66 | 08-Feb-22 A | 31-May-22 | 16% | 0 |
| **Construction** | | 110 | 87 | 25-Jan-22 A | 29-Jun-22 | | -11 |
| **Site Prep** | | 5 | 0 | 25-Jan-22 A | 31-Jan-22 A | | |
| MOB-1000 | Site Survey | 1 | 0 | 25-Jan-22 A | 25-Jan-22 A | 100% | |
| MOB-1010 | Clear & Grub | 3 | 0 | 26-Jan-22 A | 28-Jan-22 A | 100% | |
| MOB-1020 | Install Erosion Control | 3 | 0 | 27-Jan-22 A | 31-Jan-22 A | 100% | |
| **Foundations & Structure** | | 105 | 87 | 01-Feb-22 A | 29-Jun-22 | | -11 |
| NST-1000 | Set OH Power Poles | 19 | 0 | 01-Feb-22 A | 28-Feb-22 A | 100% | |
| NST-1010 | Excavate & Backfill | 20 | 20 | 28-Feb-22 | 25-Mar-22 | 0% | 4 |
| NST-1080 | Pull OH Power Cables | 5 | 5 | 28-Mar-22 | 01-Apr-22 | 0% | 26 |
| NST-1020 | UG Mechanical | 20 | 20 | 18-Apr-22 | 13-May-22 | 0% | -11 |
| NST-1030 | UG Electrical | 20 | 20 | 27-Apr-22 | 24-May-22 | 0% | -11 |
| NST-1040 | Form & Pour SOG Bldg #1 | 10 | 10 | 25-May-22 | 08-Jun-22 | 0% | -11 |
| NST-1050 | Form & Pour SOG Bldg #2 | 10 | 10 | 02-Jun-22 | 15-Jun-22 | 0% | -11 |
| NST-1060 | Set Prefab Bldg #1 | 5 | 5 | 09-Jun-22 | 15-Jun-22 | 0% | -6 |
| NST-1070 | Set Prefab Bldg #2 | 5 | 5 | 16-Jun-22 | 22-Jun-22 | 0% | -11 |
| NST-1090 | Install Lanscaping | 5 | 5 | 23-Jun-22 | 29-Jun-22 | 0% | -11 |
| **Post Construction** | | 12 | 12 | 30-Jun-22 | 18-Jul-22 | | -11 |
| **Closeout Submittals** | | 2 | 2 | 30-Jun-22 | 01-Jul-22 | | -1 |
| CLS-1000 | Submit O&M Manuals | 1 | 1 | 30-Jun-22 | 30-Jun-22 | 0% | -1 |
| CLS-1010 | Submit As-Builts | 1 | 1 | 30-Jun-22 | 30-Jun-22 | 0% | -1 |
| CLS-1030 | R/A O&M Manuals | 1 | 1 | 01-Jul-22 | 01-Jul-22 | 0% | -1 |
| CLS-1040 | R/A As-Builts | 1 | 1 | 01-Jul-22 | 01-Jul-22 | 0% | -1 |
| **Closeout Activities** | | 12 | 12 | 30-Jun-22 | 18-Jul-22 | | -11 |
| CLS-1020 | Perform Contractor Pre-Final Inspection | 1 | 1 | 30-Jun-22 | 30-Jun-22 | 0% | -11 |
| CLS-1050 | Perform Contractor Pre-Final Punchlist | 2 | 2 | 01-Jul-22 | 05-Jul-22 | 0% | -11 |
| CLS-1060 | Perform O/A Pre-Final Inspection | 1 | 1 | 06-Jul-22 | 06-Jul-22 | 0% | -11 |
| CLS-1070 | Perform O/A Pre-Final Punchlist | 5 | 5 | 07-Jul-22 | 13-Jul-22 | 0% | -11 |
| CLS-1080 | Perform Final Inspection | 1 | 1 | 14-Jul-22 | 14-Jul-22 | 0% | -11 |
| CLS-1090 | Perform Final Punchlist | 1 | 1 | 15-Jul-22 | 15-Jul-22 | 0% | -11 |
| CLS-1100 | Demoblize | 1 | 1 | 18-Jul-22 | 18-Jul-22 | 0% | -11 |



# Step 4 – Review Dates & Changes

Now that the fragnet (including durations) has been inserted into the schedule:

1. Note project completion date for the last activity, “CCD Contract Completion Date”.
2. Recalculate the CPM.
3. Note any changes to the project completion date.
4. Note any changes to interim

# Step 4 – Review Dates & Changes

| Activity ID | Activity Name | Orig Dur | Rem Dur | Start | Finish | Phy % | Total Float |
|---|---|---|---|---|---|---|---|
| Baseline Example ACE301- Update DD Feb 28 2022 TIA#1 | | 127 | 127 | 14-Mar-22 | 18-Jul-22 | | -18 |
| Milestones | | 0 | 0 | 18-Jul-22 | 18-Jul-22 | | -18 |
| MILE-1010 | CCD- Contract Completion Date | 0 | 0 | | 18-Jul-22* | 0% | -18 |
| Delays | | 25 | 25 | 14-Mar-22 | 15-Apr-22 | | -11 |
| TIA#1- Drum Discovered | | 25 | 25 | 14-Mar-22 | 15-Apr-22 | | -11 |
| TIA-10 | Govt/Cont. Negotiations - Drum Discovery | 10 | 10 | 14-Mar-22* | 25-Mar-22 | 0% | -11 |
| TIA-20 | Test Drum Contents | 10 | 10 | 28-Mar-22 | 08-Apr-22 | 0% | -11 |
| TIA-30 | Remove/Dispose of Drum | 5 | 5 | 11-Apr-22 | 15-Apr-22 | 0% | -11 |
| Construction | | 52 | 52 | 18-Apr-22 | 29-Jun-22 | | -11 |
| Foundations & Structure | | 52 | 52 | 18-Apr-22 | 29-Jun-22 | | -11 |
| NST-1020 | UG Mechanical | 20 | 20 | 18-Apr-22 | 13-May-22 | 0% | -11 |
| NST-1030 | UG Electrical | 20 | 20 | 27-Apr-22 | 24-May-22 | 0% | -11 |
| NST-1040 | Form & Pour SOG Bldg #1 | 10 | 10 | 25-May-22 | 08-Jun-22 | 0% | -11 |
| NST-1050 | Form & Pour SOG Bldg #2 | 10 | 10 | 02-Jun-22 | 15-Jun-22 | 0% | -11 |
| NST-1070 | Set Prefab Bldg #2 | 5 | 5 | 16-Jun-22 | 22-Jun-22 | 0% | -11 |
| NST-1090 | Install Lanscaping | 5 | 5 | 23-Jun-22 | 29-Jun-22 | 0% | -11 |
| Post Construction | | 12 | 12 | 30-Jun-22 | 18-Jul-22 | | -11 |
| Closeout Activities | | 12 | 12 | 30-Jun-22 | 18-Jul-22 | | -11 |
| CLS-1020 | Perform Contractor Pre-Final Inspection | 1 | 1 | 30-Jun-22 | 30-Jun-22 | 0% | -11 |
| CLS-1050 | Perform Contractor Pre-Final Punchlist | 2 | 2 | 01-Jul-22 | 05-Jul-22 | 0% | -11 |
| CLS-1060 | Perform O/A Pre-Final Inspection | 1 | 1 | 06-Jul-22 | 06-Jul-22 | 0% | -11 |
| CLS-1070 | Perform O/A Pre-Final Punchlist | 5 | 5 | 07-Jul-22 | 13-Jul-22 | 0% | -11 |
| CLS-1080 | Perform Final Inspection | 1 | 1 | 14-Jul-22 | 14-Jul-22 | 0% | -11 |
| CLS-1090 | Perform Final Punchlist | 1 | 1 | 15-Jul-22 | 15-Jul-22 | 0% | -11 |
| CLS-1100 | Demoblize | 1 | 1 | 18-Jul-22 | 18-Jul-22 | 0% | -11 |



**Note: Project Completion Date is June 30, 2022 prior to recalculating the schedule.**

# Note Any Changes to the CCD

- If the project completion date slipped, then the critical path was impacted, and the contractor is owed time.
- If applicable, note whether other contractual date(s) slipped.

**In the Example:**

- After TIA added, CCD is July 18, 2022, with **-18 calendar days** of negative total float.

- Meaning that the schedule is now 18 calendar days behind schedule(impacted) after the TIA Delay was inserted.

# Step 5 – Days Owed

Determine the number of days owed to the contractor.

Remember, the contractor is owed calendar days, not workdays.

| Activity ID | Calendar | Activity Name | Org Dur | Rem Dur | Start | Finish | Phy % | Total Float |
|---|---|---|---|---|---|---|---|---|
| Baseline Example ACE301- Update DD Feb 28 2022 TIA | | | 127 | 127 | 14-Mar-22 | 18-Jul-22 | | -18 |
| Milestones | 7Day Calendar | | 0 | 0 | 18-Jul-22 | 18-Jul-22 | | -18 |
| MILE-1010 | 7Day Calendar | CCD- Contract Completion Date | 0 | 0 | | 18-Jul-22* | 0% | -18 |
| Delays | 7Day Calendar | | 25 | 25 | 14-Mar-22 | 15-Apr-22 | | -11 |
| TIA#1- Drum Discovered | 7Day Calendar | | 25 | 25 | 14-Mar-22 | 15-Apr-22 | | -11 |
| TIA-10 | 5 Day Calendar | Govt/Cont. Negotiations - Drum Discovery | 10 | 10 | 14-Mar-22* | 25-Mar-22 | 0% | -11 |
| TIA-20 | 5 Day Calendar | Test Drum Contents | 10 | 10 | 28-Mar-22 | 08-Apr-22 | 0% | -11 |
| TIA-30 | 5 Day Calendar | Remove/Dispose of Drum | 5 | 5 | 11-Apr-22 | 15-Apr-22 | 0% | -11 |
| Construction | 5 Day Calendar | | 52 | 52 | 18-Apr-22 | 29-Jun-22 | | -11 |
| Foundations & Structure | 5 Day Calendar | | 52 | 52 | 18-Apr-22 | 29-Jun-22 | | -11 |
| NST-1020 | 5 Day Calendar | UG Mechanical | 20 | 20 | 18-Apr-22 | 13-May-22 | 0% | -11 |
| NST-1030 | 5 Day Calendar | UG Electrical | 20 | 20 | 27-Apr-22 | 24-May-22 | 0% | -11 |
| NST-1040 | 5 Day Calendar | Form & Pour SOG Bldg #1 | 10 | 10 | 25-May-22 | 08-Jun-22 | 0% | -11 |
| NST-1050 | 5 Day Calendar | Form & Pour SOG Bldg #2 | 10 | 10 | 02-Jun-22 | 15-Jun-22 | 0% | -11 |
| NST-1070 | 5 Day Calendar | Set Prefab Bldg #2 | 5 | 5 | 16-Jun-22 | 22-Jun-22 | 0% | -11 |
| NST-1090 | 5 Day Calendar | Install Lanscaping | 5 | 5 | 23-Jun-22 | 29-Jun-22 | 0% | -11 |
| Post Construction | 5 Day Calendar | | 12 | 12 | 30-Jun-22 | 18-Jul-22 | | -11 |
| Closeout Activities | 5 Day Calendar | | 12 | 12 | 30-Jun-22 | 18-Jul-22 | | -11 |
| CLS-1020 | 5 Day Calendar | Perform Contractor Pre-Final Inspection | 1 | 1 | 30-Jun-22 | 30-Jun-22 | 0% | -11 |
| CLS-1050 | 5 Day Calendar | Perform Contractor Pre-Final Punchlist | 2 | 2 | 01-Jul-22 | 05-Jul-22 | 0% | -11 |
| CLS-1060 | 5 Day Calendar | Perform O/A Pre-Final Inspection | 1 | 1 | 06-Jul-22 | 06-Jul-22 | 0% | -11 |
| CLS-1070 | 5 Day Calendar | Perform O/A Pre-Final Punchlist | 5 | 5 | 07-Jul-22 | 13-Jul-22 | 0% | -11 |
| CLS-1080 | 5 Day Calendar | Perform Final Inspection | 1 | 1 | 14-Jul-22 | 14-Jul-22 | 0% | -11 |
| CLS-1090 | 5 Day Calendar | Perform Final Punchlist | 1 | 1 | 15-Jul-22 | 15-Jul-22 | 0% | -11 |
| CLS-1100 | 5 Day Calendar | Demoblize | 1 | 1 | 18-Jul-22 | 18-Jul-22 | 0% | -11 |

Golden Rule: By Assigning all milestones a 7 Day calendar, your CCD will always calculate the correct days owed in calendar days for you.

# Step 6 – Determine Delay Dates

**Determine the actual delay dates.**

The start of delay begins on the first day that the project completion date slips and ends when the remaining  delay days are exhausted.

# Step 6 – Determine Delay Dates

A rule of thumb for determining the actual delay dates is to identify successor activity(s) to the fragnet in the schedule used in the TIA prior to inserting the fragnet.

The first day of delay will be predicated on the date when the successor activity in the fragnet to become project critical:

Successor Activities Without Negative Float - The successor activity will become project critical on the computed late start date. If there are multiple successors, choose the earliest late start date. The first day of delay will be the next day after this late start date.

Successor Activities With Negative Float - If successor activities have negative float, then the start of delay is the first day of the impact.

# Step 7 – Excusable and/or Compensable

Determine if the delay is:

- Excusable - Contractor owed time.
- Compensable - Receives extended project costs.

If the contractor has a concurrent critical path delay, then the delay is excusable, but not compensable.

If there are *no* concurrent contractor critical path delays, then the delay is excusable and compensable.

Force Majeure or Acts of God delays are excusable, but not compensable.

# Step 8 – Documentation

**Document the time impact analysis in a price negotiation memorandum and in the modification:**

- Description of the impact or changed condition and other facts and assumptions used in the TIA.
- Maintain hard and electronic copies (.xer file) of the un-impacted and impacted schedules used in the TIA.
- Description of each fragnet activity including, durations, calendars, and predecessor and successor logic.
- Describe the results of the time impact analysis including time owed to the contractor, actual delay dates, extended project costs, etc.

# Questions

# Let's Connect!
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