Time Impact Analysis



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Agenda

- Introduction
- Objective
- What, why and when to use a Time Impact Analysis (TIA)
- TIA Considerations
- TIA Process (TIA Timing: Prospective Vs. Retrospective)
- Concurrent Delays
- TIA Cost Considerations
- TIA from Subcontractors
- Summary
- Q/A



Objective

The objective of a this presentation is to inform staff on the value and standard use of TIA in the firm, Specifically highlight:

- Claim Management Analysis
- What is a TIA?

- The advantage of a TIA "why use"
- Defining a standard to develop a TIA
- What TIA considerations should you understand
- What are the steps and LOE for TIA preparation
- Address concurrence in with a TIA



Claim Management

Claim Management is a method of entitlement analysis for incurred project impacts. This method considers multiple evaluations and considerations of the following:

- Contract Requirements (Plans & Specs)
- Financial Compensation
- Third Party affects
- Regulatory Compliance
- Stakeholder influence
- Time Impacts

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This presentation will focus on the Time Impact Evaluation technique also known as TIA



What is a Time Impact Analysis (TIA)

- A TIA is a schedule delay analysis procedure developed to facilitate the award of contract time extensions due to delays that are not the responsibility of the General Contractor.
- TIA is a "Forward Looking" prospective analysis which models and determines the impact of a delay to project completion on an excepted project schedule baseline or update.
- TIA preparation and presentation is defined by many accredited associations in the engineering and construction industry. Below are references to these associations.

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AACF Article 52R-06



A What-If-Analysis is a exercise to look at potential options before a impact occurs. It also is a process to explore possible changes (owner/sub/GC impacted)

WERE AS.....

A TIA focuses on impacts that have already occurred or occurring.

Why a TIA?

Why and When would you need to develop a TIA?

Why?

- Unforeseen Conditions
- Owner Equipment Delays
- Limited/Restricted Access
- Change in Design
- Change in Contract Requirements
- Environmental Impacts
- Excessive Adverse Weather
- Mitigate scope risk
- Request for Proposal
- Late NTP
- Undisclosed Site Conditions
- Defective Contract Documents
- Funding Changes
- Unreasonable Inspections
- Excessive RFI's

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When?

- Owner Directed Analysis
- Productivity Impacted Recovery
- Lost Days Recorded
- Budget Impacts
 - Delays to the Contract Duration
- Contract Requirements
- Change Orders



Project Delay Analysis



During the schedule update process, delays may occur which will require analysis. These delays could be from any impact to the project schedule resulting from something quantifiable such as:

- Schedule slips beyond Contract Completion Date (CCD);
- Project Total Float set by a constraint becomes negative;
- Interim Contractual Milestones are delayed
- Major component of scope impacting other major scope components

The CDM Smith standard for determining the extend of impact to project completion from a potential or actual delay event (a.k.a) the Time Impact Analysis (TIA)



Change Management and TIA's Require Proper Scheduling Standard Practices



CDM Smith A successful TIA requires a proper project baseline schedule be developed and routinely maintained (Reference lesson 2 and 3)

This routine schedule maintenance and documentation include:

- Maintaining a reasonable level of schedule detail;
- Correct activity and logic status;
- Consistent and documented changes during the update period

Without this effort noted above the LOE (time, cost and resources) to develop documentation after the fact takes much longer and increases project risk!



TIA Considerations

Prior to initiating a TIA, determine all contract requirements associated with a TIA (claim) and gather all contract documents to support the full analysis.

Most contract languages associated with a TIA is defied in the general conditions and supplemental conditions of the contract. Further details also can be found in Specification sections 01250 and 01310.

At a minimum standard CDM Smith has developed recommended language for TIA located in Section 01310.3.05 "ADJUSTMENT OF CONTRACT SCHEDULE AND COMPLETION TIME"

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CONSTRUCTION SCHEDULING

PART 1 GENERAL

1.01 PROGRAM DESCRIPTION

- A. A Cariscal Path Method (CPM) constructions subsdule shall be used to control the Work and the provide a basis for determining job progress. The construction subsdule shall be prepared and maintained by the Construct all work shall be does in accordance with the established CPM subsdule. The Construct and all subcontractors shall cooperate fully in developing the construction subsdule and in executing the work in a coordance with the CPM schedule.
- B. The construction schedule shall consist of a computerized CPM network (diagram of activities) presented in a time-scaled graphic (print-out) with reports, as specified herein.
- C. [For projects that involve multiple prime contractors (in lieu of a single general contractor), the general subcontractor is usually the prime contractor and it shall prepare and maintain the project schedule and be responsible to coordinate all other subs for scheduling into a cohesive integrated plan.]

1.02 QUALIFICATIONS

The Contractor shall have the capability of preparing and utilizing the specified CPM schedule, or engage the services of a specialized scheduling professional to do so. Within seven days of the award of contact, provide a seruim of qualifications instanted for the individual within the Contractor's organization, or the outside consultant, who is being proposed as the responsible party for development and maintance of the CPM Schedule. The viewed of QM schedule are service in the state set of the same interaction of the service of the same interaction of the transmitteneous effective of the same interaction of the same set of the CPM schedule are to approach the same interaction of the same set of the same interaction project. The same interaction project of the same interaction project. The same interaction project of the same interaction project. The same interaction project of the same interaction of the same interaction project of the same interaction project. The same interaction project of the same interaction project interaction project interaction project interaction project interaction project interaction project interac

1.03 SUBMITTALS

A. Contractor shall submit Interim, Preliminary, Baseline (also known as "as-planned") CPM schedules, revisions, and Monthly Status Reports, all including graphics, reports, and narratives and an as-built schedule, as specified herein.

PART 2 PRODUCTS

- 2.01 SOFTWARE
- A. Unless otherwise approved by the [Engineer] [Construction Manager], the computer-based schedule shall be generated using Oracle-Primavera Contractor, or P6 Professional Project Management Software.
- [B. Provide [two] copies of the scheduling software program (with licenses) being used by the Contractor, for use by [the [Engineer] [Construction Manager] and/or Owner], during

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TIA Considerations (con't)

- Risk allocation (sharing) in construction contracts (JV)
- Responsibly for mitigation of delay, regardless of source
- Format for dispute resolution
- Timely written notice
- Overcoming the "bottle Neck'n" to perform a TIA
 - No baseline
 - No proactive compliant updates
 - Lack of relevant documentation
 - Client sophistication on contract terms
 - Concurrence
 - LOE to recreating the story
 - Capture impacts costs



• Again......Project (schedule) documentation!!

Steps for TIA Preparation

The TIA process can be segregated into five steps:

- 1. Identify impact events and build them into a schedule "Fragnet"; (MOST CRITICAL)
- 2. Identify schedule update version at the time when impact starts;
- 3. Model impact Fragnet into selected schedule;

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- 4. Recalculate the schedule with the incorporated impacts;
- 5. Quantify resulting impact to existing schedule and perform entitlement analysis

Note: Although defining cost may be required to support a claim, it is intended that the TIA process separate time from cost considerations. Cost should be derived after time has been established, not traded back and forth as a negotiation positions. This traditionally would be negotiated to the benefit of both parties.

Identify Impact Events and Develop a Fragnet

- Locate pertinent contemporaneous documents(i.e., RFI's, Change-In-Conditions, Change Orders, MODs, etc.);
- Identify impact causal factors and sequence of events;
- Identify added work impact activities;

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- Identify and quantify impacts to existing baseline contract work activities;
- Segregate activities and establish start and finish dates

Activity	Activity Name	Dur	Start	Finish	2013
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					May Jun Jul Aug Sep Oct Nov Dec
					5/20 Start of Impact
D-100	Owner's Delay No. 1 - Activty 1	15 d	5/20/13	6/7/13	
D-200	Owner's Delay No. 1 - Activity 2	40 d	6/10/13	8/2/13	
0-200	Owner's Delay No. 1 - Activity 2	40 0	0/10/15	0/2/13	
D-300	Owner's Delay No. 1 - Activty 3	25 d	8/5/13	9/6/13	
D 400	Ourses's Delay No. 4 Activity 4	40 d	0/0/42	0/20/42	
D-400	Owner's Delay No. 1 - Activity 4	10 0	9/9/15	9/20/15	
					90 Days Delay

Identify Impact Events and build them into a schedule "Fragnet"

- The schedule fragnet should consist of a subset of the activities in the project schedule that will be involved directly with the delay
- For ease of comprehension and review, the delay should be described as simply as possible
- Use the fewest number of activities and relationships added in order to substantially reflect the impact of the delay to the schedule
- Shown detail should be consistent with the nature and complexity of the change or delay being modeled
 - Added activities should be numbered in a logical manner to make it easy to distinguish them as new activities associated with the delay

Identify Schedule Update Version at the Time When Impact Starts

- Based on schedule Fragnet, establish start of impact;
- Identify the appropriate schedule version at the time (Baseline or Monthly update) accepted immediately Prior to start of impact event;
- Identify Critical Path Work;
- Identify forecasted overall project completion date





Qtr 3

Qtr 4

Qtr 1

15

2013

Qtr 2

Qtr 1

TIA Timing: Prospective Vs. Retrospective

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Identify Schedule Update Version at the Time When Impact Starts – Practices

• Select the appropriate accepted schedule update in existence when the impact started.

Example: The appropriate schedule should be the last Owner-accepted schedule update prior to the time of the change/delay – OR - The original baseline schedule should be used if the delay began prior to the first schedule update.

- If the time interval between the start of the delay and the last accepted schedule update is too great (or if significant deviation to the schedule was experienced between the last status date and the start of the delay), then provide a new schedule and update with a status date immediately prior to the start of the delay.
- The schedule to be impacted is called, "the contemporaneous schedule update baseline." The data date should remain the same for both original schedule update and impacted TIA reference schedule.

Insert Impact Fragnet into Selected Schedule

- Identify schedule activities related to and potentially delayed by impact event;
- If necessary, split existing activities into two or more activities where impacted;
- Identify predecessor work activity completed prior to start of impact even;
- Identify Successors work activities completed after impact event;
- Identify ongoing work activities that may be extended as result of impact event;
- Insert logic relationship as required.

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Insert Impact Fragnet into Selected Schedule – Practices

- Insert the fragnet into a copy of the contemporaneous schedule baseline update prepared as described previously.
- Using the accepted impact Fragnet as a template, add the impact activities and logic. Make the accepted activity adjustments to the existing activities as necessary to mirror the fragnet.
- Set the duration of the delay activities to zero and recalculate the CPM.
- At this point in the analysis, all forecasted and actual dates in the TIA schedule update should match that from the contemporaneous schedule update baseline. If all dates do not match, then review and correct the fragnet insertion relationships and lags as needed until they do match.

Recalculate the Schedule with the Incorporated Impacts

- Recalculate schedule with added Fragnet activities duration set to zero to verify integrity of logic relationships;
- Input actual duration of added Fragnet activities;

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• Recalculate the schedule to identify changes to forecasted overall project completion date

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								•	4/30	Data	Date									
C-150	Critical Construction Activity C1	30 d	2/26/13	4/8/13				5	750	Data	Date									
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C-350	Critical Construction Activity C3	15 d	4/30/13	5/20/13				Ģ												
D-100	Owner's Delay No. 1 - Activty 1	15 d	5/21/13	6/10/13					ļ											
D-200	Owner's Delay No. 1 - Activty 2	40 d	6/11/13	8/5/13						,		Ъ	1	9/23	Enc	l of Ir	npact			
D-300	Owner's Delay No. 1 - Activty 3	25 d	8/6/13	9/9/13																
D-400	Owner's Delay No. 1 - Activty 4	10 d	9/10/13	9/23/13									G	1						
C-450	Critical Construction Activity C4	40 d	9/24/13	11/18/13									ļ							
C-550	Critical Construction Activity C5	45 d	11/19/13	1/20/14											Ģ					
C-650	Project Completion	0 d	1/20/14	1/20/14													F	Proj	ect Co	m

Recalculate the Schedule with the Incorporated Impacts – Practices

- Insert the durations used in the fragnet into the added delay activities and re-compute the CPM.
- Address any schedule logic issues and document any logic edits

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• Analyze if the added delay activities did or did not impact the Critical & Near-Critical Activities as well as Interim Project Milestone and completion

Quantify Resulting Impact to Existing Schedule

- By comparison to the un-impacted schedule, quantify delay to forecasted overall project completion date;
- Review and verify integrity of the Critical Path activities;
- Prepare a written narrative explaining:
 - What was supposed to happen,
 - > What actually happened
 - > Why the change occurred
 - > Who is responsible

- How much Time the Contractor is entitled to be granted/compensated
- Separately determine
 Cost should be derived after time has been established

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C-350	Critical Construction Activity C3	15 d	4/30/13	5/20/13				ļ															
D-100	Added Delay Event/ Activity D1	15 d	5/21/13	6/10/13					Ļ	<u> </u>													
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C-450	Critical Construction Activity C4	40 d	9/24/13	11/18/13									ļ										
C-550	Critical Construction Activity C5	45 d	11/19/13	1/20/14											Ģ								
C-650	Project Completion	0 d	1/20/14	1/20/14					l													1001	

Quantify Resulting Impact to Existing Schedule – Practices

- Identify the activity indicating project completion and note any change in the project completion date.
- Determine the amount of time impact for the project. If the contract specifies work days, then this unit of measurement should be made in work days, vs for calendar days.
- Determine the actual dates of the impact. Using the original schedule update, determine if the added change activities were substantial enough to impact the project critical or sub-critical path.
- Quantify Excusable versus Non-Excusable Delay as well as Compensable versus Non-Compensable Delay
- Document the TIA process and the results

Camp Pendleton Project



Camp Pendleton TIA Example



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TIA Analytical Reports

Either required by the contract or agreed to by all parties, reports and graphics are essential in communicating critical information. The following are examples of some proven successful reports presented to illustrate different ways to establish your position in a TIA negotiation:

- 1. Variance Report
- 2. Fragnet

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- 3. Critical and Near-Critical Activities
- 4. Network Logic Analysis

NARRATIVE EXAMPLES

TwT		Tim	e Impact An	alysi	3	CDM
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Contract	NO		Contract (Pro	oject) Na	ne -	Issue Day
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Concurrent Delays



A concurrent delay occurs when a contractor and an owner have both caused independent critical path delays that affect the completion date of a project and are at the same approximate time period.

Concurrent Delays Considerations

- Identification of Critical and Near-Critical Paths (example)
- Whom/which party caused the delay and whom resolved the delay
- Are the delays even close to the critical path, prior and post impacts
- Are the delays independent or related (Inextricably intertwined)
- Whom was notified/whom knew of the delays
- Confirm concurrent delays has no bearing on a single issue TIA

Concurrent Delays Considerations (Cont.)

- Determination and Quantification of Excusable and Compensable Delay
 - Excusable and Compensable Delay (ECD)
 - Non-Excusable and Non-Compensable Delay (NND)
 - Excusable and Non-Compensable Delay (END)
- AACE 29R-03:

Net Affect Matrix - Concurrent Delay

Delay Event	Concurrent With	Net Effect			
Owner Delay	Another Owner Delay or nothing	Excusable & Compensable to the Contractor			
Owner Delay	Contractor Delay	Excusable but Not Compensable to both Parties			
Owner Delay	Force Majeure Delays Excusable but Not Compensable to both Parties				
Contractor Delay	Another Contractor Delays or Nothing	Non-Excusable to Contractor, Compensable to the Owner			
Contractor Delay	Force Majeure Delay	Excusable but Not Compensable to both Parties			
Force Majeure Delay	Another Force Majeure Delay or Nothing	Excusable but Not Compensable to Contractor			

Concurrent Delays (examples)

Owner - Owner Provided Pump Equipment Delivery Delay
 Contractor - Delay on Pump Pad Construction From Bad Concrete Pour

1) Pump Delivery Original Duratio	n	Pump Delay	
2) Pump Pad Original Duration	Pump Pad Delay		
Original Ir	nstall Pump M.S.		Delayed Install Pump M.S.

Project Delay From Encountered Unknown Bad Soils for Excavation
 Contractor Delay from Internal Delayed Shoring P.O. and Submittals

				_	
1) Geotech	Site Excavation	Soil	Site Excavation		
2) P.O. Original Duration	Shoring P	.O. Delay			
Origin	nal Excavation M.S.			Delayed Excavation	M.S.
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TIA Cost Considerations

Although the intent of this exercise is not to provide process of how to cost load claims or change orders, there are several considerations for developing compensation associated with a TIA impact.

- 1. Verify and establish rules/requirements for cost assessment noted in the contract documents.
- 2. Define if cost in working days and calendar days
- 3. Acceleration evaluation and/or productivity impacts
- 4. Partial/full impacted days

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- 5. Project re-sequence/logic changes to crew and resources availability
- 6. Design/subcontractor impacts (duration totals)
- 7. Define any office/overhead draw down periods
- 8. Define any concurrent delays or non-compensable time

Note: A TIA may conclude no additional days, but would have cost impacts (i.e. productivity, shipping)



TIA from Subcontractors

Many times, time impacts are requested from our subcontractors. These impacts can be grouped into two categories, owner impacts and general contractor impacts.

Owner Impacts

Less contentious position, owner impacts to subcontractor work on the CP can easily follow the process noted before as requested days and compensation would be passed to the owner.

If the impacted work is not on the critical path, then an extension of the existing process would be required to justify subcontract impacts to their specific work.

General Contractor Impacts

In this matter, CDM Smith would evaluate a subcontractor TIA. It is recommended that the subcontractor also follow the process that CDM Smith would provide the owner.

Incorporate the subs impacts into the CDM Smith master schedule for further evaluation.



TIA Summary

At this point you should be able to demonstrate a clear understanding of the TIA process. Specifically the following:

- What is a TIA
- Why and when to develop and use a TIA
- Know the Contract TIA requirements
- Implement the 5-step TIA process
 - 1. Identify impact events and build them into a schedule "Fragnet"; (MOST CRITICAL)
 - 2. Identify schedule update version at the time when impact starts;
 - 3. Model impact Fragnet into selected schedule;
 - 4. Recalculate the schedule with the incorporated impacts;
 - 5. Quantify resulting impact to existing schedule
- Define types of TIA reports and narrative
- How to address concurrent delays
- Evaluate TIA cost considerations
- Resolve subcontract TIA

