



فرمول جامع برای تدوین لایحه تاخیرات (بر اساس دو قرارداد FIDIC و AIA)

بخش پنجم: نکات کلیدی برای پیاده‌سازی مدل آینده‌نگر و گذشته‌نگر TIA به شکل حرفه‌ای

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What we will learn?

- ☐ Prospective and Retrospective Time Impact Analysis
- ☐ Understanding Float
- ☐ Understanding Concurrent Delay
- ☐ TIA Contract Requirements
- ☐ TIA Requirements
 - ☐ Prospective and retrospective provision
 - ☐ Sharing the Float
 - ☐ Concurrent Delay

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What we will learn?

- ☐ Definition of TIAs
- ☐ Preparation of TIAs
- ☐ Review of the MBTA Delay Provisions Clauses
- ☐ Post-Construction TIA
- ☐ Case Review No. 1
- ☐ Case Review No. 2
- ☐ Guideline

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Prospective and Retrospective Time Impact Analysis

- ❑ The **vast majority of construction contracts** for major construction programs today contain **Critical Path Method (CPM) scheduling specifications** that include **Time Impact Analysis** ("TIA" requirements relative to evaluating the time-related effect of changes and delays in the work on a project's schedule and the contract time.
- ❑ These requirements typically require a contractor to
 1. prepare schedule "**fragnets**" (fragmentary networks) and
 2. "utilize the schedule **update** in effect at the time a change is issued or a **delay occurs**" for purposes of substantiating, **prospectively**, contractor's entitlement to an extension of the contract time

- ❑ Time impact analysis procedures have been in use since the **mid 1960's**.
- ❑ **While** in concept these procedures are **logical** and **appear to be rather straightforward** in terms of their use,
the **application of these procedures** during construction are fraught with **problems** arising from

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- (i) **scheduling specifications** that fail to **differentiate** between and **define the steps** to be taken in **evaluating the time impact** associated with changes and delays on a prospective (in advance of performance) versus a retrospective (after-the-fact) basis;
- (ii) **misunderstanding** with respect to the **differences** between the **preparation** of a TIA for a change or delay in the work on a prospective versus a retrospective basis;
- (iii) **disagreements** between owners and contractors over the **durations** and **logic** in **contractor schedule fragnets**; and
- (iv) **disagreements** with respect to the manner in which **contractors propose** to **incorporate fragnets** into the project schedule

- ❑ The **failure to properly utilize** time impact analysis procedures **undermines** the **effective utilization** of a schedule as a forward looking management tool, and can **likewise render** the schedule ineffective for purposes of **contemporaneously** evaluating the effects of changes and delays in the work.
- ❖ In such a situation, a **project schedule** can become **nothing more than** a mere progress payment tool
that is **submitted** to an owner on a **monthly basis** in support of a contractor's progress payment request.

❑ In terms of the actual scheduling of the work, in the **absence** of a viable CPM schedule,

contractors **typically default** to the use of two to three-week look ahead bar charts in an effort to manage their projects;

albeit on a **short-term, rolling basis**, with **no clear long term picture** as to what work is actually critical as of any point in time, or when the project will be completed.

❖ Under such circumstances, contractors **resort** to reserving **their rights** to claim with respect to every problem, change, and perceived delay that occurs.

❖ And, **everyone prepares** for the inevitable dispute at the end of the job.

How, if at all, can this be avoided?

❑ The answer lies in

- (1) gaining a more **thorough understanding** of the time impact analysis process and the **steps involved** in preparing prospective and retrospective time impact analyses, and
- (2) **increasing** one's insight into how and why the process often **fails**.

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□ This section

- (a) **examines** TIA requirements and provisions within those requirements that can **undermine** their **successful** application,
- (b) **suggests** contractual language relative to the **preparation** of both prospective and retrospective TIAs,
- (c) **reviews** the steps required to **prepare** prospective and retrospective TIAs, and
- (d) **discusses** the application of **retrospective** time impact analysis procedures in **post-construction disputes**.

Overview

- ❑ The concept of "**equitable adjustment**" is **fundamental** to an understanding of the principles, procedures, and recommendations discussed in this section.
- ❑ The **typical changes clause**, such as
that used in the United States Government Standard Form 23A,
requires an "**equitable adjustment**" in the contract sum and
performance time
when the government issues or causes changes or delays in the
work.

Equitable adjustment

- ☐ In Bruce Construction, the **Court of Claims** stated that the **basic purpose** of an equitable adjustment is

"to leave the contractor whole when the Government modifies a contract."

- ☐ This statement has been **widely quoted** as stating the **basic theory** of equitable adjustment.

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Equitable adjustment

- ❑ The author of a law review article most aptly described the theory of equitable adjustment as the **"leave them where you found them" theory**, meaning that the purpose of an equitable adjustment:
 - "is to leave the parties in the **same position** cost-wise and profit-wise as they would have occupied had there been **no change**,*
 - preserving** them each as nearly as possible the **advantages and disadvantages** of their bargain."*

Equitable adjustment

❑ **Consistent** with the theory of **equitable adjustment**,

where the **price of a change order** is negotiated prior to performance of the changed work,

the **rule consistently followed** by courts and boards recognizes that estimated costs are **properly useable**,

provided that they constitute the **most accurate cost information** available at the **time** of the pricing.

❖ Where **changed work** is performed prior to **negotiating** a price, however, the **actual costs** incurred are available and are presumed **reasonable**.

Equitable adjustment

- ❑ The **concept** of equitable adjustment is **equally applicable** with respect to evaluation of the **time-related effect** of changes or delays in the work.
 - ❖ Thus, where the effect of a change on a project schedule is **evaluated in advance** of performance of the **changed work**,
it is appropriate to estimate or predict the impact of the change **prospectively**.
- ❑ The **utilization of prospective** time impact analysis procedures, such as those included in the Army Corps of Engineers Modification Impact Evaluation Guide and Veteran's Administration's VACPM Handbook,
are rooted in the **desire of owners** to protect their financial interests.

Equitable adjustment

- ❑ **Owners** want to identify and resolve **all issues** related to cost and time associated with the performance of **changed work** in advance of performance,
such that the **owner can shift the risk** associated with the performance of changed work to the contractor,
thus **limiting** its (the owner's) **exposure** to requests for additional time and compensation **after the changed work** has been **performed**.

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Equitable adjustment

- ❑ At the **same time**, owners are **concerned** with maintaining
 - ❖ forward-looking viability of the project schedule and
 - ❖ its utility in performing future prospective time impact analyses.

- ❑ While the desire to achieve these objectives is **certainly understandable**,
as a matter of **practical reality**, they are **often difficult**, and sometimes,
given project conditions, **impossible to achieve**.

Real world of construction

- ❑ In the **real world of construction**, the **vast majority** of changed work is performed and delays occur **prior** to the time contractors **meet** with an owner to discuss their entitlement to an extension of the contract time.
- ❑ As is discussed in more detail later in this section, the problem presented by this situation is that **while the vast majority** of Time Impact Analysis requirements include provisions relative to the performance of **prospective time impact analyses**, the **majority of them do not** include requirements for performing **retrospective analyses**.
- ❑ As a result, in situations where changed work is performed or a delay occurs prior to the time the parties attempt to negotiate a time extension related to same, the **parties in the absence of a contractually-specified means** for analyzing these situations are **left to their own devices** in attempting to resolve the responsibility for and amount of the time extension to which a contractor may be entitled.

Understanding Float

Understanding float

- ☐ **Whether you are preparing** a time impact analysis on a prospective or retrospective basis, it is important to understand schedule float in terms of what it is, and "who owns it."
- ☐ The difference between the maximum time available within which to perform an activity and the duration of an activity is known as **total float**.

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- ❑ Courts and boards of contract appeals have typically equated "float" with "**total float.**" The General Services Administration Board of Contract Appeals has defined "float time" as follows:

Those paths which do not lie on the critical path have certain flexibility in that there is a difference between the earliest and latest expected times for a particular event. This difference, called "total float" in CPM, allows the manager latitude in the scheduling of non-critical activities that originate or terminate at that event, and to affect tradeoffs of resources to shorten or control his project. Total float is the time any given activity may be delayed before it will affect the project completion time. It is the difference between the latest start time and earliest start time. It is also the difference between the latest finish and the earliest finish.

Total float

- ☐ The **above definition** of float is **consistent** with the view **other courts and boards** have taken in which they have viewed "float" to mean "total float."

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Total float

- ❑ Early decisions held that the **contractor**, not the owner, **owned schedule float**.
- ❑ As **critical path method delay analysis** began to grow in terms of its **acceptance by courts and boards**,
however, these tribunals departed from their traditional view and approach to float ownership issues,
focusing not on "who owned the float" perse but on whether the delay(s) in question affected the project's critical path.
- ❑ **Two cases**, which were decided by the General Services Board of Contract Appeals, marked the shift in **focus from "float ownership"** to whether delay impacted the **project's critical path.**

Total float

- ❑ In the **first case**, the Board defined the issue to be *whether the delay alleged* by the contractor **"caused any delay in project completion."**
- ❖ On reconsideration, the **Board affirmed** its decision stating that **although Government delay did exist**,
it was of **no consequence** since that delay did not affect the project's critical path."

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Total float

- ❑ In the **second case**, the **Board denied** the **contractor a time extension** in a situation where the **Government** had caused **delays to certain activities** on the project.
- ❖ In this case, the **Board found** that the contractor was not entitled to a time extension for alleged Government delay **because there was no showing** that the **project's critical path was actually affected** by the alleged delay or that any project delay was actually caused by the alleged Government conduct.

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Total float

- ❑ **These cases and numerous others** confirm the court's and board's current approach to dealing with delay and time extension analysis, which is, in essence, that "**the project owns the float.**"

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Total float

❑ In **order to clarify the owner's position** with respect to the manner in which float is to be used in managing a project and evaluating time extensions,

owners often include float-sharing clauses in their time impact analysis requirements that address "float ownership" and provide, in essence, that "the project owns the float."

An ex-ample of such a clause is as follows:

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Understanding float

Activity delays shall not automatically mean that an extension of the Contract Completion Date is warranted or due the Contractor. A Contract Modification or delay may not affect existing critical activities or cause non-critical activities to become critical. A Contract Modification or delay may result in only absorbing a part of the available total float that may exist within an activity chain on the network, thereby not causing any effect on any interim milestone date or the Contract Completion Date. Total float is defined as the amount of time between the early start date and the late start date, or the early finish date and the late finish date, for each and every activity in the schedule. Float is not for the exclusive use or benefit of either the Owner or the Contractor. Extensions of time to interim milestone dates or the Contract Completion Date under the Contract will be granted only to the extent that the equitable time adjustments to the activity or activities affected

by the Contract Modification or delay exceeds the total float of the affected activity or subsequent paths and extends any interim milestone date or the Contract Completion Date.

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Understanding Concurrent Delay

Concurrent delay

- ❑ It is also important when performing a **time impact analysis**,
to **understand concurrent delay** and its **impact** upon a contractor's entitlement to an extension of time.
- ❑ Although it is **not the purpose** of this Section to thoroughly treat this topic, for **purposes of discussion** the following basic principles are noted.

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Concurrent delay

- ❑ Concurrent delay exists when **two or more separate delay events** occur during the same time period.
- ❑ The **traditional view** of the courts and boards has been that when Government delay is concurrent or intertwined with contractor or excusable delays, **neither party** should be **able to recover** from the other for that period of delay.
 - ❖ Thus, the **owner cannot recover** liquidated damages and the **contractor cannot recover** costs of delay."

Concurrent delay

- ❑ With respect to the **apportionment** of time and damages,
the **courts have adopted the view** that when both parties to a contract breach
their contractual obligations by delaying performance,
a **court must assess** the delays **attributable** to each party and apportion
damages accordingly."

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Concurrent delay

- ❑ In order to **apportion damages** a court or board must be in the position to apportion delays between the parties.
 - ❖ This point is made taking into account the possible outcomes **when it is impossible to apportion** delays; namely:
 1. where contractor-caused delay is concurrent with owner-caused delay, the **contractor may not recover** its increased costs resulting from delay;
 2. where non-compensable delays are concurrent with Government-caused delays, a **contractor may not recover** its increased costs resulting from the delay; and,
 3. where the **owner has contributed to project delay** and such contribution **cannot be separated from other causes of delay**,
liquidated damages may not be enforced by the owner."

Concurrent delay

- ❑ A **party asserting entitlement** to a delay-based claim **must offer proof** reflecting a clear **apportionment** of the delay.
- ❑ In this regard, there are **numerous decisions** which address the **proof required** to **establish entitlement** to an extension of time and that required to establish a claim for **delay costs**.

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Concurrent delay

- ❑ In an **Armed Services Board of Contract Appeals** case, the Board, in discussing the effect of concurrent delays, noted that **concurrent delay** does not bar **extensions of time**, but it does bar monetary compensation for **daily fixed overhead costs** because **such costs** would be **incurred** on account of the concurrent delay **even if** the Government-responsible delay had **not occurred**.

Concurrent delay

❑ In an **Armed Services Board of Contract Appeals** case,

the Court, in evaluating the record regarding various delays, indicated that **although** its **findings established** that the **contractor had incurred many delays** through its own fault and that of **its subcontractors** that prevented it from timely completing its work under the contract,

the **record also established** that the **Government had contributed** to the delays by **issuing change orders**.

Under the circumstances, the Court determined that the delays were not compensable and thus did not entitle the contractor to delay damages; although the Government's actions relieved the contractor from liability for liquidated damages.

Concurrent delay

- ❑ Likewise, in a **General Services Board of Contract Appeals case**," in which the Board addressed the issue of concurrent delay, the Board stated:

A delay for which the Government is responsible is excusable by definition, and it may also be compensable. The rule is that for a delay to be compensable under either the Changes clause or the Suspension of Work clause, it must result solely from the Government's action... If a period of delay can be attributed simultaneously to the actions of both the Government and the contractor, there are said to be concurrent delays, and the result is an excusable but not a compensable delay...

Concurrent delay

- ❑ In **Freeman-Darling, Inc.**, the General Services Board of Contract Appeals addressed the issues of a **contractor's compensable delay claim**, the owner's assessment of liquidated damages, and the effect of **apportionment of delay**.
- ❑ In this regard, in **denying** the **contractor's entitlement** to the recovery of delay costs, while at the same time finding that the **contractor should not be assessed liquidated damages**, the Board stated:

That delay was concurrent with delays due to changes and strikes. The law is well settled that where both parties contribute to the delay neither can recover damages, unless there is clear evidence by which we can apportion the delay and the expense attributable to each part.²¹ Since no method is apparent for apportioning the delays, appellant may not recover increased costs for the period of June 25 to August 2, 1982. Correspondingly, for purposes of liquidated damages, appellant must be credited with an extension equal to the delay that occurred during that period.

Critical path and concurrent delays

❑ In terms of the application of **critical path method scheduling** techniques to the **apportionment** of concurrent delays,

a **number of cases** provide insight as to how courts and boards view and utilize CPM **techniques and principles**.

The following cases are instructive.

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Critical path and concurrent delays

- ❑ The decision in "Utley-James" reflects the willingness of Boards to apportion concurrent delays, noting at page 89,109:

When venturing into this area, we must be wary of deciding too readily that there was a concurrent delay. We considered this issue in *Warwick Construction, Inc.*²³ and concluded that, at the very least, we would not require a contractor claiming a compensable delay to prove that in the absence of the Government's delaying actions it would have completed the job on schedule. However, we also adverted in *Warwick* to the basic principle of *Wunderlich Contracting Co. v. United States*,²⁴ which requires that a contractor seeking compensation establish 'the fundamental facts of liability, causation, and resulting injury.' That, we said, 'has always been the law,' and we adhere to it in this appeal as we have in the past.

The lesson of *Warwick* is that certain kinds of second-guessing are proscribed. To take an easy example, if the job schedule was originally such that the contractor needed certain widgets on hand by January 1, but because of a six-month delay attributable to the Government, the contractor rescheduled the delivery for July 1, the Government cannot be heard to say the delays were concurrent because the contractor would have had to wait six months for the widgets anyway. In such a situation there is no reason to doubt that the contractor could have had the widgets on January 1 and proceeded on schedule absent the Government-caused delay. Such a simplistic example poses no problem at all. The problem lies not in reaching the right conclusion, given such an example, but in determining whether a given fact situation is an example of such an occurrence or is instead an example of a true concurrent delay.

TIA Contract Requirements

TIA contract requirements

- ❑ The **Time Impact Analysis provisions** included in contracts **vary significantly** from **contract to contract**.
- ❑ As **previously discussed**, while the vast **majority of these requirements** include provisions relative to the performance of prospective time impact analyses, the majority of them do **not include requirements** for performing retrospective analyses.

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TIA contract requirements

- ❑ *As a result, in situations where changed work is performed or a delay occurs*
 1. ***prior** to the time the parties attempt to **negotiate** a time extension related to same, or*
 2. *where the sheer number of changes and delays overwhelm the ability of the parties to evaluate these issues on a prospective basis,*
*the parties in the absence of a **contractually-specified means** for analyzing these situations are left to their **own devices** in attempting to resolve the responsibility for and amount of the time extension to which a contractor may be entitled.*
- ❑ Unfortunately, many of these situations end up being **"worked out" in a courtroom.**

Occasions in TIA

- ❑ On some occasions, **owners and their counsel** argue that the prospective time impact analysis procedures in the contract should be utilized for purposes of determining the extent to which a **contractor is entitled to an extension** of the contract time, and **contractors and their counsel** argue that retrospective analytic techniques must be used to analyze the **actual delay** that occurred in the work.
- ❖ On other occasions, contractors and their counsel take the position that the prospective TIA procedures in the contract should be utilized for purposes of analyzing delay, and owners and their counsel argue that retrospective techniques must be used to evaluate the delay in the work.

These situations are all too common.

TIA contract requirements

- ❑ An analysis of the **respective positions** of the parties **under either of these scenarios** requires a **careful examination of the contract** to determine precisely **what the contract specifies** with respect to the evaluation of schedule impacts associated with changes and delays in the work.

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TIA contract requirements

□ For example,

- ❖ does the **contract** require that a prospective time impact analysis is the **only method** to be utilized in evaluating the effect of changes or delays in the work;
regardless of whether the changes or delays are **evaluated prior to, or after**, the changed work has been performed or the delay occurred?
- ❖ Or, does the **contract require** that prospective time impact analyses are to be used in "**forward pricing**" and evaluating changes and delays, and is **silent** with respect to how changes. and delays are to be evaluated in an **after-the-fact** situation?

TIA contract requirements

❑ In **addition**, it is important to

1. examine the **facts** and **circumstances** in a given situation and
2. evaluate the manner in which the **parties conducted themselves**.

❑ Moreover, it is essential to **determine whether the schedules** on the project were **accurately updated** to reflect progress achieved, delays experienced, and the time extensions due a contractor.

❖ In this situation, it **could be argued** that the **prospective time impact analysis procedures** in the **contract** cannot (and should not) be utilized for purposes of performing an **after-the-fact schedule delay analysis**.

TIA contract requirements

At best, what a court or board may decide in a given situation is **uncertain**.

Such uncertainty **can be avoided** by including both prospective and retrospective time impact analysis requirements in contracts.

TIA Requirement

Prospective and retrospective provision

TIA Requirement

- ❑ The **following is an example** of a Time Impact Analysis **requirement** that provides for **both** prospective and retrospective analysis of changes and delays in the work.
- ❑ The inclusion of such a provision in a contract provides a **contractually-prescribed mechanism** for evaluating the **effects** of changes and delays on **both** a prospective and retrospective basis.

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A. Requirements

☐ When **Change Orders** are ordered,

1. delays are experienced, or
2. the contractor believes it is entitled to an extension of time,

the **Contractor shall submit** to the Owner a written Time Impact Analysis **illustrating**

the **influence** of each Change Order or delay on the Contract Time, as follows:

A. Requirements

1. In situations where the **Owner elects to review** a **Proposal** from the Contractor **prior** to **directing** the Contractor to **proceed with the work** related to given Change Order, or a delay initiates,
the **Contractor shall submit** a written Time Impact Analysis, including
 1. a narrative and
 2. Fragmentary CPM Network (Schedule Fragnet),**demonstrating**
 1. **how the Contractor proposes to incorporate** the Change Order or delay into the Project Schedule and
 2. the **time impact**, if any, on the Project Schedule **Milestone Dates** set forth **under Section of Contract Documents**.

A. Requirements

1. The **Time Impact Analysis** shall **demonstrate** the anticipated time impact to the **Project Schedule Milestone Dates** based upon

1. the **date the Change Order** is **issued** to the Contractor, or the **date the delay initiated**;
2. the **status of construction** at that **point in time**; and
3. the **event time computations** of all affected activities.

The event times used in the Time Impact Analysis **shall be** those set forth in

1. the most current,
2. accepted (mutually agreed-to)

update of the Project Schedule in effect at the time

1. the Change Order is issued, or
2. the delay initiated.

A. Requirements

2. In situations where

- (i) the **Owner has directed** the performance of work **related to a Change Order in advance of determining** the time impact associated with the performance of the changed work; or
- (ii) the **Contractor and Owner have not agreed** on an adjustment to the Contract Sum and/or Contract Time **prior to the Owner directing** the Contractor to proceed with the work related to a Change Order; or
- (iii) the **Contractor has provided notice** of an alleged delay in the work and incurred a delay,

?????

A. Requirements

2. In situations where

- (i) the **Owner has directed** the performance of work **related to a Change Order in advance of determining** the time impact associated with the performance of the changed work; or
- (ii) the **Contractor and Owner have not agreed** on an adjustment to the Contract Sum and/or Contract Time **prior to the Owner directing** the Contractor to proceed with the work related to a Change Order; or
- (iii) the **Contractor has provided notice** of an alleged delay in the work and incurred a delay,
the **Contractor** shall submit a **written Time Impact Analysis**, including a narrative and Fragmentary CPM Network (Schedule Fragnet) demonstrating the **actual effect** of the Change Order or delay on the Project Schedule Milestone Dates.

A. Requirements

2. The **Time Impact Analysis** shall **demonstrate** the time impact to the Project Schedule **Milestone Dates** based on an "as-planned" to "as-built" comparison of
- (i) the **event times** according to the most current, accepted (mutually agreed-to) **update** of the Project Schedule in effect at the **time** the
 1. Change Order was issued or
 2. the alleged delay initiated, to
 - (ii) a **Project as-built schedule** which covers the **period of time** during which
 1. the **changed work** was performed or
 2. delay was incurred.

A. Requirements

2. In developing the **as-built schedule**

the Contractor shall utilize

1. activity "**actual start**" and "**actual finish**" date information included in the **Project Schedule Update(s)**, in conjunction with
2. as-built schedule **activity information** obtained from the **Contractor's Daily Construction Reports** and other available sources,
to **graphically depict**
the sequence and manner in which the **Contractor actually performed** the work under the Contract during
 1. the time the changed work was **performed** or
 2. the delay occurred.

A. Requirements

2. **Thereafter**, the Contractor shall

(1) **identify** the **as-built critical path** to completion through the period of time during which the subject

1. Change Order work was performed or
2. alleged delay occurred;

(2) **prepare** a **Fragmentary CPM Network (Schedule Fragnet)** which **graphically** depicts the manner in which

1. the Change Order work was performed or
2. the delay occurred; and

(3) **incorporate** the **Schedule Fragnet** into the as-built schedule demonstrating how the changed work or delay affected the **as-built critical path**.

B. Time Extensions

- ❑ Time Extensions: **Activity delays** shall **not automatically** mean that an extension of the Contract Time is **warranted** or due the Contractor.
- ❑ It is **possible** that a modification, change or delay will **not affect** projected or as-built critical activities or **cause** noncritical activities to become critical.
- ❑ A **Change Order** or **delay** may result in **only absorbing** a portion of the available total float that may exist within an activity chain of the Project Schedule, thereby **not causing** any effect on the Project Schedule Milestone Dates.
- ❑ **Float is not** for the exclusive use or benefit of the Owner or the Contractor.
- ❑ **Extensions** of time to the Project Schedule Milestone Dates under the Contract will be **granted only** to the extent that the **time adjustments** to the activity or activities affected by a change order or delay **extends** any interim Milestone Date or the date of Substantial Completion as set forth under **Section of the Contract Documents**.

C. Procedure

1. Each Time Impact Analysis shall be submitted as follows:

- a. For Change Orders and delays, the **analysis discussed above** under Subparagraph **A.1** shall be submitted within fourteen (14) calendar days

following

1. the Owner's issuance of the Change Order, or
2. initiation of the delay,
as a part of the Contractor's proposal for the Work or delay contemplated by the proposed Change Order.

C. Procedure

❑ 1. Each Time Impact Analysis shall be submitted as follows:

b. For Change Orders or delays, the **analysis discussed above** under Subparagraph

A.2 shall be submitted within fourteen (14) calendar days

following completion of the Work related to

1. the Change Order, or
2. conclusion of the delay.

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TIA Requirement

Sharing the Float

Sharing the float provision

- ❑ As **previously discussed**, the current view held by courts and boards is that "**the project owns the float.**"
- ❑ Consistent with this view, **most time impact analysis provisions** provide that extensions of time will be **granted only** to the extent the time adjustments to the activity or activities affected by a change or delay **exceeds the total float available** at the time the change is issued or the delay occurs.

An example of such a provision is as follows:

Sharing the float provision

It is specifically pointed out that the use of available float time in the CPM schedule may be used by the Owner as defined by the Engineer, as well as by the Contractor. Float time is defined as the amount of time between the early start date, and the late start date, or the early finish date and the late finish date, of any of the activities in the schedule.

The Owner controls and owns the float time in the CPM network and, therefore, without obligation to extend either the overall completion date or any intermediate completion dates set out in the CPM network, the Owner may initiate changes to the contract work that absorb float time only. Owner-initiated changes that affect the critical path on the CPM network shall be the sole grounds for extending said completion dates. Contractor-initiated changes that encroach on the float time identified in the CPM network may be accomplished with the Owner's concurrence. Such changes, however, shall give way to Owner-initiated changes competing for the same float.

Sharing the float provision

- ☐ To the extent you are **considering entering into a contract** that includes a float provision **similar to that above**,
you may **wish to attempt to**
 - 1. negotiate** the provision out of the contract and
 - 2. replace** it with an appropriate "**project owns the float**" provision.
- ☐ If you are **working on a project** that includes **such a float provision**,
you may **already have experienced** the problems that such a provision can present.

TIA Requirement

Concurrent Delay

Concurrent delay provision

- ❑ The **current view held by courts and boards** is that a **contractor is entitled** to an extension of the contract time in situations where a **concurrent delay occurs**.
- ❑ This notwithstanding, **some owners** include provisions in their contracts which provide that
to the **extent a contractor incurs** a critical delay in the work
that runs **concurrent with an owner-caused critical delay** in the work,
the contractor will **not be entitled to an extension** of the
contract time.

An example of such a provision is as follows:

Concurrent delay provision

No time extension will be allowed if other activities under the contractor's control caused an earlier or concurrent critical delay. No event or circumstance shall be the basis of a time extension or defense to assessment of delay damages suffered by owner (including liquidated damages for loss of use) to the extent contractor's own prior, concurrent or subsequent actions or inactions would have delayed Substantial Completion of the Project even if such event or circumstance had not existed.

10. Concurrent delay – effect on entitlement to EOT

True concurrent delay is the occurrence of two or more delay events at the same time, one an Employer Risk Event, the other a Contractor Risk Event, and the effects of which are felt at the same time. For concurrent delay to exist, each of the Employer Risk Event and the Contractor Risk Event must be an effective cause of Delay to Completion (i.e. the delays must both affect the critical path). Where Contractor Delay to Completion occurs or has an effect concurrently with Employer Delay to Completion, the Contractor's concurrent delay should not reduce any EOT due.

Concurrent delay provision

☐ **To the extent** that you are **considering entering** into a contract that includes a provision similar to the above,

you may wish to negotiate the provision out of the contract.

☐ If you are

1. **already working** on a project that includes such a provision, or
2. involved in a **litigation** involving a contract that includes such a provision,

you may already have **experienced the problems** and

legal challenges a provision of this type can present.

Definition of TIAs

Prospective TIAs

❑ A **prospective** time impact analysis is

a "forward looking," time estimating procedure that utilizes

1. Critical Path Method (CPM) networking **techniques** in conjunction with
2. an analysis of the **facts** related

to a change or delay in the work, to

illustrate and forecast ("estimate" or "predict") the changes' or delays'
effect

on the **projected**

critical path to project completion and the **contract time**
as a result of

1. the change or
2. anticipated delay.

Retrospective TIAs

❑ A **retrospective** time impact analysis is

a real-time, after-the-fact schedule impact analysis procedure that utilizes

1. Critical Path Method (CPM) networking **techniques**, in conjunction with
2. an analysis of the **as-built facts**

related to a change or delay in the work,

to determine the **actual number of days** of impact to the

as-built critical path associated with

the change or delay, taking into account

the changes' or delays' time relationship to

1. past and
2. any other current delays.



US Department of veteran's affairs

“CPM Time Analysis on Contract Changes: The affect that changes or delays have on a CPM schedule is determined by a comparison of the schedules before and after the delaying activities are incorporated into the CPM Network.”

Preparation of TIAs

Prospective TIAs

- ❑ When **changes** are issued or **delays** are anticipated to occur, the **contractor** should prepare a prospective time impact analysis in order to
 1. document the facts and circumstances related to
 - i. the change or
 - ii. anticipated delay, and
 2. evaluate the anticipated effect of the change or delay on the projected critical path and the contract time.

- ❑ A **step-by-step procedure** relative to the preparation of a prospective time impact analysis should include the following **key considerations**:

Prospective TIAs

1. **Establish** the point in time (the date) on which
 - i. change directive (oral or written) was requested or
 - ii. delay initiated.

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Prospective TIAs

2. Utilize the project schedule in effect as of the time

the change was directed (**adjusted** as may be necessary and appropriate) or
the delay initiated

as the "baseline" schedule in

evaluating the effect the change or anticipated delay

may have on the **projected critical path** and the **contract time**.

Confirm that the **schedule** selected is

1. a current,
2. mutually agreed-to schedule

that has been statused and updated to include

1. progress achieved,
2. delays experienced, and
3. all time extensions granted as of the data date of the schedule.

Prospective TIAs

3. Status and update the schedule as of the date of

- ❖ issuance of the change or
- ❖ initiation of the delay.

Identify

1. the **projected critical path** to project completion and
2. **float** remaining along
3. the **various activity paths** in the schedule.

Prospective TIAs

4. **Prepare** a fragnet that graphically depicts the **complete sequence** of events related to

1. the issuance and performance of the **changed work** or
2. occurrence of the **anticipated delay**.

❑ **Identify** all activities and aspects of

- ❖ performance related to the changed work,
- ❖ commencing with the date of initiation of the change,
- ❖ running through the sequence of activities necessary to coordinate the performance of the changed work with subcontractors and vendors affected by the change, and
- ❖ all activities necessary to prepare for and perform the work associated with the change.
 - ✓ For delays, identify all activities and aspects of **performance** which may be affected by the **anticipated delay**.

Prospective TIAs

5. **Incorporate** the **fragnet** into the schedule, relating it to the **base contract activities** affected by the change or anticipated delay.
- ❑ In this regard, it may be necessary to **further refine** the activities in the schedule **in order to logically tie** the changed work activities or delay to the **appropriate base contract work activities**.
- ❖ **Changes** to other activities not directly affected by the changed or delayed work may also be **required**.
- ❑ Care should be taken to establish **realistic relationships** between
1. the changed work or anticipated delay and
 2. the base contract activities affected by the change or anticipated delay.

Prospective TIAs

6. Upon **incorporating** the fragnet into the schedule, "**run**" the schedule.

❑ This schedule becomes the "**impacted schedule**."

1. **Determine** the extent to which

- i. the **critical path** and/or
- ii. the projected project **completion date**

in the **impacted schedule** have been affected and

2. **evaluate** float consumption on **non-critical paths**.

❑ **Compare**

1. the **projected project completion** date in the impacted schedule to
2. the **projected project completion** date in the schedule prior to inclusion of the fragnet.

Prospective TIAs

7. **Determine** the extent to which any **further adjustments** need to be made to the impacted schedule in order to **reflect the effect** of
- the changed work or
- anticipated delay
- on the "**unchanged**" portion of the contract work.

- ❑ To the extent **additional adjustments** are required, the **adjustments** should be **made** and the **rationale** and **justification** for the adjustments carefully and completely documented.
- ❖ Thereafter, the **schedule** should be run again and the **results** re-evaluated.

Prospective TIAs

8. **Determine** the extent to which the **projected critical path** may have been **further impacted**

as a result of the **effect** of the changed work or anticipated delay

on the **unchanged portion** of the work,

float may have been further consumed, and/or

any **contract milestone(s)** or the **projected project completion date**

may have been further impacted.

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Prospective TIAs

9. **Recognize** that if a **contract milestone** date and/or the **projected project completion date** have been shifted in time,
you (the contractor) may be **entitled to an extension of time**.

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Prospective TIAs

10. Review relevant **contract references** and **requirements**, including plans and specifications, sketches, vendor data, regulatory requirements, daily field reports, etc., and

calculate the **duration** of excusable, compensable, and excusable, non-compensable delay and related time extension to **which you (the contractor)** are entitled.

Thereafter, **prepare** a change order request for submission to the owner.

The **time extension portion** of your request should include a **narrative** that

1. describes and illustrates the overall schedule analysis and
2. sets forth your position with respect to the **duration of the time extension** requested and the **basis** upon which it should be granted (i.e. compensable, non-compensable, or some combination of the two).

The request should be submitted to the owner.

Prospective TIAs

11. Thereafter, **negotiations** with the owner should **commence**.

□ Upon

1. the **conclusion of negotiations** and
2. assuming the parties are able to **reach agreement** with respect to the time extension requested,
 - i. the **change order** should be **bilaterally executed** and
 - ii. the **owner** should **incorporate the fragnet** that was **agreed-to between** the parties and
 - iii. the **time extension** related thereto into the project schedule in effect at the **time the change** was issued or the anticipated delay initiated.

Retrospective TIAs

□ When

- (i) an **owner directs** the performance of **changed work** in **advance of determining** the **time impact** associated with performing the **changed work**;
- (ii) the **parties fail** to **reach agreement** with respect to a prospective time impact analysis previously submitted, and the **owner** has **directed performance** of the changed work in any event; or
- (iii) a **delay has occurred**,
the actual number of days of impact to the as-built critical path associated with the change or **delay can only be determined** by performing a retrospective time impact analysis.

A step-by-step procedure relative to the preparation of a retrospective time impact analysis should include the following key considerations:



Retrospective TIAs

1. **Establish** the point in time (the date) on which
 - i. the change (oral or written) was requested or
 - ii. the delay initiated.

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Retrospective TIAs

2. **Establish** the **point in time** at which

1. the **performance** of the work related to the change was **completed**, or
2. the **delay concluded** such that follow-on work could **commence**.

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Retrospective TIAs

3. **Utilize** the **project schedule** in effect at the time the change was issued or the delay initiated (**adjusted** as may be appropriate and necessary),

as the "**baseline**" **schedule against** which the performance of the changed or delayed work will be evaluated.

- ❖ Confirm that the schedule selected is a current, mutually agreed-to schedule that has been **properly statused** and **updated to accurately** reflect progress achieved, delays experienced, and all time extensions granted as of the data date of the schedule.

Retrospective TIAs

4. Status and update the schedule as of

1. the **date of issuance** of the change or

2. **initiation** of the delay.

- ❖ Identify the projected critical path to completion and float remaining along the various activity paths in the schedule.

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Retrospective TIAs

5. **Determine** the **status** of the work (i.e., the number of days the project was ahead of or behind schedule) as of **both** the "initiation" and "completion" dates of the **changed work or delay**, and
- calculate** the overall **delay in the work** that **occurred during the period** ("**window**") of time between
1. the initiation date of the changed work or delay in **question**, and
 2. the point in time the changed work was completed, or the delay concluded.

Retrospective TIAs

6. Develop an **as-built schedule** of performance that **spans the period of time** during which the changed work was performed, or the delay occurred.

❑ The **as-built schedule** should be prepared utilizing

1. activity actual start and actual finish dates included in the project schedule(s) related to the **period of time in question**, in conjunction with
2. **as-built schedule** activity information obtained from the **contractor's daily construction reports** and **other available sources**.

❑ This schedule should **graphically** depict the sequence and manner (logic and durations) in which the work was **actually performed** during the **subject period of time**.

Retrospective TIAs

7. **Prepare** a **fragnet** that **graphically depicts** the sequence and manner in which the changed work was **performed**, or the delay **occurred**, and **incorporate** the fragnet into the as-built schedule **in order to determine** **how** the changed work or delay affected the **base contract activities** in the **as-built schedule**.
- ☐ In the **alternative**, a detailed narrative with supporting documentation should be prepared that **establishes** the relationship between
1. the **performance** of the changed work, or **occurrence** of the delay in question, and
 2. the **base contract activities** in the as-built schedule.

Retrospective TIAs

8. Identify the **as-built critical path** to completion through the period of time in question and

determine the **duration of time** (if any) during which the performance of the changed or delayed work (**Reference Step 7 above**) was on the **as-built critical path**.

In this regard, it is important to **determine whether** any **other** excusable, compensable, or inexcusable delay, has **overtaken the delay** in question on the as-built critical path.

It is also important to **determine whether** there is any concurrent delay which may impact upon **compensability**.

Retrospective TIAs

9. Upon completion of Steps 1-8,

if the **period of time** under analysis **spans various activities** of work and delays that may have been caused by different parties,

the **period of time** should be **broken down** into **various sub-periods**, or "**windows**" of time.

❖ Thereafter,

1. a **detailed analysis** of each of the delays occurring in **each of the windows** of time should be performed and
2. the **responsibility** for same **apportioned** between the parties.

❑ In this regard, the **analysis should commence** at the beginning of the **first window** of time and be carried forward **chronologically**,

evaluating progress **achieved** and delays **incurred** in the **first window** of time.

Retrospective TIAs

9. Once this analysis is performed and any "loss" or "gain" occurring in the **first window** of time is **determined**, the **analysis** should be carried forward and the **next sequential window** analyzed.
- ❑ **Ultimately**, the analysis should be carried forward **through the final "window"** of time in the **overall period** of time being evaluated.
- ❖ The objective of this analysis is to **chronologically** and **cumulatively** **quantify** the delay in the work by assessing the "**losses**" and "**gains**" in performance on the **as-built critical path** over time.

Retrospective TIAs

10. Review relevant contract references and requirements, including

plans and specifications, sketches, vendor data, regulatory requirements, daily field reports, etc., and calculate the duration of excusable, compensable, and excusable, non-compensable delay and related time ex-tension to which you (the contractor) are entitled.

❖ Thereafter, **prepare a change order request** for submission to the owner.

❑ The **time extension portion** of your request should include a narrative that

1. describes and illustrates the overall schedule analysis and

2. sets forth

❖ your position with respect to the duration of the time extension requested and

❖ the basis upon which it should be granted (i.e. compensable, non-compensable, or some combination of the two).

The request should be submitted to the owner.

Retrospective TIAs

11. Thereafter, **negotiations** with the owner should **commence**.

❑ Upon the **conclusion of negotiations** and

assuming the parties are able to **reach agreement** with respect to the time extension requested,

the **change order** should be **bilaterally executed** and the owner should **incorporate the fragnet**

that was **agreed-to** between the parties and

the time extension related thereto into the project schedule in effect at the time the **changed work** was completed or the **delay** concluded.

Review of the MBTA Delay Provisions Clauses

MBTA “Claim for Delay or Suspension of Work” Clause

☐ Subcontractor Delay

6.7 CLAIM FOR DELAY OR SUSPENSION OF WORK

- A.** The Contractor shall have no claim for damages of any kind due to any delay in commencement of the Work or any delay or suspension of any portion thereof, except as hereinafter provided.
1. Attention is directed to Section 39.0 of Chapter 30 which requires that every contract subject to the provisions of Section 39M of Chapter 30 contain the following provisions a. and b. in their entirety and, in the event a suspension, delay, interruption, or failure to act by the Authority increases the cost of performance to any subcontractor, that subcontractor shall have the same rights against the Contractor for payment for an increase in the cost of his performance as provisions a. and b. give the Contractor against the Authority, but nothing in provisions a. and b. shall in any way change, modify, or alter any other rights which the Contractor or the subcontractor may have against each other.

☐ Subcontractors also have “pass-through” legal rights

MBTA “Claim for Delay or Suspension of Work” Clause

☐ Project Award Delay

6.8 DETERMINATION AND EXTENSION OF CONTRACT TIME FOR COMPLETION

- A. The Contractor shall complete, entirely, and in an acceptable manner, the Work required under the Contract within the time stated in the Bid Form, except that the Contract time for completion shall be adjusted as follows:
1. If the Contract is not awarded as contemplated by Section 00100 of the Contract Specifications, then the number of days allowed for the completion of the Work will be computed from the date of receipt of the Contract by the Contractor or the date on which the Contractor was ordered to commence work whichever is later. For the purpose of this paragraph, the Contractor will be presumed to have received the Contract on the day following the mailing of the executed Contract to the Contractor by the Authority. If the Contract specifies a specific calendar date for completion and the Contract is not awarded as contemplated by Section 00100, of the Contract Specifications then the Contractor will be entitled to an extension of time equivalent to the number of days elapsed from 60 days (45 days if Federal funds are involved) after the opening of bids up to and including the day of receipt of the executed Contract by the Contractor or the date on which the Contractor was ordered to commence Work whichever is later.

MBTA TIA Clause

☐ Requirement for Time Impact Analysis for Delay

1.8 PROGRESS SCHEDULE

A. PROGRESS SCHEDULE SUBMITTAL

8. When change orders or delays are experienced by the Contractor and the Contractor requests an Extension of Time, the Contractor shall submit to the Authority a written Time Impact Analysis illustrating the influence of each change or delay on the current Completion Milestones. Each Time Impact Analysis shall include a 'fragnet' demonstrating how the Contractor proposes to incorporate the change order or delay into the next Progress Schedule Update. A fragnet is defined as a sequence of new activities and/or activity revisions that are proposed to be added to the existing schedule to demonstrate the influence of delay and the method for incorporating delays and impacts into the schedule as they are encountered. This fragnet shall be presented with resource and cost loading as well.

S32CN01
2011

Construction Schedule
01321-13

MBTA TIA Clause

☐ Absorbed Delays – Forensic Analysis

B. DELAY PROVISIONS

- b. The extension of Contract Time shall be considered only if the Contractor demonstrates via the timely submittal of a detailed schedule analysis by using the contemporaneous window Analysis methodology or other similar methodology acceptable to the Authority. The analysis shall include: a) a detailed narrative which clearly describes the events causing the delay and the resulting impacts to the project schedule; b) documentation substantiating and supporting the delay; c) detailed CPM schedules (both electronic and hard copies) clearly delineating the delay; d) a matrix showing delays caused by any third party and any force majeure delays; e) any additional information reasonably requested by the Authority, in order to enable the Authority to perform a timely and informed analysis of the request for extension of Contract Time.

S32CN01
2011

Construction Schedule
01321-13

MBTA TIA Clause

☐ Absorbed Delays – Forensic Analysis

B. DELAY PROVISIONS

b. The extension of Contract Time shall be considered only if the Contractor demonstrates via the timely submittal of a detailed schedule analysis by using the contemporaneous window analysis methodology or other similar

b. The extension of Contract Time shall be considered only if the Contractor demonstrates via the timely submittal of a detailed schedule analysis by using the contemporaneous window analysis methodology or other similar

S32CN01
2011

Construction Schedule
01321-13

Post-Construction TIA

Introduction

- ❑ **Retrospective Time Impact Analysis** procedures can be employed in post-construction disputes resolution in a manner **consistent** with that utilized **during construction**.
- ❑ In this regard, as an **initial matter** it is necessary to **identify** the various schedules produced during the course of the work that can be utilized as "**baseline schedules**" for purposes of performing an **after-the-fact delay analysis**.

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Introduction

- ❑ To the **extent the owner did not approve** the contractor's as-planned schedule, a **review** of the contract scheduling requirements, correspondence between the parties, the various schedules submitted to the owner during the course of performance of the work, etc., will need to be **undertaken in order to establish** a reasonable as-planned schedule for use as a "baseline" in performing your delay analysis.
- ❖ Thereafter, in terms of carrying the analysis forward, either the reasonable as-planned schedule or a schedule update (**adjusted as may be appropriate and necessary**) should serve as the **baseline for purposes** of evaluating delays in subsequent windows of time.

Introduction

- ❑ If, during the performance of the work, the **project schedule was not updated timely** with progress achieved, delays experienced, and the time extensions due a contractor, the **updates may not be suitable for purposes** of retrospective analysis.
- ❑ **Courts and boards** are **fully aware** that to the extent an owner denies a contractor the **ability to "look forward"** and plan its work so as to **achieve a properly projected contract completion date**, the project schedule so produced will be **distorted and unreliable** as a basis for determining time extensions.
- ❑ In the **landmark. decision, Fortec Constructors v. United States**, the Board recognized that the control of a project along with the **ability to accurately evaluate** time extensions is **lost if the parties do not properly update** the schedule to reflect delays and time extensions due a contractor.

Introduction

- ❑ Likewise in Continental Consolidated Corp., the Army Corps of Engineers Board of Contracts Appeals noted that to the extent a CPM schedule is to be used to evaluate requests for time extensions it must **reflect actual project conditions**.
- ❑ In this regard, the Board noted, in pertinent part:

It is essential that any changes in the work and time extensions due to the contractor be incorporated into the progress analysis *concurrently* with the performance of the changes or immediately after the delay and thus integrated into the periodic computer runs to reflect the effect on the critical path. Otherwise, the critical path chart produced by the computer will not reflect the current status of the work performed or the actual progress being attained.

Introduction

- While there have been **numerous cases** that have discussed the utilization of **retrospective time impact analysis** principles,
this course has **selected two cases** for discussion that are illustrative of the principles discussed herein.

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Case Review No. 1

Case Review No. 1

- ❑ In the first case, the **Board** was presented with an **appeal by the general contractor** on a federal detention center construction project that included **numerous and complex issues of delay**.
- ❑ The project had **become so delayed** that the owner, the Federal Bureau of Prisons, had **terminated** the **contractor for default**.
- ❑ **Both parties** presented CPM-based arguments which were supported by the testimony of **scheduling experts**.
- ❑ The **scheduling experts** relied upon different CPM methodologies and reached diametrically opposite conclusions.

Case Review No. 1

- ☐ The **contract** required the **general contractor to employ CPM analysis** in planning, scheduling, and **reporting the progress** of the work to the owner.
- ☐ The **contract also provided** that,
in the event of changes, delays or contractor requests for additional time,
the **contractor was to submit** a CPM fragmet as part of a time impact
analysis showing **how the schedule was affected**.

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Case Review No. 1

- ☐ The **project experienced many difficulties** which, the parties agreed, caused substantial delays.
- ☐ The **contractor submitted a proposed revised schedule** (apparently at the owner's request)
but, because of **alleged deficiencies** in the schedule, it was **not accepted** by the **owner**.
- ☐ The **contractor proceeded** to use the revised schedule to carry out the work
but the **owner used the earlier schedule** to track the progress of the work.

Case Review No. 1

- ☐ The **parties** were also at **disagreement** with respect to the **time impact analyses** submitted by the contractor for **various changes** and **delays** that had occurred.
- ☐ The **contractor failed** to submit the contractually provided for fragnets with its **time impact analyses**,
thus those analyses were **rejected by the owner**.
- ☐ The **contractor's position** at trial was that, due to the **number of delays**, it was **impossible** to provide **fragnets** with the **time impact analyses**.
- ☐ In any event, the **parties had no agreement** as to the effect upon the **schedule** of the various changes and delays.

Case Review No. 1

- ❑ With the lack of an agreed-upon schedule, and the lack of any agreement as to **time impact analyses**,
the **delay issues** were **contested at trial** by the **parties' respective scheduling experts**, each of whom performed a schedule delay analysis.
- ❑ The **methodology employed** by the **contractor's consultant** in performing its analysis involved a **review** of the job on a **daily basis** using as-built performance information to determine when activities of **work started and stopped**.
- ❑ In this regard, the **consultant reconstructed** the project from its inception in February 1992 until termination in October 1993.

Case Review No. 1

- ❑ After determining the **as-built critical path** of the project,
the **consultant** compared the contractor's actual performance with how the job
was **originally planned**,
to determine whether the **problems during construction impacted** the
completion date.
- ❑ When it was determined that there was a delay,
the **length of the delay** was determined by looking at an **activity on the as-
built critical path** and
comparing the dates on which the activity was actually performed to the
dates the activity was planned to start and finish.

Case Review No. 1

- ☐ The **government** also retained a **consultant** to perform a delay analysis.
- ☐ The **government's consultant** employed a "**contemporaneous time frame analysis**" to analyze the delay in the work.

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Case Review No. 1

- ☐ **Under this method** the delay was evaluated using the **information available** at the time of the delaying event, and
the **delay** in any **given month** was evaluated based on that month's updated CPM schedule.
- ☐ The analysis was based on **looking back in a window**,
which was defined by **two successive schedule updates**, and
then looking at the **critical path** and **who caused any delays**.

Case Review No. 1

- ❑ In performing its analysis the **consultant** divided the work into seventeen windows and

evaluated the **critical path** at the **beginning and end of each window**,

determining whether there was any delay, including weather delay, during
the **period of the window** being reviewed.
- ❑ **Each window compared** the completion date of two successive schedule updates and
assessed responsibility for the delay identified from **one update to the next**.
- ❑ The **critical path used** to perform this analysis was that **shown on the contractor's**
schedule updates.
- ❑ In this regard, the **consultant also determined** whether the contractor or the
government was responsible for the delays.

Case Review No. 1

- ☐ On cross examination the **government's consultant admitted** that the logic that had been utilized in performing his analysis was **not reflective of the manner** in which the work was **actually performed**.
- ☐ In addition the **consultant admitted** that, **while the contractor had changed the logic** in its December 21, 1992 schedule, he did **not use this changed logic** because it had been rejected by the Government.
- ☐ The **consultant further admitted** that if this logic was faulty or changed, the **critical path** would be **different than** in his analysis.
- ☐ The **contractor's consultant testified** that the government's consultant had derived the **incorrect critical path** as a result of using the **outdated logic**.

Case Review No. 1

- ☐ The **Board ultimately** concluded that the **testimony** of the contractor's expert was **more persuasive** because it was based upon "**actual events**" and because the **testimony of the owner's expert** was **not** based upon "the actual logic of the job."

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Case Review No. 1

- ☐ The **Board found** the **contractor's consultant's analysis** that looked at the actual events to plot the critical path to be **more reliable** than that of the **government** who had relied on the **contractor's schedule updates**, which had **not been changed** to reflect the actual logic on the job.

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Case Review No. 1

- ❑ This decision is **instructive** because it highlights the need to base a **retrospective** schedule delay analysis on **as-built events** as they actually occurred during the **course of performance** of the work on a project.
- ❑ In addition, this case **highlights** the need to establish the **as-built critical path** to completion.
- ❑ Moreover, this **decision makes clear** that in terms of performing a chronological and cumulative "**windows-type**" analysis,
the analyst **must evaluate** critical delay in the work within a given window of time **against the as-built critical path** to completion.

Failure to do so will result in rejection of the analysis.

Case Review No. 2

Case Review No. 2

- ❑ In the second case," the **General Services Board of Contract Appeals** recognized the performance of a **retrospective time impact analysis** as **appropriate**.
- ❑ This case involved the **termination for default** of a contractor on a project for the construction of an annex to the existing **Trenton Federal Courthouse in Trenton, New Jersey**.
- ❑ A **schedule analysis** was undertaken by the **contractor's expert** and **presented** at the hearing in this matter to assist in **allocating responsibility** for the various delays associated with the project.

Case Review No. 2

- ☐ The contract called for the **development by the contractor** of a CPM network plan **demonstrating complete fulfillment** of all contract requirements.
- ☐ The schedule was to be **updated regularly** and **used** in planning, performing, reporting, and coordinating the work.
- ☐ **Adjustment** to the scheduled times for completion of the work **were to be made only** in accordance with the CPM clause in the contract.
- ☐ Specifically, **each request** for a time extension based on claims, delays, or changed work was to be **accompanied by a time impact analysis** based upon the **date or dates** when changes were issued or delays began.

In this regard, the contract specifically required:

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1. The **Time Impact Analysis** shall be based upon the **date or dates** when the change or changes were issued, or the date or dates when alleged delay or delays began, the **status of the Construction Project** at that time and shall include event time **computations for all affected activities**.

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2. If the **Contracting Officer** finds that

after a review of the Time Impact Analysis that the **Contractor is entitled** to any extension of time for completing any of the **milestone times for completion**,

the **time adjustments** will be **approved** by the contracting officer,

whether or not the time for completion of the **overall project is extended thereby**, and

the **contractor will then be directed** to revise the Project Schedule accordingly.

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3. If the **contractor does not**

- ❖ **submit** a Time Impact Analysis for a change or alleged delay, or
- ❖ provide such **additional supporting information** as the **Contracting Officer may require** within the specified period of time, or within such additional time as may be **allowed** by the Contracting Officer [sic]

The **Contracting Officer will determine** the time impact, if any, of the change, alleged delay.

- ❑ If **this results** in the determination that **no adjustments** should be made, the **Contracting Officer will issue** said determination and Time Impact Analysis to the Contractor at the time of **directing such adjustment** of the time for completion.

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- ❑ The **methodology utilized by the contractor's consultant** to perform its schedule analysis, (an approach deemed by the consultant to be consistent with the Time Impact Analysis requirements in the contract specification), was a "marches through the project" approach that measured where the project stood during certain milestones.
- ❑ The **milestones** included completion of caissons, completion of critical concrete work, completion of structural steel, and various milestones applicable to installation of exterior skin.
- ❑ The **analysis undertook** to determine where the project stood both prior to and after an alleged delay or change, and to measure the **effect on the projected project completion date**.
- ❑ The method of analysis utilized was an **adaptation of the schedule specification** in the contract, which, in the **consultant's opinion**, was **not intended** for use in the **situation that occurred on the project**, i.e. where **many overlapping events affected** contract completion, in contrast to the more typical project experience of several stand alone delays.

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- ☐ The **analysis prepared** by the **contractor's consultant** included **graphics depicting** the overall project's critical path **before and after each critical event**.
- ☐ The **analysis identified** the project schedule as it stood **prior to the impact** of a delaying event and **detailed how the impact** affected the project schedule.
- ☐ This analysis, which the **board referred** to as a time impact analysis, was then **carried forward to become the schedule baseline** of the following chart, which showed the **cumulative effect** of the various impacts.

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- ☐ Of note, is the fact that in performing the subject analysis the **consultant prepared an as-built record** of performance by **determining all construction activities** performed each day on the project.
- ☐ In addition, because the **project never had an approved CPM schedule**, the **consultant revised** the version of the contractor's schedule that had been **submitted to the owner** during the course of construction, including **various comments the owner's consultant** had forwarded to the contractor in **response to the schedule submission**.

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- ☐ The Board considered the **as-planned ("baseline") schedule** established by the **contractor's consultant** to be **reasonable**.
- ☐ Thus, this schedule was used as the **baseline against** which **progress achieved** and delays experienced throughout the **course of performance** of the work were evaluated.

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- ☐ Of significance with respect to this case, is that during the course of performance of the work the **owner never approved** the contractor's as-planned schedule.
- ☐ As a **result**, it was **necessary for the consultant** to make adjustments to the contractor's baseline schedule for purposes of **utilizing the schedule** as the baseline against **which progress achieved** and **delays incurred** in the work were evaluated.

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- ❑ In addition, it is of import to note that given the **overlapping delays** that occurred during the **course of the performance of the work**, the utilization of the **prospective Time Impact Analysis provision** in the contract, which was geared towards performing "**forward-looking,**" "**single event analysis,**" was **not utilized** for purposes of performing the "**after-the-fact,**" retrospective evaluation of the multiple, concurrent changes and delays that had occurred in the work.

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- ☐ The retrospective time impact analysis performed in this case is **consistent** with a line of cases in which **courts and boards** have recognized the **propriety of utilizing** retrospective schedule analyses that **evaluate delays** against the **as-built critical** path in order to **apportion responsibility** for delays in the work on a project."

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Guideline

- ☐ These Guidelines are **intended to assist** you in preparing for the challenges associated with implementing time impact analysis procedures.
- ☐ They are **not, however, a substitute for professional representation** in any specific instance.

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1. Owners:

- ❑ **Include both** prospective and retrospective time impact analysis provisions in your **contract scheduling specifications.**

These provisions **should detail**

1. the timing of submission,
2. form, and
3. content of the TIAs

to be **submitted by a contractor** in support of a request for an **extension of the contract time.**

2. Owners:

- ☐ **Ensure** that the time impact analysis **provisions** in your contracts contain a "**project owns the float clause.**"

Likewise, **ensure that your contracts do not include provisions** that preclude the granting of a **time extension** in the **event of concurrent delay** in the work.

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Guidelines

3. Owners and Contractors:

- ❑ **Train** your project management and scheduling personnel in the **preparation** of prospective and retrospective time impact analyses.
 - ❖ **Develop project procedures** that **detail the steps** to be undertaken in preparing prospective and retrospective TIAs.
 - ❖ Also, ensure that **your project personnel understand** how float and concurrent delay factor into the preparation and negotiation of time extension requests.

4. Contractors:

- ❑ **Strive to obtain the owner's approval** of your as-planned ("baseline") schedule.
- ❑ The **absence of an approved baseline schedule** often results in the failure of effective management on a project and typically **leads to disagreements and disputes** between owners and contractors as to
 1. the status of completion of the work,
 2. the determination of criticality of work activities, and
 3. when the work on a project will be completed.
- ❑ It is also important to **recognize** that absent an approved baseline schedule, the **implementation of time impact analysis procedures** during construction are **significantly more challenging**.

5. Contractors:

- ❑ **Document** each change order issued and/or delay that occurs on a **chronological basis**.
 - ❑ **When preparing** schedule **fragnets** on a prospective basis, keep in mind that you **may be required** by the owner to **justify the reasonableness** of the durations in your fragnets.
 - ❖ Therefore, **maintain records** of
 1. the quantity,
 2. manpower,
 3. equipment, and
 4. production rate
- data utilized in developing fragnets.

6. Contractors:

- ❑ When **incorporating fragnets** into the schedule,
utilize **logical relationships** that accurately depict the relationship between the performance of the changed work and the activities in the baseline schedule.
- ❖ Be **prepared to discuss** these relationships, in **detail**, with the **owner** and to explain
 1. the means,
 2. methods, and
 3. sequencinginvolved in **performing** the changed work.

7. Contractors:

- ❑ It is important to **recognize that although** (with certain exceptions) the selection of the means, methods and sequences of performance are up to you, some **contracts provide that:**

"to the extent changed work can be (or could have been) performed along with the base contract work without causing necessary delay, no extension of the contract time will be granted."

- ❑ **Such provisions** can affect both your scheduling and cost of performance of changed work, and
must be **carefully considered in preparing TIAS.**

8. Owners and Contactors:

- ❑ Following the submission of a TIA, the parties should **meet as quickly as possible** to **negotiate** the contractor's request for time extension.
- ❑ Detailed minutes of each meeting should be **prepared and maintained** in the project files.
- ❑ The parties should **always attempt** to reach agreement on the amount of time impact to the schedule,
even if there is a **substantial disagreement** relative to compensation.
- ❑ Upon **reaching agreement**, the owner should incorporate the fragnet(s) and time extension agreed to between the parties into the **project schedule update(s)** in **accordance with the requirements** of the TIA provisions in the contract.

Guidelines

9. Owners and Contractors:

❑ To the **extent time extension** negotiations **break down**,

be sure to maintain detailed daily reports that chronicle the performance of the work,

on an **activity-by-activity basis**, for both the base contract and changed work.

❖ Ideally, **separate**

1. daily time sheets and

2. cost records

relative to the performance of **changed work** should be maintained.

موسسه مهندسی و مدیریت ساخت علوی پور (ACEMI)

دفتر آموزش



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