



فرآیند جامع آنالیز تاخیرات در پروژه

بخش چهارم:
مقدمه: آنالیز تاخیرات همزمان
(Concurrent Delays)

ارائه دهنده:

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What we will learn?

- ❑ Meaning of concurrent delays
 - ❖ General concepts
 - ❖ SCL Protocol
 - ✓ Meaning
 - ✓ True concurrent delay
 - ✓ More common usage
 - ❖ AACE Recommended Practices
 - ✓ AACE 10S-90
 - ✓ AACE 29R-03
 - Literal
 - Functional
 - ❖ ASCE Standard ANSI/ASCE/CI 67-17 (Schedule Delay Analysis)

What we will learn?

❑ Dealing with concurrent delays

❖ Legal implication

- ✓ U.S. law
- ✓ English law
- ✓ Scots law
- ✓ Canadian law
- ✓ Hong Kong law
- ✓ Australian law
- ✓ FIDIC
- ✓ AIA A201-2017
- ✓ Other contracts
- ✓ SCL Protocol
- ✓ AACE 29R-03
- ✓ ASCE Standard ANSI/ASCE/CI 67-17 (Schedule Delay Analysis)

What we will learn?

☐ Dealing with concurrent delays

❖ Practical implication

- ✓ General concept
- ✓ Separate critical path
- ✓ Same critical path

❖ My choice

- ✓ Contemporaneous
- ✓ Forensic

☐ Pacing delays

Meaning of Concurrent Delays

(General Concepts)



Concurrent delays – Introduction

☐ Few contract includes:

1. A **definition** of “**concurrent delay**”
2. **How** concurrent delay should be **resolved**?

☐ How concurrent delays **affect** a **contractor’s entitlement** to:

1. Time extensions
2. Additional compensation
3. Responsibility for liquidated damages



Concurrent delays – Introduction

❑ Controversial issue, why?

*There is also a **lack of understanding** in the industry concerning the concept of concurrent delay.*

1. **Meaning:** **Because** there are **different meaning** of **concurrent delay** itself
2. **Analyzing:** **Because** there are **different views** on the **correct approach** when **analyzing** entitlement to **ETO** and **compensation**

SCL Delay Protocol – CP 10: Concurrent delay – effect on EOT

(۳۰-د)

در اجرای مفاد این ماده برای تمدید مدت پیمان، تأخیرهای همزمان ناشی از عوامل مختلف درج شده در بند الف، فقط یک بار محاسبه می‌شود.

(۳۰-الف-۹)

هرگاه کارفرما نتواند تعهدات مالی خود را در مواعیدهای درج شده در اسناد و مدارک پیمان انجام دهد.

چگونه مشکل را در انواع مختلف حل خواهید نمود؟

Concurrent delays – Some of the scenarios



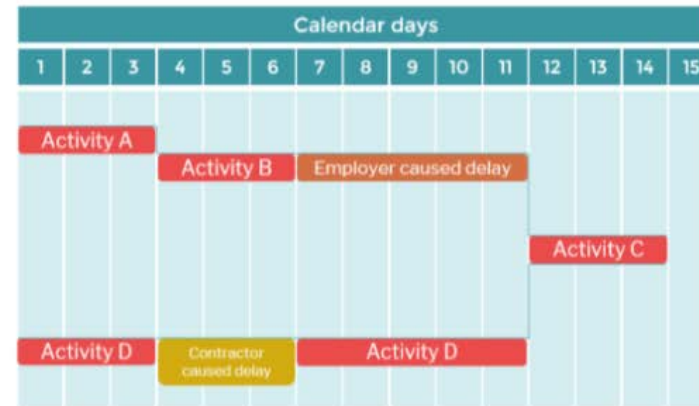
Scenario A



Scenario B



Scenario C

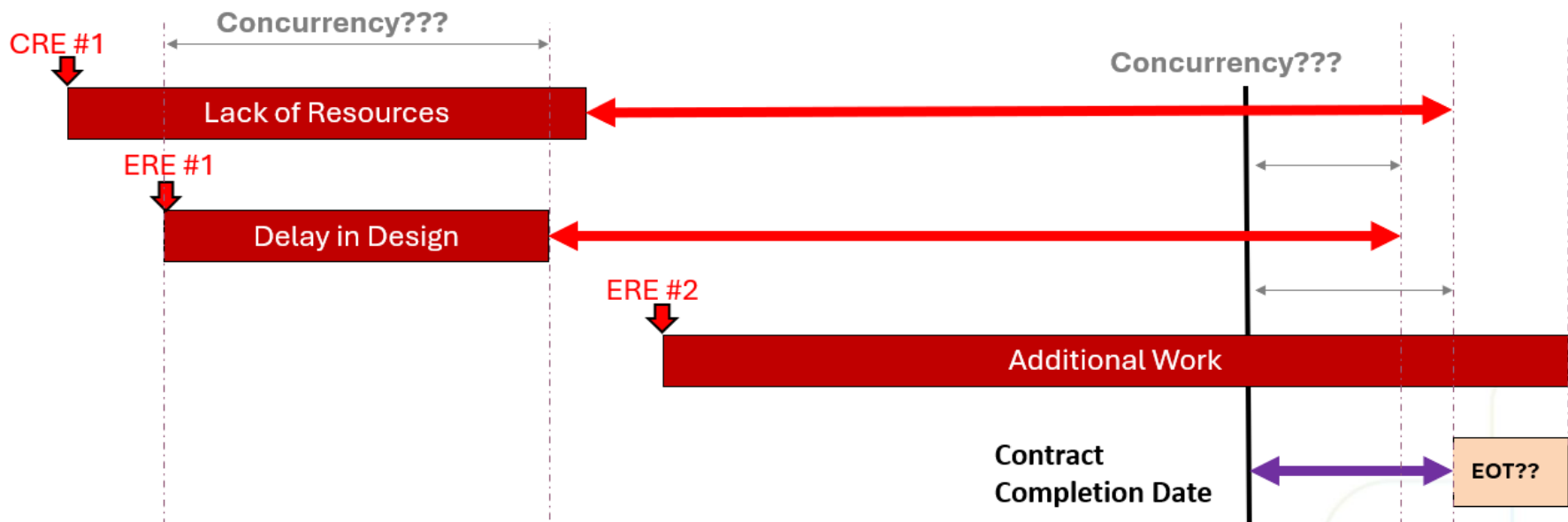


Scenario D

Concurrent delay event scenarios

Compensation? EOT? Concurrent? What would you do? Why?

Concurrent delays – Some of the scenarios



Compensation? EOT? Concurrent? What would you do? Why?

Meaning of Concurrent Delays

(SCL Protocol)

Definition

❑ **Concurrency** is very complex issue because:

1. **Meaning** of concurrent delay
2. Correct approach to **deal with** the concurrent delay

- ✓ **Protocol** provides **guidance** in order to organize and resolve concurrent delays in an agreed manner as part of the **overall delay analysis**.
- ✓ **Protocol** takes different competing arguments and represents what the **Protocol** considers to be the most appropriate solution.



Meaning of concurrent delay

□ There are **two views in SCL Protocols**

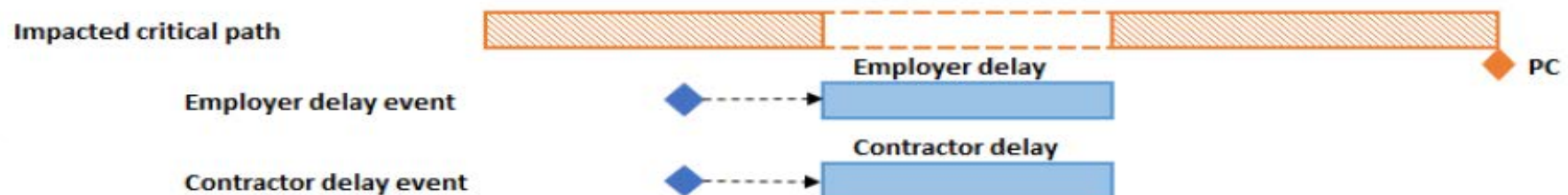
1. True concurrent delay (تأخیر همزمان حقیقی)
 - ❖ Strict approach
2. More common usage of concurrent delay (Keating's “overlapping” concurrent delay) (کاربرد رایج تر)
 - ❖ Less strict approach

Let's see the difference!

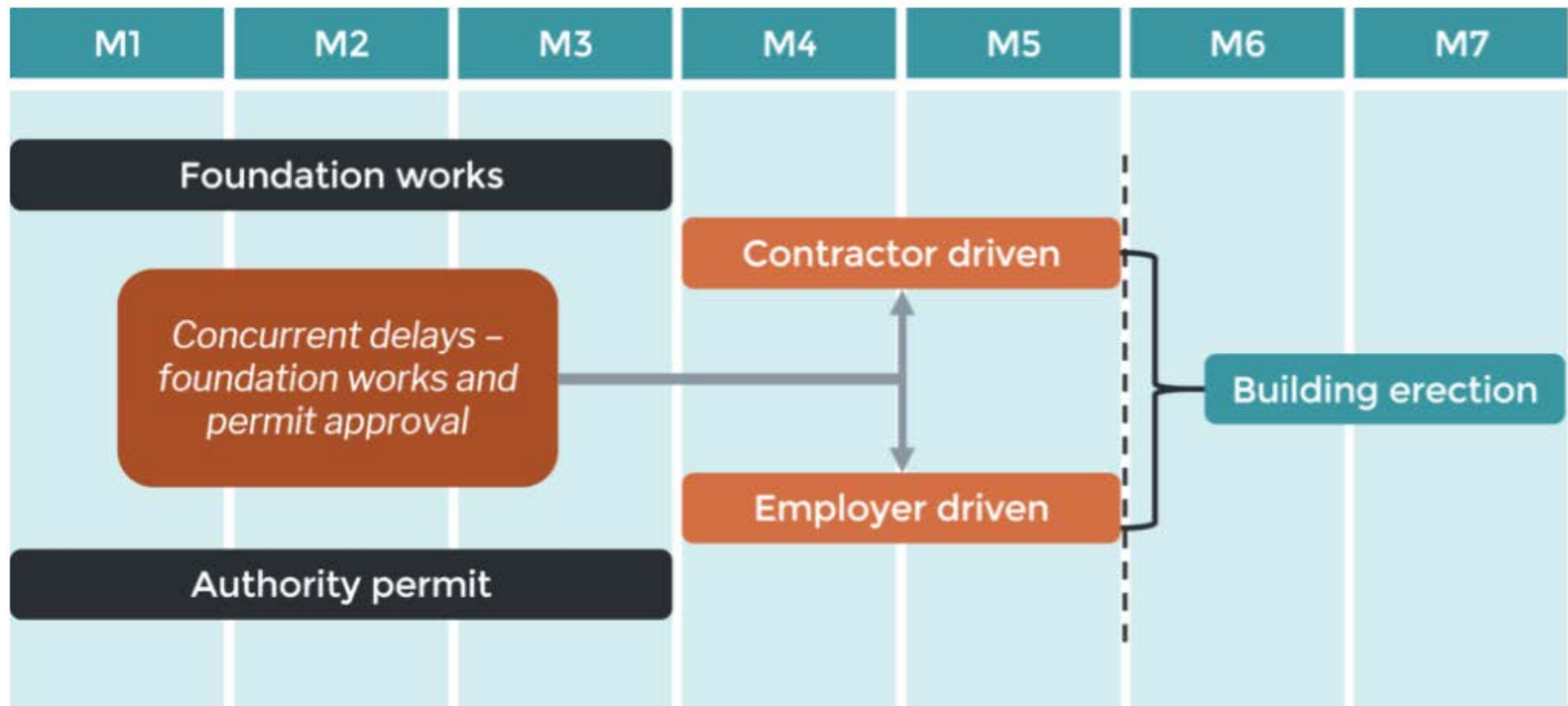


Meaning of concurrent delay – True concurrent delay

1. **Occurrence** of two or more delay events at the **same time**, one an Employer Risk Event, the other a Contractor Risk Event (**some contract uses approximately**)
 2. Sharing the **same start and finish dates**
 3. The **effects** are **felt at the same time**
 4. **Both** should lead to delay to **completion**
- ☐ It is **unlikely to occur** and **argued** by some (**Keating on construction contracts, 2016**) that this narrow definition is possibly **too limited for practical application**.



Meaning of concurrent delay – True concurrent delay

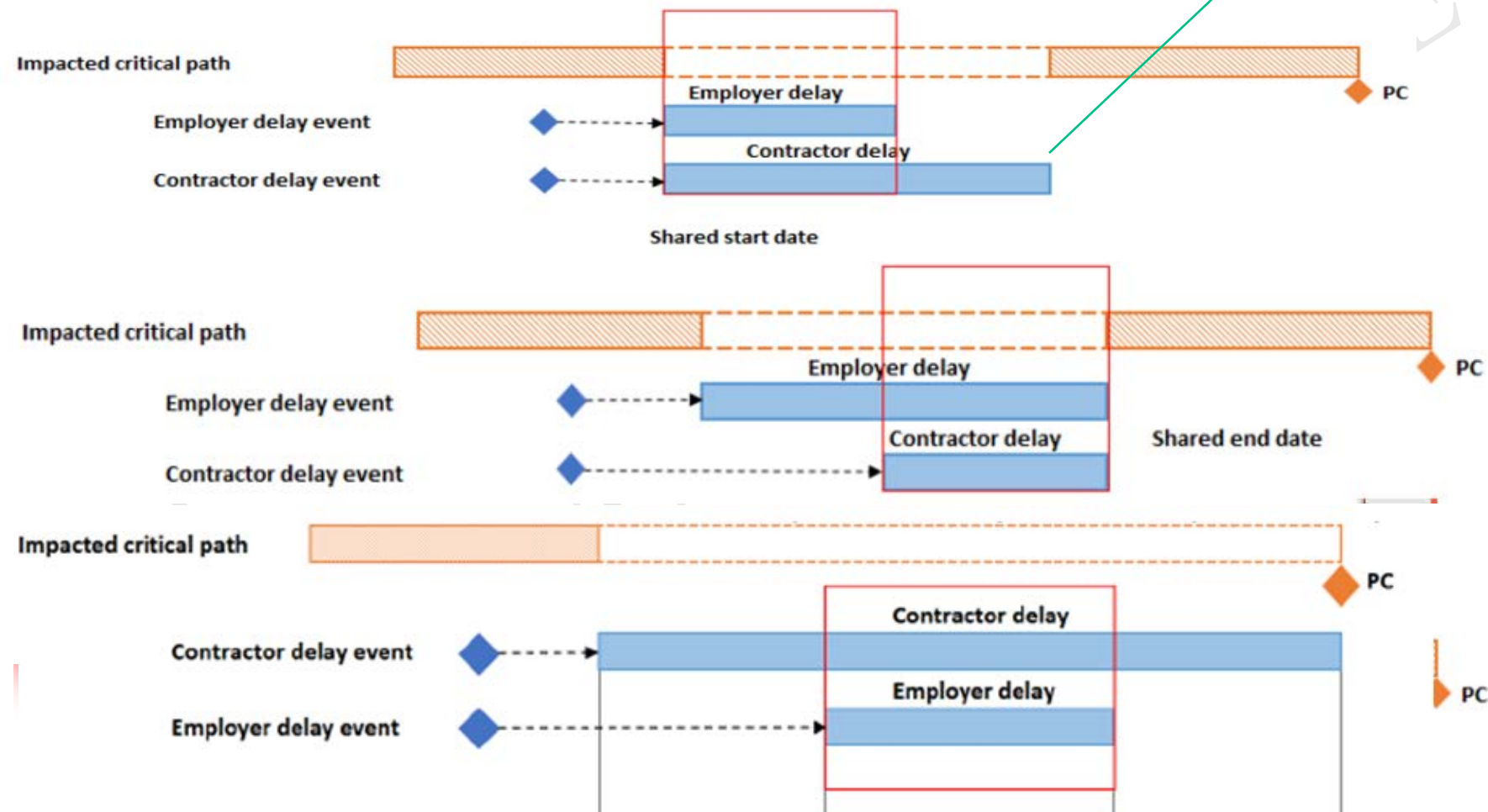


Meaning of concurrent delay – More common usage

1. Two or more delay events **arise** at **different times**, but
2. **Effects** of them are felt at the **same time**
3. **Both** should lead to delay to **completion**

Many call this “true concurrent delay”
Do you know why?

Period of overlapping delay = concurrent delay



Meaning of concurrent delay

*In both cases, concurrent delay **does not become an issue** unless each of an **employer risk event** and a **contractor risk event** lead or will lead to **delay to completion**.*



Meaning of concurrent delay

Hence, 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** (not merely **incidental** to the Delay to Completion)



Meaning of concurrent delay

- ❑ **Employer Delay** to Completion does **not exonerate the Contractor** for **all its delays** **prior** to that Employer Delay to Completion occurring.
- ❑ The **effect of the Employer Delay** should be assessed as described in **Core Principle 5** and **any EOT determined** due should simply be added to the contract completion date.

Meaning of concurrent delay

❑ In particular, the Protocol recognizes that **delay analysis is rarely precise down to the day,**

therefore the **application of common sense** requires that the **margin for inaccuracy should be **taken into account** in reaching a conclusion on concurrency.**



Meaning of concurrent delay

❑ **Protocol** says that concurrent delays have **both**

1. **Practical** implications (تبعات عملیاتی)
2. **Legal** implications (تبعات حقوقی)

We will talk about that later!

Meaning of Concurrent Delays

(AAACE Recommended Practices)

- ❑ In the **United States**, one of the technical references that is **commonly-cited** in **delay claims** is AACE International Recommended Practice **(RP) 10S-90**, entitled Cost Engineering Terminology. RP 10S-90, however, does **not offer one single definition** of concurrent delays.

Let's see the definitions!



❑ Concurrency:

- ❖ Degree to which **independent activities** may be, or are performed at the **same time** (**fully** or **partially**).
- ❖ Degree to which
 - ✓ Phases,
 - ✓ Stages, or
 - ✓ Activitiesmay be overlapped.

(June 2007)



AACE 10S-90 – Meaning of concurrent delay

1. **Two or more delays** that take place or **overlap** during the **same period** (**Keating**), either of which **occurring alone** would have **affected the ultimate completion date**.
2. Concurrent delays occur when there are **two** or **more independent causes** of delay during the **same time period** (**Functional**)

The “same” time period from which concurrency is measured, however, is **not always literally within the exact period of time**.

*For delays to be considered concurrent, **most courts do not require** that the period of concurrent delay **precisely match**.*



AACE 10S-90 – Meaning of concurrent delay

3. **True concurrent delay** is the occurrence of **two or more delay events at the same time** (*Literal*)

one an employer risk event, the other a contractor risk event and the **effects of which are felt at the same time.**

- ❖ The term “**concurrent delay**” is often used to describe the situation where two or more delay events **arise at different times**, but the **effects of them are felt** (in whole or in part) at the same time.

To avoid confusion, this is more correctly termed the “concurrent effect” of sequential delay events.



AACE 10S-90 – Meaning of concurrent delay

4. Concurrent delay occurs when **both the owner and contractor delay** the project or when either party delays the project during an **excusable but non-compensable** delay (e.g., abnormal weather).
 - ❖ The delays need **not occur simultaneously** but can be on **two parallel critical path chains** (*separate critical path*)
5. The condition where **another delay-activity independent** of the subject delay is **affecting the ultimate completion** of the chain of activities (*same critical path*).

Which one?



AACE 29R-03 – Contract

- ❑ The **existence of a contractual definition** is a **major factor** on the determination of concurrency.
- ❑ As stated in the previous subsections, **contracting parties are free to mutually agree** on any method or procedure **as long as** those agreements are **legally enforceable**.
- ❑ Therefore, the general rules, exceptions, and considerations in this **RP are applicable** to the extent that they **do not directly contradict contractual definitions** and specifications.

What **pre-requisite requirements** needed before evaluation?



AACE 29R-03 – Pre-requisites of concurrent delay

1. Two or more delays that are **unrelated**, **independent**, and would **have delayed** the project even if the **other delay did not exist** (*both on critical path*)
2. Two or more delays that are the contractual responsibility of **different parties**, but one may be a **force majeure event** (*different parties*)
3. The delay must be **involuntary** (*not pacing*); and,
4. The **delayed work** must be **substantial** and **not easily curable** (*mitigation with no cost could not have been done*)

What **types of concurrent delays** exist based on these requirements?



AACE 29R-03 – Types of concurrent delay

❑ Whether concurrency is determined literally or functionally:

1. Literal concurrency

- ❖ Happening at the same time
- ❖ Like “**true concurrency**”
 - ❖ Under this theory, if the **first delay started on day one**, and the **second delay started on day two**, they would **not be concurrent** – the delay associated with the first event would **create float in the entire project** so the **second delay could not also** be on the **co-critical path**.

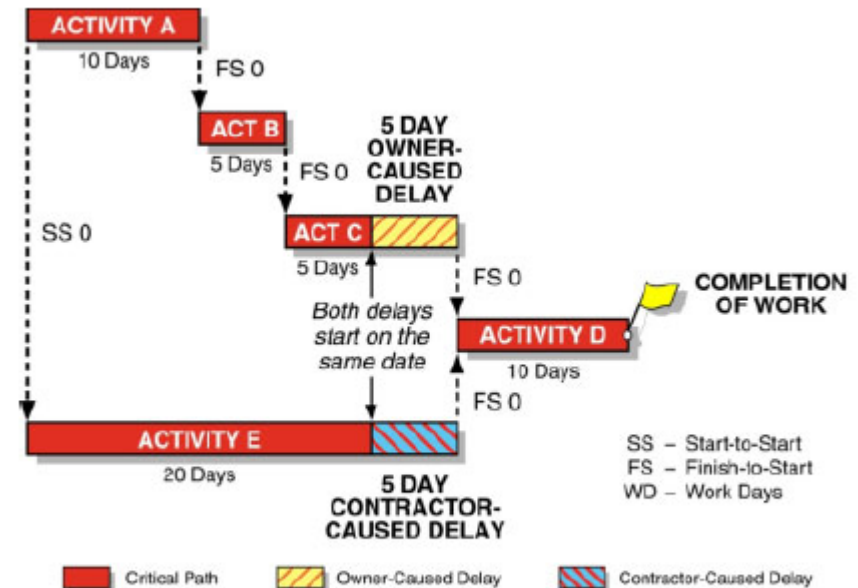
2. Functional concurrency

- ❖ Happening within the same analysis period (usually a month)
- ❖ “**Concurrent effects**”

AACE 29R-03 – Literal concurrency

- ❑ **Literal concurrency** occurs when two or more **delay-causing events** occur at the **same time**.

Illustration of Literal Concurrent Delays



The two 5 WD delays are literal, concurrent delays because they both started on the same day and are of equal duration.

AACE 29R-03 – Functional concurrency

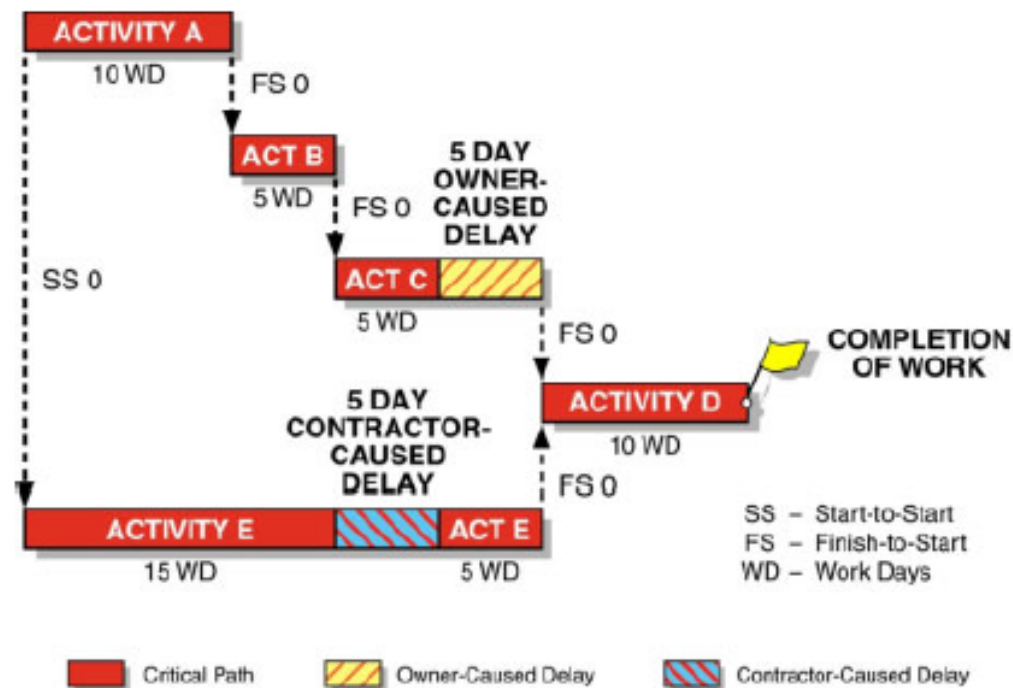
- ❑ **Functional concurrency** occurs when the **separate network paths**, on which the delays reside, **concurrently impact** the completion of work date

- ❖ Accordingly, the **functional application** of concurrent delay theory does **not necessarily** require the delay events to **occur at the same time**.

Be careful!

This is different compared to Keating Theory!

Illustration of Functional Concurrent Delays



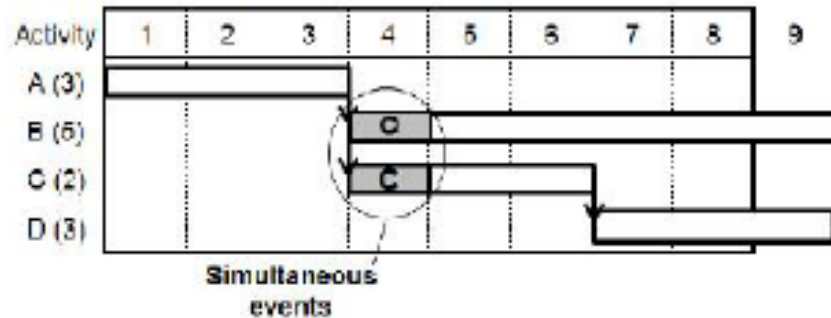
The two 5 WD delays are functionally concurrent because they both have the same effect on the completion of work, but occurred at different times during the schedule period being examined.



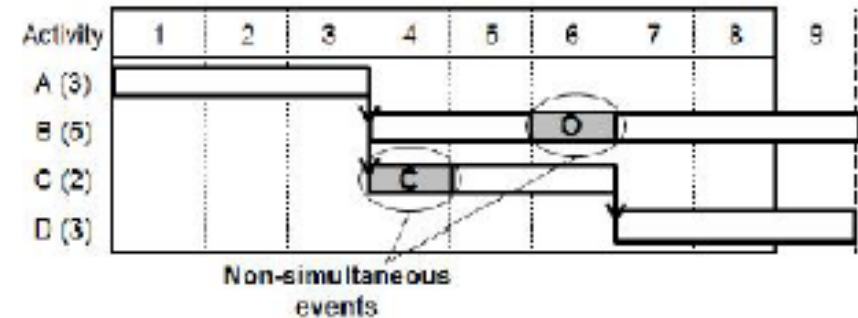
AACE 29R-03 – Functional concurrency

- ❑ **Functional concurrency** is a much **more liberal** application of the concurrent-delay theory,
 - allowing for the analyst to **identify concurrent delays simply**
 - if the **two delays occur within the same measurement period** for the delay analysis.
- ❑ Typically, a **delay-analysis measurement period** is a **month**, or the **time between schedule updates**.
 - ❖ Theoretically, a delay that occurred during the **first 5 days of the month** and a delay that occurred during the **last 5 days of the month** could be considered **concurrent**.

AACE 29R-03 – Functional vs. Literal



a) True concurrent delays



b) Concurrent effects



AACE 29R-03 – Functional vs. Literal

- ❑ **Literal** will result in **fewer concurrent** delays
- ❑ **Literal** will need **day-to-day delay analysis**
- ❑ **Functional** is more **liberal** in identifying and quantifying concurrency
- ❑ **Functional** will result in **more concurrent delays**, **less compensation** for both parties
- ❑ **Functional** theory recognizes the **real-world limitations** of exactly measuring delays
- ❑ **Contemporaneous analysis** is **more functional**.
- ❖ **Forensic analysis** is more likely to be **literal** in nature.

Remember the SCL Protocol approach?

*Employer Delay to Completion **does not exonerate** the Contractor for all its delays **prior** to that Employer Delay to Completion occurring.*

Is it against “functional theory?”

ODCC

Meaning of Concurrent Delays

(ASCE ANSI/ASCE/CI 67-17)

ASCE Standard ANSI/ASCE/CI 67-17 (Schedule Delay Analysis) – Meaning of concurrent delay

❑ **8.1 Concurrent delay** can be described as a situation where

1. **Two or more critical delays** are occurring
2. At the **same time** during **all or a portion** of the delay **time frame** in which the delays are occurring (*same time not same period, NOT FUNCTIONAL*)
3. It could be on **same or separate critical paths**
4. **Does not need** to have the **same start or finish dates** (*Keating with one exception*)
 - ❖ The standard has **no clear position** regarding the **time interval between delay events**, but it could be understood that it requires both events **literally** "occurring at the same time".

Is **functional theory** applicable here?

Is it **more consistent** with **SCL Protocol** or **AACE**?

ASCE Standard ANSI/ASCE/CI 67-xx (Schedule Delay Analysis) – Meaning of concurrent delay

❑ Draft: 2024.11.22

ASCE STANDARD ASCE/CI

67-XX

Schedule Delay Analysis

ASCE Standard ANSI/ASCE/CI 67-xx (Schedule Delay Analysis) – Meaning of concurrent delay

❑ Draft: 2024.11.22

6 CONCURRENT DELAY

In general terms, concurrent delay can be described as a situation where two or more critical delays are occurring at the same time during all or a portion of their duration.

پیش نویس دستورالعمل تمدید مدت پیمان ناشی از تاخیرات

فنی

(سازمان برنامه و بودجه)

۶- تاخیرات همزمان

- ۶-۱- به دو یا چند رویداد تاخیر که در یک زمان آغاز و به طور همزمان رخ می‌دهند و اثر هم‌زمانی را ایجاد می‌نمایند، تاخیرات همزمان گفته می‌شود، تاخیرات همزمان، باید شرایط زیر را دارا باشد:
- حداقل یک رویداد تاخیر متعلق به هریک از طرفین پیمان باشد؛
 - وقوع تاخیر از سوی طرفین غیر عامدانه باشد؛
 - هر یک از رویدادهای تاخیر حداقل در یک مسیر بحرانی وجود داشته باشد؛
 - رویدادهای تاخیر نباید به یکدیگر وابسته باشند.

در صورت وقوع تاخیرات همزمان، این تاخیرات مجاز شمرده شده و صرفاً تمدید زمانی اعطا می‌گردد.

- ۶-۲- حسب مورد ممکن است، زمان اتمام رویدادهای تاخیر در تاخیرات همزمان، همزمان نباشد، در این صورت مابه‌ازای مدت مازاد تاخیر هر یک از طرفین پیمان، مطابق با ضوابط رسیدگی، مجاز یا غیرمجاز تلقی می‌گردد.
- ۶-۳- برای تجزیه و تحلیل تاخیرات همزمان، لازم است پیمانکار در خصوص تغییرات طبق بند ۸-۲ عمل نموده و سپس نتایج مورد بررسی قرار گیرد.

۶-۴- ضوابط اعلان و رسیدگی به تاخیرات همزمان، مطابق با مفاد پیش بینی شده در بند ۴ می‌باشد.

۶-۵- لازم است در لایحه تحلیل تاخیرات، تاخیرات همزمان به صورت مجزا مشخص گردد.

So far you have learned what concurrent delay means!

BUT

HOW COULD WE DEAL WITH THIS?

EOT, Compensation, Liquidated damages, etc.?

Let's see this from two perspectives:

- 1. Legal implication**
- 2. Practical implication**

Dealing With Concurrent Delays

(Legal Implication)

Concurrent delays in Long International document - Introduction

- ❑ This company includes **International Experts** in **Claims Analysis**, **Dispute Resolution**, and **Project Management** for Process, Oil & Gas, Pipeline, Power, Industrial, Infrastructure, and Building Construction Projects.
- ❑ **Long International Inc.** has **many different offices** throughout the **world** even in the **Middle East**, but **main office** located in **USA**.
- ❑ We want to talk about the document **provided** by Long International Inc. in **2015**.

About the Author



Richard J. Long, P.E., is Founder and CEO of Long International, Inc. Mr. Long has over 40 years of U.S. and international engineering, construction, and management consulting experience involving construction contract disputes analysis and resolution, arbitration and litigation support and expert testimony, project management, engineering and construction management, cost and schedule control, and process engineering. As an internationally recognized expert in the analysis and resolution of complex construction disputes for over 30 years, Mr. Long has served as the lead expert on over 300 projects having claims ranging in size from US \$100,000 to over US \$2 billion. He has presented and published numerous articles on the subjects of claims analysis, entitlement issues, CPM schedule and damages analyses, and claims prevention. Mr. Long

Concurrent delay in various legal jurisdictions

- ☐ U.S. law
- ☐ English law
- ☐ Scots law
- ☐ Canadian law
- ☐ Hong Kong law
- ☐ Australian law
- ☐ FIDIC
- ☐ AIA A201-2017
- ☐ Other contracts
- ☐ SCL Protocol
- ☐ AACE 29R-03
- ☐ ASCE Standard ANSI/ASCE/CI 67-17 (Schedule Delay Analysis)

❑ U.S. courts and **arbitration** proceedings offer **three approaches** to the handling of **concurrent delay**:

1. **Time but no money**; or
2. **Apportionment**; or
3. **Responsibility** based on a **critical path delay analysis**

These depend on the meaning of concurrent delays...

when delays are **concurrent**, the decision will be taken based on one of the **above items**



U.S. law – Time but no money

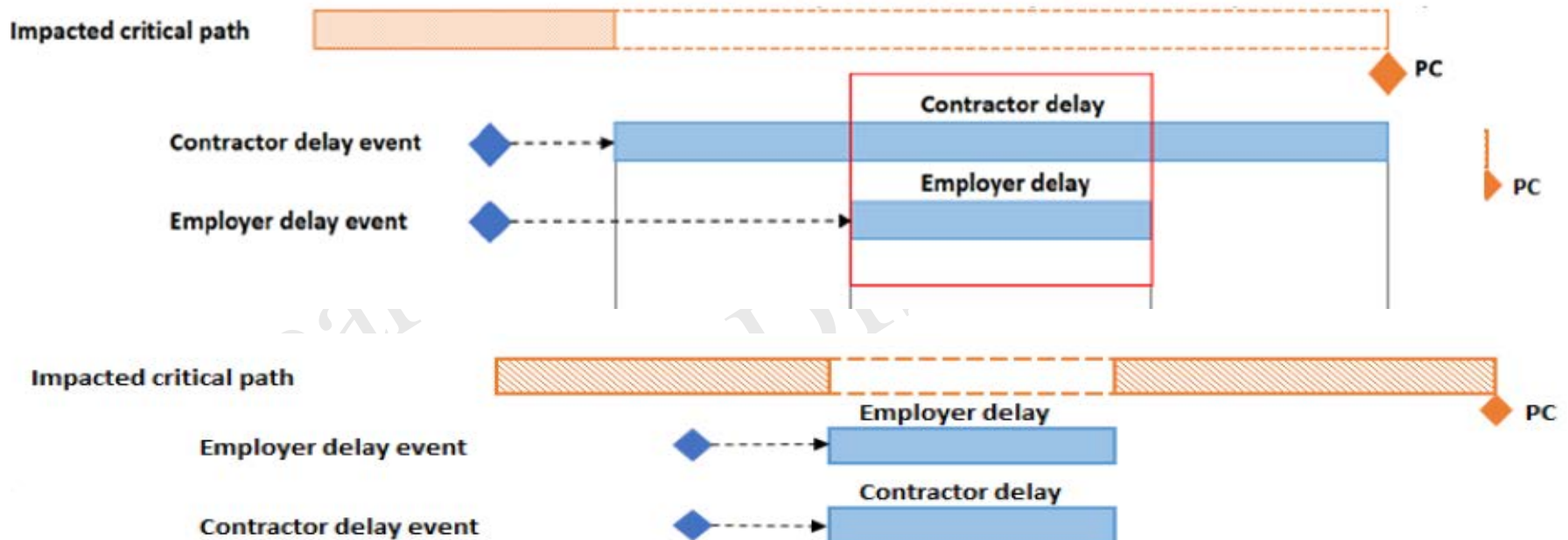
- ❑ “Time but no money” principle traces back to **early 1900s U.S.** cases when a **strict rule against apportionment** applied.
 - ❖ The **courts** could **not apportion** “with any degree of **certainty**.”



U.S. law – Apportionment

- ❑ Basically entails the **allocation** of the **time** and **money** effects of the delay to project completion **based on**

relative causative potency or significance of the competing causes of delay



Is it possible in all cases? How? Let's see!



U.S. law – Apportionment

- ❑ Under this approach, **responsibility for concurrent delay** is apportioned between the employer and the contractor based on what is **fair and reasonable**.
- ❑ **Apportionment** may mean a contractor can get a **partial**, but **not full amount** of time relief for concurrent delays to the works.
- ❑ The rationale for this approach is that the **parties should share risk and responsibility** for concurrent delay.

At face value, this might **seem a fair and sensible** solution.

Is it?



U.S. law – Apportionment

❑ However, there are **some difficulties** with it:

1. There is the **practical problem** of having to make an **apportionment**.
 - ❖ This may **not be straightforward**, and it offers **little certainty**.
2. It is **questionable** whether **one party** can be regarded as **more culpable**.
3. It is **doubtful** that words like **“fair and reasonable”** are **sufficient** to create a power of apportionment?
4. It **conflicts** with the **prevention principle** (*this is the most known term in U.K.*)
 - ❖ If a **contractor is awarded less** than a full EOT as a result of an apportionment, they will be **exposed to LDs**
where they **have been prevented** from completing the works on time.

What the **U.S. courts** have been done to **overcome** these problems?



U.S. law – Apportionment

Thus, U.S. courts will apportion delay damages when?

❑ **Evidence** permits the **segregation of costs** resulting from **each party's causes**

❖ **Courts** will **not allow** for **apportionment**

if the **segregation** of delay costs is **impossible**.

Apportionment approach is still not accepted in many of English courts!

We will see!



U.S. law – Critical path delay analysis

- ❑ Critical path delay analysis offers an **alternative to apportionment** in that it offers the **best evidence** of **cause-effect analysis** of time impacts, as explained later in **practical implication**.

U.S. law – Critical path delay analysis

Let's see some U.S. Cases...

U.S. law – Blinderman Case

- ❑ Most courts make this decision in the following:

Where both parties contribute to the delay “neither can recover damage, unless there is in the proof a clear apportionment of the delay and the expense attributable to each party.” Coath & Goss Inc. v. United States, 101 Ct.Cl.702, 714-15 (1944); Commerce International v. United States, 167 Ct.Cl.529, 338 F.2d.81, 90 (1964).

Generally, courts will deny recovery where the delays are “concurrent or intertwined” and the contractor has not met its burden of separating its delays from those chargeable to the Government.

- ❑ Meaning that neither prolongation costs **nor liquidated damages** are recoverable where apportionment is not possible.

SO

An extension of time will only be granted



U.S. law – Hood Plumbing Case

In *Hood Plumbing*,¹⁹ claims were made for delay costs and remission of liquidated damages. There were concurrent delays. It was held in relation to the claim for additional costs:

In order to recover for alleged compensable delay by the Government, a contractor must demonstrate, with a reasonable degree of accuracy, both the extent and cause of such delay. ... When delays by the Government are intertwined or concurrent with delays that are not compensable, neither the Government nor the contractor may recover unless the delays can be separated or apportioned.

With regard to the remission of liquidated damages, it was held that the contractor's delay exceeded the period of delay caused by the government and on that basis, liquidated damages could be assessed. This is not inconsistent with the principle that liquidated damages are not recoverable if delay cannot be apportioned; the assessment made in this case did amount to an apportioning of the delay.

□ Meaning that even though an **EOT** should be **granted** and **LD** should **not be applied** in concurrent delays,

the owner can assess for **LD** and **reduce EOT** if apportionment is doable.



1. **Dominant cause approach**
2. **Malmaison approach**

Prepared by Dr. Alavipour
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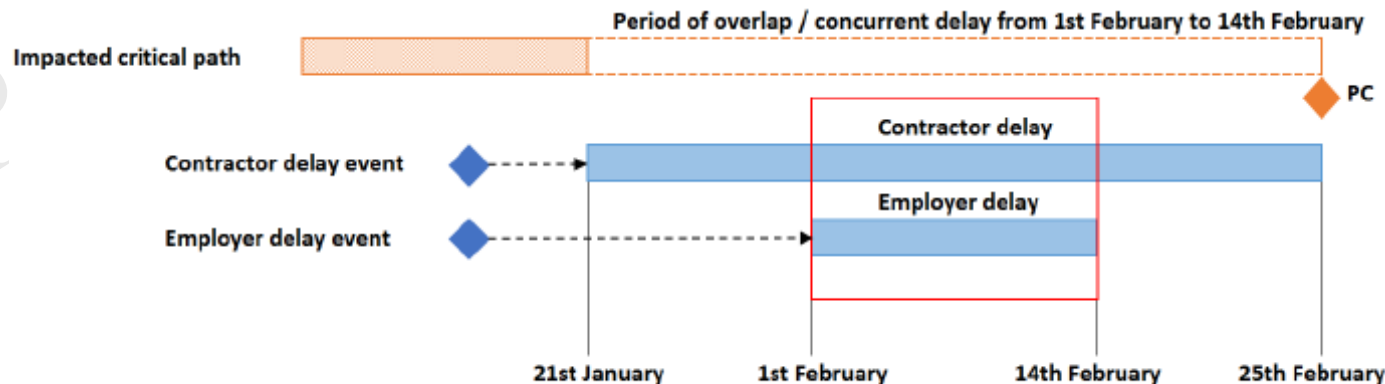


English law – Dominant Cause approach

- During the 1980s and 1990s in the world of construction claims.

"If there are two causes, one the contractual responsibility of the Defendant and the other the contractual responsibility of the Plaintiff, the Plaintiff succeeds if he establishes that the cause for which the Defendant is responsible is the effective, dominant cause. Which cause is dominant is a question of fact, which is not solved by the mere point of order in time, but is to be decided by applying common sense standards".

- It is **most useful** in situations where a delay at **risk of one of the parties**, is contained **wholly within the start and completion dates** of a delay at risk of the other party.

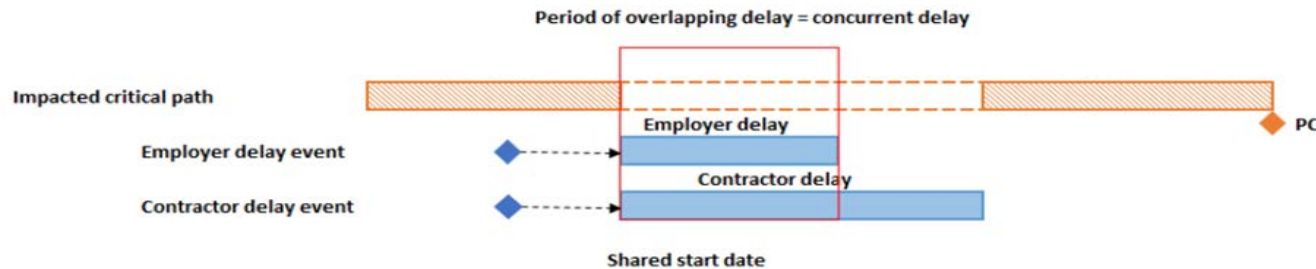




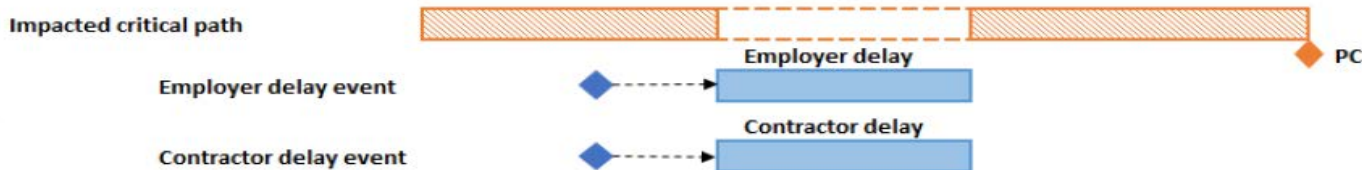
English law – Dominant Cause approach

❑ There are **difficulties**, however, with this approach:

1. First, there is the practical problem of **having to decide which cause is dominant**.



2. Second, it provides **no answer** where the delay events are **equally dominant**.



3. Third, it **conflicts** with the **prevention principle**.

❖ If the **dominant cause** is a **Contractor Risk event**, the contractor will be

1. **Denied an extension of time** and

2. May be exposed to delay damages **even though the employer has also delayed the contractor**.





English law – Dominant Cause approach

Even though the dominant cause approach does not seem to be able to always give a definitive answer of liability, this approach still seems to be relevant and has been supported in

- U.K. (case of Petroleo Brasileiro v ENS 1 Kos Ltd.) and
- Other foreign case law such as South African court.



English law – Malmaison approach

- ❑ The **Malmaison approach**, so called after the case of **Henry Boot Construction v Malmaison Hotel (Manchester) Ltd (1999) 70 Con LR** states that a contractor is entitled to a **full extension of time** for a delay caused by **two or more events**, provided one of them is an **employer's risk event (Relevant Event)** under the contract.

❖ **Relevant event:** *a delay which is caused by the **owner** or **neutral event***

"If there are two concurrent causes of delay, one of which is a relevant event [an employer risk event] , and the other is not, then the contractor is entitled to an extension of time for the periods of delay caused by the relevant event notwithstanding the concurrent effect of the other event."

Let's see an example!

English law – Malmaison approach

❑ To take a **simple example**:

1. If **no work** is possible on a site for a week not only because of **exceptionally inclement weather (a relevant event)**,
2. But also because the **contractor** has a shortage of **labor (not a relevant event)** and
3. If the **failure** to work during that week is likely to **delay** the works **beyond the completion date by one week**,

then the architect is required to **grant an extension of time of one week**.

This approach has been held to be the “generally accepted approach” in resolving issues of ‘true concurrency.’



English law – Malmaison approach – Example

❑ In the **8th edition of Keating**, the learned editors summarized the *Malmaison* approach as follows:

- ❖ *‘Thus it now appears to be accepted that a contractor is entitled to an extension of time notwithstanding the matter relied upon by the contractor is **not the dominant cause** of delay, provided only that it has at least **equal** “causative potency” with all other matters causing delay.*



English law – Malmaison approach – Example

- ❑ To be concurrent, the delays
 1. Must be of approximately "equal causative potency"¹ (*not should be clearly dominant*)
 2. Be felt at the same time.
 - ❖ The **Malmaison decision** stands as authority for the proposition that concurrent delay will
 1. Entitle a contractor to an extension of time to the completion date,
 2. But **not** to its time-related costs

¹ John Marrin QC, *Society of Construction Law UK paper "Concurrent Delay"* (February 2002), p 2.

² *Henry Boot Construction (UK) Ltd v Malmaison Hotel (Manchester) Ltd* [1999] 70 Con LR 32.

How much is that consistent with **SCL Protocol**?

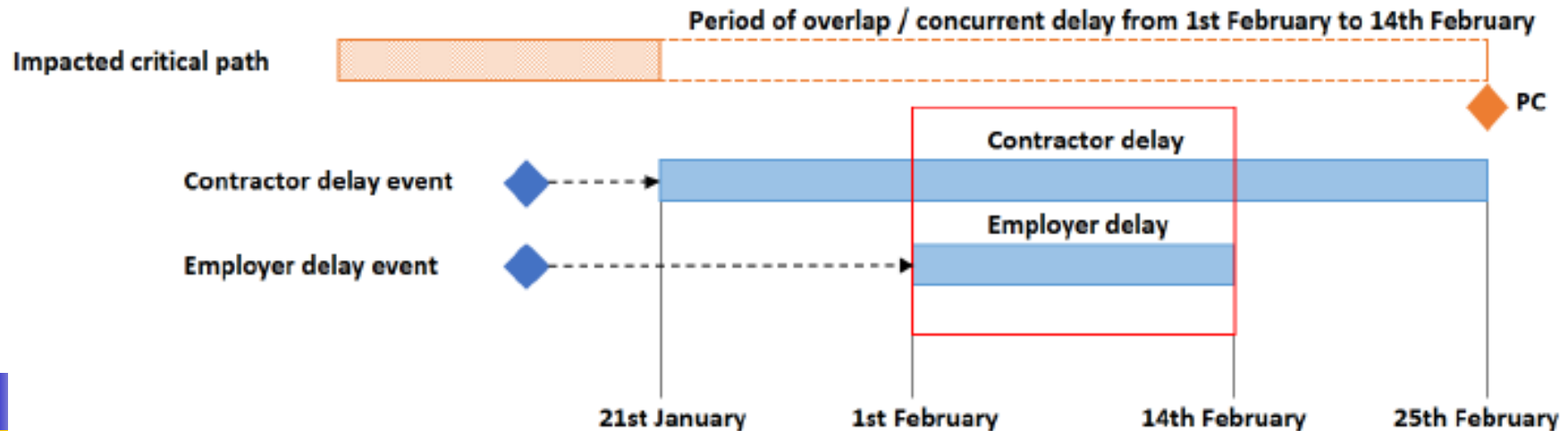
There are **two competing views** as SCL Protocol says!



English law – Malmaison approach – Example

- ❑ A contractor Risk Event will result in **five weeks contractor delay** to completion, from **January 21 to February 25**.
- ❑ **A few weeks later**, Employer Risk Event would result in **Employer Delay** to Completion from **February 1 to February 14**.

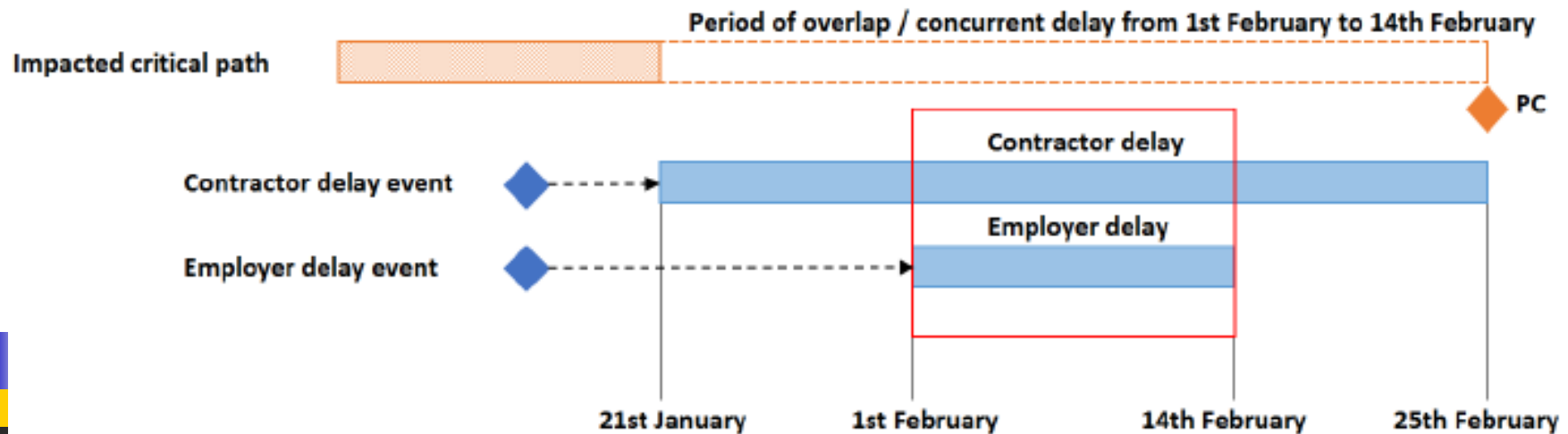
HOW TO ANALYZE? TWO VIEWS



English law – Malmaison approach – Example

View 1

- ❑ Two events are **both effective causes** of delay to completion from **February 1 to 14**, **because** each **would have caused** delay in the **absence of the other**.
 - ❖ This **may be supported** by **some courts**
 - ❖ **Liquidated damages** will **not be payable** for the **time concurrent delay** occurs.
 - ❖ This may be supported by **older English appeal court**.



English law – Malmaison approach – Example

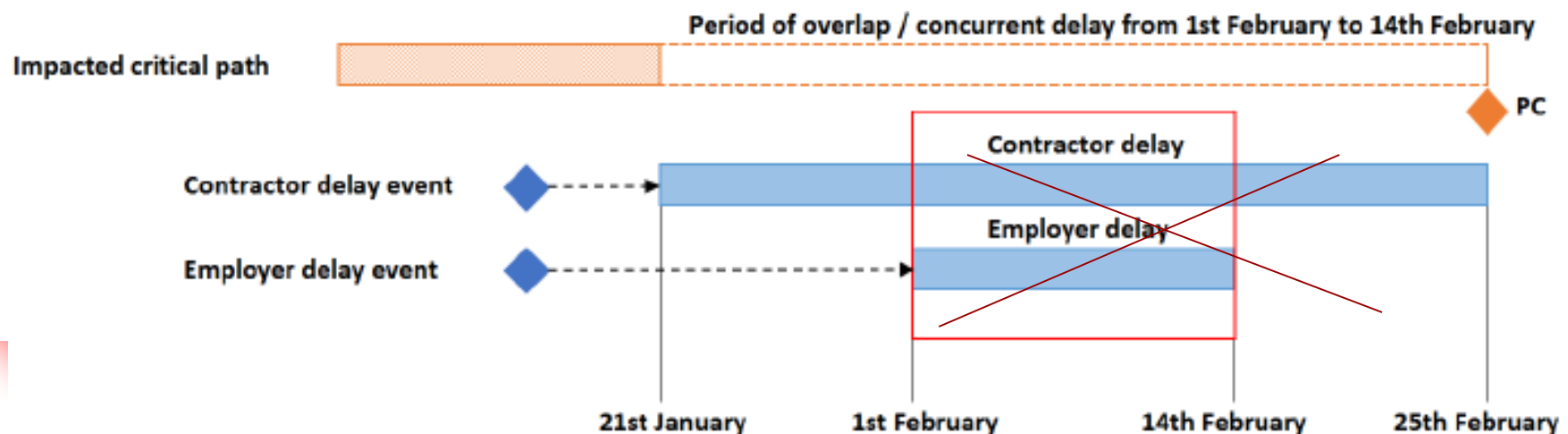
View 2

❑ Because the **works were already in delay** as a result of the **contractor delay**, the **employer delay** has caused **no further delay** and there is therefore **no concurrency**.

❖ Thus the **only effective cause** of the delay is the **Contractor Risk Event**.

✓ This ***may be supported*** by ***some other courts***.

✓ This is the consistent position taken in **recent lower level English court decision**.





English law – Malmaison approach – Example

What **feature** Malmaison has?

The Malmaison approach has the **advantage** of **not invoking** the prevention principle.

The *Malmaison* approach is adopted by the Society of Construction Law:

Where Contractor Delay to Completion occurs concurrently with Employer [Owner] Delay to Completion, the Contractor's concurrent delay should not reduce any EOT [Extension of Time] due;³⁴



English law – Malmaison approach – Example

The Protocol recommends view 2:

The **Employer Risk Event** should be seen as not causing delay to completion in the **Example** and therefore there is no concurrency.

Let's see a case of law!

English law – Malmaison approach – Example

Facts

Saga (Owners) purchased a cruise ship and contracted with Fincantieri to refurbish the ship. The works were to be completed by 2 March 2012, however completion was not achieved until 16 March 2012. The contract contained a clause that imposed liquidated damages on the Contractor for delay in completing the works "for any reason whatsoever for which the Contractor is, or its employees, agents or sub-contractors are, responsible" capped at €770,000.

The Contractor was responsible for delays between 2 March and 16 March 2012 for a number of reasons. The Owners were responsible for delays from 3 March to 14 March 2012 for reasons concerning the weight of the lifeboats and from 2 March to 10 March 2012 due to requesting additional insulation.

The Contractor tried to rely on the *Henry Boot Construction (UK) Ltd v Malmaison Hotel (Manchester) Ltd* and *Walter Lilly v Mackay* cases, stating that where there are two concurrent causes of delay, one which would be a "relevant event" entitling a contractor to an extension of time and the other not, the contractor is entitled to an extension of time for the relevant event notwithstanding the concurrent effect of the other.



English law – Malmaison approach – Example

Owners' argument

The Owners submitted that the delays were not concurrent delays. They argued that if the Scheduled Completion Date had already been delayed by earlier events for which the Contractor was responsible, the delays for which the Owners were responsible were not to be treated as occurring concurrently. The Owners submitted that because the Contractor's work was already delayed by the Contractor's own delays, any delays for which the Owner bore the responsibility could not have occurred concurrently.

Prepared by Dr. Alavipour
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English law – Malmaison approach – Example

Contractor's argument

The Contractor submitted that the Court should approach the question having regard to the prevention principle. The prevention principle is the established English law doctrine that an owner cannot insist upon the performance of an obligation which the owner prevented the contractor from performing. The principle is invoked to relieve a contractor of liability for liquidated damages and to set a reasonable timeframe for completion where an owner delays a contractor's performance.

The Contractor relied on the fact that the contract did not contain a general extension of time provision for acts of prevention by the Owners. It argued that other provisions in the contract providing that the Owners would only have a claim for liquidated damages where delay to the Scheduled Completion Date was due to a matter for which Contractor was responsible, respected the prevention principle. On that basis, the Contractor submitted that where there are two concurrent causes of delay, one being a delay event entitling the Contractor to an extension of time, and one that would not, the Contractor is entitled to an extension of time. The Contractor argued that in those circumstances it was entitled to an extension of time notwithstanding the concurrent effect of its own delays.



English law – Malmaison approach – Example

Decision

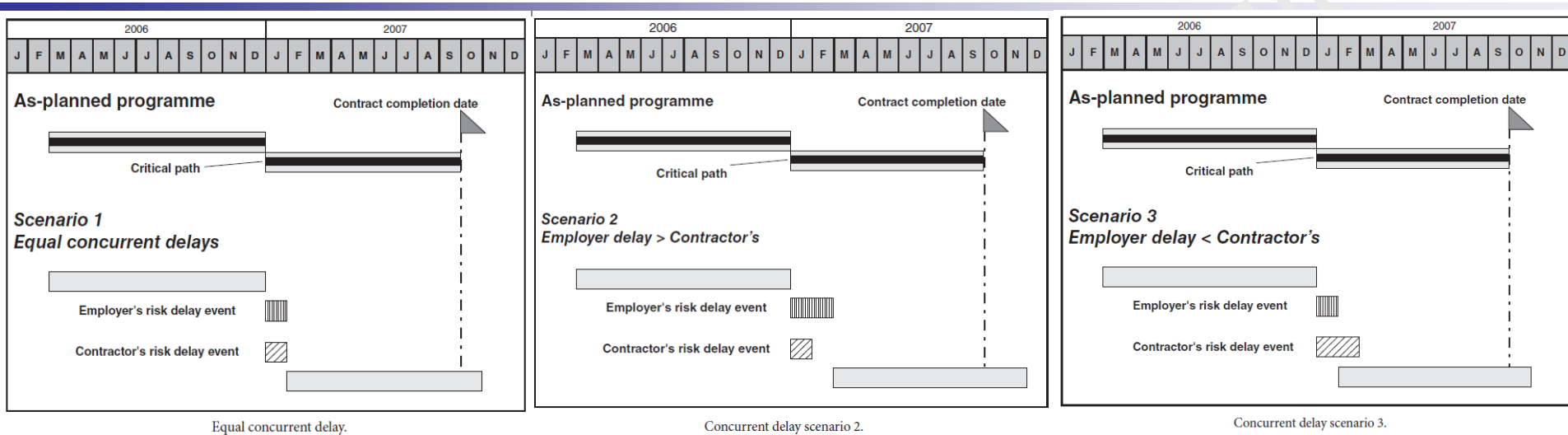
The Court rejected the Contractor's approach awarding liquidated damages to the Owners. The Court held that when the Owners' delays occurred, there were already delays occurring for which the Contractor was responsible. Accordingly, the Contractor could not rely on concurrency to defeat the Owners' claim for liquidated damages.

Referring to the analysis in *Adyard Abu Dhabi*⁴ and *Balfour Beatty Building Ltd*⁵, the Court concluded that unless there is concurrency affecting the completion date, a contractor cannot claim the benefit of it. The Court found that causation must in fact be proved based on the situation as it was known at the time.

Saga Cruises emphasises that causation should always be considered when assessing concurrent delay. A contractor should not be entitled to the benefit of an owner's delay event if it was already in delay, with effect that the owner's event had no actual impact on the completion date. A contractor must prove that an owner's delay event actually caused delay to the completion date.

This is what SCL also believes!

English law – Malmaison approach – Example



All these could be **true concurrent** based on

previous case of law and some references (Delay Analysis in Construction Contracts Book)



English law – Malmaison approach – Variation

What if an **Employer** instructs a variation
where the contractor delay extended the **contract completion**?



English law – Malmaison approach – Variation

What if an **Employer** instructs a variation
where the contractor delay extended the **contract completion**?

Employer may lose its entitlement to liquidated damages
if the **Contractor then accelerates** to recover the Contractor Delay to Completion at its
own cost
and
that results in the **variation** (an Employer Risk Event) becoming the **effective cause of**
Delay to Completion.

✓ *So which one is more common in U.K.?*

✓ *Is apportionment acceptable in U.K.?*



English law – New test

✓ So which one is more common in U.K.?

❑ There seems to be a **new development** in English jurisprudence in which a new test may be said to have been adopted.

❖ This test has been referred to as the effective cause test.

In the case of *De Beers UK Ltd v Atos Origin IT Services UK Ltd* the court has made the following statement:

“The general rule in construction and engineering cases is that where there is concurrent delay to completion by matters for which both employer and contractor are responsible, the contractor is entitled to an extension of time but he cannot recover in respect of the loss caused by the delay. In the case of the former, this is because the rule where delay is caused by the employer is that not only must the contractor complete within a reasonable time but also the contractor must have a reasonable time within which to complete. It therefore does not matter if the contractor would have been unable to complete by the contractual completion date if there had been no breaches of contract by the employer (or other events which entitled the contractor to an extension of time) because he is entitled to have the time within which to complete which the contract allows or which the employer’s conduct has made reasonably necessary.”

✓ *Is apportionment acceptable in U.K.?*

- ❑ Malmaison approach was made **less certain** after City Inn in 2010 where an **apportionment approach** was adopted by **Scottish case**.

HOWEVER

- ❑ The recent case of Walter Lilly v Giles Mackay and DMW Developments [2012] EWHC 1773 (TCC) reviewed the authorities regarding concurrent delay and brought some clarity by re-stating that:
 - ✓ **Malmaison approach** was consistent with English law, and
 - ✓ There was no place for the apportionment approach.

❑ The **Scottish courts** seem to have approved both the **dominant cause** and **apportionment methods** in John Doyle Construction Ltd v Laing Management (Scotland) Ltd and City Inn Ltd v Shepard Construction Ltd.

❖ In other words,

where there is a **dominant cause**, that will **prevail**, and

if **neither cause is dominant**, the concurrent delay is to be **apportioned**.

❑ Thus, *City Inn* may allow **apportionment** based on the **contractual requirement** to be **“fair and reasonable.”**



Canadian law

- ❑ “Canadian courts do not recognize an all or nothing approach,” and **unlike U.S. courts**, “the Canadian system does not place a high evidentiary burden on a claimant as a prerequisite to apportionment.”

Thus, **Canadian courts** tend to favor apportionment and “do the best they can.”



Hong Kong law

❑ Hong Kong courts have typically applied the **Malmaison approach** to issues of concurrent delay,

although more recent decisions suggest a movement towards the apportionment approach.

Australian law

- ❑ Australian standard forms of contract have attempted to provide a solution to the concurrent delay issue without success because

not all forms are consistent or clear.

1. In fact, **one contract** provides no time extension when the **contractor** is responsible for **concurrent delay**.
2. **Other forms**, such as clause 34.4 in AS 4000-1997 and AS 4902-2000, provide for apportionment in the event of **concurrent delays**.

- ❑ **Absent of a contractual provision**, it has been **suggested** that the “*position under Australian law would reflect the approach of English law by reverting to the common law.*”

However, one author suggests that apportioning delays would be preferable.

FIDIC (International Federation of Consulting Engineers)

- ❑ None of the previous drafted standard form contracts prior to the release of the FIDIC 2017 suites, dealt expressly with **concurrency**.
- ❑ The new FIDIC Red Book 2017 suite of contract, has introduced **Clause 8.5**, which states:

“If a delay caused by a matter which is the Employer’s responsibility is concurrent with a delay caused by a matter which is the Contractor’s responsibility, the Contractor’s entitlement to EOT shall be assessed in accordance with the rules and procedures stated in the Particular Conditions (if not stated, as appropriate taking due regard of all relevant circumstances)”

What kind of rules and procedures would the engineer include in the particular conditions?

FIDIC (International Federation of Consulting Engineers)

- ❑ The new edition, does **not prescribe** a new procedure, but it **prompts** the **engineer/employer**, to **decide on a mechanism or approach** at their discretion, which they want to adopt and to confirm this in the particular conditions of the contract.

The **party assessing** the contractor's claim, will have the freedom to determine in line with **either approach**.

This would appear to be **fertile grounds for dispute!**



AIA (Architect Institute of America)

❑ AIA General Conditions A201-2017

❖ Section 8.3

"If the Contractor is delayed at any time in the commencement or progress of the Work by (1) an act or neglect of the Owner or Architect, of an employee of either, or of a Separate Contractor; (2) by changes ordered in the Work; (3) by labor disputes, fire, unusual delay in deliveries, unavoidable casualties, adverse weather conditions documented in accordance with section 15.1.6.2, or other causes beyond the Contractor's control; (4) by delay authorized by the Owner pending mediation and binding dispute resolution; (5) by other causes that the Contractor asserts, and the Architect determines, justify delay, then the Contract Time shall be extended for such reasonable time as the Architect may determine."

AIA does not force that delay to be “true concurrent”

AIA does **not focus on “functional theory”**

AIA also prefers “apportionment”

Architect has the **power**

Other contracts

- ❑ The contract usually provide **no direct guidance** as to the **treatment of concurrent delays**.
- 1. Some contracts are **explicit**, stating that neither party is to **receive compensation** when delays are concurrent.
- 2. Some contracts state that when concurrent delay occurs, not only is no delay compensation available to either party, but the contractor is not entitled to a time extension.
 - ❖ This is **rare** and impose **significant risk** if liquidated damages also **apply** in the event of delay.
- 3. If nothing mentioned in the contract, in the **international construction industry**, the contractor would **not** be entitled to compensable delay damages and the owner would **not** be entitled to its actual delay or liquidated damages.



Other contracts

☐ New Mexico DOT contract

The Contractor is not entitled to an extension of Contract Time for any period in which a Non-Excusable Delay is concurrent with an Excusable Delay. When a Noncompensable Delay is concurrent with a Compensable Delay, the Contractor may be entitled to an extension of Contract Time but not entitled to compensation for the period the Noncompensable delay is concurrent with the Compensable Delay.

New Mexico DOT concurrent delay contract language.



SCL Protocol - EOT

- ❑ When **concurrent delay established**, the **contractor** should be **entitled** an **EOT** for the Employer Delay to Completion **using CP**.

❖ *CP 5 = Procedure for granting EOT*

- ❑ The **Contractor Delay** should **not reduce** the amount of **EOT due** to the **Contractor** as a **result** of the **Employer Delay**.
- ❑ **Employer Delay to completion** does **not exonerate** the **contractor** for all its **delays** prior to that **Employer Delay** to completion occurring (**does not allow functional theory**).
- ❑ The **Protocol's approach** to the **treatment of concurrent delay** (**once established**) prevents **arguments** about **whether** an **Employer Delay** acting **concurrently** with a **Contractor Delay**.



SCL Protocol – Compensation and LDs

14. Concurrent delay – effect on entitlement to compensation for prolongation

Where Employer Delay to Completion and Contractor Delay to Completion are concurrent and, as a result of that delay the Contractor incurs additional costs, then the Contractor should only recover compensation if it is able to separate the additional costs caused by the Employer Delay from those caused by the Contractor Delay. If it would have incurred the additional costs in any event as a result of Contractor Delay, the Contractor will not be entitled to recover those additional costs.

- ❑ The **prolongation compensation** will be recoverable **if** the contractor can prove that its **losses** result from the **employer delay**.

In most cases, **contractor** will be entitled to **compensation** **only** for any period by which the **employer delay** **exceeds** the duration of the **contractor delay** (**true concurrent delay**)



AACE 29R-03 – EOT

“Concurrent delays occur when there are two or more independent causes of delay during the same time period. The same time period from which concurrency is measured, however, is not always literally within the exact period of time. For delays to be considered concurrent, most courts do not require that the period of concurrent delay precisely match. The period of concurrency of the delays can be related by circumstances, even though the circumstances may not have occurred during exactly the same time period.”



AACE 29R-03 – Compensation and LDs

- Typically, when **both** contractor and owner are **concurrently responsible** for an **extended period** of performance,
the contractor is granted an **extension of contract time**
without compensation and
owner forgoes the collection of **LD** damages
No time-related compensation flows from either party to the other.

The SCL Protocol is consistent with Association for the Advancement of Cost Engineering (AACE) International 29R-03's interpretation, when contractor and employer driven issues are attributed to the delay, the contractor is eligible to an extension of contract time with no prolongation costs. Here, the primary purpose of any time extension claim is satisfied, this being for the contractor to avoid any liquidated damages.

ASCE Standard ANSI/ASCE/CI 67-17 (Schedule Delay Analysis) – Compensation and LDs

4.7 FOR A DELAY TO BE COMPENSABLE, IT SHOULD BE THE SOLE CAUSE OF DELAY

1. For compensable delay, the delaying event should be the sole cause of **longest path delay** (no concurrent delays compensable)
 - ❖ Typically, a delay solely caused by the owner is required to qualify as **compensable**.
 - ❖ However, third party delay may be compensable depending on the **provisions of the contract**.
2. For compensable delay, the delay should extend the scheduled completion date of the project.
 - ❖ Activities with *float can fall on the longest path* because of schedule **constraints and multiple calendars** (e.g., weekend non-work restrictions),
 - ❖ *Critical activities can fall on paths of work that are not the longest path* (again because of constraints and multiple calendars).

ASCE Standard ANSI/ASCE/CI 67-17 (Schedule Delay Analysis) – Compensation and LDs

4.7 FOR A DELAY TO BE COMPENSABLE, IT SHOULD BE THE SOLE CAUSE OF DELAY

- ❑ In some cases where **multiple subcontractors or multiple prime contractors** are **simultaneously responsible** for delay,

the **contractor or owner** may **still be able to recover** its costs **split** between the responsible parties ===== *Because this is not a concurrent delay*

as long as the **claiming party** had **no fault** or responsibility for delay during the **period claimed**.

NO CONCURRENT EXISTS

 ASCE Standard ANSI/ASCE/CI 67-17 (Schedule Delay Analysis) – Compensation and LDs

8.2 CONCURRENT DELAY TYPICALLY IS EXCUSABLE BUT NONCOMPENSABLE, MEANING A TIME EXTENSION IS GIVEN BUT NO COSTS ARE RECOVERED BY EITHER PARTY

- ❑ **Liquidated Damages:** For the purposes of assessing liquidated damages, the general rule is that **contractors will not be charged** for critical delays they cause that are concurrent with owner-caused critical delays **that cannot be apportioned** in terms of responsibility and damages.
- ❑ **Compensation:** An **owner will not be responsible** for a contractor's delay damages when the contractor simultaneously caused critical delay that is concurrent with owner-caused critical delay of equal time **that cannot be apportioned**.

This is also consistent with **SCL** and **AACE!**

Does ASCE allows for apportionment?

ASCE Standard ANSI/ASCE/CI 67-17 (Schedule Delay Analysis) – Compensation and LDs

8.3 CONCURRENT DELAY SHOULD BE APPORTIONED WHERE POSSIBLE

- ❑ Conditions that **allow** concurrent delays to be **apportioned** include situations where
1. There is **overlapping** of simultaneous delays on the **start or finish of either delay or both**
 2. When one or more of the **simultaneous delays** are **absorbed** partially by **available float** on an activity path **before** they become critical
 3. When one or more of the **simultaneous delays** have **different** start **or** finish dates and **one or more** are **critical activities**

Does it mean “primacy of delay?”

ASCE Standard ANSI/ASCE/CI 67-17 (Schedule Delay Analysis) – Compensation and LDs

8.3 CONCURRENT DELAY SHOULD BE APPORTIONED WHERE POSSIBLE

- ❑ Conditions that **allow** concurrent delays to be **apportioned** include situations where
 - ❖ To consider apportionment of concurrent delays, consideration needs to be given to
 - ✓ Facts,
 - ✓ Criticality,
 - ✓ Timing,
 - ✓ Responsibility for delay,
 - ✓ Duration of delay,
 - ✓ Method used to measure delay, and
 - ✓ Ability to mitigate.

Dealing With Concurrent Delays

(Practical Implication – Concepts)



Practical – General procedure – AACE 29R-03

AACE International's Recommended Practice for forensic schedule delay analysis **recommends** the most adopted international construction industry approach and states the following:

1. **Classify** **each delay event** **individually** and **see** who is **primarily responsible** for the **cause of the delay** (**first column** from the left side in the next slide)
2. **Evaluate** whether **each delay event** is **concurrent** with **other types of delays**.

Practical – General procedure – AACE 29R-03

3. Use the **following Table** to decide whether the concurrent delay is (**second column**):

- ☐ **Excusable or non-excusable**
- ☐ **Compensable or non-compensable** to the owner and contractor

Concurrent Delay Scenarios and Net Effect

Delay Event	Concurrent With	Net Effect
Owner Delay	Another Owner Delay or Nothing	Compensable to Contractor, Non-excusable to Owner
Contractor Delay	Another Contractor Delay or Nothing	Non-Excusable to Contractor, Compensable to Owner
<i>Force Majeure</i> Delay	Another <i>Force Majeure</i> Delay or Nothing	Excusable but Not Compensable to Either Party
Owner Delay	Contractor Delay	Excusable but Not Compensable to Either Party
Owner Delay	<i>Force Majeure</i> Delay	Excusable but Not Compensable to Either Party
Contractor Delay	<i>Force Majeure</i> Delay	Excusable but Not Compensable to Either Party

Practical – General procedure – AACE 29R-03

4. Use the **following Table** to find the net effect (**third column**):

Concurrent Delay Combinations and Net Effect

Delay Event	Concurrent With	Net Effect
<i>Force Majeure Delay</i> • Time • No Compensation for Extended Overhead • No Liquidated/stipulated Damage Assessment	Contractor-Caused Delay • No Time • No Compensation for Extended Overhead • Liquidated/stipulated Damage Assessment	Excusable • Time/No Compensation for Extended Overhead • No Liquidated/stipulated Damage Assessment
<i>Force Majeure Delay</i> • Time • No Compensation for Extended Overhead • No Liquidated/stipulated Damage Assessment	Owner-Caused Delay • Time • Compensation for Extended Overhead	Excusable • Time • No Compensation for Extended Overhead • No Liquidated/stipulated Damage Assessment
Contractor-Caused Delay • No Time • No Compensation for Extended Overhead • Liquidated/stipulated Damage Assessment	Owner-Caused Delay • Time • Compensation for Extended Overhead	Excusable • Time • No Compensation for Extended Overhead • No Liquidated/stipulated Damage Assessment

Dealing With Concurrent Delays

(Practical Implication – Separate Critical Path)

Concurrent delays to separate critical paths – Definition

1. Concurrent delays to separate critical paths

□ Requirements?

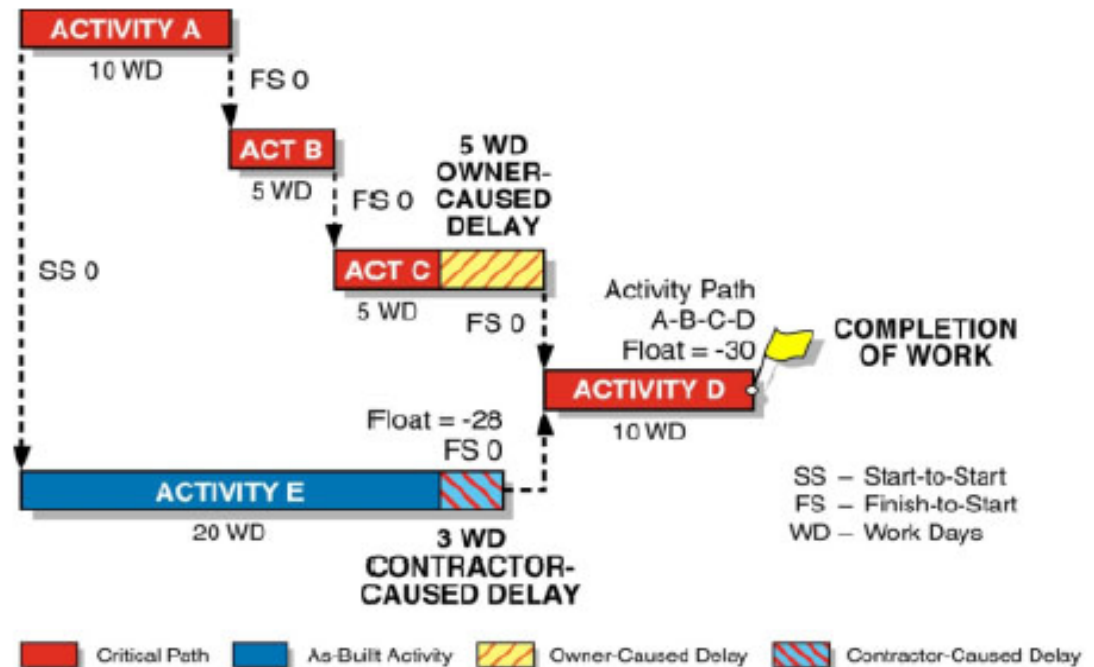
1. If the **owner-caused delay** and **contractor-caused delay** affect different activities on **parallel activity paths** which are **equally critical**, and
2. As such the **owner-caused delay** and **contractor-caused delay** would each have delayed the completion date of the project, the **delays** are said to be **concurrent delays to separate critical paths**.

Concurrent delays to separate critical paths

- ❑ Two non-concurrent WD is **compensable** and 5 WD granted for **EOT**.

For periods of concurrent delay, the contractor would not have entitlement to recover its delay costs and, likewise, the owner would not have entitlement to recover its liquidated damages

Concurrent Delays Affecting Activities with Different Float Values



The 3 WD Contractor-caused delay is only partially concurrent with the 5 WD Owner-caused delay.



Concurrent delays to separate critical paths

- ❑ The concept known as **primacy of delay** applies in this situation.
- ❑ The **Contractor's delay to bulk excavation** began before the Owner's delay to the shop drawings.
- ❑ Because of the **delay to excavation**, the Project **had more time** to complete the **shop drawings**, and the **delay to the shop drawings** never became critical.
- ❑ **Bulk excavation** was responsible for a **delay**, and the **Contractor** is not entitled to a **time extension** or **additional compensation**.

*The concept of **primacy of delay** recognizes that **critical delays** create float on **other paths of work**, and typically the terms about the **ownership of float** plays a game.*



Concurrent delays to separate critical paths – Example

- ❑ Say we have a Project with a **CPM schedule**, and in that schedule, there are **parallel critical paths** of work.
- ❑ Figure below shows **Path A** and **Path B**, each with a duration of **40 days**. **Both paths** of work are scheduled to **start the same day**. Therefore, an **analysis** at the **start** of these paths would show that **both paths** are **concurrently critical**.

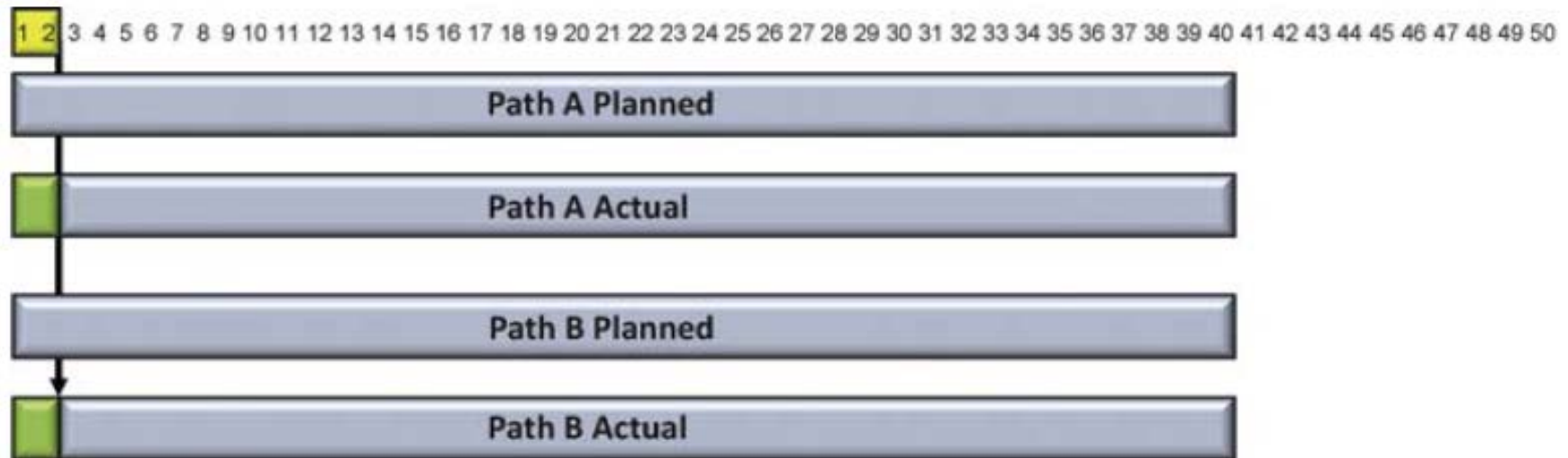
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50



Both Paths A & B, finished 10 days later than originally planned on Day 50.

Concurrent delays to separate critical paths – Example

- Both paths are worked on for the first two days

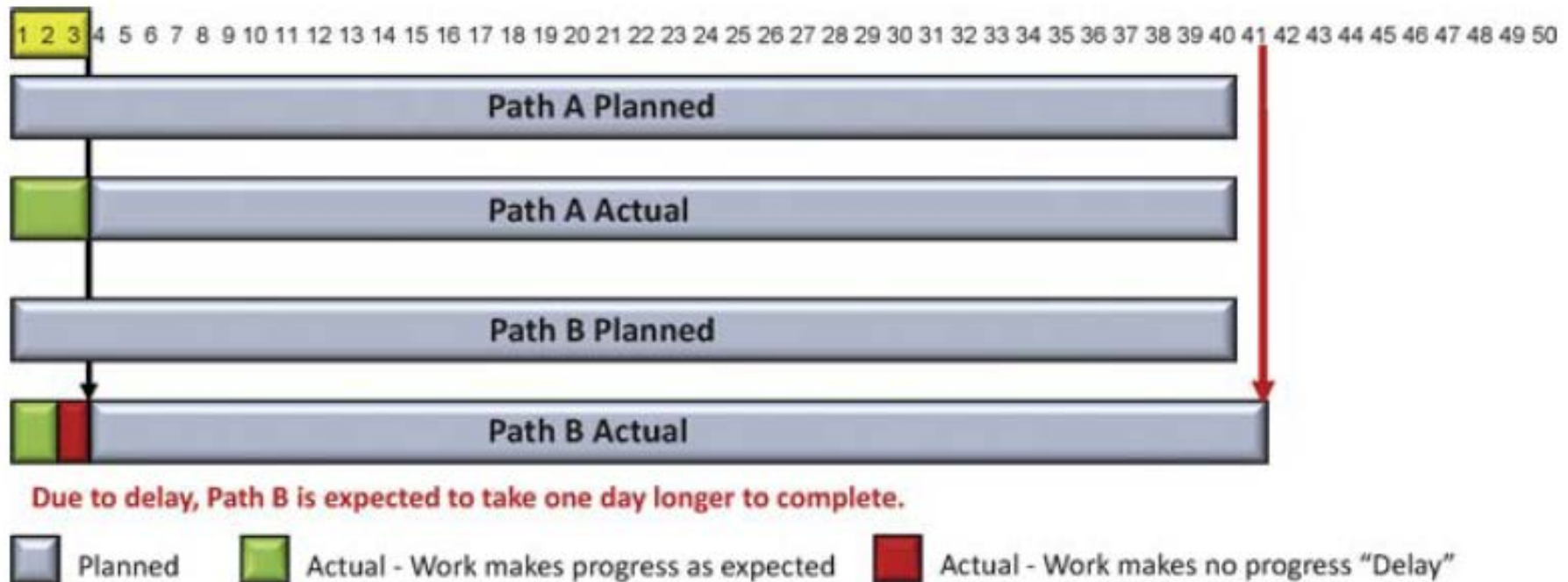


Planned Actual - Work makes progress as expected



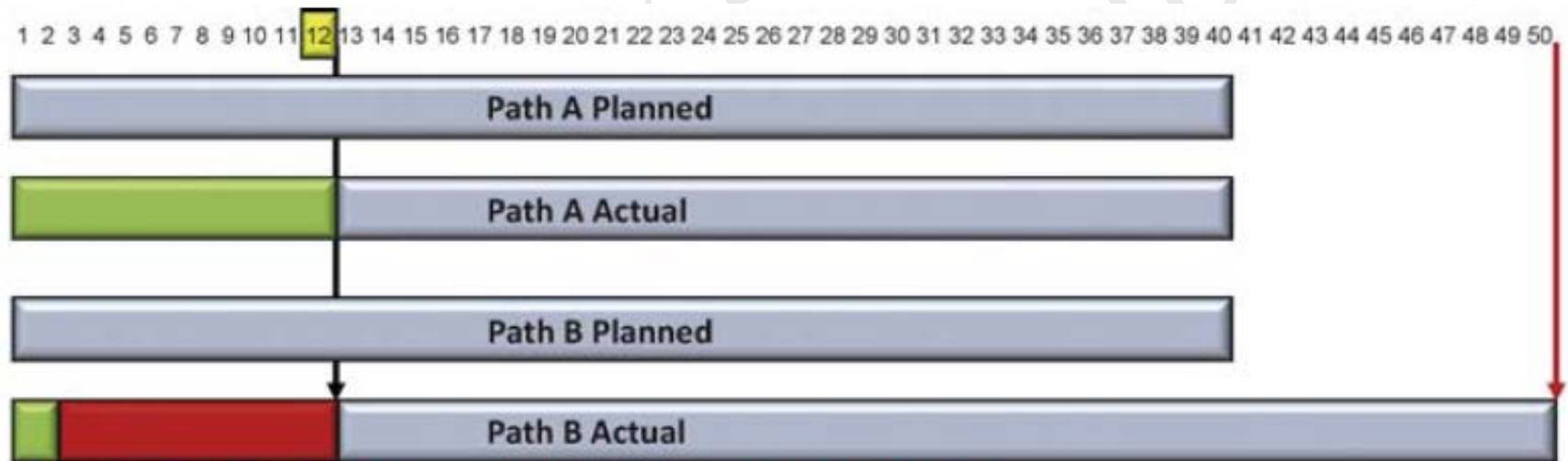
Concurrent delays to separate critical paths – Example

- ❑ Path B stops work because of a design discrepancy.
- ❑ Obviously, **Path B** is the **longest path** of the two and, for our example, the **sole critical path**.
- ❖ The critical path shifted from Paths A and B to **just Path B**.



Concurrent delays to separate critical paths – Example

- ❑ So at the **end of day 12**, **Path A** is still forecast to **complete on day 40**, and **Path B** is now forecast to **finish on day 50**.
- ❖ At this point in time, **Path A has 10 days of float**.



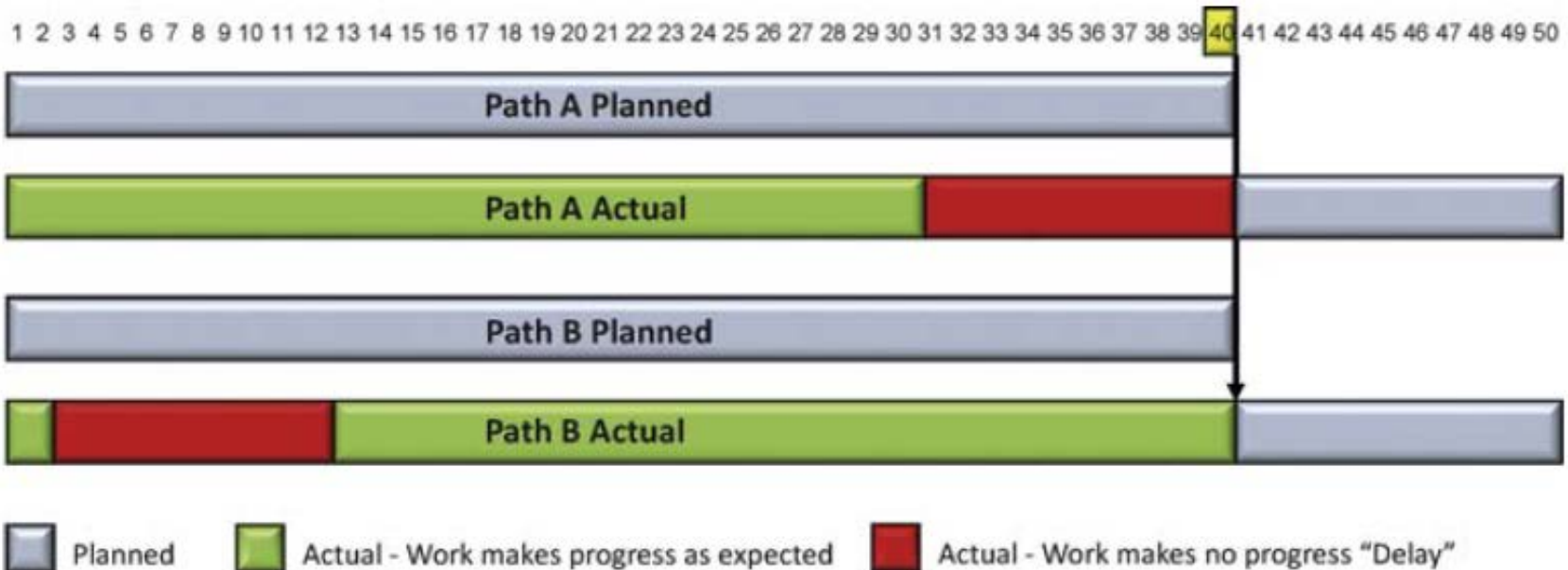
Due to 10-day delay, Path B is expected to take 10 days longer to complete.

 Planned
  Actual - Work makes progress as expected
  Actual - Work makes no progress "Delay"

Concurrent delays to separate critical paths – Example

Which one is responsible for 10 days of delays?

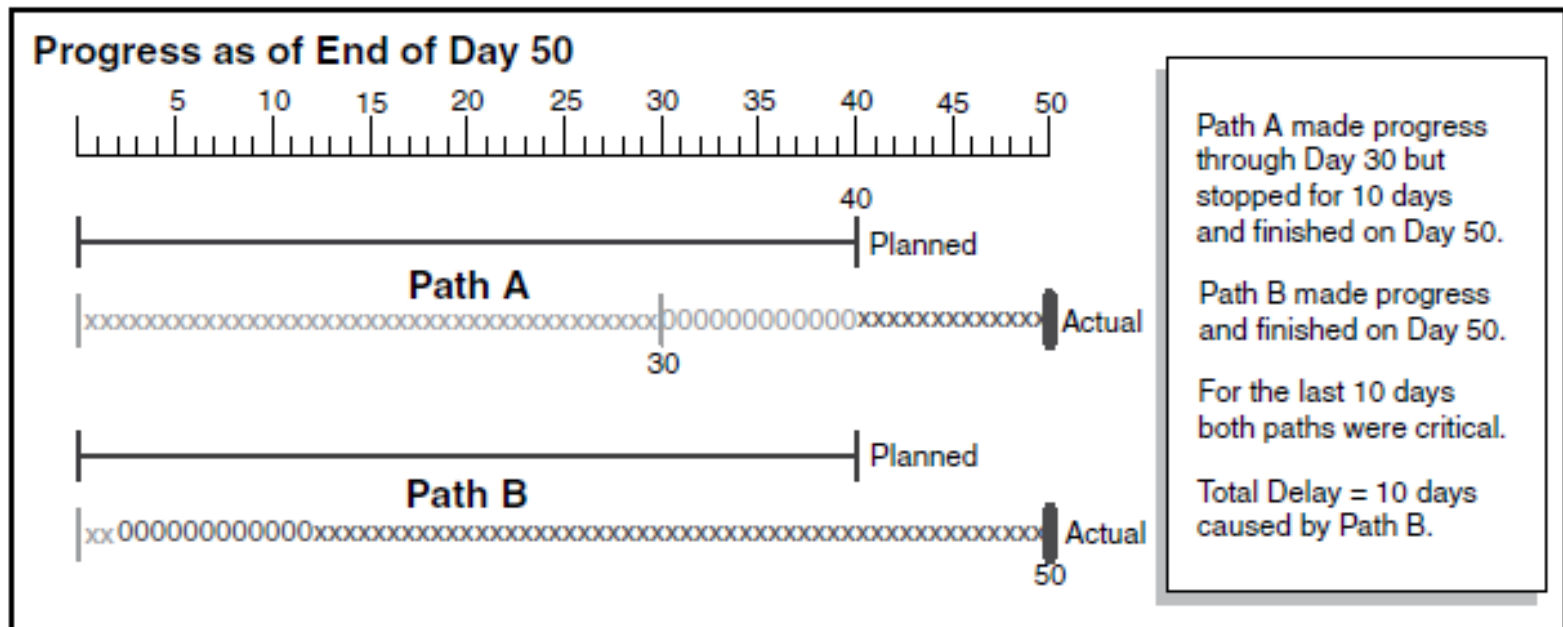
- Our **earlier analysis** showed that **Path A** had picked up **10 days of float**. Therefore, **even though it experienced 10 days** of delay, it caused **no overall delay**.



Concurrent delays to separate critical paths – Example

- ❑ If an analyst had solely looked at the start and finish dates of these two paths of activities, the analyst might conclude that they both delayed the Project by 10 days, since they both were scheduled to finish on day 40 and both actually finished on day 50.

BUT.....SEE THE NEXT SLIDE





Concurrent delays to separate critical paths – Example

- ❑ The **more detailed analysis** clearly shows that **this is not the case**.
- ❑ **No delay** was caused by **Path A**, and **all 10 days of delay** were caused by **Path B**.
- ❑ The **analyst** should perform the analysis on a **day-by-day basis** to correctly ascertain the exact activities that caused the delay and the **correct magnitude** of those delays.

Concurrent delays to separate critical paths – Conclusion

The **bottom line** is that analyzing **concurrent delays to separate critical paths** is best done by using a **technique** to analyze delays that will **identify the critical path** of the project every day.

Dealing With Concurrent Delays

(Practical Implication – Same Critical Path)



Concurrent delays to the same critical path

2. Concurrent delays to the same critical path

❑ Requirements?

1. If the **owner-caused delay** and **contractor-caused delay** affect the same activity, and
2. As such the **owner-caused delay** and **contractor-caused delay** would each have delayed the completion date of the project, the **delays** are said to be **concurrent**.

Concurrent delays to the same critical path – Example

- ❑ As of the **schedule update of June 1**, **demolition** should be finished on **June 15**, but delayed from **June 1 to June 16** because of **strike** + **concurrently owner failed to obtain a permit**.
- ❑ Two causes of delays are **concurrent** and **run for the same period**.
 - ❖ One **non-excusable** and **non-compensable** (*strike*)
 - ❖ Another is **excusable** and **compensable** (*permit*)

What to do?

Time extension + no compensation

Concurrent delays to the same critical path – Example

- ❑ If compensable and non-compensable delays are **concurrent**, and **unless otherwise** specified in the contract,

neither the owner nor the contractor is **entitled** to delay **damages** if they **cannot** be **separated** by proof.

Dealing With Concurrent Delays

(My Choice)

My recommendation on meaning and how to deal with concurrent delay

- ❑ While **functional theory** is much more **easier** **Primacy of delay** is more **accurate**

It **depends** on you, your project, and your effort could be taken!

1. Contemporaneous analysis (Prospective)

- ❖ No need of functional if you analyze as **late as delay starts**
- ❖ Functional is preferred when you have to analyze **long before a delay starts**

2. After-the-fact (Forensic or Retrospective)

- ❖ AACE approach with apportionment and the adjustment of “primacy of delay”
 - ✓ This principle of “primacy of delay” states that **whatever activity caused the delay first** is the **primary and sole driver** of delay and creates float to the other paths of work
 - Similar to one the **SCL Protocol recommends!**

My recommendation on meaning and how to deal with concurrent delay - Contemporaneous

- ❑ The purpose of **contemporaneous analysis** is more of **business decisions** to manage the **time and claims**

however, the purpose of **forensic analysis** is more **technical proof**

- ❑ The **functional theory** is “closely **attuned** to delay **methodologies** that use modeled **CPM schedules** as their basis and utilize some form of **time impact analysis**.”

- ❑ No need to develop a **separate concurrency analysis**

because there would be **no difference in EOT calculation** if **functional theory** is considered.

❖ The “**primacy of delay**” is **not important** here!

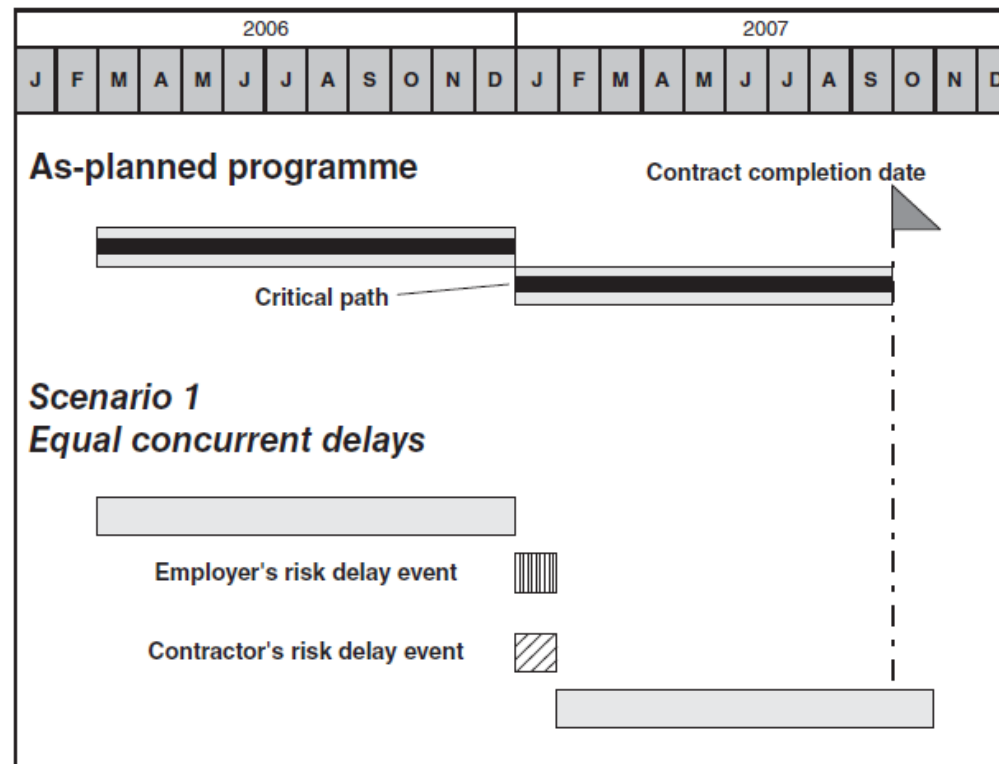
- ❑ The **functional theory** allows that CPM schedules,

even if properly maintained, are **not perfect**, and **near critical delays** may in fact be **concurrent**.”

My recommendation on meaning and how to deal with concurrent delay - Forensic

❑ Scenario 1: Both similar start and finish date (“true concurrent”)

❖ No apportionment

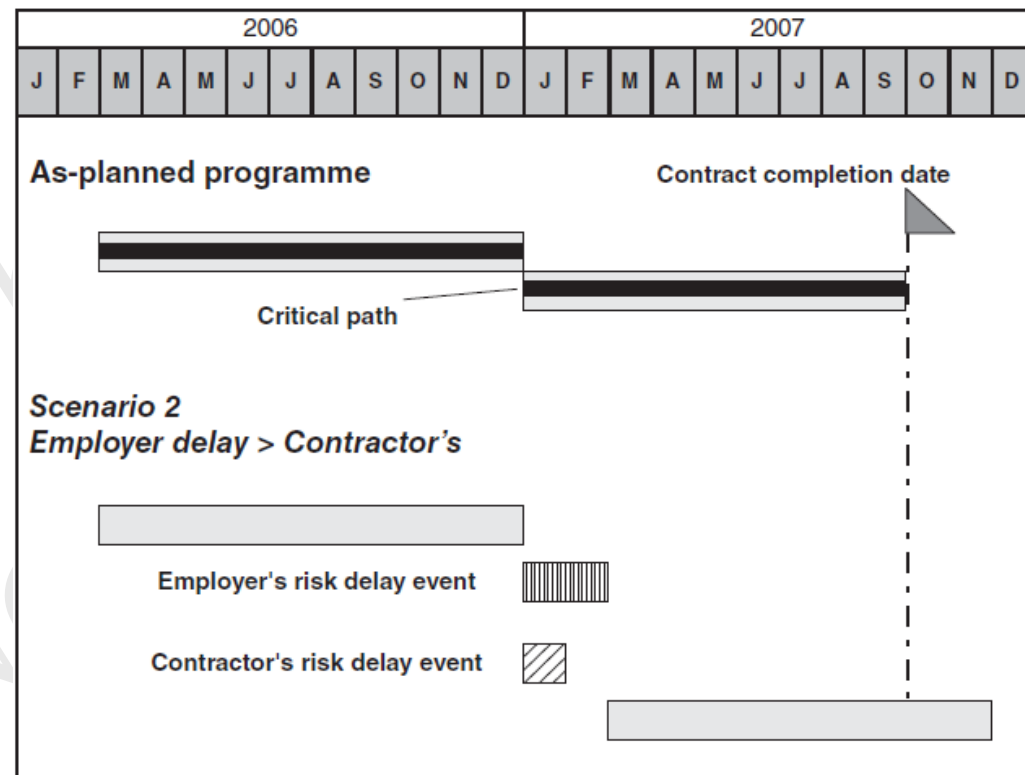


Equal concurrent delay.

My recommendation on meaning and how to deal with concurrent delay - Forensic

❑ **Scenario 2: Same start but different finish date** (*some saying “true concurrent”*)

❖ Apportionment with no need of “primacy of delay”

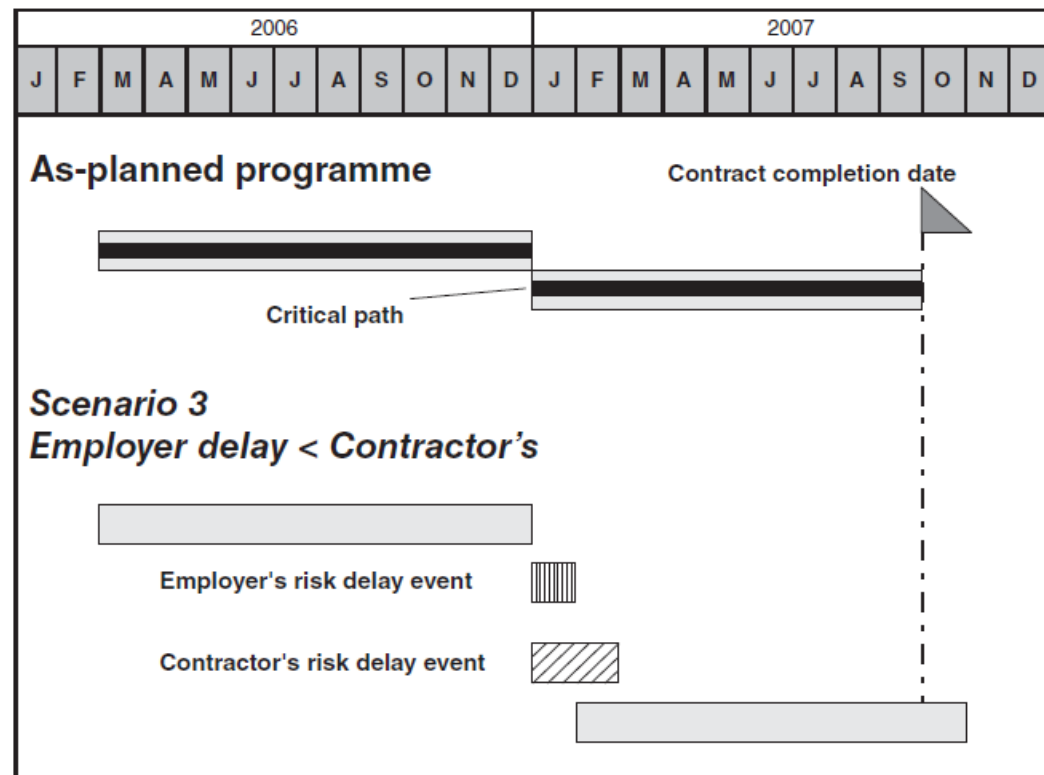


Concurrent delay scenario 2.

My recommendation on meaning and how to deal with concurrent delay - Forensic

❑ **Scenario 3: Same start** but **different** finish date (*some saying “true concurrent”*)

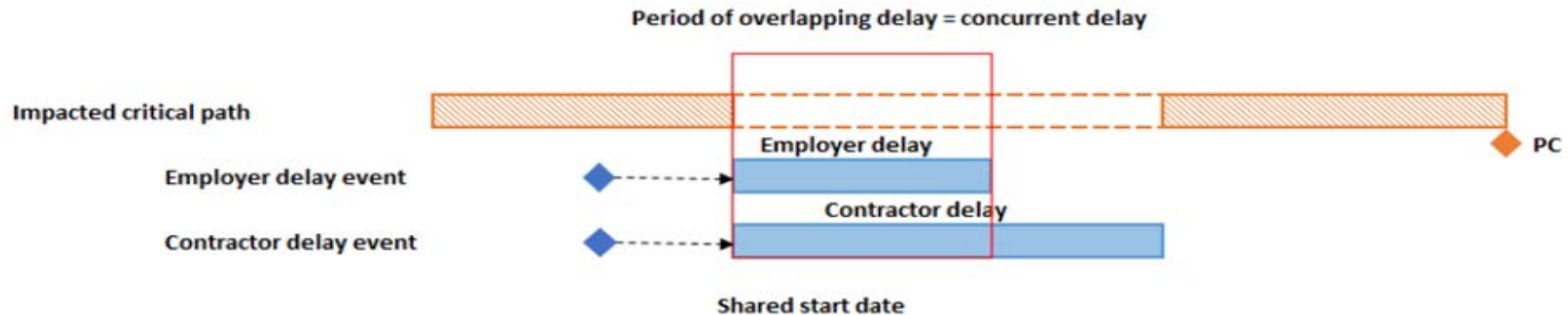
❖ Apportionment with **no need** of “primacy of delay”



Concurrent delay scenario 3.

My recommendation on meaning and how to deal with concurrent delay - Forensic

- ❑ These three Scenarios do not need “Primacy of Delay”
- ❑ If they **start** at the **same point**, the identical period is **concurrent** and the **rest** is not (rest should be summed)



My recommendation on meaning and how to deal with concurrent delay - Forensic

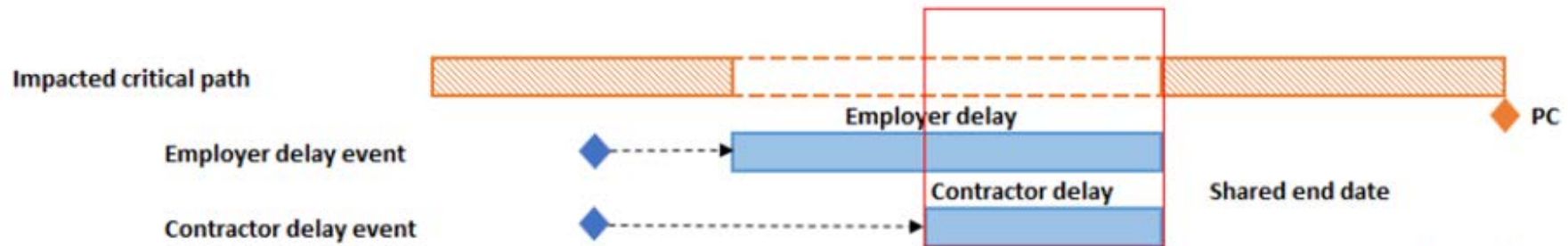
❑ Scenario 4: Different start date, but same finish date

❖ Because of when delays exist on two separate paths

❑ What could be done?

❖ All delays go to the party that starts the delay (*remember the SCL recommendation because it is not true concurrent*)

✓ If you chose this, there is no concurrency



My recommendation on meaning and how to deal with concurrent delay - Forensic

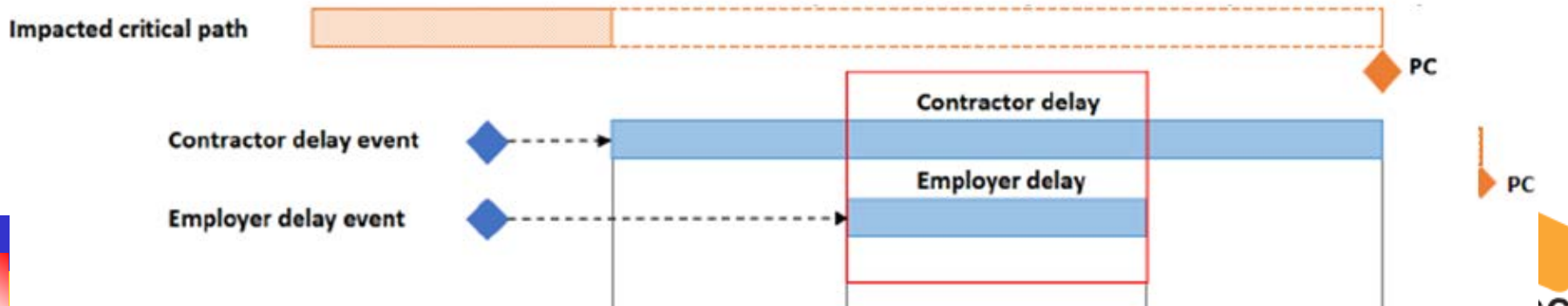
❑ Scenario 5: Having **different start** date and **different finish** date

❖ *Because of when delays exist on two separate paths*

❑ **What could be done?**

❖ All delays go to the party that starts the delay (*remember the SCL recommendation and maybe ASCE approach?*)

✓ If you chose this, there is no concurrency



Question

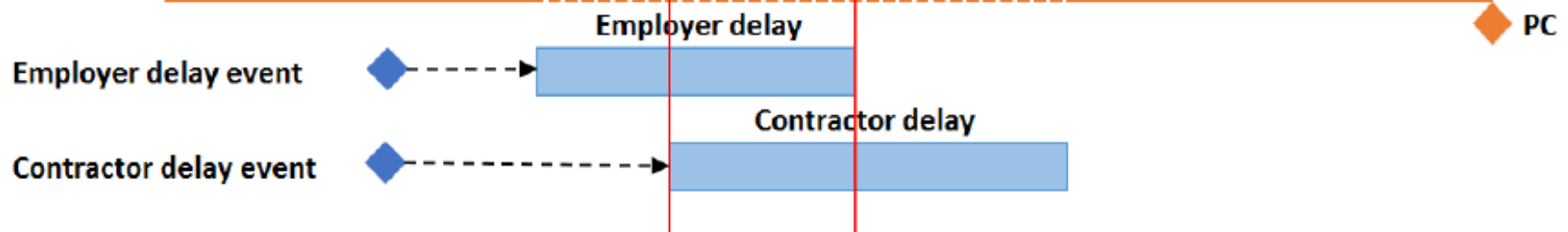
What would you do here?

Critical path



Period of overlapping delay = concurrent delay

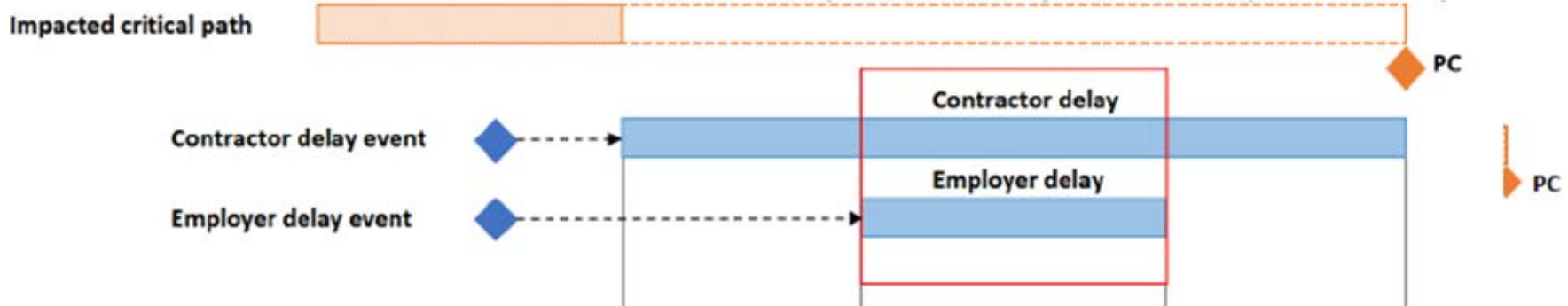
Impacted critical path



My recommendation on meaning and how to deal with concurrent delay - Forensic

What to do about previous scenarios if they were on same critical path?

Use Apportionment



My recommendation on meaning and how to deal with concurrent delay - Forensic

1. No LDs
2. No compensation
3. EOT

ALL

1. SCL
2. ASCE
3. AACE

are **consistent** in this manner

Pacing Delays



Meaning – SCL Protocol

❑ 15.2 A **Contractor** may consider **pacing activities**

that are **not on the critical path** (i.e. **slowing down non-critical activities** so that they **proceed at the same relative pace** as the delayed activities on the **critical path**).

❑ The Protocol recommends that if the **Contractor intends to pace non-critical activities**,

then it **should**

1. **Notify** the employer and the CA of **its intention** in this regard, along with
2. Its **reasons** for doing so.



Meaning – AACE 29R-03

- ❑ Pacing **occurs** when **one** of the independent delays is the **result** of a conscious, voluntary and contemporaneous decision to **pace progress** against the **other delay**.
- ❑ The **quality** that **distinguishes** pacing from concurrent delay is the fact that pacing is a **conscious choice** by the **performing party** to **proceed** at a slower rate of work with the **knowledge** of the other contemporaneous delay, **while concurrent delays** occur independently of each other **without a conscious** decision to slow the work.

Why pacing?



Meaning – AACE 29R-03

- ☐ By pacing the work, the **performing party** is exercising its option to **reallocate** its resources in a **more cost effective manner** in **response to the changes** in the **schedule** caused by the **other parent (nonpacing) delay** and thereby mitigating or avoiding the **cost associated** with the resource demands.



Meaning – AACE 29R-03

- ❑ There may be **no need** to **maintain** the **original schedule** in the face of a **known delay** caused by the other party – **no need to “hurry up and wait”**.
 - ❖ In other words, it is the **consumption of float created** in the pacing activity by the **occurrence** of the parent delay.

¹⁴ The term 'creation' should not be interpreted to mean that total float is increased. In fact, the opposite is true. The parent delay adversely impacts the overall critical path of the project, thereby decreasing total float. What it creates (increases) is relative total float on the path of the paced activity relative to the total float on the path carrying the parent delay.

Meaning – AACE 29R-03

- ❑ There are **two distinct circumstances** to which the term, pacing delay, is often applied.



Meaning – AACE 29R-03

- ❑ The **first circumstance**, often referred to as direct pacing, occurs where the **duration of a schedule activity** is **extended** due to a delay in a predecessor activity on which the **progress of the subject activity** is **directly dependent**.
- ❖ An example would be the **pacing** of electrical conduit rough-in when the **duration** of metal stud installation is extended by delays.



Meaning – AACE 29R-03

❑ In such a case, because there is **not enough work** to sustain the **continuous utilization** of a **full crew**,

the **electrical subcontractor** may order a crew size reduction,

by **temporarily reassigning** some workers to **other areas**, slowing the progress.

❖ In either case it **extends the overall duration** of electrical rough-in.

Although this is **definitely pacing**,

it is **not considered a pacing delay**

because the **two activities** are sequential and not concurrent.



Meaning – AACE 29R-03

❑ The **second type** of pacing delay is where the **paced activity** has **no direct dependency** on the **parent delay activity**,

sometimes called indirect pacing.

❖ The fact that it **shares the same time frame** is a **function** of schedule timing

as **opposed** to construction logic.

✓ An example of this type of pacing would be the **landscaping subcontractor** who **demobilizes its crew** and **returns at a later time**

because **critical path work** in the building has been **delayed**.



Meaning – AACE 29R-03

❑ In this type of pacing, the **sole relationship** of the paced activity to the **parent delay** is

the fact that the **parent delay creates additional relative total float** available for consumption by the paced activity.

❖ The **deceleration** is achieved typically by

1. Reassignment or reduction of **resources** or
2. **Entirely foregoing** the procurement of resources that would have been **otherwise necessary**.



Meaning – AACE 29R-03

❑ It should be clear that where the pacing defense is raised in answer to the **identification** of a potential concurrent delay,

the **pacing delay** is **not a distinct delay event** but

an **alternate characterization** or "label" to describe and explain the **concurrent delay event**.

❖ Therefore, the **pacing issue** is relevant **only to the extent** that **concurrency** of delays is an issue.

✓ If there have been **no potential concurrent delays** identified, then pacing is irrelevant.



Meaning – AACE 29R-03

- ❑ The term pacing defense is a **misnomer**,
because paced performance, **when properly undertaken**,
is a proactive rather than a reactive response to **another party's parent delay**.
 - ❖ The use of the **term defense** implies that pacing is a **forensic excuse**
rather than a contemporaneous option.



Meaning – AACE 29R-03

❑ **Pacing** almost **never** occurs in the context of a literal method of concurrency analysis.

❑ Under the **literal** theory,

the **initial delay event** would create float within the **other near critical** simultaneous activities.

❖ Since those activities **had float** relative to the **new critical path**,

there would be **no need to consider pacing**.

Meaning – AACE 29R-03

- ❑ Provided that **pacing** is **not precluded** by contract or local law, the **contractor's right** to pace its work in reaction to a critical path delay is a **generally accepted concept**.
 - ❖ Thus, the contractor will **not be penalized** for pacing its work.
 - ✓ This is **consistent** with the **majority view** that **float**, a shared commodity, is available for consumption on a “**first come first served**” basis.

Contracts that reserve float ownership to one party or the other may effectively preclude pacing as a management tool.

Why and when this matters?



Meaning – AACE 29R-03

- ❑ Pacing is irrelevant without the **initial assertion** of **concurrent delay**, and since **concurrent delay** is irrelevant where **compensability** is **not at issue**, the **general acceptance** of **pacing** strongly suggests that the **contractor's right to pace** would **remove** the owner's defense of concurrent delay and thereby make an **otherwise non-compensable parent delay** a **compensable one**.

Alternatively, the owner can also pace performance.



Meaning – AACE 29R-03

Alternatively, the owner can also pace performance.

- ❑ The **owner's legitimate pacing** would remove the **contractor's defense** of concurrent delay and thereby **make** an otherwise **excusable contractor delay**, non-excusable.

Demonstrating – AACE 29R-03

- ❑ In the **absence of clear law or prevailing contractual language**, the **following criteria** provide common sense guidelines for determining the legitimacy of pacing delays:

Demonstrating – AACE 29R-03

1. Existence of the Parent Delay

- ❖ By definition, pacing delay **cannot exist by itself**.
- ❖ It **exists only** in reaction to **another delay** which is
 1. **Equally** or **more** critical or
 2. **Believed** to be **more critical** than the **paced activity**.
- ❖ This calls for the calculation of **relative total float** between the parent delay and the pacing delay.

Demonstrating – AACE 29R-03

1. Existence of the Parent Delay

- ❖ Also, in cases where **many different activities** are being performed at the **same time**, it is unclear who is pacing whom.

- ✓ But **one thing** is clear:

the **parent delay** must always precede the pacing delay.

The **existence** of a **parent delay** is a mandatory requirement in legitimizing a pacing delay.

- ❖ Quantitatively, the **near-critical threshold** can serve as a **benchmark** for the **need to analyze** for pacing delays, just **like** it serves to identify **concurrent delays**.



Demonstrating – AACE 29R-03

2. Showing of Contemporaneous

❖ **Ability to Resume Normal Pace Pacing is not realistic**

unless the **party claiming** it was pacing **can show** that it had the ability to resume progress at a normal, un-paced rate.

✓ **Implicit** in that **party's ability** to show that it could have completed the schedule activity on time if necessary

is the fact that the party was able to

1. Reasonably determine or
2. Reliably approximate

when the **parent delay** would end.



Demonstrating – AACE 29R-03

3. Evidence of Contemporaneous Intent

- ❖ The case can be **further strengthened** by showing that the pacing was a conscious and deliberate decision that was **made at the time** of pacing.
- ❖ **Without a notice** signifying contemporaneous intent to pace, the **claimant** can use pacing as a hindsight excuse for concurrent delay by **offering after-the-fact testimony**.
- ✓ Typically, **contemporaneous pacing notices** are rare in any form, let alone **specific written notices**.
 - Therefore this should **not be a strict requirement** of proof.

Demonstrating – AACE 29R-03

3. Evidence of Contemporaneous

- ❖ Paced performance is **inherently risky** because it is counter intuitive for any party to intentionally delay its performance on a project where **time is of the essence**.
 - ✓ In order to **mitigate such risk**, it is always recommended that the **party claiming** the privilege **provide the party responsible** for the parent delay with notice of its intent to pace its performance.
 - Unfortunately, such **notices are exceedingly rare**.

In padding delays the contractor may be eligible for

both EOT and compensation,

However, in concurrent delays may not

*In some courts, they do **not allow for compensation**, if padding delays exist!*

Why?

*Because they believe that contractors are not entitled to compensable delay
when the result was **merely to consume float**.*

Is it acceptable in case law?

- ❑ They responded **just-in-time**, and there was **no reason to hurry up and wait.**
- ❑ Both the **employers** and **contractors** can argue that their delays **were not relevant** because they were **simply pacing** their work **with pre-existing delays.**
 - ❖ Thus, **potentially avoiding unnecessary costs** associated with the alternative of speeding up
- ❑ **Both of these scenarios** are sometimes **valid** and **both have limited** support in **US and English case law.**

What is needed to demonstrate this case?



Demonstration

- ❑ If either a contractor, or an employer's professional team, seeks to rely on this argument then the **following** should be **demonstrated by the relevant party**:
- **Knowledge** of the **more critical excusable delay**.
 - **Evidence** of an **express decision** to pace its works.
 - **Notification** to the **employer/contractor** that its works **would be paced** so as **not to cause further delay and/or disruption** to the works.
 - **Ability** to **reinstate normal outputs** if the pre-existing delay was **mitigated or avoided**.

When usually this claim is made?



Demonstration

- ❑ Pacing arguments are **most often made** at the **end of a project**, when an **as-built programme analysis** reveals that activities which **were not affected by**
 1. **Any employer** instructed variations or
 2. **Other excusable events**appear to **have been delayed** and **voluntary done!**
- ❑ **When pacing is argued**, it should be treated with both **caution and skepticism**, especially when the assertion is **unsupported by contemporaneous records**.
 - ❖ **Proving** the elements **can only be done** with **contemporaneous records**.



Demonstration

فرآیند جامع آنالیز تاخیرات در پروژه
مقدمه: آنالیز تاخیرات همزمان (Concurrent Delays)

Let's see a case!



Demonstration

- ❑ A further US case (John Murphy Construction Company, AGBCA, No 418 79–1 BCA 13,836 (1979)) addresses ‘**pacing**’ and

concludes that **when contractor** caused delays are merely being paced, concurrently with employer risk events, then contractors sometimes do so at **their own peril**:

‘Conversely, it does not appear from the record that but for the government-caused delays, appellant could have completed the work by December 13. It is concluded, therefore, that despite the delays caused by the government, the record establishes that from the time scheduled for commencement of the project, appellant was at least concurrently responsible for the delay in the progress of the work. Appellant must bear the responsibility for the consequence for his search for a less costly source of water and the manner in which he chose to sequence and perform the work.’

*According to this case, contractors are **not entitled to compensable delay** when the result was **merely to consume float**.*



فرآیند جامع آنالیز تاخیرات در پروژه

بخش پنجم:
آنالیز زمانی تاخیرات

فرآیند جامع و مدارک و مستندات لازم برای پیش بینی و آنالیز تاخیرات

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CMAA Authorized Trainer

دانشگاه Illinois Tech آمریکا

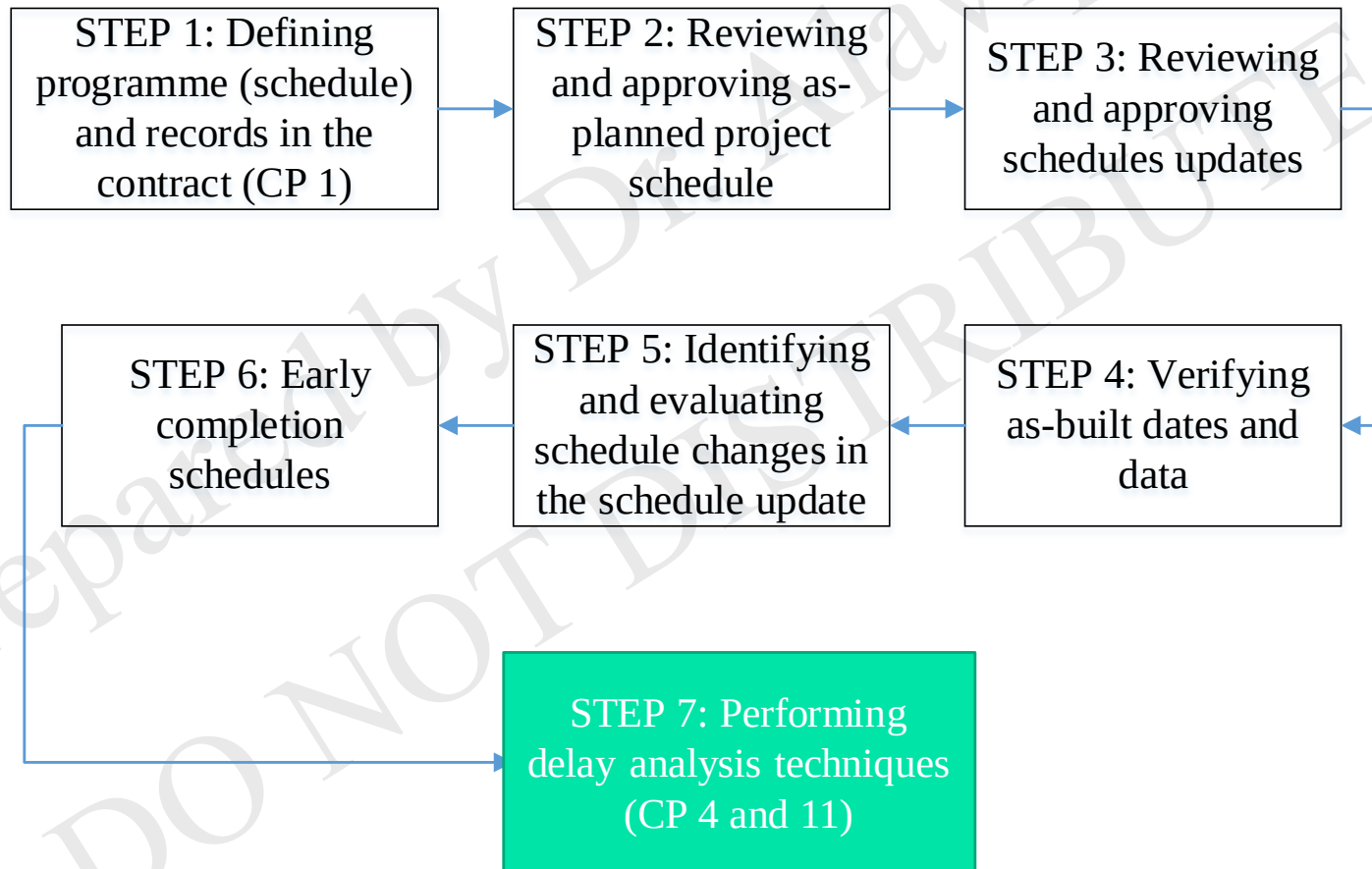
What we will learn?

□ General Procedure for analysis

- ❖ **STEP 1:** Defining programme (schedule) and records in the contract (CP 1)
- ❖ **STEP 2:** Reviewing and approving as-planned project schedule
- ❖ **STEP 3:** Reviewing and approving schedules updates
- ❖ **STEP 4:** Verifying as-built dates and data
- ❖ **STEP 5:** Identifying and evaluating schedule changes in the schedule update
- ❖ **STEP 6:** Early completion schedules
- ❖ **STEP 7:** Performing delay analysis procedure (CPs 4 and 11)

Delay analysis procedure

❑ The following Steps needed to be taken for contemporaneous analysis:



STEP 1: Defining programme (schedule) and records in the contract (CP 1)**1. Programme and records**

Contracting parties should reach a clear agreement on the type of records to be kept and allocate the necessary resources to meet that agreement. Further, to assist in managing progress of the works and to reduce the number of disputes relating to delay and disruption, the Contractor should prepare and the CA should accept a properly prepared programme showing the manner and sequence in which the Contractor plans to carry out the works. The programme should be updated to record actual progress, variations, changes of logic, methods and sequences, mitigations or accelerations measures and any EOTs granted. If this is done, then the programme can be more easily used as a tool for managing change and determining EOTs and periods of time for which compensation may be due.

❑ *The guideline presented here describes the typical records needed for effectively managing progress of the works and proving*

1. EOT claim
2. Compensation claim

STEP 1: Defining programme (schedule) and records in the contract (CP 1)

We talked about schedule in the contract in Planning and Scheduling Course

We talked about records in the contract in Document Management Course

However, we will make the link between CP 1 and delay analysis in this course.

STEP 1: Defining programme (schedule) and records in the contract (CP 1) – Introduction to records

❑ To reach a **clear** and **documented** agreement on **record keeping**, the parties should **consider**:

- (a) the types of records to be produced and the information to be contained therein;
- (b) who is responsible for both producing and checking those records;
- (c) the frequency with which those records are to be updated or produced;
- (d) the distribution list for those records;
- (e) the format of those records (for example, to ensure compatibility with any project-wide database); and
- (f) the ownership (including any relevant intellectual property rights) and storage of, and access to, those records.

It is recommended that the items mentioned included in the bidding documents.

STEP 1: Defining programme (schedule) and records in the contract (CP 1) – Introduction to records

Should owner also keep the records?

STEP 1: Defining programme (schedule) and records in the contract (CP 1) – Introduction to records

- ☐ The **employer (owner)** should consider **whether it is appropriate** to **produce** and **maintain** its own **independent set of relevant records**.
- ☐ **Why is it helpful?** Such records **assist** to:
 1. Have **better management control**
 2. **Support any claims** the employer or contractor may have **against each other**

STEP 1: Defining programme (schedule) and records in the contract (CP 1) – Format and storage of records

❑ Format and storage of records:

❖ **Records** should be produced and stored electronically (at least in PDF format)

✓ Emails, programmes and spreadsheets containing formula should be kept in **their electronic format**.

✓ **Some records** may need to be **shared by other parties** such as contractor.

DO NOT FORGET TO DEFINE ACCESS AT THE OUTSET

✓ **Technology** is quickly **changing**, therefore use **standard document management systems** that are **flexible**.

✓ Regarding the **growing use of building information modeling (BIM)**, the effective use of **BIM requires specific agreement** between the parties regarding:

1. Content of records
2. Use of records
3. Ownership of records

STEP 1: Defining programme (schedule) and records in the contract (CP 1) – Records

❑ The **“Records”** recommended here **divided** into the following **six categories**:

1. Programme records
2. Progress records
3. Resource records
4. Costs records
5. Correspondence and administration records
6. Contract and tender documents

STEP 1: Defining programme (schedule) and records in the contract (CP 1) – Categories of records

1. Programme records

- ☐ These records **set out** the **contractor's plan** for **carrying out the works**.
- ☐ Include **three major items**:
 1. Main programmes
 2. Supplemental detailed programmes
 3. Explanatory records

STEP 1: Defining programme (schedule) and records in the contract (CP 1) – Categories of records

1. Programme records

❑ Main programmies include:

1. Tender programmes
2. Contractor's proposed programmes (**submitted for acceptance**)
3. Baseline (as-planned) programme (**accepted programme**)
4. Updated programmes (**the last of which should be an as-built programme**)
5. Revised programmes to take account of
 - ❖ **Re-sequencing**
 - ❖ **Acceleration measures**
 - ❖ **Mitigation measures**
6. Detailed short-term look ahead programmes such as four week look-ahead programmes
7. Contractor's internal target programmes

STEP 1: Defining programme (schedule) and records in the contract (CP 1) – Categories of records

1. Programme records

❑ **Supplemental detailed programmes** in a suitable format such as CPM, LOB, time location analysis, tabular spreadsheet, or database for:

- (a) design;
- (b) approvals (including the CA's approvals and public authority approvals);
- (c) procurement or manufacturing;
- (d) delivery;
- (e) installation;
- (f) construction of key aspects of the works; and
- (g) testing and commissioning.

STEP 1: Defining programme (schedule) and records in the contract (CP 1) – Categories of records

1. Programme records

❑ Explanatory records that explain in words, graphics, and spreadsheets

❖ This is schedule narrative report

❖ These **records are used** to:

1. Explain **contractor's plan** in detail
2. Explain **activities** in the programmes
3. Explain how the **durations**, **logic**, and **sequences** of **activities** were **determined**

STEP 1: Defining programme (schedule) and records in the contract (CP 1) – Categories of records

1. Programme records

❑ Some examples of **explanatory records**:

1. Narrative programme for **contractor's proposed programme for baseline**

- ❖ Set out the **assumptions** at a **minimum**: key resources, risks, sequencing constraints, and the critical path

2. Narrative programme for **updated programme** or **proposed revised programme**

❖ For example:

1. **Identification** of any **delay** or **disruption** events
2. **Key changes** to the **sequence** and **duration** of activities or as-built data from:
 1. Last updated programme
 2. Critical path
 3. Near critical path

STEP 1: Defining programme (schedule) and records in the contract (CP 1) – Categories of records

1. Programme records

□ Some examples of **explanatory records**:

3. Progress curves for:

- ❖ Costs
- ❖ Resources
- ❖ Physical construction

4. Tabular report of milestones

- ❖ Scheduled
- ❖ Forecast
- ❖ Actual

COLOR	DESCRIPTION OF USE
Red	Items to be added to the drawing
Green	Items to be removed from a drawing
Blue	Comments that are not to be added to the drawing
Yellow Highlighter	Used for marked items as completed by the designer

5. As-built database for each activity

6. BIM files where BIM is being used for the activities

7. Marked-up drawings showing the anticipated completion and as-built dates for activities

STEP 1: Defining programme (schedule) and records in the contract (CP 1) – Categories of records

2. Progress records

- ☐ **Identify** the **progress** of the works at a **particular time**.
- ☐ **Contain** **as-built data**, both (1) **On-site** and (2) **Off-site**
- ☐ **Cover** all the activities that **affect completion** of the works (**near critical** or **critical path**)
- ☐ **Progress records** are required to **establish the progress** of the works **at the time of a delay or disruption event**, the **impact of that event**, and **its effect on the works**

STEP 1: Defining programme (schedule) and records in the contract (CP 1) – Categories of records

2. Progress records

☐ **Progress records** should be **connected with**

- ❖ As-planned programme
- ❖ Updated programme
- ❖ Costs records

STEP 1: Defining programme (schedule) and records in the contract (CP 1) – Categories of records

2. Progress records

☐ Include **three major items:**

1. Raw data records
2. Compiled records
3. Procurement records

STEP 1: Defining programme (schedule) and records in the contract (CP 1) – Categories of records

2. Progress records

- ❑ **Raw data records** are those that should be **compiled** on a **regular basis**, normally **daily** which record **how relevant parts of the work are being carried out**.
- ❑ **Progress achieved:**
 - ❖ **Before** periods of **delay or disruption**
 - ❖ **During** periods of **delay or disruption**
 - ❖ **After** periods of **delay or disruption**

STEP 1: Defining programme (schedule) and records in the contract (CP 1) – Categories of records

2. Progress records

☐ Sample of Raw data records:

1. Reports

- ❖ For each major work area recording weather conditions, manpower, deliveries of key materials, discovery of adverse site conditions, working hours, major plant and equipment used, and work activities underway

2. Health, safety, environmental and/or security issues log

3. Obstruction data

4. Evidence of area handovers between contractors/others

- ❖ Identifying which contractor/other party should perform each work in each area at what time

STEP 1: Defining programme (schedule) and records in the contract (CP 1) – Categories of records

2. Progress records

❑ Sample of Raw data records:

Labor Time Reporting

Daily Labor Time Card											
Project	Highway Bridge		Project No.		200808-05		Wea ther		Cloudy-windy		
Date	July 20						Prepared by		G.A.S.		
Employee Number	Name	Craft	Time Classification	Hourly Rate	Cost Code					Total Hours	Gross Amount
					03157.10.3	03157.20.3					
132	Winnowich, N.	F	ST	34.00		8				8	\$272.00
			OT								
221	Clouten, S.	C	ST	\$31.00		8				8	\$248.00
			OT								
248	Schluder, L.	C	ST	\$31.00		8				8	\$248.00
			OT								
319	Mills, R.	O	ST	\$33.00		2				2	\$66.00
			OT	0							
143	Gibson, E.	L	ST	\$22.00		8				8	\$176.00
			OT								
417	Sears, K.	L	ST	\$22.00		8				8	\$176.00
			OT								
176	Sibanda, M.	L	ST	\$22.00	2	6				8	\$176.00
			OT								
Total Hours					2	48				50	
Total Cost					\$44.00	\$1,318.00					\$1,362.00

Highway bridge, daily labor time card

STEP 1: Defining programme (schedule) and records in the contract (CP 1) – Categories of records

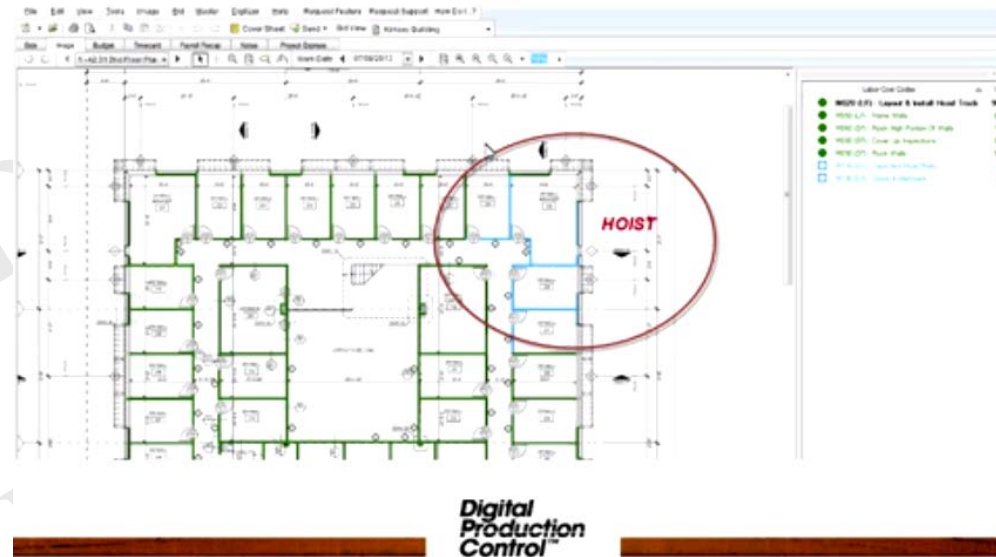
2. Progress records

❑ Sample of Raw data records:

Description	Begin Time	End Time	Quantity (LF)
Excavating Soil	700	913	
Excavating Rock	913	1400	
Excavation Soil	1400	1500	

Quantity 14.5

Duration 8



Description	Begin Time	End Time	Duration	Quantity (LF)	Productivity
Excavating Soil	700	910	2.1	20	9.52
Excavating Rock	910	1400	4.9	10	2.04
Excavation Soil	1400	1500	1	10	10.00

STEP 1: Defining programme (schedule) and records in the contract (CP 1) – Categories of records

2. Progress records

☐ Sample of Raw data records:

4. **Geological mapping** records
5. **Inspection requests/inspection** reports
6. **Site test** records
7. **Testing and commissioning** records (including certificates)
8. **Webcam videos**
9. **Progress photographs**
 - ❖ With **date taken** and if possible **GPS coordinates**

STEP 1: Defining programme (schedule) and records in the contract (CP 1) – Categories of records

2. Progress records

❑ **Compiled records:** These are records **prepared** from the (1) **raw data records** and (2) **programme records**. These include:

1. **Detailed monthly progress** reports

2. **Weekly progress** reports setting out the following:

a) **Overview of progress in the main work areas**

❖ Including design and procurement or manufacturing

b) **Work status in each area of the works**

❖ Covering the relevant programme activities underway

c) **Illustrations of progress achieved**

❖ Such as drawing of pile locations with piles completed, level and section of concrete cast, etc.

d) **Weather reports**

STEP 1: Defining programme (schedule) and records in the contract (CP 1) – Categories of records

2. Progress records

- ❑ **Compiled records:** These are records **prepared** from the (1) **raw data records** and (2) **programme records**. These include:

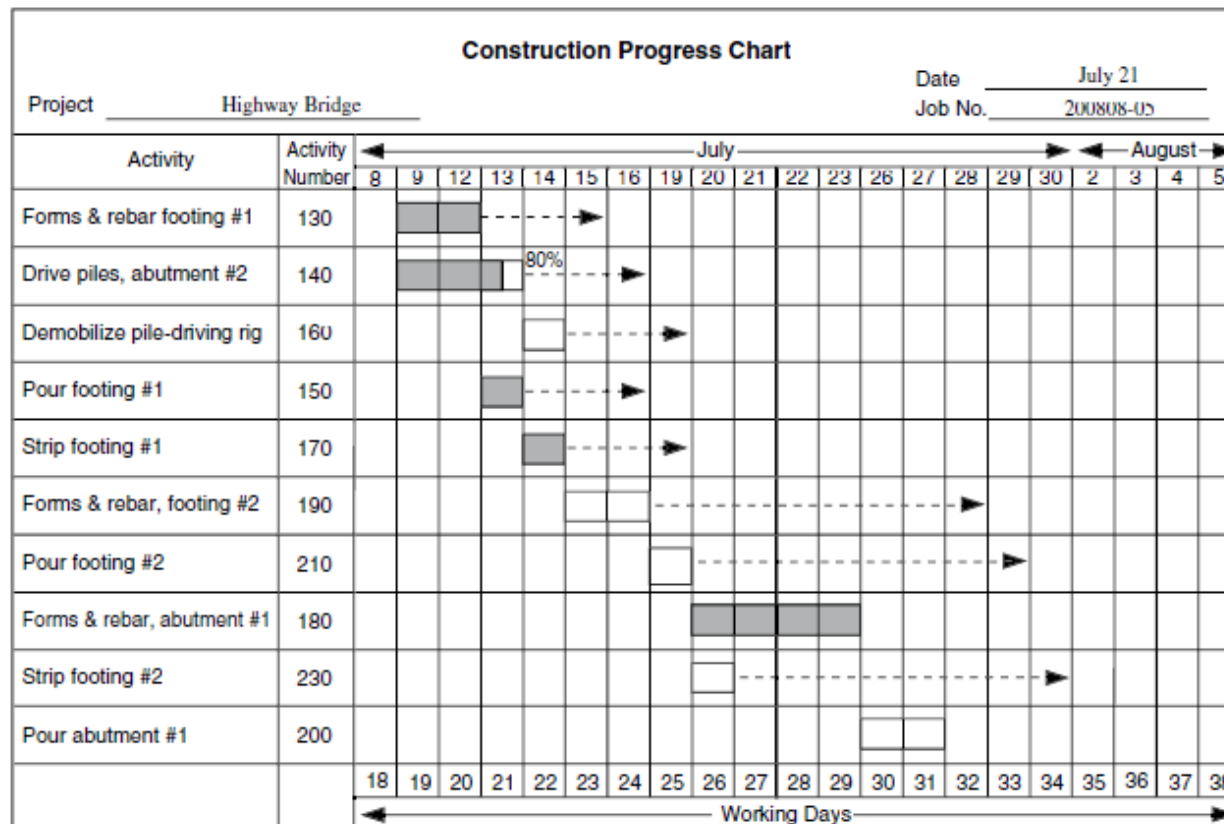
[illegible]

Activity Status Report to Monitor Project Schedule Status.

STEP 1: Defining programme (schedule) and records in the contract (CP 1) – Categories of records

2. Progress records

- ❑ **Compiled records:** These are records prepared from the (1) raw data records and (2) programme records. These include:



STEP 1: Defining programme (schedule) and records in the contract (CP 1) – Categories of records

2. Progress records

- ❑ **Compiled records:** These are records prepared from the (1) raw data records and (2) programme records. These include:

Weekly Labor Time Card									
Craft <u>C</u>									
Name <u>Clouten, S.</u>				Project <u>Highway Bridge</u>					
Employee No. <u>221</u>				Project No. <u>200808-05</u>					
Week Ending <u>July 21</u>				Prepared by <u>S.K.S.</u>					
Cost Code	Time Classification	Hourly Rate	Thursday	Friday	Monday	Tuesday	Wednesday	Total Hours	Total Cost
03157.10.3	ST	\$31.00	8					8	\$248.00
	OT								
03157.20.3	ST	\$31.00		8	8	8		24	\$744.00
	OT								
03311.10.3	ST	\$31.00					8	8	\$248.00
	OT								
	ST								
	OT								
	ST								
	OT								
Total Hours	ST		8	8	8	8	8	40	
	OT								
Gross Amount			\$248.00	\$248.00	\$248.00	\$248.00	\$248.00		\$1,240.00
Weather			Clear-hot	Clear-hot	Cloudy-gusty	Cloudy-windy	Cloudy-windy		

Highway bridge, weekly labor time card

STEP 1: Defining programme (schedule) and records in the contract (CP 1) – Categories of records

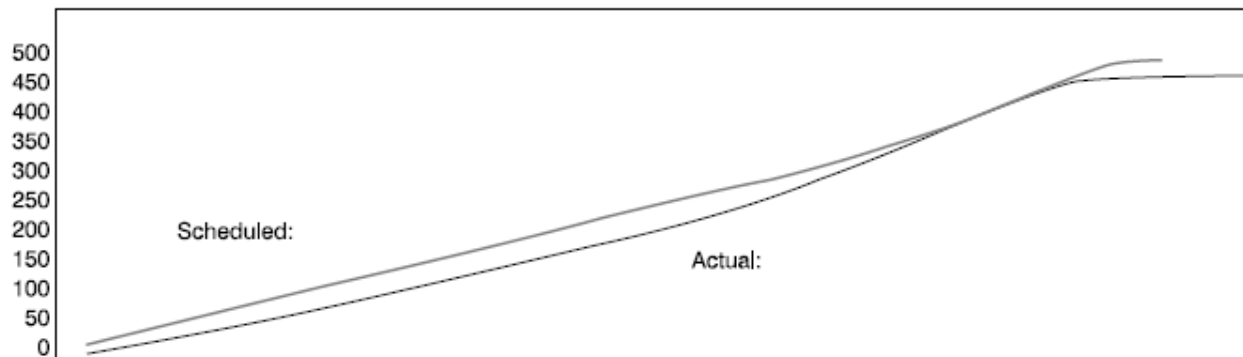
2. Progress records

- ❑ **Compiled records:** These are records prepared from the (1) raw data records and (2) programme records. These include:

Project: Olympic Hotel and Resort Foreman: Joe Wallace
System/Area: Doors, Frames, and Hardware Date Developed: 11/20/19

Work Days:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	Totals:
Estimated Crew Size:	3	3	3	3	3	4	4	4	4	4	4	4	4	4	3	0	0	
Estimated Daily Hours:	24	24	24	24	24	32	32	32	32	32	32	32	32	32	24	0	0	
Accumulated Hours:	24	48	72	96	120	152	184	216	248	280	312	344	376	408	432	432	432	432
Actual Crew Size:	2	2	2	3	3	3	4	4	4	5	5	5	5	2	2	1	1	
Actual Daily Hours:	16	16	16	24	24	24	32	32	32	40	40	40	40	16	16	8	8	
Accumulated Hours:	16	32	48	72	96	120	152	184	216	256	296	336	376	392	408	416	424	424

Manpower Curve:
Hours:



STEP 1: Defining programme (schedule) and records in the contract (CP 1) – Categories of records

2. Progress records

- ❑ **Compiled records:** These are records prepared from the (1) raw data records and (2) programme records. These include:

Weekly Labor Cost Report																
Project <u>Highway Bridge</u>		Project No. <u>200808-05</u>														
Week ending <u>July 21 (working day 27)</u>		Prepared by <u>S.K.S.</u>														
Cost Code (1)	Work Type (2)	Unit (3)	Quantity			Direct Labor Cost				Labor Unit Cost			To Date		Projected	
			Budget (4)	This Week (5)	To Date (6)	Budget (7)	Budget to Date (8)	This Week (9)	To Date (10)	Budget (11)	This Week (12)	To Date (13)	Savings (14)	Loss (15)	Savings (16)	Loss (17)
31220.10.3	Excavation, unclassified	cy	1,667	0	1,667	\$2,643	\$2,643	\$0	\$2,459	\$1.59	-	\$1.48	\$184		\$184	
31222.10.3	Excavation, structural	cy	120	0	120	\$2,985	\$2,985	\$0	\$3,353	\$24.88	-	\$27.94		\$368		\$368
31350.00.3	Pile-driving rig, mob. & demob.	job	-	-	-	*\$4,374	*\$4,374	\$0	\$4,004	\$4,374	-	\$4,004	\$370		\$370	
31361.10.3	Piling, steel, driving	lf	2,240	560	2,016	\$8,224	\$7,402	\$6,373	\$15,762	\$3.67	\$11.38	\$7.82		\$8,360		**\$9,293
03150.10.3	Footing forms, fabricate	sf	360	0	360	\$936	\$936	\$0	\$963	\$2.60	-	\$2.68		\$27		\$27
03150.20.3	Abutment forms, prefabricate	sf	1,810	0	1,810	\$3,548	\$3,548	\$0	\$2,780	\$1.96	-	\$1.54	\$768		\$768	
03157.10.3	Footing forms, place	sf	720	0	360	\$360	\$180	\$0	\$165	\$0.50	-	\$0.46	\$15		\$30	
03159.10.3	Footing forms, strip	sf	720	360	360	\$158	\$79	\$48	\$48	\$0.22	\$0.13	\$0.13	\$31		\$62	
03157.20.3	Abutment forms, place	sf	3,620	1,810	1,810	\$7,312	\$3,656	\$3,504	\$3,504	\$2.02	\$1.94	\$1.94	\$152		\$304	
03311.10.3	Concrete, footing, place	cy	120	0	60	\$1,200	\$600	\$0	\$554	\$10.00	-	\$9.23	\$46		\$92	
*67% of budget for mobilization											Subtotals		\$1,566	\$8,755	\$1,810	\$9,688
**Based on last week, will probably be \$10,087											Totals		⊕	\$7,189	⊕	\$7,878

Highway bridge, weekly labor cost report (#1)

STEP 1: Defining programme (schedule) and records in the contract (CP 1) – Categories of records

2. Progress records

- ☐ **Procurement records:** These establish the **procurement** of **materials** and **permanent equipment** for the **works** that required to **provided timely**.
- ☐ *Examples include:*
 1. **Quotations** from **sub-contractors** and **suppliers**
 2. **Supplier contracts** including any **amendments**
 3. **Shipment** records
 4. **Delivery** records

STEP 1: Defining programme (schedule) and records in the contract (CP 1) – Categories of records

3. Resource records

❑ Capture the resources used to **deliver the works**, including:

- ❖ Management
- ❖ Labor
- ❖ Equipment
- ❖ Materials
- ❖ Subcontractors

productivity should be considered!

Without **records of planned and utilized resources**, it will be more difficult **for the contractor to prove entitlement to time and costs incurred arising from additions or changes to the works and other delay or disruption events**

Resource records should be detailed and comprehensive and where possible should be allocated to the as-planned/updated programme activities.

STEP 1: Defining programme (schedule) and records in the contract (CP 1) – Categories of records

4. Cost records

- ❑ Include a **sufficient level of detail** such that **costs** can be **linked to delay or disruption events**.

- ❖ Labor
- ❖ Material
- ❖ Equipment
- ❖ Subcontractors
- ❖ Project overhead
- ❖ **General overhead**

However,
Could you always claim for HOOH?

STEP 1: Defining programme (schedule) and records in the contract (CP 1) – Categories of records

4. Cost records

☐ Regarding subcontractors

1. Subcontract agreements
2. Subcontractor correspondence (communication)
3. Claims made by subcontractors and responses
4. Subcontractor applications for payment
5. Details of all payments made to subcontractors

STEP 1: Defining programme (schedule) and records in the contract (CP 1) – Categories of records

4. Cost records

☐ Regarding suppliers

1. Supply agreements
2. Supplier correspondence (communication)
3. Claims made by suppliers and responses
4. Supplier invoices
5. Details of all payments made to suppliers

STEP 1: Defining programme (schedule) and records in the contract (CP 1) – Categories of records

4. Cost records

- ❑ If the **contractor** wants to **use a formula** for the **assessment** of **lost profits** and **general overheads (unabsorbed overheads)**, it will need to **produce evidence** that the delay caused by owner **avoid contractor** to take a **new project**.

What you need to be able to use a formula?

STEP 1: Defining programme (schedule) and records in the contract (CP 1) – Categories of records

4. Cost records

❑ To prove, you need the following:

1. **Business plans** prior to delay **caused by employer**
2. Contractor's **bidding history**
3. Records of **acceptance** or **rejection of bidding**
4. Records that **support** the **inputs into the formula** used, in particular **contractor's company accounts** for:
 - a) **Periods** immediately **preceding** and **succeeding** the **employer delay**
 - b) **Period** when the **employer delay** occurred

Let's see more in detail!

STEP 1: Defining programme (schedule) and records in the contract (CP 1) – Categories of records

4. Cost records

☐ Regarding contractor general overhead

1. Financial statements documenting annual general overhead costs and revenue (**Planning and Scheduling course**)
2. Business plans for generating profit (Company Cash flow forecast) (**Planning and Scheduling course**)
3. Records regarding bidding history
4. Records regarding bidding opportunities
5. Internal meeting minutes to review future bidding opportunities and staff availability
6. Short interval schedule and project reporting (**Planning and Scheduling course**)

Copies of all invoices should be kept in an easily retrievable filing system preferably with electronic copies.

STEP 1: Defining programme (schedule) and records in the contract (CP 1) – Categories of records

4. Cost records

- ☐ You may need to disclose some of your confidential information if the case is taken to the court...

a claiming party has to accept some **loss of confidentiality**

How we can avoid this problem?

STEP 1: Defining programme (schedule) and records in the contract (CP 1) – Categories of records

4. Cost records

The **parties** might therefore consider agreeing relevant rates in the **contract**, rather than requiring **proof of actual costs or loss** for certain eventualities

Example?

An agreement regarding **staff rates** to be charged in the event of an employer delay to completion

THIS IS BENEFICIAL TO BOTH PARTIES

STEP 1: Defining programme (schedule) and records in the contract (CP 1) – Categories of records

5. Correspondence and administration records

- ☐ All written communications between the employer, the CA, and third parties relevant to the progress of the works.
- ☐ Written communications should be:
 - ❖ Uniquely **numbered**
 - ❖ Contain a **descriptive** subject line
 - ❖ Dated and issued to the agreed **distribution list**

STEP 1: Defining programme (schedule) and records in the contract (CP 1) – Categories of records

5. Correspondence and administration records

❑ This includes:

1. Letters/emails
2. Contract management
3. Technical
4. Milestones
5. Claims

STEP 1: Defining programme (schedule) and records in the contract (CP 1) – Categories of records

5. Correspondence and administration records

☐ Letters/emails covers:

1. **Letters** and **material emails** between **parties involved** in the works
2. **Other emails** (including **internal emails**)

STEP 1: Defining programme (schedule) and records in the contract (CP 1) – Categories of records

5. Correspondence and administration records

- ☐ Email communications should have a **protocol** from the **outset** of each project.
- ☐ Emails communications should be **archived in native format**.
- ☐ Email communications that are **internal** should also **be archived**.
- ☐ Even with the **best system** for managing and achieving emails, **some emails** may be **lost**. To **reduce the adverse effect** of these issues:

1. **Material communications (of whatever nature)** should be:

- a) Prepared in the form of a letter
- b) Uniquely numbered
- c) Carefully retained

2. **Key emails** should be

- a) Kept in a centralized folder
- b) Given unique correspondence number

STEP 1: Defining programme (schedule) and records in the contract (CP 1) – Categories of records

5. Correspondence and administration records

- ☐ **Contract management** covers **all notices** or **documents** issued under the contract, **with the exception** of:
 - a) Letters/emails
 - b) Claims related records

STEP 1: Defining programme (schedule) and records in the contract (CP 1) – Categories of records

5. Correspondence and administration records

❑ Contract management **examples** include:

- a) CA instructions and **confirmation of instructions**
- b) Early warning notices (and their close out)
- c) Variations/change requests or **proposals**
- d) Bonds, insurance documents or **guarantees**
- e) All other documents issued under or required by the contract (**other than claims related records**)

STEP 1: Defining programme (schedule) and records in the contract (CP 1) – Categories of records

5. Correspondence and administration records

- ❑ **Technical records:** these are **technical documentation** submitted **during** the course of the **works**,

along with the **final documentation** submitted by the **contractor**.

❖ Technical documentation is **needed to**

demonstrate compliance by the **contractor** with

1. Contract drawings
2. Specifications

STEP 1: Defining programme (schedule) and records in the contract (CP 1) – Categories of records

5. Correspondence and administration records

❑ Technical records **examples** include:

1. Submission logs, including **date of submission**, **date of response**, **status** and **follow up required** and **underlying documentation** for:

- ✓ Design drawings and calculations
- ✓ Method statements
- ✓ Subcontractor approval requests
- ✓ Material submittals
- ✓ Shop drawings
- ✓ Requests for information and responses

STEP 1: Defining programme (schedule) and records in the contract (CP 1) – Categories of records

5. Correspondence and administration records

❑ Technical records **examples** include:

2. Approvals by the CA

3. Agendas for minutes of meetings, including:

- ❖ Design
- ❖ Construction progress
- ❖ Programme review
- ❖ Management
- ❖ Health & safety, environmental and security
- ❖ Quality

4. Deficiency/non-compliance notices (and their close out)

5. As-built drawings/documents

6. Operations and maintenance manuals

STEP 1: Defining programme (schedule) and records in the contract (CP 1) – Categories of records

5. Correspondence and administration records

❑ Milestones include:

- ❖ Achieving **certificates**
- ❖ **Contractor's request** for a **certificate** that the works are **complete**
 - ✓ And the **CA's response** including a report on any areas of **disagreement**
- ❖ **CA's certificate** that the **works are complete**

STEP 1: Defining programme (schedule) and records in the contract (CP 1) – Categories of records

5. Correspondence and administration records

☐ **Claims records** include:

1. **EOT claims/responses** including the CA's determinations
2. Claims for **additional payment/responses** including the CA's determinations
3. **Notices of dissatisfaction** with **determinations**
4. **Referrals** to further stages of the **dispute resolution procedure**
5. **Documents** produced for the **purposes of further stages of the dispute resolution procedure**

STEP 1: Defining programme (schedule) and records in the contract (CP 1) – Categories of records

6. Contract and tender (bidding) documents

❑ These documents **establish** the contractor's requirements in

1. Carrying out the **works**

2. **Assumed baseline** in terms of time and costs for carrying out the works

❖ A **complete copy** of construction contracts including **any amendments** should be maintained by both parties.

❖ Tender documents include **all correspondence** between the parties regarding the contract negotiations.

STEP 1: Defining programme (schedule) and records in the contract (CP 1) – Categories of records

6. Contract and tender (bidding) documents

❑ Tender documents include:

1. On the part of employer

- (a) Tender **submissions** by all tenders,
- (b) Tender **evaluations**, and
- (c) Employer's calculations of any **liquidated damages rates**

2. On the part of the contractor

❖ Records **demonstrating**

- 1. Build-up to its **tender price**
- 2. Any amendments to the price
- 3. Assumptions on which the **tender price** is based.

STEP 1: Defining programme (schedule) and records in the contract (CP 1) – Categories of records

6. Contract and tender (bidding) documents

☐ Contract documents:

1. **Contract agreement**
2. **Correspondence** relating to the **contract negotiations**
 - ❖ Including any **letter of intent** and **letter of award**
3. **Conditions of contract**
 - ❖ **General conditions** and **special/particular conditions**
4. **Specifications** and the **employer's requirements**
5. **Drawings**
6. **Schedule of prices** or **bills of quantities**
7. **Contractor's tender submission** and any **clarifications** to that **submission**

STEP 1: Defining programme (schedule) and records in the contract (CP 1) – Categories of records

6. Contract and tender (bidding) documents

❑ **Tender documents**: Documents **produced** or **issued** by both the **employer** and the **contractor** **pre-contract** and include the following:

1. **Instructions** issued by the **employer** to **tenderers**, including a **draft copy** of the **contract**
2. **Any clarifications** issued by the **employer** regarding those **instructions** or the **draft contract**
3. **Submissions** from **all tenderers**
 - ❖ **Technical** and **commercial** **submissions** including **all clarifications** to those **submissions**
4. **Contractor's tender build-up** including **all estimating information**
5. **Employer's tender evaluation**
6. **Employer's calculations** for any **liquidated damages rates** in the contract

STEP 2: Reviewing and approving as-planned project schedule

- ❑ As defined, the **as-planned schedule** is the schedule created either:
 1. **Before construction begins**
 2. **Very early in the first stage of the project**
- ❑ **As-planned** should represent the **Contractor's plan** to construct the project based on the **information** it had at **the time of bid**.
- ❑ It is **erroneous** to use the **Owner's version** as the **as-planned schedule** for the project because the **Contractor** may plan to **construct** the Project in a **different sequence** or **manner**.



STEP 2: Reviewing and approving as-planned project schedule

- ❑ After identifying the schedule, the **analyst** should review that schedule for sequencing and feasibility.

A note of caution:

Often the analyst, or the person assessing the Project for delays, **reviews** the Contractor's schedule and decides that it did not correctly portray:

- (1) Sequencing of the project
- (2) Durations for the activities

STEP 2: Reviewing and approving as-planned project schedule

❑ The **reviewer** of the **as-planned schedule** should **ultimately** be able to **conclude** that the **as-planned schedule**:

1. **Complies** with the **contract requirements**,
2. **Depicts** the **contractor's plan** to complete the project, and
3. **Represents** a plan that is **constructible**, with a **critical path** that **makes sense**



STEP 2: Reviewing and approving as-planned project schedule

❑ Although there is **no single checklist** that defines what constitutes a **“good” Project schedule**, it is recommended that the **reviewer** should take the **following steps** when performing the review of the **Contractor’s as-planned schedule**.

❖ For the purposes of this discussion, it is **assumed** that the **as-planned schedule** is a **Critical Path Method (CPM) schedule**.

1. **Understand** the **contract requirements**
2. **Verify** the **contents** of the schedule **submission**
3. Does the schedule **conform** to the **contract requirements**?
4. Is the schedule **contractible** and are the **durations reasonable**?
5. Do the **critical path** and **near critical paths** make sense?



STEP 2: Reviewing and approving as-planned project schedule

1. Understand the contract requirements

- ☐ Reviewer should have a **thorough understanding** of the **contract documents**
- ☐ The **contract documents** will **provide** the reviewer with **necessary information** including, but **not limited to**:
 1. Project's scope of work
 2. Project's staging or phasing
 3. Contract milestones
 4. Owner review times
 5. Third-party responsibilities
 6. Contract restrictions and constraints

STEP 2: Reviewing and approving as-planned project schedule

2. Verify the contents of the schedule submission

- ❑ The **first step** is to determine whether or not the **contractor's schedule submittal** meets the **requirements** of the **contract's scheduling specification**.
- ❑ Most **CPM scheduling specifications** require the contractor to **submit**
 1. A copy of **electronic schedule file**
 2. **Schedule narrative**
 3. Multiple schedule or **tabular reports**

and requires the contractor to **submit** the schedule **within a certain time**.

In the **written review**, the reviewer should **state**:

1. Whether the submission was **submitted on time**
2. **Missing reports**
3. **Deadline to submit missing reports**



STEP 2: Reviewing and approving as-planned project schedule

3. Does the schedule **conform** to the **contract requirements**?

☐ After **reviewing contract documents comprehensively (Step 1)** and after **checking the contents of the schedule submission (Step 2)**,

the reviewer should determine whether the **project schedule conforms** to the **contract documents**.



STEP 2: Reviewing and approving as-planned project schedule

❑ Sample of items to evaluate when reviewing the schedule's conformance to the contract requirements:

1. Does the schedule conform to the **contract milestones, phasing, sequencing requirements**, and so forth?
2. Does the **schedule conform** to the **CPM scheduling & time extension provisions**?
3. Include **all of the tasks** necessary to **complete the scope of work**



STEP 2: Reviewing and approving as-planned project schedule

3. Does the schedule **conform** to the **contract requirements**?
 1. Does the schedule **conform** to the **contract milestones, phasing, sequencing requirements**, and so forth?
 - ❖ **As-planned schedule** should **conform** to the **contract's phasing**.
 - ❖ **As-planned schedule** should **not forecast** project milestone dates **later** than the **contract milestone dates**.

Why **milestones** are important?



STEP 2: Reviewing and approving as-planned project schedule

ASCE Standard ANSI/ASCE/CI 67-17 (Schedule Delay Analysis)

5.4 IF MULTIPLE MILESTONES HAVE DELAY DAMAGES ASSOCIATED WITH THEM, A SEPARATE DELAY ANALYSIS SHOULD BE PERFORMED FOR EACH MILESTONE

☐ **Float values** are affected by **different constraints** in the CPM network.

☐ In instances where the schedule contains **milestone constraints**,

it may be **more accurate** to identify the **critical path** through

1. Subject milestone or
2. Activities

that must be progressed to **keep that milestone on time**.

Why phasing and sequencing **requirements** are important?

STEP 2: Reviewing and approving as-planned project schedule

ASCE Standard ANSI/ASCE/CI 67-17 (Schedule Delay Analysis)

- ❑ **Chronology** of delay is an important part of a **critical path analysis** as the **basis for segregation** of delays to allow related costs and time impacts to be attributed to the parties involved (**apportionment**).
- ❑ **A chronological evaluation** is critical in determining when events occurred, their impact on the contemporaneous project schedules, and the contemporaneous decisions made by the parties, emphasizing the importance of **keeping project records and schedule updates** throughout the project.
- ❑ The **schedule** is **not static and changes continually** on the basis of events as they unfold on a project,
and this **must** be reflected in a proper **evaluation** of project delays.



STEP 2: Reviewing and approving as-planned project schedule

3. Does the schedule **conform** to the **contract requirements**?
2. Does the **schedule conform to the CPM scheduling & time extension provisions**? Some of **contract's scheduling provision**:
 - ❖ **Limit** the **duration of activities**
 - ❖ **Limit** the use of **unnecessary or inappropriate constraints**
 - ❖ **Prohibit activities** with **open ends**
 - ❖ **Prescribe** the use of certain **logic relationships, lags, and leads**
 - ❖ **Establish** the required **level of detail** in the **schedule**

Let's look at them more in detail!



STEP 2: Reviewing and approving as-planned project schedule

❑ Limit the duration of activities

- ❖ As a guide, **no activity or lag** (other than a summary activity) should **exceed 28 days** in duration.
- ❖ Wherever possible, an **activity** should not **encompass more than one trade** or operation.

How about the time when rolling wave planning used?



STEP 2: Reviewing and approving as-planned project schedule

❑ **Limit** the use of **unnecessary** or **inappropriate constraints**

- ❖ **Manually applied constraints** such as 'must start' or 'must finish' fixed dates, 'zero float' and other programming techniques that can have the effect of inhibiting a programme from reacting **dynamically to change** should be **avoided** (or, if unavoidable, properly explained in the programme narrative) (SCL).

How about other hard constraints?



STEP 2: Reviewing and approving as-planned project schedule

ASCE Standard ANSI/ASCE/CI 67-17 (Schedule Delay Analysis)

5.3 EXCESSIVE CONSTRAINTS ON ACTIVITIES THAT INTERFERE WITH A LOGIC-DRIVEN CRITICAL PATH MAY COMPLICATE EVALUATION OF CRITICAL DELAYS AND SHOULD BE CONSIDERED IN A DELAY ANALYSIS

- ☐ Excessive constraints should generally be **avoided**.
- ☐ In a constrained schedule, **total float may be driven** by constrained dates **instead of the project end date**.
- ☐ The **use of constraints complicates** the use of total float as a **time prioritizing tool**.
- ☐ Particularly, the **use of** specified constraints on individual activities or specifying float values on individual activities **may interrupt a logic-driven critical path** and is **not preferred**.



STEP 2: Reviewing and approving as-planned project schedule

❖ Prohibit activities with open ends

- ❖ The **Contractor's proposed programme** (and any revisions) should be prepared with **sufficient detail using logic links** (i.e. each activity is linked to **both a predecessor and successor activity or milestone**)

to provide **proper forward visibility** so that the **effect of delay** and **disruption events** can be **predicted** with as **much accuracy as possible (SCL)**.

Remember **dangling logic** in Planning and Scheduling Course?





STEP 2: Reviewing and approving as-planned project schedule

❑ **Prescribe** the use of certain **logic relationships, lags, and leads**

- ❖ **Lags** may be introduced for **non-work periods (such as curing of concrete)** but **better visibility and understanding** is provided if such matters are **shown as activities** in themselves
- ❖ Where utilized, the **Contractor should provide an explanation** in the programme narrative as to **why particular leads and lags** have been applied (SCL).
- ❖ **Leads and lags** may result in **incorrect progress tracking** if **delays prevent** the project from being performed as **planned**.
- ❖ A **preferred alternative** to leads and lags is to **break activities up into smaller segments** and use **finish-to- start relationships** (ASCE)

STEP 2: Reviewing and approving as-planned project schedule

3. Does the schedule **conform** to the **contract requirements**?
3. Include **all of the tasks** necessary to **complete the scope of work**
 - ❖ **Tasks** and **activities** to **construct the project**
 - ❖ **Activities** for **preparation** and **submission** of:
 1. **Key submittals,**
 2. **Time for the procurement of key equipment and materials,**
 3. **Adequate time for certain owner activities:**
 1. Submittal reviews
 2. Procurement of owner-furnished materials or equipment



STEP 2: Reviewing and approving as-planned project schedule

3. Does the schedule **conform** to the **contract requirements**?

3. Include **all of the tasks** necessary to **complete the scope of work**

❖ **For example**, the **schedule** should include:

- ❖ Time for permitting or third-party/regulatory activities
- ❖ Concrete cure times
- ❖ surcharge durations for settlement
- ❖ Winter shutdown periods
- ❖ Permitting restrictions
- ❖ Work area restrictions
- ❖ Coordination with adjacent projects



STEP 2: Reviewing and approving as-planned project schedule

3. Does the schedule **conform** to the **contract requirements**?

If one of three major items **missed** in the schedule, the **reviewer** asks the contractor to **revise** and **resubmit** the **schedule**.



STEP 2: Reviewing and approving as-planned project schedule

4. Is the schedule **contractible** and are the **durations reasonable**?

☐ After **verifying** that the **as-planned schedule** meets the **Contract requirements**, the **next step** involves an evaluation of

1. **Schedule's sequencing** of the **work activities**
2. **Activity durations**

موسسه مهندسی و مدیریت ساخت علوی پور (ACEMI)

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