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Strategic delay analysis: proving delay claims

20 July 2023

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Why do we argue about delay?

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- For the Employer, contractual completion date:
  - Liquidated damages
  - Termination right
- For the contractor, a gateway to money:
  - Prolongation costs
  - Further costs?

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Some tricky terms…

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- What do we mean by delay?
- “EOT” / extension of time provisions
- Delay damages / LDs / DLDs
- “time at large”
- “the prevention principle”
- Concurrent delay
- Critical path / Critical Path Analysis
- Sequential delay
- Pacing delay
- Float

Distinction between "critical" and "non-critical" delay

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Critical delay is required for an extension of time claim

- The *"critical path",* a simple definition: the sequence of activities that determines the duration of the programme.
- A *"critical"* delay is a delay to the progress of a critical activity which has the effect of extending the overall project duration and the completion date because it causes a knock on delay to subsequent critical activities.
- A *"non-critical"* activity is an activity that is not on the critical path. That means a delay to a non-critical activity will not delay completion of the project. Therefore:
  - No entitlement to an extension of time; but
  - Possible ability to recover costs associated with the activity delays.

Delay and/or disruption

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What we mean by disruption?

- The Society of Construction Law Delay and Disruption Protocol (2nd Edition: February 2017):

  The objective of a disruption analysis is to demonstrate the loss of productivity and hence additional loss and expense over and above that which would have been incurred were it not for the disruption events for which the Employer is responsible

Liquidated damages

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- Liquidated damages (LDs, or DLDs):
  - On failing to achieve the completion date, the employer is not required to prove either the reasons why the contractor is late or the loss it has suffered;
  - Unless otherwise stated, liquidated damages provide a sole remedy for the Employer for delays to completion.
  - Provides both parties with certainty.

Extension of time provisions

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- Identify and agree the circumstances in which the contractor is entitled to a longer period for completion of the works (and therefore relief from LDs);
    - Provide recourse to adjust completion dates for delays to completion due to employer's risk;
    - Set out the procedure for adjusting the contractual completion date(s).
- Provide both parties with certainty.
    - Avoid any ‘time at large’ disputes (when the EOT mechanism has failed and a contractor is required to complete in a reasonable period of time and Employer loses right to LDs); and
    - Protect the completion date by avoiding the application of the prevention principle.

In the context of a construction or engineering project, the principle that ***one party may not insist on a second party's compliance with the contract, where the first party has itself prevented the second party from being able to comply***

Extension of time provisions

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Identify circumstances giving rise to an EOT entitlement (e.g. variation)

Notification of delay as a condition precedent:

- an entitlement to an extension of time may be lost if notice is not given;
- allows the employer to take action to reduce the delays.

Obligation to provide further particulars of the impact of the event on progress.

Extension of time provisions

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Procedure as per FIDIC Conditions of Contract (Sub-clause 8.4)

Step 1: The contractor should submit a notice to the employer within 28 days of becoming aware of an event or circumstance which may result in an extension of Time for Completion.

Step 2: Within 42 days of becoming aware of the event or circumstance, the contractor should submit a fully detailed claim of Extension of Time for Completion, which includes full supporting particulars of the basis of the claim.

Step 3: The employer shall respond with approval or disapproval within 42 days of receiving the claim or any other further particulars supporting a previous claim.

> *"The Employer shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine (i) the extension (if any) of the Time for Completion (before or after its expiry) in accordance with Sub-Clause 8.4 [Extension of Time for Completion]..."*

Extension of time provisions

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Procedure as per JCT Standard Building Contract 2016

- Notice of delay events

  "*If and whenever it becomes reasonably apparent that the progress of the Works or any Section is being or is likely to be delayed the Contractor shall forthwith give written notice…of the material circumstances, including the cause and causes of the delay, and shall identify in the notice any event which in his opinion is a Relevant Event*" (JCT Standard Building Contract 2016, clause 2.27.1).

- Expected effects

  "*In respect of each event identified in the notice, the Contractor shall, if practicable in such notice, or otherwise in writing, as soon as possible thereafter, give particulars of its expected effects including an estimate of any expected delay in completion of the Works or any Section beyond the relevant Completion Date*". (JCT Standard Building Contract 2016, clause 2.27.2).

Extension of time provisions

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NEC procedure

Clause 61.3:

> *"The Contractor notifies the Project Manager of an event which has happened or which he expects to happen as a compensation event if*
>
> - *the Contractor believes that the event is a compensation event and*
> - *the Project Manager has not notified the event to the Contractor.*
>
> *If the Contractor does not notify a compensation event within eight weeks of becoming aware of the event, he is not entitled to a change in the Prices, the Completion Date or a Key Date unless the Project Manager should have notified the event to the Contractor but did not."*

Obligation to mitigate delays

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- General duty to mitigate.
- Express obligations to mitigate.
  - The JCT Standard Building Contract 2016 requires the Contractor to use his / her *"best endeavours"* to prevent delays to the works. Obligations such as to use "*best endeavours"* or "*all reasonable endeavours"* are generally regarded as being more onerous than the common duty to mitigate.
  - According to *Keating on Construction Contracts* (11th Edition):

    "*in some cases it might be the Contractor's duty to re-programme the Works either to prevent or to reduce delay. How far the Contractor must take other steps depends upon the circumstances of each case, but it is thought that the proviso does not contemplate the expenditure of substantial sums of money*" (21-140)
- Keep a contemporary record of the steps taken and the reasons other potential mitigation measures were not taken.

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Concurrent delay

The meaning of “concurrent delay”

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Concurrent delay will only arise in the following circumstances:

- Two delay events (one a contractor risk, the other an employer risk) occur at the same time;
- The effect of those two events, in terms of overall delay to the project, are felt at the same time.

Therefore, if a project is already in delay due to the contractor, late variations (or other Employer risk events) are unlikely to be considered concurrent causes of delay.

True concurrency of delay is rare.

Henry Boot Construction (UK) Ltd v. Malmaison Hotel (Manchester) Ltd.

Royal Brompton Hospital NHS Trust v. Hammond and Others

Concurrency – Impact on EOT under English law

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'Time but no money'

- The contractor is entitled to an EOT but cannot claim for the associated loss and expense (time related costs) because it would have incurred this loss in any event due to its own delay.
- The employer cannot assess/claim liquidated or actual damages because the contractor is entitled to an EOT (and because the liquidated or actual damages it seeks would have been incurred in any event due to its own delay).

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Concurrent delay outside England and Wales?

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City Inn Ltd v Shepherd Construction Ltd. (Scottish Law)

> *"Where there is true concurrency between a relevant event and a contractor default, in the sense that both existed simultaneously, regardless of which started first, it may appropriate to* ***apportion*** *responsibility for the delay between the two causes."*
>
> *"…obviously, however, the basis for such apportionment must be fair and reasonable. Precisely what is fair and reasonable is likely to turn on the exact circumstances of the particular case."*

UAE: Likely also to favour apportionment. Relevant provisions of the UAE Civil Code:

- Article 245, good faith
- Article 291, the apportionment of liability where two or more parties are responsible for damage,
- Article 290, flexibility to reduce a damages award if the claimant is also responsible for the loss suffered.

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Proving your entitlement

Proving your entitlement (to either delay or disruption)

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- Legal submissions in relation to the relief due under the contract and basis on which an extension of time is due.
- For delay claims, identify the periods of time attributable to each cause of delay to the project:
  - Independent expert analysis opining on the causes of delay (or disruption).
  - Reliable methodology.
- However, contemporary documents are the foundation of your case. These will be supplemented by witnesses evidence, and the basis for your expert's conclusions.
- Judges/arbitrators will reach a decision that is consistent with the contemporary documents and "common sense": what actually happened?

Proving your entitlement (to either delay or disruption)

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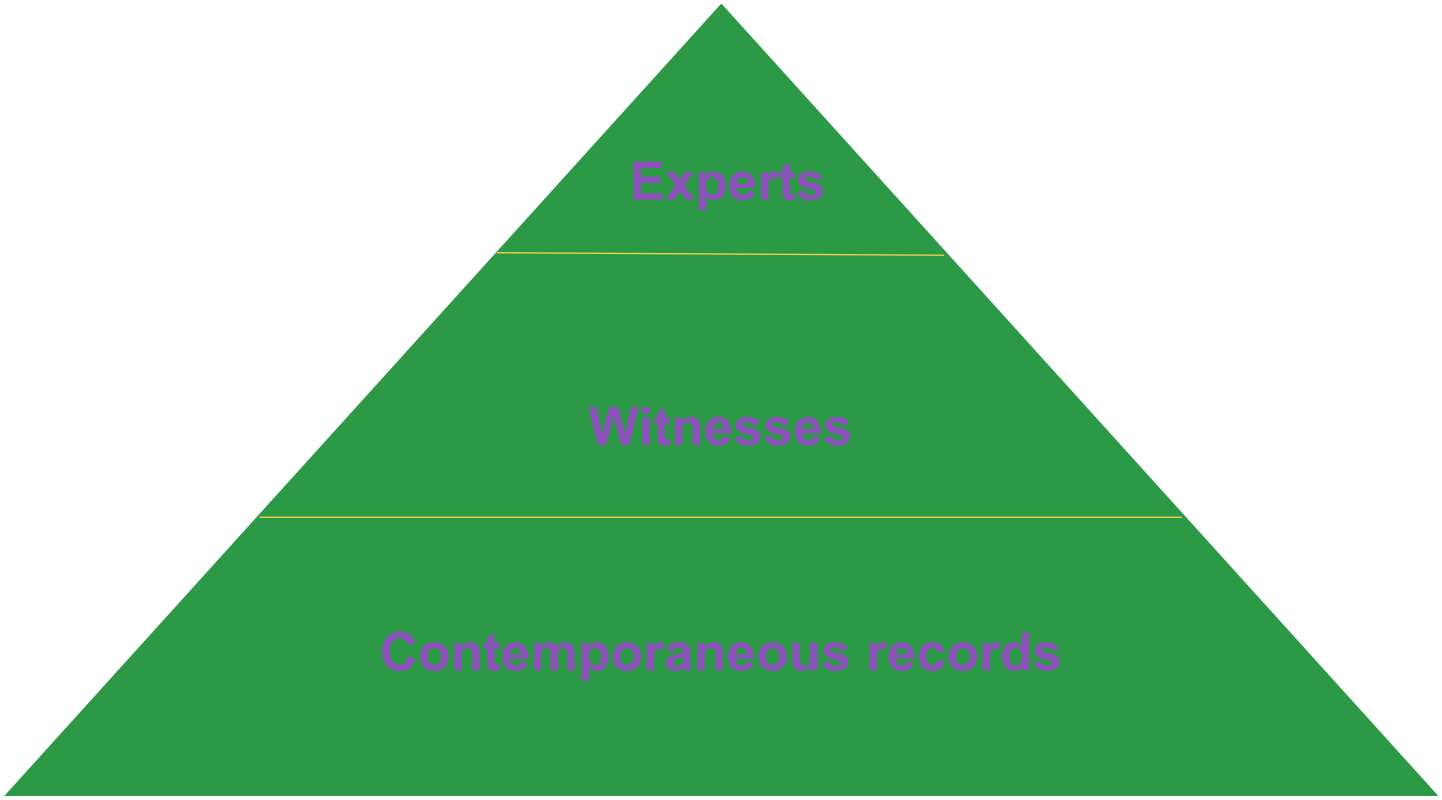

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Proving your entitlement: costs

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- An extension of time may provide a gateway to prolongation costs
- For disruption claims, track why costs are incurred as and when they are incurred:
  - Contemporaneous records of why resources were underutilised;
  - use cost codes for activities / working areas, etc.
- Tender costs often used as a basis: must be able to demonstrate the tender assumptions were reasonable. Were costs incurred in accordance with the tender before the delay / disruption?
- Detailed evidence of the reasons costs were incurred is required; estimates of loss of productivity may be acceptable.

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Strategic delay analysis: proving delay claims

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3. **Common Themes**

Concurrency, sequential delays, pacing and float

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The Basics of Delay Analysis

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Many Construction Disputes Involve Significant Issues Pertaining to Time

- Is the contractor entitled to an Extension of Time (EOT)?
- How much EOT is due?
- Must the contractor pay Liquidated and Ascertained Damages (LADs) or is it entitled to recover damages for delay (prolongation costs)?
- Is there concurrent delay? If so, how should it be treated?
- Were appropriate mitigation measures taken to avoid or reduce delay?
- Did disruption (inefficient and uneconomical working) occur and if so, why?

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Many Construction Disputes Involve Significant Issues Pertaining to Time

- To answer the previous questions, programming experts provide '*critical path delay analysis*' and conclusions on the causes and timing of periods of delay.
- The Critical Path is:

  "*...the sequence of activities through a project network from start to finish, the sum of whose durations determines the overall project duration*".

  - ***Society of Construction Law's Delay & Disruption Protocol 2nd Edition (2017)***

- Only activities / events that are on the critical path are relevant when considering an EOT, LADs, application of extended overhead costs, etc.

  Note: projects can be significantly disrupted but not delayed.

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Many Construction Disputes Involve Significant Issues Pertaining to Time

Q: So where do we start our analysis?

A: With the Programmes*

In conjunction with understanding the programming requirements and obligations under the relevant contract.

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The Role of the Programme when Assessing Delay

- Most construction contracts require the contractor to:
  - produce a programme at the start of the works showing how and when the contractor intends to construct the works;
  - monitor the progress of the works in accordance with the programme; and
  - update the programme for any relevant change: delay events, new instructions, variations / change orders, award of EOT, etc.
- The objectives of a programme are to:
  - determine the earliest date upon which completion can be achieved;
  - identify the activities on the critical path to completion (and activities with 'float');
  - show the interrelationship (logic) of activities;
  - show the rationale of the sequence of site operations; and
  - identify the time constraints imposed by labour, plant, materials and working calendars.

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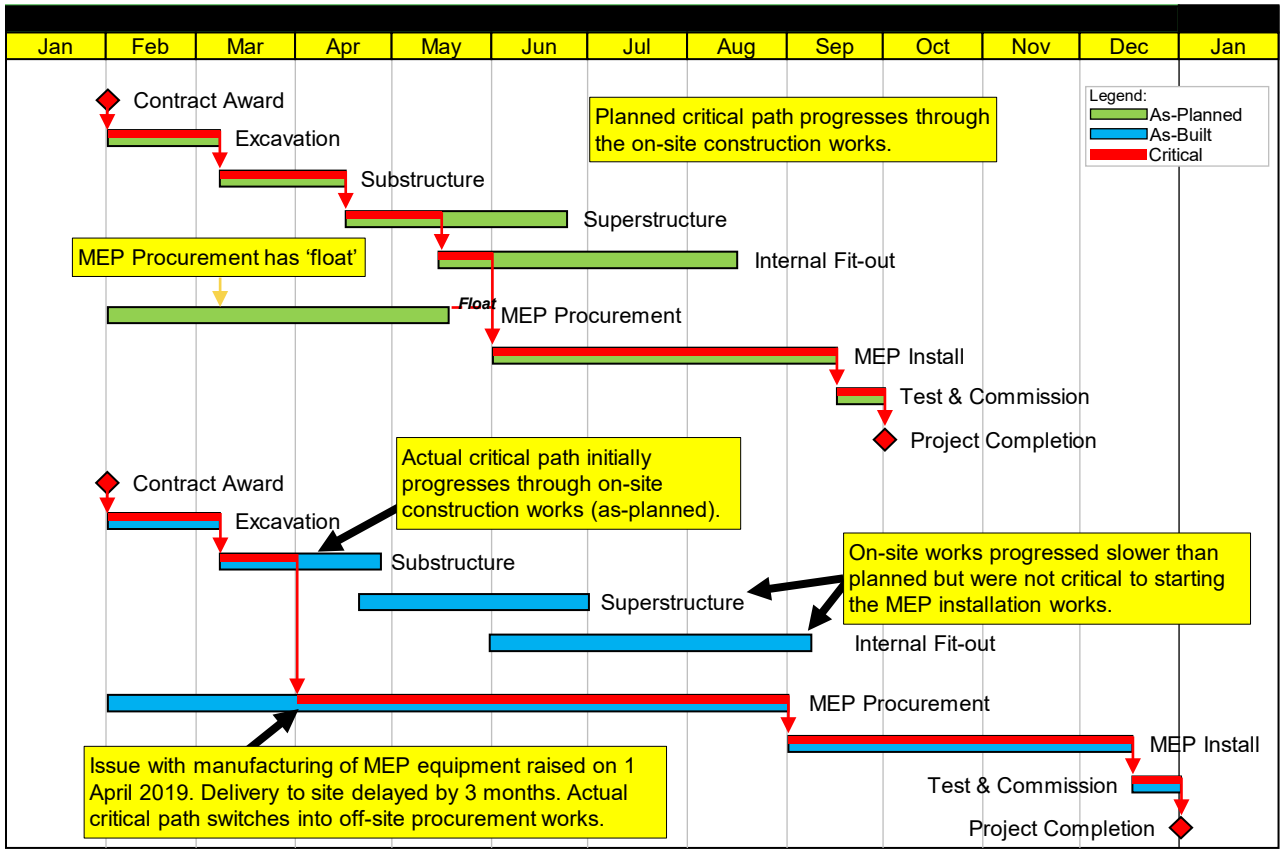
The Role of the Programme when Assessing Delay

- The actual critical path is typically the most contentious issue.
  - Need to establish what changed from the planned critical path?
  - When and why did the change(s) (i.e., event(s)) occur?
- For example.
- A full set of well organised documents is key for a detailed critical path and delay analysis exercise.



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Identifying the Critical Path

Q: How do we identify the Critical Path?

A: Through a Forensic Review and Analysis of the Contemporaneous Documents, which can include *inter alia*:

- **Programme updates;**
- **Progress reports;**
- **Progress percent completes;**
- **Delay measurements; and**
- **EOT requests and delay notices.**

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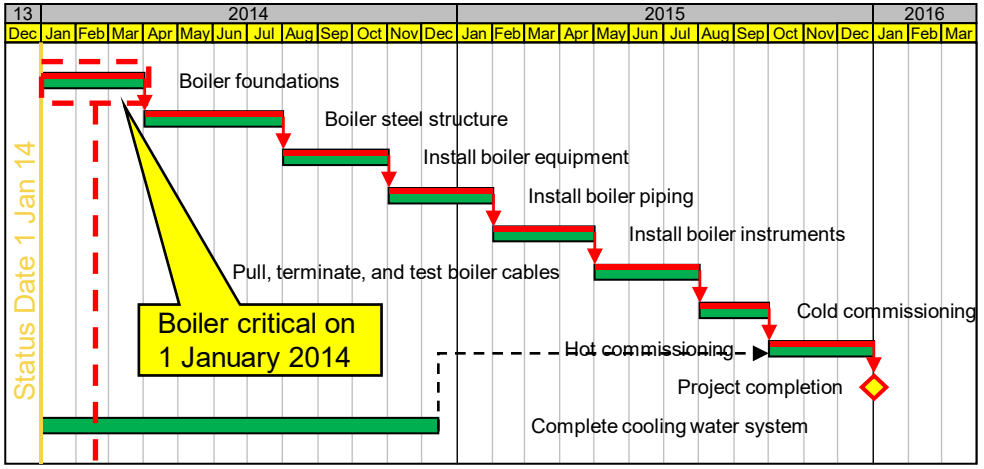
The Critical Path: What do the Programmes tell us?

Programme updates

- If reasonable, programmes are the most comprehensive planning document
- We can get an initial feeling for the critical path contenders through an analysis of the contemporaneous programme updates:
  - Step 1: Take the first activity in the planned critical path of a programme update and identify the area (or system) which it is in;
  - Step 2: Repeat monthly (or whatever the frequency of the programme updates permit).
- This output represents what was critical the day the programme was issued (i.e., Status or Data Date)



Programme Updates	JAN 14	MAR 14	MAY 14	JUL 14	SEP 14	NOV 14	JAN 15	MAR 15	MAY 15	JUL 15	SEP 15	NOV 15	JAN 16
Boiler													
Cooling water system													
Commissioning													

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The Critical Path: What do the Contemporaneous Documents tell us?

Progress reports' "Areas of Concern"

- It is unlikely that an area (or system) was critical and not mentioned in the areas of concern or similar sections of the progress reporting.
- For example.

22 JAN 2015 - AREAS OF CONCERN

- Electrician manpower mobilisation urgently required for **boiler** instrument and cabling work.
- Late payment remains an issue impacting progress.
- Site cleanliness has become a health and safety concern.
- Ongoing design issues have prevented any meaningful progress to the **cooling water system**.

Programme Updates	JAN 14	MAR 14	MAY 14	JUL 14	SEP 14	NOV 14	JAN 15	MAR 15	MAY 15	JUL 15	SEP 15	NOV 15	JAN 16
Boiler													
Cooling water system													
Commissioning													

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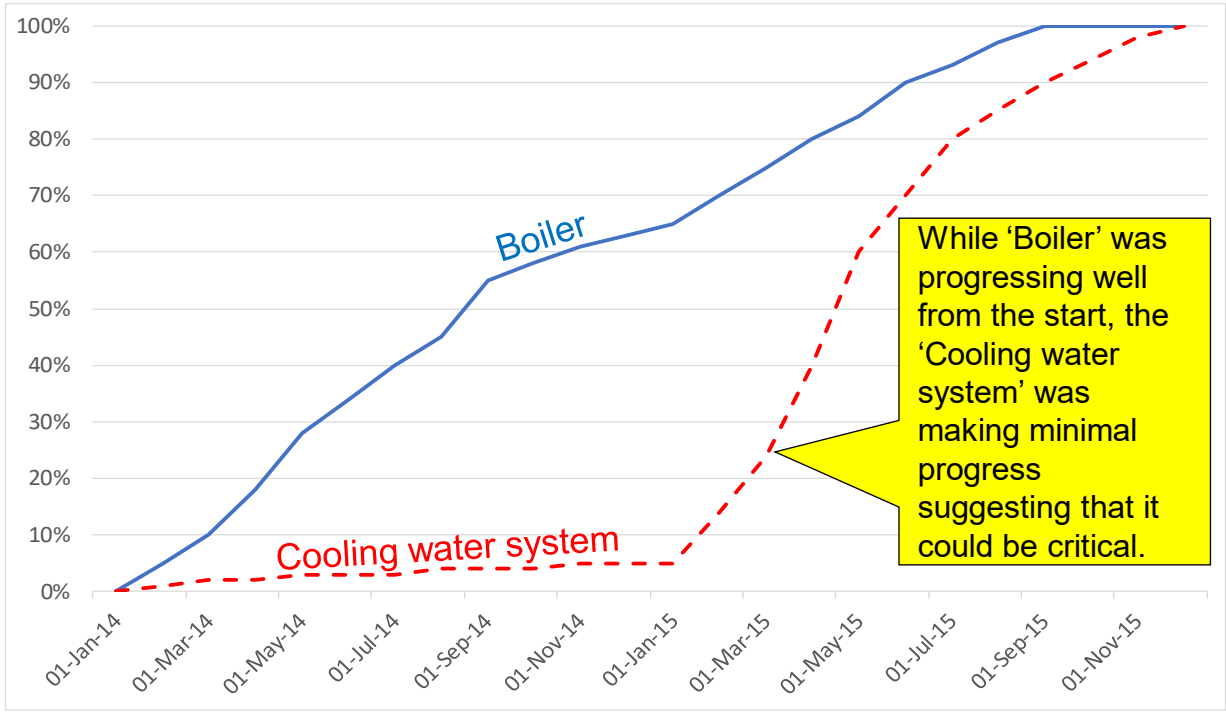
The Critical Path: What do the Contemporaneous Documents tell us?

Percent completes (As-Built Progress Curves)

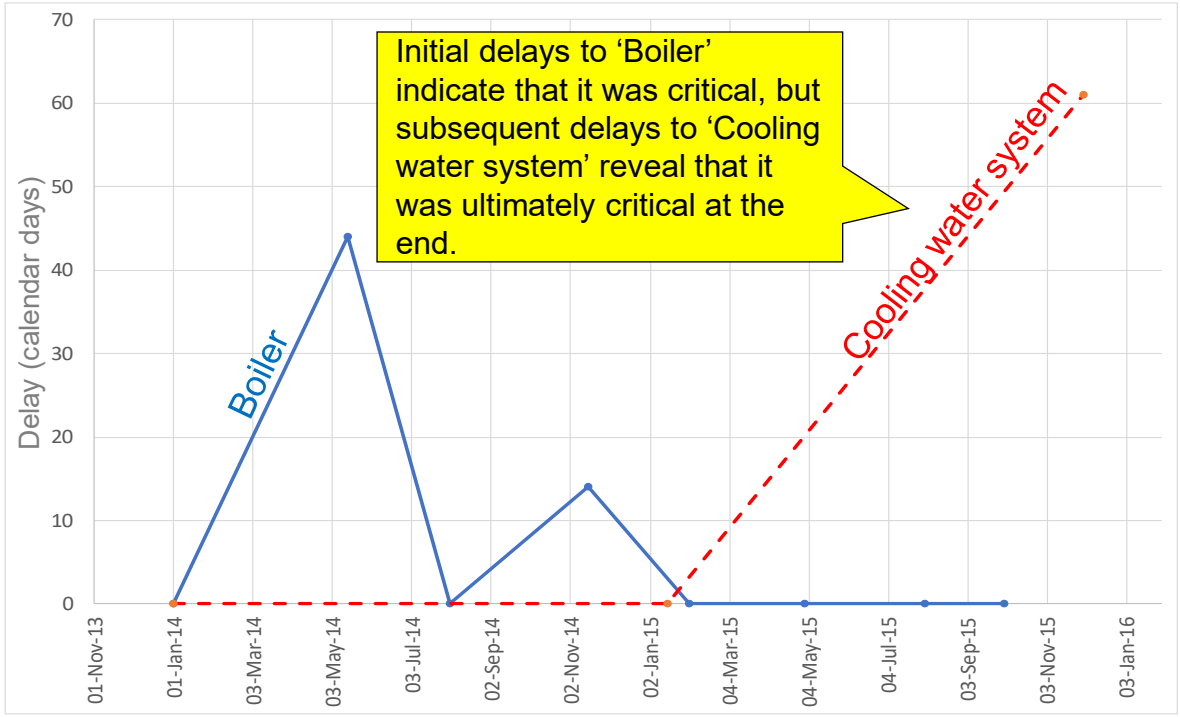
- An area (or system) which fails to make relatively significant planned progress, is more likely to be critical.



The Critical Path: What do the Contemporaneous Documents tell us?

Delay measurements

- The area (or system) suffering the most delay is more likely to be critical.



The Critical Path: What do the Contemporaneous Documents tell us?

EOT submissions and delay notices

- If the contractor puts forward EOT submissions for events which effect a specific area (or system), then it is asserting that this area (or system) is critical.
- If the employer grants an EOT based on an EOT submission, then it is a tenuous position to suggest at a later date that the claimed delay events were not critical.

15 Jan 2015 - "*Due to the late provision of the **cooling water system** design, the contractor is entitled to an EOT to its Completion Date of 40 days*."

2 May 2015 – "*Due to security concerns on site, the works were delayed by 3 days*."

Questions

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- Actual Critical Path
- First steps in identifying likely critical path contenders

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Forensic Delay Analysis

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Forensic Delay Analysis - Methodologies

Methods of Delay Analysis As set out in the SCL Protocol 2nd Edition (2017)

There is no 'one size fits all approach'. However, the methods that seek to determine the critical path **contemporaneously** are generally considered more forensically reliable.

Method of Analysis	Analysis Type	Critical Path Determined	Delay Impact Determined	Requires
Impacted As-Planned Analysis	Cause & Effect	Prospectively	Prospectively	- Logic linked baseline programme. - A selection of delay events to be modelled.
Time Impact Analysis	Cause & Effect	Contemporaneously	Prospectively	- Logic linked baseline programme - Update programmes or progress information with which to update the baseline programme. - A selection of delay events to be modelled.
Time Slice Windows Analysis	Effect & Cause	Contemporaneously	Retrospectively	- Logic linked baseline programme. - Update programmes or progress information with which to update the baseline programme.
As-Planned versus As-Built Windows Analysis	Effect & Cause	Contemporaneously	Retrospectively	- Baseline programme. - As-built data.
Retrospective Longest Path Analysis	Effect & Cause	Retrospectively	Retrospectively	- Baseline programme. - As-built programme.
Collapsed As-Built Analysis	Cause & Effect	Retrospectively	Retrospectively	- Logic linked as-built programme. - A selection of delay events to be modelled.

*"The only appropriate method is to determine the matter by **paying close attention to the facts,** and assessing whether White [the Plaintiff] has proved, on the probabilities, that delay in the underboring solution **delayed the project as a whole** and, if so, by how much."*
(White Constructions Pty Ltd v PBS Holdings Pty Ltd [2019] NSWSC 1166, paragraph 197) [**Emphasis added**]

"*Irrespective of which method of delay analysis is deployed, there is an overriding objective of ensuring that the conclusions derived from that analysis are sound from a **common sense** perspective."*
(SCL Delay Protocol 2nd Edition, page 32, paragraph 11.2) [**Emphasis added**]

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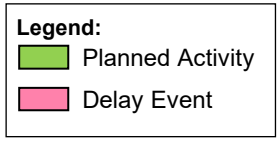
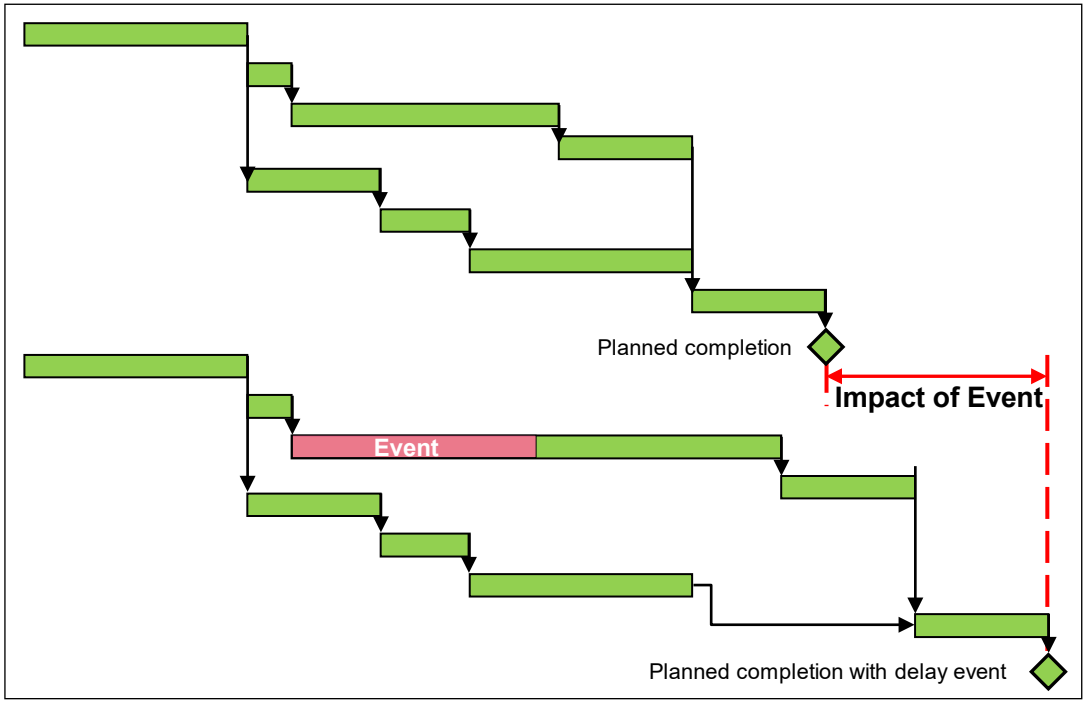
Impacted As-Planned Analysis

Steps:

- **Step 1:** Establish the baseline programme.
- **Step 2:** Input delay event.
- **Step 3:** Reschedule and check completion date.





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Impacted As-Planned Analysis

1. This analysis requires the following information:

- A logic-linked planned programme in its native format.
- Determination of the **likely duration** of the delay event so it can be modelled on the baseline programme.

2. Reasons to perform this type of analysis:

- There is insufficient as-built progress information in order to understand what actually happened.
- The delay event is relatively straightforward and occurs at or near the commencement of the works (i.e., delay to site access).

3. Common problems with this type of analysis:

- Requires a reasonable and fully logic-linked baseline programme.
- Provides a **prospective** determination of the effect of the delay event.
- The results are typically **biased** towards the party whose interest lies in maximising the impact of the delay event.
- Only considers **selected delay events** and may ignore other more critical delay events.
- Cannot be used to determine the existence of **concurrent delays** and/or their true effect on the critical path.
- Takes no account of **progress, resources, changing logic** and is unlikely to be reliable in dispute resolution.

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Time Impacted Analysis

Steps:

Step 1: Verify baseline programme and correct for errors.

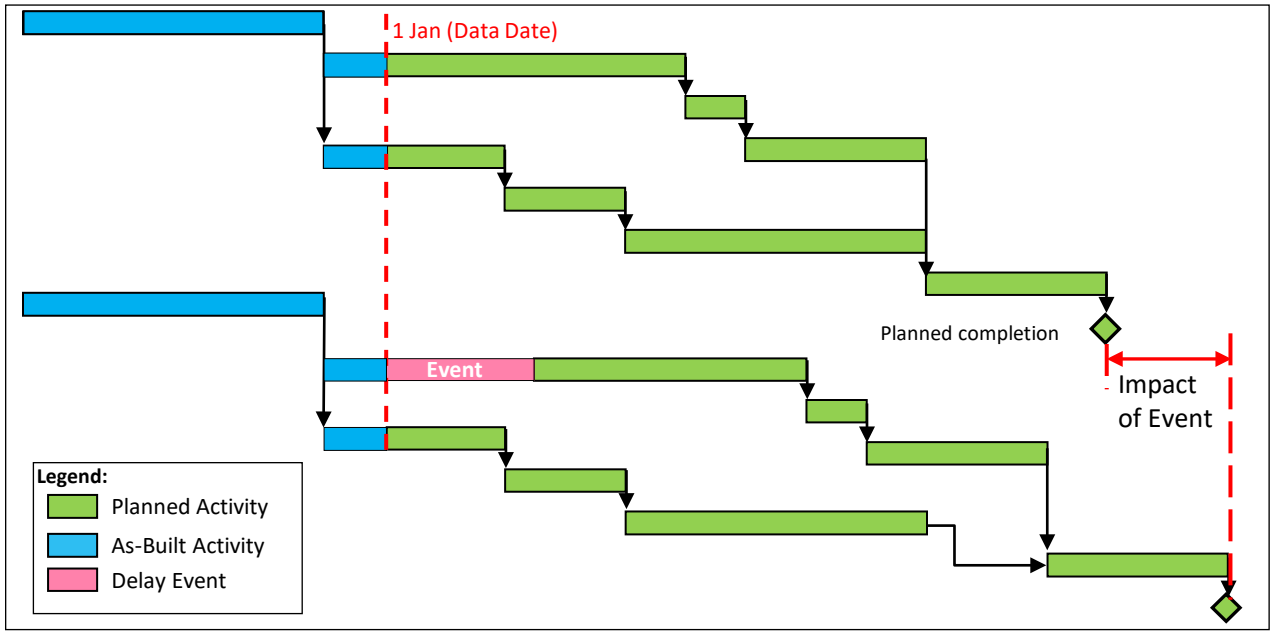
Step 2: Input progress up to the time the event occurred.

Step 3: Reschedule and check completion date.

Step 4: Identify delay events and periods.

Step 5: Impact delay and record logic changes.

Step 6: Reschedule, check completion and record any further delay



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Time Impacted Analysis

1. This analysis requires the following information:

- A logic-linked planned programme in its native format which was produced immediately prior to the delay event.
- Reliable and consistent **progress data** up to the time the delay event occurred.
- Determination of the **likely duration** of the delay event so it can be modelled on the baseline programme.

2. Reasons to perform this type of analysis:

- The analysis is most reliable if **performed immediately after** the parties became aware of a delay event but do not yet know the eventual impact of the event.
- This method of analysis is prescribed within the NEC form of construction contracts.

3. Common problems with this type of analysis:

- Requires a reasonable and fully logic-linked baseline programme, in its native format which was produced immediately prior to the delay event, which may not be available.
- Relies on a **prospective** determination of the effect of the modelled delay event which, if performed after the actual effects become known, may be inconsistent with what actually happened.
- Only considers **selected delay events** and may ignore other more critical delay events (i.e., it is a cause and effect approach). In this regard time impact analysis favours the party selecting the events to be modelled.

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As-Planned vs As-Built Windows Analysis

Steps:

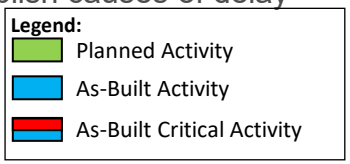
Step 1: Verify baseline programme and correct for errors.

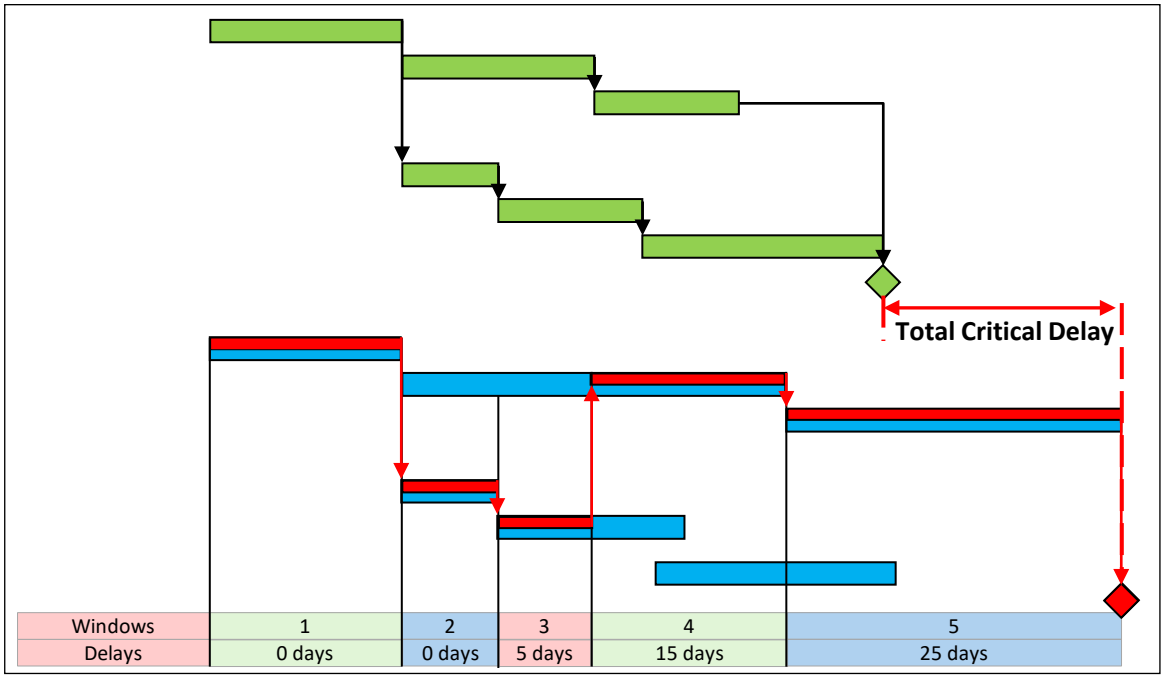
Step 2: Establish as-built programme.

Step 3: Establish contemporaneous or actual critical path by common sense and practical analysis of available facts

Step 4: Compare key as-built dates in windows of time with Baseline programme to establish incidence of and extent of delay.

Step 5: Establish causes of delay





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As-Planned vs As-Built Windows Analysis

1. This analysis requires the following information:

- Baseline programme.
- As-built programme.
- Sufficient as-built information, or understanding of the facts, to determine the actual critical path.
- Sufficient as-built information to explain the causes of critical delay.

2. Reasons to perform this type of analysis:

- The **programme updates are too few or unreasonable**, thereby preventing their use for a time slice windows method of delay analysis.
- Besides the time slice windows method, this is the only method of analysis which determines the **critical path contemporaneously** and the **effect of the delay events retrospectively**.

3. Common problems with this type of analysis:

- Unreasonable assumptions in the baseline programme can lead to unreasonable results.
- The analysis supporting the determination of the critical path is not sufficiently robust.
- **Project records may be inadequate** to accurately determine the causes of delay.
- Can be **time consuming** and therefore can be **expensive**.

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Take Away Points

- Typically, as-planned versus as-built method of delay analysis is most successfully used:
  - It answers the 'factual' questions of what was planned to happen v what actually happened?
- The exception to this is on NEC projects (which prescribes time impact analysis) and on disputes during which the works are not yet complete;
- Typically, the most contentious delay issue is the expert's critical path opinion;
- Critical path analysis is document intensive and should consider all available progress records;
- Limitations on document availability or quality can prevent the use of certain methods; and
- No matter which method or approach has been used, it is crucial to make sure that the analysis is **based on facts and makes common sense.**

Questions

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- Different Methods

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Common Themes

Common Themes

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- Concurrency
- Sequential Delay
- Pacing Delay
- Float

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Concurrency

- What are the minimum requirements for critical 'concurrency' to be present:
  - Both events must delay activities on the critical path;
  - Delay caused by events must coincide or overlap; and
  - One party is liable for one event and another party is responsible for the other.
- Parties often refer to concurrent events which happen at the same time but are not both critical. While the events are concurrent, the non-critical event is irrelevant in terms of EOT and most delay related costs.

  "*Concurrent delay can be defined as a period of project overrun which is caused by two or more effective causes of delay which are of approximately equal causative potency.*" – John Marrin QC

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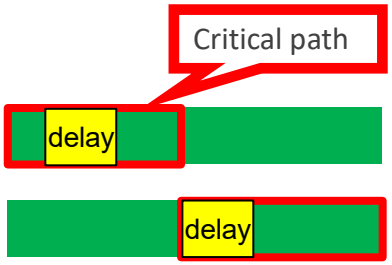
Concurrency - Examples

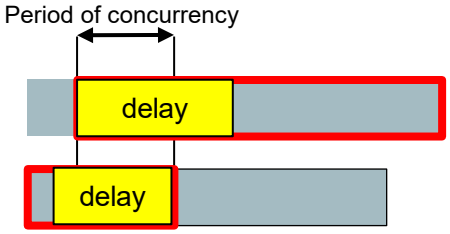


Not concurrent delay because the events do not happen at the same time

Not concurrent delay because the lower event is not critical to completion

Concurrency - Examples

Yes, concurrent delay because the events are happening at the same time and are both critical to completion



Yes, concurrent delay (in part) because the events are happening at the same time and for a period were both critical to completion

(See *"Thomas Barnes & Sons plc v Blackburn with Darwen Borough Council [2022] EWHC 2598 (TCC))"*

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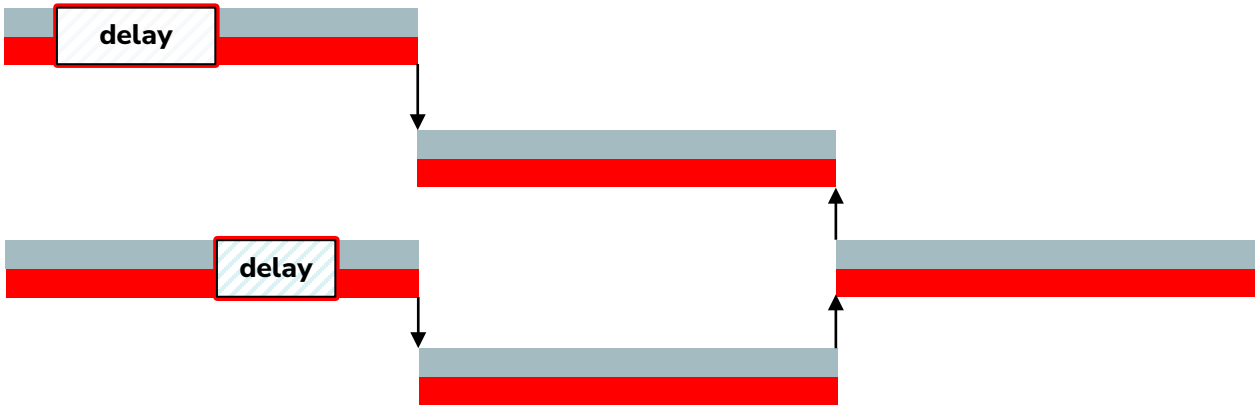
Sequential Delay

- Importantly, concurrent delays rarely occur in practice;
- In most cases, the use of programming and factual investigation confirms that the delay was not a concurrent delay, but a sequential delay; and
- The impact of sequential delays on the completion of the project should be dealt with in the order they occurred.



delay Employer delay: Late drawing approval

delay Contractor delay: Late completion of RC frame

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Pacing Delay

- Pacing occurs when a contractor makes the conscious decision to progress slower than planned;
- This self-imposed delay to a non-critical sequence occurs when another sequence is critical;
- Pacing consumes available float on a non-critical sequence; and
- Pacing can allow a contractor to lower production and labour costs resulting in cost savings.
- AACE describes pacing:

  "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"

- Importantly, 'actual' pacing should always be confirmed at the time rather than used as an excuse in a later delay analysis exercise.
  - (It could be a risky strategy to 'pace' one sequence not knowing what the future looks like)

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Float

- Float is the ‘slack’ (or number of days) an activity has or the extent to which an activity can be delayed before it will delay project completion;
- It is calculated from the programming software based on activities relationships and planned durations;
- Activities on the critical path have ‘zero’ days float – they have no spare days and cannot suffer delay;
- Usually, either party can benefit from ‘project’ float subject to any contract clauses on the issue (who owns the float?).
- Easy way to remember, float is:

“how many days can one activity be delayed without impacting its successor activity or project completion date?”

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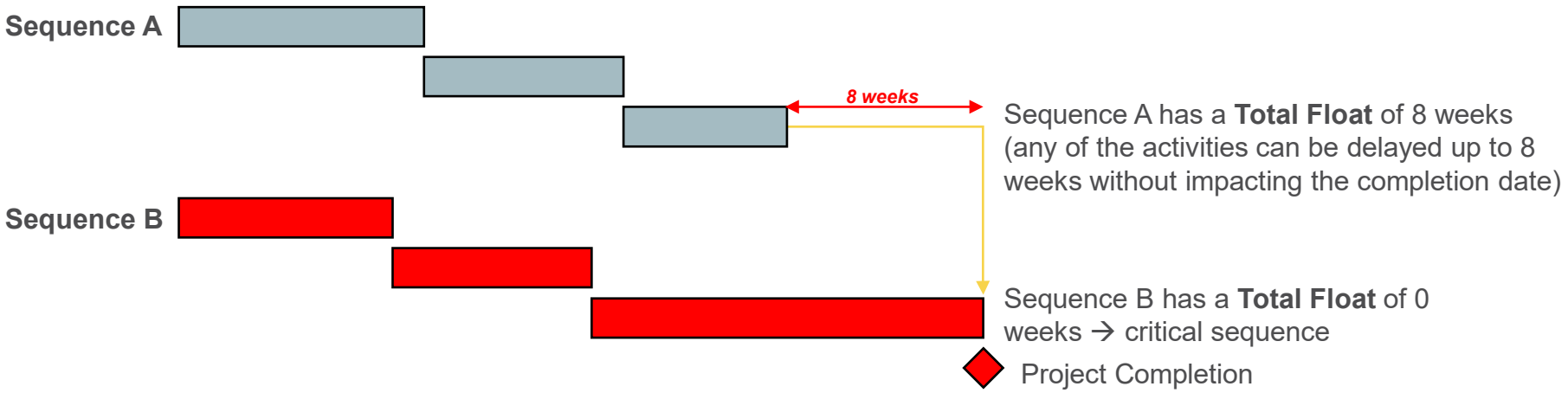
Float – Total Float

- **Total Float**: the amount of time a sequence can be delayed without causing delay to completion (e.g. 8 weeks for Sequence A);
- Zero for activities on critical path (e.g. Sequence B).



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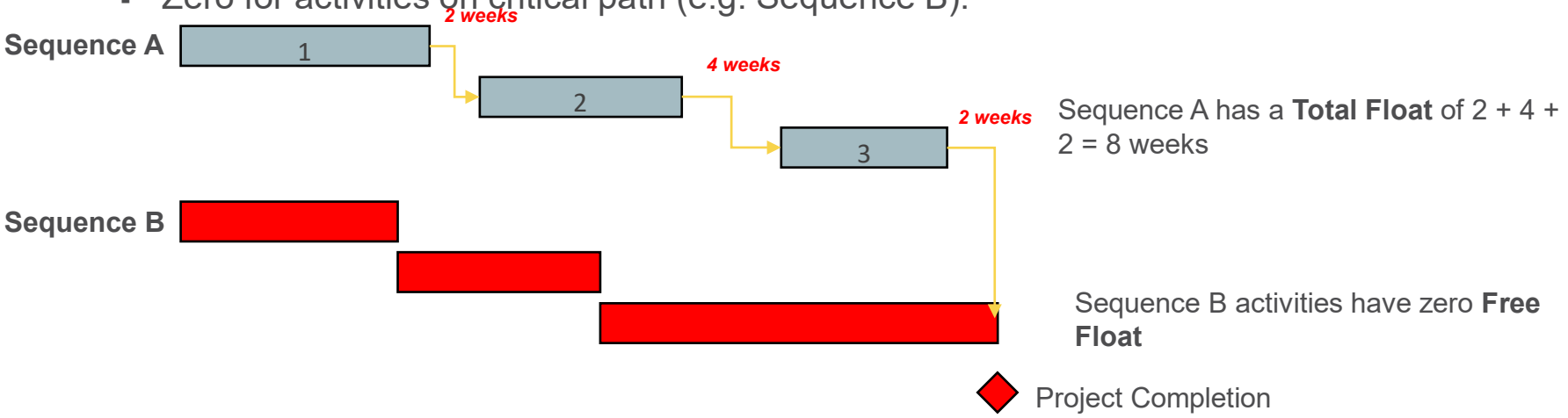
Float – Free Float (or Activity Float)

- **Activity Float (or Free Float):** amount of time an activity can be delayed without delaying the start date of its immediate successor activity (e.g. gaps between Sequence A activities);
- The sum of all free Activity Float (or Free Float) in a sequence equals Total Float (e.g. 8 weeks for Activity 1 of Sequence A); and
- Zero for activities on critical path (e.g. Sequence B).



Questions

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- Concurrency
- Sequential Delay
- Pacing Delay
- Float

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The construction & energy law specialists

Thank you. Questions?

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