



ADB

FIDIC Contract Management Workshops

Introduction to Delay Analysis

Islamabad Day 2 (Part II) – 29 August 2023

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Programme (PB)

- Programme must show:
 - order of execution of the Works, dates for Contractor's Documents, procurement, off-site manufacture and fabrication, delivery, construction, erection, and testing;
 - sequencing of the Works, taking into account the lead time for obtaining any approvals;
 - detail of works performed by nominated Subcontractors;
 - the sequence and timing of inspections and tests;
 - that the Works will be completed within the Time for Completion.

Programme (PB)

- Programme is to be accompanied by a supporting report (“Method Statement”) setting out how the Contractor intends to execute the Works and the resources he intends to use.
- Engineer must:
 - give notice to the Contractor within 21 days of how the Programme does not comply with the Contract;
 - not give comment on its attainability (he should only acknowledge receipt).

Programme (PB)

- Linked to the requirement to maintain valid programmes is the requirement to submit monthly progress reports (SC 4.21).
- Each report must include:
 - charts and detailed descriptions of progress,
 - photographs,
 - details of the manufacture of each major item of Plant & Materials,
 - records of Contractor's Personnel,
 - copies of QA documents, etc.,
 - lists of notices with respect to Employer's and Contractor's claims,
 - safety statistics and
 - comparisons of planned and actual progress with details of measures to overcome delays.

Updated Programme (PB)

- The submission of the monthly report is a pre-requisite for issue of the Interim Payment Certificate for the period covered by the report (see Clause 14.3).
- What can be done if the Contractor fails to submit an updated programme on a regular basis (normally monthly)?
 - The Engineer may withhold issuing an Interim Payment Certificate.
 - This may be too severe for most Employers and ADB.
 - Suggest temporarily withholding a certain amount in the range of 10% to 20%.
 - Best to include such a withholding provision as a Particular Condition.
 - The withholding should not be permanent (and cannot be permanent without a Particular Condition) and must be returned in the first IPC after Taking Over, at the latest, even if the Contractor never complies.

Revised programme (PB)

- If the Contractor is not entitled to an extension of the Time for Completion and the rate of progress of the Works is:
 - too slow to complete the Works within the Time for Completion; or
 - the Contractor has fallen (or will fall) behind the current Programme;the Engineer can instruct the Contractor to submit a revised programme and supporting report describing the revised methods he proposes to adopt, at his own risk and cost, to expedite progress and comply within the Time for Completion.

Revised Programme (General comment all FIDIC forms)

- Does the revised programme have to show completion by the current Time for Completion to serve as a revised baseline programme?
 - Imagine a Time for Completion at say 15 August 2022.
 - The Contractor's is late by eight months.
 - A recovery programme is instructed on 4 August 2022.
 - Would it be serious to expect a programme showing on time completion?

Revised Programme (General comment all FIDIC forms)

- Imagine another situation where the Contractor can recover say six months out of a ten month delay, but it is impossible for him to complete on time.
- Such a programme can be used to measure progress and future delays.
- Remember that the Engineer does not accept the programme.
- Using such a programme does not mean that the Engineer or the Employer are accepting that the Time for Completion is extended.
- Failure to allow such a revised programme means that there is in effect no programme and there is no proper way to measure progress or future delays.

New Programme Provisions in 2017 RB

New requirements on content of the Programme (SC 8.3)

- Now a defined term under SC 1.1.66.
- SC 8.3(g) states that **to the level of detail shown in the Specification:** programming software is to be used and that all activities are to be logically linked with early and late start and finish dates for each activity, the float and the critical path.
- Clarifies that the Commencement Date and Time for Completion must be shown.
- Clarifies that all days of rest and holidays must be shown.
- Clarifies that the Review period for submissions must be shown.
- Clarifies that the sequence and timing of inspection and tests must be included.
- Remedial works to be included in revised programmes.

New Programme Provisions in **2017 RB**

New requirements on content of the Programme (SC 8.3)

- Clarifies the situation on Site access. SC 8.3(b) refers to showing the dates for access for each part of the Site in the Contract Data. PB refers only to a single date. Otherwise, the same as the PB.
- More details on the content of the supporting report including:
 - Estimated of number and class of the Contractor's Personnel and of each type of Contractor's Equipment.
 - Identification of any significant changes to the previous programme.
 - The Contractor's proposals to overcome the effect of any delays to « **progress** » of the Works.
- Nothing in the Programme or report shall be deemed to be a Notice.

New Programme Provisions in **2017 RB**

New requirements on Commencement Date (SC 8.1)

- The PB is the only FIDIC form of Contract that stipulates conditions precedent before the Commencement Date comes into effect.
- The **2017 RB** does not have conditions precedent.
- Therefore the Commencement Date is by Engineer's Notice not less than 14 days prior to the Commencement Date but the Commencement Date must be within 42 days of the Letter of Acceptance.

Advance Warning Provisions

- **2017 RB (SC 8.4)**: Each Party and the Engineer shall advise each other of future events or circumstances that:
 - a) Adversely affect the work of the Contractor's Personnel
 - b) Adversely affects the performance of the Works when completed.
 - c) Increases the Contract Price
 - d) Delays the execution of the Works or a Section
- The Engineer may request the Contractor to submit a Variation proposal to minimise the effects of such events.
- **PB (SC 8.3 3rd para.)**: **Only the Contractor is obliged to warn** of specific probable future events which may adversely affect the work, increase the Contract Price or delay the execution of the Works.
- The Engineer may require the Contractor to submit an estimate of the effect of the future event and/or a Variation proposal.
- No sanction for failure to warn in either **PB** or **2017 RB**,

Miscellaneous Matters on Delay

- Now let's say that the Contractor is entitled to an extension of the Time for Completion but the Engineer instructs him to take measures in order to reduce the delay, he must be paid the additional costs of the measures. (SC 8.6 PB and SC 8.7 **2017 RB**)
- The power to instruct the Contractor to take acceleration measures unilaterally in the face of Employer delay is not available under the **Gold Book**.
- If the Contractor fails to complete within the Time for Completion (after taking account of any entitlement to extensions of time), he must pay Delay Damages to the Employer, at the rate stated in the Contract.
- The Employer shall not be entitled to the Delay Damages unless he issues a notice to the Contractor within the 28 days' limit set out in SC 2.5 (PB). **There is however no time bar provision in the PB.**
- Note that in the **2017 RB** there is a time bar for Employer's Claims, so failure to issue a Notice of Claim can result in the loss of the Delay Damages.

When should a time extension be given

- The best practice is to analyse the impact and grant the EOT as close the delay event as possible.
- SCL Protocol Core Principle No. 4: *"Do not 'wait and see' regarding impact of delay events. The parties should attempt so far as possible to deal with the time impact of Employer Risk Events as the works proceed...."*
- SCL Protocol Core Principle No. 7 *"Where the full effect of an Employer Risk Event cannot be predicted with certainty at the time of initial assessment by the [Engineer], the [Engineer] Should grant an EOT for the then predictable effect. The EOT should be considered by the [Engineer] at intervals as the actual impact of the Employer's Risk Event Unfolds and the EOT increased but not decreased....."*

When should a time extension be given

- Last sentence of Sub-Clause 8.4 (PB): *"When determining each extension of time under Sub-Clause 20.1, the Engineer shall review previous determinations and may increase, but shall not decrease, the total extension of time."* (2017 RB is similar)
- FIDIC and the SCL protocol are in sync.

SCL Protocol



**SOCIETY OF
CONSTRUCTION LAW
DELAY AND DISRUPTION
PROTOCOL**

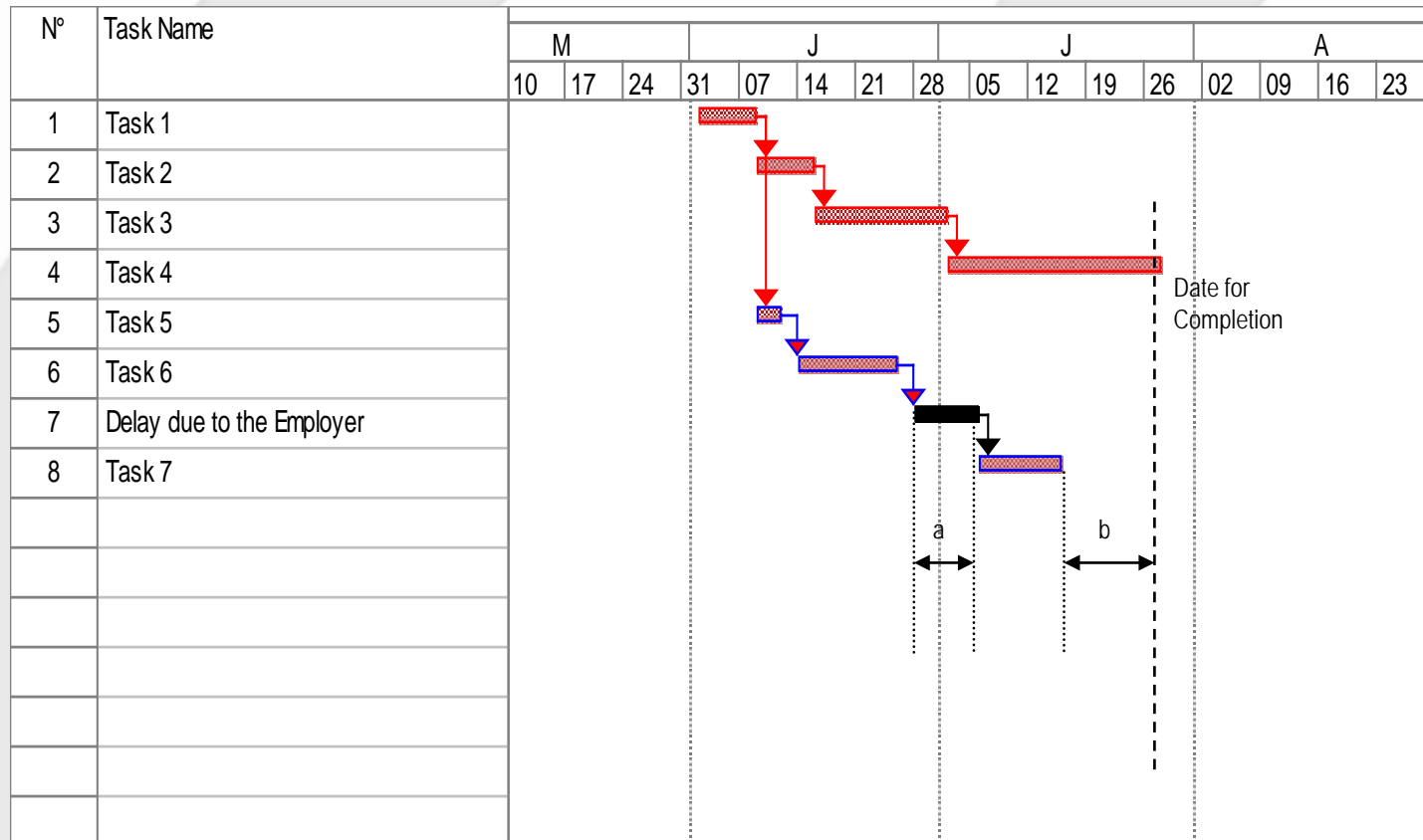
2nd edition
February 2017

https://www.scl.org.uk/sites/default/files/documents/SCL_Delay_Protocol_2nd_Edition_Final.pdf

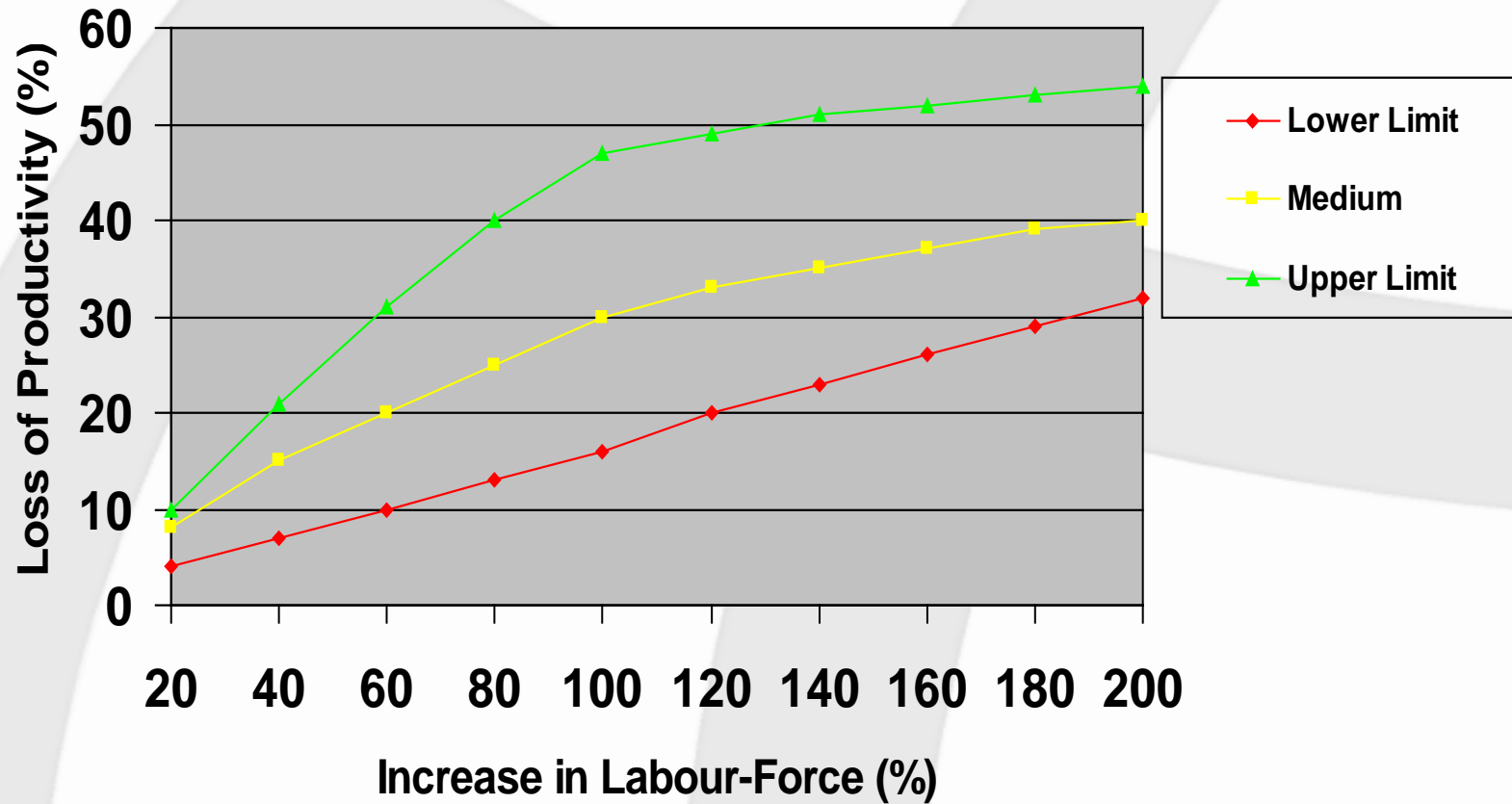
Disruption v Delay to Completion

- Disruption occurs when work which is not on the critical path is delayed. This is sometime called delay to progress.
- Delay to completion occurs when a delay is on the critical path and the Time for Completion is delayed.
- Non critical delays to progress should be measured and analysed also as they may be claimable and multiple delays on a non-critical path of the programme may eventually cause a change in the critical path.
- Disruption often takes the form of reduced productivity of a given part of the Works.

DELAY NOT AFFECTING THE CRITICAL PATH



LOSS OF PRODUCTIVITY v INCREASE IN LABOUR-FORCE



Example:

A task that is normally achieved by 60 men in 100 days, requires a total labour input of :

6000 man-days

After doubling the labour-force, productivity falls to 65 % of normal output, therefore the time needed to achieve the task becomes :

$$6000 / (120 \text{ men} \times 0.65) = 77 \text{ days}$$

Reduction in duration = 100 days - 77 days =

23 days or 23 %

Increase in the labour cost =

(120 men x 77 days) - (60 men x 100 days) =

3240 man-days or 54 %

Types of delay analysis

Type of Analysis	As-planned programme without network	Networked as-planned programme	Updated as-planned networked programme	As-built records
As-planned v as-built	X	or X	and X	or X
Impacted as-planned		X		
Time slice windows analysis		X	and X	or X
Time impact analysis		X	or X	and X
Collapsed as-built				X

As-Planned v As-Built

- A simple after completion method of delay analysis.
- In its simplest form, the as-planned dates are compared to the as-built records.
- This will show; delayed and early start dates, extended or shortened durations and early or delayed finished dates for each of the planned activities.
- An analysis and explanation is required for the visible difference between as-planned dates the as-built dates and responsibility determined from the contemporaneous records.
- Determination of the critical path can be difficult and also determination of concurrent delays.
- An older method, and while not recommended, it is still used frequently.
- Can be improved on by using a time slice windows approach with revised programmes if they exist.

Impacted As-Planned

- Another basic method, however not considered to be very probative.
- The delay events are defined and the time impact is inserted into the as-planned programme.
- There is a tendency for the Contractor not to include his own delays in such an analysis.
- Does not take into account changes in sequence of the Works or concurrent delays.
- Not recommended except for very initial delays when looking to estimate the final impact of a delay.

Time Slice Windows Analysis

- A series of updated baseline programmes (snapshots or time slices).
- Typically in one month intervals.
- These will show the actual critical path in each time slice as the works progress and the critical delay at the end of each time slice.
- Identify what might have caused the critical delay from the contemporaneous records.
- Verification of the reasonableness of the programme and the accuracy of the reported progress.
- Through this method, the delays in each period can be allocated to the responsible Party in each time slice.

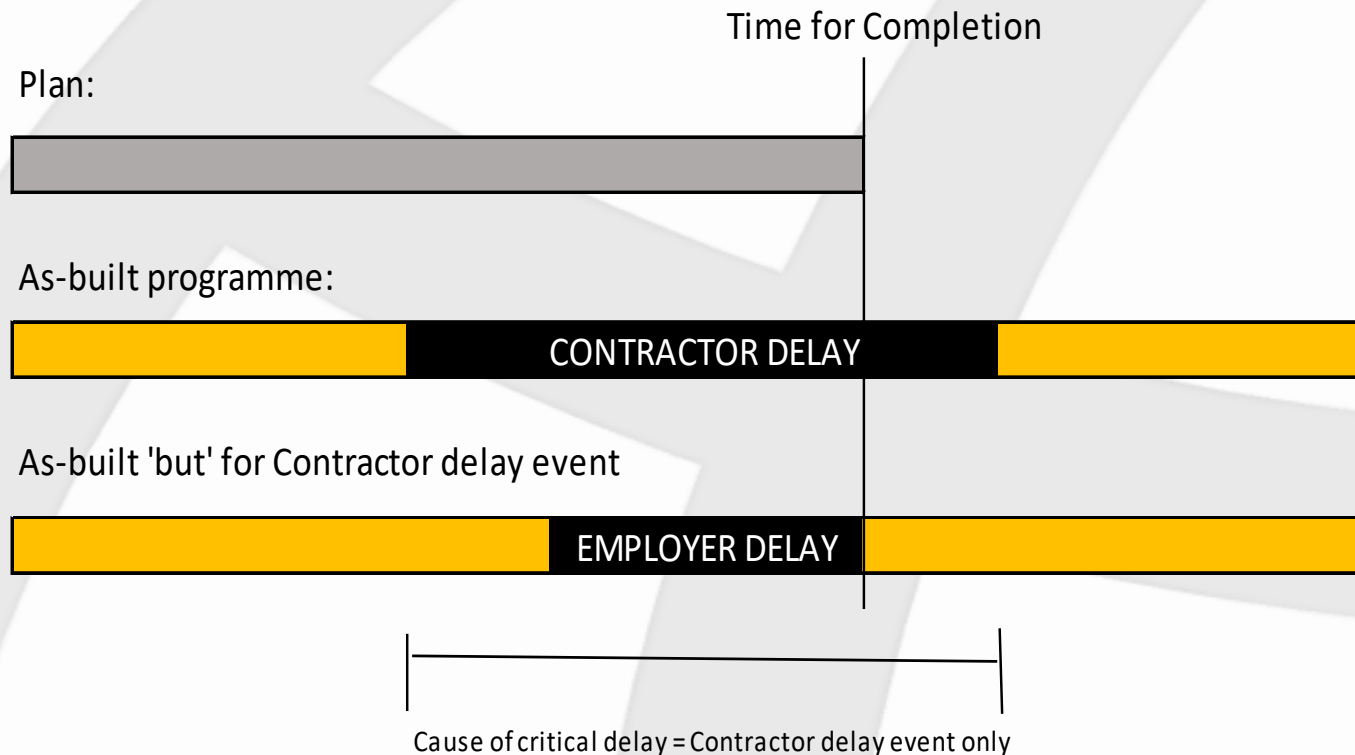
Time Impact Analysis

- A continuous process of introducing delay event sub-networks into a logic-linked baseline programme to determine the prospective impact the delay event would have on the then predicted completion dates.
- The baseline for each analysis should be a contemporaneous updated programme.
- Mitigation or acceleration already incorporated into the updated programme needs to be considered as these can distort the projected impact of the delay events.
- Considered a best practice for contemporaneous assessment of an EOT application.
- Often does not capture the eventual actual delay caused by the delay events as subsequent project progress is not considered

The Collapsed As-Built Method

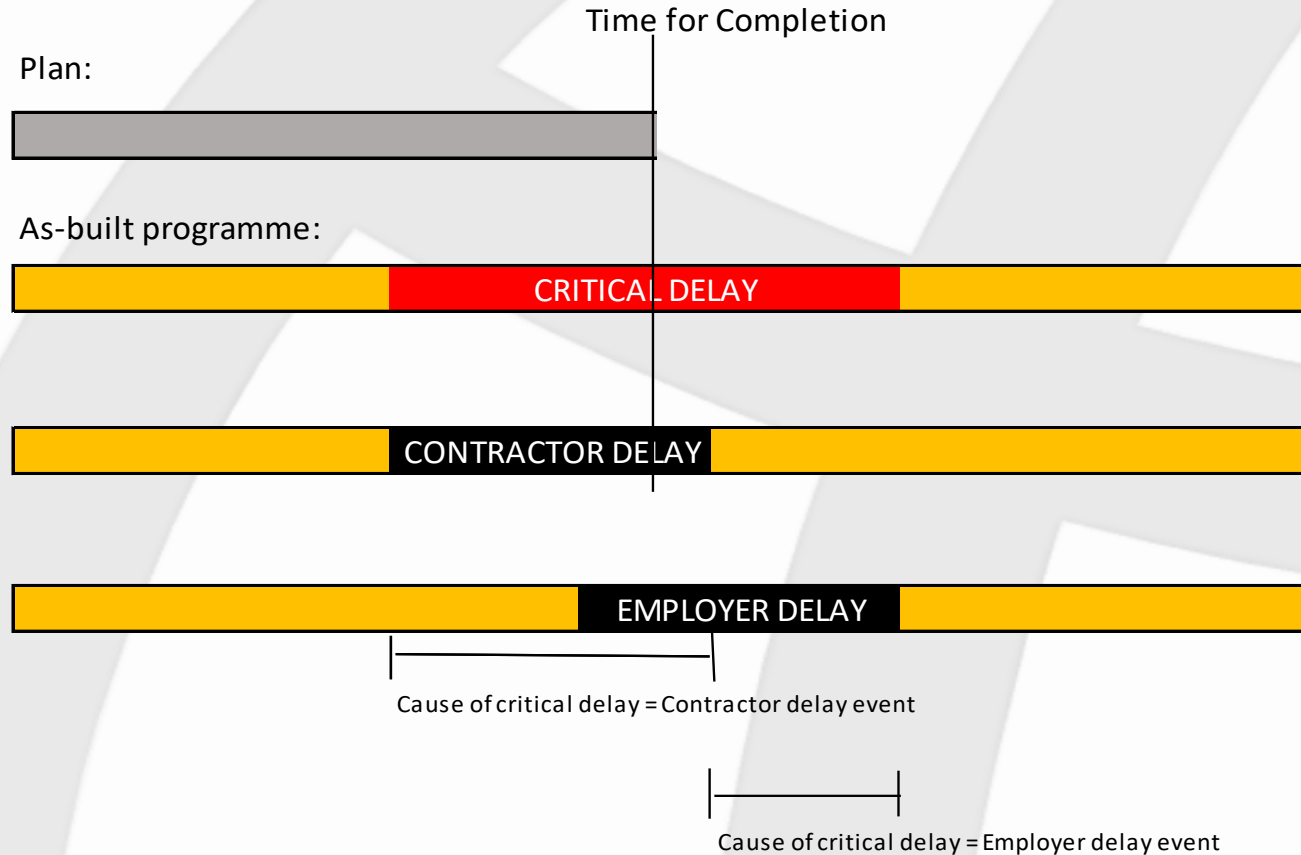
- This method does require a baseline programme.
- It requires a detailed logic-linked as-built programme.
- Often this has to be created from records and this can be time consuming and expensive.
- The sub-networks for the Employer delay events within the as-built programme are identified and they are extracted in order to determine the net impact of the delay event.
- This method however only shows the incremental delays to the critical path.
- After all the Employer delay events are extracted, the end result will show the date when the Contractor would have completed the project 'but for' the Employer's delays.

Understanding Concurrency – Example 1



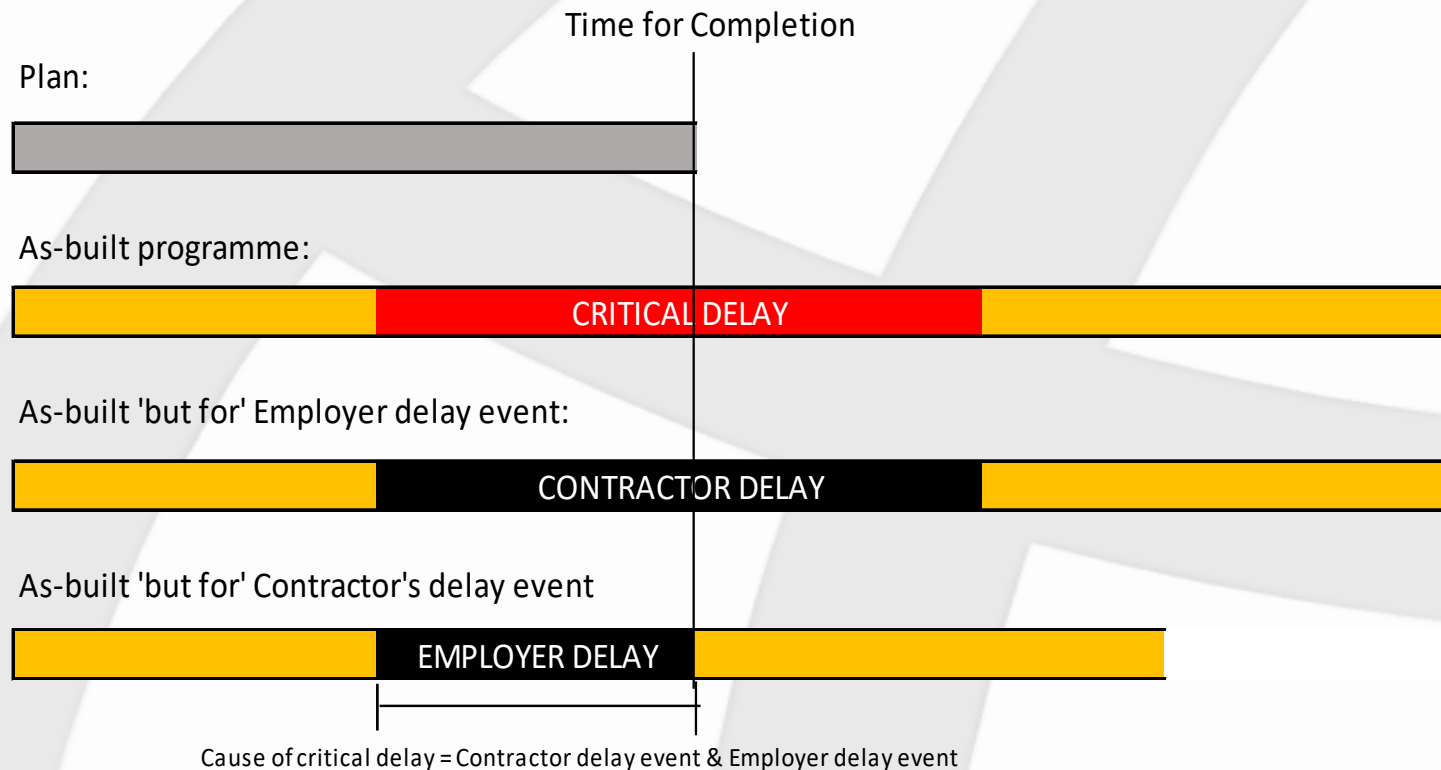
The Employer's delay is not an effective cause of critical delay in this example and so concurrent delay does not exist

Understanding Concurrency – Example 2



It is only after the Contractor's delay event that the Employer's delay event becomes critical . As a result concurrent delay does not exist

Understanding Concurrency – Example 3



For a period of time each of the Contractor's delay and Employer's delay are causing critical delay to completion and therefore concurrent delay arises during this period

Burden of proof regarding concurrency

- Most of the methods of delay analysis described above would require the Contractor to be transparent about showing his own delays.
- Likewise these application of these methods without attempting to identify concurrency would also be considered as being an incorrect application of the method.
- Note the new reference to concurrency in the **2017 RB (SC 8.4)**: Concurrency is to be assessed in accordance with the rules and procedures stated in the Special Provisions (if not stated, as appropriate taking due regard of all relevant circumstances)
- However, it is the Employer who is usually the Party alleging concurrency and as a practical matter the burden of proof often transfers to the Employer from a legal perspective.
- The Engineer should therefore be prepared to undertake his own delay analysis, or at least be deeply involved in reviewing the details of the Contractor's programmes all through the project.

Thank You!

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References:

<https://globalarbitrationreview.com/chapter/1175332/comparative-approaches-to-concurrent-delay>

https://www.scl.org.uk/sites/default/files/SCL_Delay_Protocol_2nd_Edition_Final.pdf