CONSIDERATION OF DELAY AND EXTENSTIONS OF TIME

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INTRODUCTION – TIME AND DELAY

- Understanding Time and Delay in construction can be a complex interaction between the contract, the facts, the law, and analysis methodologies
- This session attempts to weave a thread around these issues and shed some light on the complexity
- We will run (perhaps too fast?) through many of the issues, but feel free to stop me to ask questions!

BACKGROUND ISSUES

- UK Construction turnover (2014) about £85 Billion
  - Thousands of projects per year
  - 250k UK businesses employing over 1.15m staff
- Worldwide construction turnover is clearly vast!
- Historic survey suggested average delays of 48 days
- While standard forms require programme preparation, this important activity is often given limited regard, and few contracts specify specific claim methodologies
- Contracts often fail to assess in detail the risk of delay to the programme or put plans in place to minimise or manage delay when it occurs

BACKGROUND ISSUES (2)

- Low Contractor margins combine with a lack of clarity in the standard forms on programming… which leads to numerous, but often poor quality, EOT claims
- The varying experience and ability of the professional team leads to a lottery in terms of claim responses
- The financial consequences (a swing which comprises both “relief from Damages” and “payment of related preliminaries”) are high; so claiming for delay often becomes confrontational
- Time claims are a rich source of disputes!

LEGAL / CONTRACTUAL ISSUES

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- Common law: implies completion in "A Reasonable Time" – but this leads to uncertainty and no specific obligation to progress
- Contracts therefore define a specific Completion Date, by which the Contractor must finish – and most require "diligent progress"
- Failure to complete leads to "damages" for late completion
- However, as it is difficult to prove "general damages", Liquidated Damages introduced (but note: "a genuine pre-estimate of loss")
- The "prevention principle" can stop damages from being applied in relation to acts or omissions by the Employer
- This leads to a need for clear and unambiguous EOT clauses (e.g. Peak v McKinney) – if time is not to be put "at large"
- Issues summarised by Lord Drummond Young in recent City Inn

LEGAL / CONTRACTUAL ISSUES

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- Important parts of EOT clauses:
  - Define method / process for making claims
  - Clear ID of Relevant Events / allocation of risks
  - Ensure Employer acts of prevention are covered, e.g.
    - » Any impediment, prevention or default – by act or omission – of the Employer or his servants or agents
  - Define who makes EOT decisions (but relative <u>independence</u> required by, e.g., Architect)

OTHER LEGAL PRINCIPLES?

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- Balfour Beatty v Chestermount:
  - "*…objective is to arrive at the aggregate period of time within which the contract works… ought to have been completed having regard to the incidence of non-contractor's risk events*"
- City Inn v Shepherd:
  - "*This process involves inherent uncertainties*"
- John Barker v Portland:
  - Use of a logical analysis, not impressionistic, contractually compliant, with the relevant events logically linked to the delays claimed

OTHER LEGAL PRINCIPLES?

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- Brompton v Hammond:
  - Fact, not theory, based: "*It seems to me that it is a question of fact in any given case whether a relevant event has caused or is likely to cause delay to the works beyond the Completion Date*"
- City Inn:
  - Causation is key: "*The question of causation must be treated by the application of common sense to the logical principles of causation, and if it is possible to identify an act of the employer as the dominant cause of the loss that will suffice*"
  - Can the claimant prove that the delay claimed is the dominant or effective cause?

OTHER LEGAL PRINCIPLES?

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- Quantification and Demonstration:
  - Ascon v McAlpine: "*It is Ascon which is seeking an extension of time and must establish a cause of a quantified period of delay entitling it to that extension*"
  - Max Abrahamson: "*The importance of records, the importance of records, the importance of records*"
- Programming:
  - A computer critical path analysis is not <u>always</u> required, but any programmes / analysis should be fact-based and logical
    - *Balfour Beatty v Lambeth* & *Mirant v Ove Arup*

BASIC PROGRAMMING ISSUES

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- There is often a conflict between the interests of Employer and Contractor
- The Employer may have:
  - Fixed tenant fit-out / move-in dates (e.g. office building)
  - Advertised opening date (e.g. shopping centre)
  - Lost revenue and poor market image if late
- He wants <u>time certainty</u>

BASIC PROGRAMMING ISSUES

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- Contractor has planning difficulties:
  - Limited timescale (in which to prepare programmes)
  - Complex programming may be required
  - May not fully comprehend site issues at start of project
  - Has to programme to fit in Employer's timescales
  - Must plan all phases of work up front: e.g. basic interior fit-out planning occurs before any subcontract tender, even though these can involve extremely complex relationships
- Yet… the Contract Programme is expected to be both reliable and accurate!

BASIC PROGRAMMING ISSUES

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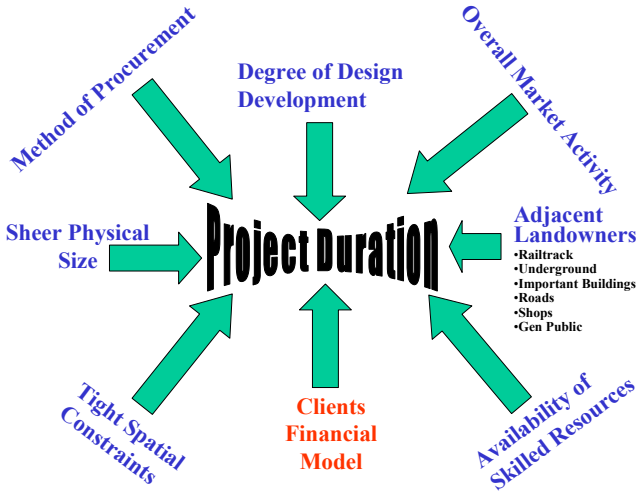

BASIC PROGRAMMING ISSUES

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- In preparing a construction programme, all information must be considered:
- Key tasks will involve:
  - Considering the full list of processes and activities involved
  - Assess resource requirements and past progress achieved in order to assess activity durations
  - Consider and insert activity relationships (Programme Logic Links)
  - Consider constraints (either internal, such as resources, or external, such as demolition requirements or access difficulties)
  - Prepare final programme
- The programme should arise from / be associated with a reasonably detailed Method Statement, as applicable

PLANNING VERSUS PROGRAMMING

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- Planning:
  - Conceptualising HOW things are to be done
  - Use construction drawings and method statements
  - The where, why, whom, what, and when will follow naturally
- Programming:
  - Scheduling when in time things are to be done

"You can plan without programming, but you cannot programme without planning"

Mr Alasdair Maclennan, Regional Chairman, ICE Glasgow

Example: Programming 101
Activities and basic links

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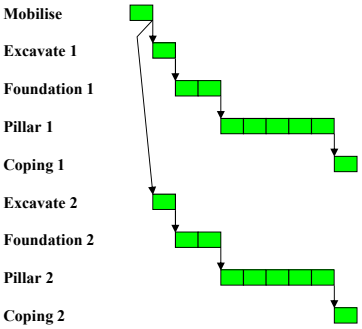

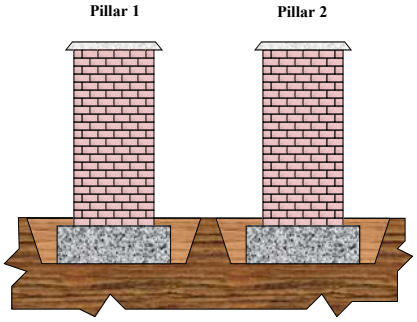

Project – build 2 pillars

Example: Programming 101
Constraints

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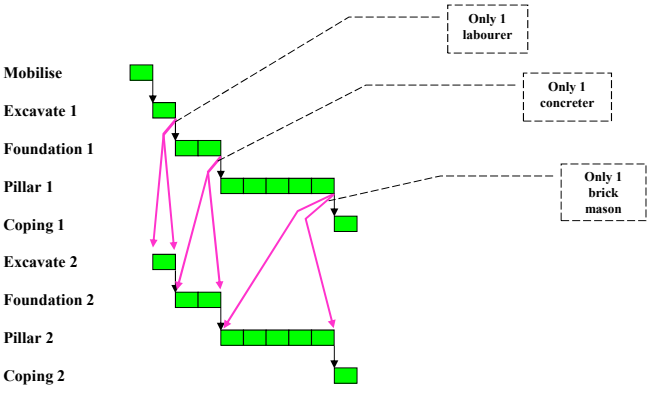
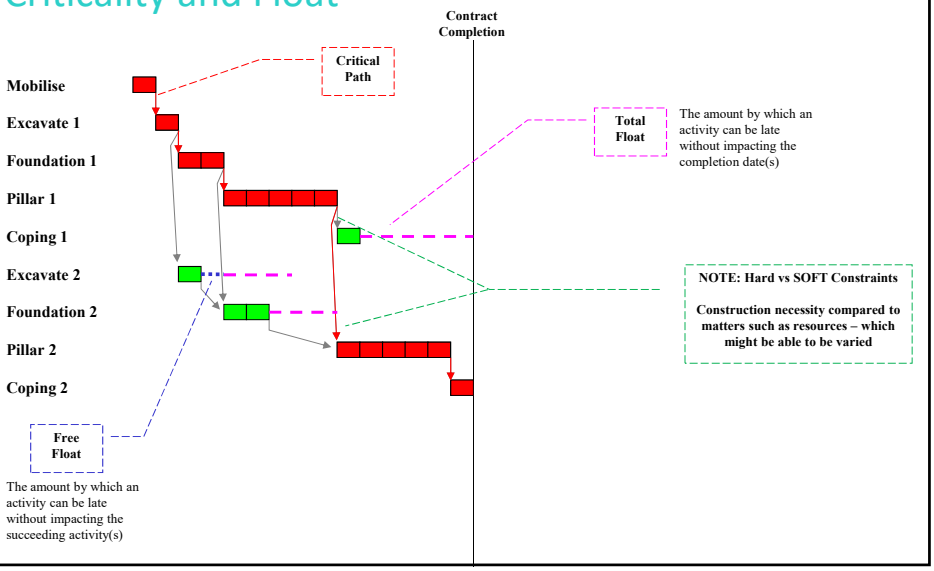
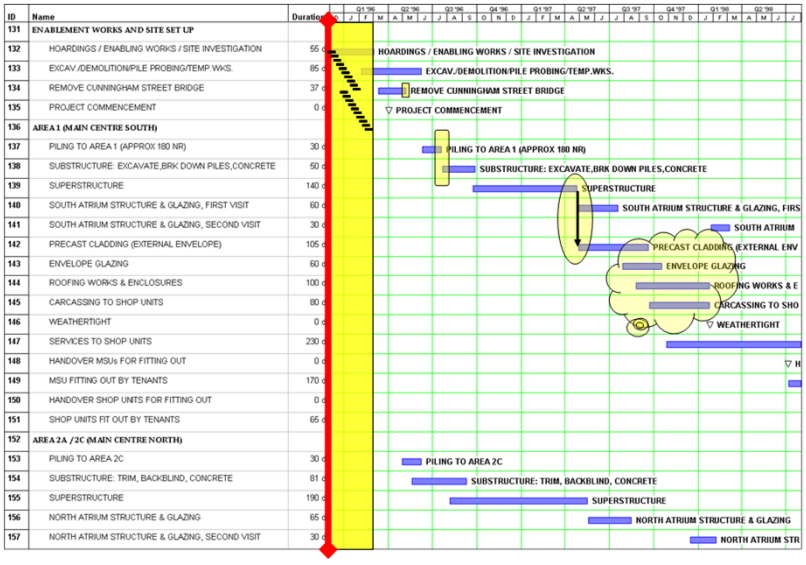


Example: Programming 101
Criticality and Float



Issues: Confidence with time



BASIC PROGRAMMING CONCLUSIONS

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- Employer provides info, constraints, and expectations
- Contractor advises on buildability, activities required, timescale achievability, and prepares the programme
- However:
  - Constraints mean that Employer and Contractor aims are often in (possibly considerable) tension
  - Programming the whole job is difficult, if not impossible, at an early stage
  - Nevertheless, the Contract Programme is used for measuring progress throughout the project, and is then often used in later EOT claims
- A Contract Programme should be prepared with care!

More complex programming issues: Float, Causation, and Concurrency

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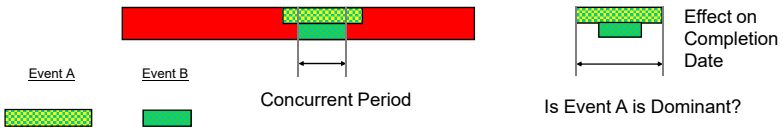
- Float
  - Who owns it and how it should be treated?
- Causation principles
  - Cases summarised in Keating on Building Contracts
  - "Dominant Cause" principle is popular, and if true "dominance" can be established that is likely to hold significant weight.
  - Marrin QC considered that the CA has discretion to consider and choose between competing (and perhaps concurrent) causes
  - Black QC concluded (from *Malmaison*) that any assessment should consider whether any Employer risk event would have impacted on the [originally] agreed construction period – may be too broad.
  - SCL Protocol 2nd Edition and the most recent case law (*Saga*) appears to support a narrower "what is the real, critical, delay?" approach
- Concurrency issues can, and do, create confusion!

FLOAT

- Who owns the float?
  - Different forms deal with it in different ways
  - JCT, ICE, FIDIC generally require likely or actual delay to completion to be demonstrated, so float might be available to either party
    - In *Ascon v McAlpine* Judge Hicks considered that it was owned by whoever uses it first
  - NEC defines ownership of "terminal float" and allows a contractor to build ownership of float into the programme
  - Clearly the precise wording of the contract can alter or define float ownership (sometimes confusingly)

DOMINANCE IN CONCURRENCY

- Delays to non-critical activities simply have no impact on the completion date. They are not truly concurrent – and so no EOT award is likely to be appropriate.
- Where there are multiple delays to critical activities, dominance should be examined:



- Event A starts first and lasts longer – it would appear to be "dominant"

DOMINANCE IN CONCURRENCY

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Pipe example – 2 volunteers please!!!

RELEVANT CASE LAW ON CONCURRENCY

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- There are a number of "key" cases, including:
  - *Henry Boot vs Malmaison*
  - *Brompton Hospital v Hammond* (No 7)
  - *Motherwell Bridge vs Micafil*
  - *Saga and Fincantieri*

- Malmaison
  - It is often claimed that the judge (Dyson) determined that… if two "concurrent" delays exist, one of which is an Employer risk, the Contractor must be awarded an EOT.
  - This view has many adherents (especially in the contracting world and contractor's solicitors), but it is not necessarily correct in practice…

RELEVANT CASE LAW ON CONCURRENCY

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- Adherents argue that Paragraph 13 makes it very clear:
  - *"…if there are two concurrent causes of delay, one of which is a Relevant Event, and the other is not, then the Contractor is entitled to an extension of time for the period of delay caused by the Relevant Event notwithstanding the concurrent effect of the other event. Thus, to take a simple example, if no work is possible on a site for a week not only because of exceptionally inclement weather (a Relevant Event), but also because the Contractor has a shortage of labour (not a Relevant Event) and if the failure to work during that week is likely to delay the works beyond the Completion Date by one week, then if he considers it fair and reasonable to do so, the Architect is required to grant an extension of time of one week.* ***He cannot refuse to do so on the grounds that the delay would have occurred in any event by reason of the shortage of labour****".*

RELEVANT CASE LAW ON CONCURRENCY

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- And the Paragraph 13 comment (by Dyson) was certainly referred to in the (later) Royal Brompton case (by Seymour):
  - *"…if Taylor Woodrow was delayed in completing the works* ***both*** *by matters for which it bore the contractual risk* ***and*** *by Relevant Events, within the meaning of that term in the Standard Form, in the light of the authorities to which I have referred,* ***it would be entitled to extensions of time by reason of the occurrence of the Relevant Events notwithstanding its own defaults****".*

RELEVANT CASE LAW ON CONCURRENCY

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- But both cases were also founded on the earlier *Balfour Beatty v Chestermount* judgement, and a detailed reading of both (and that earlier case) sheds a different light.
- Concurrency alone does not entitle the Contractor to an EOT… and the cases were decided on fact & causation
  - Seymour in Brompton went on to state:
  - "*It seems to me that it is a question of fact in any case whether a Relevant Event has caused or is likely to cause delay to the Works beyond the Completion Date*"
  - **Factual causation** issues are evident in all the relevant judgements as the principle on which they determine delay claims

RELEVANT CASE LAW ON CONCURRENCY

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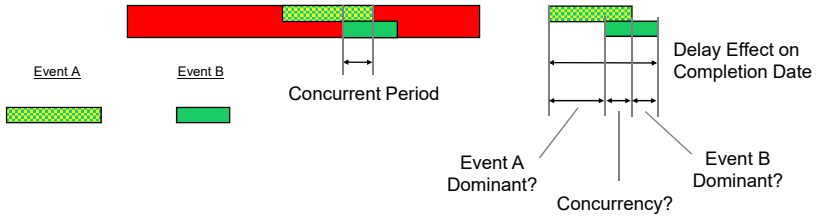
- Seymour went on to conclude that "true concurrency" only occurs if both events start about the same time and last for the same period of time, and are (therefore) difficult or impossible to separate (in causation terms):

  "… it is, I think, necessary to be clear what one means by events operating concurrently. It does not mean, in my judgment, a situation in which, work already being delayed, let it be supposed, because the Contractor has had difficulty in obtaining sufficient labour, an event occurs which is a Relevant Event and which, had the Contractor not been delayed, would have caused him to be delayed, but which ***in fact, by reason of the existing delay, made no difference****. In such a situation, although there is a Relevant Event…* *the completion of the Works is [not] likely to be* ***delayed thereby*** *beyond the Completion Date"*

CAUSATION IN CONCURRENCY

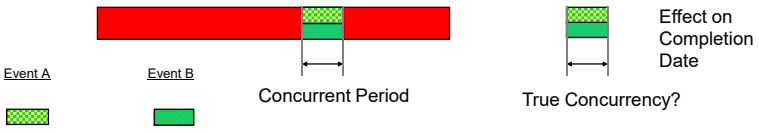
- So, considering causes of delay which operate concurrently but occur at different times:



- It appears that, as Event A starts first, it is initially dominant. Does it remain so, or is this period of overlap to be treated as a "concurrent"?
- If Event B continues to have a delaying effect after Event A ceases, it will certainly be Event B that is dominant for that period of time

"TRUE" CONCURRENCY

- There may be situations in which it is impossible to establish dominance:



- The events are "truly concurrent"
  (or perhaps "equally dominant" or "equally causative"?)

METHODS / EVIDENTIAL REQUIREMENTS

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- Lord Macfadyen in Doyle v Laing
  - *"…causation must be treated as a common sense matter."*
  - Compliance with Malmaison and Brompton requires a CA to ascertain, on a fair and reasonable basis, what particular event is causative of delay at any particular time. **This is easier said than done!**
- Programmes and Records
  - Max Abrahamson: The three lessons for a CA to learn in a dispute about EOT "*the importance of records, the importance of records, the importance of records*"
  - A well worked and detailed programme from the outset, supported by a detailed method statement, is one such record

METHODS / EVIDENTIAL REQUIREMENTS

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- Methodologies – Lloyd in Balfour Beatty v Lambeth
  - *"By now one would have thought that it was well understood that, on a contract of this kind, in order to attack on the facts a clause 24 certification for non-completion (or an extension of time determined under clause 25), the foundation must be the original programme (if capable of justification and substantiation to show its validity and reliability as a contractual starting point) and its success will similarly depend on the soundness of its revisions on the occurrence of every event, so as to be able to provide a satisfactory demonstration of cause and effect. A valid critical path (or paths) has to be established both initially and at every later material point since it (or they) will almost certainly change".*

SOME HIGH LEVEL METHODOLOGICAL / EVIDENTIAL CONCLUSIONS

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- The contract is king
- Delays happen – but how were they managed?
- Claims will occur –the assessment of delay should be based on realistic a cause and effect demonstration
- A close relationship between lawyer and programmer may be fundamental to the success or failure of any claim (no matter which side you are on)
- There are numerous practicalities to consider!

DELAY DURING THE CONTRACT: KEEPING INFORMATION AND RECORDS

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- Records that are helpful in a dispute:
  - ❑ Progress reports and updated (progressed) programme
  - ❑ Factual records on progress
  - ❑ Photos
  - ❑ Completion or inspection certificates
  - ❑ Marked-up construction or services drawings
  - ❑ Monitoring records (e.g. COW reports, RE Diary, independent progress / programme monitor)
  - ❑ Scott schedules of events, changes, and variations, along with estimated or actual impacts

DELAY DURING THE CONTRACT: PROGRAMME UPDATING

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- One of the best records is an <u>accurate</u> measure of the actual progress of the work, recorded on or against the as-planned programme.
- Without progress recording, and the consideration of actual delay to activities, it is difficult to identify:
  - Activities which are progressing as planned
  - Activities on which progress is too slow or delayed
- Without a properly updated, dynamic, programme it is unlikely that the impact of slow progress or delay will be identified as having an affect on the completion date.

Example: Progress updating Critical Delay – to example programme

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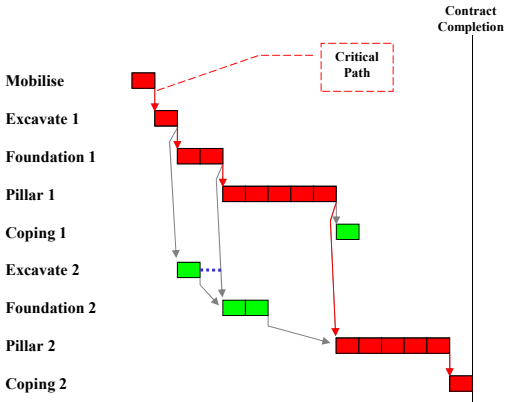

It is only if the critical (red) activities are delayed that the completion date will be affected – the others (green) have float!

Example: Progress Updating Day 0

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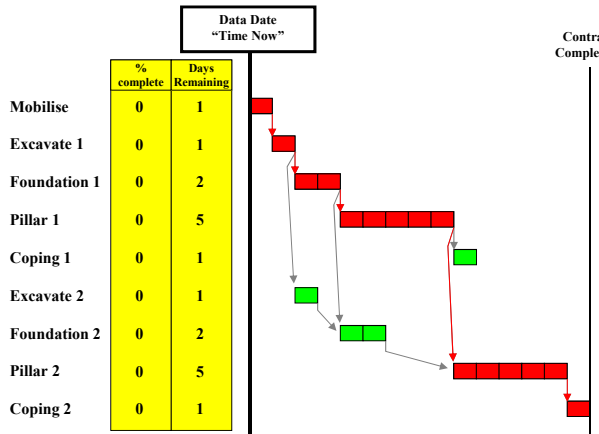

	% complete	Days Remaining
Mobilise	0	1
Excavate 1	0	1
Foundation 1	0	2
Pillar 1	0	5
Coping 1	0	1
Excavate 2	0	1
Foundation 2	0	2
Pillar 2	0	5
Coping 2	0	1

Conclusions:
As at Day 0:

There is no projected delay to completion

Critical Path runs mainly through Path 1

Projected Duration 15 Days

Example: Progress Updating Day 4

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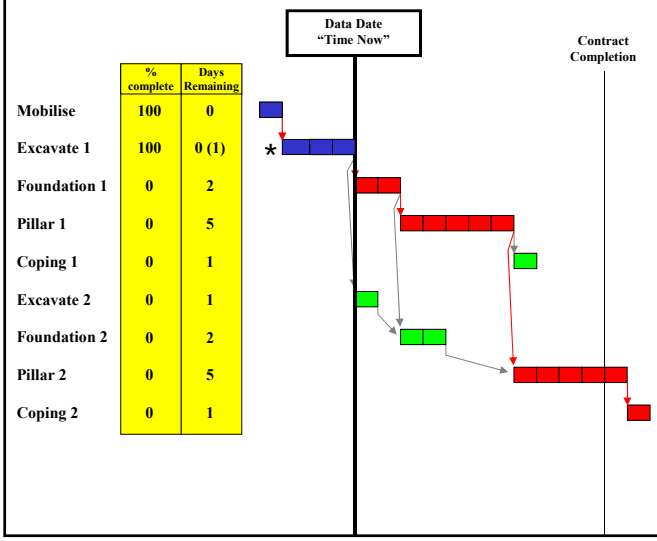

	% complete	Days Remaining
Mobilise	100	0
Excavate 1	100	0 (1)
Foundation 1	0	2
Pillar 1	0	5
Coping 1	0	1
Excavate 2	0	1
Foundation 2	0	2
Pillar 2	0	5
Coping 2	0	1

Update on Day 4:

Ground obstructions to Excavation 1 caused a 2 day prolongation

Delay to completion of 2 days is projected

Critical Path remains mainly through Path 1

Projected Duration 17 Days (i.e. 2 days of "progress" delay already incurred)

Example: Progress Updating Day 8

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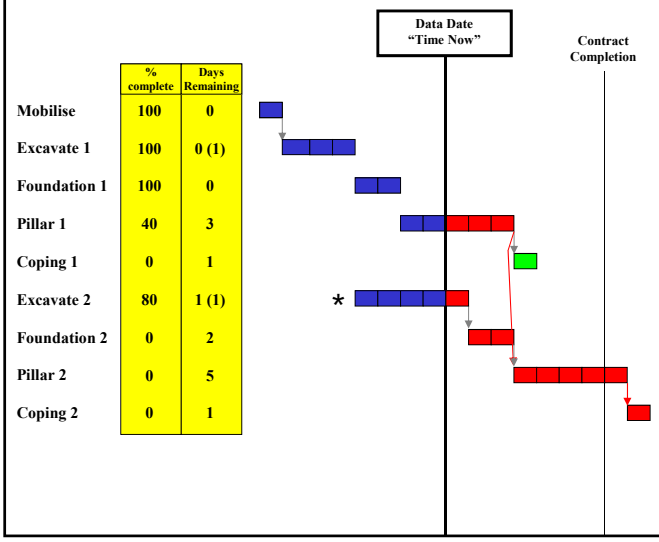

	% complete	Days Remaining
Mobilise	100	0
Excavate 1	100	0 (1)
Foundation 1	100	0
Pillar 1	40	3
Coping 1	0	1
Excavate 2	80	1 (1)
Foundation 2	0	2
Pillar 2	0	5
Coping 2	0	1

Update on Day 8:

Pillar 2 Excavation was prolonged 4 days by obstructions

The 2 day projected delay to completion is unchanged (but float on path 2 is used up)

Critical Path now runs through BOTH Paths 1 & 2

Projected Duration 17 Days

Example: Progress Updating Day 10

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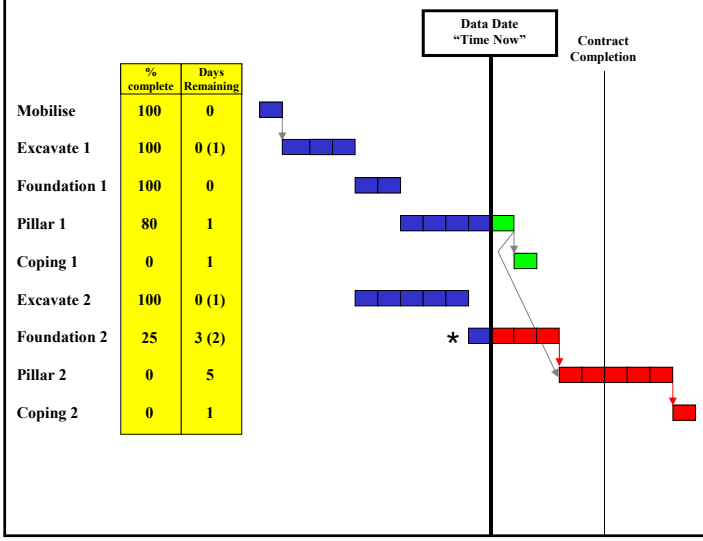

	% complete	Days Remaining
Mobilise	100	0
Excavate 1	100	0 (1)
Foundation 1	100	0
Pillar 1	80	1
Coping 1	0	1
Excavate 2	100	0 (1)
Foundation 2	25	3 (2)
Pillar 2	0	5
Coping 2	0	1

Update on Day 10:

Additional delay is occurring to Foundation 2 – Note 25% duration in 1 day (which should have resulted in 50%)

Future delay to Foundation (remaining 75% taking 3 more days) means Projected Completion is delayed a further 2 days (to 4 days total)

The Critical Path now runs only through Path 2

Projected Duration 19 Days

Example: Progress Updating
Day 18 (project completion)

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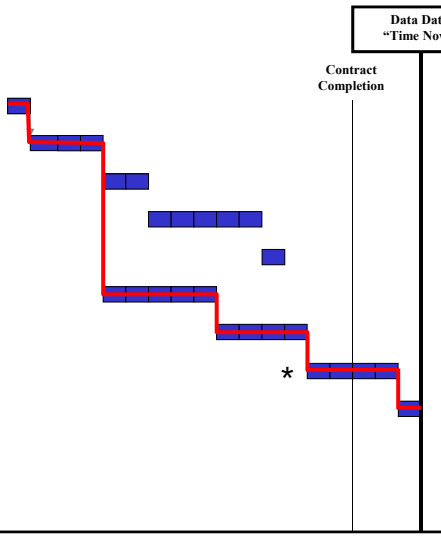
	% complete	Days Remaining
Mobilise	100	0
Excavate 1	100	0 (1)
Foundation 1	100	0
Pillar 1	100	0
Coping 1	100	0
Excavate 2	100	0 (1)
Foundation 2	100	0 (2)
Pillar 2	100	0 (5)
Coping 2	100	0



Update at Day 18:

An increase in resources led to a reduced time to complete Pillar 2 Brickwork (4 days not 5)

The actual delay to completion was reduced from 4 days to 3 days

The "as-built" Critical Path ran largely through Path 2

Actual Duration 18 Days

Example: Progress Updating
Claiming an EOT

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- If progress updating is done properly (and regularly), it will be a simple matter for the Contractor to explain to Contract Administrator why delay arising from an Employer Risk should result in an EOT:
  - Contract says Ground Obstructions are an Employer Risk
  - Excavation hit obstructions – which took 3 and 5 days to complete (to the respective pillars) instead of 1 day (as had been planned)
  - Excavation was critical to the programme. These delays caused 2 days of critical delay
  - Please grant an EOT of 2 days

Example: Progress Updating Records, Records, Records!

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- However, if good records of actual progress, and detailed records of the background reasons for any delays, have not been kept, then EOT claims may still fail:
  - **Contractor:** "Please give me an EOT of 2 days for ground obstructions. They were your risk under the contract."
  - **CA:** "I remember your programme updates stated that excavation was delayed. Please provide particulars of the claim, including records of the obstructions, and the work and time required to remove them."
  - **Contractor:** "We told you about the delays when they were happening."
  - **CA:** "And I asked you for details, but you never sent any. I am told your resources were insufficient, and were working inefficiently."
  - **Contractor:** "We didn't make detailed records of the obstructions."
  - **CA:** "It seems to me that the delay to excavation is likely to have been caused be your lack of / poor resources. No EOT due."

Post-Contract Delay Evidence for delay disputes

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- Issues to consider:
  - Identification of delay
  - Responsibility for delay
  - Concurrency of delay
  - Notification requirements
  - The information needed for an EoT claim

WHAT DOES THIS MEAN IN PRACTICE?

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- From this review, the key causation requirements I summarised from the other cases appears to be largely unchanged.
- When seeking to determine whether an EOT is due:
  - Establish the facts of the case, the actual progress of the works, and the likely / actual delays to progress, so as to establish the necessary "causation criterion".
  - If Relevant Events can be identified which have caused clear critical delay to the project, then an EOT is likely to be due for any period of delay demonstrably caused.
  - If there is concurrency of delay, then to the extent that the RE remains an "*effective cause*" (i.e. it has "*delayed the works*", and has "*approximately equal causative potency*"), then the existence of concurrent Contractor delay should not reduce an entitlement to EOT.
    - (Though of course concurrent Contractor delay may have an effect on any costs award associated with the EOT being granted)

WHAT DOES THIS MEAN IN PRACTICE? ANALYSIS METHODOLOGIES

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- It seems likely that only methodologies which demonstrate the reality of the project's shifting critical path, and find a way to show the realistic extent of likely and/or actual delay, are likely to find favour with decision-makers.
- In the following pages I will explain some of the "normal" methodologies, and how they demonstrate causation, including:
  - Impacted as-planned / "Additive"
  - Compressed as-built / "But-For" / Deductive
  - Time slicing / "Time Impact Analysis"
  - As-Planned vs As-Built Comparative / "Traditional"
  - Also: various kinds of "Windows" approaches

ANALYSIS METHODOLOGIES: Impacted As-Planned Method

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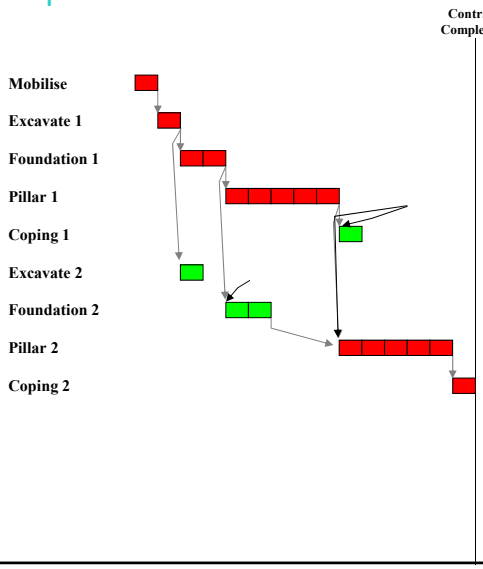

Step 1 Identify Delay Events

Delay Event 1 (Rock Excavation at Pillar 2)

Delay Event 2 (Bad Weather during Brickwork to Pillar 1)

Step 2 Establish relationship of Delay Events to Baseline Programme. Insert Delay Events into Programme

ANALYSIS METHODOLOGIES: Impacted As-Planned Method

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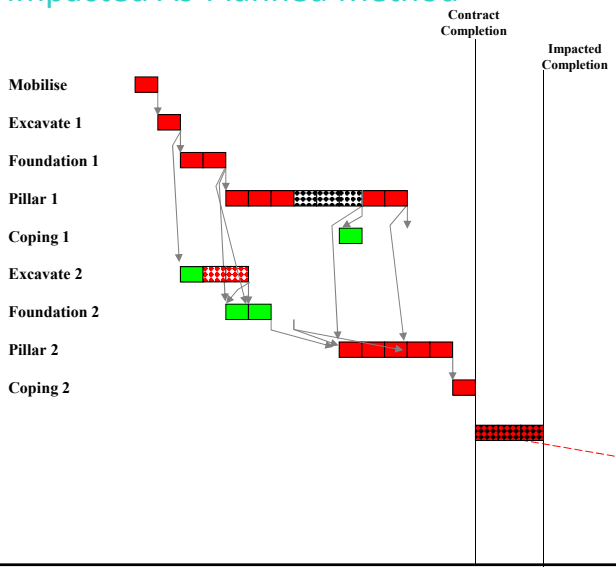


Step 1 Identify Delay Events

Delay Event 1 (Rock Excavation at Pillar 2)

Delay Event 2 (Bad Weather during Brickwork to Pillar 1)

Step 2 Establish relationship of Delay Events to Baseline Programme. Insert Delay Events into Programme

Step 3 Recalculate Programme

Conclusion The calculated programme overrun is the simulated effect of the inserted delay events

The projected effect of Events 1 and 2 on the Baseline Programme – Event 2 is critical, while event 1 is not.

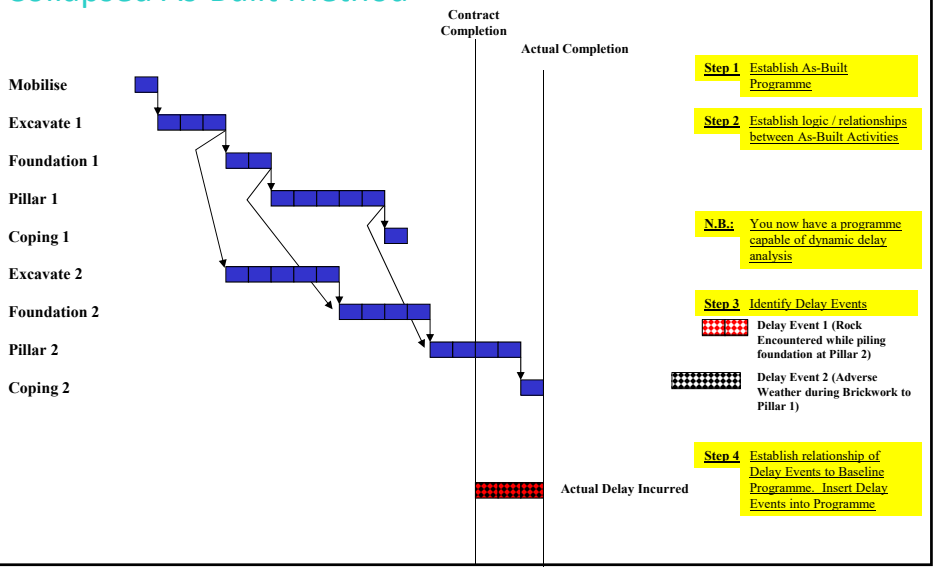
ANALYSIS METHODOLOGIES: Impacted As-Planned Method

DGA

- This approach inserts claimed events into a Contractor's as-planned programme. It returns the theoretical effect of those events on the original plan of work.
- It remains a favoured method of contractors, as it simple and easy to apply, and may generate a significant EOT claim.
- However, it is highly theoretical and is not generally considered "factual". As noted in *Great Eastern v Laing (2005)* it "*takes no account of the actual events which occurred on the project*" and was "*hypothetical*".
- This approach will rarely (if ever) properly demonstrate actual delay, nor will it properly demonstrate causation.

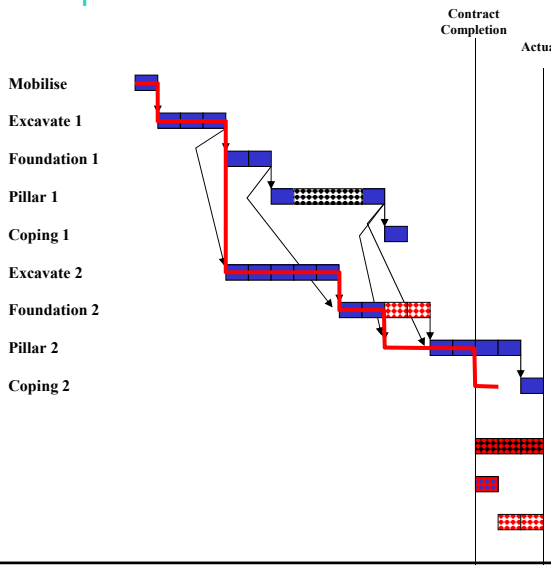
ANALYSIS METHODOLOGIES: Collapsed As-Built Method

DGA



ANALYSIS METHODOLOGIES: Collapsed As-Built Method

DGA



Step 5 Select Event to carry-out "But For" Analysis on. **First analysis** – *had Delay Event 1 not occurred, would the project have completed earlier?*

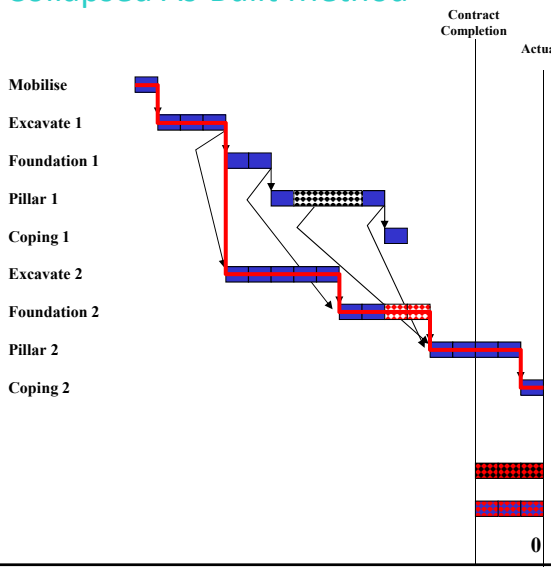
Step 6 Instruct Programme to regard the delay component as nil duration

Step 7 Recalculate the Programme

Step 8 **Form Conclusion:** "But-for" Delay Event 1 – the project would have finished 2 days earlier – therefore 2 days entitlement / delay arises from Delay Event 1

ANALYSIS METHODOLOGIES: Collapsed As-Built Method

DGA



Step 5 Select Event to carry-out "But For" Analysis on. **Second analysis** – *had Delay Event 2 not occurred, would the project have completed earlier?*

Step 6 Instruct Programme to regard the delay component as nil duration

Step 7 Recalculate the Programme

Conclusion "But-for" Delay Event 2 – the project would not have finished any earlier – therefore no entitlement / delay arises from Delay Event 1

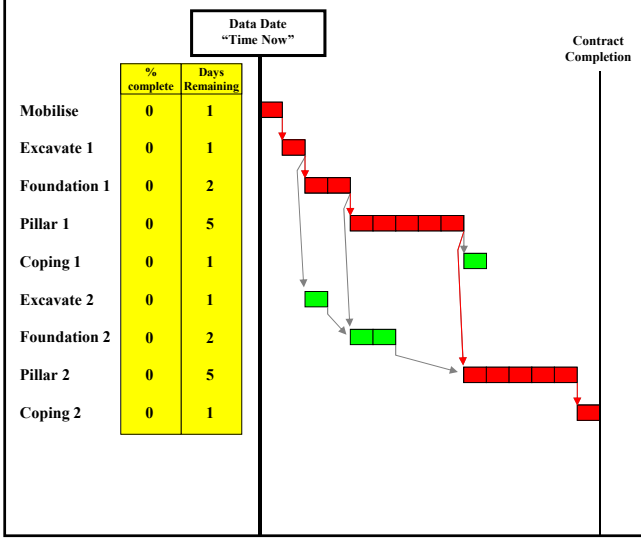
ANALYSIS METHODOLOGIES: Collapsed As-Built Method (But For)

DGA

- This approach has few adherents and is no longer common.
  - Though some would like to see it brought back into fashion
- It often relies on a (subjective) re-creation of the "as-built" activities and links, and may be subject to manipulation/bias.
- However, the analysis (even when complete) will not provide assistance in demonstrating how the works progressed, or identifying what activities were critical "at the time".
- Generally speaking it tends only to support the views of the party that produces it, and will fail to identify any issues such as concurrency, re-sequencing, acceleration, etc.
- As such, this approach does not properly demonstrate actual delay, nor will it properly demonstrate causation.

ANALYSIS METHODOLOGIES: Time Slice / Updating Day 0

DGA



	% complete	Days Remaining
Mobilise	0	1
Excavate 1	0	1
Foundation 1	0	2
Pillar 1	0	5
Coping 1	0	1
Excavate 2	0	1
Foundation 2	0	2
Pillar 2	0	5
Coping 2	0	1

Conclusions:
As at Day 0:

There is no projected delay to completion

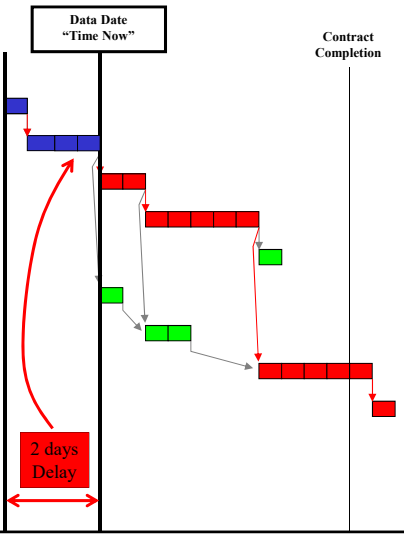
The Critical Path runs mainly through Path 1

Projected Duration 15 Days

ANALYSIS METHODOLOGIES: Time Slice / Updating Day 4

DGA

	% complete	Days Remaining
Mobilise	100	0
Excavate 1	100	0 (1)
Foundation 1	0	2
Pillar 1	0	5
Coping 1	0	1
Excavate 2	0	1
Foundation 2	0	2
Pillar 2	0	5
Coping 2	0	1



Update on Day 4:

Ground obstructions in excavation caused a 2 day prolongation.

A delay to completion of 2 days is projected

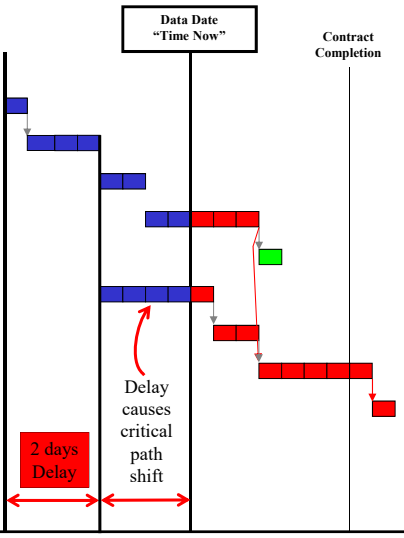
The Critical Path remains mainly through Path 1

Projected Duration 17 Days

ANALYSIS METHODOLOGIES: Time Slice / Updating Day 8

DGA

	% complete	Days Remaining
Mobilise	100	0
Excavate 1	100	0 (1)
Foundation 1	100	0
Pillar 1	40	3
Coping 1	0	1
Excavate 2	80	1 (1)
Foundation 2	0	2
Pillar 2	0	5
Coping 2	0	1



Update on Day 8:

The Pillar 2 excavation was prolonged 4 days by obstructions

However, the 2 day projected delay to completion remains (float on path 2 was used up)

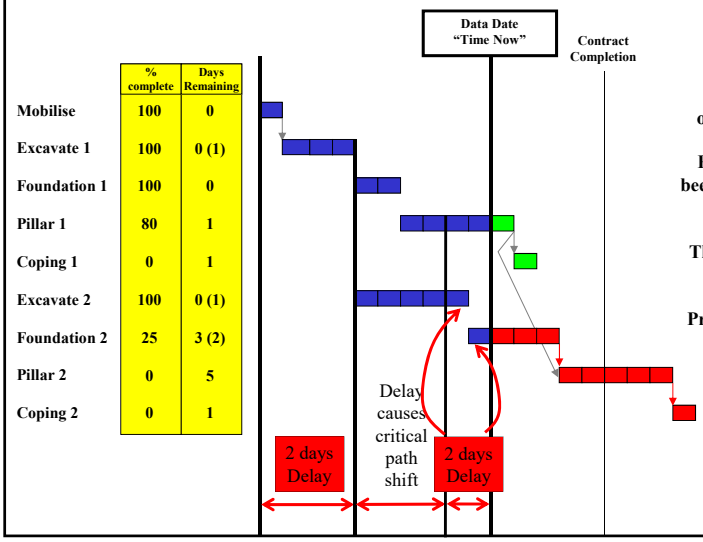
The Critical Path now runs through BOTH Paths 1 & 2

Projected Duration 17 Days

ANALYSIS METHODOLOGIES: Time Slice / Updating Day 10

DGA

	% complete	Days Remaining
Mobilise	100	0
Excavate 1	100	0 (1)
Foundation 1	100	0
Pillar 1	80	1
Coping 1	0	1
Excavate 2	100	0 (1)
Foundation 2	25	3 (2)
Pillar 2	0	5
Coping 2	0	1



Update on Day 10:

An additional delay has occurred to Foundation 2

Projected completion has been delayed a further 2 days (to 4 days total)

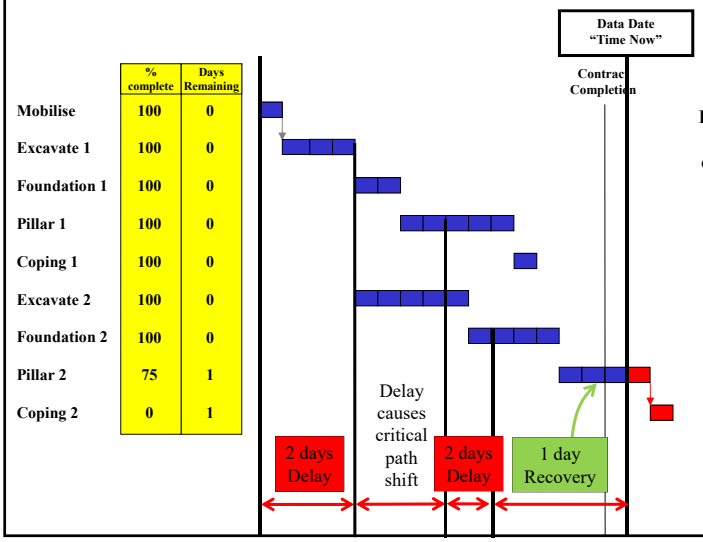
The Critical Path now runs only through Path 2

Projected Duration 19 Days

ANALYSIS METHODOLOGIES: Time Slice / Updating Day 16

DGA

	% complete	Days Remaining
Mobilise	100	0
Excavate 1	100	0
Foundation 1	100	0
Pillar 1	100	0
Coping 1	100	0
Excavate 2	100	0
Foundation 2	100	0
Pillar 2	75	1
Coping 2	0	1



Conclusions:
As at Day 16:

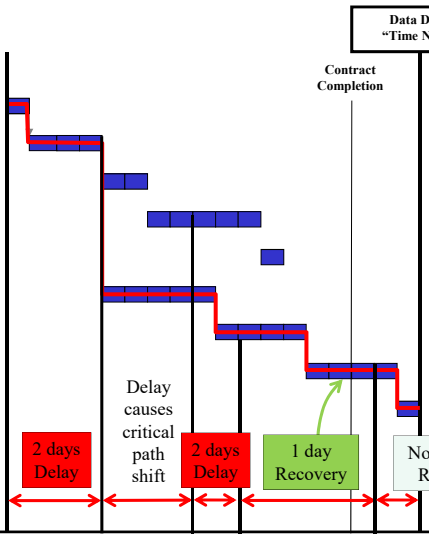
Increased resources has led to a reduced time to complete pillar 2, reducing the projected delay to completion to 3 hours

The Critical Path remains through path 2

ANALYSIS METHODOLOGIES:
Time Slice / Updating - Completion

DGA

	% complete	Days Remaining
Mobilise	100	0
Excavate 1	100	0 (1)
Foundation 1	100	0
Pillar 1	100	0
Coping 1	100	0
Excavate 2	100	0 (1)
Foundation 2	100	0 (2)
Pillar 2	100	0 (5)
Coping 2	100	0



Update at Day 18:

An increase in resources led to a reduced time to complete pillar 2

The actual delay to completion was reduced from 4 hours to 3 hours

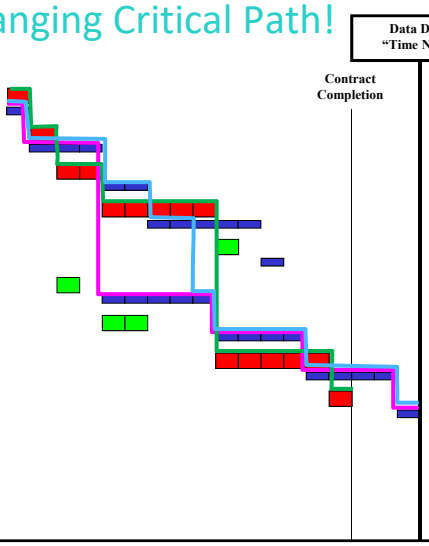
The "as-built" Critical Path ran largely through path 2

Actual Duration 18 Days

ANALYSIS METHODOLOGIES:
Time Slice / Updating
Note the changing Critical Path!

DGA

Mobilise
Excavate 1
Foundation 1
Pillar 1
Coping 1
Excavate 2
Foundation 2
Pillar 2
Coping 2



Critical Path Analysis shown on As-Planned v As-Built:

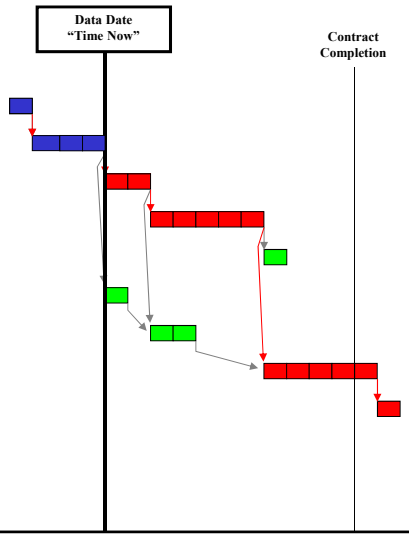
Compare Critical Paths:
-As-Planned
-Contemporaneous
-As Built

Depending on the analysis, different Critical Paths are shown and potentially different EOT conclusions may result

ANALYSIS METHODOLOGIES:
Time "Impact" variant: Event occurs Day 4 – Make a pre-impact programme update

DGA

	% complete	days Remaining
Mobilise	100	0
Excavate 1	100	0
Foundation 1	0	2
Pillar 1	0	5
Coping 1	0	1
Excavate 2	0	1
Foundation 2	0	2
Pillar 2	0	5
Coping 2	0	1



Time Slice Conclusions:
As at Day 4:

Problems in excavation led to a 2 day prolongation and hence a projected delay to completion

The Critical Path remains through Path 1

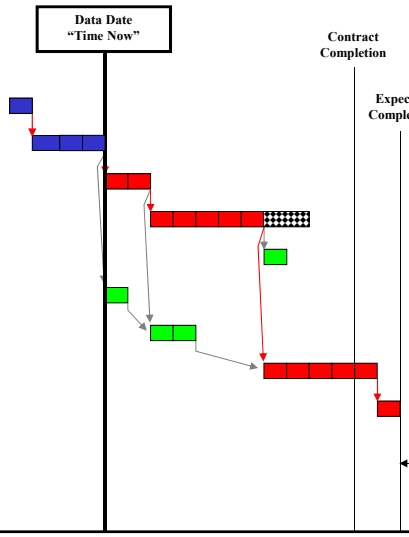
A Future Delay occurs – likely impact assessed

Delay Event 1 (Variation on Pillar 1 construction method)

ANALYSIS METHODOLOGIES:
Time "Impact" variant: Create Analysis of Delay Impact & "analyse"

DGA

	% complete	days Remaining
Mobilise	100	0
Excavate 1	100	0
Foundation 1	0	2
Pillar 1	0	5
Coping 1	0	1
Excavate 2	0	1
Foundation 2	0	2
Pillar 2	0	5
Coping 2	0	1



Time Slice Conclusions:
As at Day 4:

Problems in excavation led to a 2 day prolongation and hence a projected delay to completion

The Critical Path remains through Path 1

A Future Delay occurs – likely impact assessed

Delay Event 1 (Pillar 1 construction method changed)

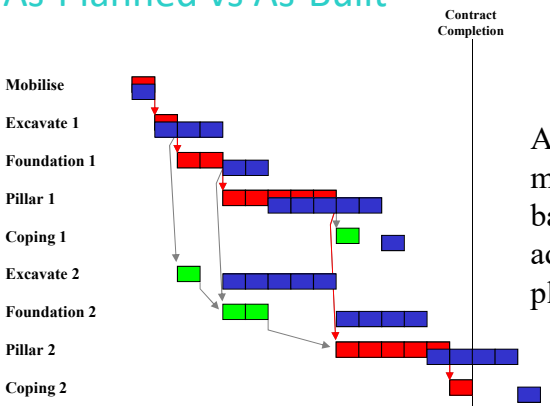
ANALYSIS METHODOLOGIES:
Time Slicing and Time Impact Analyses

DGA

- time slicing can be very helpful in examining and establishing the critical path (as it progressed), particularly if good contemporaneous programmes and their updates were produced during the project. If not, the generation of appropriate time slice updates requires significant effort and so can be expensive.
- BUT: The base programme and logic must be realistic and clear, and it (and all updates) must properly simulate future delay (if it is to be used for impacting events). All known events must be impacted properly and in sequence (including slow progress and contractor problems), otherwise a "theoretical" criticism will be valid.
- It can be a very thorough and helpful method if produced on a "factual" and realistic basis. If done properly, it should properly demonstrate actual critical delay and causation of "delay to completion".
- However, it can take time (and cost) to produce / perform, may be compromised by poor / limited records, and (in my experience) is often manipulated by the party producing it (which then attracts criticism).

ANALYSIS METHODOLOGIES:
As-Planned vs As-Built

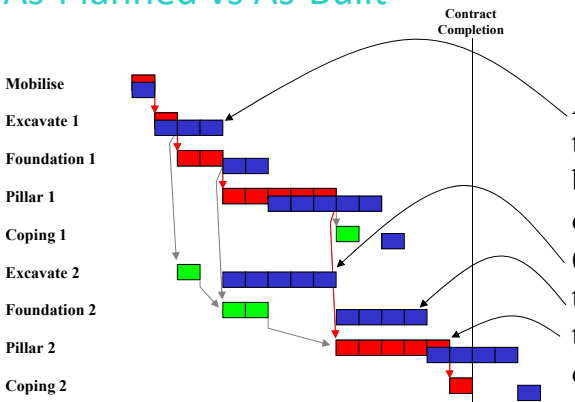
DGA



As-Built activities are mapped onto the baseline programme adjacent to their "as-planned" counterparts

ANALYSIS METHODOLOGIES: As-Planned vs As-Built

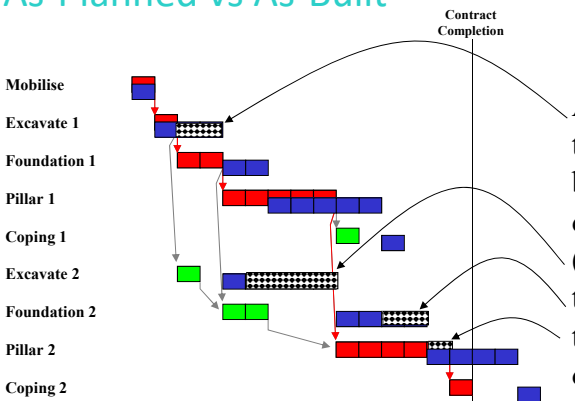
DGA



A basic comparison of the as-planned and as-built activities allows determination of delay (and recovery) – so as to form conclusions as to the likely causes of delay

ANALYSIS METHODOLOGIES: As-Planned vs As-Built

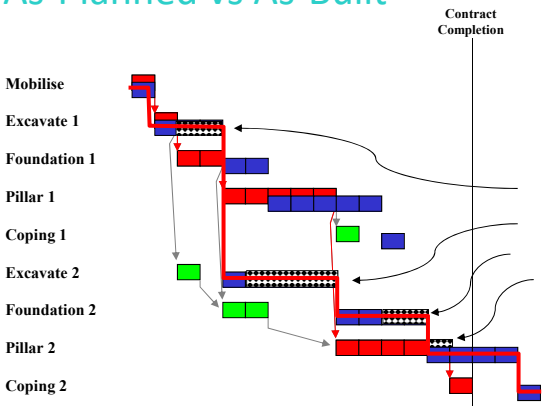
DGA



A basic comparison of the as-planned and as-built activities allows determination of delay (and recovery) – so as to form conclusions as to the likely causes of delay

ANALYSIS METHODOLOGIES: As-Planned vs As-Built

DGA



Consideration of delay and recovery periods on the "Critical Path" – leads to formation of conclusions

In a basic analysis, CP may not be identified accurately – and there may be accusations of a "global" approach

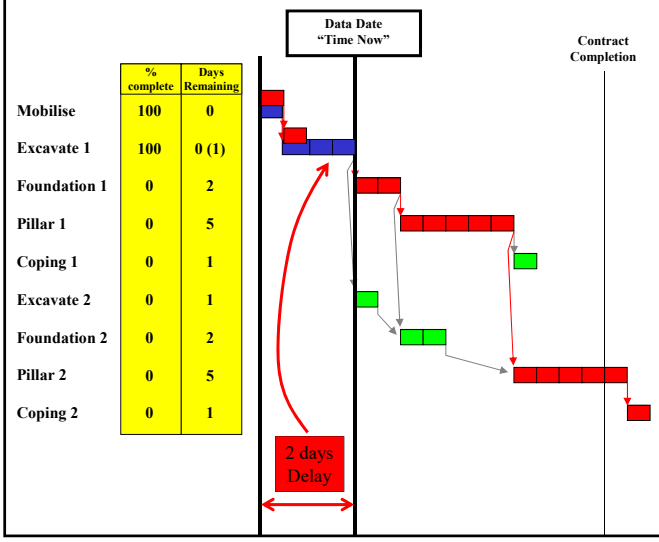
ANALYSIS METHODOLOGIES: As-Planned vs As-Built

DGA

- This approach may be criticised as "simplistic" or global, and may (in isolation) have difficulty establishing criticality through the project.
- However, if the critical path can be identified (because it is evident, or by the other analysis methods such as time slicing), then this method enables a very clear determination of actual delay to the critical activities, and shows when that actual delay occurred.
- Activity delays can then be investigated in detail (using the factual matrix) to find and conclude on the causes of that delay.
- The high degree of factual content makes it reliable, and it is easy to generate a clear, visual, representation of the actual delay(s).
- It is not normally capable of disentangling concurrency issues (or re-sequencing, etc.) so is often used alongside other methods.
- If done properly, it is a thorough method which establishes "factual" delay results. Demonstrating causation, however, relies on the backup investigations.

ANALYSIS METHODOLOGIES: "Windows" Analysis Example

DGA



Analysis "Window": Start of project to the Start of Foundations:

As-Planned vs As-Built Observation: 2 day prolongation to Excavation.

Factual Investigations: Ground obstructions occurred. Demonstrates whole 2 day prolongation.

Programme Observation: This activity is on the critical path, this a critical delay is projected to completion

The (future) Critical Path remains unchanged.

Projected Duration 17 Days and claim for EOT of 2 days

ANALYSIS METHODOLOGIES: Windows Analysis

DGA

- This is generally seen as a variant of the As-planned vs As-built analysis, but focuses investigation in specific time periods ("Windows"). These can use "progress update" periods but are more commonly defined by "key milestones" that will allow clear "delay measurement".
- Within each "window", the current and updated programmes are examined to determine and establish the likely path(s) of criticality.
- Delay is established either by "programme impact" (comparing update programmes at the beginning and end of the window, and considering the differences caused by the events in the window) or by investigating the causes of as-built delay to critical activities within the window.
- It requires good progress records to be considered reliable.
- If done properly, it is a thorough method that can establish "factual" delay results, based on what was actually occurring within the window, and may also demonstrate criticality (and shifts in criticality). As such it an properly demonstrate actual delay and causation.

WHAT DOES THIS MEAN IN PRACTICE? DEALING WITH CONCURRENCY

DGA

- If applied properly, the more significant methods of time slicing, time impacting, and (detailed) As-planned vs As-built (including windows-based) analyses should help to establish (or avoid) claims of, concurrency:
  - They should allow the separation of events which are clearly critical and causing delay (and are therefore "effective" or "dominant") from those which are not (such that those which are not "effective", or are of much lesser "causative potency", can be dismissed)
  - Where there are competing (and potentially concurrent) causes of delay, this should become apparent from any of the more "investigative" forms of analysis
  - In time slicing / impacting methods, the establishment and inclusion of <u>all</u> delay matters (including culpable delays) should <u>not</u> be avoided, otherwise accusations of manipulation may be validly made.

WHAT DOES THIS MEAN IN PRACTICE? ANALYSIS HEALTH WARNINGS

DGA

- Health Warning on Critical Path Analysis (CPS) needed!
  - In software – a link is a link is a link
  - Reality – Logic is hard / soft / fuzzy, and any analysis needs to be consistent with reality and the facts
- For cautionary tales, read:
  - *Skanska v Egger*
  - *Great Eastern Hotel Co. v John Laing*
  - *City Inns v Shepherd Construction*
- Implication for delay analysis… Great "Attention to Detail" is needed!

WHAT DOES THIS MEAN IN PRACTICE? GLOBAL DELAY CLAIMS

DGA

- The analysis methods I describe above are clearly distinguishable from cases where a Contractor is effectively claiming a "global delay".
- For a "global delay" claim to be valid, I would expect it to meet similar criteria to that needed generally for a "good" global cost claim. These principles have been clearly set out by others (who I plagiarise here(1)!).
- Starting points… what is a Global Claim?
  - One in which the Contractor seeks compensation for Employer risk events, but does not (or cannot) demonstrate a direct link to the loss.
  - In the case of delay, this may primarily be because it is effectively (or practically) impossible to explain the detailed causal nexus between the events alleged and the delay / disruption suffered to the works.
  - Supporters argue that, in such an event, a global claim may be the only way to compensate a Contractor for its losses, so as to prevent an Employer from benefitting from the (often complex) delay situation (that it has caused).

(1) For further comment and assistance on Global Claims, I suggest you to read Annalise Day and Jonathan Cope's Society of Construction Law paper (D160 May 2013).

EVIDENTIAL BACKUP

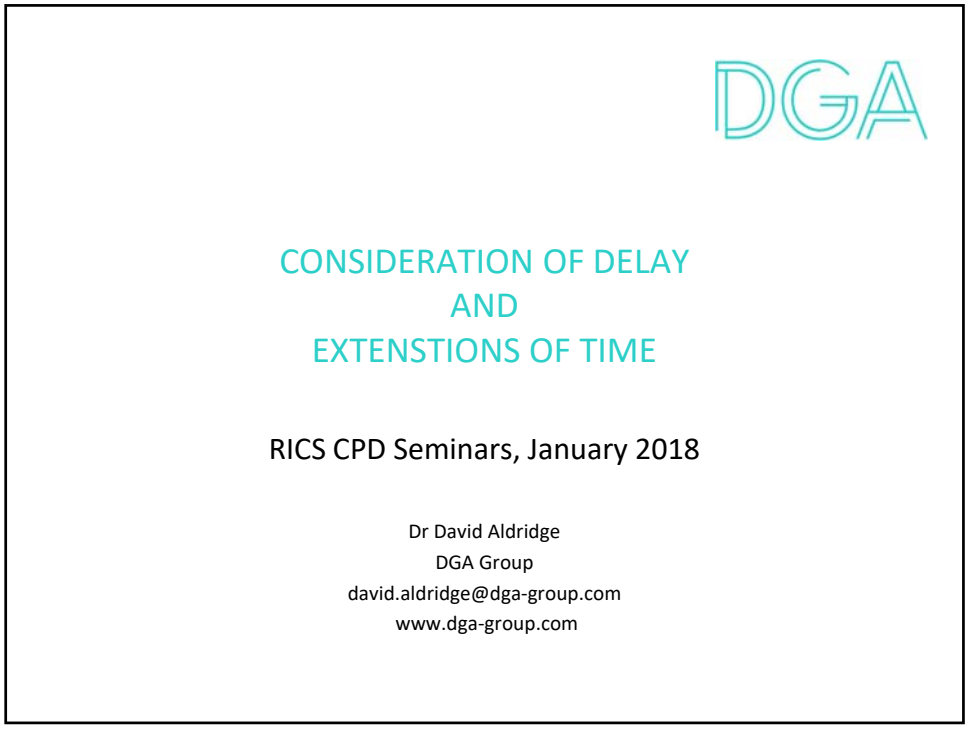
DGA

- The best evidence to support an EOT claim are contemporaneous records:
  - Notices / letters – stating that the Employer is causing the delay
  - Updated programmes showing the changes required from the delays being incurred
  - Evidence of actual progress impacts (site diaries, memos, internal correspondence, Sub-Contractor claims, marked up drawings)
  - Independent records (e.g. Met Office records of weather)
  - Photos of impact(s) suffered
  - Changed method statements / demonstration of changed working practices on site

CONCLUSIONS
EXPERT EVIDENCE ON DELAY

- Can be a vital link in the demonstration of a case – or its refuting
- Get Experts involved early, then he or she has the best chance to advise you on the merits of the case – before your position gets strongly entrenched!
- Importance of Expert impartiality
  - For your own practical and financial reasons
  - A partial Expert is not believable
  - It is his or her duty (to the courts)

CASE STUDY and EXAMPLES
on the day (not in Handouts)


DGA
CONSIDERATION OF DELAY
AND
EXTENSTIONS OF TIME
RICS CPD Seminars, January 2018
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