



Project Controls
E X P O

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Forensic Delay Analysis
The Ultimate Test for Project Controls



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About the Speaker

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Ewen is an experienced and renowned expert in the field of programming; delay and disruption; and associated prolongation costs in relation to construction and engineering projects. In particular, he has worked for both international consultants and contractors and has first-hand experience of assisting and representing clients in litigation, arbitration, mediation and adjudication, both for the claimant and respondent. He has prepared numerous expert witness reports; drafted standard forms of contract and lectured on various commercial and contractual subjects within the construction industry. Ewen has also acted in commercial negotiations and settlements, resolving potential disputes as well as providing advice on contract procurement.

Ewen is well versed in many of the standard forms of construction contract including the NEC, JCT, ICE, GC Works Conditions as well as bespoke forms of contracts including PFI contracts and has worked on contracts that span, inter alia, major building, civil engineering, oil and gas, mechanical and electrical, pharmaceutical, infrastructure including highways and rail as well as fit-out works.

Introduction

1. Why is forensic delay analysis the ultimate test for project controls?
2. Methods of delay analysis
3. Choice of method of delay analysis
4. Demonstration of methods of delay analysis
5. Project controls, data and records for delay analysis

1. The Ultimate Test?

Why is forensic delay analysis the ultimate test for project controls?

- If you have got to the stage where a forensic delay analysis is required then the project may no longer be under control and may be ultimately tested in formal dispute resolution.
- Forensic delay analysis will also ultimately test how good controls have been during a project as it will require detailed and appropriate records for that analysis to be undertaken.
- The quality of the records can dictate the quality of the forensic delay analysis.

2. Forensic Delay Analysis Methods

Common methods of delay analysis

- As-planned versus as-built analysis
- Impacted as-planned
- Collapsed as-built
- Time impact analysis (windows/snapshot analysis)

3. Choice of Method of Delay Analysis

Parameters

- Relevant conditions of contract
- Nature of causative events
- Value of the dispute
- Time available
- Records available
- Programme information available
- Programmer's skill level

3. Choice of Method of Delay Analysis

Parameters (SCL Delay and Disruption Protocol)

Type of analysis	As-planned programme without network	Networked as-planned programme	Updated as-planned networked programme	As-built records
As-planned vs. as-built	X	Or X	And X	Or X
Impacted as-planned		X		
Collapsed as-built				X
Time impact analysis		X	Or X	And X

4.1. 'As-planned' vs 'As-built'

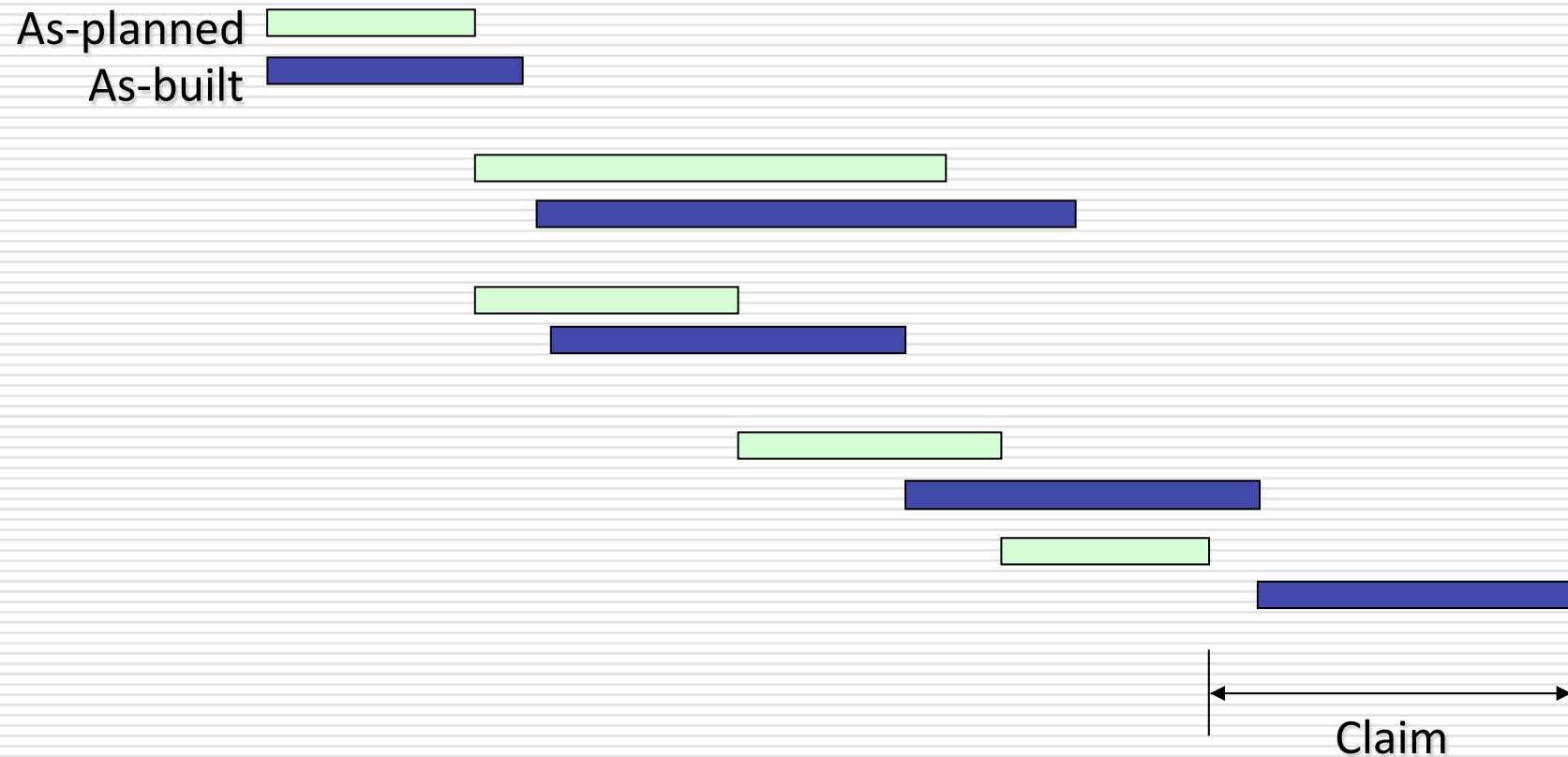
Essentials

- Good base programme (ideally agreed at start)
- Programme as closely as possible reflects project logic
- As-built information to establish as-built comparison
- May be chosen where issues are simple and liability is clear
- No CPA required

Steps

- Determine baseline programme
- Determine as-built programme and plot against planned

4.1. 'As-planned' vs 'As-built'



4.1. 'As-planned' vs 'As-built'

Summary

- Only retrospective
- No cause and effect
- Takes no account of concurrency
- Assumes fault lies with others
- Unreliable in dispute resolution

4.2. Impacted 'As-planned'

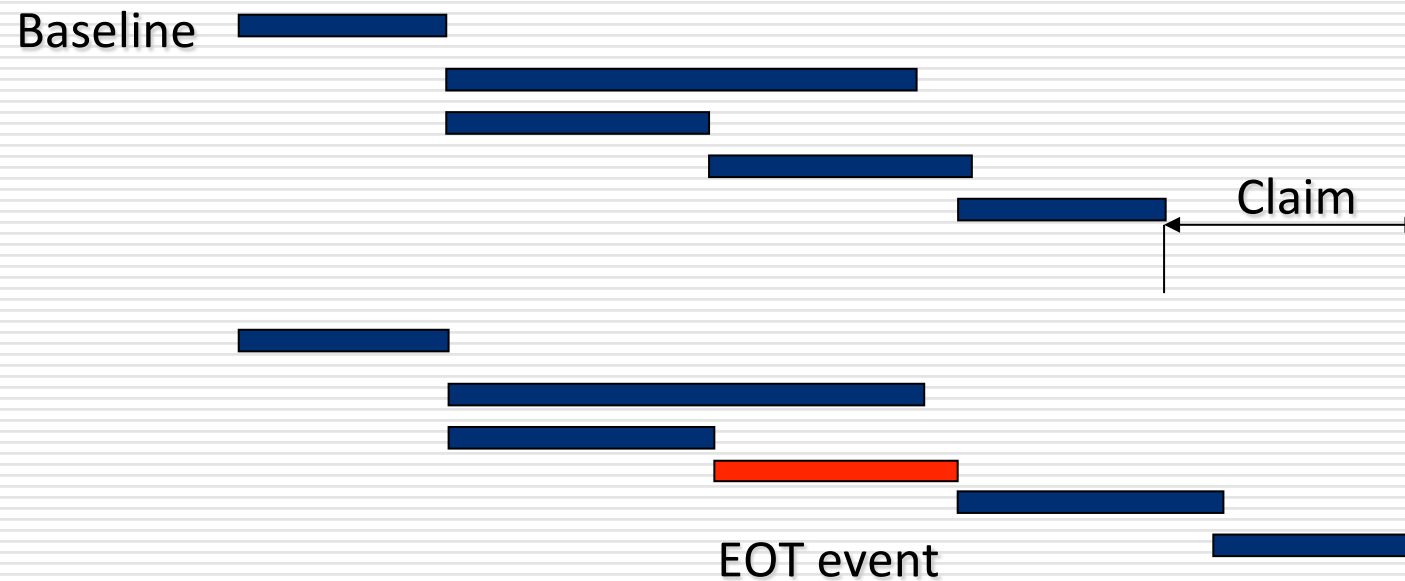
Essentials

- Good base programme (ideally agreed at start)
- Programme reflects project logic
- Likely choice where programme not updated and limited/no as-built information available

Steps

- Impact all events on planned programme
- Can be done in steps of time intervals - cross checked with key as-built milestones

4.2. Impacted 'As-planned'



4.2. Impacted 'As-planned'

Summary

- Prospective/retrospective
- Limited cause and effect
- Takes no account of:
 - Progress
 - Resources
 - Changing logic
- Unreliable in dispute resolution

4.3. Collapsed 'As-built'

Essentials

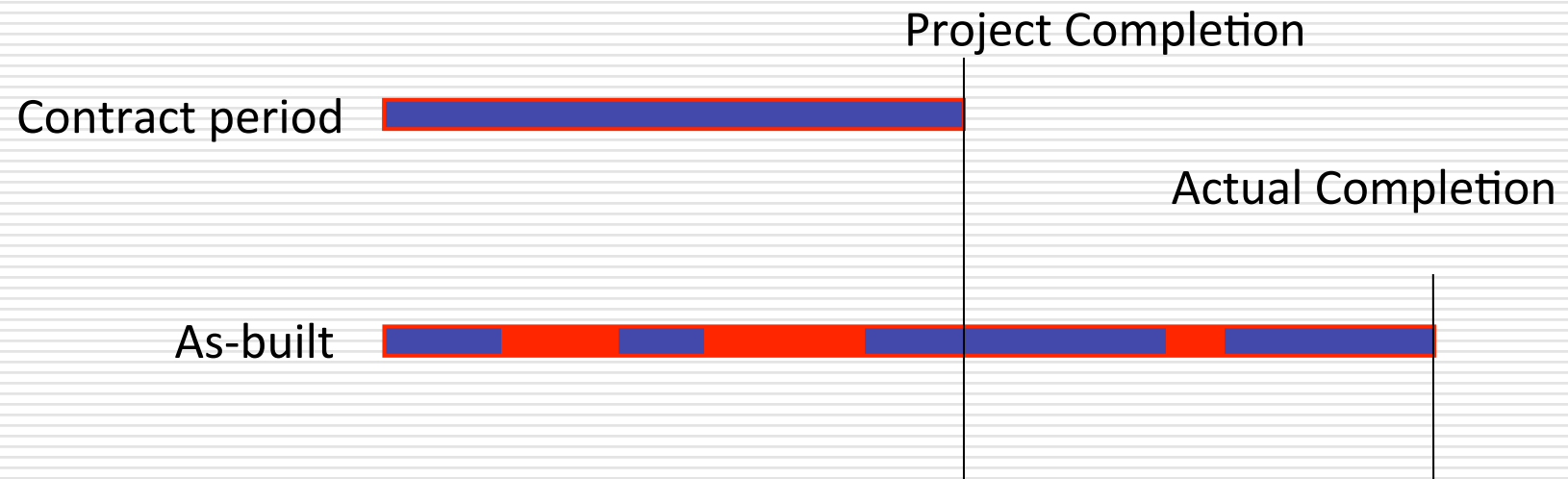
- Detailed as-built records
- Detailed understanding of construction logic
- Access to site team
- Basis for measuring and identifying the extent of delays

Steps

- Reconstruct as-built programme & determine logic
- Identify delay periods & responsibility for delays
- Carry out delay analysis
- Explain approach and results

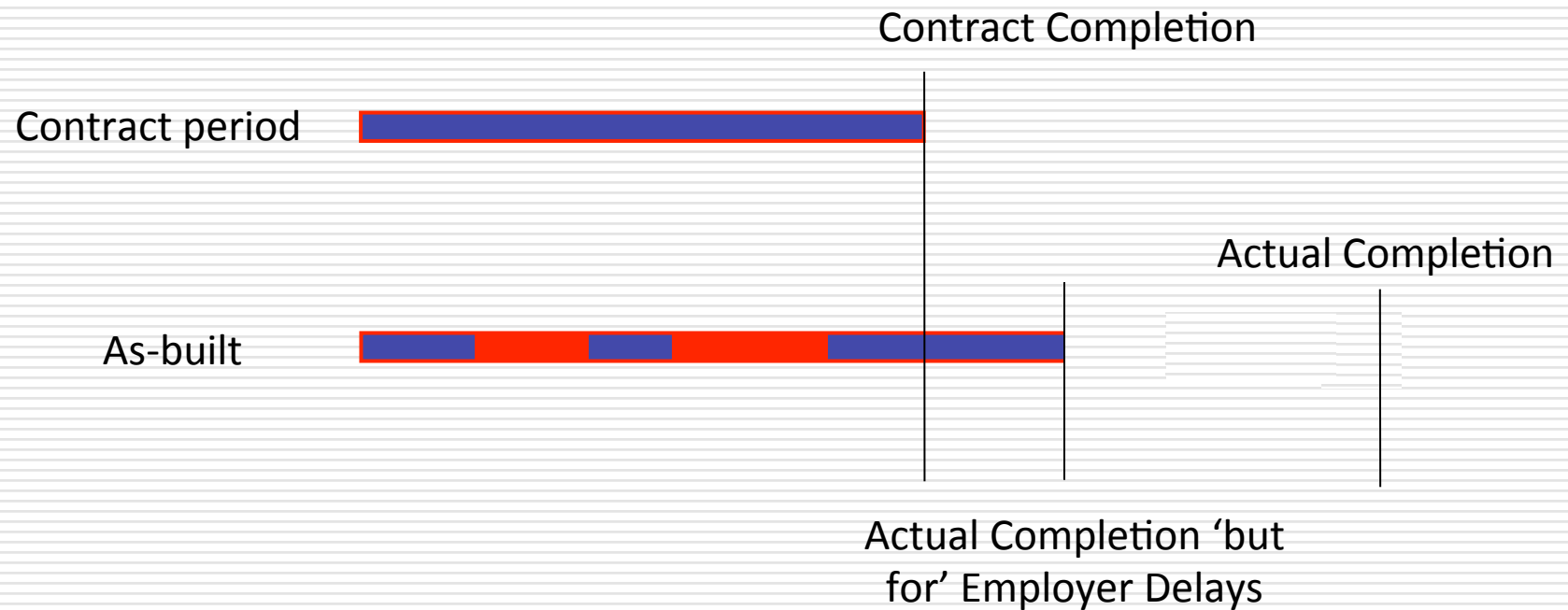
4.3. Collapsed 'As-built'

- Reconstruct as-built programme & determine logic
- Identify Employer delays



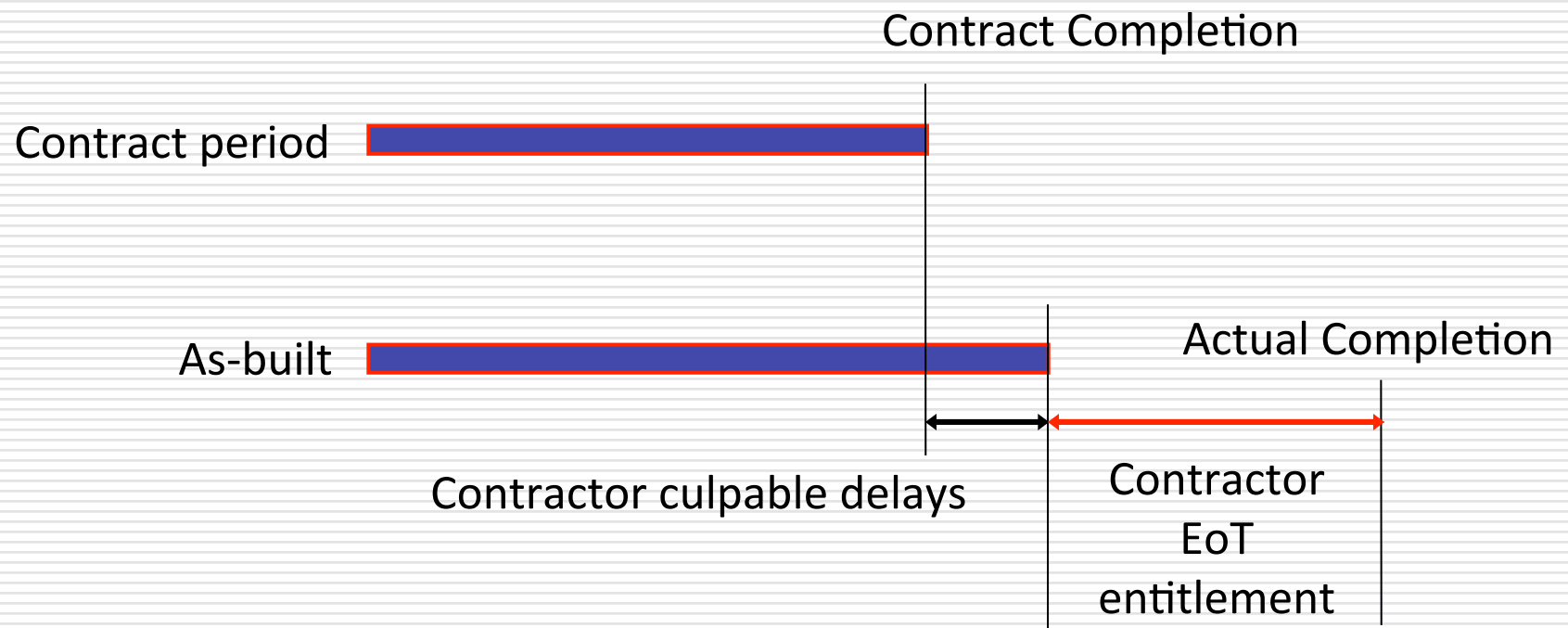
4.3. Collapsed 'As-built'

- Zero the Employer Delays



4.3. Collapsed 'As-built'

- Entitlement



4.3. Collapsed 'As-built'

Summary

- Retrospective (limited prospective)
- Factually based
- If done properly:
 - Demonstrates cause and effect
 - Takes account of concurrency
- Relatively quick
- Reliable in dispute resolution

4.4. Time Impact Analysis

Essentials

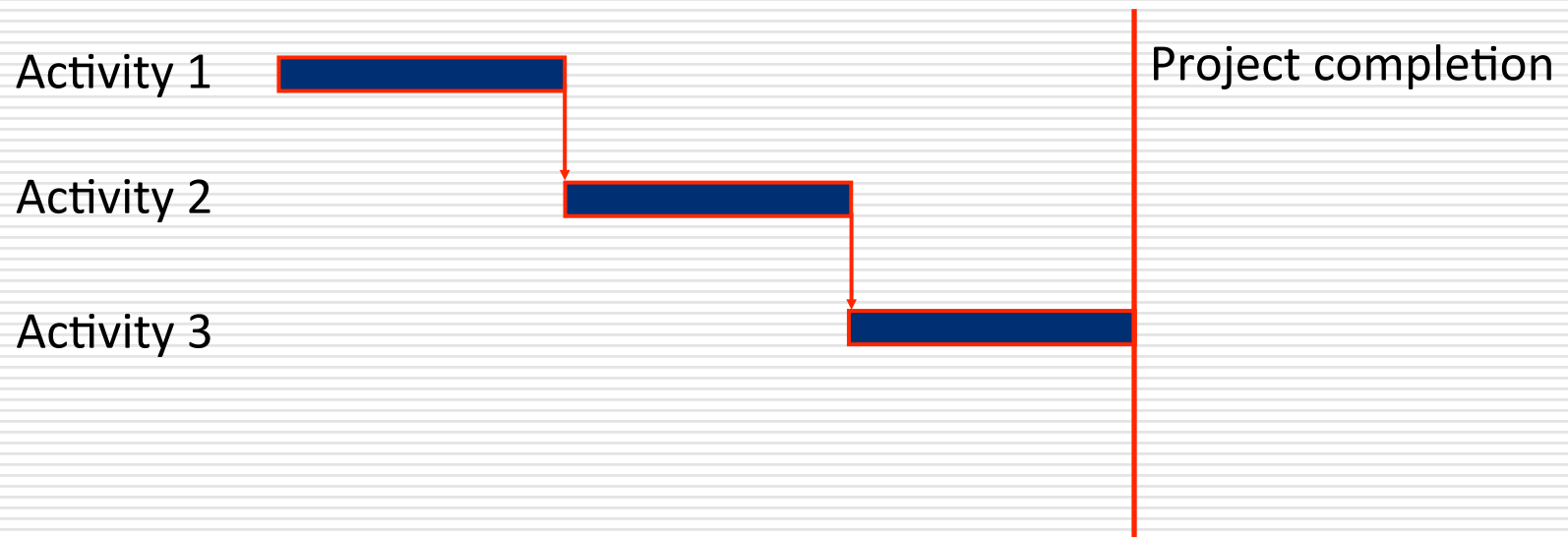
- Good base programme (ideally agreed at start)
- Programme reflects project logic
- Reliable and consistent progress data, in sufficient detail and at small enough intervals to make the analysis meaningful

Steps

- Verify base programme and correct for errors
- Identify delay events and periods
- Input progress up to start of first window period or first delay
- Reschedule and check completion
- Impact delay and record any logic changes to deal with mitigation
- Reschedule and check completion and record any further delay

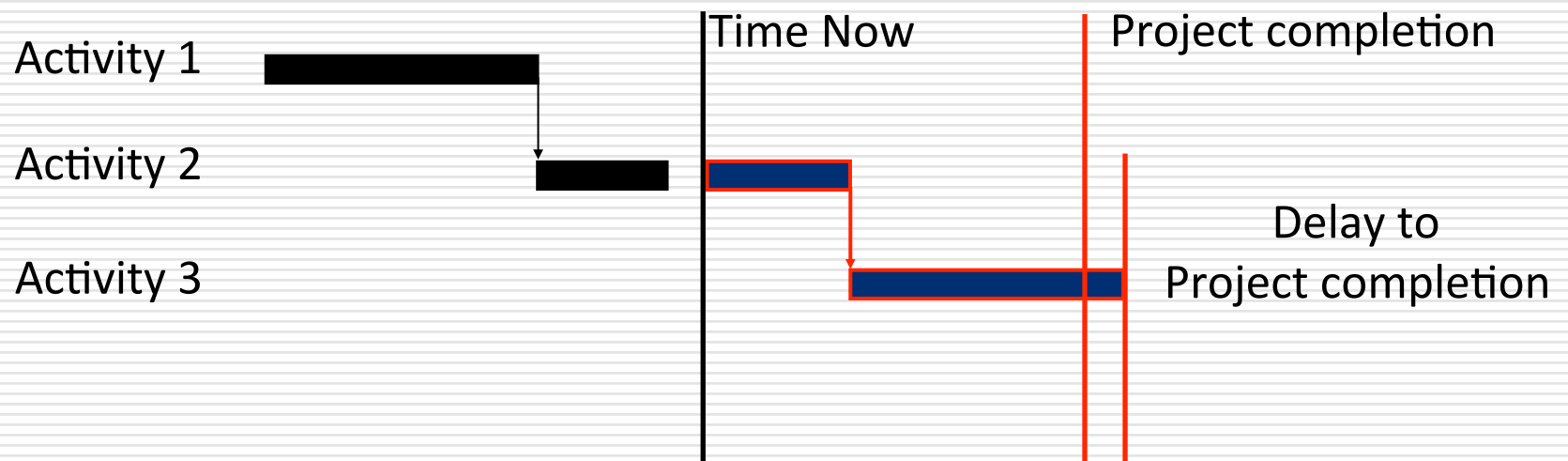
4.4. Time Impact Analysis

- Master Programme



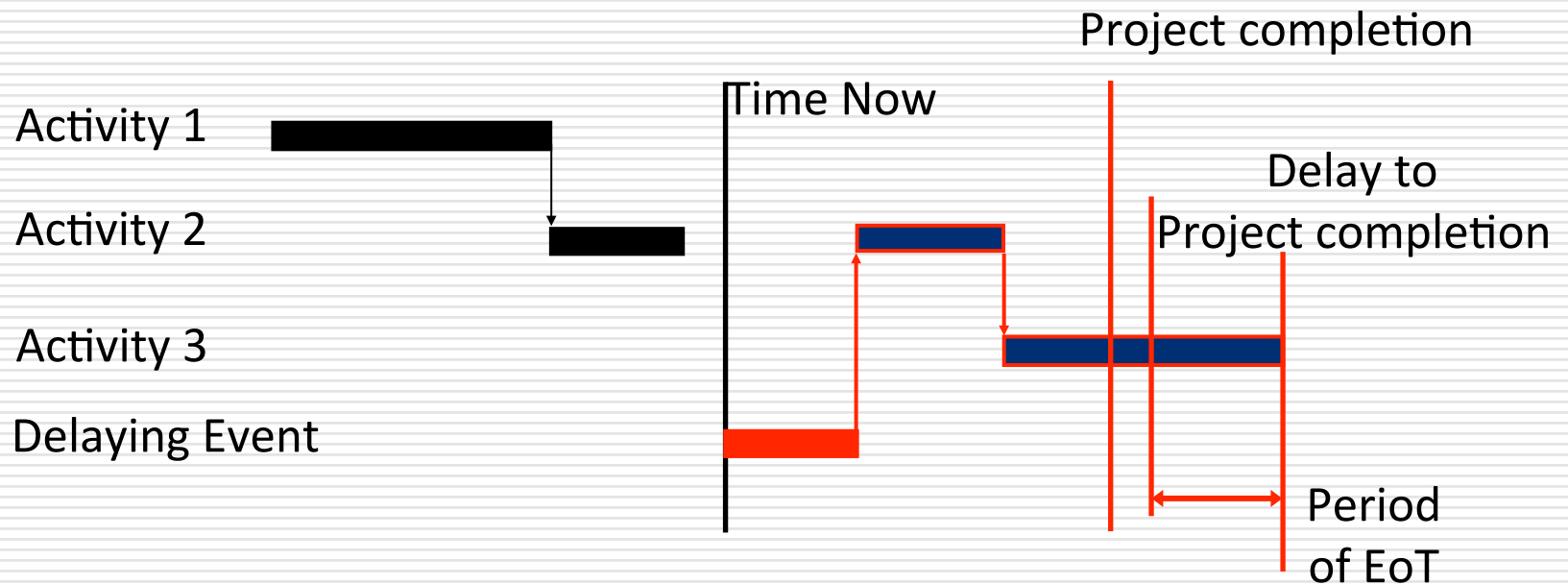
4.4. Time Impact Analysis - illustrated

- Step 2, Enter progress & record effect



4.4. Time Impact Analysis - illustrated

- Step 3, Analyse the delaying event



4.4. Time Impact Analysis

Summary

- Prospective/Retrospective
- Cause and effect
- Takes account of progress/resource/logic
- Reliable in dispute resolution
- Preferred method of SCL Protocol
- Complicated (and therefore slow)
- Difficult to communicate (Skanska v Egger [2004])

5. Project Controls, Data and Records

Programmes

- Allow comparison of what would have happened with what actually happened
- Need to:
 - Meet contract requirements
 - Be a workable management tool
 - Be current
 - Be shared
 - Be the Contractor's

5. Project Controls, Data and Records

Programme Data Generally 1

- Requirements:
 - The activities in all work packages
 - The earliest and latest start and finish dates for every activity in each work package
 - Access dates for each phase or section
 - Milestone and key dates
 - Holiday periods
 - Dates by which design work or drawings to be produced plus allowances for approval periods and re-submittals
 - Dates by which samples are to be produced plus allowances for re-submittals
 - Procurement periods and delivery dates

5. Project Controls, Data and Records

Programme Data Generally 2

- Requirements:
 - Dates by which work will be ready for testing by the Employer
 - The work contained in defined Provisional Sums
 - Activities representing the likely work content of undefined Provisional Sums
 - Commissioning periods
 - Provisions for float, time risk allowances, quality control procedures, health and safety requirements
 - Be resourced and costed
 - Be coded to build in intelligence

5. Project Controls, Data and Records

Records

- Allow comparison of what would have happened with what actually happened
- Need to:
 - Meet contract requirements
 - Be expressed by reference to a programme
 - Be quantitative
 - Be accurate
 - Be regularly kept
 - Be public
 - Be consistent
 - Record context

5. Project Controls, Data and Records

Records Generally 1

- Requirements:
 - Meet the contract requirements
 - Start and finish dates of activities
 - Degree of completion of activities
 - Labour resources by trade, activity and location
 - Operating plant/equipment with hours worked, idle or down time for repair
 - Key procurement activities
 - Any delays encountered
 - Weather conditions encountered
 - A list of instructions given and received and any conflicts in plans and/or specifications

5. Project Controls, Data and Records

Records Generally 2

- Requirements:
 - A list of notices served regarding progress
 - Information required from and by the Employer/CA
 - Intervals at which each of these types of records should be submitted
 - The reports should be signed and dated by the CA
- Consider:
 - Marked up drawings
 - Photographs
 - Videos
 - More sophisticated techniques such as BIM

5. Project Controls, Data and Records

Delay Schedule

- A delay schedule requires completion of information in respect of each delaying event under the following columns which should be set out in schedule format:
 - a) Reference number
 - b) Cause and effect of delay or disruption
 - c) Period of delay to section or part of works
 - d) Period of delay to completion date
 - e) Contract clause relevant to delay
 - f) Contract clause relevant to loss and expense or contract clause breached
 - g) Date of delay notice and particulars
 - h) Date of loss and expense notice and particulars

5. Project Controls, Data and Records

Disruption Schedule

- A disruption schedule requires completion of information in respect of each disrupting event under the following columns which should be set out in schedule format:

a) Reference number	e) Correspondence relating to disruption
b) Instruction, late issue of drawing, V.O. and the like which caused disruption	f) Additional hours of labour (or sub-contractor's additional time)
c) Part or section of work affected	g) Hourly rate
d) Manner in which part or section of work was affected	h) Additional plant, hours/days/weeks
	i) Hourly/daily/weekly rate
	j) Total cost of disruption

Summary

- A forensic delay analysis is likely to be the ultimate test to see whether the project controls have been operated successfully
- The choice of method of delay analysis can be dictated by the quality, appropriateness and consistency of project records
- Forensic delay analyses are more reliable if based upon factual as-built records rather than theoretical assessments
- Use schedules to record delay and disruption or any potential entitlement
- Thank you and any questions?