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Delay Analysis
Letting the Evidence Speak for Itself

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Corporate Overview

- Hill International (NYSE:HIL) is a publicly traded construction consulting firm providing project management, construction management and construction claims services to public and private clients in every major construction market sector around the world.
- Knowles is a wholly owned subsidiary of Hill International. Together, our combined resources of over 3,300 professionals in 110 offices across 5 continents form the world's largest construction claims consultancy.
- As a global leader in construction disputes, with a portfolio of some of the world's largest and most prestigious projects in every major construction market sector; we continue our commitment to excellence, providing an unrivalled range of resources, experience and services, including construction claims, construction management and project management services.

About the Speaker

Keith Tregunna, a Director of Knowles, has worked in the construction industry for nearly 40 years. He has been employed in the UK and overseas in preparing, defending and negotiating claims including delay analysis and the provision of expert reports on a wide range of small and large engineering and building projects.

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The Society of Construction Law Delay and Disruption Protocol - 2002

- **Concluding notes and dedication**
  - **"The Protocol recognises that improved education and training in programming techniques will be required by both Contractors', Employers' and CAs' staff before the recommendations of the Protocol and its Guidance Sections can achieve widespread acceptance throughout the construction industry."**
  - **What about Adjudicators and Judges?**

Critical Path Analysis

- **Some Important Terms – BS6079**
  - **"Critical Path"**

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

Critical Path Analysis

- **Some Important Terms – BS6079**
  - **"Critical Path Analysis"**

    "procedure for calculating the critical path and floats in a network"

Critical Path Analysis

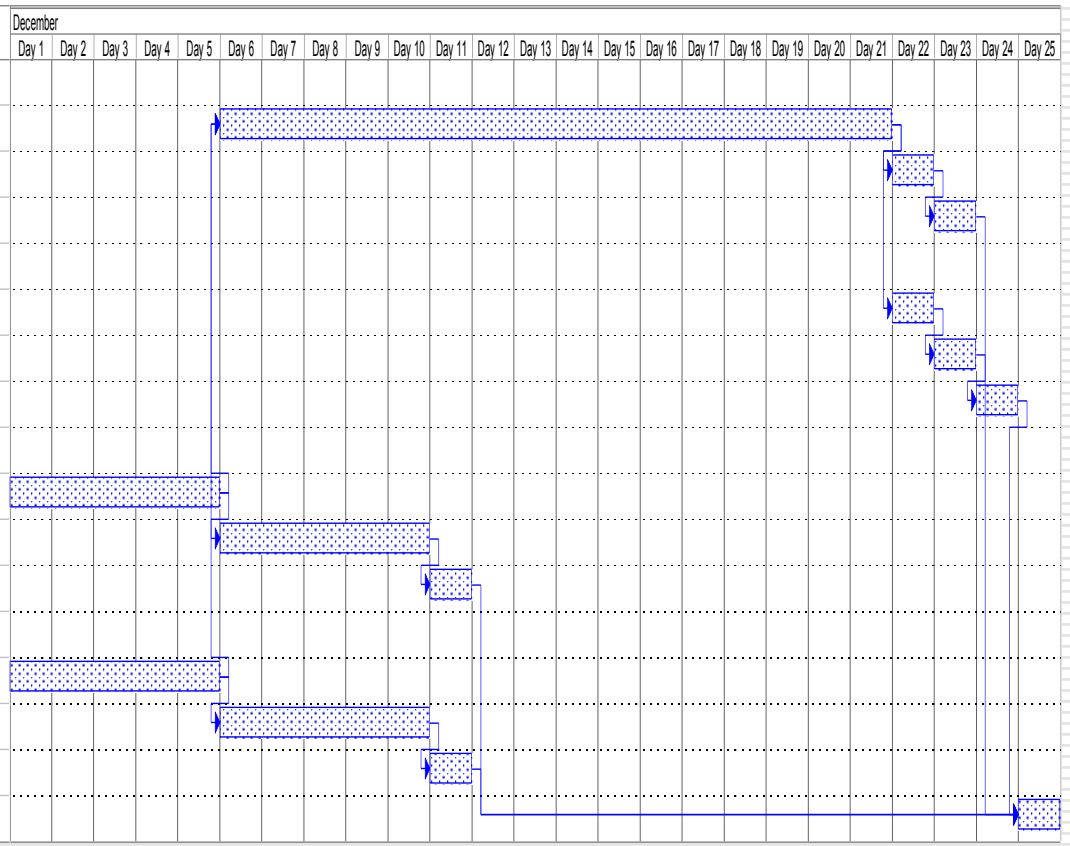
- **Some Important Terms – BS6079**
  - **“free float”**

    “time by which an activity may be delayed or extended without affecting the start of any succeeding activity”
  - **“total float”**

    “time by which an activity may be delayed or extended without affecting the total project duration”

Critical Path Analysis

ID	Task Name	Duration	Predecessors
1	My Present	18 days	
2	Selection	16 days	10,14
3	Purchase	1 day	2
4	Wrapping	1 day	3
5	Wifes Present	3 days	
6	Selection	1 day	2
7	Purchase	1 day	6
8	Wrapping	1 day	7
9	Daughters Present	11 days	
10	Selection	5 days	
11	Purchase	5 days	10
12	Wrapping	1 day	11
13	Sons Present	11 days	
14	Selection	5 days	
15	Purchase	5 days	14
16	Wrapping	1 day	15
17	Delivery	1 day	4,8,12,16



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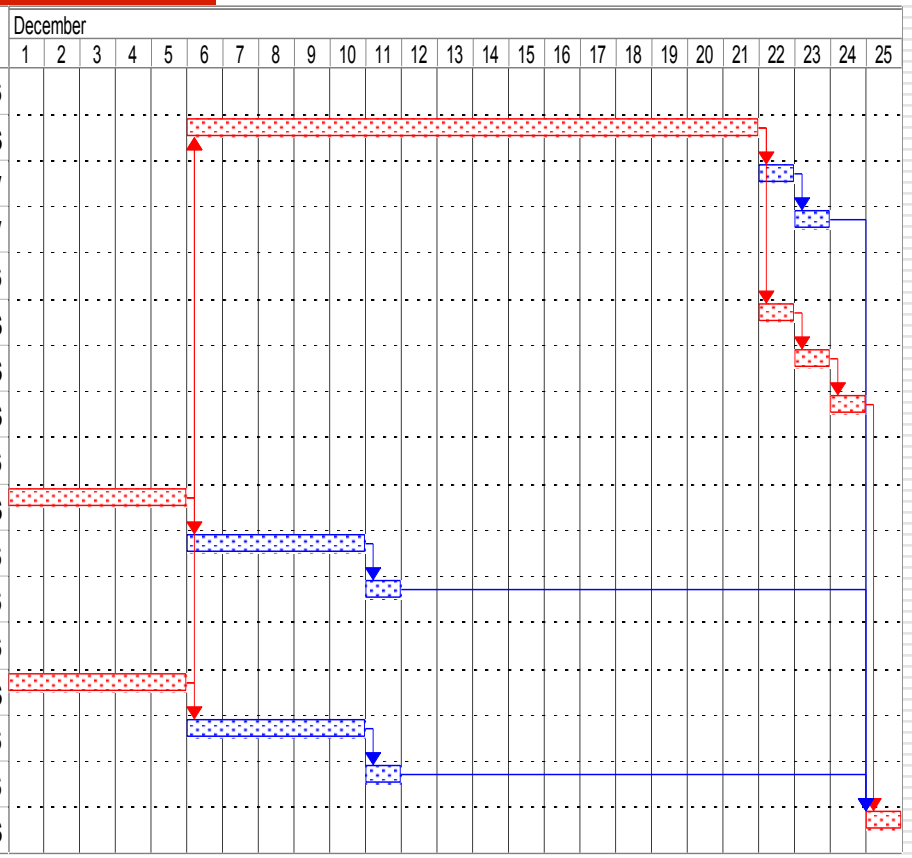
Critical Path Analysis

ID	Task Name	Duration	Early Start	Late Start	Total Float
1	**My Present**	**18 days**	**06**	**06**	**0 days**
2	Selection	16 days	06	06	0 days
3	Purchase	1 day	22	23	1 day
4	Wrapping	1 day	23	24	1 day
5	**Wifes Present**	**3 days**	**22**	**22**	**0 days**
6	Selection	1 day	22	22	0 days
7	Purchase	1 day	23	23	0 days
8	Wrapping	1 day	24	24	0 days
9	**Daughters Present**	**11 days**	**01**	**01**	**0 days**
10	Selection	5 days	01	01	0 days
11	Purchase	5 days	06	19	13 days
12	Wrapping	1 day	11	24	13 days
13	**Sons Present**	**11 days**	**01**	**01**	**0 days**
14	Selection	5 days	01	01	0 days
15	Purchase	5 days	06	19	13 days
16	Wrapping	1 day	11	24	13 days
17	Delivery	1 day	25	25	0 days



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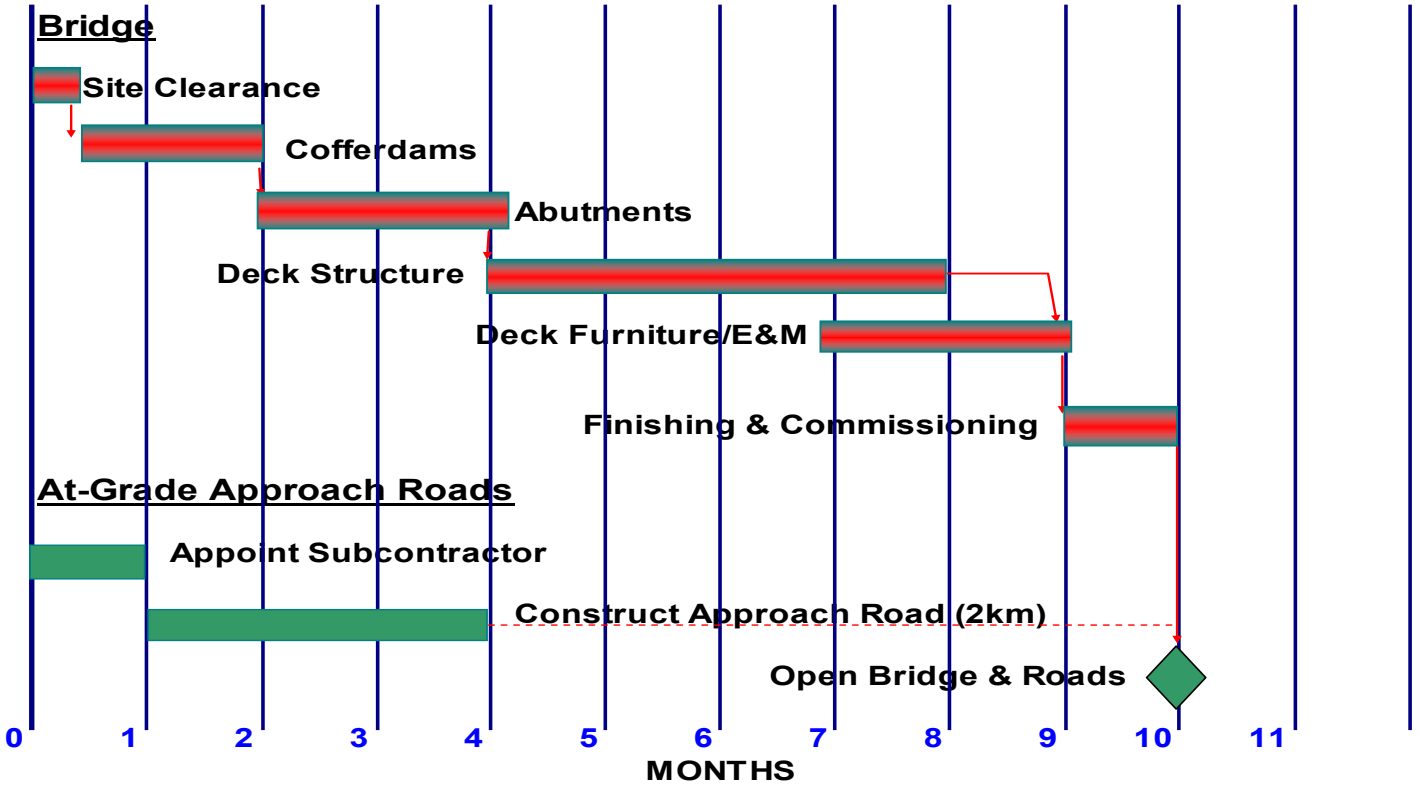
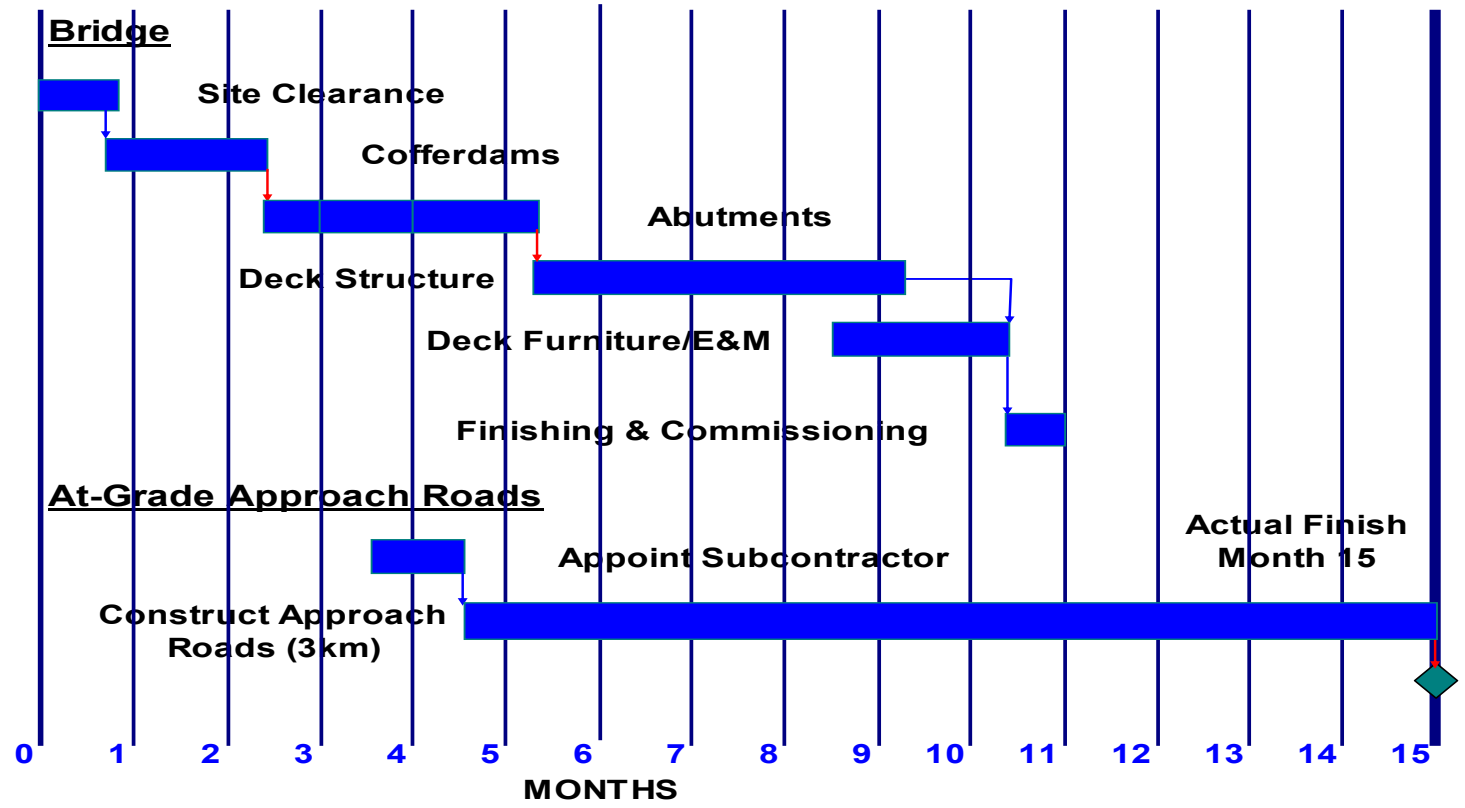
Delay Analysis – the baseline



Delay Analysis – as built



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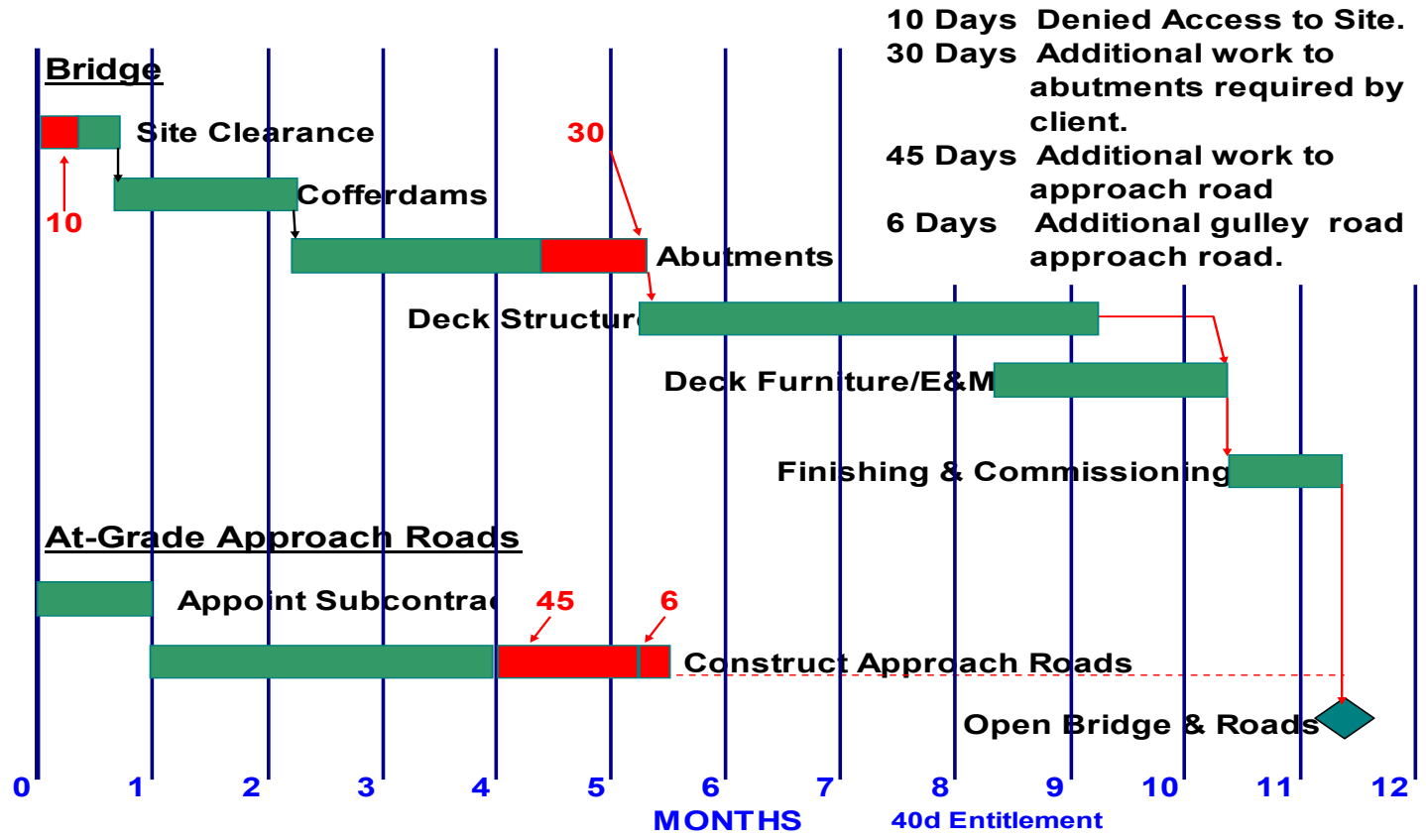
Delay Analysis – impacted as planned ("what if?")



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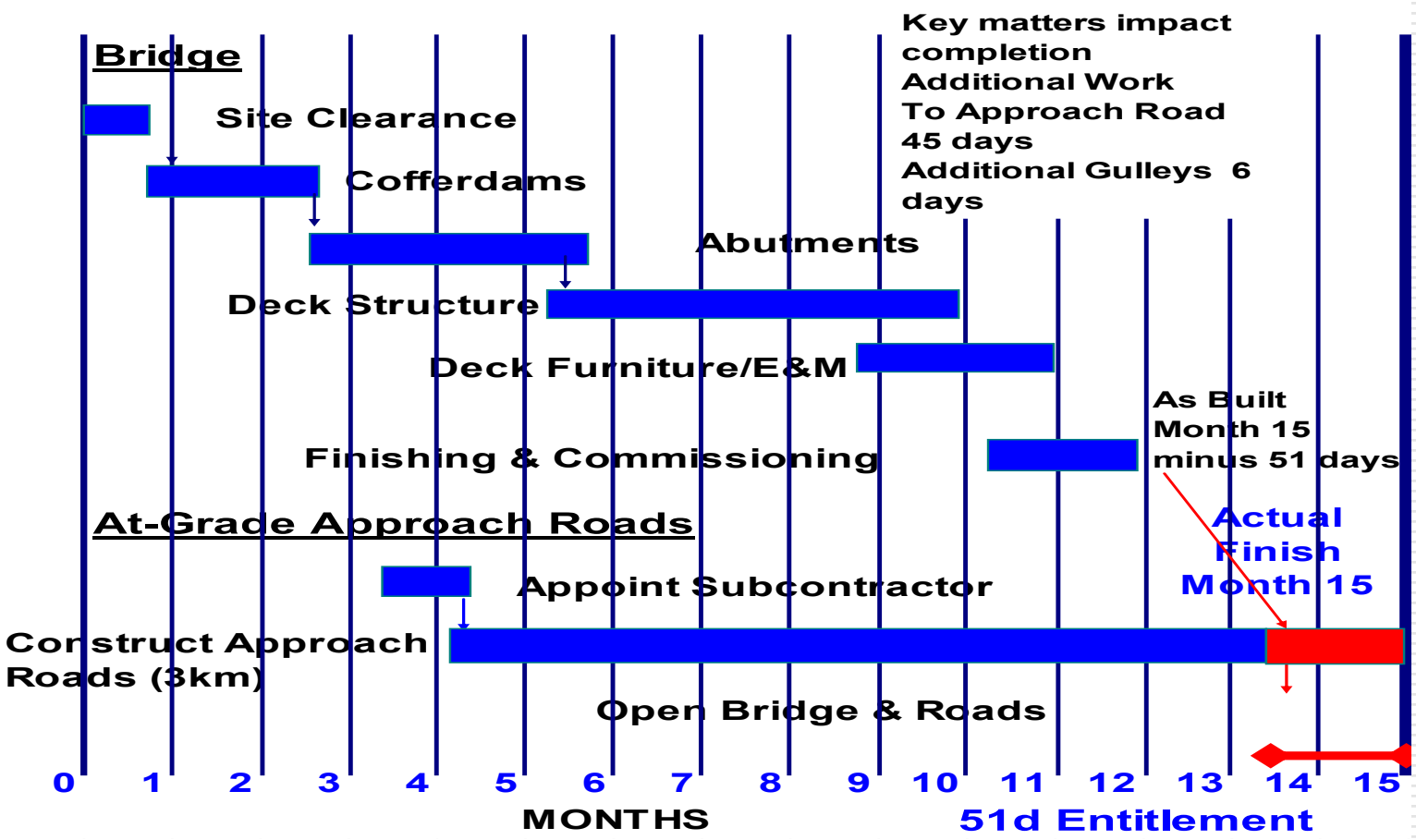
Delay Analysis – Collapsed as Built



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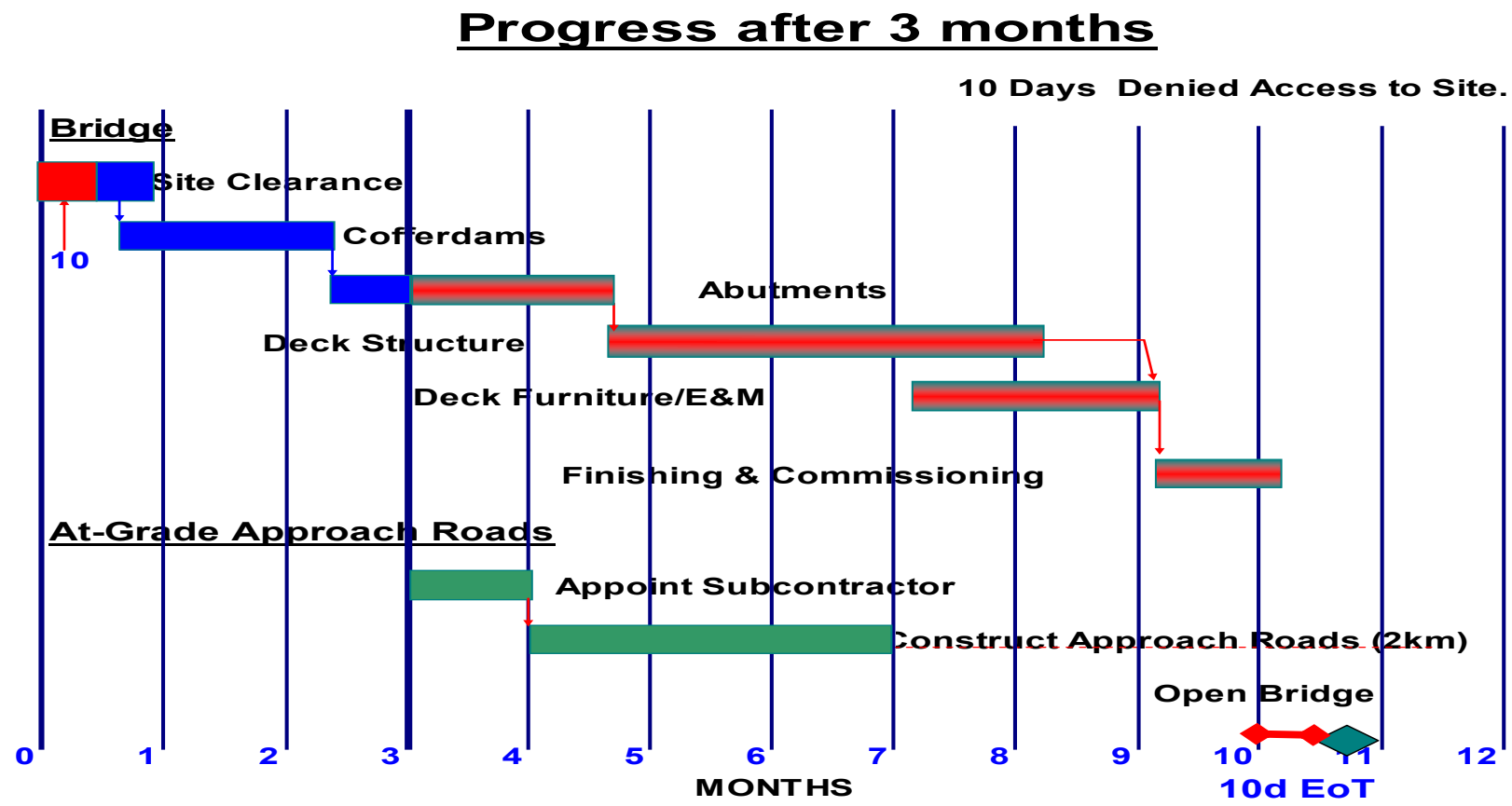
Delay Analysis – Time Slice/Window



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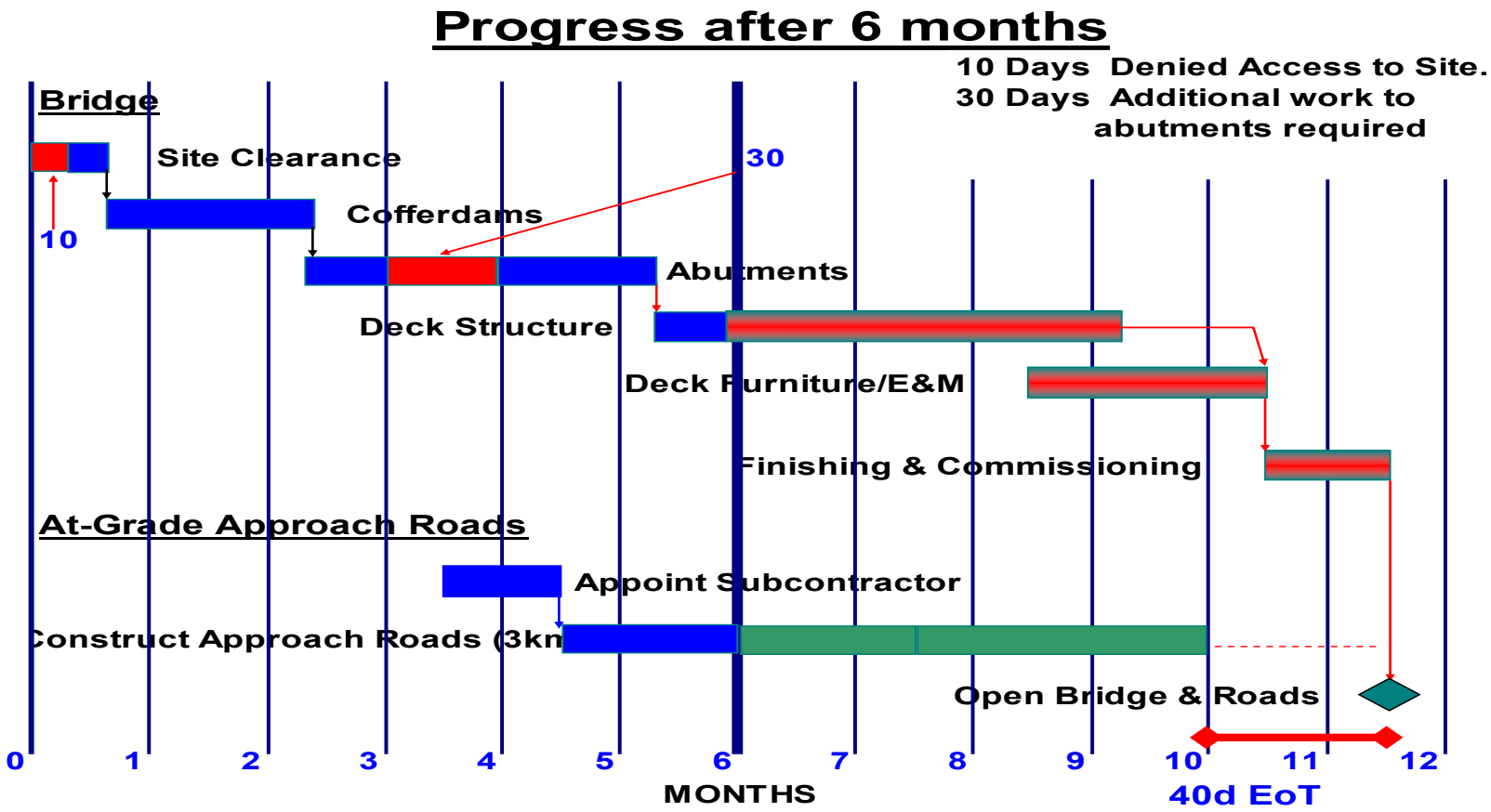

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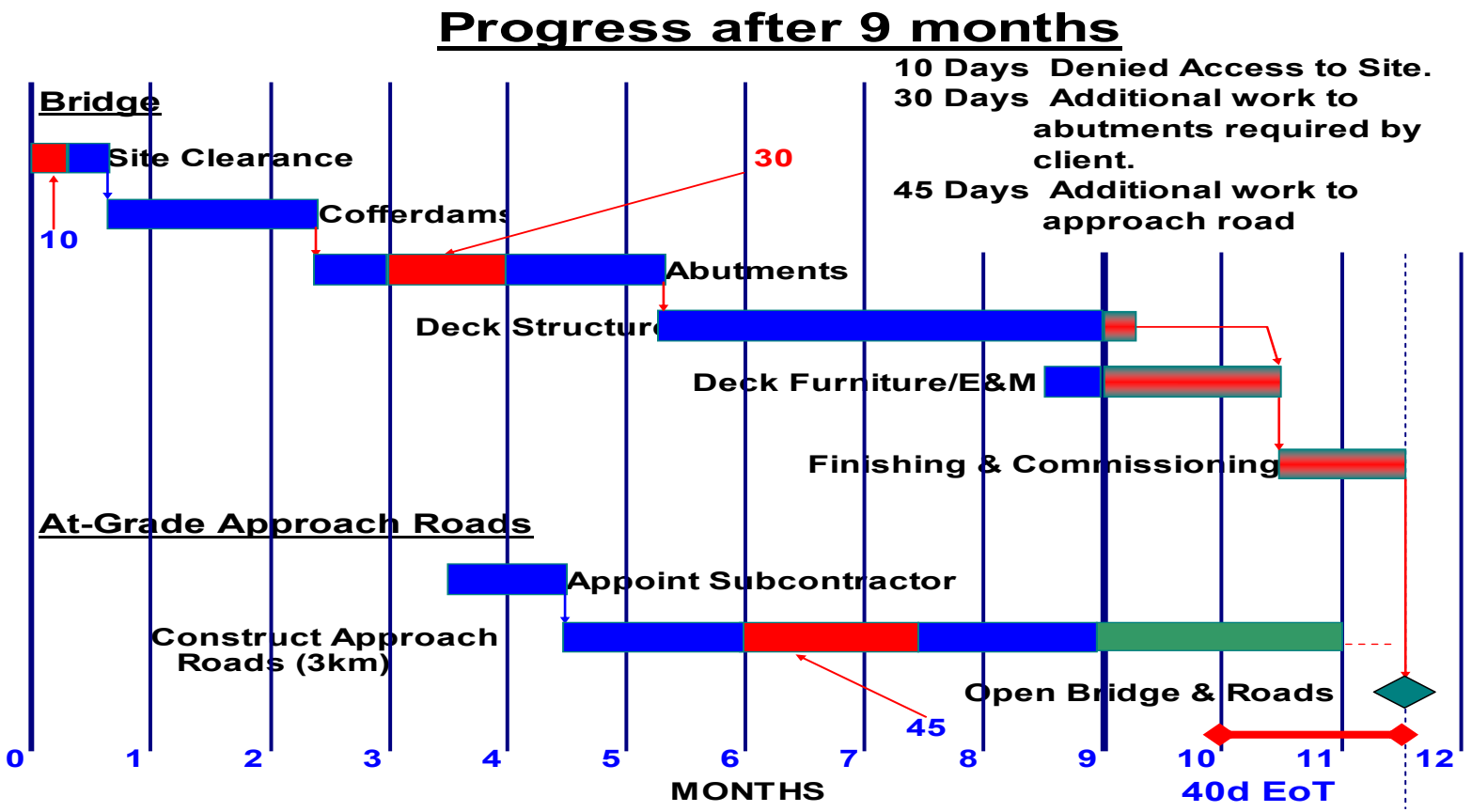
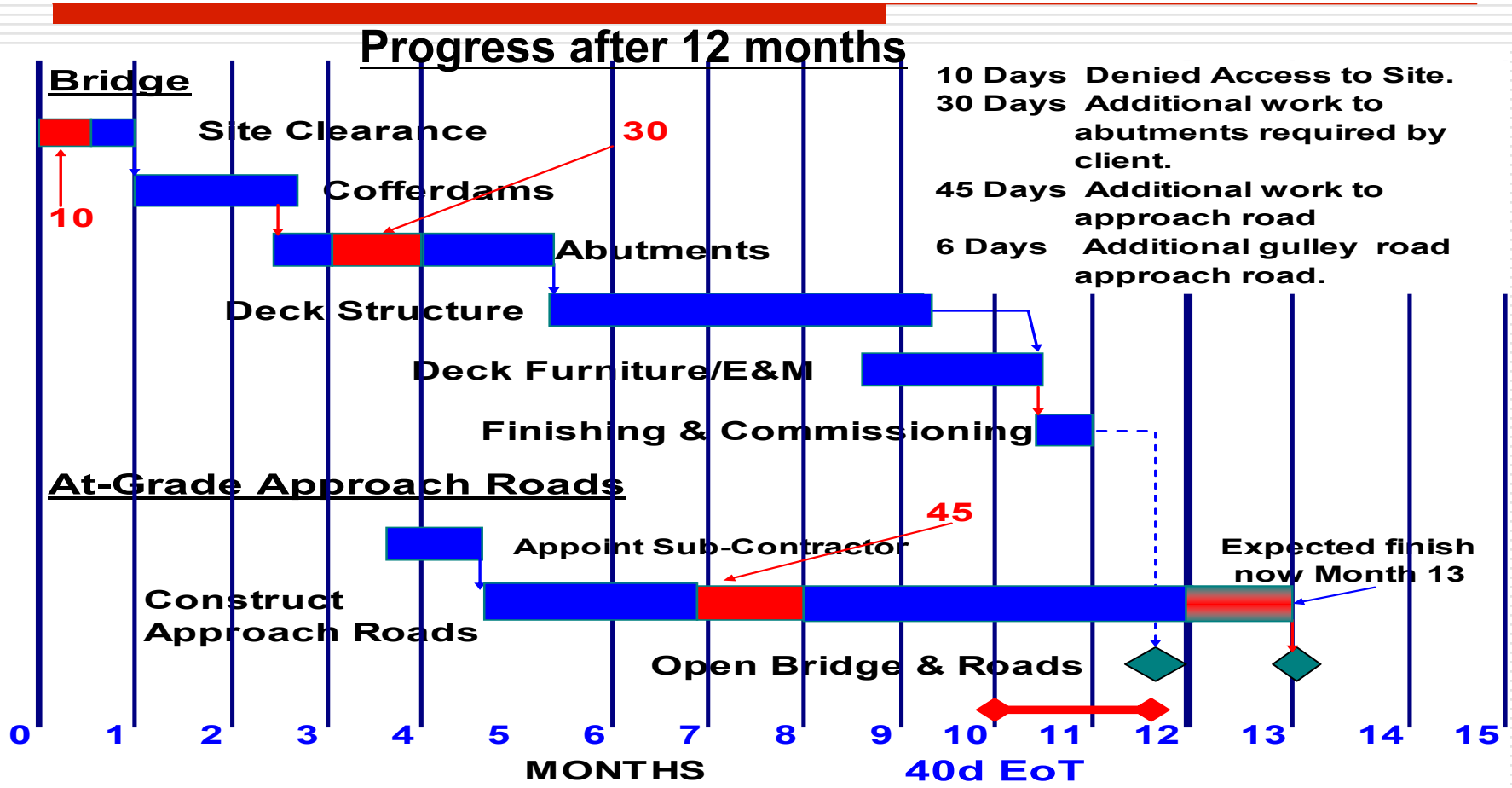


Delay Analysis – Time Slice/Window



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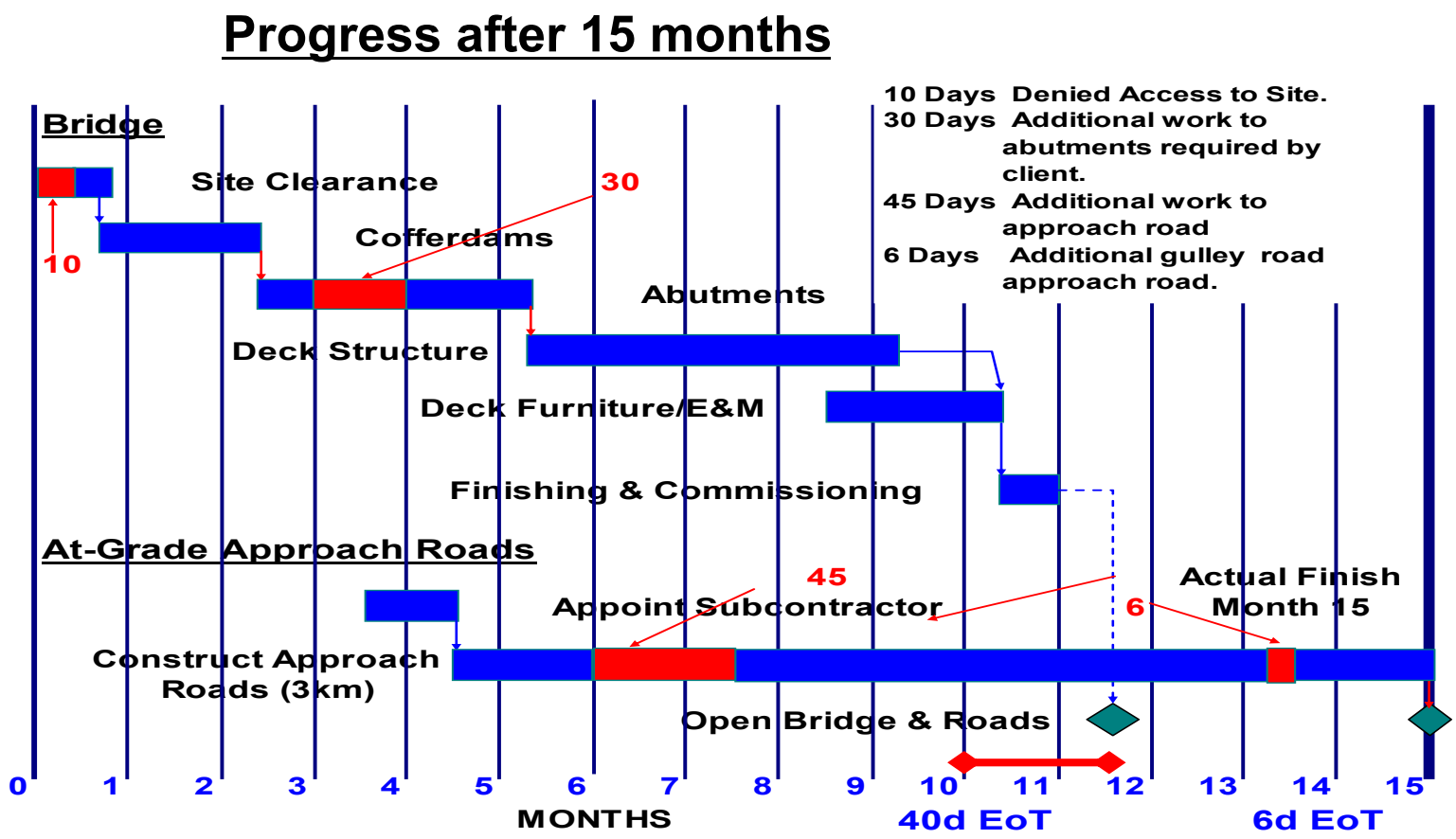
Delay Analysis – Time Slice/Window



Delay Analysis – Time Slice/Window

Tabulation of Delays & Entitlement

Window	Delay(s)	On Critical Path (y/n)	Entitlement
1 (Mths. 1-3)	10d - delayed possession	Yes	10d
	30d - abutment variation	Yes	30d
2 (Mths. 4-6)	45d - additional road	No	Nil
3 (Mths. 7-9)	nil	N/A	Nil
4 (Mths. 10-12)	nil	N/A	Nil
5 (Mths. 13-15)	6d - drainage variation	Yes	6d
TOTAL			**46 DAYS**

The Methodologies – the Magic?

Analysis Method	Calculated Entitlement
As Built	5 Months
Impacted as Planned / "What-if"	40 days
Collapsed as Built / "But-for"	51 days
Time-Slice / "Window"	46 days

Legal Principles and Case Law

John Barker Construction v London Portman Hotels 1996

- The architect or contract administrator must undertake a logical analysis
- The application of an impressionistic rather than a calculated and rational assessment is not sufficient

Legal Principles and Case Law

Balfour Beatty v Lambeth [2002]

- **Presentation Requirements**
  - **Contract Programme**
  - **Critical Path Analysis**
  - **As-Built Records**
  - **Logical Method of Analysis**

Legal Principles and Case Law

- **Skanska v Egger [2004]**
  - **Beware of Focusing on the Method and Ignoring the Facts**
  - **Quality of data entered into software which is important not the delay and disruption programme or methodology used**

Legal Principles and Case Law

- Great Eastern Hotel Company Ltd v John Laing [2005]
  - Laing used Impacted As-planned Analysis
  - GEHC used a form of Time Impact Analysis
  - Judge favoured the factual basis of GEHC and Laing analysis hypothetical

Legal Principles and Case Law

- **Mirant Asia-Pacific v Ove Arup [2007]**
  - **"…..I accept, that the critical path analysis is a tool or technique to assist in the management of construction projects and not an end in itself. …. To reduce the number of disputes relating to delay, the contractor should prepare and the employer should accept a properly prepared programme showing the manner and sequence in which the contractor plans to carry out the works. The programme should be updated to record actual progress and any extensions of time granted."**

Legal Principles and Case Law

- City Inn Ltd v Shepherd Construction Ltd [2010]
  - Keith Pickavance - Const. L. J. 637
  - "Although there is nothing in the decision of the Outer House to show that the judge was aware of it, the Court's difficulty was not brought about by the absence of factual evidence, conflicting expert evidence, different delay analysis techniques, or having to unravel what in retrospect appeared to be the effects of concurrent events. The difficulty was self inflicted and brought about by the Court's attempt to deal with delay in the same way as it customarily deals with loss and expense. It was the failure to recognise the impossibility of dealing with time, as though it were money, which caused the Outer House to reach an irrational decision."

Legal Principles and Case Law

- **Walter Lilly & Co Ltd v Giles Mackay & DMW [2012]**
  - **"He, broadly, logically and conventionally, adopted the approach of establishing critical delay by reference to the "logical sequence(s) of events which marked the longest path through the project. In the …… absence of any usable contemporaneous programme from early 2007 onwards,…. adopted a much more objective approach to his expert analysis whilst (the other expert) proceeded on a much more subjective approach."**
  - **He produced as Appendix D a "Weighted Significance Matrix" which was worthless and self-fulfilling when he on a largely subjective basis awarded weightings to the various possible causes of delay; this was taken through the project in 2007 and 2008 on a monthly basis and, unsurprisingly gave much higher weightings to the subjectively accepted factors (such as plastering defects) selected by him or his client as "significant".**

The Lessons

- Often members of the tribunal deciding your case do not know how a critical path is calculated, therefore presenting them with an analysis using the latest clever software tool or some sophisticated self serving statistics is unlikely to win them over.
- Focus on the facts – the delay analysis does not have a life of its own – use it as a means of illustrating the impact of a delay not as a means of mysteriously pulling out a delay unsupported by facts like a rabbit out of a hat.
- Often when there is no working programme with a critical path it is because it has too many activities and is unmanageable – simplify it.
- Always if possible undertake a time impact analysis. Keep an eye on actual progress even if you are unable to undertake a windows or time impact analysis.

SIMPLES!

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