



ARTICLE

Which method to use?

Deciding on the most appropriate method of delay analysis

Time, quality and cost are the three crucial elements of a construction contract. A perfect project would be carried out on time, at a low cost, and be of high quality. But it's not always that simple. As the saying goes, "time is money". Delays to construction projects are a major cause of disputes and spark great debate in the industry. But what is the best method of delay analysis and do they all produce the same result?

"Selecting the appropriate method of delay analysis seems to be part of where so many disputes go wrong."

Back in October 2002, the publication of the Society of Construction Law's 'Delay and Disruption Protocol'¹ caused continued debate about the key delay issues that arise in construction projects. The Great Delay Analysis Debate² considered the motion that '*the time impact method is the most appropriate for the analysis of delay in construction disputes*', and the experts involved presented divergent views basing their arguments on different delay analysis methodologies.

Same same, but different?

There are several different delay analysis methods that can produce different results due to the many variables involved and the subjectivity of analyses. The selection of the appropriate delay analysis methodology is not academic; it has practical and potentially costly implications, so should be chosen wisely.

What are the main methods?

Forensic delay analysis methods generally conform to one of four primary categories: impacted as planned, time impact analysis, collapsed as-built, and as planned versus as built. These four main categories have secondary derivatives and can be used in a number of approaches including additive,

¹ The Society of Construction Law Delay and Disruption Protocol, October 2002 - www.scl.org.uk

² <https://www.scl.org.uk/papers/great-delay-analysis-debate>

subtractive and analytical techniques. The most used methods of delay analysis, derived from the four primary categories are:

- Impacted as planned analysis
- Time impact analysis
- Time slice windows analysis
- As-planned versus as-built windows analysis
- Longest path analysis
- Collapsed as-built analysis.

A natural selection – where disputes go wrong

Selecting the appropriate method of delay analysis seems to be part of where so many disputes go wrong. The basic facts are often not sufficiently established or understood when the claim is prepared, meaning the proper context in which an event occurred is often ignored when alleging that an event has delayed the completion date. There are two forms of analysis:

Prospective

The determination of the likely effect of a delay on completion.

Retrospective

Demonstrating the actual effect of a delay event based on what actually happened.

The first two methods of analysis listed above: impacted as-planned analysis and time impact analysis, are prospective forms of analysis. The other four methods are retrospective as shown in Table 1.

Does timing matter?

The timing of when the analysis is carried out may require an analyst to determine the delay impact either prospectively or retrospectively. Indeed, the SCL Delay and Disruption Protocol 2nd edition³ specifically addresses considerations where a delay analysis is assessed after completion of the works, or significantly after the effect of an employer risk event. Paragraph 11.1 states that the prospective analysis of delay may no longer be relevant or appropriate, and as such, other available methods need to be considered.

The subjectivity of determining which method of delay analysis is the most appropriate has been addressed in both the SCL Delay and Disruption Protocol 2nd edition and the US Association for the Advancement of Cost Engineering (AACE) Recommended Practice for Forensic Schedule Analysis (FSA)⁴. Both documents are used and referred to extensively by contractors, employers and claims consultants alike.

³ https://www.scl.org.uk/sites/default/files/documents/SCL_Delay_Protocol_2nd_Edition_Final.pdf

⁴ AACE International (2011) 29R-03: Forensic Schedule Analysis

TABLE 1. SUMMARY OF DELAY ANALYSIS METHODS³

| 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. Updated programmes or progress information 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. Updated programmes or progress information 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 data. |
| Collapsed as-built analysis | Cause & effect | Retrospectively | Retrospectively | Logic linked as-built programme. A selection of delay events to be modelled. |

Selecting the right method – is there a right or wrong answer?

The SCL Protocol proposes that irrespective of which delay analysis method is deployed, there is an overriding objective of ensuring that the conclusions derived from that analysis are sound from a common-sense perspective. This is particularly relevant where there is a significant risk that the remaining duration projections, logic links, calendars and constraints within a baseline programme might produce anomalous results.

Both the SCL Protocol and the FSA provide guidance on the factors to be considered when selecting which techniques are appropriate under given circumstances. These are:

1. Relevant conditions of contract (SCL & FSA)
2. Nature of causative events (SCL)
3. Value of the project or dispute (SCL)
4. Time available (SCL & FSA)
5. Nature, extent & quality of records available (SCL & FSA)
6. Nature, extent & quality of programme available (SCL)
7. Forum in which assessment is being made (SCL & FSA)
8. Purpose of analysis (FSA)
9. Size of dispute (FSA)
10. Complexity of dispute (FSA)
11. Budget of forensic schedule analysis (FSA)
12. Expertise of the forensic schedule analyst and resources available (FSA)
13. Legal or procedural requirements (FSA)
14. Custom and usage of methods on the project of the case (FSA).

Whereas most standard conditions of contract contain no express provision stating what method of analysis should be used. However, NEC3 ECC⁵ requires, at clause 32.1, ‘the Contractor to show the actual progress achieved on each operation and its effect upon the timing of the remaining work’. Whilst the NEC contains express provision in relation to programme updates which would include the effect of compensable events, it does not mandate the use of a particular method of analysis.

Where the contract makes provision for prospective analysis, and where the contractor has complied with the contract requirements in relation to an award of

an extension of time contemporaneously, as the case under the NEC form, it may be possible that any dispute arising in relation to this issue should be resolved using a retrospective analysis.

The reliability of delay analysis depends on the selection of a suitable method and the availability of project records. It is important to note that none of the techniques yield reliable results if the information used is invalid.

The power of records

Both the SCL Protocol and the FSA recommend that the choice of method for delay analysis should be based on the nature, extent and quality of the records and programme information available. Careful consideration needs to be given to the contemporaneous records, including, but not limited to:

- Programmes
- Progress reports
- Minutes of meetings
- Certificates
- Diaries
- Timesheets
- Labour, material and equipment allocation sheets
- Materials and equipment quotations and delivery records
- Photographs and videos
- Test records
- Correspondence
- Contract and tender documents.

The blind application of any of these techniques is never appropriate. It is always essential to consider the key factors mentioned above, including the cost-benefit of adopting a particular method, and to find ways of communicating the results in a way that is both credible and readily understandable.

Selecting a methodology – the key criteria

The delay analysis methods described above are commonly used in practice, although other variants of these techniques and methods of presentation are available. Each method responds to different criteria, as follows:

- **Impacted as-planned analysis** - a simple type of delay analysis suited to identify what effect would an event(s) have had on the completion date assuming everything else went exactly as planned in the baseline

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programme and the as-built records are poor or non-existent. However, it may be necessary to reconstruct the baseline programme.

- **Time impact analysis** - an appropriate method for determining the expected effect of an event on the completion date from the point in time when it was instructed or arose. However, if the analysis is carried out retrospectively, the analysis can be based on actual as-built records and will be more accurate and reliable.
- **Time slice windows analysis** - suited to identify what was the contemporaneous or actual critical path to completion throughout the works and determine what were the causes of delay. In my experience, when applying this method it should include an analysis of the as-planned and as-built records in each window to determine what events might have caused the identified critical delays due to delayed progress or new non-progress changes in logic of critical activities.
- **As-planned vs as-built windows analysis** - an alternative to the “time slice windows” analysis for projects when there is concern over the validity or reasonableness of the baseline programme and/or contemporaneously updated programmes. The SCL suggests that a greater level of detail is required to determine the actual critical path because this method doesn’t substantially rely on programming software. An analysis of the as-built records is required to determine the actual critical path in each window and determine what events might have caused the identified critical delay to key dates as per “effect & cause”.
- **Longest path analysis** - suited to identify what was the as-built critical path to completion, viewed retrospectively, and determine what were the causes of delay. An analysis of the as-planned and as-built records is required to determine what events might have caused the identified critical delay. However, the SCL suggests that a potential limitation to this method is its ‘limited capacity to recognise and allow for switches

in the critical path during the course of the works’. In my experience, it’s necessary to adopt other methods to support the analysis such as resource curve analysis or earned value analysis for the affected workflows.

- **Collapsed as-built analysis** - often the most appropriate where the situation requires the retrospective analysis of delay to identify “but for” the event(s) when would the completion date have been achieved. This method is best suited to straightforward analyses rather than complicated projects as it can be difficult to apply where there are a lot of complex issues at play.

Minimising disputes - the power of persuasion

Common sense is understanding the limitations of each of the methods and the primary objective of any delay analysis is to clearly communicate that the events complained of had the effect contended for. This requires presentational as well as analytical skills, and often a compromise between the cost of the analysis and the persuasiveness of the results is required.

When parties use inconsistent analysis methods to resolve time-related disputes, major differences can occur that widen rather than narrow the argument. However, if the analysis of a delay is carried out correctly and if both parties agree on the philosophy of methodology to be used then disputes will be minimised.

For more information on how FTI Consulting can support you with delay analysis, please contact Adi on the details below.

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