



# Effect then cause...but how?

In this article, Delay Expert and HKA Principal Russell Bates, explores the difficult area of identifying and assessing the possible impact of delay related causes in a retrospective analysis of events.

## Introduction

Delay analysis methodologies divide between consideration of assessing the critical path from either a prospective, contemporaneous or retrospective view.

In a prospective view, the causative issue is known, and the objective is to assess the impact (effect of that issue). It is referred to as a causation-based analysis.

In a contemporaneous or retrospective view of criticality, the approach is to establish the effect first, i.e., during the course of a project, when and for how long critical delay was experienced. This is referred to as an effect-based analysis.

## Stage 1 – Incidence and Extent of Critical Delay

This is illustrated in the figure below which compares a planned timeline of 12 months (highlighted in green) for a building project with the actual timeline of 14 months (highlighted in blue). In this instance, the analyst concludes that all phases were completed in accordance with the planned intent with the exception of the cladding phase. The cladding phase took 4 months to complete as compared to the two months planned, resulting in a two-month critical delay to the project (highlighted in red). The conclusion is that there was a critical delay of 2 months to the progress of the cladding.

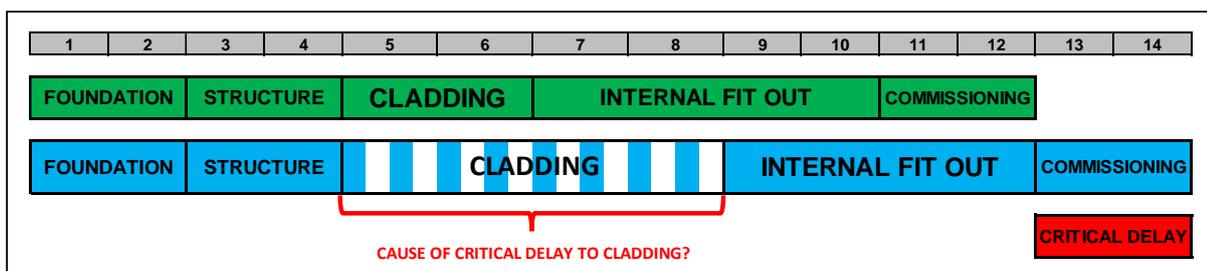
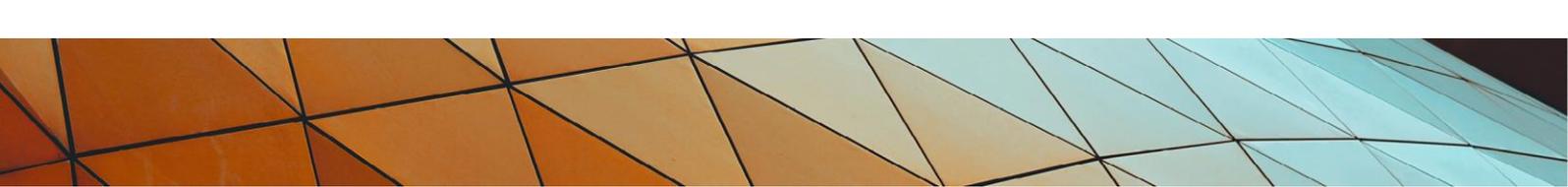


Figure 1: establishing the incidence and extent of critical delay



In this example, one would deduce that the cladding phase started in line with the planned date required, however, once the works were underway, delay began to accrue. The next step for the analyst is therefore to establish the causative issue(s) that gave rise to the critical delay to progress of the cladding.

I recall a discussion with a colleague who took the view that as delay analysts, our unique skill is in establishing which activities were critical and the extent of critical delay incurred. Establishing the causative issues should be relatively straight forward and be evident from factual records, or in the absence of such, witness testimony of those present on the project. In other words, you should not need a third-party consultant or expert to research this, it is something the client ought to be able to establish.

Nonetheless, in my experience establishing both cause and effect has been part of the service expected by clients and their legal advisors, often because:

1. Inevitably, as a practising delay expert, I am appointed to take a retrospective view of events. Personnel turnover is a normal feature of any project, therefore those who might be most able to comment on particular issues are long gone.
2. The appointment of a third party, whilst not having first-hand knowledge of the project, provides an independent view which is not coloured by project politics or ongoing arguments between the project participants. In effect, the delay expert provides a second opinion.

Nonetheless, based on my colleague's view, when carrying out a delay analysis, either as a precursor to, or part of dispute related proceedings, one would expect that the most likely source of controversy would be in ascertaining the incidence and extent of critical delay regardless of cause.

## **Stage 2 - Forensic Investigation of Records – Access to Records**

In so far as it describes various methodologies for delay analysis, the SCL Protocol<sup>1</sup> identifies methodologies for establishing 'effect' in terms of criticality but when it comes to causation, merely states:

*Thereafter, the analyst investigates the project records to determine what events might have caused the identified critical delay in each period.*

In my experience this part of the analysis can be controversial and no less complicated to unravel. I recall a past project for a new office build where I was appointed to provide an expert opinion on behalf of the contractor on the incidence and extent of critical delay and the causes of critical delay.

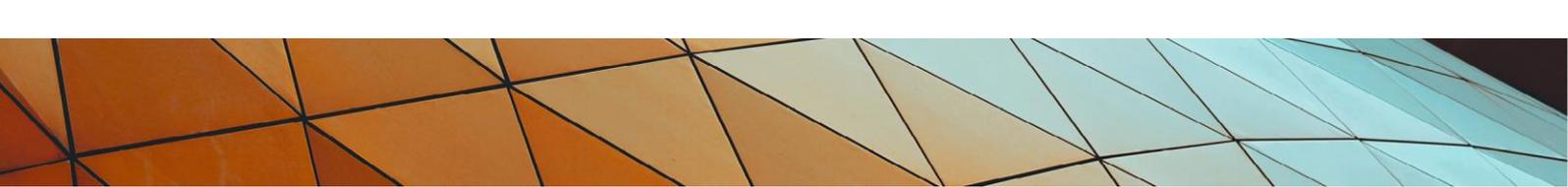
When I first became involved, the issue that had been occupying the minds of the parties and had resulted in delay to the start of the internal fit out of the building, was having to carry out remedial works to fire protection. However, I concluded that the critical path was elsewhere, through a work sequence associated with external cladding.

So when I was asked to engage with the employer's appointed a delay expert, my expectation was for there to be disagreement as to the course of the critical path through the project. To my astonishment he agreed with my assessment of criticality. However, any sense of relief was cut short because it transpired that he took a very different view as to the causes of delay to the external cladding.

Whilst the information provided to me indicated that the progress of on-site installations was being hampered by late issue of design information, my opposing expert concluded that delay was the result of manpower

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<sup>1</sup> Society of Construction Law Delay and Disruption Protocol, 2<sup>nd</sup> Edition 2017, Clause 11.6; subclauses (c) 'Time Slice Analysis', (d) 'As-planned versus as built in windows' and (e) 'Retrospective longest path' analysis.



shortages by the cladding subcontractor, a matter which he said had been recorded in documents provided to him by his client.

It was therefore evident from our discussions that the identification of a specific cause, was predicated on what documents we had been given access to that in turn informed our understanding or perception of where the particular problem lay.

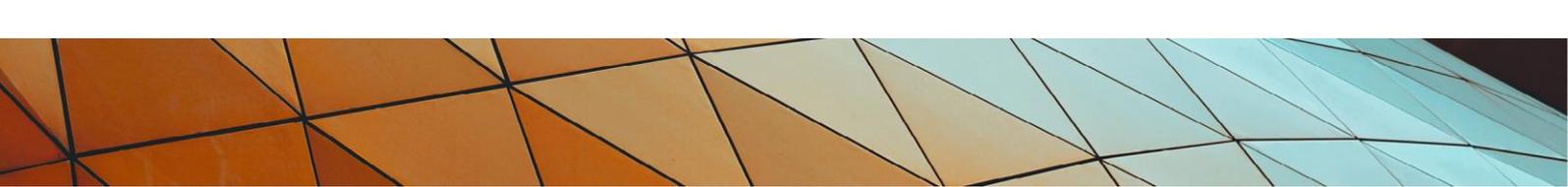
Why could such a circumstance arise?

1. The third-party analyst is dependent on access to contemporaneous records provided by his client. In response to a request for information, the point of contact in the client organisation may make their own judgement as to what documents would be relevant and be supplied in response to this request. For example, I recall one instance where in response to my request to be provided with all periodic progress reports generated during the progress of the project, the client provided monthly progress reports. It also had available weekly progress reports but assumed that this merely duplicated the information in the monthly reports so did not provide them. However, these weekly reports were found to contain useful factual information which would have been beneficial to me at the start of my analysis.
2. The point of contact for providing information within the client organisation may not be aware of what information is available or where it is stored.
3. Otherwise, it is not unknown for a client not to disclose records which would be prejudicial to its own claim.
4. When appointing an expert, given pressures in terms of time and costs, a client or instructing lawyer may seek to restrict the scope of analysis by arranging for the document collation process to be carried out by the client's personnel. For reasons previously stated, this may obscure or hinder what documents are available and what might be relevant.
5. For the same reason, there may be concern that any investigation carried out by a third-party analyst becomes side-tracked by studying documents that are regarded as irrelevant. The client or its instructing lawyer will expect the analyst to explain why a certain set of documents is relevant, as it does not want to bear the cost of consultants reading through voluminous documents, the majority of which do not inform or have relevance to the factual investigation.

## **Stage 2 - Forensic Investigation of Records**

To minimise the risk of not having access to key documents but responding to concerns about controlling time and costs, the following procedure is suggested.

1. As explained above, when carrying out a delay analysis which takes a contemporaneous or retrospective view of criticality, the first step is to determine effect in terms of establishing the incidence and extent of critical delay. The analysts initial document request therefore should focus on data sources which are expected to provide progress and as-built information.
2. In the example illustrated in Figure 1 above, the conclusion was that there had been a 2-month critical delay to the progress of external cladding. Having established this, the focus of the analyst would then turn to investigate contemporaneous records specific to the external cladding in months 5 – 8 when the cladding works were being carried out.



3. As part of the second stage of this investigation, it is suggested that the analyst keeps in mind a checklist when searching or requesting for information regarding the activity in question. In the worked example provided, this would include:

a) Information outstanding which might prevent the external cladding works from starting or progressing on site as planned, for example:

- Were there any outstanding design issues to be resolved and if so, how did these affect the ability to progress with work on site? Such as:
  - Outstanding or changed design information.
  - Responses to technical queries.
- Was design information provided confirmed as suitable for construction?  
Were any relevant building control approvals secured?
- Were there any concerns or objections from third parties that needed to be resolved?
- Was RAMS<sup>2</sup> documentation specific to the works to be undertaken submitted and approved in good time?
- Were all notice requirements of works to be undertaken issued? For example, to local authorities, where works are required in the public highway.

b) Were there issues with procurement and delivery of materials to site that might prevent the external cladding works from starting or progressing on site as planned? Such as:

- Were subcontractors appointed and mobilised to site in accordance with the planned intent? If not:
  - Did the tender process start on time; if not, why?
  - Were bids received on time; if not, why?
  - Was the subcontract award made on time; if not, why?
  - Was the lead in and mobilisation to start on site in accordance with the contractor's programme; if not, why?
- Were materials, fabricated elements and plant delivered to site in accordance with the planned intent? If not:
  - Did the enquiry process start on time; if not, why?
  - Were prices received from potential suppliers on time; if not, why?
  - Was a purchase order placed on time; if not, why?
  - Were fabrication and delivery periods in accordance with the contractor's programme; if not, why?

c) Were there site constraints that might have prevented the external cladding works from starting or progressing as planned? Such as:

- Access to the work front including:
  - Presence of other subcontractors or a lack of handover documentation preventing the works from starting.
  - Access constrained by having to provide level of access to statutory undertakers not envisaged by the construction programme.

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<sup>2</sup> Risk Assessment Method Statements: these are documents prepared to identify hazards in the workplace and which assess the risk and severity of any hazards to any operatives.

- Is there a change to the planned sequence or methodology for carrying out the works?
- Does the subcontractor programme align with the main contractor programme?
- Was the requisite manpower present?
- Was plant operating effectively or was worked stopped because of breakdowns?
- Were delivered materials free of defects?
- Were there any weather events which resulted in lost time?
- Was rework and defective work carried out?
- Was the work carried out efficiently, in having accounted for all other factors?

4. Assuming that Q&A dialogue with the client generated a comprehensive data set concerning the critical delay in question, the analyst can then examine the documents decided to determine the cause of critical delay. In the worked example given (Figure 1), this investigation might show that although works commenced on site on time, it was discovered that the mullion and transom cladding supports supplied to site contained fabrication defects, and therefore a new batch had to be provided. Using the documents available, the time from discovery to re-delivery to site is calculated to be exactly 2 months:

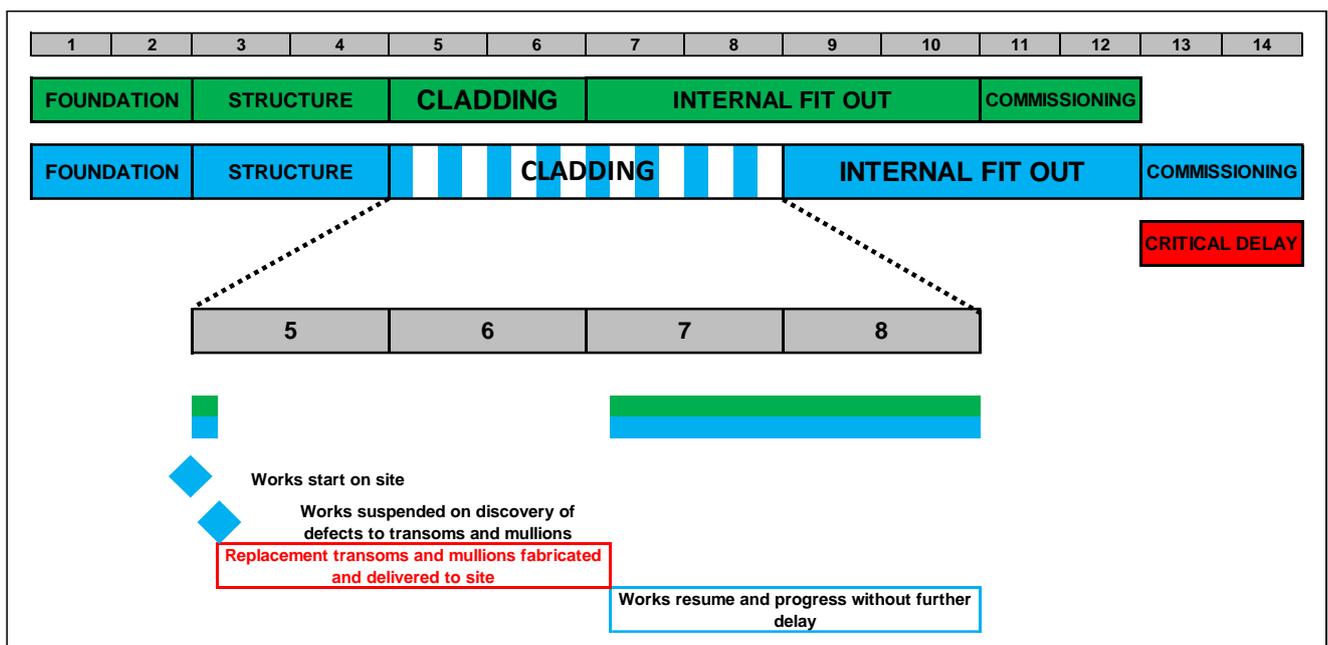


Figure 2: investigating the cause of critical delay (single factor)

## Stage 2 - Forensic Investigation of Records – Alternative Scenario

Investigations are not always so clear cut; the figure below illustrates an alternative scenario where the actual progress of the cladding works has been affected by several causative issues:

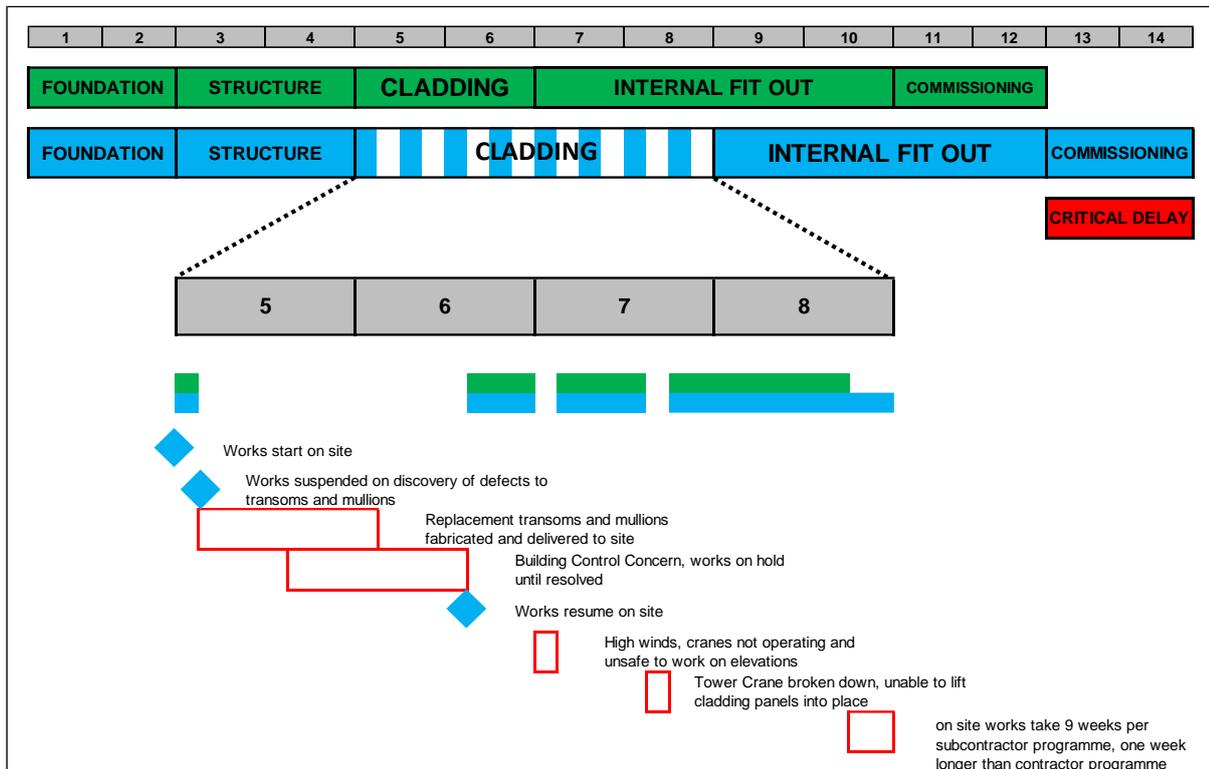


Figure 3: investigating the causes of critical delay (multiple contributory factors)

The analyst should check the contemporaneous records available to ascertain whether:

- Potential causative issues are supported by the facts.
- Potential causative issues are not supported by the facts.
- There is some degree of uncertainty as to the extent to which a potential causative issue contributed to the critical delay.

However, uncertainty may prevail because of:

- Illegibility: it is the norm to work with electronic copies of documents, but it may not be clear what was written in the original document.
- The quality of written English may be poor whether in handwritten site documents, such as daily logs and site diaries, as well as emails, minutes and progress reports. In such instances, an analyst or expert may need to make assumptions or form an opinion as to what the document intended to say.
- The reliability of certain records might be questionable, for example progress reports and meeting minutes may reflect the commercial position of the party who has drafted the document and not necessarily the facts.
- Whilst contemporaneous records evidence that an event happened, there may not be sufficient information available to articulate with precision, the impact of the event in terms of causing critical delay.
- Similarly, whilst it is known that several causative issues contributed to the delay incurred, it might not be clear how much of the delay could be reasonably attributable to each. For example, on one project I found that site records were clear that delays to excavation works were attributed to both restricted access (having to work around other trades), and particularly wet weather, making the process of digging more arduous. However, they were not clear on precisely which days either of the difficulties was prevalent, and consequently, I had to form an opinion as to how much time should be

attributed to each. In extreme cases, this can result in claims being presented in the 'death by a thousand cuts' format, as illustrated in the figure below:

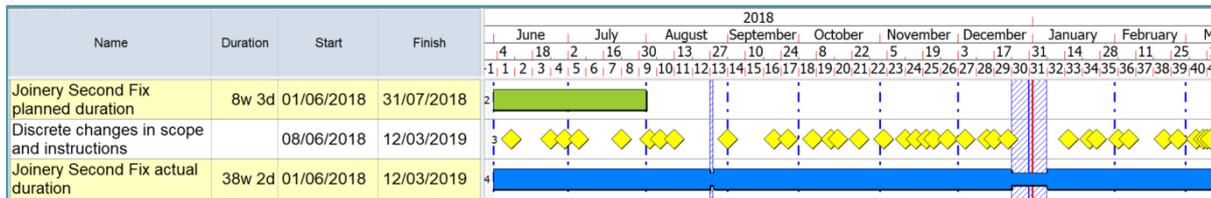


Figure 4: illustration of a claim being presented in the 'death by a thousand cuts' format

In this instance, 2<sup>nd</sup> fix joinery works took circa 38 weeks to complete (the blue coloured bar in the figure above) as compared to the original planned 8 weeks and 3 days. The architect instructed around 75 changes to this package of work (represented by the yellow stars in the figure above). It was the contractor's position that this phase of work could not be completed any quicker, given the frequency with which changes were being made.

It may not have been possible to identify the significance of each change event, in terms of the additional work scope generated, and how this affected the joiner's ability to progress its works efficiently.

It is not an approach I would advocate unless there is no alternative, as it in effect amounts to a 'global' claim, that the claimant may be unable to evidence any further. The claim might be challenged on the basis that, whilst there were clearly a large number of changes, there is no certainty that these changes generated the 30-week delay encountered and there is an assumption that other factors such as possible slow progress by the joinery subcontractor did not contribute to the overall delay. However, it does illustrate the difficulty that can ensue if contemporaneous records are lacking in detail. In such a circumstance, expert opinion provided to a tribunal will need to be qualified and balanced to reflect the lack of certainty involved.

- Whilst contemporaneous records provide some level of detail, the root cause of delay might not be apparent. For example, I found in one dispute, refurbishment works which included the construction of a mezzanine floor had not commenced because according to the contractor, the mezzanine works were on hold as the installation method was to be reviewed. The employer disputed this arguing the works had been instructed and therefore the contractor should be proceeding with the installation. However, on investigation a different picture emerged:
  - The mezzanine floor was to be supported by a new steel structure.
  - The original intent was for the existing roof to be removed and replaced, and in the meantime, the mezzanine steels would be craned through the open roof.
  - However, in order to save on cost, a decision was made to retain the existing roof. This resulted in the steelwork being re-designed in shorter sections and manhandled through a window aperture in order to get it into the building and into position for bolting together.
  - Therefore, the root cause of the delay was the decision to retain the existing roof that in turn increased the number of beams and columns to be lifted and erected.

## Conclusion

1. Delay analysis methodologies which rely on ascertaining a contemporaneous or retrospective view of the critical path require a two-stage approach.

- **Stage 1:** To define the effect in terms of the incidence and extent of critical delay.
  - **Stage 2:** To ascertain the causative issues behind each discrete incidence of critical delay.
2. Stage 1 provides a framework for Stage 2 by which the analyst can focus the investigation on the specific period when critical delay occurred, and the activities which were experiencing critical delay at that time.
  3. The analyst should keep an open mind and consider all potential causative issues.
  4. It is unlikely that establishing causation will be a simple matter of ascertaining the facts because it is likely that the critical delay incurred was due to a number of contributory factors.
  5. Establishing the amount of delay that should be attributed to each factor may be difficult, and if uncertainty prevails as a result of contemporaneous records being illegible, unclear, unreliable or failing to articulate the circumstances concerning each causative issue, expert opinion will need to be applied.

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