FEATURE ARTICLE

Scheduling (programme) analysis: hired gun advocacy or effectively meeting a burden of proof?

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There is an undeniable need for logical, factually supportable and credible evidence to assist in calculating delay, time extensions, concurrency and compensability as well as liquidated damages and actual damages. Yet the differing methods of scheduling (programme) analysis can lead to distrust and rejection of some or all resulting evidence. This is a universal dilemma as is apparent from the decisions from numerous countries. The authors suggest a series of best practices that should improve upon the reliability of such evidence and increase its acceptability.

Courts, arbitration tribunals, adjudicators, disputes resolution boards and decision-makers are frequently called upon to determine whether a party to a construction contract is entitled to a time extension and of what duration, whether it is compensable or non-compensable, or whether liquidated damages or actual damages may be assessed and for what duration. The party seeking the relief usually has the legal and evidential burden;[1] thus the problem begins.

Delays often vary in duration, sequence

and cause, and even when a critical path method (CPM) network programme (schedule) has been utilised, there is still much to be determined. Delays are often intertwined in and among numerous activities in the project schedule, some of which have float, others of which are critical. This makes apportionment of the delay complex. One way to determine this allocation is by the application of the court's common sense.[2] Some Boards of Contract Appeals in the US have required detailed proof as to the particulars of each delay and their impact using contemporaneous records.[3] The burden of proof can shift to an owner/employer when seeking liquidated damages or actual damages,[4] but the contractor must apportion the delay when owner/employer critical path delay is concurrent with the contractor's delay.[5] As a result, schedule consultants are often brought in as experts to explain entitlement in the form of a schedule (programme) delay analysis. The evidence of programming experts may be of persuasive assistance.[6] Dozens of variations of individual CPM schedule delay analysis methods exist but generally fall within the genre of the following five categories of methods:

- time impact analysis;
- collapsed as-built;
- as-built critical path;
- impacted as-planned; and
- total time (as-planned v as-built).

A time impact analysis method utilises the change to the projected completion date of the schedule (programme) between the contemporaneous schedule updates to evaluate critical delays during the project in a chronological and cumulative fashion. Collapsed as-built methods remove specific delay from the as-built schedule to show where the contractor would have finished, but for that delay. As-built critical path methods identify delays that fall on the longest path in the as-built schedule. Impacted as-planned methods project delays into the baseline schedule as if they had been known at the start of the project. A total time method, or as-planned versus as-built, compares the original as-planned schedule with the as-built schedule and considers the difference and the extension of time. Many of these methods have often been criticised in legal decisions depending on how they are utilised, their completeness, accuracy and whether they were derived from contemporaneous records.[7]

Part of the problem with the variety of schedule delay methods, however, is that they can produce different results when applied to the same situation. Studies that come to this conclusion include:

- Abdulaziz A Bubshait and Michael Cunningham, 'Comparison of Delay Analysis Methodologies', *Journal of Construction Engineering and Management – ASCE*, p 315, July/August 1998;
- Michael F D'Onofrio and Kenji P Hoshino, 'AACE Recommended Practice for Forensic Schedule Analysis', Presented at the 2010 ABA Forum on the Construction Industry Annual Meeting 'The Age of Turbulence: Managing Money Issues in Construction';
- W Stephen Dale and Robert M D'Onofrio, 'Reconciling Concurrency in Schedule Delay and Constructive Acceleration' 39 *Public Contract Law Journal* 161–229; and
- Mark C Sanders, 'Forensic Schedule Analysis: Example Implementation, Part 2', 2011 *AACE International Transactions* CDR.493.

Some advocates and scheduling (programme) experts use the fact that the various methods can reach different conclusions when applied to the same situation to conclude one of two things: that no method is acceptable or that all methods may be acceptable in specific situations.

The first position, that no method is acceptable, is principally attributable to the conclusion that schedule manipulation can result in two schedule delay analyses reaching opposite conclusions. The confusion over which method is more accurate may lead some to give up or reject all methods. This possibility of manipulation is compounded by the fact that use of different methods may be, in and of itself, a form of manipulation because of the way each treats delay. The general consensus, as noted by many practitioners and the Society of Construction Law's Delay and Disruption Protocol, is that time impact analysis is the preferred method. However, even the term 'time impact analysis' may refer to a variety of methods utilising the schedule updates. Further, a number of consultants and experts refer to the method they use as time impact analysis, regardless of what method is actually used.

The attacks on the schedule (programme) analysis provided by experts have caused considerable difficulty for courts in particular. In one instance, a court reverted to methods that were used before computer software came to be used extensively in programming of complex construction

contracts utilising older non-computer-based methodology techniques because an error in one logic link can vitiate the whole programme, and any errors in a number of links will almost inevitably vitiate the programme.[8] When such expert analysis failed to have enough detail to allow the court to determine the number of delay days and contains errors, one court found that the contractor failed to carry its burden of proof and the claim was denied.[9] When the owner/employer failed to present any delay analysis on its claim for contractor delay, the claim was denied.[10]

The need for better voluntary guidelines is clear from the limitations on what courts can impose, but the importance of what courts, arbitration tribunals, adjudicators, dispute resolution boards and decision-makers need strongly suggests that such voluntary guidelines are necessary. A party is entitled to present its case as it sees fit and no judge is entitled to require a party to establish causation and delay by a particular method.[11] Nevertheless, a court must require a party to spell out with sufficient particularity its case and where the case depends upon the causal effect of an interaction of events, to spell out the nexus in an intelligible form.[12] An expert's analysis which was 'in essence a total time approach which is virtually of no value' was rejected by the court.[13]

To bring some clarity, more stringent criteria to review a schedule delay analysis are required. The eight guidelines listed below are considered a best practice for schedule delay analysis and were first suggested in February 2012.[14] While originally proposed in accordance with US case law, these guidelines are not specific to any particular jurisdiction but are a best practice based on how a project is scheduled, administered and evaluated after-the-fact. The eight guidelines can provide reliable results in any scenario. Most of the guidelines conform to the Delay and Disruption Protocol. The eight guidelines any schedule delay analysis should comply with are:

1. Compare the plan to perform the remaining work before each delay with the plan to perform the remaining work after that delay

This typically involves utilising the schedule updates the contractor prepares contemporaneously during the project to determine the change to the projected completion date of the project. It is important not just to look at the estimated impact of a delay event but also to determine the actual impact to the schedule just after the delay event is completed. This varies slightly from the Delay and Disruption Protocol because after-the-fact, the analysis should focus on the actual schedule (programme) impact when the delaying activity is finished, as opposed to how long the parties thought the delay might last at the start of the delay.[15]

2. Identify critical delays

Delay has to be critical to the contract completion date in order to justify a time extension. Delays that absorb float are not critical. However, due to added constraints in current scheduling software, there may be critical delays that are not on the longest path and activities with float on the longest path. If an activity does not have any float, by definition it is critical as it would impact the required contract completion date.

3. Evaluate all delays in a chronological and cumulative manner

The order in which the delays are inserted is important, as float is created by extensions of time and absorbed by contractor delay throughout the project. Evaluating delay out of sequence will mask what actually happened on the project.

4. Adjust the contract completion date to reflect excusable delay as it occurs

Adjusting the contract completion date is also necessary for accurate float values and a determination of which activities are critical at any point in time on the project.

5. Include accurate as-built information in the analysis

Any delay analysis should reflect the actual progress of construction. Altering or using incorrect as-built data can change the results of a schedule delay analysis.

6. Minimise projected future delays

Inserting delays well in advance of the data date can alter the logic-driven float calculations in the schedule and change which

activities are critical. Generally, projecting future delays should be minimised and, if used, incorporated based on what information was known by the parties at that point in time on the project.

7. Correct any necessary logic flaws, but carefully document and explain any changes to the contemporaneous schedules

Revision to the baseline schedule or schedule updates may be necessary after-the-fact but should be minimised. Generally, only changes to mandatory physical constraints or required contractual constraints should be adjusted in the schedule, and the contractor's preferential sequencing should be left alone. Courts, adjudicators, arbitration tribunals, dispute resolution boards and deciding parties tend to be sceptical of substantial changes made well after construction of the project.

8. Tie causation to each delay in accordance with the principles of schedule delay

These include:

- non-excusable delay;
- excusable compensable delay; and
- excusable non-compensable delay.

These principles of causation are based on the contract language for owner/employer delay, contractor delay, concurrent delay, offsetting delay and force majeure delays when recognisable under a remedy-granting clause for changes, variations and other descriptive events.

The second claim, that all methods are acceptable in certain situations, is often used to justify continued use of knowingly flawed methods, such as collapsed as-built and the as-built critical path. For instance, because the preferred method, time impact analysis, requires schedule updates, some argue that when schedule updates are not available, use of flawed methods may be acceptable. This may involve some risk, as the contractor is usually required by contract to prepare and submit schedule updates. Failure to comply with a contractual provision for schedule updates may in and of itself prevent the contractor from proving its delay after-the-fact.[16] A time impact analysis, which is the contractor's burden of proof, could still be conducted by recreating schedule updates but courts, adjudicators, arbitration tribunals and dispute resolution boards tend to be sceptical of analysis created entirely after-the-fact for purposes of dispute resolution. Likewise, the Society of Construction Law's Delay and Disruption Protocol also notes in section 1.14.1 that 'failure to maintain such records [including schedule updates] does not justify the Contractor in making a global claim'. While this statement applies to the clearly disfavoured global claim (as-planned versus as-built) method, the statement could just as well apply to any other method that does not comply with the eight guidelines identified above.

The eight simplified guidelines reflect a checklist that any court, adjudicator, arbitration tribunal, dispute resolution board or decision-maker can use to assist in identifying the accuracy and reliability of a schedule (programme) delay analysis method.

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Notes

1 *Joseph Constantine Steamship Line Ltd v Imperial Smelting Corp* [1942] AC 154 (HL); *CMM Corp v United States* 20 Cl Ct 649 (1990).
2 *Galoo Ltd v Bright Grahame Murray* [1994] WLR 1360 (EWCA).
3 *L&C Europa Contracting* ASBCA No 52848 (2004).
4 *WG Yates & Sons Constr Co* ASBCA Nos 49398 & 49300 (2001).
5 *Sollitt Constr Co v United States*, 2005 US LEXIS 52 (Fed Cl, 23 February 2005).
6 *Mirant Asian-Pacific Constr (Hong Kong) Ltd v Ove Arup* [2007] W L 1623219 (TCC).
7 See, for example, *Alstom Ltd v Yokogawa Australia Pty Ltd (No7)* [2012] SASC 49; *City Inn Ltd v Shepherd Constr Ltd* [2007] WL 4190646 (CSOH); *ERDC Group Ltd v Brunel Univ* [2006] EWHC 687 (TCC); *Multiplex Constructions (UK) Limited v West India Quay Dev Co (Eastern) Ltd* [2006] EWHC 1569 (TCC); *Great Eastern Hotel Co Ltd v John Laing Constr Ltd, Laing Constr Plc* [2005] EWHC 181 (TCC); *Balfour Beatty Constr Ltd v The London Borough of Lambeth* [2002] EWHC 597 (TCC).
8 *City Inn Ltd*, see note 7 above.
9 *Youngdale & Sons Constr Co v United States* 27 Fed Cl 516 (1993).
10 *Versar, Inc*, ASBCA, paragraphs 93, 459 (2012).
11 *GMTC Tools and Equipment Ltd v Yuasa Warwick Machinery Ltd* [1994] 73 BLR 107.
12 *Bernhard's Rugby Landscapes Ltd v Stockley Park Consortium Ltd* [1997] 82 BLR 39 (TCC).
13 *Morganti Nat'l, Inc v United States* 49 Fed Cl 110 (2001).
14 See D'Onofrio and Meagher, 'What is a Schedule Good For?', ABA Forum on the Construction Industry Midwinter Meeting, 3 February 2012.
15 *Adyard Abu Dhabi v SD Marine Services* [2011] EWHC 848 (Comm) and *City Inn Ltd*, see note 7 above.
16 *Fortec Constructors v United States*, 8 Cl Ct 490 (1985).