Assessing Extensions of Time

Tony Farrow
Trett Consulting
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Contracts require the Works to be completed by a set date, subject to the Contractor's entitlement of extensions of time under the Conditions of Contract.

The Conditions of Contract usually recognise that if the Contractor is delayed in the completion of the Works by the defined risk items and had given notice and particulars of its claim, the Engineer should grant an extension of time as may be justified in the circumstances.
In the following notes, Trett Consulting's Tony Farrow summarises some pertinent points with respect to approaches for investigating project delays and the assessment of causation and entitlement to extensions of time.

Most Conditions of Contract do not define how delay is to be established, what detailed particulars the Contractor is to provide or how the Engineer is to justify and so fix the extension of time.

Hence, we need to carry out exercises in order to assist the investigation of why projects run late and to assess what delay may have been caused by particular events or the many situations and circumstances that frequently arise on construction projects. This work can then be of assistance in the review of causation of delay and entitlement under the terms of the particular contract.

1. Selecting Methods of Delay Analysis?

Programming software is now regularly used to plan and manage building projects. Software packages vary, with price usually influencing the detail and sophistication of the package. At the cheapest level, packages provide an ability to produce bar (gantt) charts with little or no data processing facilities and limited graphics output. At the top end, packages allow programmes of many thousands of activities to be developed, using complex critical path analysis techniques and providing database facilities which provides the basis for analysing labour, material and plant resources, as well as drawings, procurement, quantities of work etc. They also provide comprehensive graphic facilities.

These software packages have been developed to assist organisations in the execution of projects. However, they are also increasingly used in the area of extension of time analysis, to such an extent that there is a growing body of knowledge on this topic. In November 2001, I wrote a paper for the Society of Construction Law which discussed some of the methods of analysis used in this field and how different methods produce different results. It also considered aspects of good and not so good practice. The paper is entitled 'Extension of Time Analysis: Methodology and Mythology'.

In this paper, I outline two broad approaches to delay analysis; theoretical and actual. The theoretical methods do not necessarily consider what delay actually arose but seek to demonstrate what might have been the delay arising from particular events. The actual-based methods focus on identifying where or when delay arose and identifying the events or circumstances giving rise to it.

Approaches to delay analysis can also be categorised as prospective methods and retrospective methods. When a project is in progress and the Contractor and Engineer forecast the impact of known events and

their impact on the future completion date, an estimate of the prospective situation is made and an extension of time is considered. On the other hand, if the project is complete and the events and their consequences have run their course, the analyst is able to retrospectively consider what has occurred and make assessments after-the-event.

The Society of Construction Law's 'Delay and Disruption' protocol (sometimes referred to as the Extension of Time protocol) recognises these points. Essentially, if the project is 'live' and one is making judgements about the future, then the analysis is based on the known facts to-date and assessments about the future i.e. one might call the future assessment a theoretical prediction of what might occur. However, if the project is complete, the parties should be able to consider the real facts in the case and seek to identify what did occur i.e. this is an assessment of what actually arose. Hence the SCL Protocol distinguishes between live projects and completed projects.

In practice, all methods of analysis have an element of theory or estimation and no analysis is solely a factual investigation because records are never as complete as one would like and the process demands the application of many assumptions, which are usually subjective and personal. However, the moretheoretical the method of analysis, the wider is the range of potential outcomes when applying the same set of facts or assumptions to different methods. Hence, from a methodological point of view, the analysis is less reliable. This is a fact of life if one is dealing with prospective situations, but in cases where the project is complete, the analysis can be more rigorous by the use of methods that focus on the actual situation, not theory.

2. As-planned programme

A number of the methods of analysis involve the use of the asplanned programme. This is the representation of the project, in programming terms, at the start of the Works. It can be an important document since it acts as a reference point to explain what happens during the project and how the live project differed from the initial plan.

The contract may require the Contractor to submit a programme shortly after contract award. The Parties use this to monitor progress and events. It is normal to adopt this programme as a basis for the asplanned programme. However, at the commencement of the project, the Contractor is not aware of all matters and as progress is made, the initial programme is updated and revised, with new projections about the remaining works to completion. Hence, the as-planned programme should not be seen as a single programme and in delay-analysis, one should recognise and consider the Contractor's updated intentions and expectations. This point is emphasised in the SCL Protocol i.e. it recommends the use of updated programmes to analyse delay events, not to analyse all delay events using a single, original, baseline programme.

When undertaking a retrospective, forensic examination of delay on a project, the initial as-planned programme may be deficient in certain respects, in terms of structure, activities, logic, criticality, detail and accuracy. For example, a particular element of the project which has been subject to delay-events, may not be shown on the as-planned programme, or is not identified in the necessary level of detail. In these situations, the analyst has to adjust the as-planned programme to make it possible to carry out an assessment of delay.

However, developing the as-planned programme in greater detail can produce arguments. Hindsight is a wonderful gift of the delay analyst and one can always come up with a sound argument to justify the sequence in which a particular element of unplanned work would have been carried out, as well as its

duration. Consequently, the more hindsight that is applied to your methodology, the greater the opportunity for challenge on the grounds of bias or unreliability. If you do not have an as-planned programme in sufficient detail, think twice about developing a very complex plan.

From the methodological perspective, therefore, one should try and limit the modifications to contemporaneous documents.

3. As-built programme

Given that the as-planned programme is used as a baseline for measuring variance, the as-built programme is used to establish what actually transpired and from this, one establishes the delta between the plan and the actual. The investigation continues with an exploration of the causes of the delta. Hence, the agreement of as-built records is an important task as it can remove a great deal of the factual debate regarding extensions of time. The as-built programme can be derived from several sources. The most common are progress records, where the Contractor or the Engineer, or both, assess the production achieved each month by reference to the programme of work. The assessment is usually based on a percentage of the work complete. An alternative source is the monthly valuation of the work completed, which ought to correlate with the progress records but does not always. The progress and valuation as-built records can be supplemented by other records such as subcontractor information, photographs, correspondence, diary records etc.

The difficulties in establishing asbuilt records include the use of inaccurate data. For example, a Contractor may overstate the amount of work complete or the QS may understate the amount earned. There is a general tendency for the early progress to be over optimistic and the completion of the final '10%' of an activity to take considerably longer than its straight-line prediction. However, there should be less debate about the as-built situation than the as-planned programme.

4. Critical Path Analysis

Critical path analysis is a mathematical and logic tool that can be used to predict how long it will take to complete a series of activities. Many project management software packages use the technique to allow a planning model of a project to be developed which is then used as a management tool during project execution. A Contractor's programme created using critical path analysis allows the parties to identify which parts of the project, or which activities, are critical and those which are non-critical. A critical aspect of the project is one where the timescale is recognised as being 'tight' and that any problems or delays to tasks in that aspect of the works may likely delay the overall project. A noncritical aspect of the project, on the other hand, is one where there is plenty of time available to carry out the various tasks (there is 'float') and that any delay to these is unlikely to effect the project-end date.

What is a critical and what is a non-critical aspect of the project is ultimately derived from the project management software but in reality, it is the input that dictates the output. By this I mean that the person preparing the programme defines the criticality of the elements of the project, not the software. For example, the structure of the programme, the activity durations and the logic links between activities is defined by the programmer and the software programme uses this information to establish criticality.Change the structure, durations and links and the software programme will change the criticality.

Criticality can also be dependant upon organisation structure and resources. A plan to utilise one earthwork subcontractor and three tower cranes is likely to have a different critical path than a plan to utilise three

earthwork subcontractors and five tower cranes.

Criticality will change as the project develops. This is because the assumptions made in the original plan may not reflect what actually arose or because the programmer changes the assumptions in the ongoing plan, based upon latest knowledge and revised actions or methods of working by the Contractor or Engineer. Hence, when undertaking retrospective extension of time analysis, one should not hold on to a single critical path programme for the project because this was never the case in practice.

From the methodological point of view, what is important to recognise is that critical path analysis involves a great deal of underlying assumptions which are not factual but are preferences and so subject to a range of opinion. Consequently, different analysts can produce wideranging results using the same factual data because they hold different views regarding methods of working, sequences of building and resources for construction; all reasonable but each leading to different critical paths.

The more the number of activities in a programme, the greater will be the number of logic links between them and so greater will be the number of assumptions involved in completing the model. Hence, it is possible that when carrying out retrospective delay analysis using critical path analysis, large programmes with hundreds and thousands of activities will produce unreliable results. This is because the analyst has made hundreds of assumptions with respect to preparing the programme and when considering the impact of an event, he or she makes a single adjustment, whereas in practice, a programmer would likely make many adjustments to a programme if faced with a potential delay. This is project management.

Finally, it is important to recognise that it is easy to manipulate a critical path programme in order to derive the required end result. For example, if a programmer wishes to make a certain section of the work critical, he achieves this by fixing durations of activities or logic links between activities. Equally, if there has been variations issued in one part of the works, it is possible to make this element of the programme critical, so that the introduction of the variations will have a delaying effect on the overall project. This is another reason why it is worth considering reducing the number of activities on very large programmes used in retrospective delay analysis.

5. Other Issues

In carrying out planning exercises to assess delay, it is sometimes necessary to deal with a number of other issues. These include ownership of programme float, concurrency of delay events and dominance theory.

6. Concurrency

The SCL Protocol defines concurrency in the following way (Appendix A, page 53):

True concurrent delay is the occurrence of two or more delay events at the same time, one an Employer Risk Event, the other a Contractor Risk Event and the effects of which are felt at the same time. The term ‘concurrent delay’ is often used to describe the situation where two or more delay events arise at different times, but the effects of them are felt (in whole or in part) at the same time. To avoid confusion, this is more correctly termed the ‘concurrent effect’ of sequential delay events.

Essentially, concurrency seeks to consider the situation where both the Employer and the Contractor are causing delay and the question is, does the Contractor get an extension of time? The proposition in the SCL Protocol is that the contractor does get the extension of time but he is only entitled to any extra costs

(damages or loss and expense) incurred as a specific consequence of the employer-caused delay. This basically means that if the Contractor is able to identify extra costs at the activity or event level, he recovers these but not the general running costs of the project (refer to paragraph 1.10.4 of Guidance Section 1). On the other hand, the Employer foregoes recovery of liquidated damages.

Examples of the SCL Protocol's position on concurrency are set out in its Appendix D but there are a number of very important issues to consider:

The Protocol is possibly at odds with English Law, which it recognises at paragraph 1.4.11 of Guidance Section 1. The alternative position on concurrency is that the most 'dominant' delay event (which might be considered the longest or most critical) decides liability and entitlement. Hence, to follow the Protocol could be to ignore the law (that is, unless the parties have signed-up to the Protocol).
It is argued that concurrency only occurs where two events are actually delaying the progress and completion of the project. For example, if a Contractor is digging out a basement on Monday but his plant breaks down and production stops, it is said that he cannot claim there was a concurrent delay on Monday because he still had not received the next set of drawings which would allow him to progress with the next stage of the basement. Only when the contractor had finished the digging of the basement and was ready to commence the next stage, would the works be delayed by outstanding drawings. Essentially, it is said that any event must be delaying or impeding current progress for it to be considered a 'delay event'; when there are two or more of these events occurring at the same time, then there is concurrency.
If the project is in delay for which there is no entitlement of extension of time and an Employer causes a further delay after the contractual date for completion by issuing a late variation or changed requirement, it is said that the Contractor's entitlement is assessed on the 'net' method not the 'gross' method. By this, I mean that the extension of time is calculated by reference to the period of time needed to deal with the Employer-caused event, and this period is added on to the contract completion date; one does not consider the timing of the event and measure delay from that date.

7. Ownership of programme float

I mentioned earlier that there are critical and non-critical parts of a programme. Delays to critical parts cause the project's end date to overrun whereas delays to noncritical parts will only cause the project's end date to overrun when the entire available float on that part has been used up. A common question in delay analysis is, if an Employer causes delay and uses up the float, is a Contractor entitled to be compensated for the loss of it?

If the project owns the float, then the party using it first has the benefit. If the Contractor owns the float and the Employer uses it, the Contractor ought to be compensated, either by the return of the float or by payment of extra cost.

8. Dominance Theory

I have mentioned that where there are two or more events causing delay to the project at the same time, this is termed concurrency. Where there are concurrent Employer-caused and Contractor-caused delays, there is a legal argument which says that the delay is allocated to the more dominant of the concurrent events. Hence, if the dominant event is found to be an Employer risk event, then a Contractor is awarded an extension of time for the delay. However, if the dominant event is a Contractor risk event, no extension is allowed.

All these issues need to be considered against the facts of the case, the terms of the contract and the laws governing the contract.