



## Book Status

Roger Gibson's book, 'Construction Delays: Extension of Time Submissions and Prolongation Claims' is in the publication phase, with a publication date of 1 January 2008. The publishers are Taylor and Francis and the book, priced at £75, can be pre-ordered online from the publishers or through other major book retailers such as Amazon or Waterstones.

The book will be useful for construction professionals dealing with extensions of time and time-related loss and expense claims, and for lawyers and others who are involved in the contentious side of the construction and engineering industries.

For a synopsis and list of contents of the book, [click here](#).

## Guidance From The Court On Delay Analysis.

In the recent *Mirant Asia-Pacific (Construction) (Hong Kong Ltd v Ove Arup & Partners* case in the Technology & Construction Court, Judge Toulmin made some key observations in his Judgment that are important in respect of 'Delay Analysis'.

The project was the construction of a coal fired power plant at Sual on Luzon Island in the Philippines. The construction of the plant was carried out by a consortium of several companies and the client was the Philippines government power company. One of the consortium companies changed its name to Mirant Asia-Pacific Construction, and this company awarded a contract to Ove Arup for the design of the foundation slab for the power station's boilers. In the event, in April 1997, two of the main foundations of the boiler house, designed by Arup, dropped. Remedial works had to be carried out which impacted on the erection of the steelwork support for the boilers which had already commenced.

The action was commenced by Mirant against Arup in 2002. After a second hearing in 2004, Judge Toulmin decided that Ove Arup had been negligent in the design and was liable for the consequential damages of that negligence. The matter was taken to the Court of Appeal where the judgment was upheld.



## Guidance From The Court On Delay Analysis.(Cont'd)

### The Critical Path

In his latest judgment, issued in April 2007, Judge Toulmin indicated that it was necessary to investigate and establish as to whether the remedial work to the boiler foundations were on the critical path for completion of the project..

Judge Toulmin made the following observations and statements on 'the critical path'.

"As computers have become more sophisticated, the critical path analysis has been enabled to become more sophisticated. This has become an invaluable tool which enables a complex construction Project to be managed with better available information. The analysis will identify at a given date which important aspects of the Project are falling behind the programme, particularly if they are on or close to the critical path, what if any is the impact on other aspects of the programme and where additional resources need to be placed. It is also used as a tool for analysing, as at the given date, what has caused any delay that has occurred and what is the extent of that delay."

### Delay Analysis

Judge Toulmin made the following observations on 'Delay Analysis'.

"There may be more than one critical path.

It is important to look at activities at or near the critical path to understand their potential impact on the Project.

Windows analysis, reviewing the course of a Project month by month, provides an excellent form of analysis to inform those controlling the Project what action they need to take to prevent delay to the Project.

Without such analysis those controlling the Project may think they know what activities are on the critical path but it may well appear after a critical path analysis that they were mistaken.

A less reliable form of critical path analysis is the watershed analysis. This analyses the Project in terms of a few key events. It may be a sufficient check in the course of a Project to analyse what changes, if any, may need to be made in the Project at the time of a benchmark event.

Both windows analysis and watershed analysis are used frequently to analyse delays at the end of a Project. A watershed analysis will be less reliable particularly if the gaps between the watersheds are lengthy. It does not show the pattern of events between the watersheds. This may be very important where a number of activities are at or near the critical path. What the watershed analysis provides is a snapshot at the particular time when it is carried out.

Float in a programming sense means the length of time between when an activity is due to start and when it must start if it is to avoid being on the critical path. Float can also be used to refer to the additional time needed/allowed to complete an activity over and above the shortest time that is reasonably required.



## Guidance From The Court On Delay Analysis.(Cont'd)

It is, of course, obvious that the analysis is only valid if it is comprehensive and takes account of all activities.

I add the proposition that if a retrospective delay analysis is being conducted on a Project, the analysis must include the time to the end of the Project, otherwise activities may occur which will take them on to the (or a) critical path after the date of the final window or watershed."

HHJ Toulmin had some observations on the 'Windows' method of Delay Analysis; by stating,

"Windows analysis is the most accepted method of critical path analysis. As Pickavance (referring to the book 'Delay and Disruption in Construction Contracts', by Keith Pickavance), makes clear at page 572 of his book, "Windows" (and "Watersheds") are not methods of analysis in themselves; they are merely aspects of conducting the critical path analysis. In essence they represent the division of the overall construction period into smaller periods into which each new set of corresponding progress can be entered into the programme and analysed.

The term "Windows analysis" refers to the regular reviews and updates undertaken by the contractor, normally monthly. These periods of time would be described as monthly windows. Unlike previous monthly reviews, the planner would use sophisticated software programmes to plot which activity or activities were on and which were near to the critical path each month. The programmes would take into account those activities which had started early or had been delayed. Also built into the programmes would be the progress of those activities which had started since the previous monthly window. This would enable the employer and the contractor to analyse over the relatively short periods of time what changes had occurred, and identify what problems needed to be investigated and put right.

The analysis would also identify delay, enabling those concerned to investigate and, if appropriate, agree the cause at an early stage. A monthly review would, in a complex Project like Sual, have enabled the consortium to see what activities were at or close to the critical path and to take urgent action where necessary. It would also have enabled a much more sophisticated retrospective analysis of the delay to be undertaken than that which was able to be carried out.

So, what lessons in respect of 'Delay Analysis' do we learn from the *Mirant v Arup* judgment? Judge Toulmin gave some good advice and useful guidance which can be summarised into the following five items.

1. "The analysis will identify at a given date which important aspects of the Project are falling behind the programme, particularly if they are on or close to the critical path, what if any is the impact on other aspects of the programme. It is also used as a tool for analysing, as at the given date, what has caused any delay that has occurred and what is the extent of that delay."



## Guidance From The Court On Delay Analysis.(Cont'd)

This is the nub of a good and reliable 'Delay Analysis'.

2. "There may be more than one critical path."

An important observation that is often not appreciated by those reviewing a 'Delay Analysis'.

3. "It is important to look at activities at or near the critical path to understand their potential impact on the Project."

This is a good point which should be followed by anyone carrying out a 'Delay Analysis'.

4. "If a retrospective delay analysis is being conducted on a Project, the analysis must include the time to the end of the Project, otherwise activities may occur which will take them on to the (or a) critical path after the date of the final window".

Again, sensible advice that is sometimes overlooked in a 'Delay Analysis'.

Article By Roger Gibson

## Planning Tips, Progress Records and Reporting.

In the previous article in this series, I reviewed the submittal and acceptance phase of a programme. In this article, I review progress records and reporting.

If one looks at the health of the project and compares it to health of a vehicle, the comparisons are striking. People who ignore routine maintenance of a vehicle typically experience premature breakdowns and exorbitant repair costs that could be traced directly back to the lack of maintenance. If a contractor ignores routine maintenance of a project by taking the easy approach of updating schedules, the outcome is very likely to be an expensive "repair" in the form of a claims battle and often a claims loss, or even missed opportunities.

Most construction professionals do not enjoy reporting progress. This task rivals the other bane of keeping minutes of meetings. The fact that the progress reporting duty is taken on not with relish, but usually because no-one else will touch it with a barge pole, is evident in the tosh that often passes for the monthly Client Progress Report.

These reports contain more than just progress, of course. There are the usual sections in there – safety, risk, commercial, etc – but this chapter concerns the programme/progress section. Quite often the programme and or progress sections fall into one of two approaches;

- The 'I'm going to prove to everyone, especially my boss, how clever I am, with lots of technical jargon and long words' approach,



## Planning Tips, Progress Records and Reporting.(Cont'd)

- The 'lets take last month's report and just change the figures' approach.

The first approach will be almost impenetrable and unfathomable to anyone reading it, including the boss. The second approach is plain boring and is effectively saying to the client that you can't be bothered and the monthly report is unimportant.

On most projects, the client is looking for simplicity in the monthly report, and he is primarily interested in one key thing; when will the project be complete. The information in the programme/progress section of the report to the client should be easy to understand and well annotated/explained.

The format of progress reporting should be agreed with the client at the onset of the project. The programme, which will normally be maintained as a critical path network in proprietary planning software, should be capable of being summarised to level 1 bar chart format.

The most readily understood graphic is that of the 'staggered-line'. Graphics of the original baseline programme and the current revised or working programme should have a vertical line showing the progress cut-off date. Progress may be indicated either by colouring along the bar or by the vertical line diverting to the actual progress position for each bar. This is a very simplistic 'Progress Indicator' chart.

Unfortunately, we tend to leave the client to interpret the chart for himself, and often he will not have the information to do this meaningfully and may easily jump to the wrong conclusion. Therefore, both the chart and the accompanying narrative should contain an explanation of why activities are shown in delay, what the implications are for completion of the project, and how you intend to redress the situation and by when.

The simple 'Progress Indicator' chart and an accompanying narrative may be enough for many projects, but each project is unique and there will be many where auxiliary methods are necessary, or even required under the contract. Details of three such methods are given below.

The first of these is the 'Planned Progress' chart. This addresses the volume of work, and simply measures the volume of progress in terms of activity weeks, giving no allowance for weighting of activities. Planned progress can be shown in terms of a cumulative S-curve of activity weeks achieved if the early dates are met. Another curve can be generated from the late dates. When plotted on the same chart, the area between the curves represents the zone within which the actual achievement line should lie.

Figures are calculated after each progress update and the actual line plotted. The closer this line is to the early (left hand) line, then the more comfortable all parties should feel. A drift towards the late (right hand) line means that float is being used up and more activities are becoming critical.



## Planning Tips, Progress Records and Reporting.(Cont'd)

Even though there is no weighting factor, the fact that every programme activity is taken into account means that the law of averages comes into play, and the outcome is virtually identical to one where complex weightings based on earned value or work content have been laboriously applied.

A second method is the 'Progress Tracking' chart. This is a simple but effective way of showing progress in terms of quantity or value or work done at any point. It is basically two charts in one. The x-axis is a common time scale. The left hand y-axis shows unit per time unit (week or month) shown in histogram form; whereas the right hand side relates to the cumulative figure and is shown as a simple line. The actual performance is input on a regular basis and compared to the plan.

Because this method relies on the work being measured in the same units throughout, this approach is well suited for package works or individual operations or trades. It would usually be introduced to show close control of a particular critical or near-critical activity. As the planned figures are likely to be based on early dates, it is important to stress that the plan is target-based and that moderate slippage does not necessarily mean that the programme has been compromised.

The third method is a 'Line of Balance' chart. This approach comprises a series of cumulative line graphs set against a common time scale. This approach is somewhat specialist in nature and is ideal for situations of repetition, such as housing and high-rise.

The angle of each line represents the rate of output, and the gap between the lines shows the working float between operations or trades. In a situation where the lines represent recorded progress on site, it is easy to see who is delaying whom. This method also allows simple 'what-if' scenarios to be explored.

A further method of recording progress which should be encouraged is colouring in drawings as work proceeds. However, the colouring in of drawings is not particularly useful in comparing progress to a plan. But it is an accessible way of showing how the site is proceeding and should not be dismissed on the grounds of crudity. Often it is exactly what is needed to convey a sense of momentum; and this method of recording progress is particularly useful in a claim situation.

However, for progress reports, this method should only cover one or two activities at a time, and one should avoid confusing the message through overkill. Types of activities that are particularly suited to this method include piling, pipe caps, slabs, roof coverings and ceilings.

To summarise, simplicity is the watchword. Firstly, the contractor should state when the project is forecast to be complete. Secondly, give the client a programme with a staggered line and explain the main features; including what is to be done to recoup lost time. Finally use any of the auxiliary methods, as appropriate, to focus on critical areas or to get key points over.



## Planning Tips, Progress Records and Reporting.(Cont'd)

Progress reporting should not be a complicated process. Clients do not scrutinise boring or complicated documents to find the hidden message. It is in everyone's interest to present information in as simple a format as possible. The client will never complain of condescension if the message is clear, and if he wants something a little more sophisticated, he will ask for it.

### **Contact Us**

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