White Paper –

Understanding Project S-Curves

Ever increasing pressure on businesses to deliver projects on time and to budget means that accurate monitoring of progress, resources and costs are even more important than ever before.

Creating a schedule of activities and a critical path using Project Management software tells us when our project will finish. Adding progress and actuals and then rescheduling the remaining work will give us a revised completion date.

However, it can be very difficult to visualise how the project is performing and as importantly, how likely to perform from a Gantt chart, particularly when the schedule contains hundreds or thousands of activities.

Andrew Willard. Director

Willmer Limited

Creating S-Curves from the project data can give us much more information about our project depending on the shape of the curves. Often a client or sponsor will ask for an S-Curve as part of the regular progress report, it is recommended that they are used alongside traditional project management software to improve project performance and monitoring.

Creating S-Curves can seem a daunting task, especially as they are not a standard feature of most project management software applications. Project Tracker provides a one click method of importing data from Primavera P6, Microsoft Project or Asta Powerproject.

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Understanding the different types of curve

An S-Curve report can be made up of a number of different curves.

Actual Line

This line displays the actual progress to date and dependant on the measure used, will show duration, cost or resource units completed. The actual curve is always drawn to the report or data date.

From the example we can see the project is currently 23% complete.
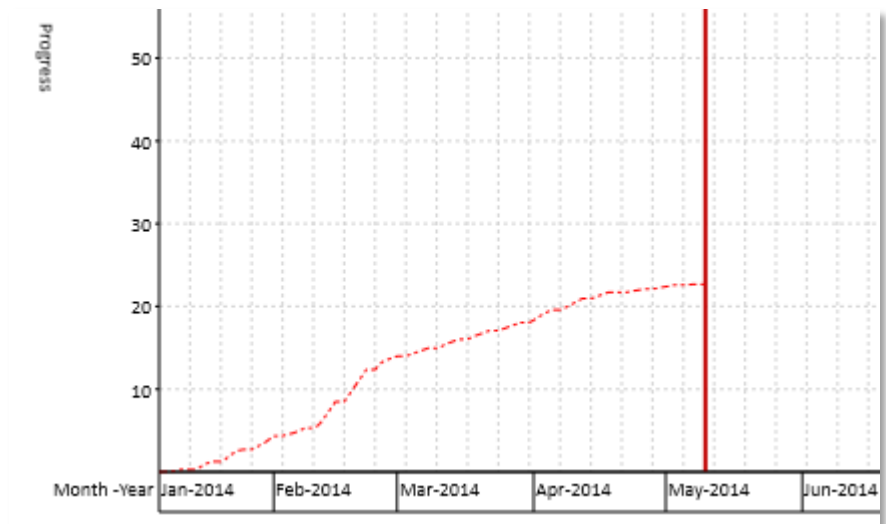
Target Line

The target line always runs from the report date to the end of the project and reflects the current position of the remaining activities should they be completed as scheduled.
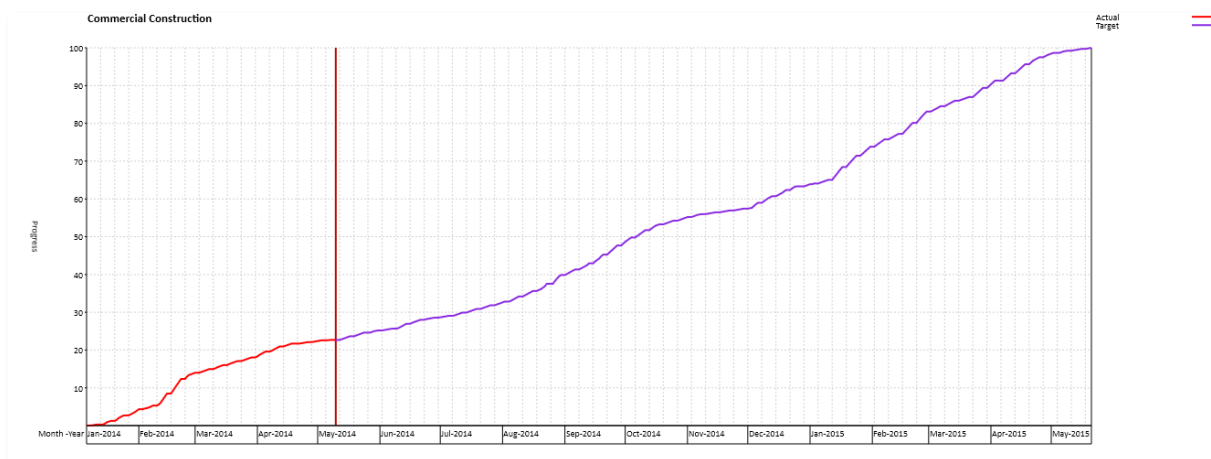
Early and Late Target Lines

Two additional target lines are useful that display the scheduled position of activities, both in their earliest finish and latest finish date position. Again, these are drawn from the report date and will meet the normal target line.
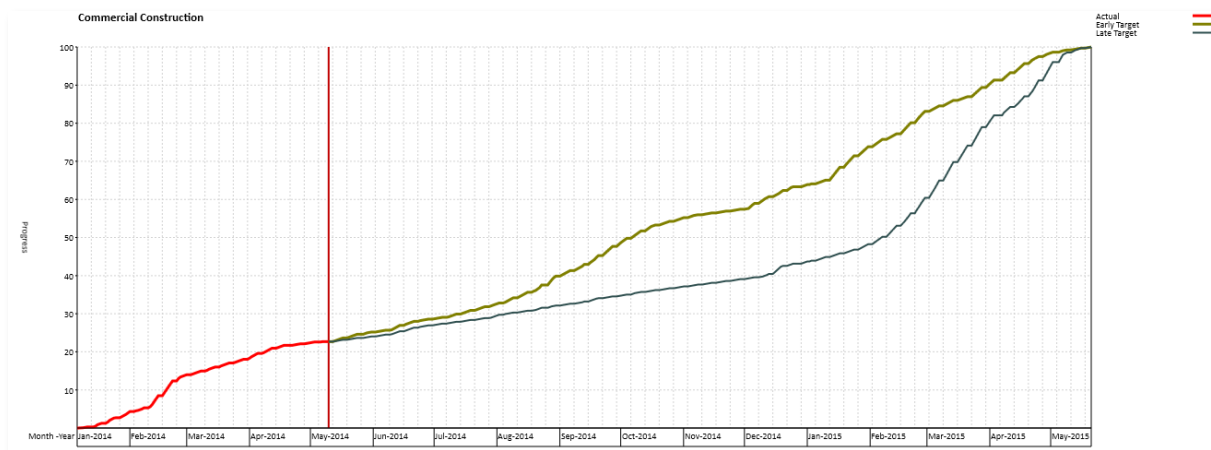

Baseline Line

This line plots the position of the activities contained in the baseline. An on-schedule plan will mean the baseline curve finishes at the same point as the target line.
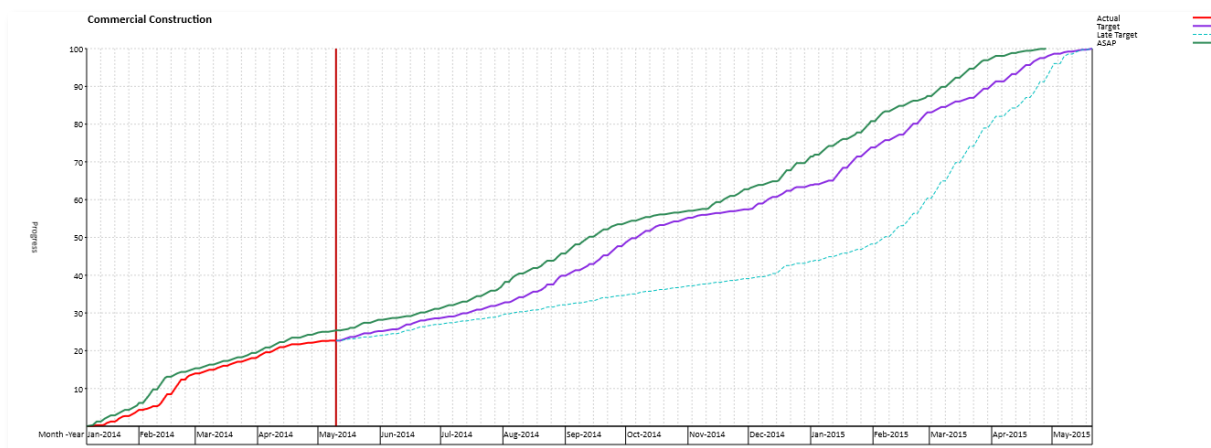
What can an S-Curve tell you about your project?

Projects generally start slowly and then accelerate in the middle before slowing down again at the end. This produces a curve which resembles an S, flatter at the start and then rising quickly before flattening out at the end.
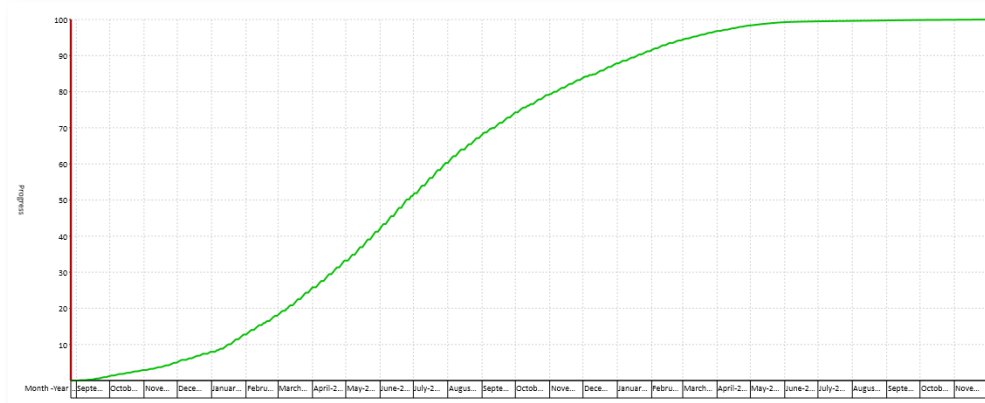

The curve below highlights that the majority of the work in the project is front loaded and indicates the need for increased resources at the start. Scheduling more activities towards the start of the project than can be reasonably accomplished in the time available, will result in less activities planned in the far term. Front loaded schedules usually result in front loaded budgets, assuming the resources are aligned with the activities.

This results in good performance results, which are favourable for a period of time and then deteriorate with time until the true performance becomes evident later in the project.
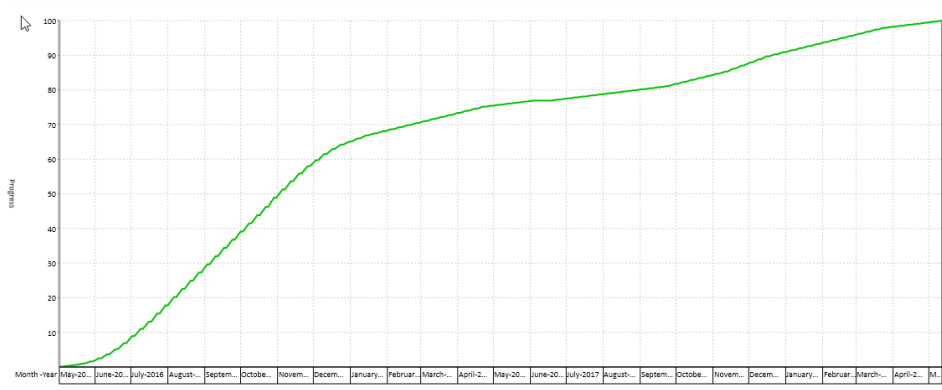
The curve shown below indicates a back loaded schedule. This may have implications for an on target successful completion of the project as the bulk of the work happens at the end and any delays may be difficult to make up given the lack of time to completion.
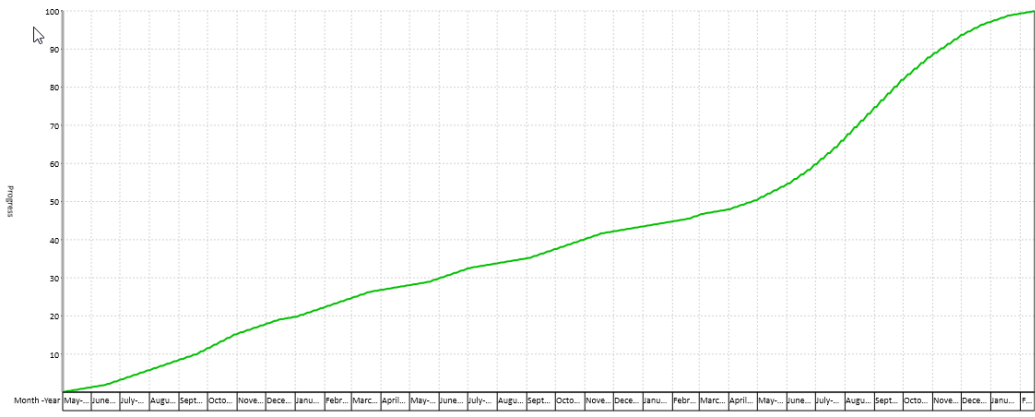

Assessing project performance based on the S Curve

As the project is progressed we begin to see trends and future predictions as to the likely finish date.

The following examples show the types of S Curve that might be seen in the lifetime of the project.

The report below shows that the project is behind schedule as the actual and target lines lie below the baseline curve. The fact that the target line extends beyond the baseline shows the project will finish late.
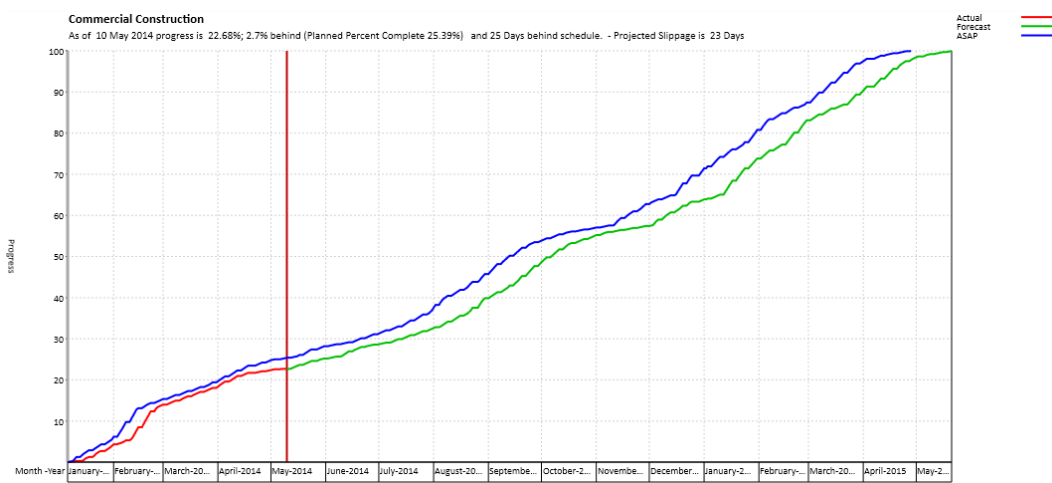
The project in this instance is ahead of programme at the data date as the red actual line is above the baseline and is forecast to continue.
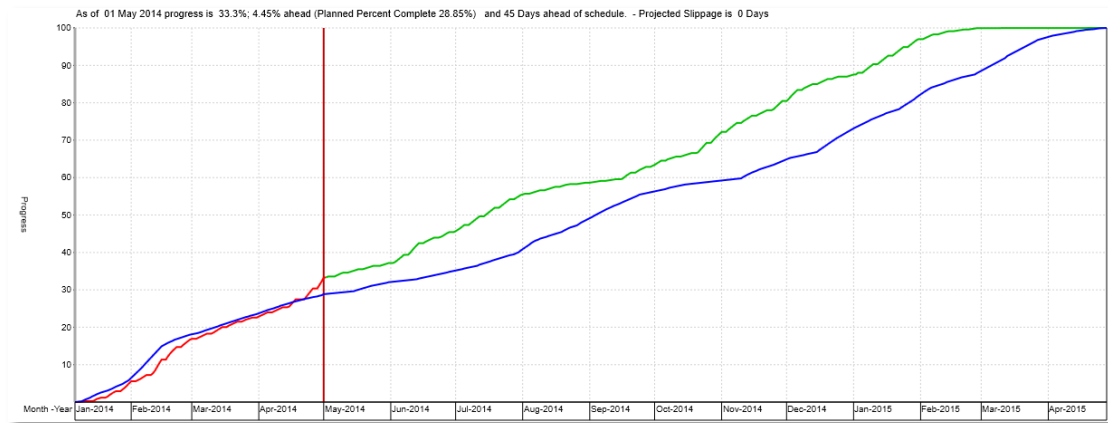
The curve below shows the addition of a late curve, with the remaining activities in their latest finish positions (orange). Although the project is behind schedule as the actual line is below the baseline we can see that the green target line runs between the envelope of the baseline and the late line which can indicate that although progress is not on target it may be within acceptable limits.
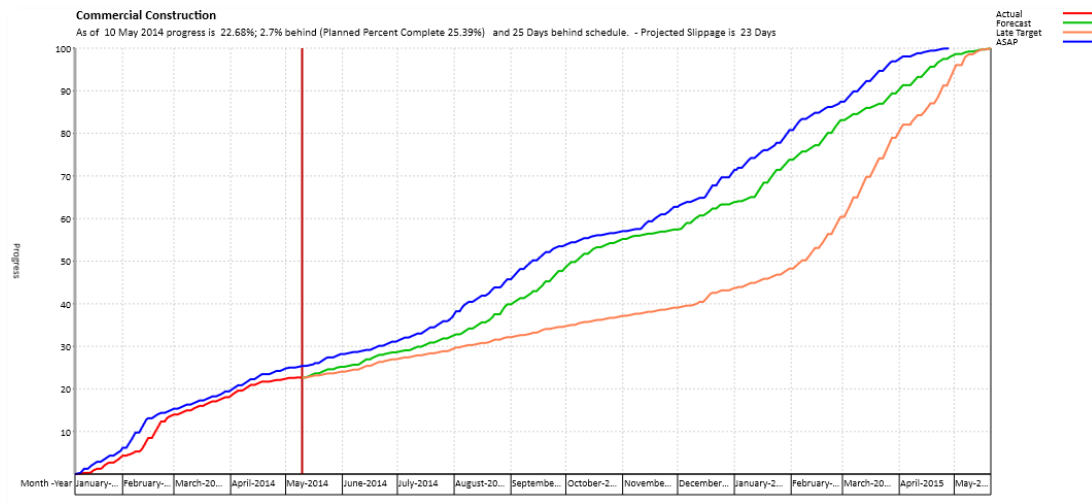
# Drill down to look at the detail

S Curves can be also used to determine the performance of specific resources or sections of the programme and their impact on the overall progress.

In the example below the project is behind programme.
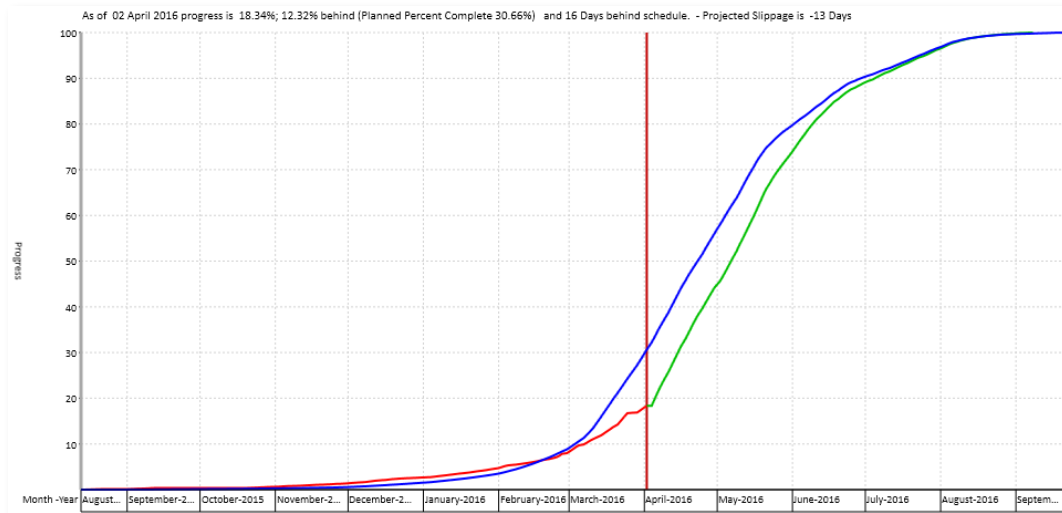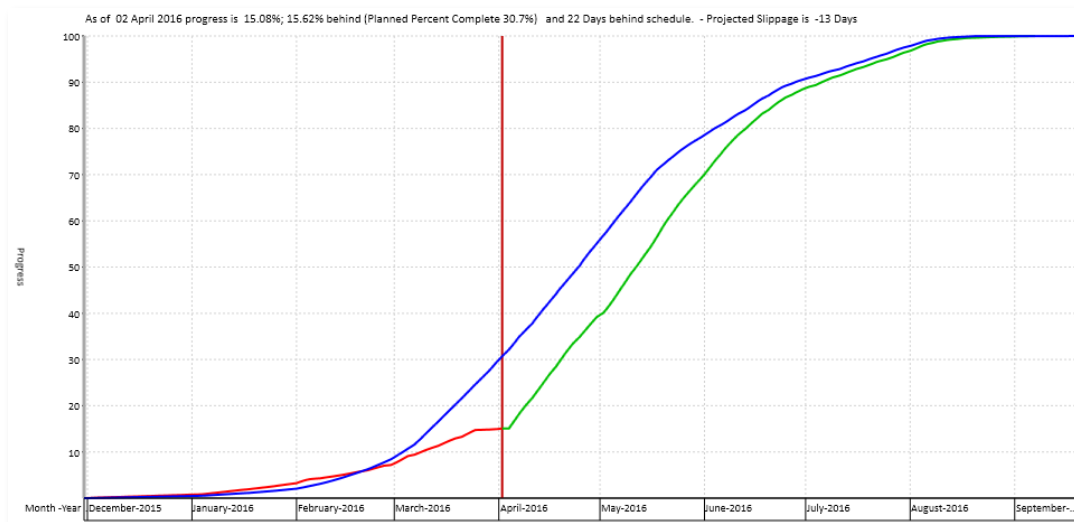

By analysing the performance of one element or resource in the programme we can see that it started well above expectations and is now generally on schedule.
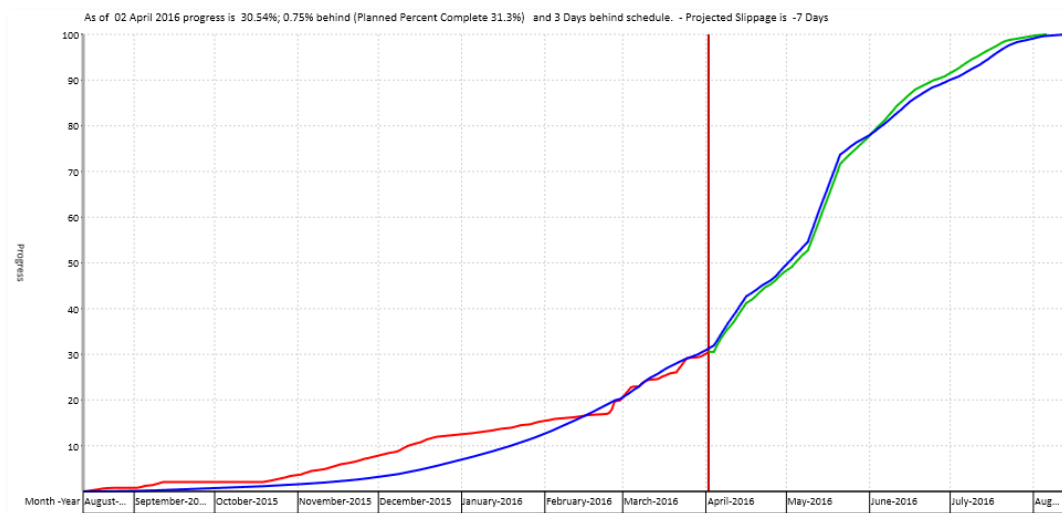
However, looking at another section or resource we can see performance is significantly behind and is impacting the schedule.

As of 02 April 2016 progress is 15.08%; 15.62% behind (Planned Percent Complete 30.7%) and 22 Days behind schedule. - Projected Slippage is -13 Days

This detailed analysis allows us to understand better which parts of the programme are performing well or poorly, which in turn allows us to make more informed decisions in managing the project.

Summary

An S-Curve allows the status of a project to be monitored graphically as it progresses, and displays an historical record of actuals to date. By analysing the S-Curves, project managers can quickly identify project growth, slippage, and potential issues that may impact the successful outcome of the project should nothing be done.

For more information on this white paper, Project Tracker or Willmer Limited, visit www.willmer.co.uk

The Author

Andrew Willard has spent 20 years in project management and scheduling across industries such as construction, oil and gas, engineering, manufacturing, pharmaceuticals and IT.

Clients included Lockheed Martin (US), Unocal (US), Taylor Wimpey (UK), Mace (UK), Balfour Beatty (UK), Hansen Yuncken (Aus), Abigroup (Aus) and Christchurch Rebuild (NZ).

He has used this experience to identify a need for project reporting and developed Project Tracker.

Project Tracker

Project Tracker is a Windows based application that imports project information from Primavera P6, Microsoft Project and Asta Powerproject* to create S-Curves which are used to analyze the progress of the project.

Most project management software does not provide in built S-Curve capability; therefore users must export data to spreadsheet software such as Microsoft Excel to plot the curves.

This method requires a number of steps and a certain level of knowledge including how to add resources or costs to the plan, how to create time phased exports from the PM tool, how to open the data in the spreadsheet and how to create graphs from the data. Project Tracker eliminates all of these steps.

Aside from the number of steps required to export data from PM software to a spreadsheet; this method can be acceptable as a reporting medium but the problem with this method is that the analytical possibilities are not available as the data is now disconnected from the actual plan.

Therefore rather than just importing the data required to plot a curve, Project Tracker imports the activity data and is able to optionally plot a Gantt Chart under the S-Curve allowing the Project Manager to assess which activities may be causing issues and what action can be taken.

One of the key benefits of Project Tracker is that it will create an S-Curve using the durations of activities. To produce S-Curves using the spreadsheet method it has been necessary to add resources and/or costs to all the activities in a project.

Project Tracker will of course plot resource and cost curves but the ability to use duration data is unique.

Willmer Limited

Willmer Limited is a UK based company that offers planning and training services for any company involved in projects. The founders have many years' experience of implementing, training and delivering planning and scheduling services to the construction, rail and engineering industries. Additionally we have worked with Finance, IT and Pharmaceutical companies. The founders both worked at senior level for one of the leading project management software companies in professional services.

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