

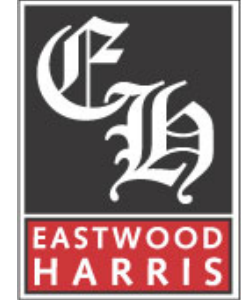
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Melbourne Cricket Ground, Melbourne

Understanding the Techniques to
Update a Schedule

About the Speaker

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- ❑ Paul Eastwood Harris holds an Honours Degree in Civil Engineering obtained in the UK and is a Certified Cost Engineer through AACE International, a certified PRINCE2™ practitioner.
- ❑ He has worked in the project controls industry for a number of years and has assisted many companies in a range of industries to set up and run project controls systems.
- ❑ Primaskills Pty Ltd, his Melbourne, Australia based company offer project controls consulting and training services to the project management industry with a strong focus on Microsoft Project, Primavera P6 and Asta Powerproject.
- ❑ He has written and published over 50 books/training manuals on SureTrak, Primavera P3, Oracle Primavera P6, Microsoft Project and Asta Powerproject which are published by his publishing company, Eastwood Harris Pty Ltd. They are available through most online books sellers, are supported by instructor PowerPoint slide shows and used by over a hundred companies around the world.

Introduction

- ❑ In the Western World the building and construction industries are dominated firstly by Microsoft Project, then by Oracle Primavera P6. Asta Powerproject is well represented in Europe and gaining acceptance outside Europe.
- ❑ A properly updated schedule is critical to the effective management of a project.
- ❑ There are three techniques that are used to update a project schedule which the author has named:
 - Un-impacted
 - Impacted with Actuals
 - Impacted Live.

The three techniques to update a schedule

- ❑ **Un-impacted.** With this technique only the percentage complete is assigned to activities to denote progress, and no activity dates (start or finish) are assigned or changed during the update process. This technique provides the status of each activity but does not generate a revised end date for the project.
- ❑ **Impacted with Actuals.** With this technique actual dates are assigned in the past to complete activities and to the completed portions of in-progress activities. Unstarted activities and incomplete portions of in-progress activities are scheduled into the future. New activities reflecting scope changes can be added as appropriate and the project is scheduled to generate a revised end date. This technique conforms to AACE International recommended practices for statusing and updating a schedule.
- ❑ **Impacted Live.** With this technique, completed activities are manipulated so that they are scheduled when they actually occurred. The following software inbuilt fields are not used: **% Complete**; **Actual Duration**; **Actual Start**; and **Actual Finish**. In-progress activities are adjusted so they start when they actually started and will finish when they are planned to finish, while un-started activities are scheduled into the future with scope changes added as necessary.

Aim

- The aim of this presentation is to outline:
 - The three techniques that are used to update a schedule,
 - The advantages and disadvantages of each technique, and
 - How Microsoft Project, Oracle Primavera P6 and Asta Powerproject support each of these techniques.

Outline of the Three Techniques to Update a Schedule

Un-impacted

Impacted with Actuals

Impacted Live

Outline of Un-Impacted

□ When updating the schedule:

Activity Name	Duration	Orig Dur % Comp	01-Apr					08-Apr					15-Apr					22-Apr					29-Apr					06-May					13-May				
			S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
A	10d	90%	[Yellow bar from 01-Apr to 08-Apr]										[Red bar from 08-Apr to 15-Apr]																								
B	10d	30%											[Yellow bar from 15-Apr to 22-Apr]	[Red bar from 22-Apr to 29-Apr]																							
C	10d	10%																					[Yellow bar from 29-Apr to 06-May]	[Red bar from 06-May to 13-May]													

- A baseline is not set,
- The data date is displayed on the Gantt Chart,
- An activity % is assigned to tasks,
- No dates are changed,
- Progress may be displayed on the tasks.

Outline of Un-Impacted

□ Observing the picture below shows:

Activity Name	Duration	Orig Dur % Comp	01-Apr					08-Apr					15-Apr					22-Apr					29-Apr					06-May					13-May				
			S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
A	10d	90%	Yellow										Red																								
B	10d	30%											Yellow	Red																							
C	10d	10%																					Yellow	Red													

- Activity A has incomplete work in the past,
- Activity B is behind time with incomplete work in the past, and
- Activity C has work that is complete in the future.

□ The schedule may not be used:

- To manage the project, or
- For delay analysis.

Out of sequence progress

- ❑ Out of sequence progress occurs when a successor activity starts before the driving predecessor activity with a Finish to Start relationship has finished.
- ❑ Most software has options to decide how the incomplete portion of a successor activity is calculated when it has commenced before the predecessor is complete.
- ❑ The functions have different names and operate differently in each software.

Advantages and Disadvantages of Each Technique

Un-impacted

Impacted with Actuals

Impacted Live

Advantages Un-Impacted

- ❑ The advantages of the Un-impacted technique are:
 - It is simple with Microsoft Project and little training is required to use this technique when the software supports this technique,
 - This technique allows the observation of the progress of activities against the plan,
 - Clearly identifies which work is ahead of plan and which is behind plan, and
 - It hides slippage from the client/customer.

Disadvantages Un-Impacted

- ❑ The disadvantages of updating a schedule with this technique are:
 - Incomplete work may be scheduled in the past and completed work may be scheduled in the future, further affecting other related incomplete work,
 - It cannot effectively be used to manage work when the project is not running according to schedule,
 - It does not generate a revised completion date based on the current status and performance to date,
 - It may not be easily used for a time impact analysis or other evaluation of schedule changes because the actual dates and actual durations will be incorrect.

Advantages of Impacted with Actuals

- ❑ The advantages of the Impacted with Actuals technique are:
 - It conforms to AACE International recommended practices,
 - It uses the software in the way it is designed to be used,
 - It is the process that may be used to manage a project because all uncompleted work is scheduled in the future,
 - It generates a revised projected finish date for the project,
 - It may be used for extension of time and delay analysis, and
 - This technique of updating a schedule supports Windows Analysis, Half Step, and other forensic techniques for analyzing project delays.

Disadvantages of Impacted with Actuals

- ❑ The disadvantages of this technique are:
 - The As-Built critical path for completed activities cannot easily be generated,
 - The total float and critical path are no longer calculated for completed work after an **Actual Finish date** is applied to an activity, and
 - Thus the impact of delays to the critical path may not be clearly visible.

Advantages of Impacted Live

- ❑ The advantages of the Impacted Live technique are:
 - It may be used to manage a project during the construction/updating phase as all incomplete work is scheduled in the future,
 - It generates a revised finish date for the project,
 - The Critical Path is displayed for both completed and incomplete work,
 - Changes to the As-Built Critical Path from the Baseline Critical Path are easily observed, and
- ❑ This technique allows both client and contractor delays to be removed from the As-Built schedule, and the whole schedule will recalculate for delay and acceleration analysis,
- ❑ This is similar to using a Collapsed As-Built forensic schedule evaluation technique.

Disadvantages of Impacted Live

- ❑ The disadvantages of this technique are:
 - This technique is not accepted in many contracts,
 - It goes against the CPM calculation process that most software is designed to use, creating the following issues:
 - The software data date function is not used as designed,
 - Resources may not have the Actual and Remaining Units and Costs assigned,
 - The inbuilt software Actual Start, Actual Finish, Actual Duration and % Complete fields are not utilized,
 - Out of sequence progress functions may not be used,
 - A higher level of user skill is required.

How Software Packages Handle Each Technique

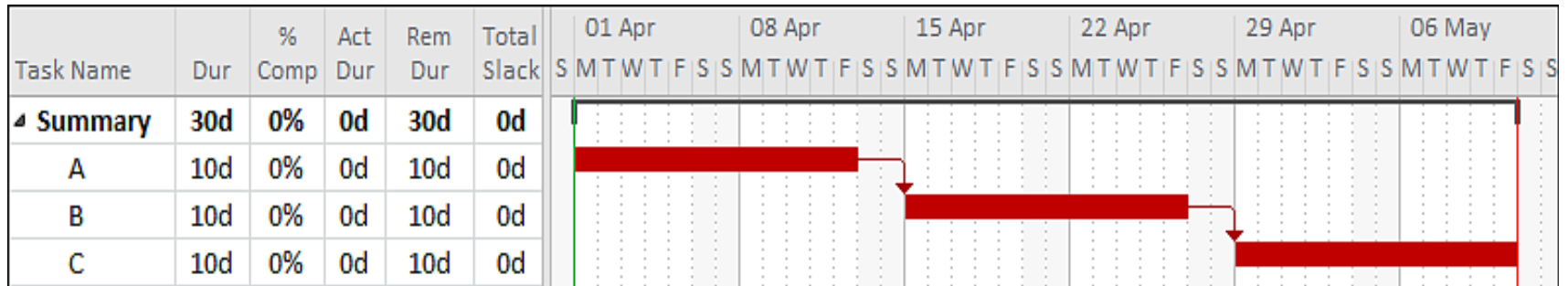
Microsoft Project

Oracle Primavera P6

Asta Powerproject

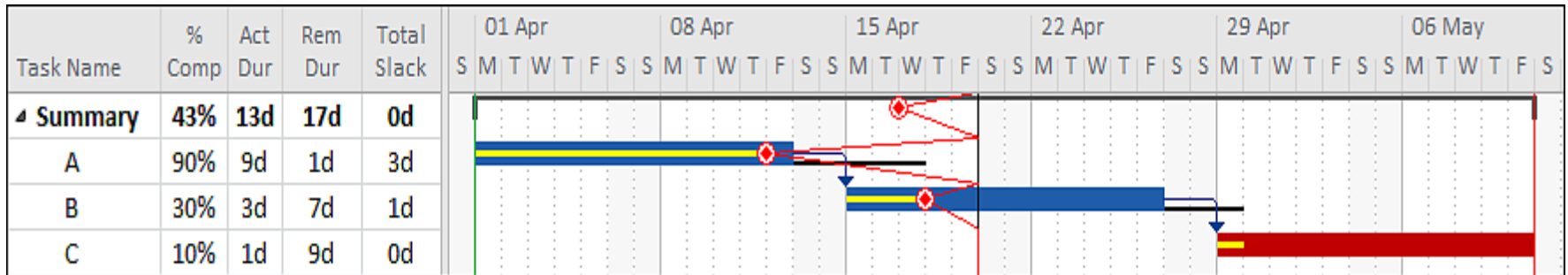
Un-impacted – Microsoft Project

- ❑ Microsoft Project makes this technique very simple and is the most natural technique for untrained users to update a schedule,
- ❑ Microsoft Project by default does not force incomplete work into the future or complete work into the past in the default scheduling mode,
- ❑ Microsoft Project is the ideal for a user who would like to update a schedule with this technique,
- ❑ The picture below displays an unprogressed project:



Un-impacted – Microsoft Project

- The picture below shows a schedule that has been updated by:



- Entering and displaying the **Status Date**,
- Entering the task **% Complete** and
- Displaying the **Progress Lines**.

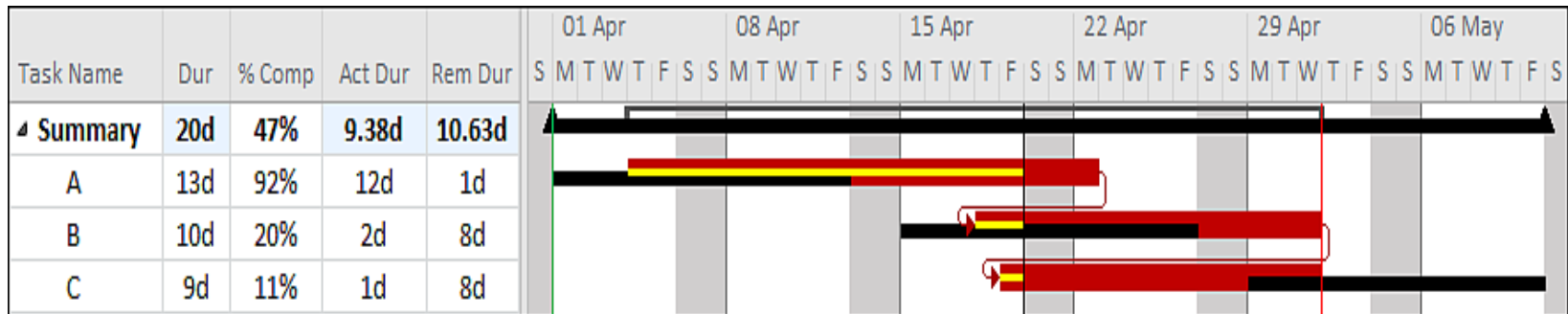
- The **Summary Task % Complete** is often misleading and is calculated from the sum of the **Detailed Tasks Actual Durations** divided by the sum **Detailed Tasks Durations**.

Impacted with Actuals – Microsoft Project

- ❑ To obtain a correctly updated schedule the following conditions must exist:
 - The Microsoft Project **Status Date** must be set and displayed,
 - **Actual Dates** and **Actual Durations** must be in the past, and
 - **Remaining Durations** must be in the future.
- ❑ It is important to understand is that a change to the **% Complete** changes the **Actual Duration** and **Remain Duration**, resulting in either completed work in the future or incomplete work in the past. Thus the **% Complete** should never be manually changed.
- ❑ The **Physical % Complete** may be used to record progress and display the % of progress.

Impacted with Actuals – Microsoft Project

- ❑ The picture below has been updated correctly,



- **Actual Durations** are in the past,
- **Remaining Durations** in the future, and
- The **% Complete** has not been edited.

- ❑ Many software options need to be understood and changed for this process to work.
- ❑ These options are outlined in detail in the paper.
- ❑ The process is difficult and time consuming.

Impacted with Actuals – Microsoft Project

- ❑ There are some tools that may be used to assist with updating a project in Microsoft Project but they are complex and difficult to use:
 - **Split in-progress tasks**
 - **Update Project, Update work complete through:**
 - **Update Project, Reschedule Uncompleted Work To Start After:**
 - **Splitting** tasks
 - **Status Date Calculation Options - When Updating a Schedule**

- ❑ Details of how to use these functions are in the paper.

Advantages of Microsoft Project

- ❑ Microsoft Project has a very high market penetration, and its advantages are:
 - Sharing project data is simple because many other companies use it,
 - Many commands are similar to other Microsoft Office products,
 - It is very simple to create small unresourced project schedules,
 - It is a desktop application and does not incur the high cost of installing and maintaining a database and employing administrators.

Disadvantages of Microsoft Project

❑ This issues include but not limited to:

- Microsoft Project ignores the **Status Date** in the default mode of operation,
- No View supplied with a default installation displays the **Status Date**,
- The **Task Finish** date is not calculated from the **Status Date** plus the **Remaining Duration**,
- It only allows one relationship between two tasks making it difficult to maintain a Closed CPM Network (no open ends),
- The **Actual Duration** is not calculated by the software and has to be calculated manually,
- The % Complete is linked to the **Actual Duration** and **Remaining Duration**, thus any change to the % **Complete** field will result in incomplete work displayed in the past or completed work displayed in the future.
- There are several functions in the software that, if used improperly, will result in an incorrectly updated schedule,
- The start and finish date and time of splits in tasks are not available through the user interface,
- A baseline is a copy of some project data but is not a copy of a complete project,
- The management of multiple baselines is difficult as they may not be named,
- It is difficult to display more than one baseline bar,
- Very few people understand how Microsoft Project calculates an in-progress schedule.

Un-impacted – P6

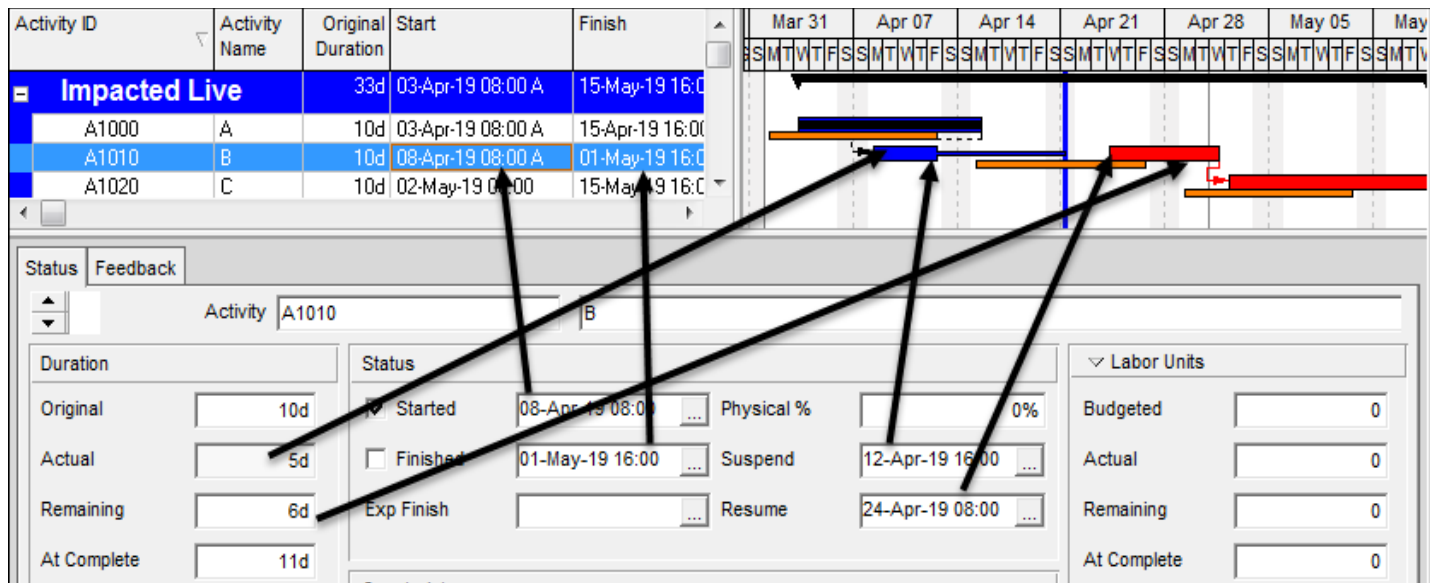
- ❑ This technique could be used with P6 but the author has never seen it utilized.

Activity ID	Activity Name	Orig Dur	Actual Start	Physical % Complete	Mar 31							Apr 07							Apr 14							Apr 21							Apr 28							May 05													
					S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S							
Unimpacted																																																					
A1000	A	10d	01-Apr-19 08:00	90%																																																	
A1010	B	10d	15-Apr-19 08:00	30%																																																	
A1020	C	10d	29-Apr-19 08:00	10%																																																	

- ❑ One of the main reasons why many companies move from Microsoft Project to P6 is so their schedulers will not update a schedule using the Un-impacted technique and using P6 forces users to update a schedule properly.
- ❑ Examples of this technique are outlined in the paper.

Impacted with Actuals – P6

- ❑ This is the way the P6 is designed to be used,
- ❑ It is far easier to update a P6 schedule using Impacted with Actuals than with Microsoft Project,
- ❑ The picture below shows a schedule that has been updated using the Suspend and Resume.



Impacted Live – P6

- As with other products, it is possible to use this technique with Primavera P6:

Activity ID	Activity Name	Progress % Complete.	Original Duration	Start	Finish	Mar 31	Apr 07	Apr 14	Apr 21	Apr 28	May 05
						S	S	S	S	S	S
						S	S	S	S	S	S
						S	S	S	S	S	S
						S	S	S	S	S	S
						S	S	S	S	S	S
Impacted Live			28d	01-Apr-19 08:00	08-May-19 16:00						
A1000	A	100%	12d	01-Apr-19 08:00	16-Apr-19 16:00						
A1010	B	40%	14d	11-Apr-19 08:00	30-Apr-19 16:00						
A1020	C	10%	16d	17-Apr-19 08:00	08-May-19 16:00						

- The data date may be displayed either using the P6 **Data Date** and not scheduling, or displaying a **Curtain**.
- A misleading summary % complete value will be displayed when a **UDF Number** or **Integer** field is used for the % complete, but will not be displayed when a **UDF Text** field is used:

Activity ID	Activity Name	Progress % Complete Text.	Progress % Complete Integer.	Progress Bar Start Date.	Progress Bar End Date.	Mar 31	Apr 07	Apr 14	Apr 21	Apr 28	May 05
						S	S	S	S	S	S
						S	S	S	S	S	S
						S	S	S	S	S	S
						S	S	S	S	S	S
						S	S	S	S	S	S
Impacted Live			150	01-Apr-19 08:00	18-Apr-19 12:48						
A1000	A	100%	100	01-Apr-19 08:00	16-Apr-19 16:00						
A1010	B	40%	40	11-Apr-19 08:00	18-Apr-19 12:48						
A1020	C	10%	10	17-Apr-19 08:00	18-Apr-19 12:48						

- There are two techniques outlined in the paper.

Advantages of P6

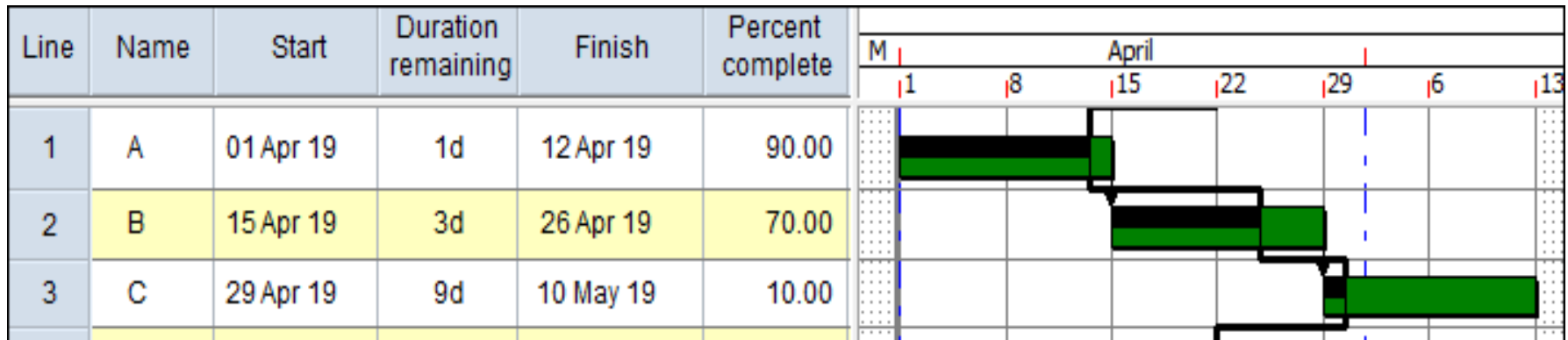
- ❑ The P6 scheduling engine is usually considered more robust than Microsoft Project and the advantages of P6 are:
 - P6 is far easier and quicker to update a schedule than Microsoft Project,
 - The ability to record an unlimited number of baselines which are complete copies of the current project,
 - The ability display and compare up to 4 baseline bars against one current schedule,
 - It calculates the **Actual Duration** from the **Actual Start** to the **Data Date** or **Suspend Date** and a change to the **Duration % Complete** does not change the **Actual Duration** only the **Remaining Duration**,
 - It always schedules uncompleted work in the future, and
 - It allows four relationships between two activities making creating a Closed CPM Network far simpler than Microsoft Project.

Disadvantages of P6

- ❑ P6 is graphically less powerful than most other:
 - The default Activity Views have a number of bar formatting issues and they should all be edited,
 - Users must understand the planned dates issues,
 - Scheduling does not force actual dates in the future back into the past,
 - Users must always show the time to ensure constraints and actual dates and not entered at irrelevant times,
 - The inability to create multiple activity splits, but may be achieved by either:
 - Assigning a calendar to an activity, or
 - Creating multiple activities to represent the splits.

Un-impacted- Asta Powerproject

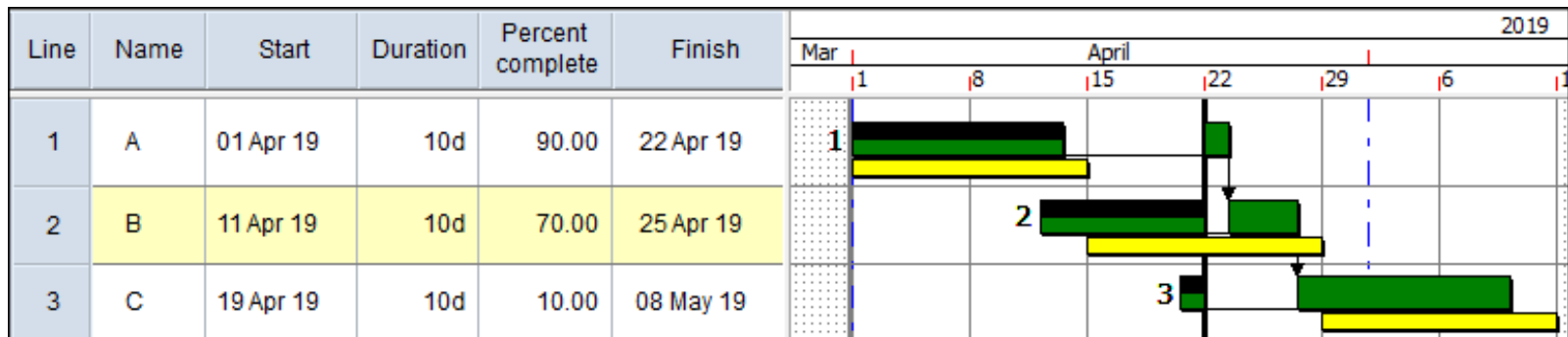
- Asta Powerproject is one of the few products that allows all techniques to be utilised with relative ease,
- The picture below displays an Un-impacted schedule using the **Jagged Progress** function:



- This is an optional function that may be turned off.

Impacted with Actuals- Asta Powerproject

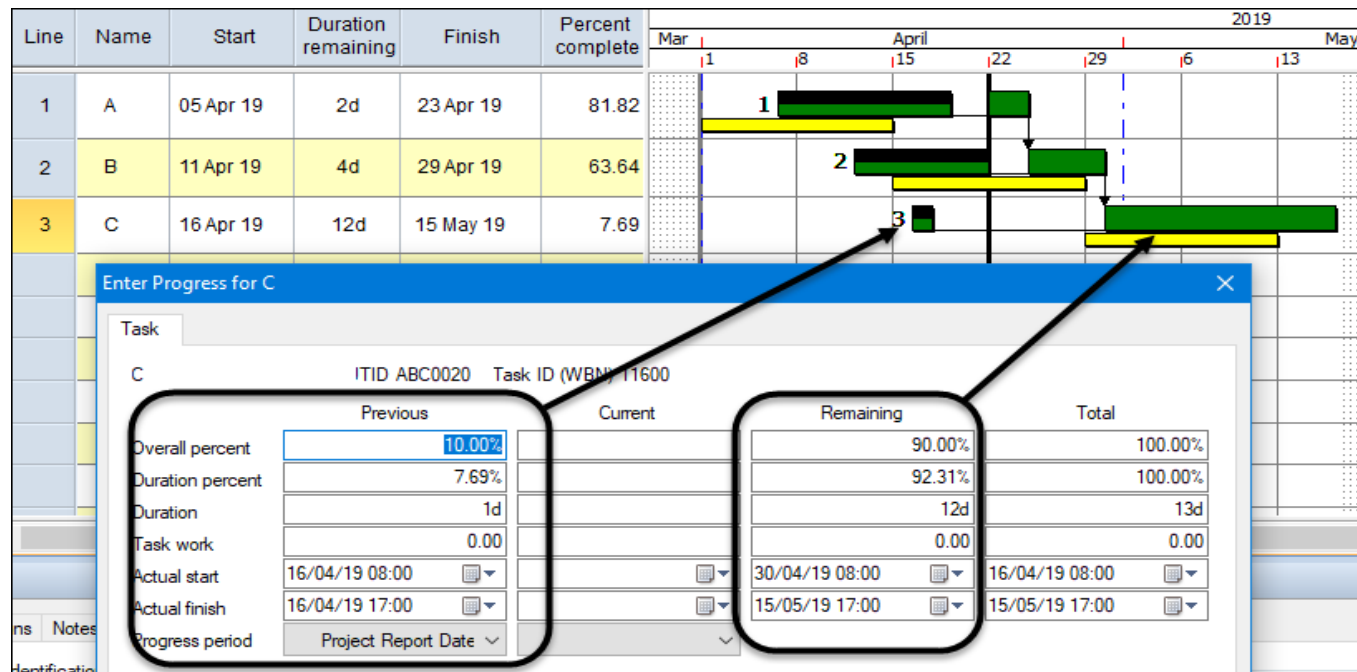
- ❑ One common technique used to update a schedule is to straighten the **Progress** line.



- ❑ This process has moved:
 - All incomplete work to the past,
 - All complete work to the future,
 - **Actual Start** dates have been modified when there was completed work in the future.
- ❑ A **Straight Progress** line may be used by default.

Impacted with Actuals- Asta Powerproject

- At this point in time the **Actual Start**, **Duration** and **Actual Finish** dates of all splits in the past and future may be edited:



- The **Duration remaining** may be edited to reflect when incomplete work should be scheduled in the future.

Impacted Live- Asta Powerproject

□ Like any other product this technique is possible with Asta using the process:

Line	Name	Start	Duration remaining	Finish	User percent complete	
1	A	01 Apr 19	12d	16 Apr 19	100.00	
2	A	01 Apr 19	10d	12 Apr 19		
3	B	11 Apr 19	13d	29 Apr 19	40.00	
4	B	15 Apr 19	10d	26 Apr 19		
5	C	11 Apr 19	17d	16 May 19	10.00	
6	C	29 Apr 19	10d	10 May 19		

- The task percent complete may be recorded using the Asta **User percent complete** field,
- The percent complete may not be displayed on a bar,
- The red bar border displays the baseline and current schedule critical path
- There are multiple splits in the future and past on task C.

Advantages of Asta Powerproject

- ❑ Asta Powerproject has many more scheduling options and functions than either P6 or Microsoft Project,
- ❑ Those features relevant to the three schedule updating techniques are:
 - An unlimited number of links between activities, allowing a partial critical path through activities,
 - Multiple splits in the past and future,
 - Scheduling options to allow the imitation of either Microsoft Project or P6 scheduling,
 - Unlimited number of baselines may be saved which are complete copies of the project,
 - Up to 10 baseline bars may be displayed,
 - Multiple Report Dates (data dates) set at the start of the projects and the appropriate Report Date displayed at each update,
 - View all baseline data from a current project view, including data items such as each individual resource properties and the baseline critical path.

Disadvantages of Asta Powerproject

- ❑ Asta Powerproject does not have a high market penetration in some countries and often contracts specify a scheduling software such as P6 or Microsoft Project which have a high market penetration, thus making Asta Powerproject less likely to be nominated in a contract.
- ❑ Asta Powerproject has many more scheduling options and functions than either P6 or Microsoft project and as a result takes longer to learn. This issue may be overcome by the creation of templates and writing of procedures for users to follow.
- ❑ User defined bars may not be created and formatting of total and free float is weaker than other products.

Summary of the Three Techniques

Conclusion - Summary of the Three Techniques

- There are three techniques that may be used to update a schedule, these have been demonstrated and in summary are:
 - **Un-impacted.** A baseline is not set and only the % Complete is assigned to activities and no activity dates are changed in the update process.
 - **Impacted with Actuals.** A baseline should be set. With this technique actual dates are assigned in the past to completed activities and complete portions of in-progress activities. Unstarted activities and incomplete portions of in-progress activities are scheduled in the future. Scope changes are added and the project scheduled to provide a revised end date.
 - **Impacted Live.** A baseline should be set. The software inbuilt % Complete, Actual Duration, Actual Start and Actual Finish fields are not used. Completed activities are manipulated so they are scheduled when they actually occurred, in-progress activities are adjusted so they start when they actually started and will finish when they are planned to finish, un-started activities are scheduled into the future and scope changes added. This technique provides a revised end date for the project.

The Advantages and Disadvantages of Each Technique

- ❑ **Un-Impacted.** This technique provides the status of each activity but does not provide a revised end date for the schedule. This technique results in a schedule that may not be used for managing a project or claims analysis.
- ❑ **Impacted with Actuals.** This is how most software is intended to be used. This schedule may be used for managing a project and this technique opens up the opportunity to perform a Windows Analysis and the Half Step method to evaluate delay claims.
- ❑ **Impacted Live.** This schedule may be used for managing a project and this technique maintains an As-Built Critical Path allowing a “Collapsed As-Built” technique to be used to evaluate claims. Also the removal of delay activities allows a Collapsed As-Built analysis to be performed on a schedule that has been built during the execution of the project. As this schedule is built up over time, it would help negate the criticisms of the Collapsed As-Built windows analysis not reflecting reality because it was updated on a regular basis and may be reviewed after each update.
- ❑ There is a table in the paper that summarises how each software package supports each updating technique.

Conclusions

Unimpacted Technique

- A schedule should not be updated using the Unimpacted technique,
- This technique only provides the status of activities against the original plan and
- May not be used for managing a project or to analyze delays to support Extension of Time claims.

Impacted with Actuals Technique

- ❑ A schedule should be updated using the Impacted with Actuals technique when it is required to:
 - Managing a project with the schedule, and
 - Analyze delays to support Extension of Time claims.
- ❑ The reasons for using the Impacted with Actuals technique are:
 - It is the method identified in AACE International, Recommended Practice 90R-17, Statusing the CPM Schedule,
 - The Impacted with Actuals technique uses the software in the way it was designed, and
 - This method has wide industry acceptance, whereas the other two methods are usually not accepted.

Impacted Live Technique

- ❑ This technique has some disadvantages over the Impacted with Actuals technique:
 - It does not use the software packages discussed in this paper in the way they are designed to be used, and
 - It is a difficult technique to use and significantly more complex than the Impacted with Actuals technique.
- ❑ The reasons for using the Impacted Live technique are:
 - The schedule may be used for managing a project.
 - This technique maintains an As-Built Critical Path allowing a “Collapsed As-built” technique to be used to evaluate claims, and
 - This technique will help negate the criticisms of the Collapsed As-Built windows analysis not reflecting reality because it was updated on a regular basis as the project was executed and may be reviewed after each update.
 - The resulting schedule would be useful in providing contemporary, not forensic, delay analysis and time impact (including responsibility for delay).

Software suitability for the Impacted with Actuals technique

- ❑ The Impacted with Actuals technique is the recommended technique:
 - Microsoft Project has the highest industry penetration, but it is difficult and time consuming to use the Impacted with Actuals technique and it is very simple to end up with a schedule with either complete work in the past or incomplete work in the future.
 - Primavera P6 has wide industry acceptance and provides a straight forward process to update a program using the Impacted with Actuals technique.
 - Asta Powerproject has a lower market penetration, but it has many more useful scheduling functions than either P6 or Microsoft Project and a schedule may be simply updated with the Impacted with Actuals technique.

QUESTIONS/COMMENTS?

(PLEASE USE MICROPHONE)