CALCULATION DIFFERENCES WHEN

IMPORTING FROM

MICROSOFT PROJECT 2003 - 2010

INTO

ORACLE PRIMAVERA P6 VERSION 7

BY

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OF
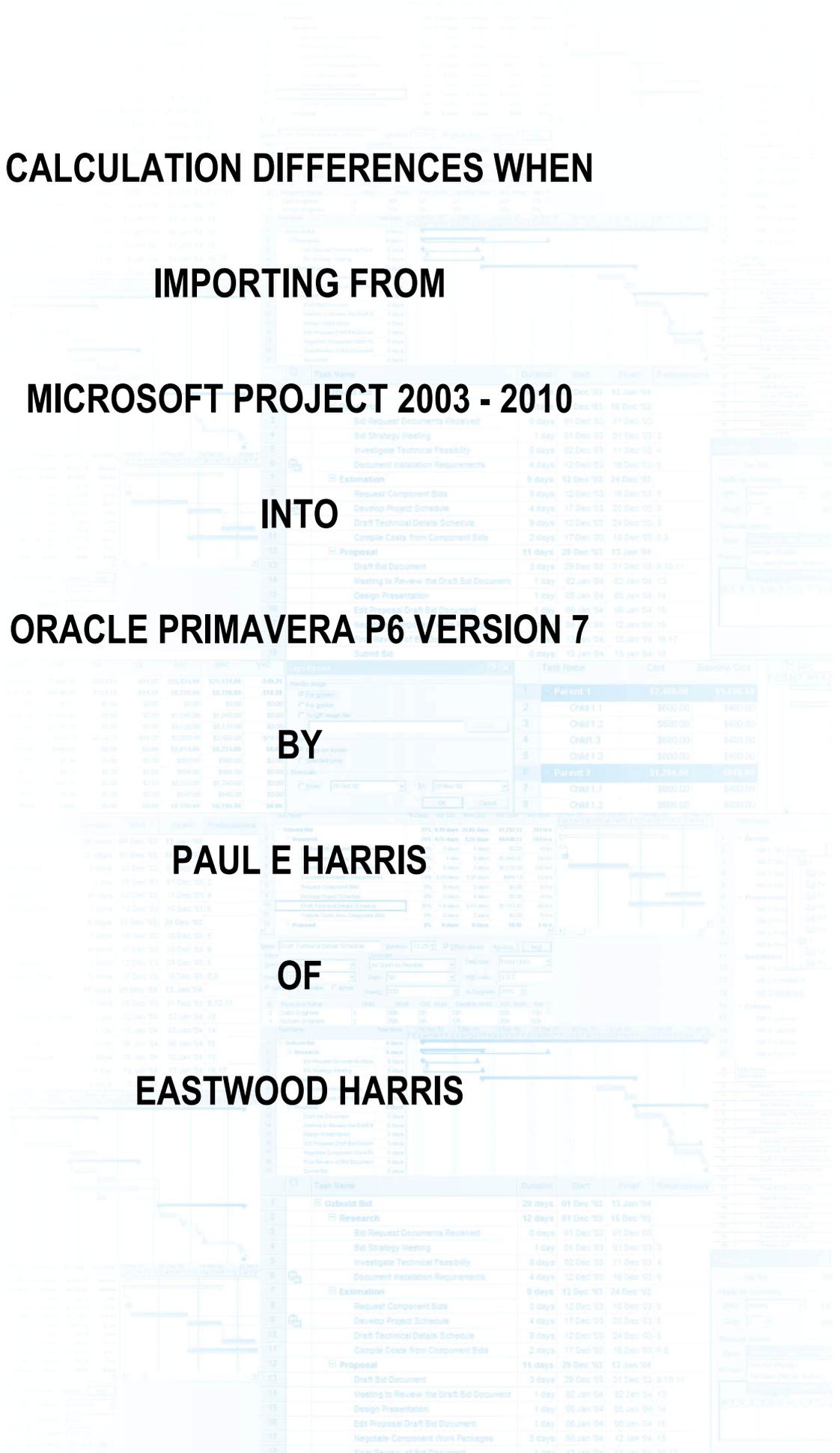
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1   INTRODUCTION

Many people convert schedules from one software package to another for a number of reasons but often without understanding that the conversion may result in different values.

Microsoft Project (MSP) and Oracle Primavera P6 Version 7 (P6) calculate differently. It is unlikely that a schedule will calculate the same dates and other values such as durations and resource data in both packages unless the schedules are very simple or a large amount of manual manipulation is applied after conversion.

There are options for importing data from MSP to P6 and different releases of Primavera P6 handle the importing process differently. P6 has a number of options that affect how the data is imported or exported, further complicating the import and export process.

This document will not explain the process of importing and exporting data, but will focus on how the two software packages calculate the data and explain why different results will be obtained.

It is not a case of one package being wrong and one being right but a case of the packages being different. This situation is no different to one country driving on the left and one driving on the right; neither country is right or wrong, just different. As long as people drive on the same side of the road, or users use the same software, then there will be fewer problems in the comparison of schedules when a schedule is created in one software and converted to be reviewed in another.

Oracle Primavera P6 Version 7 introduced a change to the way it displayed activity and summary durations in days. MSP has not made any significant changes in the way it calculates since the introduction of multiple calendars in 2000, except that 2003 introduced calculating leads and lags on the successor calendar and not the project calendar. Therefore this paper will consider only Oracle Primavera P6 Version 7 and MSP2003 and later.

2   AIM

The aim of this document is to outline the differences in the way P6 Version 7 and MSP2003 to 2010 calculate schedules with a specific focus on how P6 Version 7 calculates data from a schedule imported from MSP2003, 2007 or 2010.

The report will look at the 4 levels of schedule, as defined by Paul Eastwood Harris in all his scheduling books, and explain the differences in how the software packages calculate at each level.

3   SUMMARY

Oracle Primavera and MSP calculate differently and as the complexity of the schedule increases, the possibility of a MSP file imported into P6 calculating the same results decreases.

The importation of a schedule can be best described as a transfer of data that is calculated differently in each software package. The risk of the two schedules calculating differently increases with the complexity of the schedules.

If it is intended to import a schedule into P6, then this objective should be established at the start of scheduling the project. Many functions in both products must be avoided and progress must be entered into MSP following a disciplined process in order that P6 will achieve the same result on calculation.

The use of P6 to analyse resourced or progressed schedules created in MSP for contractual claims, extensions of time and dispute resolution should be avoided as there could never be an agreement on the schedules calculated values.

4   LEVELS OF SCHEULE

There are four modes or levels in which planning and scheduling software may be used.

	Planning	Tracking
Without Resources	**LEVEL 1** Planning without Resources	**LEVEL 2** Tracking progress without Resources
With Resources	**LEVEL 3** Planning with Resources	**LEVEL 4** Tracking progress with Resources

As the level increases, the number of functions that operate differently in the products also increases and the likelihood of the schedules not calculating with the same values also increases.

5   LEVEL 1 - PLANNING WITHOUT RESOURCES

At this level there is a good chance for the two products to calculate the same values if leads and lags are not used, there is only one calendar assigned to all tasks and the use of constraints is minimised.

5.1   Lead and Lag calculation

MSP uses the Successor calendar for lead and lag calculation, whereas P6 has the option for all leads and lags in a single schedule to be calculated on the predecessor, successor, project or 24 hour calendar. If the P6 schedule is set with an option that is not consummate with the MSP successor calendars then the same result may not be achieved.

5.2   Split Tasks

P6 does not support split tasks in the same way as Microsoft Project, so tasks with splits which are Fixed Units or Fixed Work will calculate differently to Fixed Duration when imported into P6.

5.3   Durations In days

P6 is able to show the duration in days correctly when activities have different hours per day. MSP only shows the durations in days correctly when all task calendars have the same hours per day.

5.4   Example Import

The following schedule was imported from MSP to P6 Version 7 using the P6 default options for the importation of a MSP schedule:

|	Task Name	Duration	Start	Finish	Type	Predecessors	Total Slack	Task Calendar	
1	A	5d	1 Nov '10	5 Nov '10	Fixed Duration		6.13d	None	
2	B	5d	7 Nov '10	9 Nov '10	Fixed Duration	1FS+5d	32d	24 Hours	
3	C	5d	1 Nov '10	5 Nov '10	Fixed Duration		0d	None	
4	D	5d	15 Nov '10	19 Nov '10	Fixed Duration	3FS+5d	0d	None	
5	E	12d	1 Nov '10	16 Nov '10	Fixed Duration		3d	None	
6	F	5d	1 Nov '10	16 Nov '10	Fixed Units		3d	None	

NOTE: The duration in days of Task B which is on a 24 hour per day calendar is misleading as this is 40 hours long and should display as 1.666 days.

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On import and after recalculating it looked like this:

Activ ID	Activity Type	Orig Dur	Start	Finish	Total Float	Calendar
1	Resource Dependent	5d	01-Nov-10	05-Nov-10	-25d	Standard
2	Resource Dependent	5d	13-Nov-10	22-Dec-10	-4d	24 Hours
3	Resource Dependent	5d	01-Nov-10	05-Nov-10	0d	Standard
4	Resource Dependent	5d	15-Nov-10	19-Nov-10	0d	Standard
5	Resource Dependent	12d	01-Nov-10	16-Nov-10	3d	Standard
6	Resource Dependent	5d	01-Nov-10	05-Nov-10	10d	Standard

There are a number of issues:

1. The 24 hour calendar was imported with a setting of 8 hours per day not 24 hours per day, activity 2 duration looks very suspicious as it had 1 working hour per day:
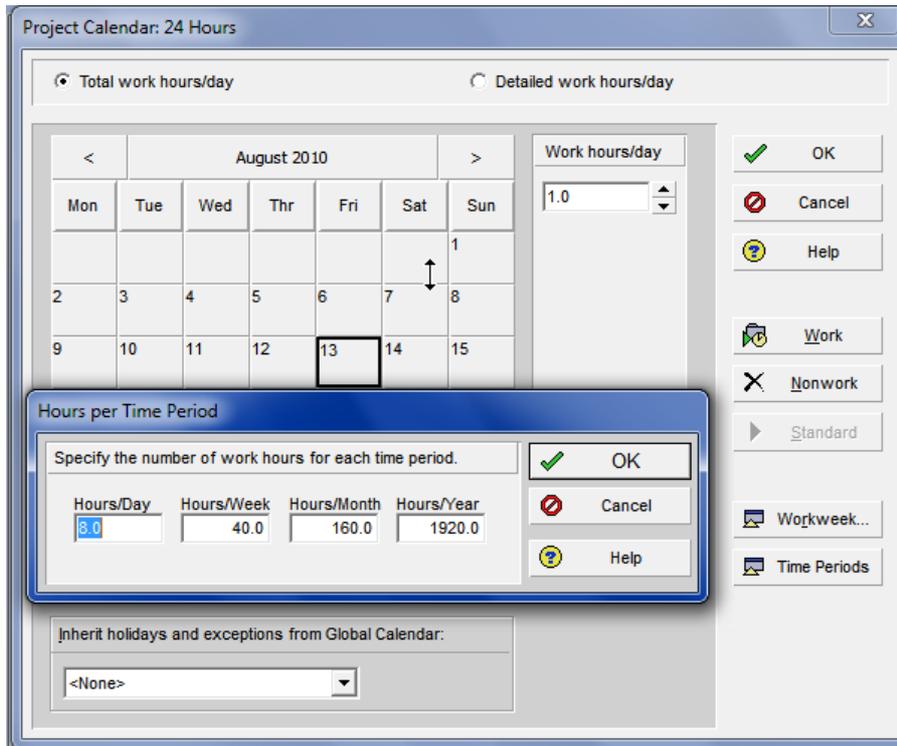
2. The Project has a must finish by date of the 19 Nov which created the Negative Float. MSP does not support a Project **Must Finish By** date when scheduling from the Start Date.
3. Calendar Lag was set to predecessor in Primavera.
4. When these issues were manually adjusted the schedule calculated as per below:

Activ ID	Activity Type	Orig Dur	Start	Finish	Total Float	Calendar
1	Resource Dependent	5d	01-Nov-10	05-Nov-10	5d	Standard
2	Resource Dependent	1d 16h	07-Nov-10	09-Nov-10	7d 16h	24 Hours
3	Resource Dependent	5d	01-Nov-10	05-Nov-10	0d 7h	Standard
4	Resource Dependent	5d	08-Nov-10	12-Nov-10	2d	Standard
5	Resource Dependent	12d	01-Nov-10	16-Nov-10	0d	Standard
6	Resource Dependent	5d	01-Nov-10	05-Nov-10	7d	Standard

5. We have a better match but the split activities will never match unless manually adjusted.

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6   LEVEL 2 - TRACKING PROGRESS WITHOUT RESOURCES

Tracking Progress with MSP has always been difficult for professional schedulers as software calculation ignores the Remaining Duration, the Status Date and the Current Date. The Finish Date of an in-progress activity in MSP is calculated from the Actual Start date plus the task Duration. In P6 the Finish Date of an in-progress activity is calculated from the Data date and Remaining Duration and the Actual Duration is calculated by the software.

Many users update a MSP schedule to produce an "Un-impacted" program where only the % completes are entered and the original planned dates are not adjusted to match the Actual Start or Actual Finish dates. This situation is demonstrated in the schedule below and is difficult to achieve in P6 because it has incomplete work in the past and complete work in the future.

		Task Name	% Complete	Duration	Actual Duration	Remaining Duration	Type	
1		J	50%	5 days	2.5 days	2.5 days	Fixed Duration	
2		K	50%	5 days	2.5 days	2.5 days	Fixed Duration	
3		L	50%	5 days	2.5 days	2.5 days	Fixed Duration	
4		M	50%	5 days	2.5 days	2.5 days	Fixed Units	
5		N	50%	5 days	2.5 days	2.5 days	Fixed Units	
6		O	50%	5 days	2.5 days	2.5 days	Fixed Units	

This is not logical, as incomplete work may not take place in the past and work may not be completed in the future. This is the way many users update an MSP schedule, especially in the building industry, and is effectively a Baseline showing current progress.

On the other hand P6 will always move incomplete work into the future when the schedule is calculated whereas MSP will not.

This method of progressing a schedule and producing an "Un-impacted" program shows what work is ahead or behind in time but does not recalculate the end date. This is considered bad practise by most professional schedulers, including the author.

The standard calendar of 8 hours per day 5 days per week has been used in this example.

The MSP **Reschedule uncompleted work to start after** function has been used in conjunction with **Split in-progress tasks** to produce the schedule below. This works in a similar way to the **P6 Retained Logic** function and will produce the result shown below.

The following changes have been made by the software:

1. Incomplete work is pushed into the future, and
2. There are some interesting differences in the Remaining Durations of Fixed Durations and Fixed Units tasks.

		Task Name	% Complete	Duration	Actual Duration	Remaining Duration	Type	
1		J	24%	10.5 days	2.5 days	8 days	Fixed Duration	
2		K	31%	8 days	2.5 days	5.5 days	Fixed Duration	
3		L	45%	5.5 days	2.5 days	3 days	Fixed Duration	
4		M	50%	5 days	2.5 days	2.5 days	Fixed Units	
5		N	50%	5 days	2.5 days	2.5 days	Fixed Units	
6		O	50%	5 days	2.5 days	2.5 days	Fixed Units	

NOTE: Complete work in the future is still in the future, which is not logical and is not rectified by this function.

This schedule has now been manually adjusted so the completed work is in the past producing an "Impacted" progressed schedule with incomplete work in the past and complete work in the future:

	Task Name	% Complete	Duration	Actual Duration	Remaining Duration	Type	
1	J	24%	10.5 days	2.5 days	8 days	Fixed Duration	
2	K	31%	8 days	2.5 days	5.5 days	Fixed Duration	
3	L	24%	10.5 days	2.5 days	8 days	Fixed Duration	
4	M	50%	5 days	2.5 days	2.5 days	Fixed Units	
5	N	50%	5 days	2.5 days	2.5 days	Fixed Units	
6	O	50%	5 days	2.5 days	2.5 days	Fixed Units	

Now let's see what happens when this is imported into P6:

Activ ID	Activity Type	Duration % Complete	Orig Dur	Actual Duration	Remaining Duration	At Completion Duration	Total Float	Start	Finish
1	Resource Dependent	23.81%	10d 4h	8d	8d	16d	-14d	01-Nov-10 A	22-Nov-10
2	Resource Dependent	31.25%	8d	3d	5d 4h	16d 4h	-14d	08-Nov-10 A	30-Nov-10
3	Resource Dependent	23.81%	10d 4h	3d	8d	24d 4h	-14d	08-Nov-10 A	10-Dec-10
4	Resource Dependent	50%	5d	8d	2d 4h	10d 4h	0d	01-Nov-10 A	15-Nov-10
5	Resource Dependent	50%	5d	3d	2d 4h	8d	0d	08-Nov-10 A	17-Nov-10
6	Resource Dependent	50%	5d	3d	2d 4h	10d 4h	0d	08-Nov-10 A	22-Nov-10

Activ ID	Activity Type	Duration % Complete
1	Resource Dependent	23.81%
2	Resource Dependent	31.25%
3	Resource Dependent	23.81%
4	Resource Dependent	50%
5	Resource Dependent	50%
6	Resource Dependent	50%

1. We have negative float due to a **Project Must Finish By Date** being set in P6, not available in Microsoft Project.
2. The P6 Act Completion Durations and MSP Durations are very different.
3. Activities that were Fixed Units in MSP are calculated differently to those that were Fixed Duration.

We have not as yet imported a schedule with progress using multiple calendars which could result in some other differences in calculation.

To ensure the same dates are calculated in both MSP & P6 manual intervention is required. As P6 does not support splitting it may be difficult for both the dates and durations to match when an MPS schedule has split tasks.

7   LEVEL 3 - PLANNING WITH RESOURCES

The way MSP and P6 calculate a resourced schedule is different. The hierarchy of Calendars is interesting and the following fields determine which calendar is used to schedule the work and calculate the Start and End date of a task:

- **Project Calendar** is used to calculate the Task Dates when no Task Calendar or resources are assigned.

- **Task Calendar** is used to calculate the Task Dates when a Task Calendar is assigned and no resources are assigned.

- **Resource Calendar** is used to schedule resource work when resources are assigned, but not necessarily the task Start and Finish dates:
  - ➢ Irrespective of the assignment of a task calendar, and
  - ➢ **Scheduling ignores resource calendars** option is unchecked.

- **Task Type** – **Fixed Duration** tasks dates calculate differently to **Fixed Units** and **Fixed Work** Type tasks when resources are assigned.
  - ➢ **Fixed Duration** tasks calculate the Task Dates based on the Task Calendar and this may extend the Task Duration so it is greater than the Resource Work Period.
  - ➢ **Fixed Units** and **Fixed Work** tasks calculate the Task duration using the resource calendar.

- **Scheduling ignores resource calendars** – When a Task Calendar has not been assigned then this option is not available. With this option checked the Task Calendar is used for calculation and the resource calendar ignored.

Task No	Task Calendar	Resource assigned	Scheduling ignores resource calendars	Task Type	Calendar Used to Calculate Work	Calendar Used to Calculate Dates
1	None	No		Any	N/A	Project
2	Yes	No		Any	N/A	Task
3	None	Yes		Fixed Duration	Resource	Task
4	Yes	Yes		Fixed Duration	Resource	Task
5	Yes	Yes	Yes	Fixed Duration	Task	Task
6	None	Yes		Fixed Units or Work	Resource	Resource
7	Yes	Yes		Fixed Units or Work	Resource	Resource
8	Yes	Yes	Yes	Fixed Units or Work	Task	Task

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In the picture below the Project Calendar (None) is 5 day per week and the resource may work Sunday through to Wednesday. The activities are in the same order as the table above.

The P6 calendar rules are different and simpler.

Activity Type	Notes
Task Dependent	Activities assigned as Task Dependent acknowledge their **Task Calendar** when scheduling and the Finish Date is calculated from the Task Calendar.
Resource Dependent	Activities assigned as Resource Dependent acknowledge their **Resource Calendar** when being scheduled. This is similar to an Independent Activity Type in P3 and SureTrak and the resources work independently and they do not have to be available at the same time.
	The Activity Finish Date is calculated based on the longest Resource Duration when the resource option of **Drive Activity Dates** is checked against the resource assignment.
	NOTE: The activity start date and time is calculated on the activity calendar not the resource calendar. This may delay the start of an activity when the resource calendar has longer working hours than the activity calendar.

P6 does not allow resources to be assigned against Milestones which causes issues on import and these tasks milestones may be converted into tasks.

The schedule above was imported into P6 and the result is below:
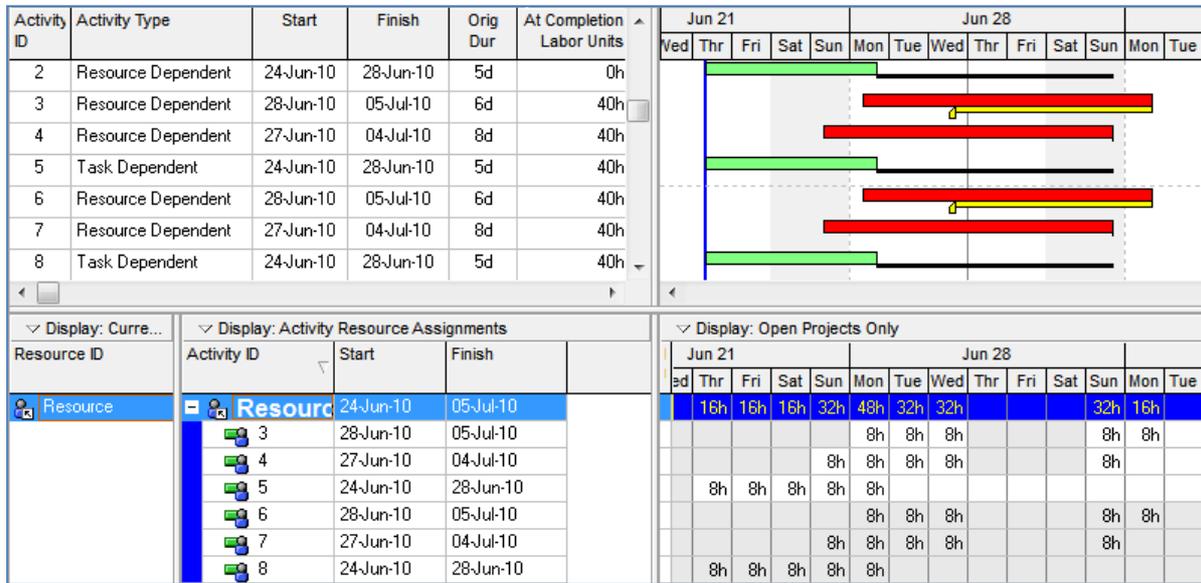
1. The Negative Float is caused by the setting of a Project **Must Finish By** date.
2. There are many differences in dates and durations:

Activity ID	Start Difference	Finish Difference	Dur Difference
1	0	0	0
2	0	0	0
3	4	1	-1
4	3	0	-3
5	0	0	0
6	1	1	1
7	0	0	3
8	0	0	0

With the differences in the way the products calculate it is highly unlikely that any resourced project in MSP with multiple calendars, varying activity types and resources will calculate the same in P6 without a large amount of manual intervention.

8   LEVEL 4 - TRACKING PROGRESS WITH RESOURCES

It is clear with the issues outlined above that a schedule in MSP with progress, resources, multiple calendars, leads and lags, splits and different Task Types would NEVER calculate the same in MSP as P6.

Tracking progress with resources adds yet another level of complexity which further reduces the possibility of the two products calculating the same schedule values.

9   OTHER ISSUES

There are many other issues that have not been addressed in this paper such as:

- **Constraints:** An **As Late As Possible** constraint in P6 is calculated as a Zero Free Float and only consumes Free Float so it does not delay a successor activity. In MSP an **As Late As Possible** constraint is treated as a Zero Total Float so delays all the successors that have Total Float.

- **Calendars:** MSP allows calendars down to minutes while P6 only to ½ hours. MSP calendars in increments of less that 30mins will not convert correctly and will result in more variances.

- **Calculation options** in MSP and P6 all work differently. There are functions in P6 that do not exist in MSP and functions in MSP that do not exist in P6.

- **Profiling Resources** in MSP and **Bucket Planning** in P6 would probably calculate differently in both products but this has not been explored by the author.

10   IMPORTING A P6 FILE INTO MISCROSOFT PROJECT

If one is to go from P6 to MSP then there are a raft of other issues to consider including but not limited to:

- P6 allows two relationships between two activities, MSP allows only one,

- P6 allows two constraints per activity, MSP allows only one,

- P6 has Suspend and Resume which is not supported in MSP and the author has not explored how this is handled on import,

- P6 has start and finish milestones which are assigned by the User. In MSP Milestones without a predecessor are start milestones, those with a predecessor are finish milestones and the user may not determine the milestone type.

11   CONCLUSIONS

Importing a file from MSP to P6 is data conversion resulting in data that is calculated differently in P6 than MSP.

Only the simplest schedules may be imported from MSP to P6 with a level of confidence that they will calculate the same dates and Float values.

MSP allows the creation of an "Un-impacted" progressed schedule with ease. It is more difficult to produce an "Impacted" progressed schedule with MSP.

The architecture of P6 make it difficult to produce an "Un-impacted" progressed schedule but simple to produce an "Impacted" progressed schedule.

A MSP "Un-impacted" progressed schedule with incomplete work in the past and complete work in the future would never calculate the same data in P6.

A progressed MSP schedule would have to be carefully set up and progressed following a strict procedure if it is to be imported into P6. It is highly likely that this process would ultimately fail on any large complex project.

Once multiple calendars and resources are introduced, the possibility of the two programmes producing the same schedule are significantly reduced again.

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It is of the opinion of the author that a progressed, resourced schedule with multiple calendars, splits, lags and different activity types would never calculate the same in both products.

The use of P6 to analyse MSP schedules should be discouraged and only be considered with very simple unprogressed projects that have been set up so that they can be imported into P6 with confidence. It is better to build an analyse the schedule in the same product.

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19 November 2010

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Eastwood Harris Pty Ltd is a supplier of planning and scheduling books and training material, please go to www.eh.com for details of these books and courses.

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Paul Harris holds an Honours Degree in Civil Engineering obtained in the UK and is a Certified Cost Engineer through AACEI International, a PRINCE2 Registered Practitioner, an Approved PRINCE2 Trainer and a "Managing Successful Programmes" Registered 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. His Melbourne, Australia based company, Eastwood Harris Pty Ltd, offers project controls consulting and training services world wide with a strong focus on Microsoft Project and Primavera software. He has published a number of books on Primavera and Microsoft Project.