

PLANNING AND CONTROL USING ORACLE® PRIMAVERA® P6 VERSIONS 8 to 20 PPM PROFESSIONAL

Planning and Progressing Project Schedules With and Without Roles and Resources in an Established Database

BY

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INTRODUCTION

This publication is an upgrade of the *Project Planning & Control Using Primavera P6 Version 7* and has been written to enable new users to learn the planning and scheduling functions of Primavera Version 8, 15, 16, 17, 18, 19 or 20. Please note there are no versions 9 to 14 and Oracle changed their naming convention with the release of 15.1 so the name is the same as the year of the release. Due to the changes in the menus in this release, it is not possible to make the book backward compatible to earlier versions of the software.

Many users will have prior experience with Elecosoft (Asta) Powerproject or Microsoft Project and the author explains where there are differences in the products' functionality.

The author would appreciate any constructive comments on how this publication may be improved.

SUMMARY

The publication may be used as:

- A training manual for a three-day training course, or
- A self-teach book, or
- A reference manual.

The screen shots for this publication are taken from Primavera Versions 8.1 or 8.2 or 8.3 or 8.4 or 15.1 or 15.2 or 16.1 or 16.2 or 17 or 18 or 19 or 20.

One-day, two-day, or three-day training courses may be run using this publication and it includes exercises for the students to complete at the end of each chapter. After the course, students may use this publication as a reference book. Instructors' PowerPoint presentations are available from Eastwood Harris web sites.

This publication is ideal for people who would like to quickly gain an understanding of how the software operates and explains how the software differs from Elecosoft Powerproject and Microsoft Project, thus making it ideal for people who wish to convert from these products.

CUSTOMIZATION FOR TRAINING COURSES

Training organizations or companies that wish to conduct their own training may have this publication tailored to suit their requirements. This may be achieved removing, reordering or adding content to the publication and by writing their own exercises. Please contact the author to discuss this service.

AUTHOR'S COMMENT

As a project controls consultant, I have used a number of planning and scheduling software packages for the management of a range of project types and sizes. The first publications I published were user guides/training manuals for Primavera SureTrak, P3 and Microsoft Project users. These were well received by professional project managers and schedulers, so I decided to turn my attention to Primavera Enterprise, which is now called Primavera P6. This publication follows the same proven layout of my previous publications. I trust this publication will assist you in understanding how to use Primavera P6 on your projects.

APPRECIATION

I would like thank Michael Jack for his assistance in writing this book and Thomas Grant for his assistance in proof reading parts of the book.

CURRENT BOOKS PUBLISHED BY EASTWOOD HARRIS

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3.19 Workshop 1 – Navigating Around the Windows



Background

To become familiar with Primavera you will open your database and navigate around the windows.

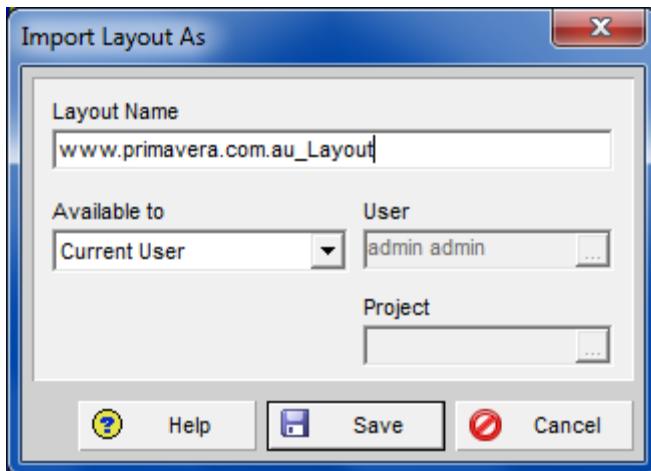
Note: Your windows may look different from the one used in this publication which uses a demonstration database provided by Oracle Primavera.

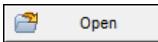
Assignment

1. Open your database. If a project is open, select **File, Close All** to close the project.
2. Close all open windows except the **Projects Window**. If the **Project Window** is not open then select **Enterprise, Projects** to open the **Projects Window**.
3. Hide and display the **Status Bar** by using the **View, Status Bar** menu.
4. Scroll up and down and inspect the Enterprise Project Structure and the projects.
5. Expand and close the EPS structure using the **[+]** and **[−]** buttons to the left of the project descriptions and use the right mouse menu **Expand All, Collapse All** and **Collapse To....**
6. Explore the **EPS** by selecting **Enterprise, Enterprise Project Structure...**, click on the column headings and explore the menu options by clicking on the **Display: EPS** menu.
7. From the **Projects Window**, hide and display the bottom pane **Projects Details** form by clicking on the **View, Show on Bottom, No Bottom Layout** and **View, Show on Bottom, Details**.
8. Add the button to the **Bottom Layout** toolbar and then use the and buttons on the **Bottom Layout** toolbar to hide and display the bottom pane **Projects Details** form.
9. Double click in the Gantt Chart area in line with a project to bring the project bar into view.
10. Select the **View, Toolbars..., Customize, Options** tab and uncheck the **Show full menus after a short delay** and the **Menus show recently used commands first** options in to ensure full menus are always displayed.
11. Open the **Projects Details** form, right-click on a tab in the **Projects Details** form and select **Customize Project Details...** then hide and display some tabs. Leave only the **General, Dates, Defaults** and **Notebook** tabs displayed. We will reveal the remainder as needed:

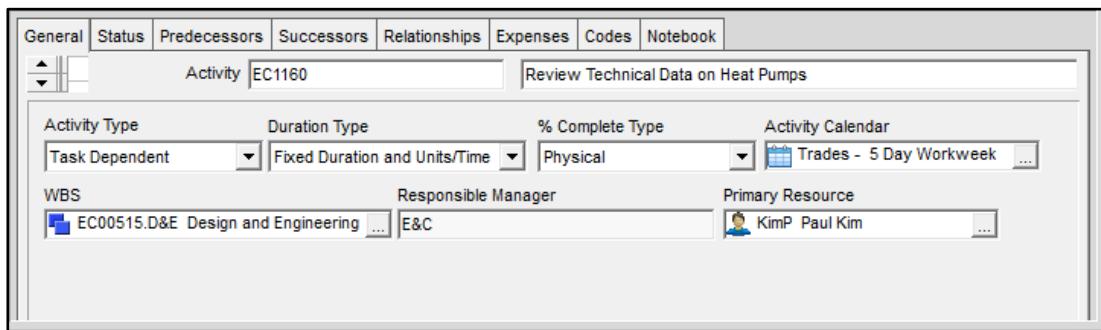
General	Dates	Defaults	Notebook
Project ID EC00515-1	Project Name City Center Office Building Addition		
Status Active	Responsible Manager E&C	Project Leveling Priority 10	
Check Out Status Checked In	Checked Out By	Date Checked Out	
Project Web Site URL <input type="text"/> <input type="button" value="Launch..."/>			

12. Select a project you have access to (possibly the City Center Office Building Addition project if you are operating in the Primavera Demonstration database) and open the **Project** by right-clicking on the project and selecting **Open Project**.
13. Click on the **Activities** tab or the  icon on the right-hand side of the screen or select **Project, Activities** if the **Activities Window** does not open automatically and display the project activities.
14. You should now download a layout titled **www.primavera.com.au_Layout.plf** found at **www.primavera.com.au** or **www.eh.com.au** under **Software and Downloads** page, unzip it and place it on your desktop.
15. Import the Layout as a Project Layout by selecting **View, Layout, Open Layout**.
16. Do not save your Layout.
17. Select , select the layout from your desktop, import and save it:



18. The Layout will be saved as a User Layout, select  to apply the layout and you will see the changes on the screen.
19. Now select  to apply the Layout and close the **Open Layout** form.
20. Double-click in the Gantt Chart area in line with an activity to bring the activity bar into view.
21. Click on the Activity ID column title multiple times and see the activities reorder, then click on other column titles and see the activities reorder based on the column data. Leave the activities ordered by Activity ID.
22. Adjust the timescale using the  buttons.
23. Move back to the **Projects Window** and then back to the **Activities Window** using the tabs at the top of the window.
24. From the **Activities Window** display the **Activity Details** form in the **Bottom** pane by selecting **View, Show on Bottom, Details** and then hide it by selecting **View, Show on Bottom, No Bottom Layout**.
25. From the **Activities Window** hide and display the bottom pane **Activity Details** form by clicking on the  and  buttons on the **Bottom Layout** toolbar.

26. Open the **Activity Details** form, right-click on a tab in the **Activity Details** form and select **Customize Activity Details...** then hide and display some tabs. Set the tabs as per the picture below:

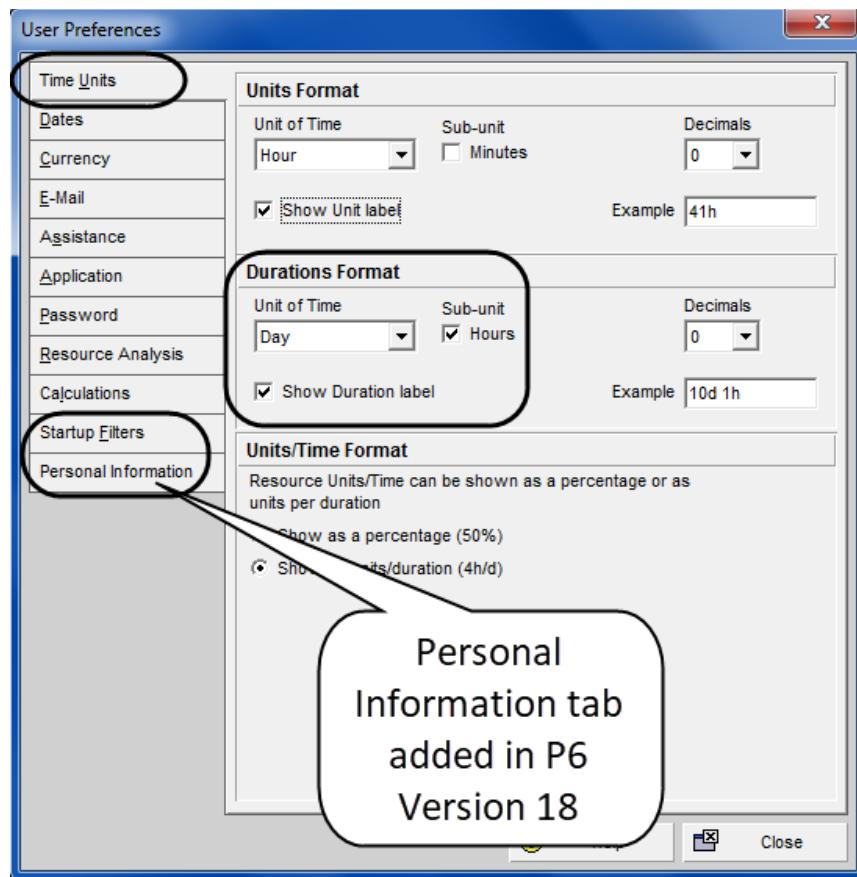


27. Close the project by selecting **File, Close All** and return to the **Projects Window**. From the **Projects Window**, ensure some bars are displayed by double-clicking in the bar area.
28. Open the **User Preferences** form by selecting **Edit, User Preferences...** and select the method you wish to display the date from the **Dates** tab and set your options as per below, (people in the US may wish to use the **Month, Day, Year** option, but ensure you show the time in hours:

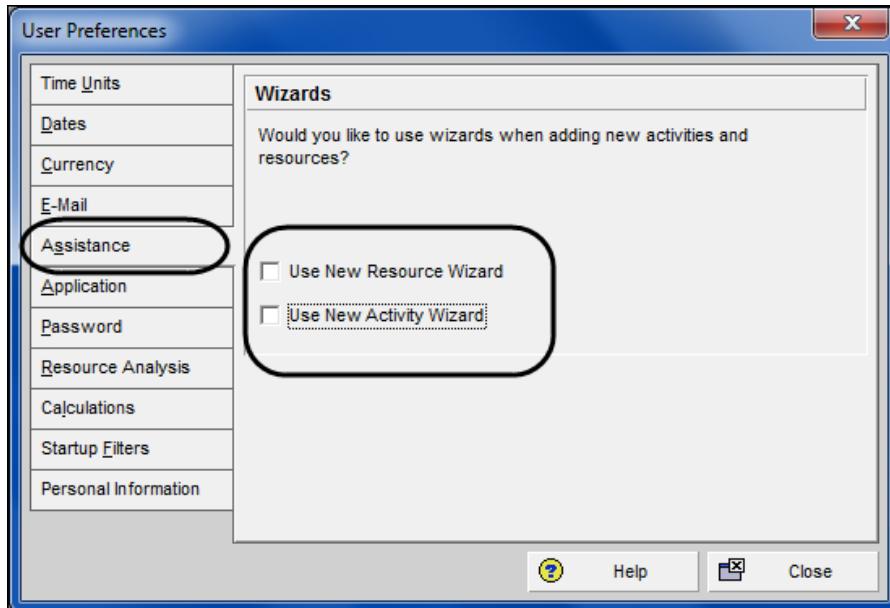


NOTE: It is strongly recommended that the time is always displayed as per the picture above so the user knows the time when Actual Start, Actual Finish and Constraints are applied because the software will often select 00:00, first minute of a day.

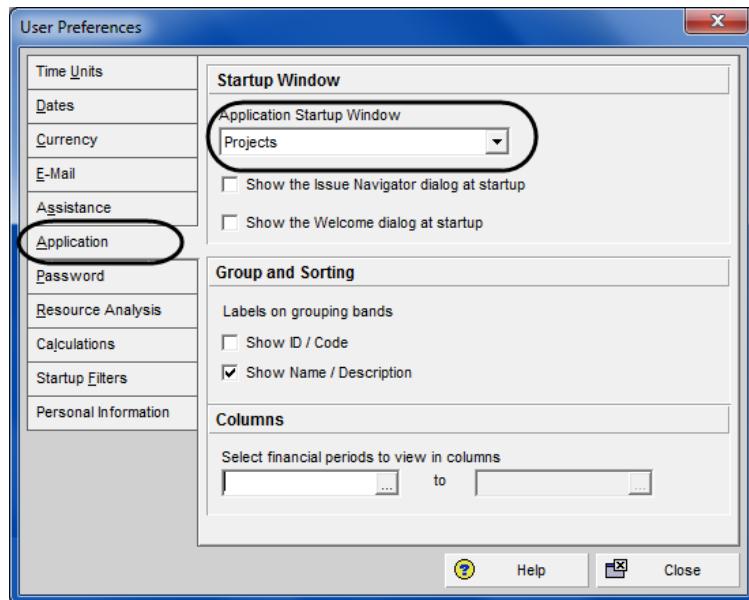
29. Select the **Time Units** tab and set your options as shown below:



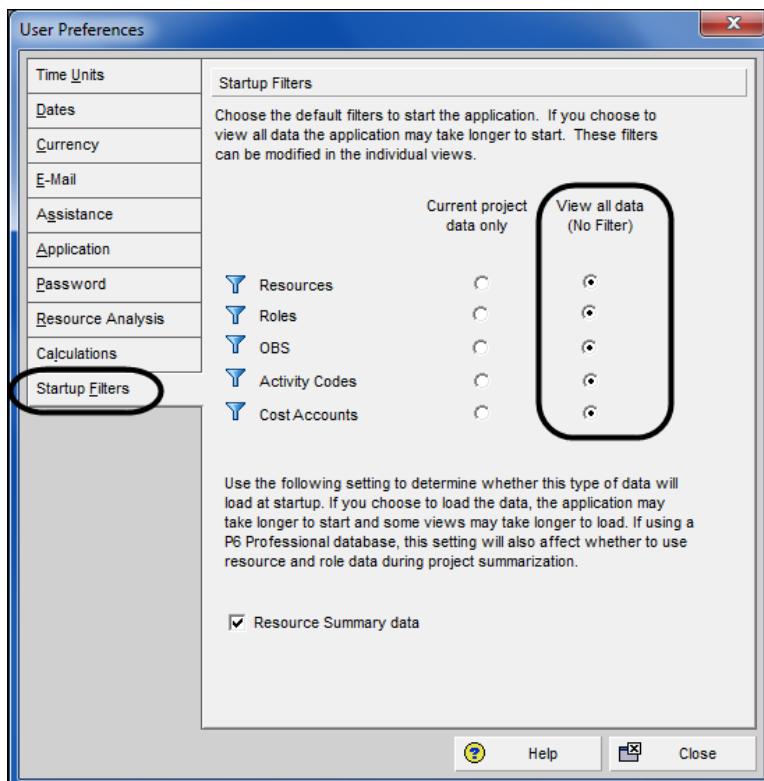
30. Select the **Assistance** tab and uncheck both **Wizards** as shown below because these make it slower to add activities and resources:



31. Select the **Application** tab and select the **Application Startup Window** as **Projects**. This will ensure the database opens at the **Project Window** each time you start up Primavera.



32. Select the **Startup Filters** and check **View all data (No Filter)** as this will ensure that when you open a one of the windows you will see all the database data and not a blank screen.



33. Close the **User Preferences** form.
34. Ensure all projects are closed by selecting **File, Close All**.

4.7 Workshop 2 – Creating Your Project



Background

You are an employee of Wilson International and are responsible for planning the Bid preparation required to ensure that a response to an RFQ (Request For Quote) from OzBuild Pty Ltd is submitted on time. While short-listed, you have been advised that the RFQ will be available on 06 December 2021 at 8:00 hrs (8:00 am) and you will be required to submit 3 bound copies of the proposal before 27 January 2022 at 16:00 hrs (4:00 pm).

NOTE: When multiple users are working in a single Professional database or using the Optional Client then:

- The Database Administrator or Instructor should create a unique EPS Node for each student to create their projects under.
- Each student should also be assigned a unique Project ID to use when creating their projects.

Assignment

1. Close any open projects.
2. Create a new project with the following information by selecting **File, New...** to open the **Create a New Project** wizard:

- Select an appropriate EPS Node in your database to create the project or your nominated node when working in a shared database.
- Project ID – OZB.

NOTE: This Project ID may not be accepted if you are working in a shared database when there is another project with this Project ID. You may need to use another Project ID in this situation, such as OZB plus your initials.

- Project Name – Bid for Facility Extension
- Planned Start Date – 06 December 2021 at 08:00

NOTE: Ensure that the 08:00 (8:00 AM) is added in this step. Forgetting to check and, if required, setting the time when assigning dates may lead to the schedule not calculating correctly.

- Must Finish By – Leave Blank
- Responsible Manager – Accept the default
- Rate Type – Accept the default which is usually Price/Unit or Standard Rate
- Click **Finish** to create the project.

3. The project should now be open. Check the text in the top left side of the screen; the project name should be displayed.
4. Ensure you are in the **Projects Window**.
5. Ensure the project is selected by clicking on it.

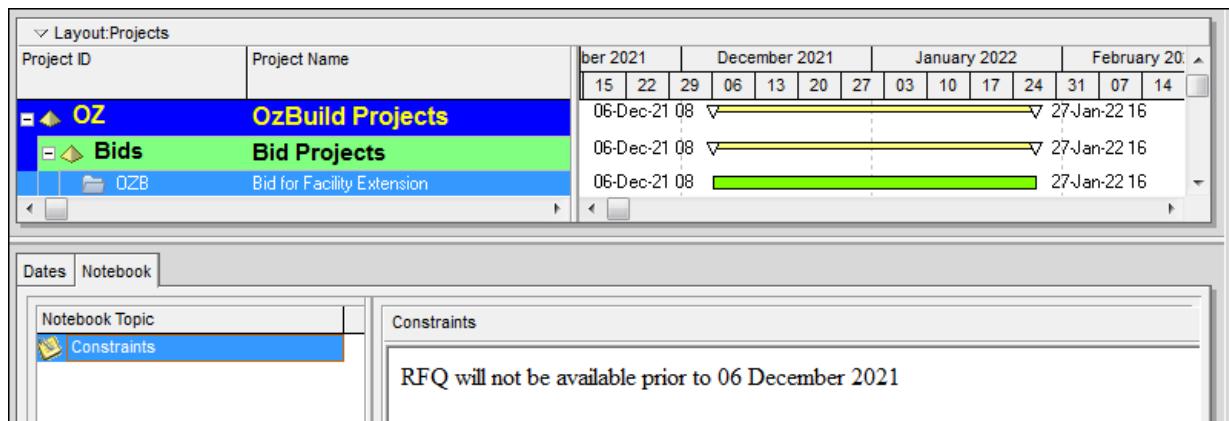
6. Add the following project information in **Project Details** in the **Bottom Pane**:

- Select your project in the **Project Window** by clicking on it.
- In the **General** tab set the **Status** to **What-if**. The project needs to be open to change the **Status**.
- **Dates** tab
 - Set the Data Date to 06 December 2021 at 08:00
 - Anticipated Start 06 December 2021 at 08:00
 - Anticipated Finish 27 January 2022 at 16:00

You should now see a bar in the Bar Chart above spanning these dates although there are no activities in the schedule. If no bar is displayed double-click in the Gantt Chart area level with the project.

- Add a Notebook Topic using a suitable topic such as Constraints, Project Status or Issues stating, "RFQ will not be available prior to 06 December 2021."

7. Your project should look like this:



NOTES:

The date format will be displayed according to the **User Preferences** settings by selecting **Edit, User Preferences...** and selecting the **Dates** tab. Your date format should display the time as per the picture above.

The **First day of week** dates are displayed in the Timescale are normally a Sunday or Monday. This display option is set by the Administrator. In the picture above the Start of week has been set as Monday and in the picture below, this has also been set as a Monday:

	December 2021				January 2022				
	29	06	13	20	27	03	10	17	24

5.15 Workshop 3 – Maintaining the Calendars



Background

The normal working week at OzBuild Pty Ltd is Monday through Friday, 8 hours per day excluding public holidays. The installation staff works Monday through Saturday, 8 hours per day and the company observes the following holidays:

	2021	2022	2023	2024
New Year's Day	1 January	3 January*	2 January*	1 January
Easter	2 - 5 April	15 - 18 April	7 - 10 April	29 March- 1 April
Christmas Day	27 December*	26 December*	25 December	25 December
Boxing Day	28 December*	27 December*	26 December	26 December

* These holidays occur on a weekend and the dates have been moved to the next weekday.

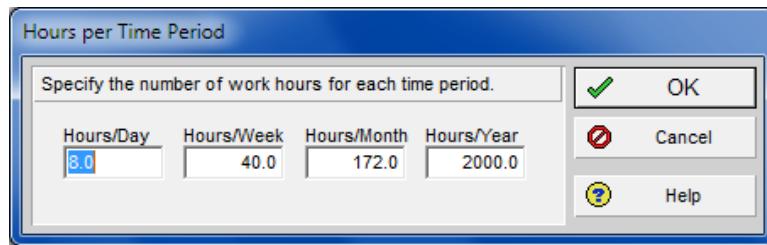
NOTE: Boxing Day is a holiday the day after Christmas celebrated in many countries.

Assignment

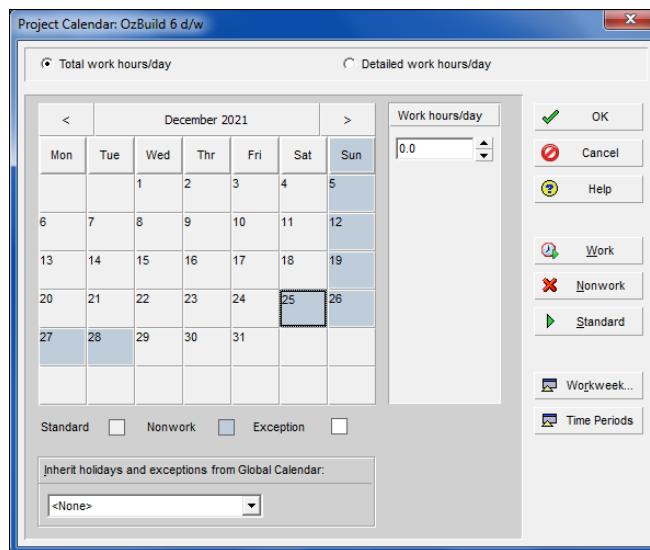
We will create two new calendars for this project, although we could use a standard calendar

1. Ensure your new OzBuild Bid project is open.
2. Select **Enterprise, Calendars...** to open the **Calendars** form,
3. Select the **Project** radio button,
4. Create a new Project Calendar titled “OzBuild 5 d/w” by clicking on the Add button and copying an appropriate calendar.
5. Click on the Modify... button to open the **Calendars** form.
6. Select the **Detailed work hours/day** radio button.
7. Click on the Workweek... button to open the **Calendar Weekly Hours** form.
8. Make the work hours from 08:00 to 16:00 without a lunch break from Monday to Friday and close the form.
9. Select **<None>** for **Inherit holidays and exceptions from Global Calendar**.
10. Click on the Time Periods button and check the Hours per Time Period are the same as in the diagram below, if not then edit them and then close the form:

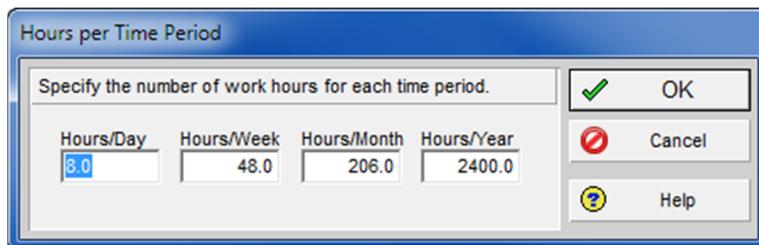
The screenshot shows the 'Calendar Weekly Hours' dialog box. On the left, a list of days of the week is shown with Monday selected. To the right is a grid for setting work hours. The grid has columns for 'Day of the Week' (Monday-Friday) and 'Work hours' (08:00-16:00). The first column (Monday) has a yellow highlight. The 'OK' button is highlighted in blue at the top right of the dialog.



11. Add the holidays above in 2021 and 2022 only.
12. Check there are no pre-existing holidays in the source calendar that should be made into work days.



13. Create a new calendar titled "OzBuild 6 d/w" for the 6-day week by copying the same Global calendar.
14. Make the work hours from 8:00 to 16:00 from Monday to Saturday and close the form.
15. Select <None> for Inherit holidays and exceptions from Global Calendar.
16. Click on the button and check the Hours per Time Period are the same as in the diagram below, if not then edit them and then close the form:



17. Add the holidays above in 2021 and 2022 only.
18. Ensure Saturday 25 December 2021 and 1 January 2022 are made into Non-Work days.
19. Ensure Easter Saturdays are made into Non-Work days
20. Check there are no pre-existing holidays in the source calendar that should be made into work days.
21. Should you wish to make the first day of the week a Monday then select Admin, Admin Preferences, General tab and change the Starting Day of Week to Monday.

6.8 Workshop 4 – Creating the Work Breakdown Structure



Background

A review of the scope identifies three deliverables:

- Technical Specification
- Delivery Plan
- Bid Document

Assignment

1. With your OzBuild project open click on the button to open the **WBS Window**.
2. Click in the WBS field header until the sort indicator is displayed as three horizontal bars, as displayed in the picture below. The WBS will now be displayed hierarchically now:

WBS Code	WBS Name
OZB	Bid for Facility Extension

Three Horizontal bars

3. Select the Project Node and press the **Ins** key, or right-click and select **Add** to add the WBS Nodes and continue to add all three WBS Nodes for the three Phases above.
4. If the WBS Nodes are not indented, click the **WBS Code** heading as described in paragraph 2, until they are indented.
5. Use the arrows on the **Move** toolbar (right side of screen) to put them in the correct order and indent.
6. Your result should look like the following picture:

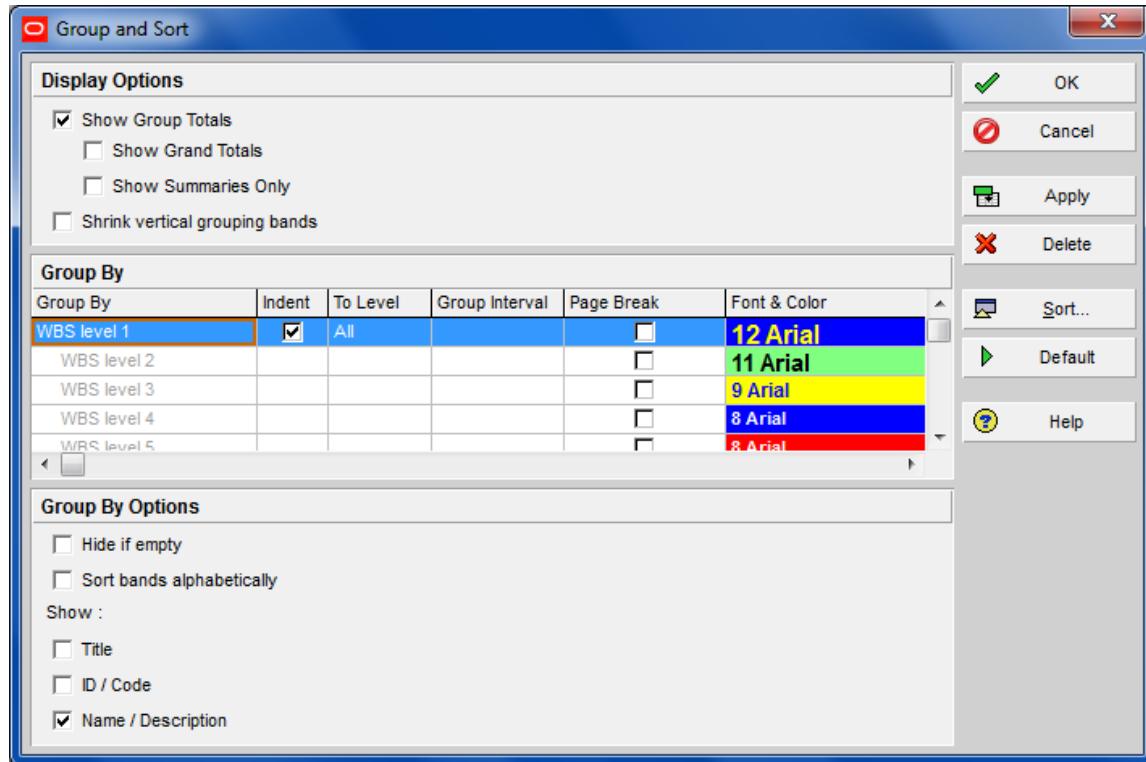
WBS Code	WBS Name
OZB	Bid for Facility Extension
OZB.1	Technical Specification
OZB.2	Delivery Plan
OZB.3	Bid Document

7. Move to the **Activities Window** by clicking on the icon on the **Project** toolbar or clicking on the **Activities** tab. Your screen may look like this:

Projects		Activities		WBS									
▼ Layout: www.primavera.com.au_Layout						Filter: All Activities							
Activity ID		Activity Name		Original Duration		Start		Finish		Total Float			
											Sun	Mon	
											Tue	Wed	
											Thr	Fri	
											Sat		
■	Bid for Facility Extension			0d					0d				
	Technical Specification									0d			
	Delivery Plan									0d			
	Bid Document									0d			

NOTE: Users may have to press the F5 key to refresh their data if the WBS is displayed incorrectly.

8. Your view may look different when you have not used the [www.primavera.com.au Layout](http://www.primavera.com.au/Layout).
9. The WBS will not be displayed for two reasons, in the **Group and Sort** form:
 - The **Group By** must be set to **WBS level 1** and **To Level** set to **All**, and/or
 - **Hide if empty** must not be checked.
10. If the WBS is not displayed correctly select **View**, **Group and Sort by** to open the **Group and Sort** form and set it as per the picture below:



7.16 Workshop 5 – Adding Activities



Background

We need to set up the defaults and add the activities to the schedule.

Assignment

1. Go to the **Projects Window**, highlight the OzBuild project and select the **Defaults** tab in the **Activity Details** pane. If required, adjust all the following parameters.

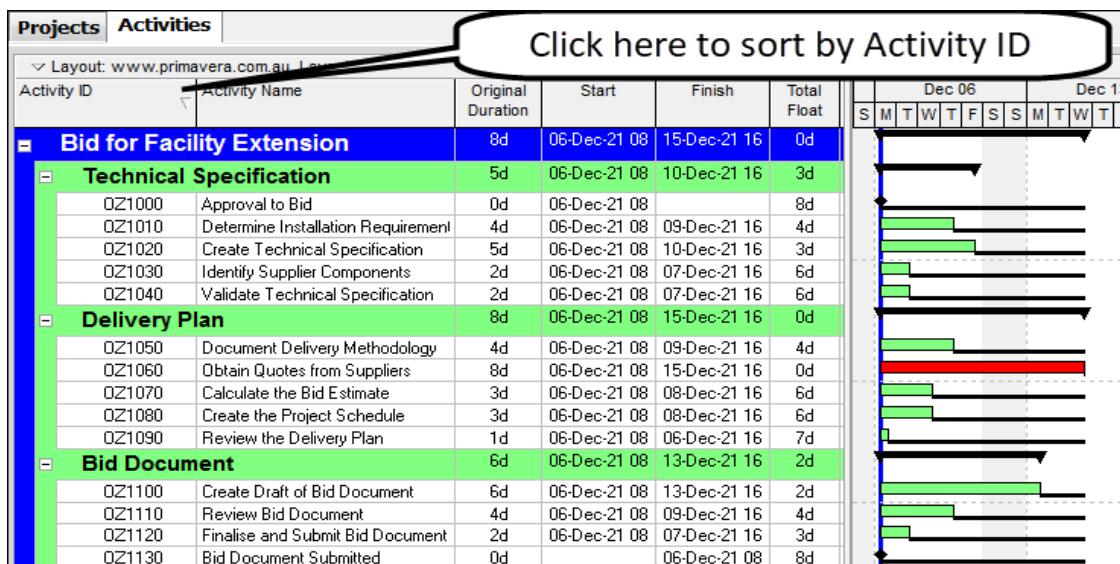
2. Open the **Activities Window** and add the following activities under the appropriate WBS.

NOTE: If the **New Activity** wizard appears select the “do not show this wizard again.”

3. Click on the Activity ID column header if the activities become out of order.

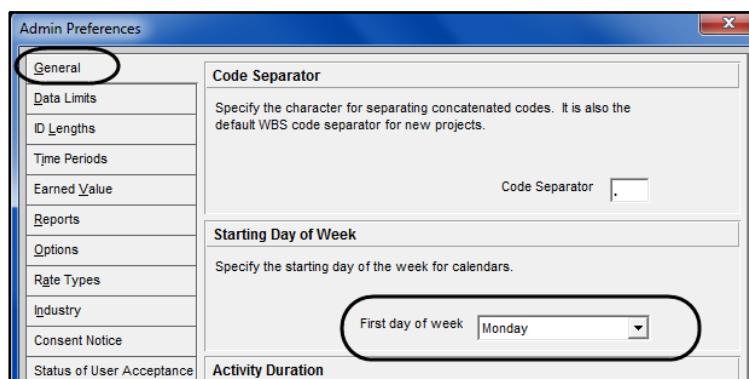
Activity ID	Activity Name	Orig Dur	Calendar	Activity Type
	Technical Specification			
OZ1000	Approval to Bid	0d	OzBuild 5d/w	Start Milestone
OZ1010	Determine Installation Requirements	4d	OzBuild 5d/w	Task Dependent
OZ1020	Create Technical Specification	5d	OzBuild 5d/w	Task Dependent
OZ1030	Identify Supplier Components	2d	OzBuild 5d/w	Task Dependent
OZ1040	Validate Technical Specification	2d	OzBuild 5d/w	Task Dependent
	Delivery Plan			
OZ1050	Document Delivery Methodology	4d	OzBuild 5d/w	Task Dependent
OZ1060	Obtain Quotes from Suppliers	8d	OzBuild 5d/w	Task Dependent
OZ1070	Calculate the Bid Estimate	3d	OzBuild 6d/w	Task Dependent
OZ1080	Create the Project Schedule	3d	OzBuild 6d/w	Task Dependent
OZ1090	Review the Delivery Plan	1d	OzBuild 5d/w	Task Dependent
	Bid Document			
OZ1100	Create Draft of Bid Document	6d	OzBuild 5d/w	Task Dependent
OZ1110	Review Bid Document	4d	OzBuild 5d/w	Task Dependent
OZ1120	Finalise and Submit Bid Document	2d	OzBuild 5d/w	Task Dependent
OZ1130	Bid Document Submitted	0d	OzBuild 5d/w	Finish Milestone

4. Assign the **Activity Calendar** a 6-day per week calendar to Activity IDs OZ1070 and OZ1080 in the **General** tab of the **Activity Details** form.
5. Reschedule by pressing **F9** and check that the Data Date is set at 6 December 2021 at 08:00.
6. Your answer should look like the following picture, but you may have different columns displayed and there may be different text on the bars.
7. Ensure the sort order is by Activity ID by clicking on the Activity ID Heading:



NOTE:

1. The picture above was created using the **www.primavera.com.au_Layout**, you will see different colors and columns when you use a different Layout. If you are unable to import this Layout, try selecting a different layout using the command **View, Layouts, Open Layout...** and select another layout from the list, such as the **Classic** or **Default WBS** Layout. If this does not solve your problem, then refer to the **Layouts and Formatting** sections of this book.
2. If your timescale week start date is different to the one above, for example the first day in the timescale is 5 Dec whereas the first day above is 6 Dec, then you may change this for all projects in the database if you have the access rights:
 - From the Professional Client (EPM) select **Admin, Admin Preferences** form, **General** tab, **Starting Day of Week** section and select Monday:



- From the Web Client (EPPM) for the Optional Client, log into the web and select **Administer, Application Settings, General tab, Starting Day of Week** section.

8.12 Workshop 6 – Formatting the Bar Chart



Background

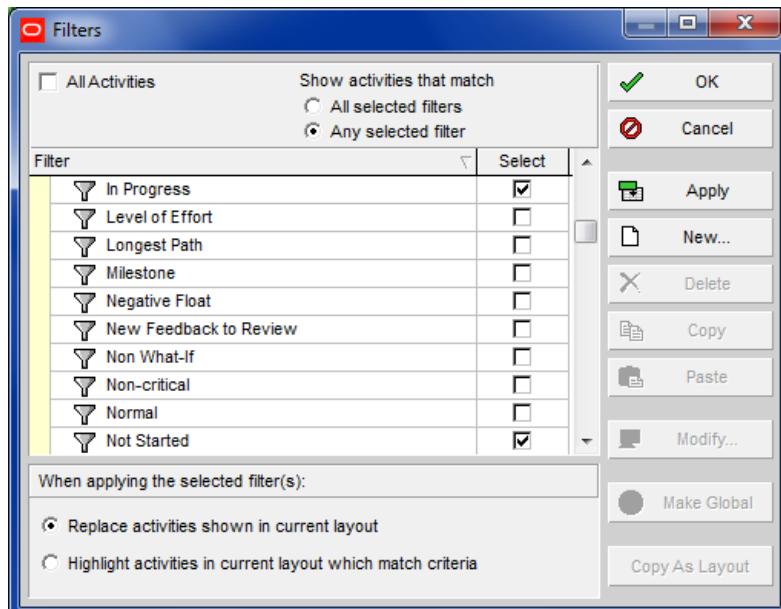
Management has received your draft report and requests that some changes be made to the presentation.

Assignment

Format your schedule as follows, but depending on the default settings, your Gantt Chart View may differ from that shown, e.g., there may be no summary bars:

1. You will not have to complete the Step 2 of this workshop if you have internet access and are able to download a layout from www.primavera.com.au.
 - If you have downloaded and applied the www.primavera.com/Layout.plf move to Step 3, DO NOT COMPLETE Step 2.
 - If you have NOT downloaded and applied the www.primavera.com/Layout.plf complete Step 2.
2. Format Bars, if you are unable to download the www.primavera.com/Layout.plf layout then:
 - To format the bars open the **Bars** form,
 - Click on the button to set the bars to the Primavera default settings,
 - Edit the **Float Bar Filter (Total Float bar)** so it only shows float for Not Started or In Progress activities. Ensure you select the **Any selected filter** in the **Filters** form:

Display	Name	Timescale	User Start Date	User Finish Date	Filter	Preview
<input checked="" type="checkbox"/>	Float Bar	Float Bar			Not Started or In Progress	



- Delete the **Secondary Baseline & Tertiary Baseline** bars,
- Move the Baseline bars and Baseline Milestones to the bottom of the Bars form to remove relationships on the Baseline bars,
- Add missing Project Baseline Milestone and format the Baseline bars as per the picture below, making them different colors:

Display	Name	Timescale	User S	User F	Filter	Preview
<input type="checkbox"/>	Project Baseline Bar	Project Baseline Bar			Normal	
<input type="checkbox"/>	Project Baseline Milestone	Project Baseline Bar			Milestone	
<input type="checkbox"/>	Primary Baseline	Primary Baseline Bar			Normal	
<input type="checkbox"/>	Primary Baseline Milestone	Primary Baseline Bar			Milestone	

- Remove all text from all bars, except from the **Current Bar Labels** bar, by:
 - Clicking on the **Bar Labels** tab at the bottom,
 - Clicking on one bar at a time and using the button at the bottom (NOT SIDE) of the screen to delete the text line,
 - Change the **Current Bar Labels** bar filter to read All Activities and do not display.

3. Display the following bars:

- Remaining Level of Effort
- Actual Level of Effort
- Actual Work
- Remaining Work
- Remaining Critical Work
- Milestones
- % Complete
- Summary Bar
- Float Bar (Total Float)
- Negative Float Bar

4. Adding Columns:

- Add **Calendar** and **Activity Type** columns, from the **General** section of the **Columns** form, to the right of the Activity Name column.
- Adjust the column widths to a best fit by dragging the column header divider lines.
- Display the **Total Float** column if not displayed.

5. Press the **F9** key and click the button which will schedule the project and calculate the float.

6. Adjusting Row Heights:

- Change the Row Height to 30 points by selecting **View, Table Font and Row** and apply,
- Now check the **Optimize height by row content** box, not exceeding 1 line per row and apply,
- Now change the setting to 18 point height for all rows and apply.
- Click on to close the form.

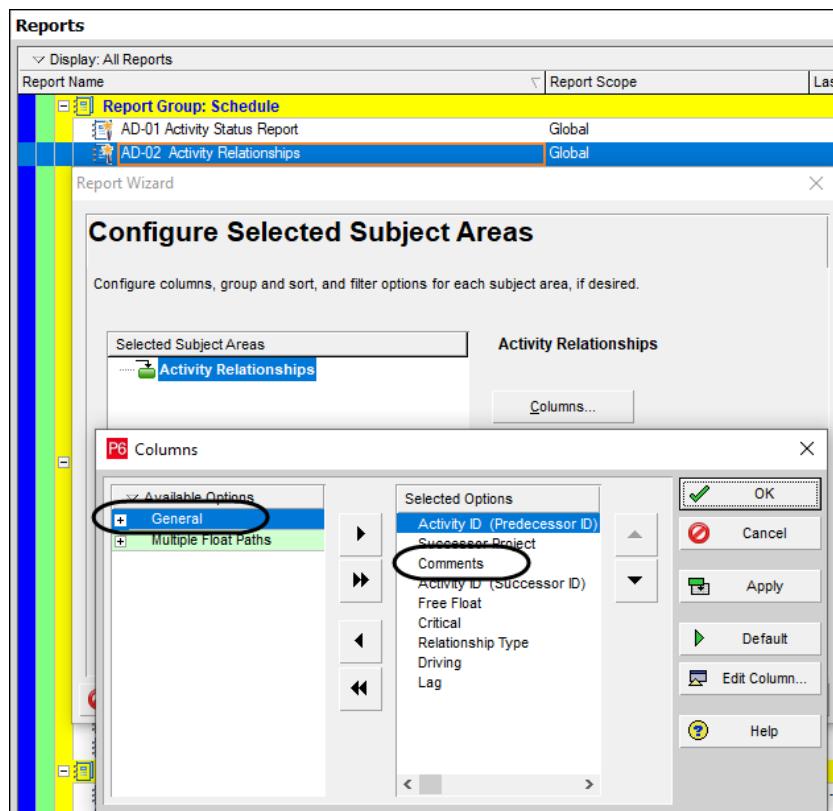
The comment is seen in both the Predecessor and Successor window of each relationship assigned a comment:

Successors						
		Activity EC1440		Set Mechanical and Electrical Equipment		
Project ID	WBS	Activity ID	Activity Name	Comments	Relations	Lag
EC00501	EC00501.Mech	EC1500	Install HVAC Ducts		FS	0
EC00501	EC00501.Mech	EC1490	Rough-In Phase Begins	Lag to allow for slow delivery	FS	10

This is a very useful function and in the past one had to either use a Note or a UDF assigned to either the predecessor or successor activity to record notes about a relationship.

This function is also useful for recording changes to relationships.

The **Comments** column is available in the **Activity Relationship** report:



9.13 Workshop 7 – Adding the Relationships



Background

You have determined the logical sequence of activities, so you may now create the relationships.

Assignment

1. Display the **Predecessor** column from the **Lists** section of the **Columns** form, to the right of the Activity Name.
2. Input the logic below using several of the methods detailed in this chapter:

Activity ID	Activity Name	Predecessors
Bid for Facility Extension		
Technical Specification		
OZ1000	Approval to Bid	
OZ1010	Determine Installation Requirements	OZ1000
OZ1020	Create Technical Specification	OZ1010
OZ1030	Identify Supplier Components	OZ1020
OZ1040	Validate Technical Specification	OZ1030
Delivery Plan		
OZ1050	Document Delivery Methodology	OZ1040
OZ1060	Obtain Quotes from Suppliers	OZ1030
OZ1070	Calculate the Bid Estimate	OZ1050, OZ1060
OZ1080	Create the Project Schedule	OZ1070
OZ1090	Review the Delivery Plan	OZ1080
Bid Document		
OZ1100	Create Draft of Bid Document	OZ1050
OZ1110	Review Bid Document	OZ1090, OZ1100
OZ1120	Finalise and Submit Bid Document	OZ1110
OZ1130	Bid Document Submitted	OZ1120

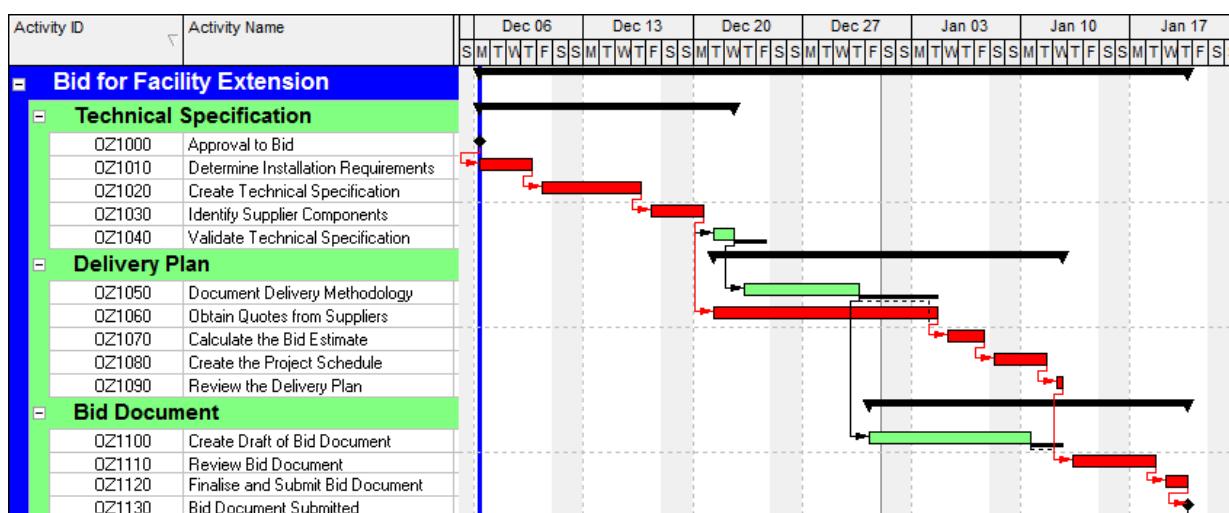
3. Press **F5 – Refresh Data** if the relationships do not appear in columns.
4. Press **F9** or click on the button to schedule.
5. Hide and display the Logic Links using the icon. Leave them displayed.

continued...

Answer to Workshop 7

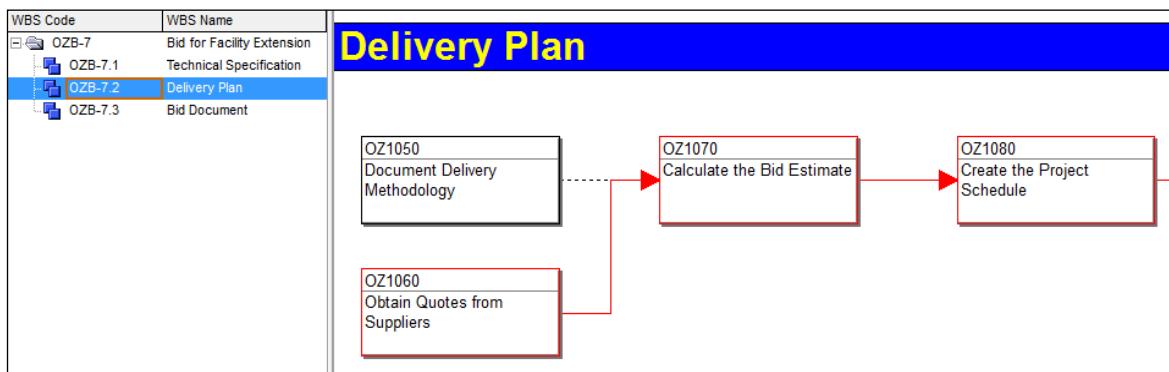
6. Format the columns as per the following picture:

Activity ID	Activity Name	Predecessors	Successors	Original Duration	Start	Finish	Total Float
Bid for Facility Extension				31d	06-Dec-21 08	20-Jan-22 16	0d
Technical Specification				13d	06-Dec-21 08	22-Dec-21 16	2d
OZ1000	Approval to Bid		OZ1010	0d	06-Dec-21 08		0d
OZ1010	Determine Installation Requirements	OZ1000	OZ1020	4d	06-Dec-21 08	09-Dec-21 16	0d
OZ1020	Create Technical Specification	OZ1010	OZ1030	5d	10-Dec-21 08	16-Dec-21 16	0d
OZ1030	Identify Supplier Components	OZ1020	OZ1040, OZ1060	2d	17-Dec-21 08	20-Dec-21 16	0d
OZ1040	Validate Technical Specification	OZ1030	OZ1050	2d	21-Dec-21 08	22-Dec-21 16	2d
Delivery Plan				14d	21-Dec-21 08	12-Jan-22 16	0d
OZ1050	Document Delivery Methodology	OZ1040	OZ1070, OZ1100	4d	23-Dec-21 08	30-Dec-21 16	2d
OZ1060	Obtain Quotes from Suppliers	OZ1030	OZ1070	8d	21-Dec-21 08	04-Jan-22 16	0d
OZ1070	Calculate the Bid Estimate	OZ1050, OZ1060	OZ1080	3d	05-Jan-22 08	07-Jan-22 16	0d
OZ1080	Create the Project Schedule	OZ1070	OZ1090	3d	08-Jan-22 08	11-Jan-22 16	0d
OZ1090	Review the Delivery Plan	OZ1080	OZ1110	1d	12-Jan-22 08	12-Jan-22 16	0d
Bid Document				14d	31-Dec-21 08	20-Jan-22 16	0d
OZ1100	Create Draft of Bid Document	OZ1050	OZ1110	6d	31-Dec-21 08	10-Jan-22 16	2d
OZ1110	Review Bid Document	OZ1090, OZ1100	OZ1120	4d	13-Jan-22 08	18-Jan-22 16	0d
OZ1120	Finalise and Submit Bid Document	OZ1110	OZ1130	2d	19-Jan-22 08	20-Jan-22 16	0d
OZ1130	Bid Document Submitted	OZ1120		0d		20-Jan-22 16	0d



10 ACTIVITY NETWORK VIEW

The **Activity Network**, also known as the **PERT View**, displays activities as boxes connected by the relationship lines. See the following picture:



This chapter will not cover this subject in detail but will introduce the main features.

Many features available in the **Gantt Chart View** are also available in the **Activity Network View**, including:

Topic	Menu Command
<ul style="list-style-type: none"> Viewing a Project Using the Activity Network View. 	<ul style="list-style-type: none"> Click on the Top Layout toolbar  button, or Select View, Show on Top, Activity Network.
<ul style="list-style-type: none"> Adding and Deleting Activities in the Activity Network View. 	<ul style="list-style-type: none"> Use the Insert and Delete keys, or Use the Edit toolbar, Add  and Delete  buttons, or Use the menu commands Edit, Add and Delete.
<ul style="list-style-type: none"> Adding, Editing and Deleting Relationships. 	<ul style="list-style-type: none"> Graphically drag from one activity to another, or Use the Predecessor, or Successor, or Relationship tabs in the Activities Window, Details form.
<ul style="list-style-type: none"> Formatting the Activity Boxes. 	<ul style="list-style-type: none"> Select View, Activity Network, Activity Network Options...., or Right-click in the Activity Network area and select Activity Network Options....

10.1 Viewing a Project Using the Activity Network View

To view your project in the **Network View** either:

- Click on the **Top Layout** toolbar  button, or
- Select **View, Show on Top, Activity Network**.

10.2 Adding and Deleting Activities

10.2.1 Adding an Activity

A **New Activity** may be created without a relationship by:

- Using the **Insert** key, or
- Use the **Edit** toolbar, **Add**  button, or
- Selecting **Edit, Add**.

10.2.2 Deleting an Activity

Activities may be deleted by:

- Using the **Delete** key, or
- Use the **Edit** toolbar, **Delete**  button, or
- Selecting **Edit, Delete**.

10.3 Adding, Editing and Deleting Relationships

Relationships may be added, deleted or edited using the following methods:

10.3.1 Graphically Adding a Relationship

- To create a FS relationship, move the mouse to the right side of the predecessor activity box (the pointer will change to a ) and drag to the left side of the successor activity. Selecting the left or right side of the predecessor and successor activity box will determine the type of relationship that is created.
- To edit the relationship, select the relationship (it will change to blue), double-click to open the **Edit Relationship** form, and edit the relationship.

10.3.2 Using the Activity Details Form

Open the **Relationships** tab in the **Activity Details** form:

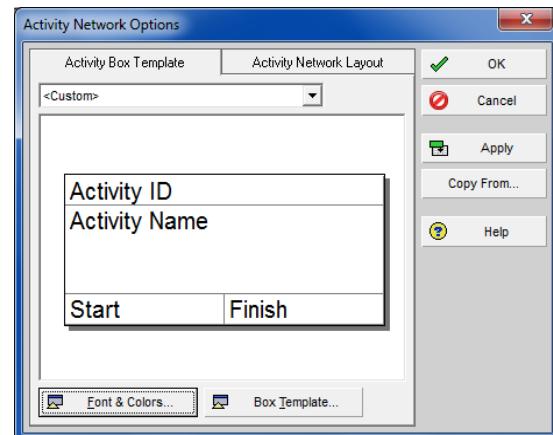
- When the **Activity Details** form is not displayed, select **View, Show on Bottom**.
- Then add, edit, and delete activities in the same way as with the Gantt Chart.

10.4 Formatting the Activity Boxes

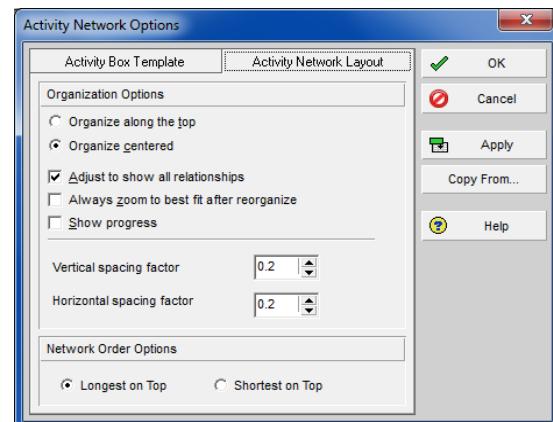
Activity Boxes may be formatted from the **Activity Network Options** form, which may be displayed when an Activity Network View is displayed. The formatting affects both the **Trace Logic** and **Activity Network Window** formatting for the layout that is being formatted:

- Select **View, Activity Network, Activity Network Options...**, or
- Right-click in the PERT area and select **Activity Network Options...:**
 - A selection of box templates are available from the drop-down box under the **Activity Box Template** title. These templates display different data in the box.
 - Click on  **Font & Colors...** to format the text font and colors,
 - Click on  **Box Template...** to edit the template or add and remove data items from the activity boxes.

NOTE: This option also formats the **Trace Logic** boxes with the same format.



- Click on the **Activity Network Layout** tab to display further options which are self-explanatory:
 - **Show progress** will place a diagonal line through an in-progress activity and a cross through a completed activity.
 - The **spacing factors** are a percentage of the box sizes.



10.5 Reorganizing the Activity Network

Activities in the **Activity Network** view may be repositioned by dragging. There are two functions available when right-clicking in the **Activity Network** view:

- **Reorganize** will reposition activities that have not been manually positioned, and
- **Reorganize All** will reposition all activities including those that have been manually positioned.

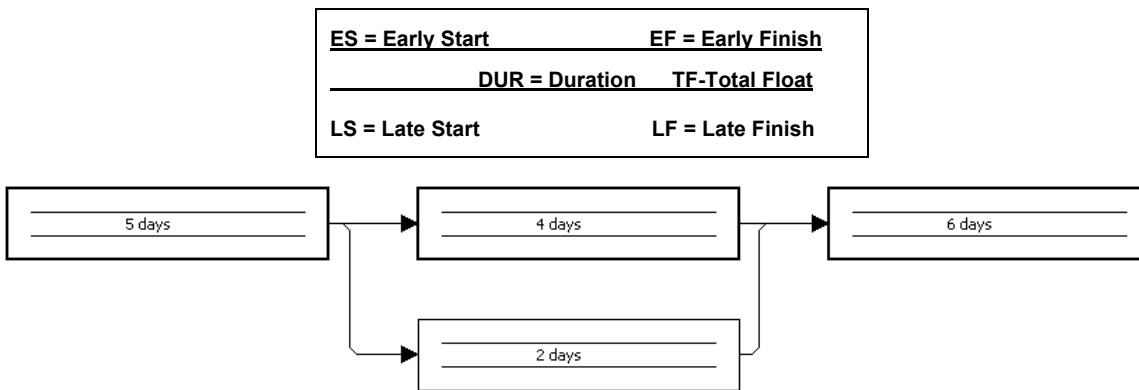
10.6 Saving and Opening Activity Network Positions

When activities are manually dragged into new positions on the screen for presentation purposes, it is possible to save and reload these positions at a later date, they are not saved when you exit the view:

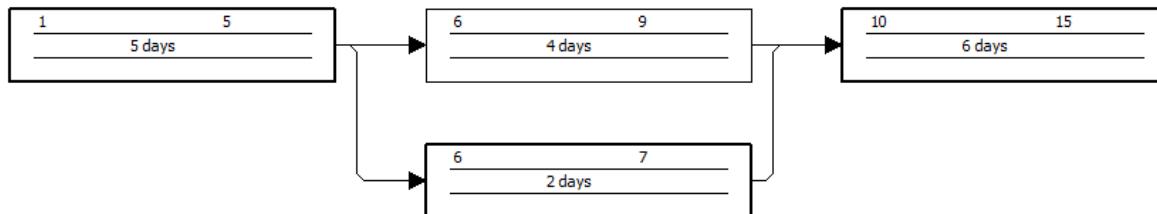
- **View, Activity Network, Save Network Positions...** will create an *.anp file, and
- **View, Activity Network, Open Network Positions...** will enable an *.anp file to be located and loaded which will reposition the activities as they were saved.

10.7 Early Date, Late Date and Float Calculations

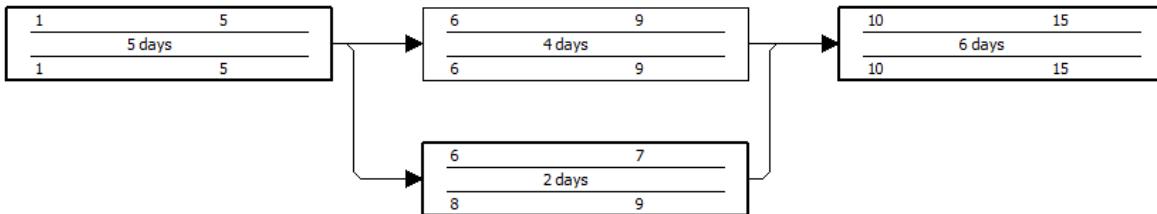
To help understand the calculation of late and early dates, float and critical path, we will now manually work through an example. The boxes below represent activities.



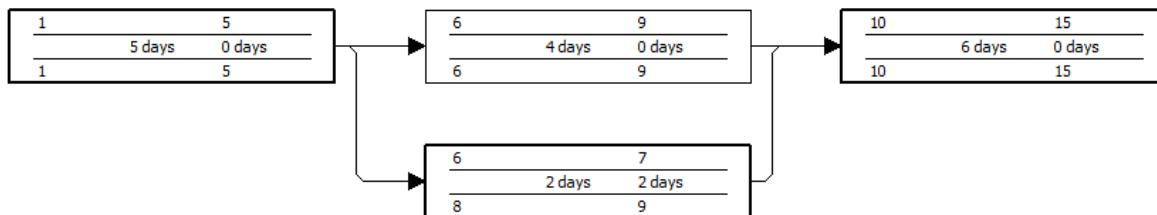
- The forward pass calculates the early dates: $EF = ES + DUR - 1$
Start the calculation from the first activity and work forward in time.



- The backward pass calculates the late dates: $LS = LF - DUR + 1$
Start the calculation at the last activity and work backwards in time.



Total Float is the difference between either the **Late Finish** and the **Early Finish** or the difference between the **Late Start** and the **Early Start** of an activity. The lower 2 days' activity has float of $9 - 7 = 2$ days. None of the other activities has float.



The **Critical Path** is the path where any delay causes a delay in the project and runs through the top row of activities. **Free Float** is the difference between the Predecessor Early Finish and the Successor Early Start.



An activity may not be on the Critical Path and may have more than one predecessor. A **Driving Relationship** is the predecessor that determines the Activity Early Start.

10.8 Workshop 8 – Scheduling Calculations and Activity Network View



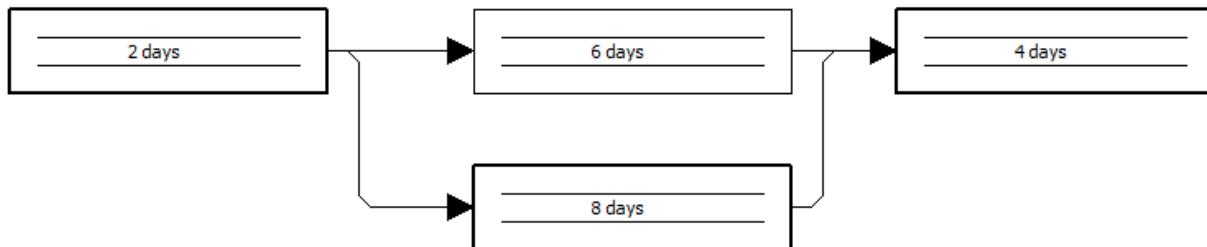
Background

We want to practice calculating early and late dates with a simple manual exercise.

Assignment

1. Apply the Activity Network View of your OzBuild schedule by clicking on the  icon.
2. Click on each node of the WBS and notice how only activities assigned to each node are displayed.
3. Click on the three Zoom icons  and notice their effect on the schedule.
4. Calculate the Early Dates, Late Dates, and Total Float for the following activities, assuming a Monday-to-Friday working week and the first activity starting on 1 April.

<u>ES = Early Start</u>	<u>EF = Early Finish</u>
<u>DUR = Duration</u>	<u>TF - Total Float</u>
<u>LS = Late Start</u>	<u>LF = Late Finish</u>



<		April :						>	
Sun	Mon	Tue	Wed	Thr	Fri	Sat			
	1	2	3	4	5	6			
7	8	9	10	11	12	13			
14	15	16	17	18	19	20			
21	22	23	24	25	26	27			
28	29	30							

5. See over the page for the answer:

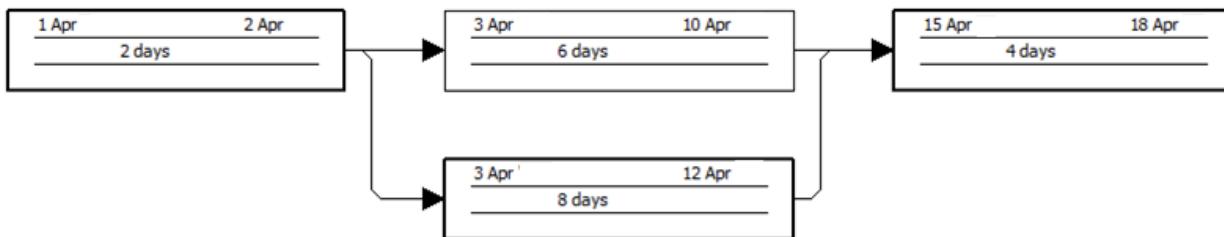
Answer to Workshop 8

<u>Early Start</u>	<u>Early Finish</u>
<u>Duration</u>	<u>Float</u>
<u>Late Start</u>	<u>Late Finish</u>

<	April						>
Sun	Mon	Tue	Wed	Thr	Fri	Sat	
1	2	3	4	5	6		
7	8	9	10	11	12	13	
14	15	16	17	18	19	20	
21	22	23	24	25	26	27	
28	29	30					

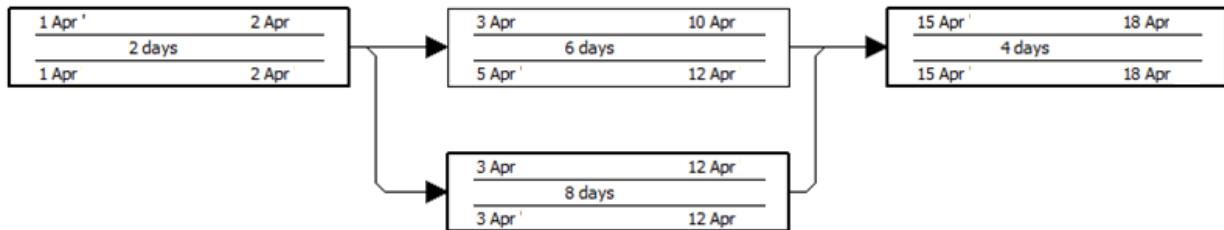
Forward Pass

$$EF = ES + DUR - 1$$



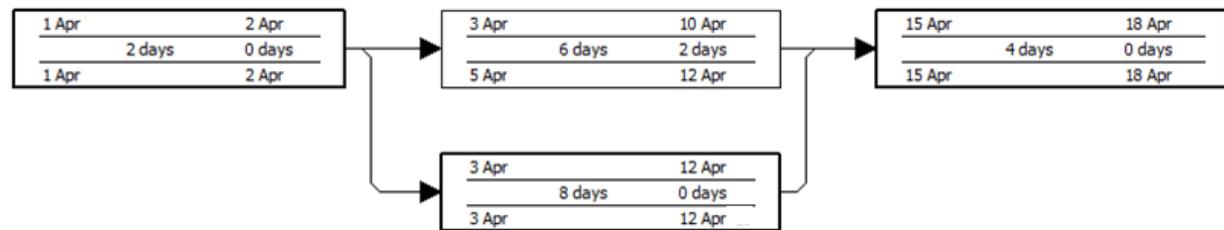
Backward Pass

$$LS = LF - DUR + 1$$

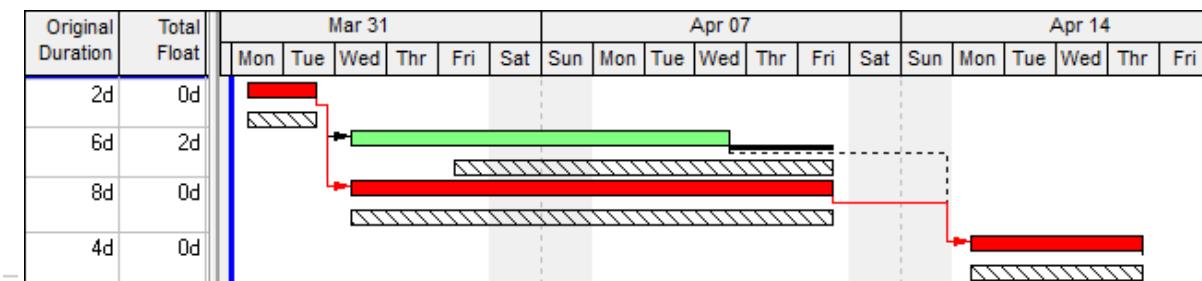


Float Calculation

$$TF = LS - ES$$



The Early Bar is the upper bar, the Late Bar the lower bar and the end of the Total Float bar, which is the thin bar, ends at the Late Finish date.



11 CONSTRAINTS

Constraints are used to impose logic on activities that may not be realistically scheduled with logic links. This chapter will deal with the following constraints in detail:

- **Start On or After**
- **Finish On or Before**

These are the minimum number of constraints that are required to effectively schedule a project.

Start On or After (also known as an “Early Start” or “Start No Earlier Than” constraint as it only affects the Early dates calculation) is used when the start date of an activity is known and does not have a predecessor. Primavera will not calculate the activity early start date prior to this date.

Finish On or Before (also known as “Late Finish” or “Finish No Later Than” constraint as it only affects the Late dates calculation) is used when the latest finish date is stipulated. Primavera will not calculate the activity’s late finish date after this date.

The following table summarizes the methods used to assign Constraints to Activities or how to add notes to activities:

Topic	Notes for Creating a Constraint
<ul style="list-style-type: none"> • Setting a Primary and Secondary constraint with the Activity Details form. 	Open the Status tab on the Activity Details form.
<ul style="list-style-type: none"> • Setting Constraints using columns. 	<p>The following columns may be displayed and the constraints assigned or edited:</p> <ul style="list-style-type: none"> • Primary Constraint • Primary Constraint Date • Secondary Constraint • Secondary Constraint Date • Expected Finish Date
<ul style="list-style-type: none"> • Dragging an Activity in the Gantt Chart. 	Dragging an Activity in the Gantt Chart will open the Confirmation form where the user is able to confirm the setting of a Start On or After constraint.
<ul style="list-style-type: none"> • Adding Notes, these could be about constraints or other activity information. 	The Activity Details form has a Notebook tab, which enables Notes to be assigned to Notebook Topics .

The AACE RP 24R-03 Developing Activity Logic is applicable to this chapter.

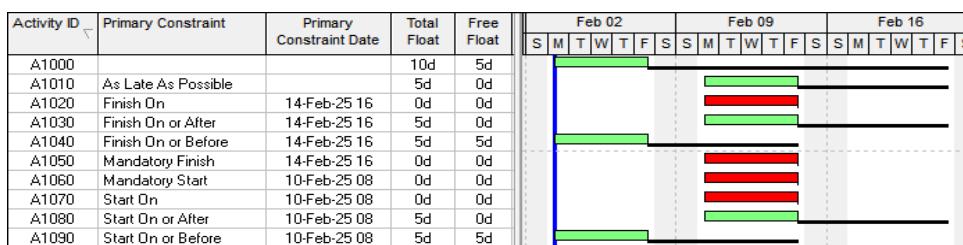


Primavera will permit two constraints to be assigned to each activity. Microsoft Project only permit one constraint except when a Deadline constraint is applied in Microsoft Project. Elecosoft (Asta) Powerproject allows only one constraint but the **Work Between** constraint is similar to applying two constraints.

A full list of **constraints** available in Primavera:

- **<None>** This is the default for a new activity. An activity by default is scheduled to occur **As Soon As Possible** and does not have a Constraint.
- **Start On** Also known as **Must Start On**, sets the activity start date, has no float. The early start and the late start dates are set to the Constraint Date.
- **Start On or Before** Also known as **Start No Later Than** or **Late Start**, this constraint sets the late date after which the activity will not start.
- **Start On or After** Also known as **Start No Earlier Than** or **Early Start**, this constraint sets the early date before which the activity will not start.
- **Finish On** Also known as **Must Finish On**, sets the activity will finish date, has no float as the early finish and the late finish dates are set to be the same as the Constraint Date.
- **Finish On or Before** Also known as **Finish No Later Than** or **Late Finish**, this sets the late date after which the activity will not finish.
- **Finish On or After** Also known as **Finish No Earlier Than** or **Early Finish**, this sets the early date before which the activity will not finish.
- **As Late As Possible** This calculates as a Zero Free Float constraint and it is delayed only to consume Free Float only, will not delay any other activity and does not have any particular Constraint Date. Unlike Microsoft Project where an As Late As Possible constraint will consume Total Float and delay all successor activities with Total Float.
- **Mandatory Start** This constraint prevents float being calculated through this activity and effectively breaks a schedule into two parts. This is also sometimes called a Hard Constraint.
- **Mandatory Finish** This constraint prevents float being calculated through this activity and effectively breaks a schedule into two parts. This is also sometimes called a Hard Constraint.
- **Expected Finish** An **Expected Finish** sets the Early Finish to the Expected Finish constraint date and calculates the Remaining Duration from the Early Start date for an un-started activity, or Data Date if the activity is in-progress to the Expected Finish date.

Earlier Than constraints operate on the **Early Dates**, and **Later Than** constraints operate on **Late Dates**. The following picture demonstrates how constraints calculate Total Float of activities without links:



i An activity assigned an **As Late as Possible** constraint in Primavera P6 and Elecosoft (Asta) Powerproject (as Placement) will schedule the activity so it absorbs only **Free Float** and will not delay the start of any successor activities, this is normally called a **Zero Free Float** constraint. In Microsoft Project, an activity assigned with an **As Late as Possible** constraint will be delayed to absorb the Total Float and delay all its successor activities which have float, not just the activity with the constraint.

11.1 Assigning Constraints



When setting constraints sometimes the constraint time will not be set at the start or finish of the activity calendar but set at 00:00 or some other irrelevant time. Therefore, when setting constraints, you should always display the time by selecting **Edit, User Preferences ..., Dates** tab to ensure the constraint time is compatible with the activity calendar.

11.1.1 Number of Constraints per Activity

Two constraints are permitted against each activity. They are titled Primary and Secondary Constraint. After the Primary has been set, a Secondary may be set only when the combination is logical and therefore a reduced list of constraints is available from the Secondary Constraint list after the Primary has been set.

11.1.2 Setting a Primary Constraint Using the Activity Details Form

To assign a constraint using the **Activity Details** form:

- Select the activity requiring a constraint,
- Open the **Status** tab on the **Activity Details** form,
- Select the **Primary Constraint** type from the **Date** drop-down list to the right of **Primary Date**:

Constraints			
Primary	<input type="button" value="Start On or After"/>	Secondary	<input type="button" value="< None >"/>
Date	<input type="text" value="03-Jan-12 08"/> ...	Date	<input type="text"/> ...

11.1.3 Setting a Secondary Constraint Using the Activity Details Form

To assign a constraint using the **Activity Details** form:

- Select the activity requiring a constraint,
- Open the **Status** tab on the **Activity Details** form,
- Select the **Secondary Constraint** type from the **Date** drop-down list to the right of **Secondary Date**:

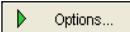
Constraints			
Primary	<input type="button" value="Start On or After"/>	Secondary	<input type="button" value="Finish On or Before"/>
Date	<input type="text" value="03-Jan-12 08"/> ...	Date	<input type="text" value="11-Jan-12 16"/> ...

The picture above shows that after a **Primary Start On or After** constraint is set there are only two Secondary Constraints available. After a constraint is set the date will have an asterisk "*" next to it.

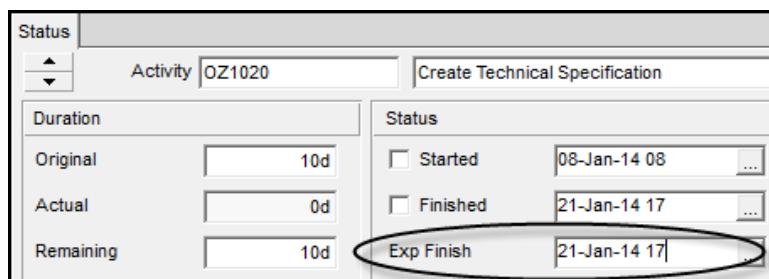
- Start Constraints will have the "*" next to the Start Date, and
- Finish Constraints will have the "*" next to the Finish Date.

11.1.4 Expected Finish Constraint

This constraint is set in the dates **Status** area above the **Constraints** area and will only work if the Tools, Schedule...,

 **Use Expected Finish dates** check box is checked.

This constraint is set in the **Status** section of the **Activity Details** form, **Status** tab, not under the **Constraints** section as one would expect:



Status	
Activity	OZ1020
Duration	
Original	10d
Actual	0d
Remaining	10d
Status	
<input type="checkbox"/> Started	08-Jan-14 08
<input type="checkbox"/> Finished	21-Jan-14 17
<input type="checkbox"/> Exp Finish	21-Jan-14 17

An **Expected Finish** constraint recalculates the **Remaining Duration** on a permanent basis.

An **Expected Finish** constraint in the past will always set the **Remaining Duration** to zero.



The author uses an Expected Finish constraint as a tool to calculate the Remaining Duration when the planned finish date is known, but then removes it after calculation. This is because when the Expected Finish constraint date is in the past it will zero out the Remaining Duration.

11.1.5 Setting Constraints Using Columns

The following constraint columns may be displayed and the Constraints edited or assigned using these columns:

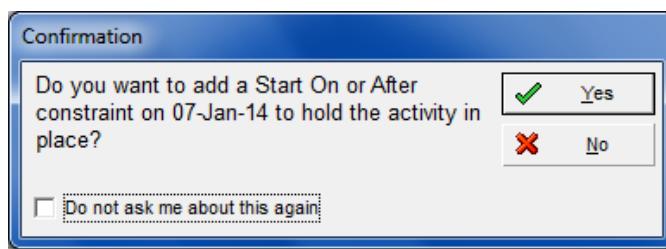
- Primary Constraint
- Primary Constraint Date
- Secondary Constraint
- Secondary Constraint Date
- Expected Finish

Activity ID	Activity Name	Primary Constraint	Primary Constraint Date	Secondary Constraint	Secondary Constraint Date	Expected Finish
Bid for Facility Extension						
Technical Specification						
OZ1000	Approval to Bid	Start On or After	02-Jan-14 08			
OZ1010	Determine Installation Requirements	< None >				
OZ1020	Create Technical Specification	As Late As Possible				
OZ1030	Identify Supplier Components	Mandatory Start				
OZ1040	Validate Technical Specification	Start On				
Delivery Plan						
OZ1050	Document Delivery Methodology	Start On or After				
OZ1060	Obtain Quotes from Suppliers	Start On or Before				
OZ1070	Calculate the Bid Estimate					

11.1.6 Typing in a Start Date

A **Start On or After** constraint may be assigned from the **Activity Status** tab or the **Start Date** column by typing a date into the **Start** field:

- A **Start On or After** constraint is assigned by overtyping the Start date. The **Confirmation** form will confirm this action.



Confirmation

Do you want to add a Start On or After constraint on 07-Jan-14 to hold the activity in place?

Yes

No

Do not ask me about this again



A date typed into the finish date will not assign a Finish Date constraint but will adjust the duration of the activity. In Microsoft Project, a date typed into either the Start or the Finish field will set a constraint; Primavera does not operate in this way.



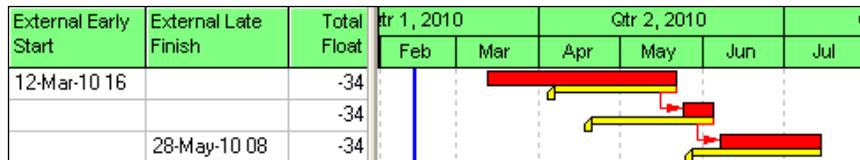
Beware of clicking **Do not ask me about this again** as you will be unable to turn this option back on again using the user interface with earlier versions of P6.

11.2 Understanding External Dates

In summary:

- **External Dates** are created where there are inter-project relationships in a source database that you are importing a P6 project from.
- When you import the project into your database that had **External Relationships** in the source database then these relationships are not imported then **External Dates** are created that represent the missing relationships and calculate like constraints.
- You must always search for **External Dates** when you import a project from an unknown source.
- Check this in the Tools, Schedule..., Options form and check **Ignore relationships to and from other projects** to disable **External Dates**, but I do not recommend this option.
- **External Dates** may be located by displaying the columns **External Early Start** (which works as an Early Start Constraint) and the **External Late Finish** (that works like a Late Finish Constraint) or look for Start and Finish dates that have an “*”.

These dates can be very confusing if one is not aware that they have been created or how they operate. The negative float in the picture below is created by these dates after an activity's duration was increased by 34 days:

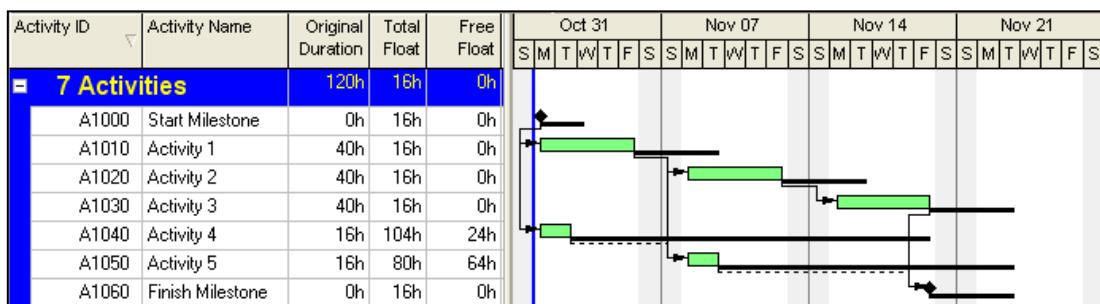


11.3 Project Must Finish By Date

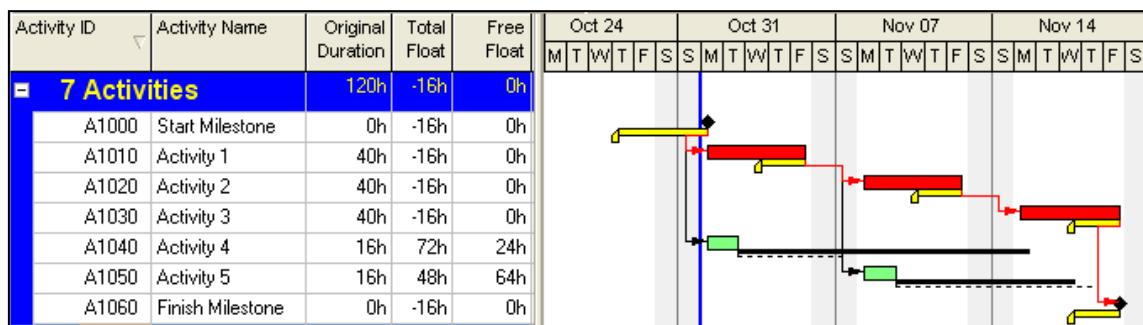
An absolute finish date may be imposed on the project using the **Project Window, Dates** tab:

Schedule Dates		Anticipated Dates	
Project Planned Start	02-Dec-13 08	Anticipated Start	02-Dec-13 08
Must Finish By	24-Jan-14 17	Anticipated Finish	27-Jan-14 16
Data Date	02-Dec-13 08	Finish	21-Feb-14 17

Imposing a **Must Finish By** date makes Primavera calculate the late dates from the **Must Finish By** date rather than the calculated early finish date. This will introduce positive float to activities when the calculated **Early finish** date is prior to the **Must Finish By** date:



This will also create negative float when the activity's calculated early finish date is after the **Must Finish By** date, but it is not obvious where the negative float is being driven from as there are no constraints assigned to activities:



When opening multiple projects some further issues need to be considered when a **Project Must Finish By** date is set and these are covered in the **Multiple Project Scheduling** chapter.

To remove a **Project Must Finish By** date, highlight the date, press the **Delete** key and then the **Enter** key or tab out of the cell to ensure the date is removed.



It is not obvious where the float is being generated after a **Must Finish By** date is imposed on a project. This is often confusing to people new to scheduling and it is recommended that you do not use a **Must Finish By** date. Instead, tie all activities to a **Finish Milestone** which has a **Late finish** constraint.

11.4 Activity Notebook

It is often important to note why constraints have been set. Primavera has functions that enable you to note information associated with an activity, including the reasons associated for establishing a constraint.

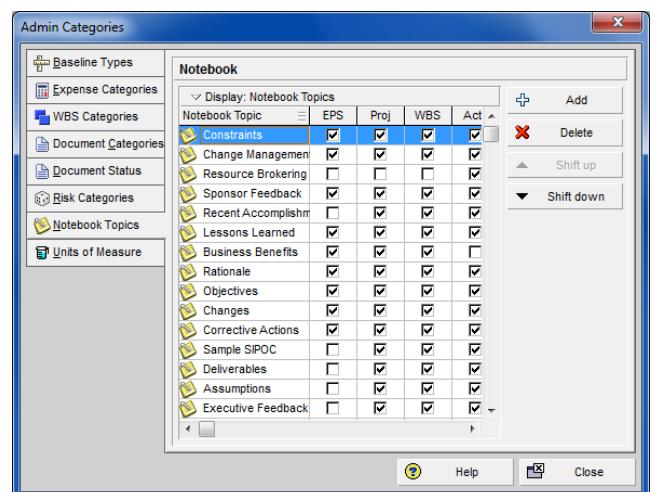
The **Activity Details** form has a **Notebook** tab, which enables Notes to be assigned to **Notebook Topics** and has some word processing-type formatting functions.

11.4.1 Creating Notebook Topics

Notebook Topics are created by selecting **Admin**, **Admin Categories...** in the Professional Version, and through the Web tool for the Optional Client and then selecting the **Notebook Topics** tab. After a topic has been created this topic may be made available to the following data fields by checking the appropriate box:

- EPS
- Project
- WBS
- Activities

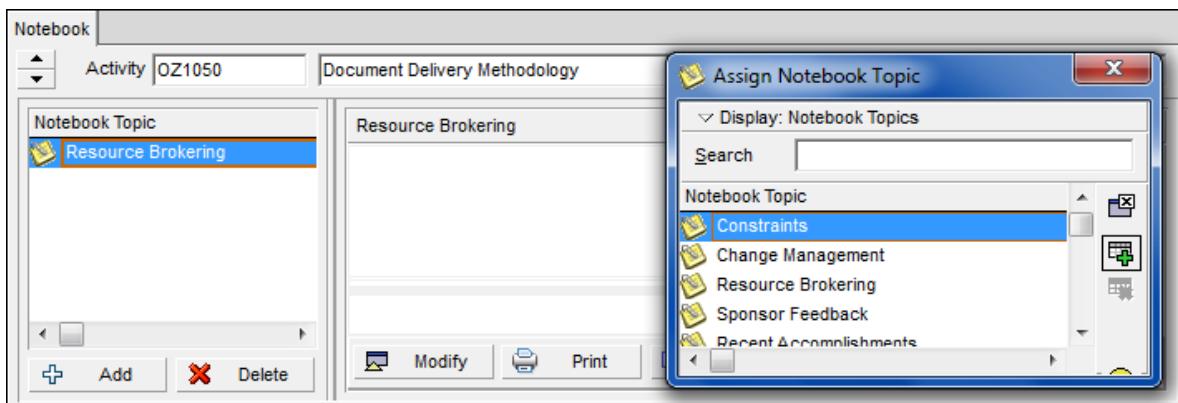
-



11.4.2 Adding Notes

To add a note to an activity:

- Select the **Notebook** tab in the **Activity Details** form,
- Click to open the **Assign Notebook Topic** form,
- Assign a Notebook topic using the icon, and
- Click to open a form where you may type in your note:



11.5 Completed Schedule Check List

At this point in time the schedule is complete and the following list could be used to check a completed schedule before submission:

- Check the full scope of the project has been captured.
- Ensure all contract or customer requirements have been considered by reading the contract or scope of works.
- Check all calendars and holidays are correct and that the holidays are set well into the future so any delayed activity will calculate correctly. Typically this would be twice the project duration.
- Ensure there is a closed network with all activities having a start predecessor and finish successor. This may be achieved by displaying the predecessor and successor columns.
- Check all relationships are valid.
- Check all constraints are valid and cross referenced to contract documentation.
- Review float. Activities with excessive float should be assigned dummy successors or delayed if they are not scheduled in a realistic timeframe with sequencing logic or Early Start constraints.
- Ensure all stakeholders are represented and agree to their scope or work.
- Ensure all risk mitigation activities have been added.
- Check the Critical Path is realistic and aligned with what project personnel consider critical.
- A resourced schedule should be optimized by checking the histograms and tables.
- Evaluate the contingent time.
- Ensure all project personnel are in agreement with the schedule.



There are many other check lists available and one of the more popular ones is the US Defense Contract Management Agency (DCMA) 14-point schedule assessment which has been incorporated into software tools such as Acumen Fuse and Primavera P6 EPPM.

11.6 Workshop 9 – Constraints



Background

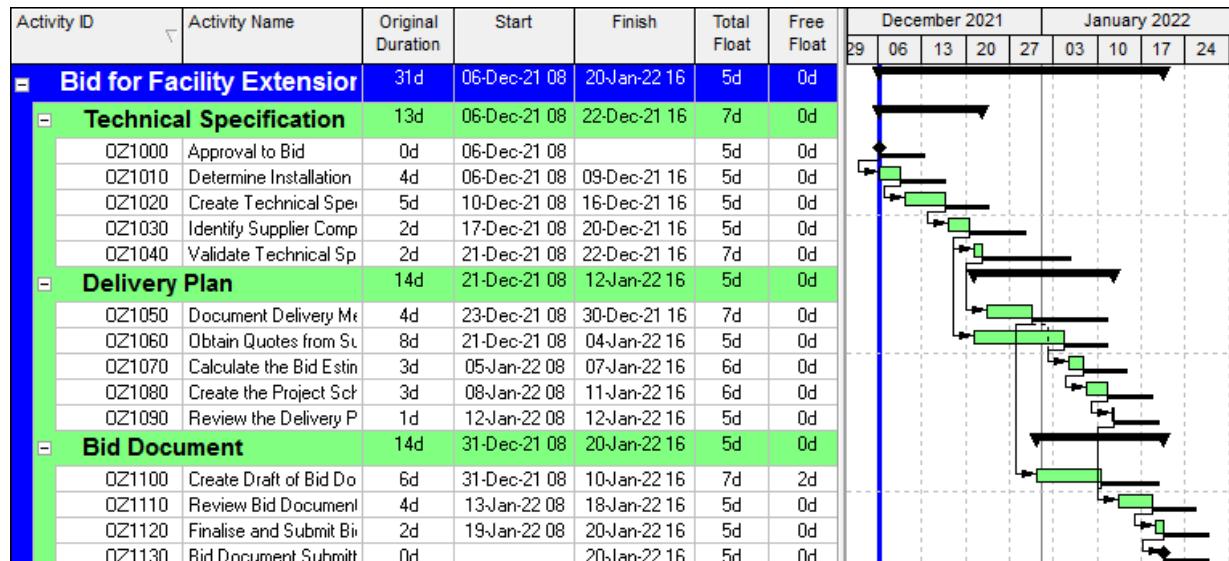
Management has provided further input to your schedule as the client has said that they require the submission on or before 27 January 2022.

Assignment

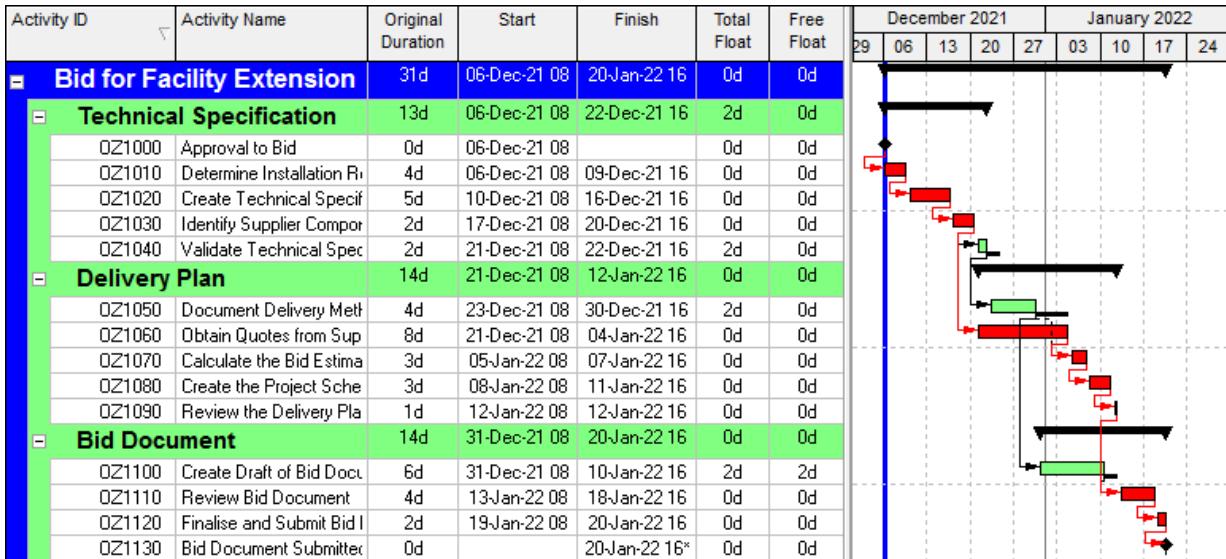
1. Go to the **Activities Window** and observe the calculated finish date and the critical path of the project before applying any constraints.
2. Bars – Display the **Float Bar (Total Float Bar)** and **Neg Float Bar (Negative Float Bar)**.
3. Columns – display the columns as per the picture below.
4. The client has said that they require the submission on 27 January 2022. Apply a **Finish On or Before** constraint and assign a constraint date of 27 January 2022 16:00 to the **Bid Document Submitted** activity from the **Status** tab.

NOTE: The author has in the past found that constraint times have not always matched the activity calendar start times (e.g., 08:00) and finish times (e.g., 16:00) and have been set to 00:00. If you find the floats do not calculate correctly, then open the **User Preferences** form and display the time. Review if the times are correct and if not edit them to suit your calendar.

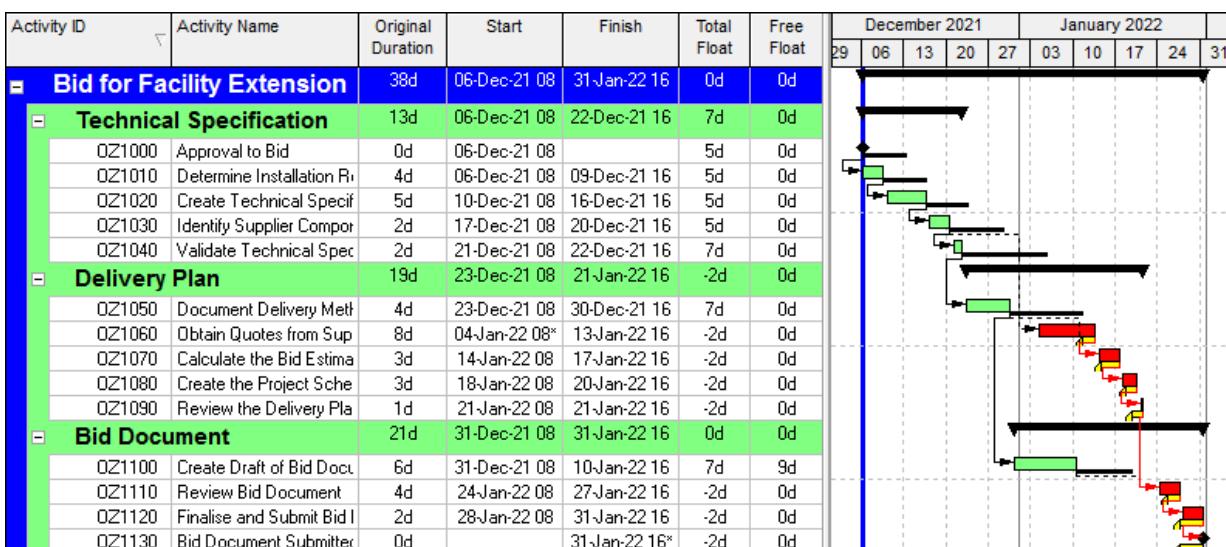
3. Schedule the project. There should be no change in the Total Float as a **Finish On or Before** constraint will not develop Positive Float.
4. Remove the **Finish On or Before** constraint from the **Bid Document Submitted** activity.
5. Now move to the **Project Window, Dates** tab and assign a **Project Must Finish By** constraint of 27 January 2022 16:00. Return to the **Activities Window** and reschedule. All activities now have their float calculated to this date and have positive float.



6. Remove Project Must Finish By constraint of 27 January 2022 16:00 (by highlighting the date and pressing the Delete key and tab out of the cell to ensure the date has been deleted).
7. Schedule the project and the Critical Path should return.
8. Apply a Finish On or Before constraint and assign a constraint date of 27 January 2022 16:00 to the **Bid Document Submitted** activity and schedule, the Critical Path will remain.

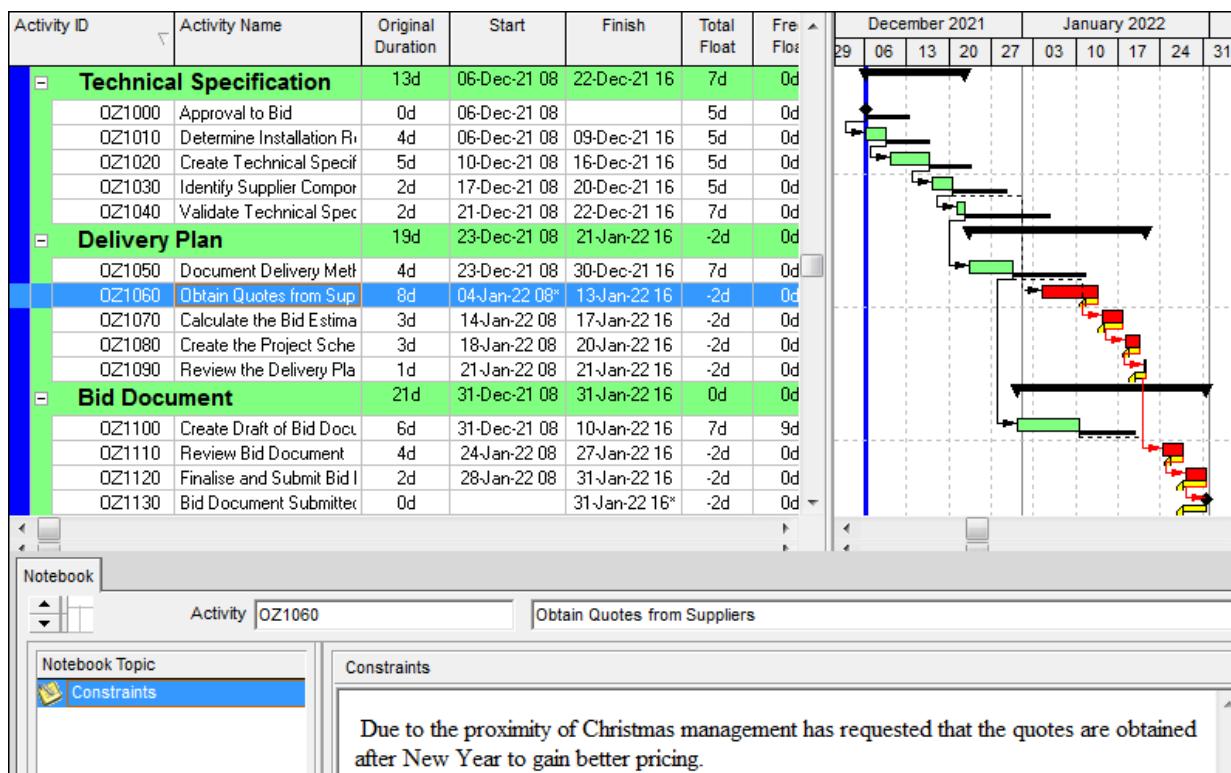


9. Due to the proximity to Christmas, management has requested that you delay the **Obtain Quotes from Suppliers** until first thing in the New Year (04 January 2022). Consensus is that a better response and sharper prices will be obtained after the Christmas rush.
 - To achieve this, set a Start On or After constraint date of 04 January 2022 08:00 on the **Obtain Quotes from Suppliers** activity.
 - Now reschedule. Observe the impact on the critical path and end dates.

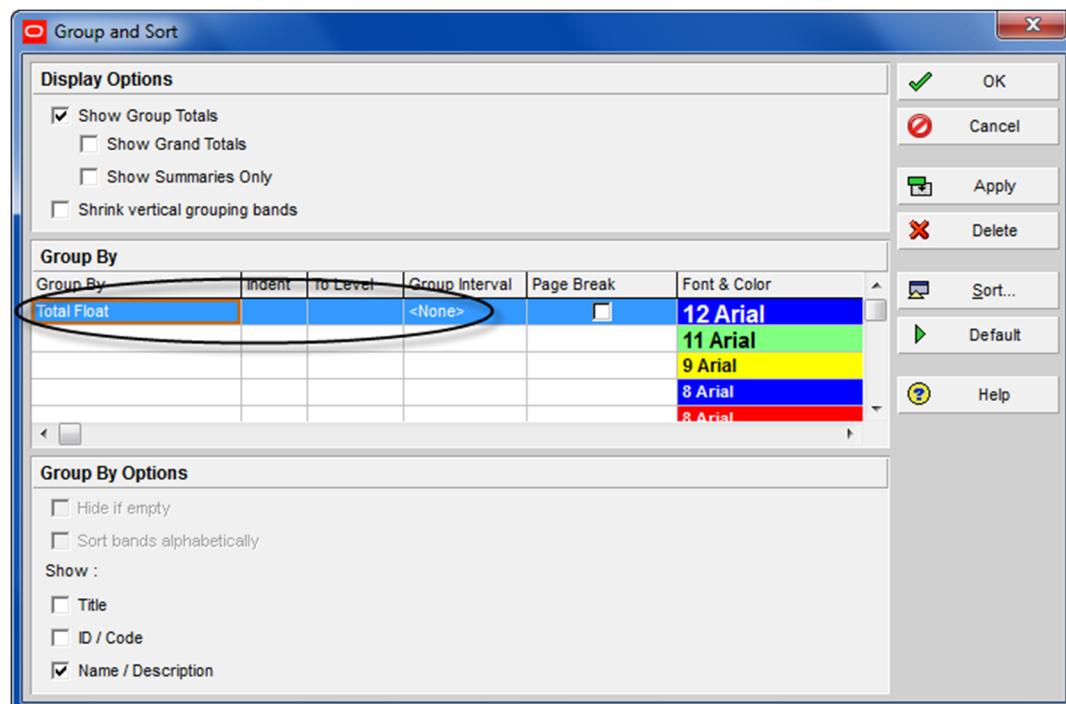


10. You will notice that the Finish Constraint on the **Bid Document Submitted** activity has created some negative float, which is displayed in the Total Float column and the Negative Float bar.
11. Display the Notebook tab in the Activities Window.

12. Add a Notebook Topic against the **Obtain Quotes from Supplier** activity indicating why there is a constraint on 03 January 2022.



13. Open the **Group and Sort** form by clicking on the icon and group by **Total Float** and close the form.



continued...

14. Sort on duration (by clicking in the Original Duration column) to bring the longest activity to the top. It is normally the longest activity that may be shortened.

Activity ID	Activity Name	Original Duration	Start	Finish	Total Float	Free Float	December 2021		January 2022							
							29	06	13	20	27	03	10	17	24	31
-2d		20d	04-Jan-22 08	31-Jan-22 16	-2d	0d										
OZ1060	Obtain Quotes from Sup	8d	04-Jan-22 08*	13-Jan-22 16	-2d	0d										
OZ1070	Calculate the Bid Estima	3d	14-Jan-22 08	17-Jan-22 16	-2d	0d										
OZ1080	Create the Project Sche	3d	18-Jan-22 08	20-Jan-22 16	-2d	0d										
OZ1090	Review the Delivery Pla	1d	21-Jan-22 08	21-Jan-22 16	-2d	0d										
OZ1100	Review Bid Document	4d	24-Jan-22 08	27-Jan-22 16	-2d	0d										
OZ1120	Finalise and Submit Bid I	2d	28-Jan-22 08	31-Jan-22 16	-2d	0d										
OZ1130	Bid Document Submitter	0d		31-Jan-22 16*	-2d	0d										
5d		11d	06-Dec-21 08	20-Dec-21 16	5d	0d										
OZ1000	Approval to Bid	0d	06-Dec-21 08		5d	0d										
OZ1010	Determine Installation R	4d	06-Dec-21 08	09-Dec-21 16	5d	0d										
OZ1020	Create Technical Specif	5d	10-Dec-21 08	16-Dec-21 16	5d	0d										
OZ1030	Identify Supplier Compor	2d	17-Dec-21 08	20-Dec-21 16	5d	0d										
7d		12d	21-Dec-21 08	10-Jan-22 16	7d	0d										
OZ1040	Validate Technical Spec	2d	21-Dec-21 08	22-Dec-21 16	7d	0d										
OZ1050	Document Delivery Met	4d	23-Dec-21 08	30-Dec-21 16	7d	0d										
OZ1100	Create Draft of Bid Docu	6d	31-Dec-21 08	10-Jan-22 16	7d	9d										

15. After review, it is agreed that 2 days may be deducted from Review Bid Document activity.

Change the duration of this activity to 2 days, reschedule:

Activity ID	Activity Name	Original Duration	Start	Finish	Total Float	Free Float	December 2021		January 2022							
							29	06	13	20	27	03	10	17	24	31
0d		18d	04-Jan-22 08	27-Jan-22 16	0d	0d										
OZ1060	Obtain Quotes from Sup	8d	04-Jan-22 08*	13-Jan-22 16	0d	0d										
OZ1070	Calculate the Bid Estima	3d	14-Jan-22 08	17-Jan-22 16	0d	0d										
OZ1080	Create the Project Sche	3d	18-Jan-22 08	20-Jan-22 16	0d	0d										
OZ1090	Review the Delivery Pla	1d	21-Jan-22 08	21-Jan-22 16	0d	0d										
OZ1110	Review Bid Document	2d	24-Jan-22 08	25-Jan-22 16	0d	0d										
OZ1120	Finalise and Submit Bid I	2d	26-Jan-22 08	27-Jan-22 16	0d	0d										
OZ1130	Bid Document Submitter	0d		27-Jan-22 16*	0d	0d										
7d		11d	06-Dec-21 08	20-Dec-21 16	7d	0d										
OZ1000	Approval to Bid	0d	06-Dec-21 08		7d	0d										
OZ1010	Determine Installation R	4d	06-Dec-21 08	09-Dec-21 16	7d	0d										

16. Now organize by WBS and sort by Activity ID:

Activity ID	Activity Name	Original Duration	Start	Finish	Total Float	Free Float	December 2021		January 2022							
							29	06	13	20	27	03	10	17	24	31
Bid for Facility Extension		36d	06-Dec-21 08	27-Jan-22 16	0d	0d										
Technical Specification		13d	06-Dec-21 08	22-Dec-21 16	9d	0d										
OZ1000	Approval to Bid	0d	06-Dec-21 08		7d	0d										
OZ1010	Determine Installation R	4d	06-Dec-21 08	09-Dec-21 16	7d	0d										
OZ1020	Create Technical Specif	5d	10-Dec-21 08	16-Dec-21 16	7d	0d										
OZ1030	Identify Supplier Compor	2d	17-Dec-21 08	20-Dec-21 16	7d	0d										
OZ1040	Validate Technical Spec	2d	21-Dec-21 08	22-Dec-21 16	9d	0d										
Delivery Plan		19d	23-Dec-21 08	21-Jan-22 16	0d	0d										
OZ1050	Document Delivery Met	4d	23-Dec-21 08	30-Dec-21 16	9d	0d										
OZ1060	Obtain Quotes from Sup	8d	04-Jan-22 08*	13-Jan-22 16	0d	0d										
OZ1070	Calculate the Bid Estima	3d	14-Jan-22 08	17-Jan-22 16	0d	0d										
OZ1080	Create the Project Sche	3d	18-Jan-22 08	20-Jan-22 16	0d	0d										
OZ1090	Review the Delivery Pla	1d	21-Jan-22 08	21-Jan-22 16	0d	0d										
Bid Document		19d	31-Dec-21 08	27-Jan-22 16	0d	0d										
OZ1100	Create Draft of Bid Docu	6d	31-Dec-21 08	10-Jan-22 16	9d	9d										
OZ1110	Review Bid Document	2d	24-Jan-22 08	25-Jan-22 16	0d	0d										
OZ1120	Finalise and Submit Bid I	2d	26-Jan-22 08	27-Jan-22 16	0d	0d										
OZ1130	Bid Document Submitter	0d		27-Jan-22 16*	0d	0d										

17. Notice that activities with constraints have an “*” by their dates.

12 GROUP, SORT AND LAYOUTS

Group and Sort enables data such as activities in the **Activities Window**, WBS Nodes in the **WBS Window**, projects in the **Project Window**, and many other data items to be sorted and organized under other parameters such as **Dates** and **Resources** or user defined **Activity** and **Project Codes**. This function is similar to **Grouping** in Microsoft Project and Elecosoft (Asta) Powerproject.

Layouts is a function in which the formatting of parameters such as the **Group and Sort**, **Columns** and **Bars** is saved and reapplied later. This function is similar to **Views** in Elecosoft (Asta) Power Project and Microsoft Project. A **Layout** may be edited, saved, or reapplied at a later date and may have a **Filter** associated with it. Layouts contain the formatting for all options of both the top and bottom pane.

Layouts do not save the Date, Time and Duration formatting, these are set in the **User Preferences** form.

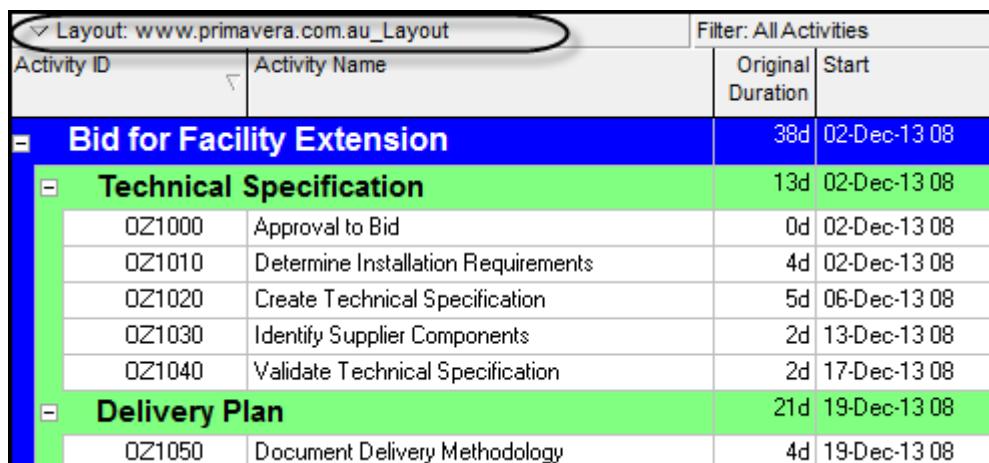
Although Group and Sort is available in many forms, Layouts are only available in a few places including the following Windows:

- Projects
- WBS
- Activities
- Tracking

This chapter will concentrate on how **Group and Sort** and **Layouts** are applied in the **Activities Window** but the same principles apply to the other windows. This chapter covers the following topics:

Topic	Notes on the Function
<ul style="list-style-type: none"> • Reformat the Grouping and Sorting of projects in the Projects Window or activities in the Activities Window by opening the Group and Sort form 	<ul style="list-style-type: none"> • Click on the  icon, or • Select View, Group and Sort by, Customize.
<ul style="list-style-type: none"> • Create, save or edit a Layout 	Select either: <ul style="list-style-type: none"> • From the menu View, Layout, Save Layout As..., or • From the Layout bar Layout, Save As....

The **Layout** bar location is indicated in the following picture:



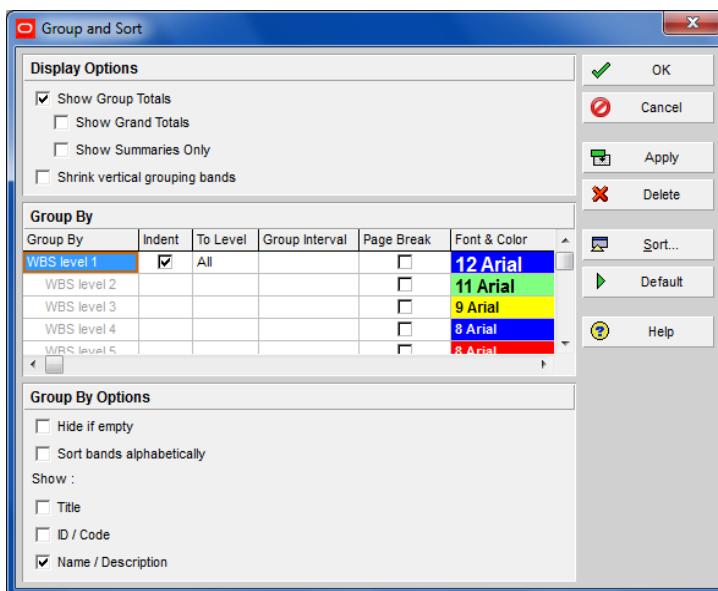
Layout: www.primavera.com.au_Layout		Filter: All Activities	
Activity ID	Activity Name	Original Duration	Start
	Bid for Facility Extension	38d	02-Dec-13 08
	Technical Specification	13d	02-Dec-13 08
OZ1000	Approval to Bid	0d	02-Dec-13 08
OZ1010	Determine Installation Requirements	4d	02-Dec-13 08
OZ1020	Create Technical Specification	5d	06-Dec-13 08
OZ1030	Identify Supplier Components	2d	13-Dec-13 08
OZ1040	Validate Technical Specification	2d	17-Dec-13 08
	Delivery Plan	21d	19-Dec-13 08
OZ1050	Document Delivery Methodology	4d	19-Dec-13 08

12.1 Group and Sort Activities

The **Group and Sort** function has been used in this publication to group activities under WBS bands.

To Group and Sort activities open the **Group and Sort** form by:

- Clicking the  toolbar icon, or
- Selecting **View, Group and Sort by, Customize**.



12.1.1 Display Options

Show Group Totals

Show Group Totals is a new function in Primavera Version 6.0 which when unchecked hides the summary data in the bands, which prevents the truncating of Band titles.

Summary Data Displayed

Activity ID	Original Duration	Start	Finish	Total Float
Bid for Fac	139d	08-Dec-09 A	22-Jan-10	0d
Research	31d	08-Dec-09 A	21-Dec-09	6d
OZ1000	0d	08-Dec-09 A		
OZ1010	1d	08-Dec-09 A	08-Dec-09 A	
OZ1020	8d	09-Dec-09 A	21-Dec-09	2d
Estimate	52d	22-Dec-09	08-Jan-10	3d
OZ1070	2d	07-Jan-10	08-Jan-10	0d

Summary Data Hidden

Activity ID	Original Duration	Start	Finish	Total Float
Bid for Facility Extension				
Research				
OZ1000	0d	08-Dec-09 A		
OZ1010	1d	08-Dec-09 A	08-Dec-09 A	
OZ1020	8d	09-Dec-09 A	21-Dec-09	2d
Estimate				
OZ1070	2d	07-Jan-10	08-Jan-10	0d

Show Grand Totals

Show Grand Totals provides a total of all the activities in a band at the top of a view and is similar to displaying a Project summary task in Microsoft Project or Elecosoft (Asta) Powerproject.

This displays a Summary band for multiple projects and adds up all the costs and hours for a project, displays the earliest and latest dates and a summary duration for all the data displayed. This feature is very useful:

- When the project is not organized by WBS and therefore has no project total line, or when multiple projects have been opened to calculate all the projects' values, and
- When multiple projects are open and thereby enables the total for multiple projects to be displayed.

Activity ID	Activity Name	BL Project Total Cost	BL Project Labor Units
Total		A\$6,899,980.56	100392
+ Nesbid Building Expansion		A\$550,470.40	9346
+ Haitang Corporate Park		A\$636,980.80	10735
+ City Center Office Building Addition		A\$1,162,028.80	20110
- Harbour Pointe Assisted Living Center		A\$4,550,500.56	60201

Show Summaries Only

Show Summaries Only hides all the activities and displays only the WBS or Codes that have been used to summarize the activities:

Activity ID	Activity Name	Early Start	Early Finish	BL Budgeted Labor Cost	2003		Qtr 1, 2004				Qtr 2, 2004			
					Ov	Dec	Jan	Feb	Mar	Apr	May	Jun		
- 1-5 OzBuild Bid		01-Dec-03	29-Jan-04	\$22,830			29-Jan-04, 1-5 OzBuild Bid							
1-5.1 Research		01-Dec-03	17-Dec-03	\$6,640			17-Dec-03, 1-5.1 Research							
1-5.2 Estimation		12-Dec-03	15-Jan-04	\$8,150			15-Jan-04, 1-5.2 Estimation							
1-5.3 Proposal		15-Jan-04	29-Jan-04	\$8,040			29-Jan-04, 1-5.3 Proposal							

Shrink Vertical Grouping Bands

Shrink vertical grouping bands is new to Primavera Version 6.0 and narrows the Vertical Bands on the left of the screen. This is useful in projects with a number of levels in the WBS as this provides more usable screen space and paper width for printing.

Option Unchecked			Option Checked		
Activity ID	Activity Name	Original Duration	Activity ID	Activity Name	Original Duration
Bid for Facility Extension			Bid for Facility Extension		
Research			Research		
OZ1000 Bid Request Docume...	0.0d		OZ1000 Bid Request Docume...	0.0d	
OZ1010 Bid Strategy Developed	1.0d		OZ1010 Bid Strategy Developed	1.0d	
OZ1020 Technical Feasibility S...	8.0d		OZ1020 Technical Feasibility S...	8.0d	
Estimate			Estimate		

12.1.2 Group By

The **Group By** box has several options:

- **Group By and Indent**

When a hierarchical code such as a **WBS** and the **Indent** are selected, the subsequent bands are completed by the software and there are no other banding options available. The WBS is then displayed hierarchically:

Group By	Indent	To Level	Group Interval	Font & Color
WBS level 1	<input checked="" type="checkbox"/>	All		12 Arial
WBS level 2				11 Arial
WBS level 3				9 Arial
WBS level 4				8 Arial

Activity ID	Activity Name	Early Start	Early Finish
	Bid for Facility Ext...	06-Dec-04	24-Jan-05
	Research	06-Dec-04	21-Dec-04
OZ1010	Bid Strategy M...	06-Dec-04	06-Dec-04
OZ1020	Investigate Te...	07-Dec-04	16-Dec-04
OZ1030	Document Inst...	17-Dec-04	21-Dec-04
OZ1000	Bid Request D...	06-Dec-04	
	Estimation	17-Dec-04	10-Jan-05
OZ1040	Request Comp...	04-Jan-05	06-Jan-05

When a hierarchical code such as a **WBS** is selected and the **Indent** is NOT selected on a line then the subsequent bands are **NOT** completed by the software and other bands may be selected. The WBS is not displayed hierarchically:

Group By	Indent	To Level	Group Interval	Font & Color
Early Start			Week	12 Arial
WBS	<input type="checkbox"/>	All		11 Arial
Resources				9 Arial
				8 Arial

Activity ID	Activity Name	Early Start	Early Finish
	01-Dec-03	01-Dec-03	11-Dec-03
	Research	01-Dec-03	11-Dec-03
A1010	Sales Engineer, System Engin...	01-Dec-03	01-Dec-03
A1020	Bid Strategy Meeting	01-Dec-03	01-Dec-03
	System Engineer	02-Dec-03	11-Dec-03
A1030	Investigate Techni...	02-Dec-03	11-Dec-03
	08-Dec-03	12-Dec-03	15-Jan-04
	Research	12-Dec-03	17-Dec-03
A1030	Sales Engineer, System Engin...	12-Dec-03	17-Dec-03
	Document Installati...	12-Dec-03	17-Dec-03

- **To Level**

The **To Level** option decides how many levels of the hierarchical code structure such as the WBS will be displayed. All activities are displayed under the lowest level of WBS, as chosen from the **To Level** drop-down box.

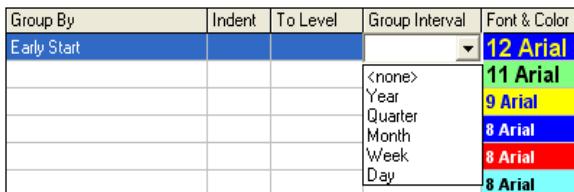
This option enables other banding below the select level which is not permitted with the **All** option.

Group By				
Group By	Indent	To Level	Group Interval	Font & Color
WBS	<input type="checkbox"/>	2		12 Arial
		All		11 Arial
		1		9 Arial
		2		8 Arial

Group By				
Group By	Indent	To Level	Group Interval	Font & Color
WBS	<input type="checkbox"/>	2		12 Arial
Resources				11 Arial
				9 Arial
				8 Arial

- **Group Interval**

This option is available with some fields such as **Total Float**, where the interval may be typed in, and **Date** fields, where a drop-down box enables the selection of the time interval used to group activities:



Activity ID	Activity Name	Early Start	Early Finish
01-Dec-03		01-Dec-03	11-Dec-03
A1010	Bid Strategy Meeting	01-Dec-03	01-Dec-03
A1020	Investigate Techni...	02-Dec-03	11-Dec-03
08-Dec-03		12-Dec-03	15-Jan-04
A1030	Document Installati...	12-Dec-03	17-Dec-03
A1060	Draft Technical De...	12-Dec-03	15-Jan-04
15-Dec-03		18-Dec-03	08-Jan-04
A1050	Develop Project Sc...	18-Dec-03	08-Jan-04

- **Font and Color**

Double-click these boxes to open the **Edit Font and Color** form to change the font and color of each band.

12.1.3 Group By Options

- **Sort Banding Alphabetically**

WBS Code	WBS Name
OZB	Bid for Facility Extension
OZB.C	Technical Specification
OZB.A	Delivery Plan
OZB.B	Bid Document

When unchecked they are sorted naturally per the picture above:

Activity ID	Activity Name
OZB-04	Bid for Facility Extension
OZB-04.C	Technical Specification
OZB-04.A	Delivery Plan
OZB-04.B	Bid Document

When this is checked the bands are sorted by the code assigned to the Activity Code or WBS Code:

Activity ID	Activity Name
OZB-04	Bid for Facility Extension
OZB-04.A	Delivery Plan
OZB-04.B	Bid Document
OZB-04.C	Technical Specification



This function is extremely useful for providing two sort orders for coding structures such as the WBS when the coding is entered, but only operates when the coding in the WBS Window is not in a natural sort order.

- Hide if empty**

Check this box to hide bands that:

- Have not been assigned an activity, or
- When activities have been filtered out and only the bands remains.



This function is useful when you have filtered on a couple of activities and the screen is filled with blank bands. This will remove all the blank bands.

- Show Title, Show ID/Code and Show Name/Description**

These options format the display of the band title. It is not possible to uncheck all the options as there then would not be a title in the band. The options change depending on the data displayed in the band:

With All Options Checked

Activity ID	Original Duration	Start	Finish	Total Float
Project: REF101206 Bid for Facility Extension				
WBS: REF101206.1 Research				
OZ1000	0d	07-Dec-09		4d
OZ1010	1d	07-Dec-09	07-Dec-09	4d
OZ1020	8d	08-Dec-09	17-Dec-09	4d
WBS: REF101206.2 Estimate				
OZ1070	2d	07-Jan-10	08-Jan-10	0d

With Only Description Checked

Activity ID	Original Duration	Start
Bid for Facility Extension		
Research		
OZ1000	0d	07-Dec-09
OZ1010	1d	07-Dec-09
OZ1020	8d	08-Dec-09
Estimate		
OZ1070	2d	07-Jan-10

NOTE: These options are set for each band individually.

12.1.4 Sorting

The icon opens the Sort form where the order of the activities in each band may be specified.

The order shown in the picture provides a good natural “Waterfall” order to activities:



This order may be easily overridden by clicking on the column titles to reorder activities and therefore the use of this option is problematic as clicking on the column header is very simple and will override options set here.

Field Name	Sort Order
Start	Ascending
Finish	Ascending
Total Float	Ascending

12.1.5 Reorganize Automatically

Primavera Version 4.1 introduced a function titled Reorganize Automatically in the User Preferences form and this was removed from the User Preferences form in Version 8. This function is now titled Auto-Reorganization which is covered next.

12.1.6 Auto-Reorganization

This function reorganizes data based on the current **Group and Sort** order when an activity's attributes are changed.

For example, when an activity's WBS code is re-assigned in the Activity Details pane, then the activity will automatically be moved to the newly assigned WBS band where the activities are grouped by WBS when this option is turned on.

This has now been moved to the menu and may be turned on and off and is uniquely set for each window. To activate or de-activate this function:

- Select **Tools, Disable Auto-Reorganization**, or
- Click on the  **Tools** toolbar icon.



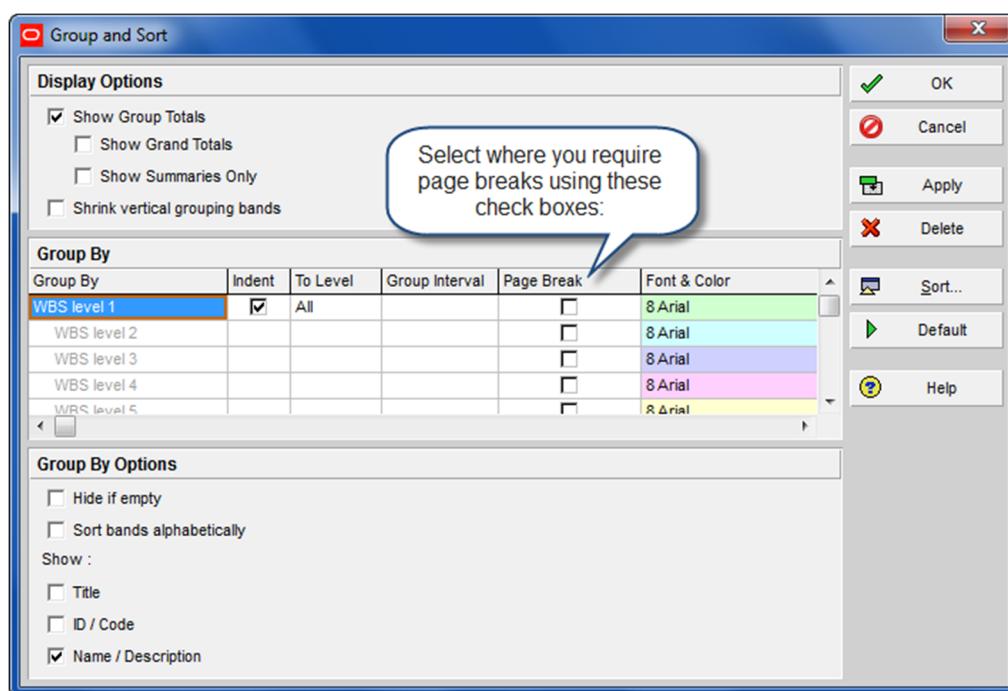
When the icon is a dark shade then the function is disabled and the command on the menu erroneously still states **Disable Auto-Reorganization** when it actually means **Enable Auto-Reorganization**.

When a new Layout or Filter is applied then the data is also automatically reorganized.

12.1.7 Set Page Breaks in the Group and Sort Form

In earlier versions of P6 page breaks could only be set at the first band in the **Group and Sort** form from the **Page Setup, Options** tab. The option of being able to set page breaks at any level has been added to P6 Version 8.1.

Select **View, Group and Sort by, Customize** or click on the  icon and select **Customize** to open the **Group and Sort** form:



12.1.8 Group and Sort Projects at Enterprise Level

Projects in the **Projects Window** may be Grouped and Sorted in a similar way to the Grouping and Sorting of activities.

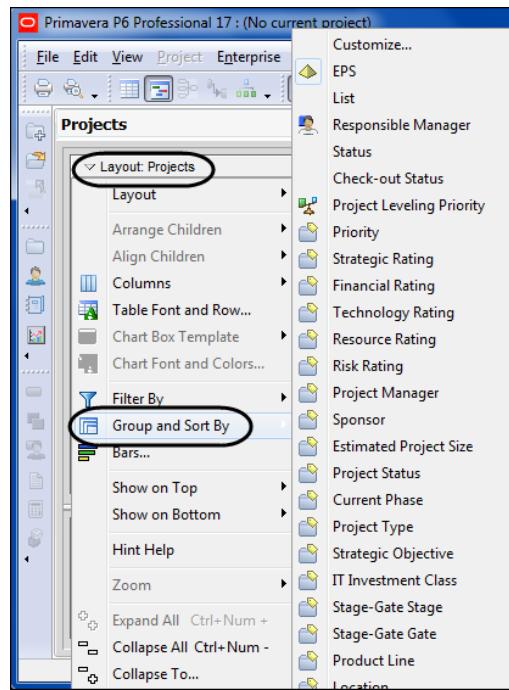
When a database is opened, the projects are by default displayed under the Enterprise Project Structure (EPS) in the **Projects Window**.

The projects may be Grouped and Sorted under a number of different headings by:

- Selecting **Layout, Group and Sort by, Customize**, or
- Right-clicking in the columns area and selecting **Group and Sort ...**, or
- Selecting **View, Group and Sort By**

Then selecting the option from the drop-down list.

The **Customize...** option will open the project's **Group and Sort** form which operates in a similar way to the Activity's **Group and Sort** form.



12.2 Understanding Layouts

A standard load of Primavera is supplied with a number of predefined Layouts for some of the windows which are defined by default as **Global Layouts** and any user on the system may apply these. These layouts may be copied and shared with other users or be available to the current user in a similar way as filters.

Primavera Version 6.0 introduced Project Layouts available from the Activities Window. Project Layouts are only available when a project is open and may be exported with a project and therefore minimizes the need for Global Layouts.

In large databases with many users and projects there becomes a need to code layouts so they may easily be found in long lists of filters. Prefixing them with the project number may be considered.

The following types of Layout are available in the **Activities Window**:

- **Global** which are normally managed by the Database Administrator and are available to all users and all projects,
- **User** that a user may apply to any project that the user has open, and
- **Project** that may only be applied when a project is open.

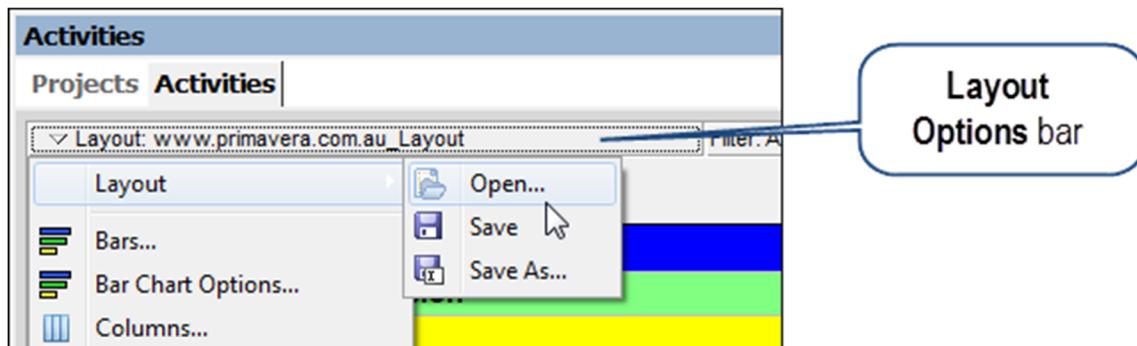


Layouts are not exported with an XER file in but may be exported using a PLF file. Therefore, to send a person a complete project schedule you may need to include the layout as a PLF file so the other user may easily reproduce your view of the data.

12.2.1 Applying an Existing Layout

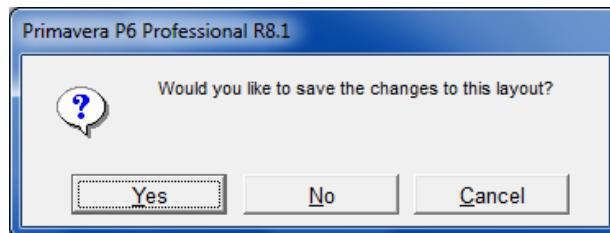
Layouts may be applied from the **Open Layout** form by:

- Selecting the **Open** option from the **Layout Options** bar:



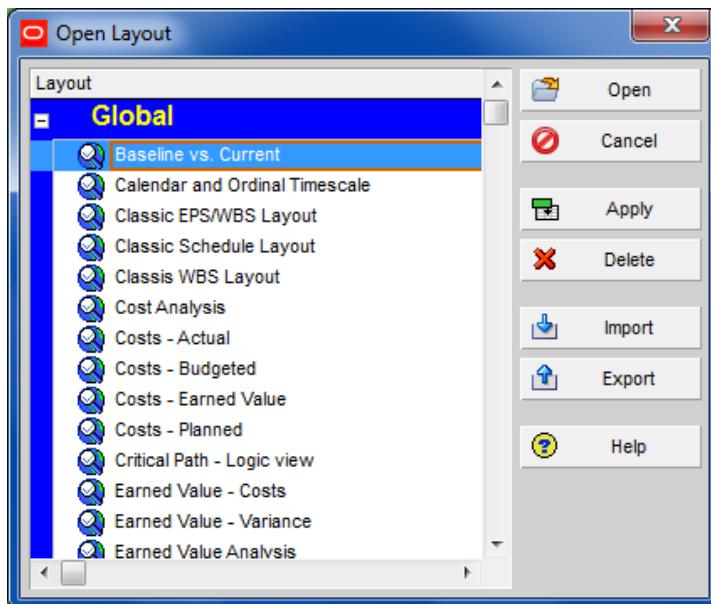
- Or, by selecting **View**, **Layout**, **Open Layout**....

When a Layout has been edited by changing any parameter, such as column formatting, a form will be displayed allowing the confirmation of the changes that have been made to the layout.



The **Open Layout** form will be displayed and an alternative layout may be selected from the list. The list has three headings after a project layout has been created, **Global**, **User**, and **Project**:

- Click on the **Apply** icon to apply the layout. This will leave the form open but allow the effect to be viewed, or
- Click on the **Open** icon to apply the layout and close the form:

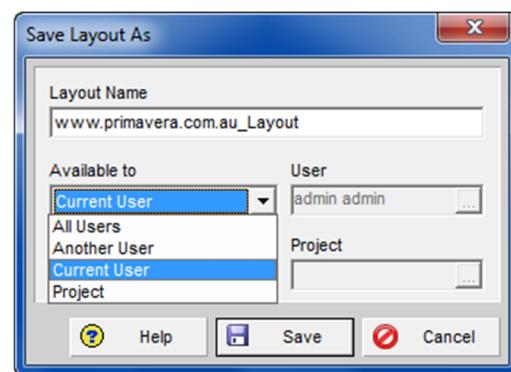


Click on the **Layout** icon to reorder the Layouts.

12.2.2 Creating a New Layout

A new layout may be created by saving an existing layout with a new name and editing it:

- Apply the layout that closely matches the requirements of the new layout and apply.
- Select either:
 - From the menu **View, Layout, Save Layout**, or
 - From the Layout Options bar **Layout, Save As...**:
- Type in a new **Layout Name** and select to whom you wish the layout to be available.
 - **All Users** will make the layout Global and therefore available to all users and you will need the appropriate security access to be able to create a Global Layout.
 - **Another User** will make the layout available to a nominated user.
 - **Current User** will make a copy for your own use.
 - **Project** will make the layout available to anyone who has the project open. This option is useful to reduce the number of Global Layouts in a database with a number of projects requiring a number of layouts each.
- Click on the  save toolbar icon.



12.2.3 Saving a Layout after Changes

This layout may now be edited and the edits saved by selecting:

- From the menu **View, Layout, Save Layout As**, or
- From the Layout bar **Layout, Save**.

12.2.4 Layout Types

A layout is comprised of a **Top Pane** and a **Bottom Pane**. Each **Pane** may be assigned a **Layout Type**. This is a list of **Layout Types** and the panes that may be applied to the **Activities Window**:

Layout Name	Available in Top Pane	Available in Bottom Pane
• Gantt Chart	Yes	Yes
• Activity Details		Yes
• Activity Table	Yes	Yes
• Activity Network	Yes	
• Trace Logic		Yes
• Activity Usage Profile		Yes
• Resource Usage Spreadsheet		Yes
• Resource Usage Profile		Yes
• Activity Usage Spreadsheet	Yes	Yes

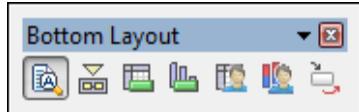


The available layouts vary depending on the window open. This chapter will predominately discuss the Activities Window but experimentation will show the options available in the other windows.

12.2.5 Changing Activity Layout Types in Panes

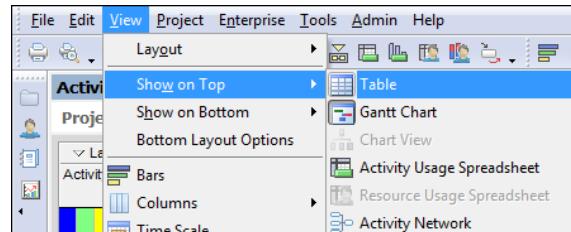
The **Toolbars** have icons for the display options in the top and bottom pane. Placing the mouse over each icon will display the function of each:

-  are the **Top Layout** toolbar icons, and

-  are the **Bottom Layout** toolbar icons.

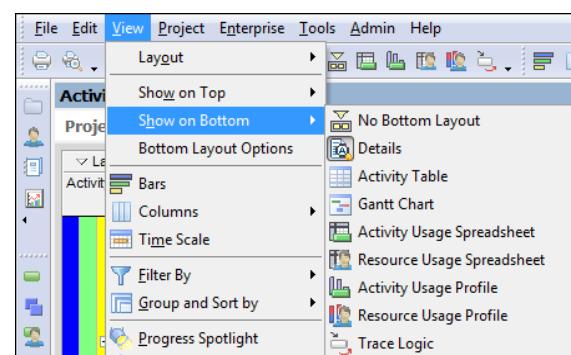
To change a **Layout Type** in a pane, select from the menu:

- **View, Show on Top**, or



- **View, Show on Bottom**.

Then select the Layout Type required from the list.



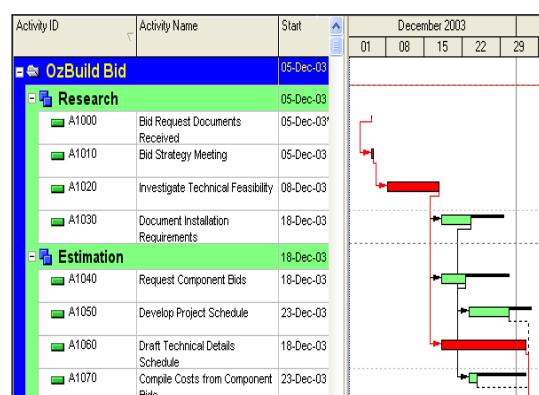
12.2.6 Activities Window Layout Panes

Each Layout Type has a number of options and the formatting of these has been discussed in earlier chapters.

Gantt Chart

The Gantt Chart has two sides:

- The left side where the columns are displayed may be formatted with the **Columns, Sorting and Grouping** functions.
- The right side may be formatted using the **Timescale, Bars and Gridlines** functions.



Activity Details

These may be displayed at any time in the Bottom Pane with any of the tabs hidden or displayed.

Activity Table

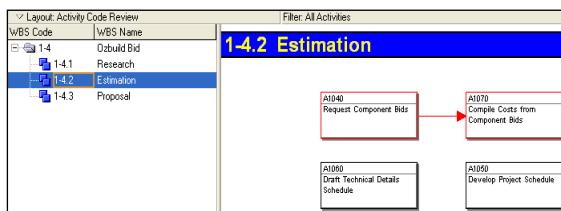
This layout is the same as the left side of the Gantt Chart and has no Bars and Timescale on the right side.

Activity ID	Activity Name	PHAS - Phase	RESP - Responsibility	DEPT - Department
Project: W220 Bid Programme for Wilson Bedding				
1000	Bid Request Documents Received	R	CFP	SLS
1010	Bid Strategy Meeting	R	DTW	PRCH
1020	Investigate Technical Feasibility	R	SSM	IT
1030	Document Installation Requirements	E	SSM	IT
1040	Request Component Tenders	E	ARL	PRCH

Activity Network

Like the Gantt Chart it has two panes:

- The **left** pane displays the WBS:
 - This side may not be formatted except by adjusting the width of the columns.
 - The selection of a WBS Node acts like a filter and will only display activities that are associated with the selected WBS Node and lower level member WBS Nodes. This enables the relationships between activities within one WBS Node to be checked.
- The **right** pane displays the activity data in boxes and is organized under headings:
 - The Activity Boxes may be formatted as described in the **Activity Network** chapter.
 - The activities may be Grouped, which is covered in the **Grouping** section of this chapter.



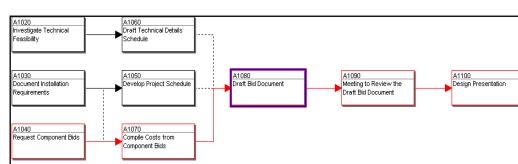
Trace Logic

The Trace Logic options allow the selection of the number of predecessor and successor levels.

This is achieved by selecting **View, Show on Bottom, Trace Logic**.

To select the number of levels of predecessors to be displayed you are required to open the **Trace Logic Options** form.

The form is then opened by right-clicking in the lower pane and selecting **Trace Logic Options....**



Formatting Trace Logic and Activity Network

Formatting of these boxes in both of these panes is linked to the formatting in the **Activity Network**. The boxes are formatted by right-clicking in the right screen of the **Activity Network** pane and selecting **Activity Network Options....**

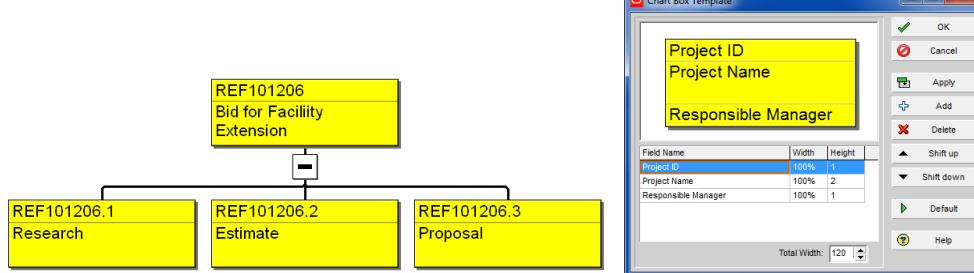
Resource Analysis Panes

The **Activity Usage Profile**, **Resource Usage Spreadsheet**, **Resource Usage Profile**, **Activity Usage Spreadsheet** views display resource information and will be discussed in the **Resource Optimization** chapter.

12.2.7 WBS and Projects Window Panes

The WBS and Projects Windows have three icons for the top pane:

-  shows a table without bars,
-  shows a table with bars, and
-  displays a Chart View of the WBS and the boxes may also be formatted by right-clicking and selecting **Chart Box Template**:



12.3 Copying a Layout To and From Another Database

A layout from any **Window** may be copied to another database by using the Import and Export functions from the **Open Layout** form. The layout is saved in a **Primavera Layout File (*.PLF)** format as a stand-alone file and is then imported into another database.

Layouts may also be imported into Visualizer using the **More, Manage, Import** option.



Layouts that include User Defined Fields and Codes may not display the UDF or Code information, or display incorrect information when a project and layout are imported because the UDFs and Codes are assigned a different database index number on import and these index fields are used to display the UDF data.

12.4 Workshop 10 – Organizing Your Data



Background

Having completed the schedule, you may report the information with different Layouts.

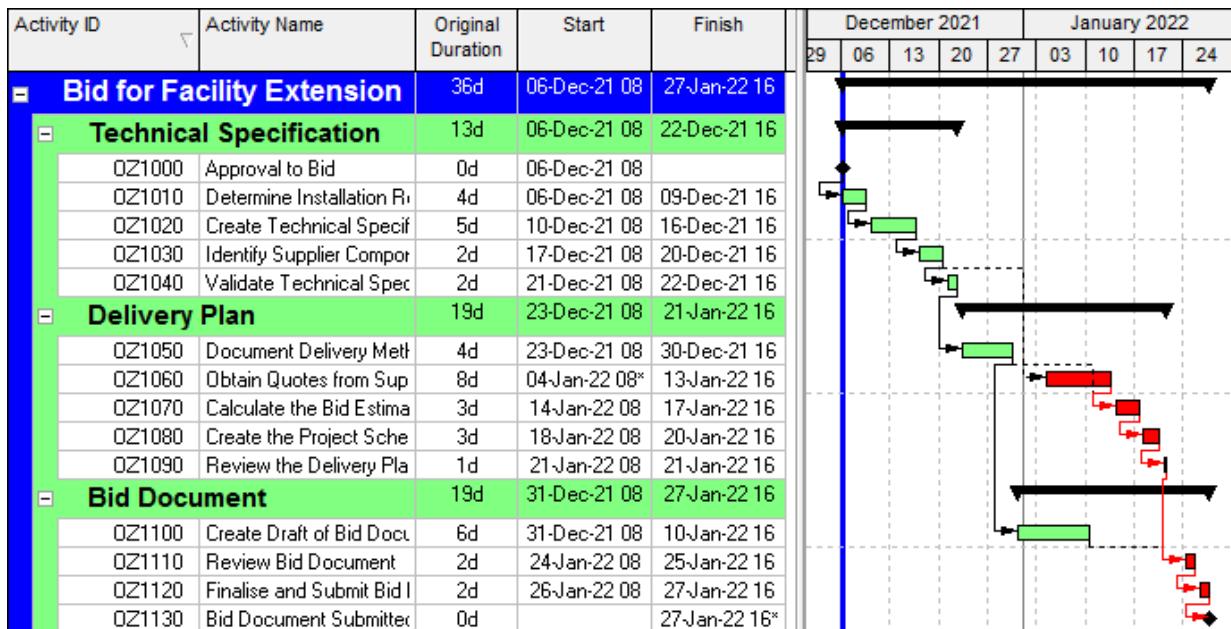
Assignment

Display your project in the following formats, noting the different ways you may represent the same data.

1. Hide and display the relationships, use the icon.
2. Display the **Activity Network**, use the icon.
3. Select **Zoom in**, **Zoom out** and **Best fit** using the icons.
4. Scroll up and down or click the **WBS Nodes** on the left side of the screen. You will notice that only the Activities associated with the highlighted WBS are displayed.
5. Ctrl-click and select two WBS Nodes and you will see the relationships between the activities in each WBS Node.
6. Display the **Activity Table** by clicking on the icon.
7. Now display the Gantt Chart by clicking on the icon
8. Hide and display the **Bottom** pane by clicking on the and icons; you may need to add these icons to your toolbar.
9. With the bottom pane displayed click the icon to show the **Trace Logic** form.
10. Right-click in the **Trace Logic** form, select **Trace Logic Options...** and change the number of Predecessor and Successor Levels displaying 1, 2 and 3 levels and note the change in the layout.
11. Click on the predecessors and successors in each option and observe the changes.
12. Click on different activities in the upper pane and see the effect on the **Trace Logic** form.
13. Click on the icon to display the **Activity Details** form.

continued....

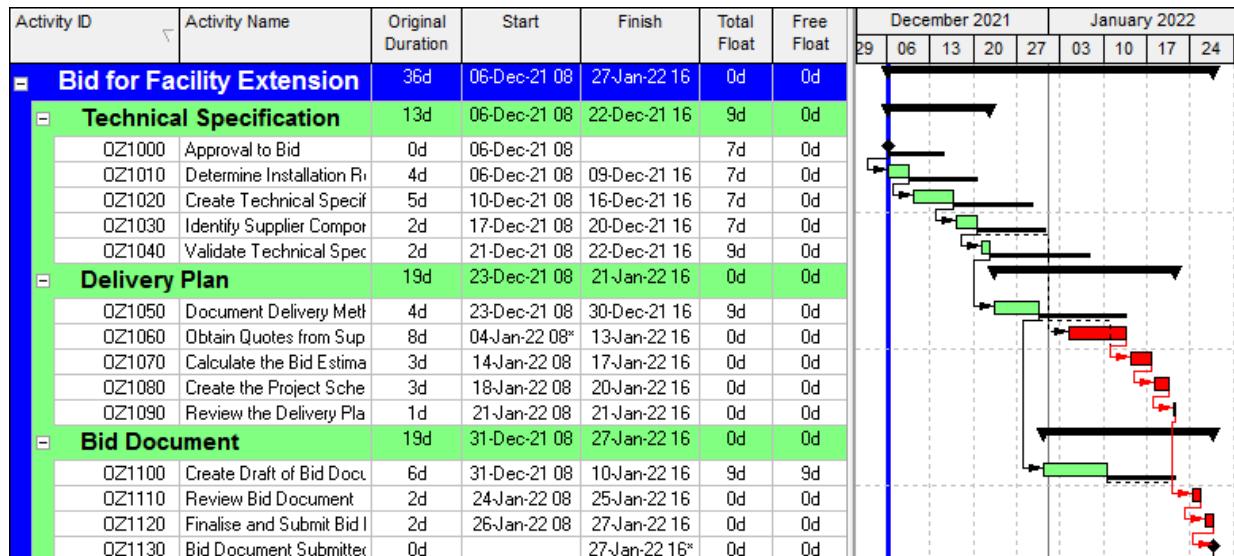
14. Create a new layout titled **OzBuild Workshop 10 – Without Float**, making it a User Layout, displaying the columns and formatting the bars per the following picture; the Total Float and Negative Float bars are not displayed:



15. Save this layout.

16. Make a copy of it titled **OzBuild Workshop 10 – With Float**, making it a User Layout, displaying the columns and formatting the bars per the following picture; this is displaying the **Total Float** and **Negative Float** bars:

17. Save this layout.



13 FILTERS

This chapter covers the ability of Primavera to control which activities are displayed, both on the screen and in printouts, by using **Filters**.

13.1 Understanding Filters

Primavera has an ability to display activities that meet specific criteria. You may want to see only the incomplete activities, or the work scheduled for the next couple of months or weeks, or the activities that are in-progress.

Primavera defaults to displaying all activities. There are a number of pre-defined filters available that you may use or edit. You may also create one or more of your own.

A filter may be applied to display or to highlight only those activities that meet a criterion.

There are four types of filters:

- **Default** filters which are supplied with the system and may not be edited or deleted but may be copied and then edited or modified and are often used in conjunction with the display of bars.
- **Global** filters which are made available to anyone working in the database,
- **User Defined** filters which are defined by a user and available only to that user unless it is made into a **Global** filter, and
- **Layout** filters which make a copy of the filter only available when the current layout is applied.
NOTE: If the current layout is a **Project** layout then this effectively makes the **Layout** filter a project filter.

The following types of filters are not available:

- Drop-down or Auto filters as in Excel and Microsoft Project.
- Interactive filters as available in SureTrak, Elecosoft (Asta) Powerproject and Microsoft Project. This is when a filter is applied and the user is offered choices from a drop-down list. The lack of this function may result in an excessive quantity of filters being generated or the user continually editing frequently used filters.
- Project filters, but copying all the filters used in a project to all the Project Layouts effectively creates Project filters but this is a lot of administration.

On the other hand, P6 does allow multiple filters to be applied at the same time.



There are no dedicated project filters (except by creating a Layout filter) available in Primavera, so you might consider placing the project name or number at the start of a filter name so you may identify which filters belong to which projects. This is especially helpful when you have a number of **User Filters** or there are a number of **Global Filters**.

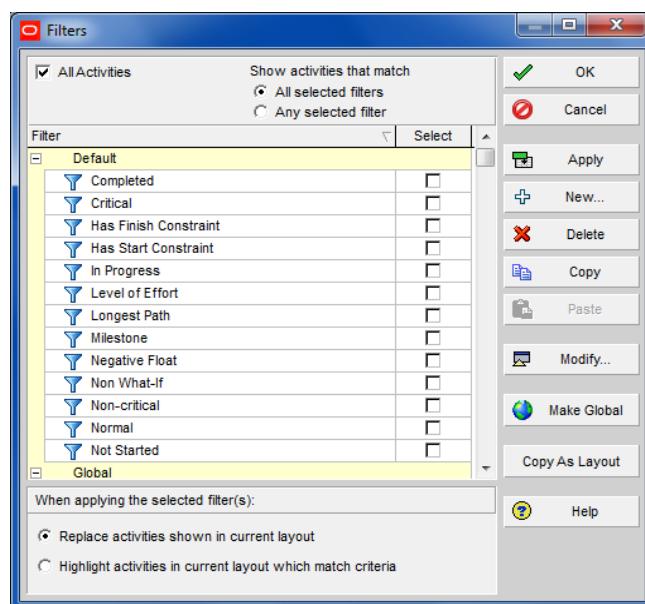
Topic	Menu Command
<ul style="list-style-type: none"> • To apply, edit, create, or delete a filter open the Filters form. 	<ul style="list-style-type: none"> • Click on the icon, or • Select View, Filter By..., Customize, or • Right-click in the columns area and select Filters....

13.2 Applying a Filter

13.2.1 Filters Form

Filters are applied from the **Filters** form which may be opened by:

- Clicking on the  icon, or
- Selecting **View, Filters...**, **Customize...** or
- Right-clicking in the columns area and selecting **Filters...**
- NOTE:** If the **All Activities** check box is not checked then there is a filter applied.



13.2.2 Applying a Single Filter

A single filter is applied by:

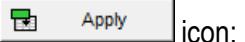
- Checking the **Select** check box beside one filter, and
- Clicking on the  icon to apply the filter and not close the form. If the result is undesirable another option may be selected, or
- Clicking on  to apply the filter and close the form.
- When applying the selected filter(s):
 - Only activities that comply to the filter criteria will be displayed when the **Replace activities shown in the current layout** button is checked.
 - These activities will be highlighted in the **Select Activity** color when the **Highlight activities in current layout which match criteria** button is checked.

13.2.3 Applying a Combination Filter

A combination filter has two or more filters selected and has two options under **Show activities that match**:

- All selected filters** where an activity to be displayed or highlighted has to match the criteria of **ALL** the filters, or
- Any selected filters** where an activity to be displayed or highlighted has to match the criteria of **ONLY ONE** filter.



In many places in the software there will be an option of either clicking on the  icon or the  icon:

- The  icon applies the format yet leaves the form open.
- The  icon applies the format and closes the form.

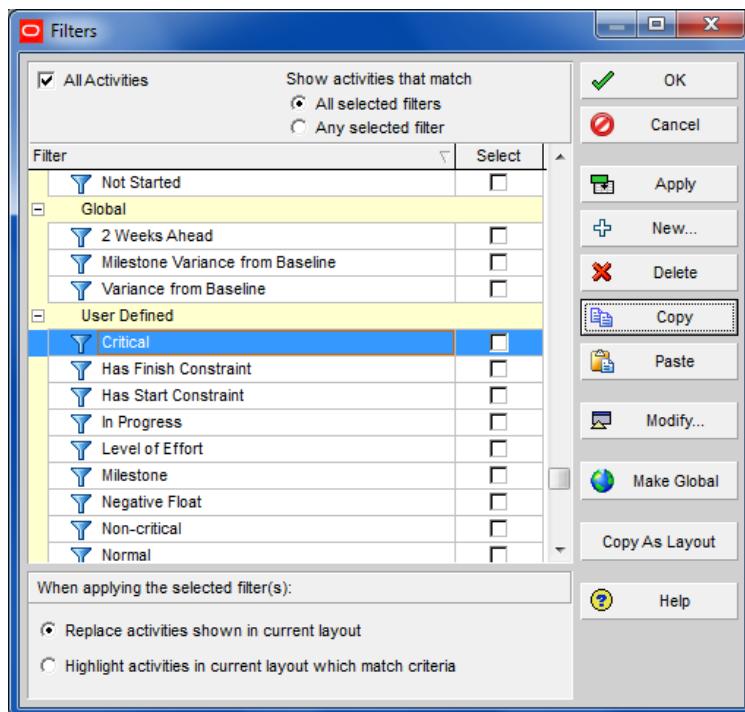
13.3 Creating and Modifying a Filter

13.3.1 Creating a New Filter

Filters may be created from the **Filters** form by:

- Clicking on the icon in the **Filter** form and create a new filter, or
- Copying an existing filter using the and icons and then editing the new filter.

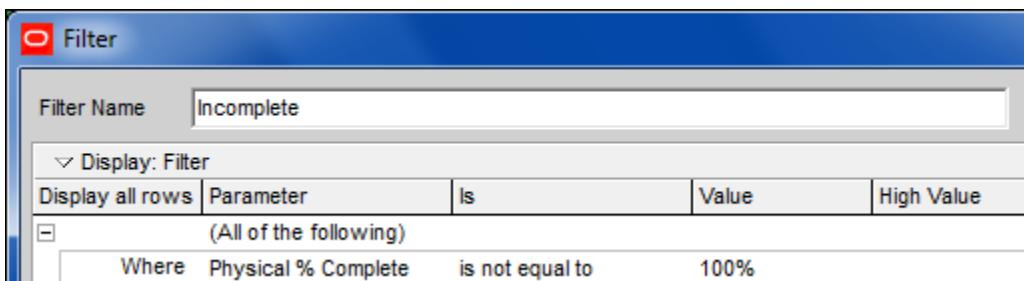
New filters will be created in the **User Defined** filter area at the bottom of the list.



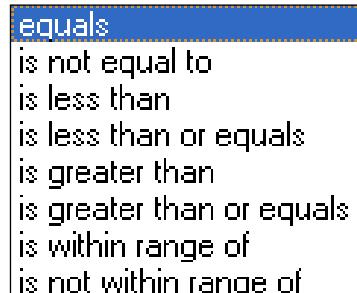
There are a large number of options available to create a filter and from the following examples you should be able to experiment and add your own filters. To modify an existing filter, select it from the **Filters** form and click the icon.

13.3.2 One Parameter Filter

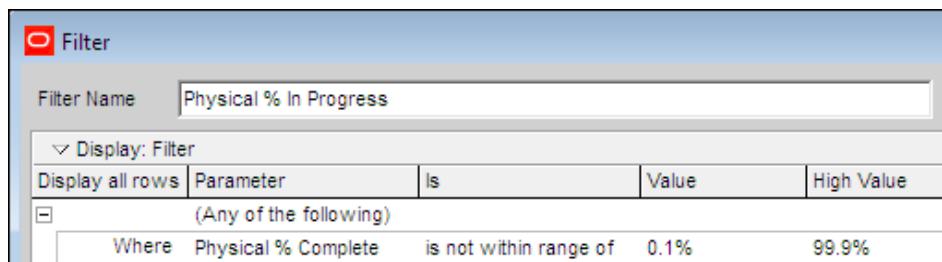
The following example is a filter to display incomplete activities:



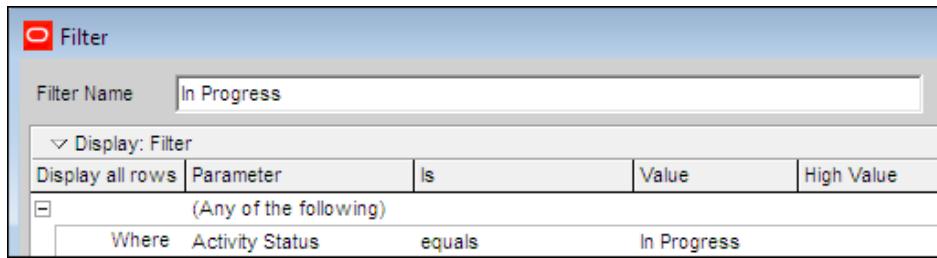
- Parameter** is used to select any of the available database fields:
- Select one of the options from the **Is** drop-down box:
- The parameter selected in the **Is** box determines if:
 - Only one **Value** is required, which is entered into the **Value** field, or
 - A range is required and two values are to be entered; then the **Value** and **High Value** are entered.



The following example is a filter to display in-progress activities using the **is not within range of** and **Value** and **High Value** options:

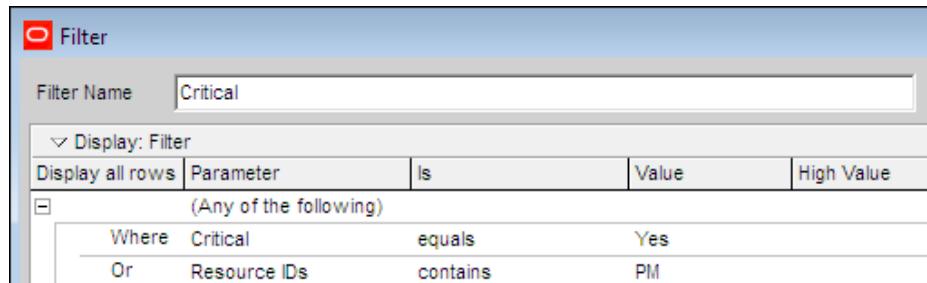


And this example uses the **equals** parameter and only the **Value** field is completed:



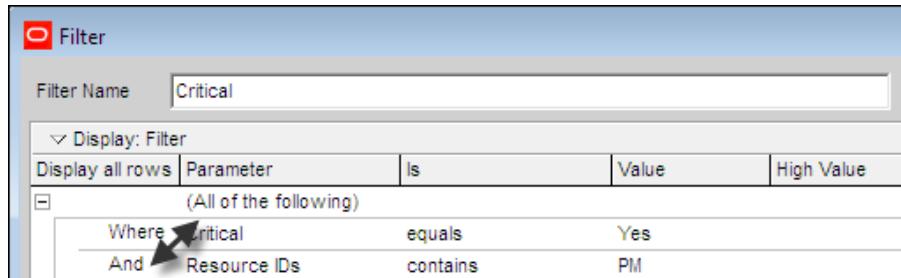
13.3.3 Two Parameter Filter

The following example is a filter to display all critical path activities and activities assigned the PM resource:



- The drop-down box under **Parameter** has two options:
 - (All of the following).** This is used when an activity must meet all of the parameters selected below.
 - (Any of the following).** This is used when an activity must meet any of the parameters selected below.

When the first parameter is change to **All of the following** the **Display all rows** option changes to an **AND**. Therefore, with the filter below there would normally be fewer activities displayed as the activities have to be critical and assigned the resource PM:



13.3.4 Multiple Parameter Filter

The following example is a filter to display incomplete activities on the critical path with resources PEH and SEH:

Display: Filter				
Display all rows	Parameter	Is	Value	High Value
(All of the following)				
Where	Physical % Complete	is within range of	0.1%	99.9%
And	Critical	equals	Yes	
(All of the following)				
Wher	Resource IDs	contains	PEH	
And	Resource IDs	contains	SEH	

- In this example, **(All of the following)** was selected from the **Parameters** drop-down box which enables a nesting effect of filter parameters.

13.3.5 Editing and Organizing Filter Parameters

Lines in a filter are added, copied, pasted, and deleted using the appropriate icons in the **Filters** form.

The arrows allow the filter lines to be moved up and down and indented to the left and outdented to the right in a similar way to indenting and outdenting tasks in Microsoft Project.



A filter may be optimized to delete the redundant filter lines using the **Optimize** command:

Display: Filter				
Optimize	Parameter	Is	Value	High Value
(All of the following)				
Print Preview	Physical % Complete	is within range of	0.1%	99.9%
And	Critical	equals	Yes	
(All of the following)				
Wher	Resource IDs	contains	PEH	
And	Resource IDs	contains	SEH	

13.3.6 Understanding Resource Filters



NOTE: THIS IS A VERY IMPORTANT POINT FOR RESOURCE FILTERING

When filtering on resources, the filter must use the option of **contains** in the **Is** column and not **equals**. This is because when an activity has been assigned more than one resource, then the activity will not be selected with a filter using the **equals** parameter.

13.4 Workshop 11 – Filters



Background

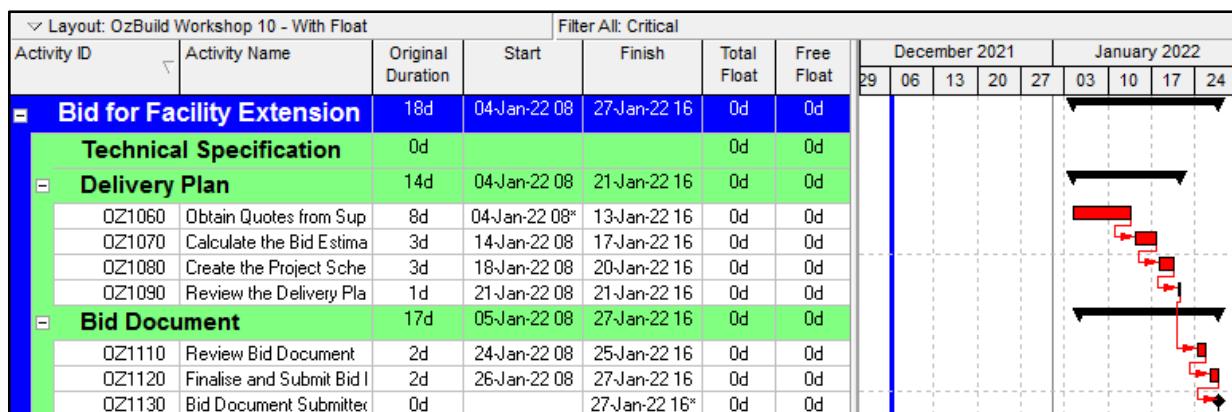
Management has asked for reports on activities to suit their requirements.

Assignment

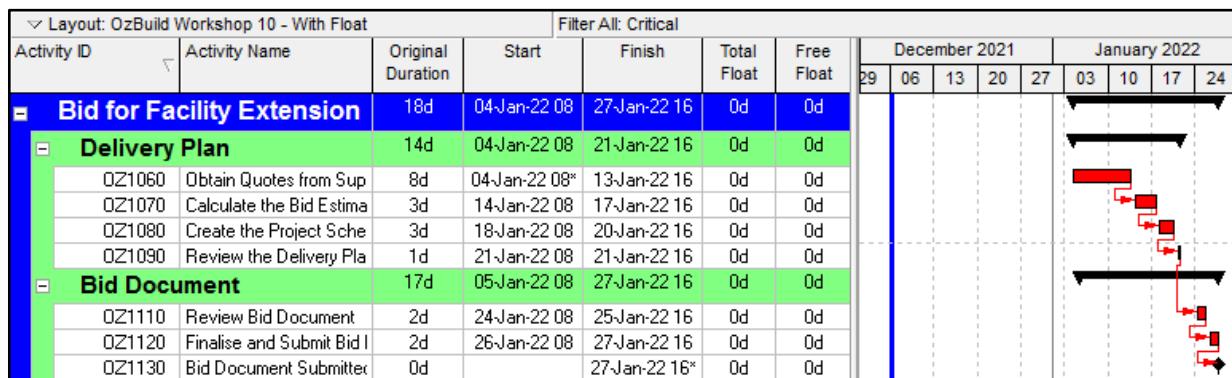
Ensure your OzBuild Bid project is open.

1. Apply the OzBuild Workshop 10 – With Float layout.
2. They would like to see all the critical activities.
 - Ensure a column showing the **Total Float** is displayed, and
 - Apply the **Critical** activities filter.

You will see only activities that are on the critical path and their associated summary activities.



3. Open the **Group and Sort** form and check the **Hide if empty** box and notice the **Technical Specification** band is hidden.

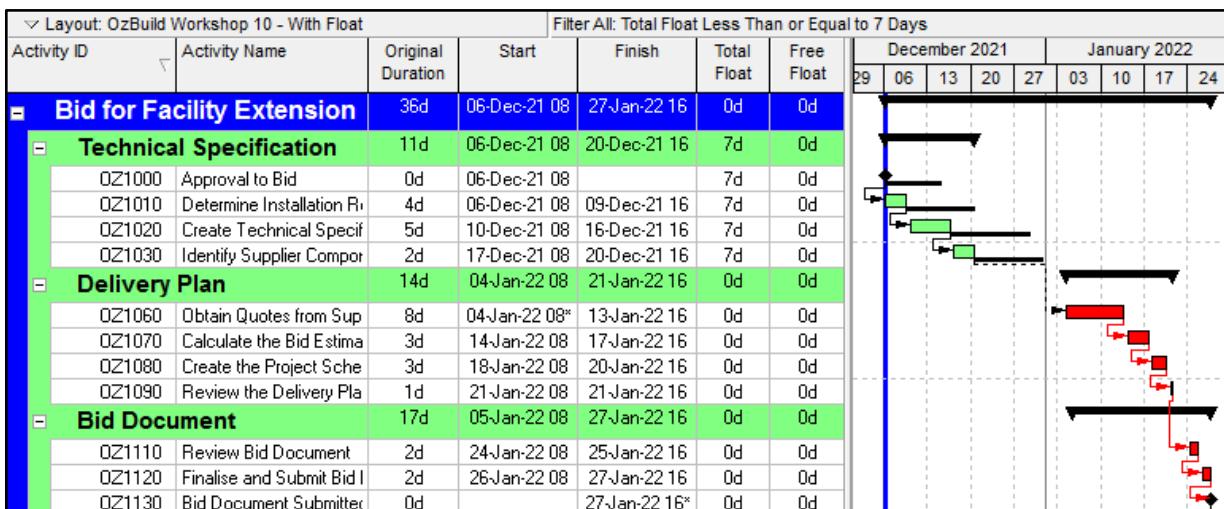


continued...

4. Now apply some other filters such as the **Milestone**, **Has Start Constraint** and **Has Finish Constraint**.
5. Management would like to see all the activities with float less than or equal to 9 days:
 - Create a new filter titled: **Total Float Less Than or Equal to 9 Days**, and
 - Add the condition to display a total float of less than 9 days.

Filter Name	Total Float Less Than or Equal to 9 Days			
Display: Filter				
Display all rows	Parameter	Is	Value	High Value
(All of the following)				
Where Total Float		is less than or equals	9d	

- Close the Filter form,
- Click on the **All Activities** check box to ensure all activities are displayed,
- Apply the new filter,
- You should find that activities with more than 7 days float are hidden:

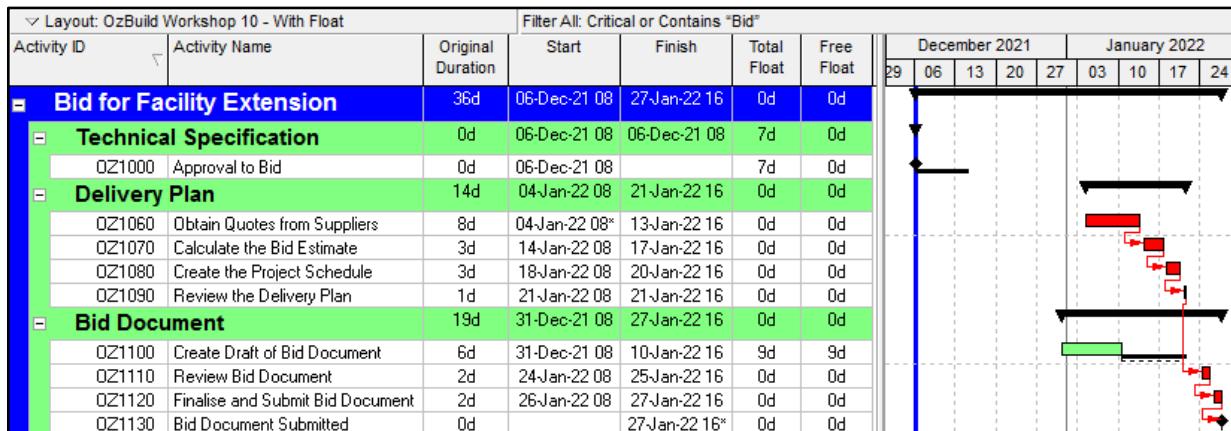


6. They would like to see all the activities that are critical or contain the word “Bid”.

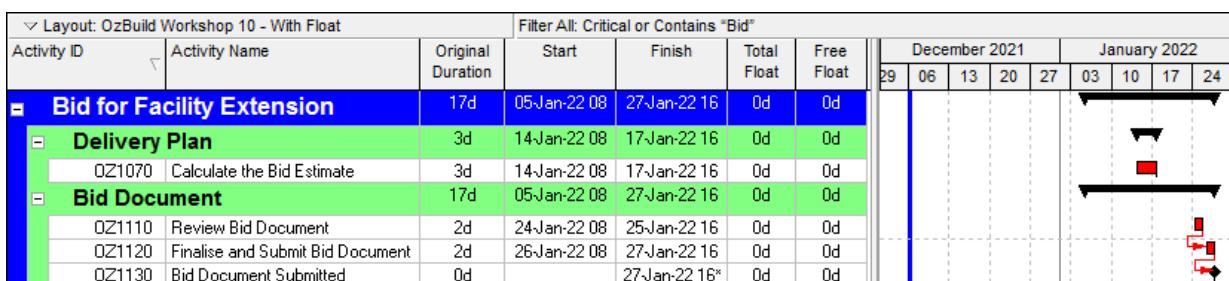
- Copy the **Critical** filter,
- Edit the filter title to read: **Critical or Contains “Bid”**
- Edit the top line to read **(Any of the following)**,
- Add the condition: **Or Name (Activity Name) contains Bid**, and

Filter Name		Critical or Contains "Bid"											
▽ Display: Filter Display all rows Parameter Is Value High Value													
<input type="checkbox"/> (Any of the following)													
<table border="1"> <tr> <td>Where</td> <td>Critical</td> <td>equals</td> <td>Yes</td> </tr> <tr> <td>Or</td> <td>Activity Name</td> <td>contains</td> <td>bid</td> </tr> </table>						Where	Critical	equals	Yes	Or	Activity Name	contains	bid
Where	Critical	equals	Yes										
Or	Activity Name	contains	bid										

- **Note:** The text is not case sensitive,
- Apply the filter.



7. Now change the **(Any of the following)** option to **(All of the following)** and see the effect.



8. There should be fewer activities as it is now displaying activities that meet both conditions.

9. Now apply the **All Activities** filter to display all the activities.

14 PRINTING, REPORTS AND VISUALIZER

This is the stage at which the schedule is printed so people may review and comment on it. This chapter will examine some of the options for printing your project schedule.

There are several tools available to output your schedule:

- The **Printing** function prints the data displayed in the current Layout.
- The **Reporting** function prints reports, which are independent of the current Layout. Primavera supplies a number of predefined reports that may be tailored to suit your own requirements. Reports will not be covered in detail in this publication.
- The **Project Web Site Publisher** to publish the schedule to a web site.
- **Visualizer** was new to P6 Version 8.3 and an update of the P6 Version 8.2 **Timescaled Logic Diagram** module. It also now includes **Schedule Analyzer**.
- You may also copy and paste text data from columns and some tables into Excel and other products.



It is recommended that you consider using a product such as Adobe Acrobat to output your schedule in pdf format. You then will be able to e-mail high quality outputs that recipients may print or review on screen without needing a copy of Primavera.

14.1 Printing

When a Layout is split, the lower pane may be printed with the upper pane, with the exception of the **Activity Details** pane. This is similar to Elecosoft (Asta) Powerproject, but different from Microsoft Project where only the Activity View may be printed. Other products, such as Elecosoft (Asta) Powerproject and Tilos, allow multiple resource histograms to be printed in one printout, which is not possible in P6.

Print settings, such as headers and footers, are applied to the individual Layouts and the settings are saved with that Layout.

The following normal print commands may be used when printing:

- File, Page Setup...
- File, Print Setup...
- File, Print Preview
- File, Print... or Ctrl+P

Each of these functions will be discussed only for printing the Gantt Chart. Printing all other Layouts is a similar process. Some Layouts will have different options due to the nature of the data being displayed. These other options should be easily mastered after the basics covered in this chapter are understood.

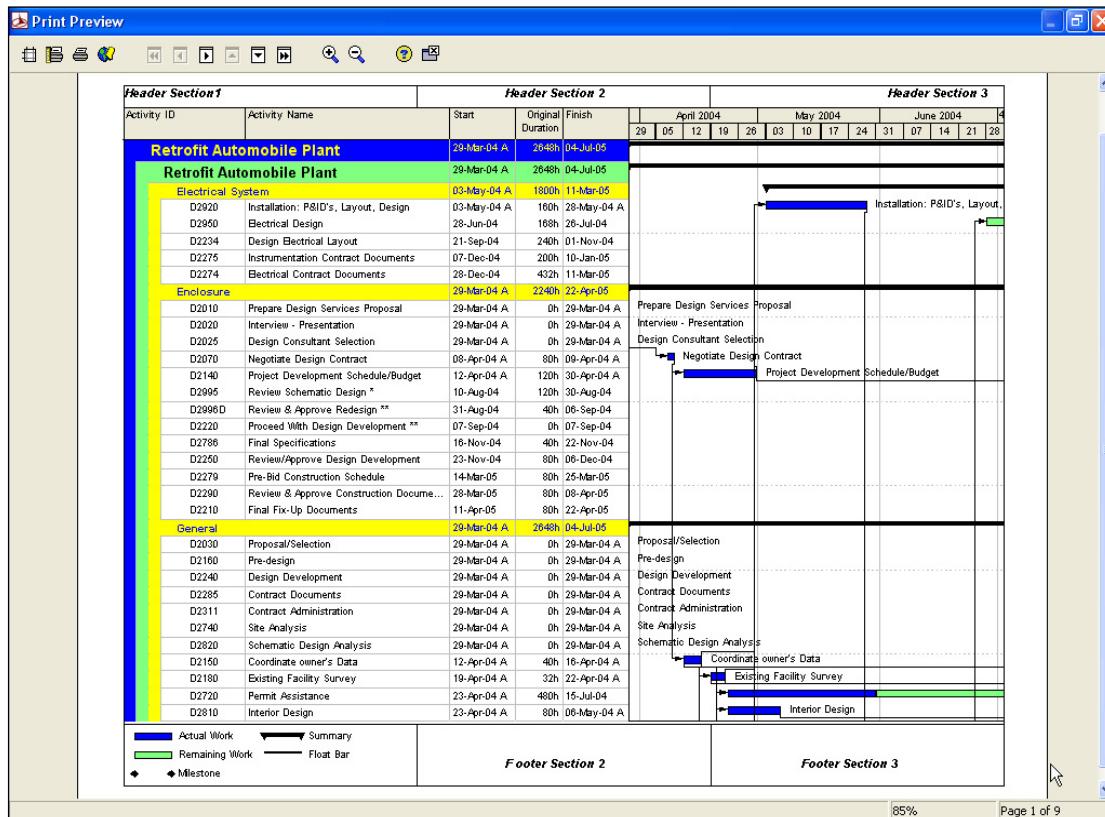


Each time you report to the client or management, it is recommended that you save a copy of your printout or report and a pdf file is an excellent method of saving this data. In conjunction with a robust file-naming convention that includes the project title and Data Date, a pdf file will enable you to reproduce these reports at any point in time in the future and have available a copy of the project schedule for dispute resolution purposes.

It is good practice to keep a copy of the project after each update, especially if litigation is a possibility. A project may be copied either by creating a Baseline, by exporting the project as an XML file (which will also save any Baseline) or XER (without a Baseline) or by using the project copy function, then making the **Status** inactive in the **General** tab of the **Projects Window**. It is important to note that although the project may be marked as inactive it may still be opened and modified.

14.1.1 Print Preview

To preview the printout, use the Primavera **Print Preview** option. Select **File, Print Preview** or click the  icon on the **Print** toolbar:



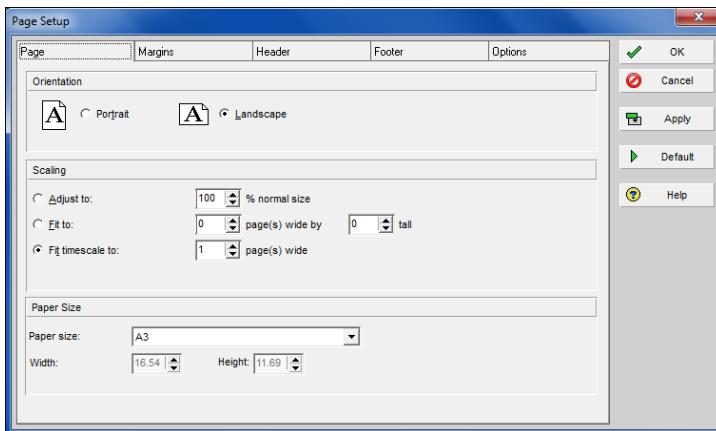
The following paragraphs describe the functions of the icons at the top of the **Print Preview** screen from left to right:

- The  icon opens the **Page Setup** form to be covered in the next paragraph.
- The  icon opens the **Print Setup** form where the printer and paper size, etc., may be selected.
- The  icon opens the **Print** form where the printer, the pages to be printed, and the number of copies to be printed may be selected.
- The  icon opens the **Publish to HTML** form and saves the view in HTML format where both the tables and bar charts are converted.
- The first six icons on the left,      
- The magnifying glass   icons zoom in and out. You may also click in the **Print Preview** screen to zoom in.
- The  button opens the Help file.
- The  icon closes the **Print Preview** screen.

14.1.2 Page Setup

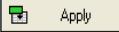
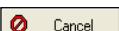
To open the **Page Setup...** form:

- Click the  **Page Setup** icon on the **Print** toolbar, or
- Select **File, Page Setup...** to display the **Page Setup** form:



The **Page Setup** form contains the following tabs: Page, Margins, Header, Footer and Options.

When changes are made to a header or footer then the icons on the right side may be used:

-  – Applies the changes so they are visible without closing the form.
-  – Resets the Page Setup settings to default.
-  – Accepts the changes and closes the form.
-  – Cancels the changes and closes the form.

Page Tab

The Primavera options in the **Page** tab are:

- Orientation** enables the selection of **Portrait** or **Landscape** printing.
- Scaling** enables you to adjust the number of pages the printout will fit onto:
 - **Adjust to:** – enables you to choose the scale of the column text and then the horizontal scale of the bars is adjusted to fit the remaining space.
 - **Fit to:** – enables you to choose the number of pages across and down and Primavera should scale the printout to fit.
 - **Fit timescale to:** – enables the user to select the number of pages the Gantt Chart is scaled over but leaves the font of the columns un-scaled. This will often be the best setting with 1 page(s) wide selected.

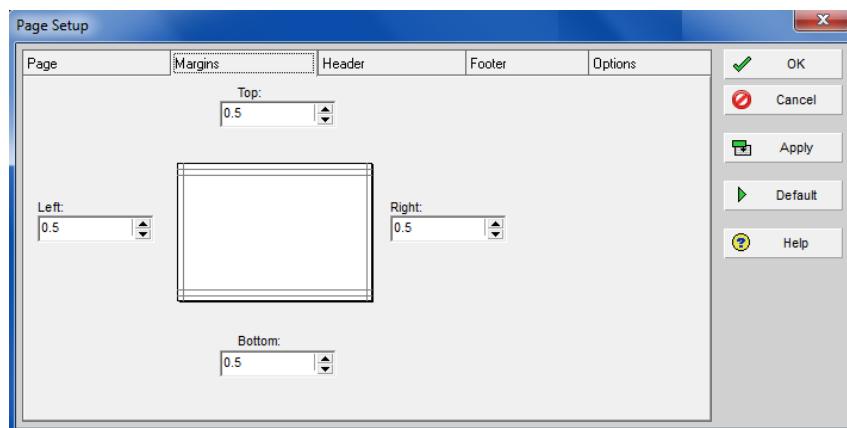


These options work in conjunction with each other and can get quite difficult to operate. The author recommends that a good starting point for print options is to first set the **Adjust to:** to 100% so the text is printed out in a legible size and then set the **Fit timescale to:** is set to 1 page wide.

- Pages are numbered first across and then down, and does not follow the Microsoft Project convention of numbering pages down and then across.

Margins Tab

With this option, you may edit the margins around the edge of the printout.

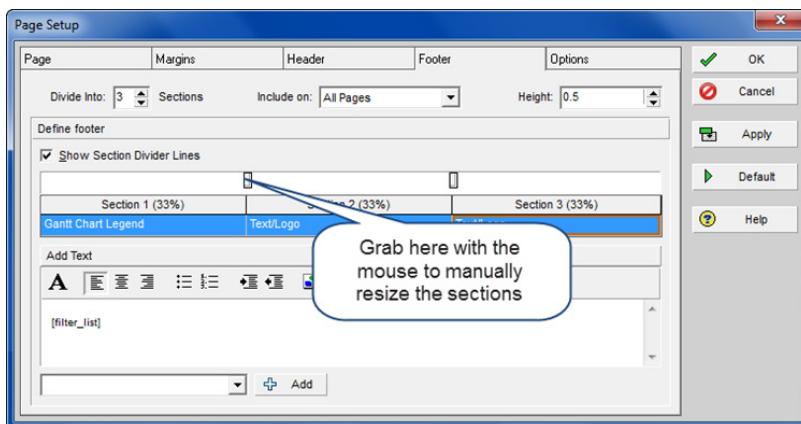


Type in the margin size around the page. It is best to allow a wider margin for an edge that is to be bound or hole punched – 1" or 2.5cm is usually sufficient.

Header and Footer Tabs

Headers appear at the top of the screen above all schedule information and footers are located at the bottom. Both the headers and footers are formatted in the same way. We will discuss the setting-up of footers in this chapter.

Click on the **Footer** tab from the **Page Setup** form. This will display the settings of the default footers and headers. You should modify the output to suit your requirements.

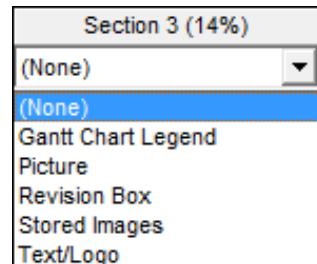


- **Divide Into:** – determines the number of sections the Header/Footer is divided into from 1 to 5 sections.
- **Include on:** – determines on which pages the Header/Footer is to appear: First Page, Last Page, All Pages, or No Pages.
- **Height:** – enables the user to select the height of the Header/Footer.
- **Define Footer**
 - **Show Section Divider Lines** check box – hides or displays the divider lines between the sections.
 - The sections may be sized by manually moving the divider lines with the mouse and the slide underneath the **Show Section Divider Lines**.

- Section Content

This may be selected by clicking on the icon under the **Section** title and a subject type to be displayed selected.

- **(None)** – leaves the section blank.
- **Gantt Chart Legend** – displays all the bars checked in the display column of the **Bars** form and only the fonts may be edited by clicking on the little icon at the bottom.
- **Picture** – enables a picture to be placed in the footer and it may be manually adjusted to fit the space or automatically adjusted by checking the **Resize picture to fit the selection** box.
- **Revision Box** has a **Revision Box Title**: – the following information may be entered manually: Date, Revision, Checked, Approved.
- **Stored Images** – New to P6 Version 18. Up to 20 pictures at a max of 500x500 dpi may be saved in a database and are available for any user to access. This solved the issue of when one user had embedded a picture in a Layout Header and a second user did not have access to the same directory and was thus unable to display the same picture when applying the same Layout. Version 19 introduced the ability to upload multiple images at one time. Pictures are uploaded using **Enterprise, Store Image....**
- **Text/Logo** – enables many types of data to be displayed including text, a data item selected from the drop-down box, fonts formatted by clicking on the formatting icons



, a Logo inserted by clicking on the icon, Tables added by clicking on the icon, and a Hyperlink added by clicking on the link icon which opens the **Hyperlink** form.

NOTE: When you are editing text in a header or footer and a line return created by using the **Enter** Key will result in a paragraph break and a large gap between the lines. This may be prevented by using a soft return using the **Shift & Enter** command:



When adding text in some earlier versions of P6 letter “s” may not be typed into the Header and Footer in some earlier versions of P6 Version 8. You will be able to cut and paste the required text with an “s” from another program like Notepad or you may create an image and insert the image into the header or footer. This issue was rectified in P6 Version 15.

- The button allows the insertion of database fields from the drop-down list which automatically update with from the current project. The following fields may be set for the whole organization: **Custom Label 1 to 3, Footer Label 1 to 3, and Header Label 1 to 3** and defined in P6 Professional in the **Admin, Admin Preferences..., Reports** tab and in the Primavera EPPM Optional Client **NOT FROM THE WEB** but from **Tools, Reports, Report Preferences**.

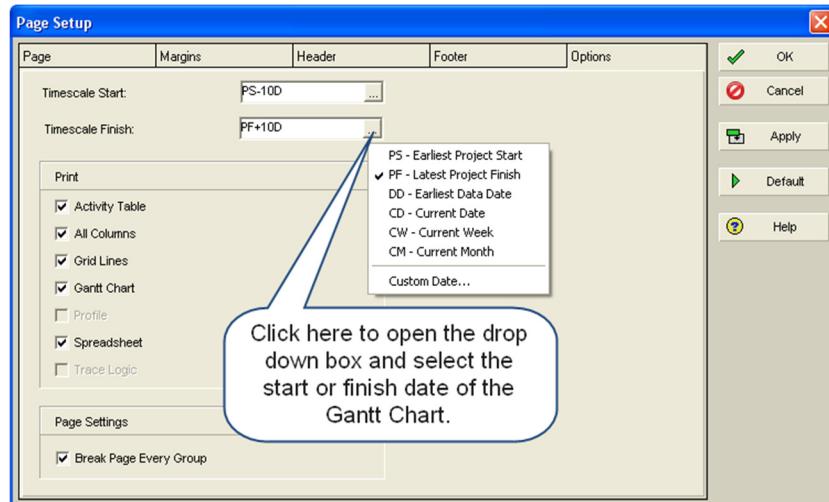


The button is a very useful feature as it allows for standard layouts to be created that update automatically from database fields such as Project ID and Project Name and therefore are always valid when you open a different project.

Options Tab

The Options tab has three sections:

- **Timescale Start:** and **Timescale Finish:** These options enable the **start and finish** point of the timescale to be set. Click on the  icon and select a date from the drop-down list. A **Custom Date...** may be selected from the menu and a calendar is opened to select the date.



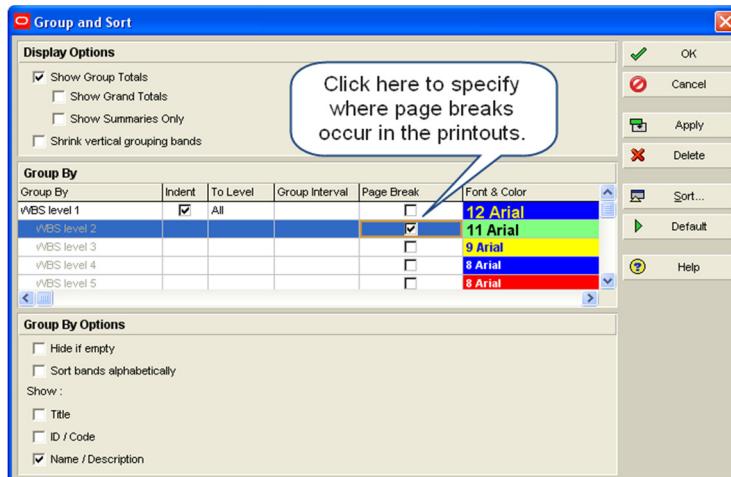
- A lag from the nominated dates may be specified, see the picture above where the timescale starts 10 days before the Project Start date and ends 10 days after the Project Finish date.
- The **Print** options alter depending on the Layout. The check boxes allow a selection of the data to be printed.



Only one resource histogram or a resource table may be printed at a time.

- The **Break Page Every Group** puts a page break at each change of heading in the first group in the **Group and Sort** form. The option in this form only works when there are more than one level 1 band in the Group and Sort form and would not work for a WBS when Indented to All Levels but would work when activities are grouped by a Start or Finish date.

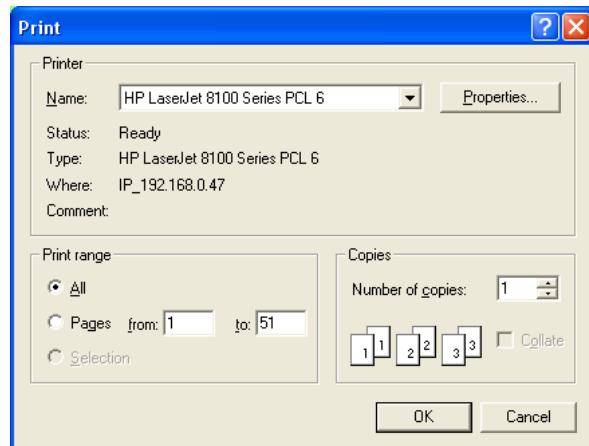
P6 Version 8.1 has also added a function in the **Group and Sort** form that now allows a page break at any select level in Grouping of activities which in a way make this option redundant:



14.1.3 Print Form

The Print form is be opened by:

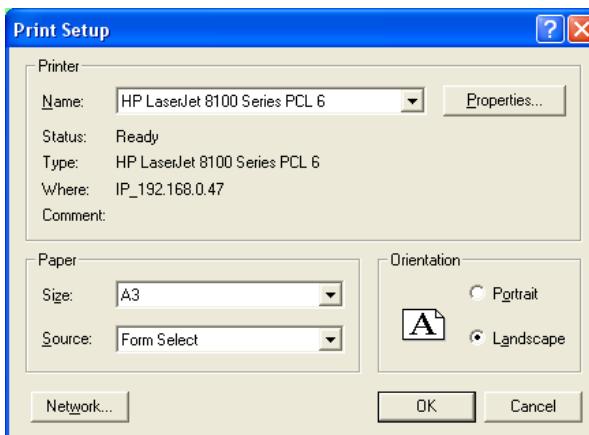
- Selecting **File, Print...**, or
- Executing the keystrokes **Ctrl+P**, or
- Clicking on the  print icon in the **Print Preview** screen.



14.1.4 Print Setup Form

The Print Setup form is be opened by:

- Selecting **File, Print Setup...**, or
- Clicking on the  print icon in the **Print Preview** screen.



14.2 Reports

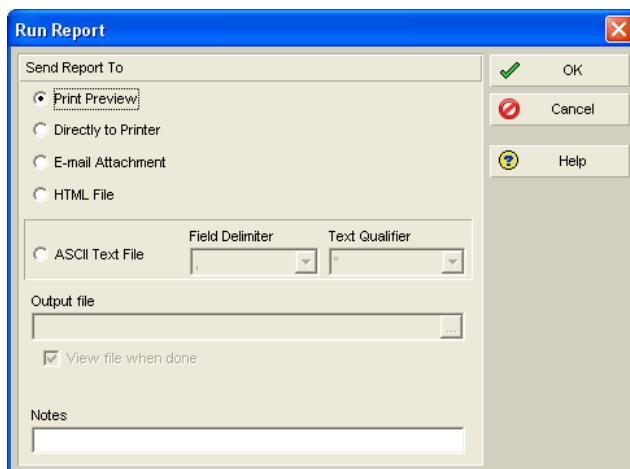
 Click the **Report** icon on the Enterprise toolbar or select **Tools, Reports, Reports** to open the **Reports Window**:

Report Name	Report Scope	Last Run Date
Report Group: Standard Construction Reports		
AD-01 Activity Status Report	Global	
LA-01 Two Week Lookahead	Global	
LG-01 Logic Report, By Project	Global	
Notebook Topics	Global	
RC-01 Resource Control Report	Global	
+ Report Group: Schedule		
- Report Group: Resource		
- Report Group: Control		
RC-01 Resource Control - Detail by Activity	Global	
RC-02 Resource Control - Summary by Resource	Global	

- The reports are grouped under a hierarchical structure that may be modified by opening the **Tools, Reports, Reports Groups** form or right-clicking and using the menu.

14.2.1 Running Reports

- A single report may be run by right-clicking on a report and selecting **Run**, **Report...** or clicking the  icon on the **Reports** toolbar. This will open the **Run Report** form:
- Selecting the option of **ASCII Text File** will allow the report to be opened and edited in Excel. The default Field Delimiter and Text Qualifier are usually suitable for Excel.



- Batches** are groups of reports that are run at the same time:
 - **Batches** are created and edited by using the **Tools, Reports, Batch Reports...** form, and
 - Run by clicking the  icon in the **Reports** toolbar.

14.2.2 Editing Reports

- Reports may be cut, copied, and pasted using the **Edit** toolbar icons or right-clicking.
- They may be renamed by clicking on the description.
- Some reports may be edited with the **Report Wizard** and all may be edited with the **Report Writer**.
 - Reports that have a  icon by the report name may be edited with the **Report Wizard**, which is the simplest method of editing these reports. **Note:** These reports may also be edited with the **Report Writer**.
 - Reports that have a  icon by the report name may only be edited with the **Report Writer** and this is quite complex. There are basic instructions in the Help file.
- To create a new report or modify an existing report that was created with the **Report Wizard**, run the **Report Wizard** by clicking the  icon on the **Reports** toolbar, or selecting **Tools, Report Wizard....**

14.3 Publish to a Web Site

Primavera has several functions that enable a project to be published to a web site which is effectively the only “Free Reader” that Oracle Primavera provides with P6 and is a great way of sharing your project schedule with a number of other organizations.

The **Tools, Publish**, menu has three options for creating a web site for a currently opened project:

- Project Web Site...** creates a complete web site with any Reports or Layouts that have been created. This is a very useful function if it is required to publish a large amount of data.
- Activity Layouts...** creates a web site with just the selected Activity Layout.
- Tracking Layouts...** creates a web site with just the selected Tracking Layout.

14.4 Visualizer

14.4.1 Understanding Visualizer

Visualizer was new to P6 Version 8.3 and an update of the P6 Version 8.2 **Timescaled Logic Diagram** module. It is a separate piece of Windows Client software that reads your Oracle Primavera database and allows a higher level of Gant Chart customization than available from the Activities Window in either Professional or Web Client. Version 16 added **Claim Digger** to Visualizer and named it **Schedule Comparison**.

The screen dumps used in this section of the book are mainly taken from P6 Versions 15 and 18, but as Visualizer evolves, the menus change and your version may not be the same as these pictures.

Visualizer may be run from within P6 or from the Windows Start Menu and will create either:

- **Timescaled Logic Diagram (TSLD),**
- **Gantt Charts,** and
- Version 16 introduced **Schedule Comparison** to the menu.

It includes the following functions:

- Printing of Layouts imported from P6 and the creation of new Visualizer layouts,
- Notebook Topics and Steps may be displayed as fields in the activity table or as bar labels,
- Show Lead or Lag on relationships,
- Stack columns and use word wrapping in the Gantt chart,
- Show Multiple Activities on one row in the TSLDs, thus reducing the number of rows,
- Formatting of fields and labels,
- Use functions such as Baseline Bar display, Filters, Group and Sort,
- The Enterprise, Activity Code form allows Activity Codes colors to be defined. These colors may be assigned to bars, bar Start and Finish points in Visualizer, but these colors may not be assigned to bars in the Activity window Bars form.
- More shape choices and other formatting options for bars,
- Run reports in batches using programs like Windows Scheduler,
- Primavera Version 15.1 has enabled the ability to import and export PLF Layout files which are created in P6 Professional. Also, user may exchange Visualizer Layouts using the import and export of a VLF file.

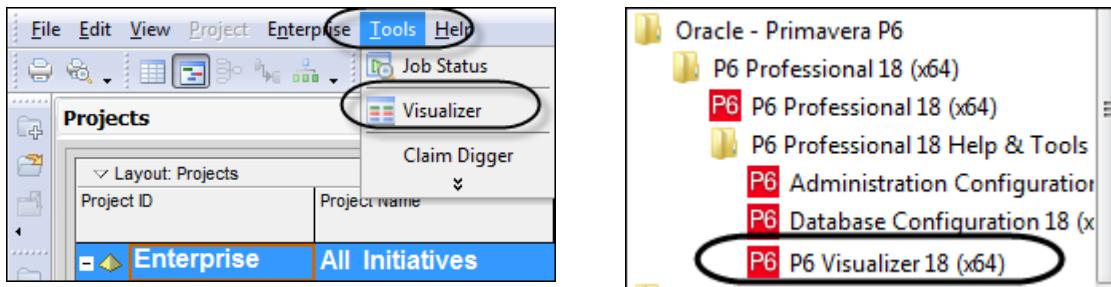
Understanding how Visualizer operates:

- It is a separate piece of Windows Client software that is installed on a PC,
- It uses the same security as PPM,
- It may not be used to manipulate data, therefore it is just for presentation,
- The user is required to select an existing layout or create a new layout which will either display a Gantt Chart or TSLD, before selecting the project to report,
- Then the projects to report on are selected,
- The layout is formatted and saved, if required,
- Visualizer layouts may be created and saved as Global, Project or User layouts, and
- Visualizer uses P6 Admin Preferences for Calendar Start Day of the week, and on line help settings.

14.4.2 Starting Visualizer

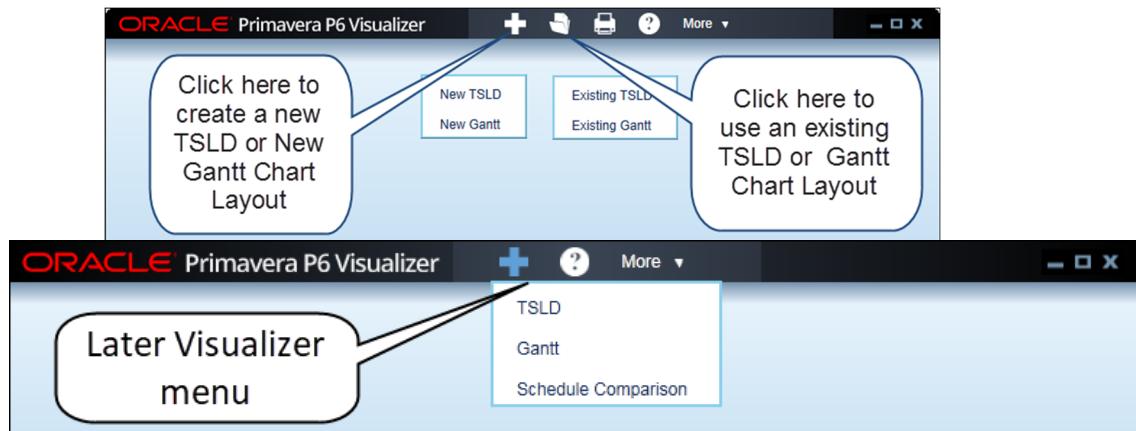
To start Visualizer:

- From P6 select **Tools**, **Visualizer**, and Visualizer will start without the need to log in again, or
- From the Windows Start Menu without opening P6 and using your P6 login name and password:



There are initially 4 or 5 buttons at the top of the screen and the additional printing button was available on earlier versions of Visualizer and removed in later versions:

- - to create a New TSLD or New Gantt (chart)
- - to open an Existing TSLD or Gantt (Chart), removed from later version of Visualizer
- - print, removed from later version of Visualizer
- - to access Help, both local and Local or Online
- - to Manage, and in later versions, import and export layouts.



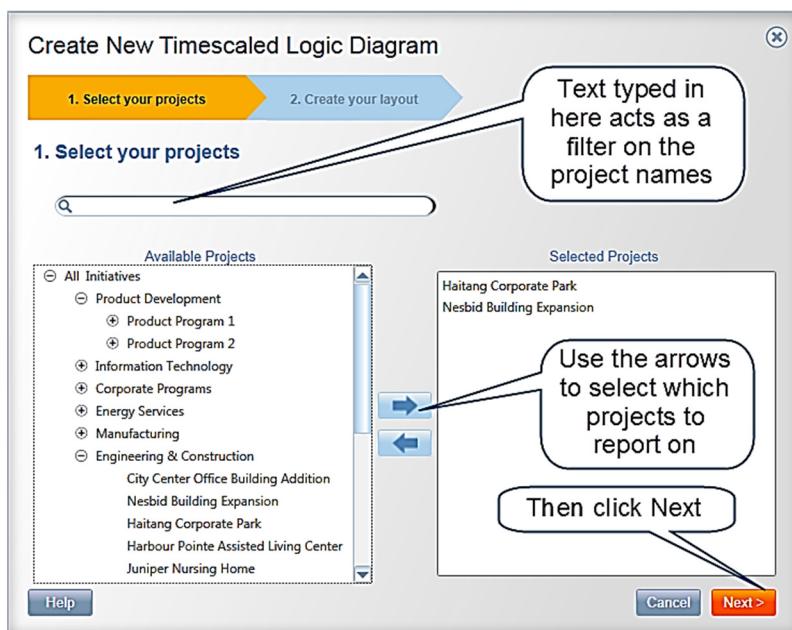
Version 8.4 introduced some new functions, including:

- Display **Shifts** as a **Date Interval**. This function is accessed from the **Timescale tab Date Interval** list.
- The ability to add a customized legend in headers and footers. This function is accessed from **Page Setup tab**, **Title Block tab**.
- Multiple Layouts may be selected and moved from one grouping to another in the **Manage Layouts** form.
- Bar Setting may now be copied from one layout to another. This function is accessed in the **Bars & Labels tab**, **Available Bars** section.

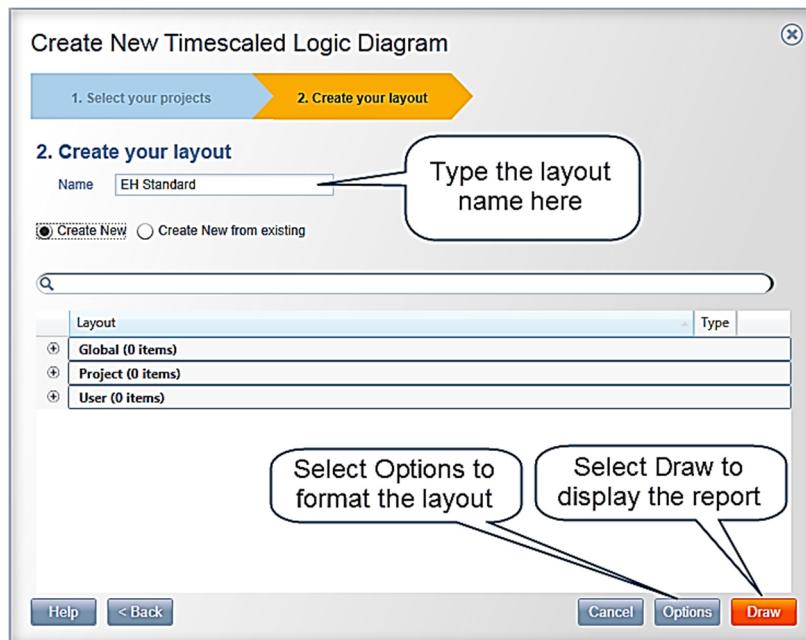
14.4.3 Create a New TSLD – Timescaled Logic Diagram

To create a new TSLD select  **New TSLD**:

- You will then select which projects to report on, the picture below displays the options available to create a new TSLD:

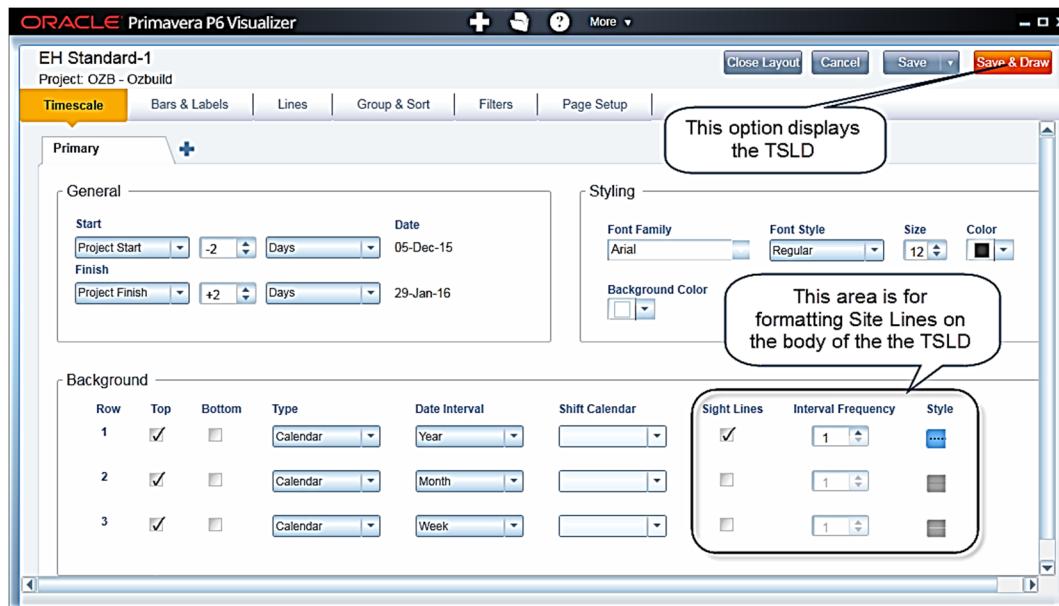


- Name the layout with an appropriate name,
- Use the radio buttons to either:
 - Select to copy an existing TSLD and select from the list below, or
 - To create a new TSLD,
- Select **Draw** to see the result or click **Options** to edit the layout:



The **Options** form allows a large number of formatting options, which are similar to other P6 formatting functions, but graphically richer:

- **Timescale** is for formatting all aspects of the timescale, plus the gridlines on the body of the diagram:



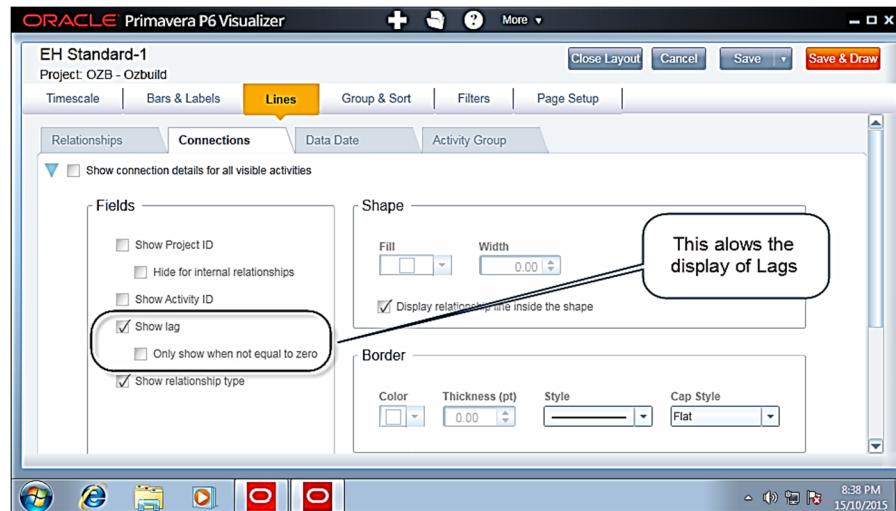
The **Bars & Labels** form is where bars are added, edited and deleted. This area is not intuitive so follow these instructions carefully:

- The **Available Bars** form is where bars are added, edited and deleted.
- You must name the bar with a name that makes sense, Visualizer does not name bars,
- The bar at the top of the list is drawn first and the second one in the list is drawn on top of the first, when it is on the same line,
- A bar selected under **Available Bars** is then formatted in the options on the right hand side,
- The middle top bar shows how the selected bar will be formatted and the bars in the middle bottom shows how all the bars will look:



Lines tab is where the Relationships, Data Date and Activity Group bands are formatted:

- **Relationships** tab is where the relationships to be displayed are selected,
- **Connections** tab is where Lead and Lag may be displayed,
- **Data Date** allows formatting of the Data Date,
- **Activity Group** allows the placing of a line around a group of bars that are associated with one activity:

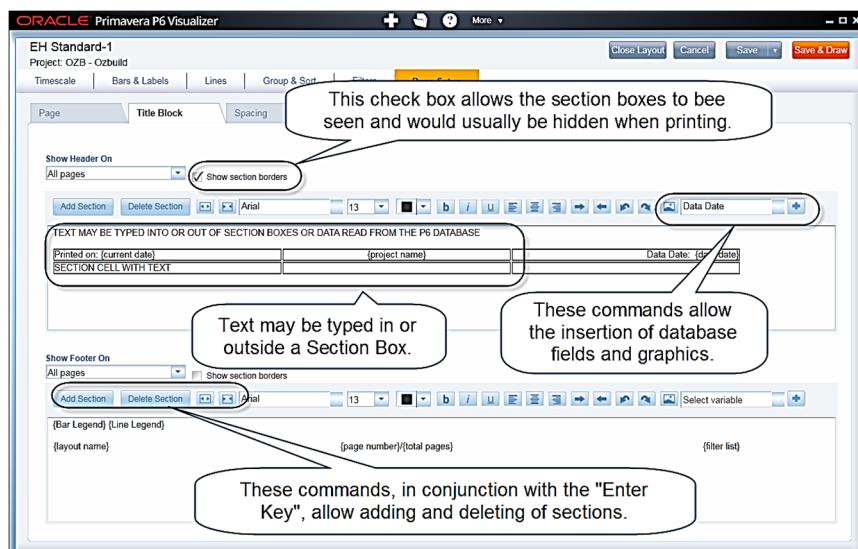


Group & Sort and **Filters** Page Setup forms work in the same way as other P6 products, but still does not allow grouping on single resource when multiple resources are assigned to an activity.

Filters with the normal filtering functions,

Page Setup is a little different to other P6 products:

- To understand what is going on it is important to check **Show section borders**,
- **Sections** are effectively boxes that may be placed in the header or footer and project data may be typed in or read from the P6 database,
- Sections may be added deleted or adjusted in size,
- Headers and Footers are formatted the same way:

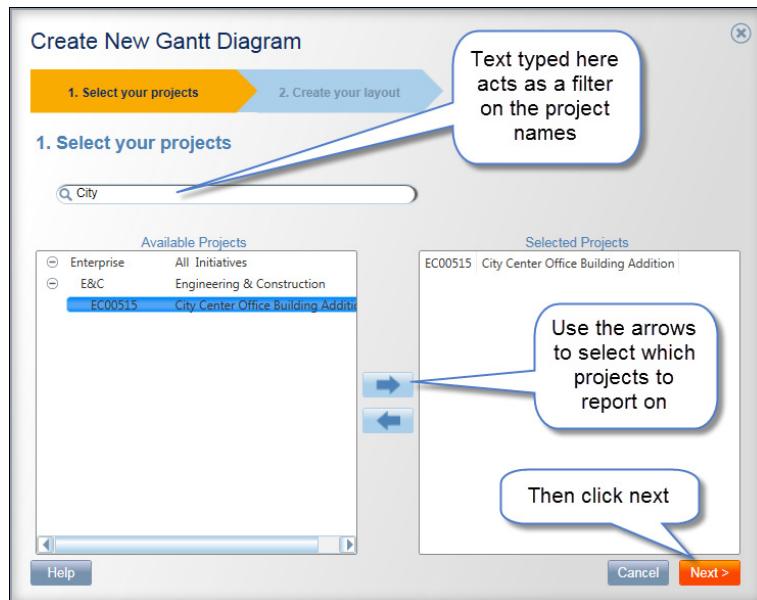


14.4.4 Create a New Gantt Diagram

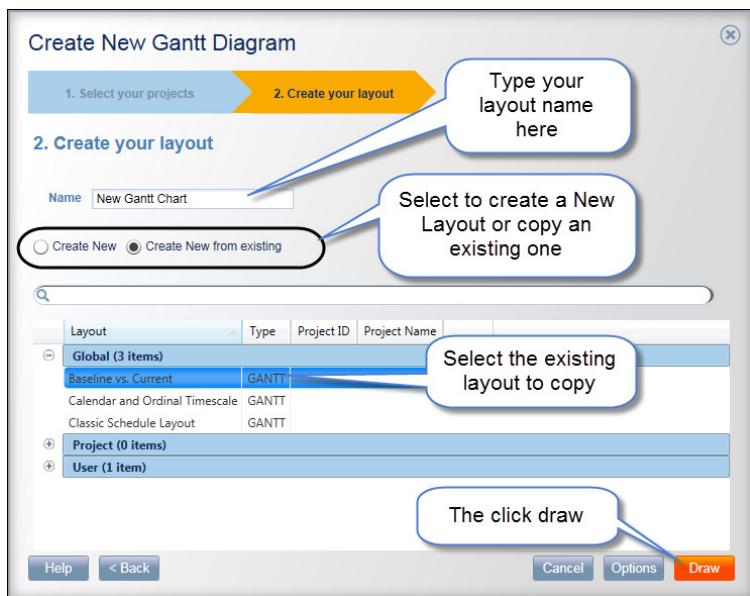
Most of the options in the tabs are self-explanatory and the Gantt Diagram layout functions are similar to formatting in PPM and EPPM.

To create a new Gantt Chart select  **New Gantt**:

- You will then select which projects to report on, the picture below displays the options available to create a new Gantt Chart:



- Name the layout with an appropriate name,
- Use the radio buttons to either:
 - Select to copy an existing Gantt Diagram and select from the list below, or
 - To create a new Gantt Diagram,
 - The new Gantt Diagram is created as a User Layout.



- Select Draw to see the result or click Options to edit the layout:

Demo-1
Project: EC00501 - Haitang Corporate Park

Activity Name	Start	Finish	Resources
Variance - BL1 Finish Date	BL1 Start	BL1 Finish	Variance - BL1
Paint Building Interior	14-Sep-12	28-Sep-12	Painter
0	14-Sep-12	28-Sep-12	0
Punch List	07-Jan-13	11-Jan-13	Painter, Labor, Finish Carpenter
0	07-Jan-13	11-Jan-13	0
Insulate Ducts	26-Jan-12	01-Feb-12	HVAC
0	26-Jan-12	01-Feb-12	0
Install HVAC Ducts	03-Nov-11	02-Dec-11	HVAC
0	03-Nov-11	02-Dec-11	0
Fabricate and Deliver Flooring	01-Mar-11	03-Feb-12	Project Controls
0	01-Mar-11	03-Feb-12	39
Award Contract for Flooring	18-Feb-11	25-Feb-11	Project Controls
144	17-Mar-11	23-Mar-11	1

Close Layout Print Save As Options

December Dec 18 January Jan 1

1:21 PM 12/22/2015

The Options form allows a large number of formatting options which are similar to other P6 formatting functions, but graphically richer:

- Chart & Grid
 - Content tab allows formatting of the columns and text.

Win 7 P6 15.1 EPPM - VMware Player (Non-commercial use only)

Player | Win 7 P6 15.1 EPPM - VMware Player (Non-commercial use only) |

ORACLE Primavera P6 Visualizer

Demo-1
Project: EC00501 - Haitang Corporate Park

Chart & Grid Timescale Bars & Labels Filters Save Save & Draw

Content Row Header

Show: Gantt Chart & Grid Gantt Chart Grid

Grid Position: Left Show line number

+ Add X Delete Default

Field	Display Title	Column	Row
Activity Name	Activity Name	1	1
Variance - BL1 Finish Date	Variance - BL1 Finish Date	1	2
Start	Start	2	1
BL1 Start	BL1 Start	2	2
Finish	Finish	3	1
BL1 Finish	BL1 Finish	3	2
Resources	Resources	4	1

Font Family: Arial
Text Wrap
 Wrap Text
Maximum Number of Lines: 5
Maximum Label Width: 150
Apply to All

1:42 PM 13/02/2015

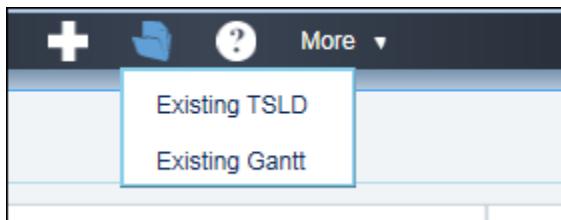
- Row allows alternate coloring of rows,
- Header is used to format the column headers.

Timescale, Bars & Labels Lines, Group & Sport, Filters, and Page Setup all work in the same way as the TSLD and will not be covered a second time.

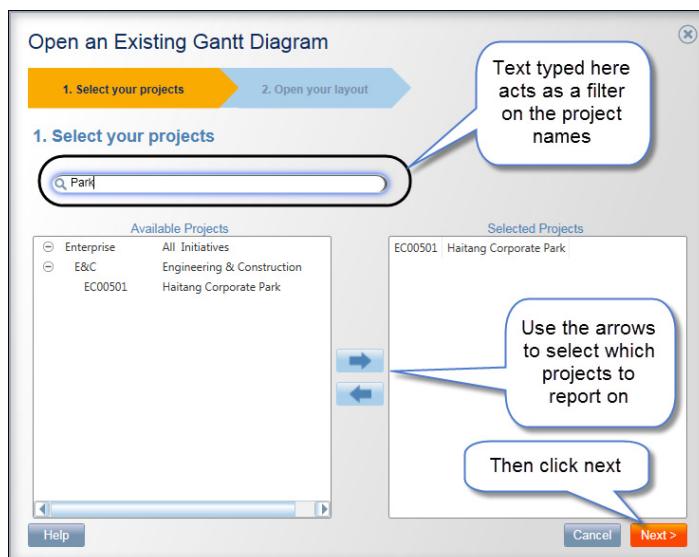
14.4.5 Open an Existing TSLD or Gantt Chart

To open an existing TSLD or Gantt Chart is very similar to creating a new one:

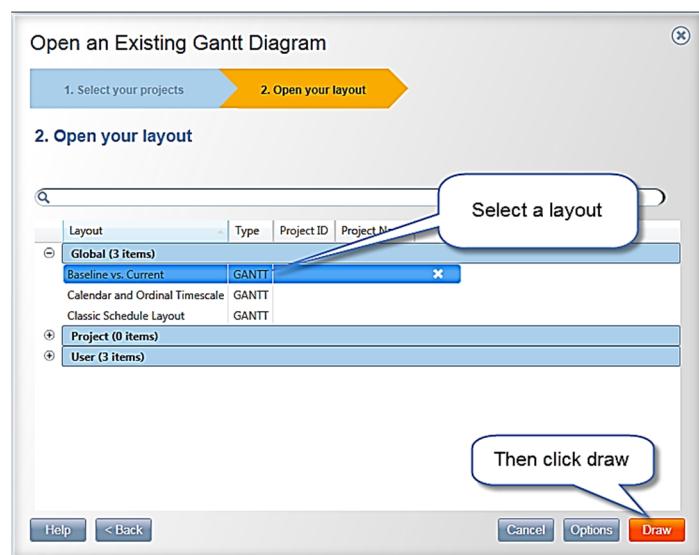
- Select **Existing TSLD** or **Existing Gantt** from the menu:



- Select one or more projects:



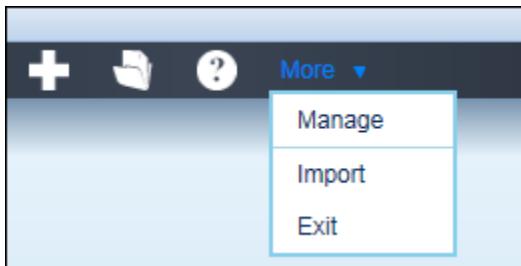
- Select an existing layout and click on draw:



Use the **Options** to edit the layout and **Print** to print the report.

14.4.6 Manage Layouts

The **More** menu has options for managing Layouts but the **Import** function was moved to the **Manage Layouts** form in later versions of Visualizer:



A New Gantt Chart or TSLD is created as a User Layout.

The **Manage** option allows a user to make any existing Layout a Project or Global layout:

- **Filter** allows the selection of **Gantt Chart** or **TSLD** layouts,
- Layouts may be copied and pasted to and from Global, Project and User.
- **Renaming** a layout is achieved by clicking on a Layout name and this will allow editing of the name:

Layout	Type	Project ID	Project Name
Baseline vs Current	TSLD		
Baseline vs. Current	GANTT		
Calendar and Ordinal Timescale	GANTT		
Classic Schedule Layout	GANTT		
TSLD with Bar Necking	TSLD		
TSLD with Steps	TSLD		
Project (1 item)			
Baseline vs Current	TSLD	MFG00337	Arcadia - Automated System
User (2 items)			
Baseline2 vs Current	TSLD		X
TSLD with Bar Necking	TSLD		

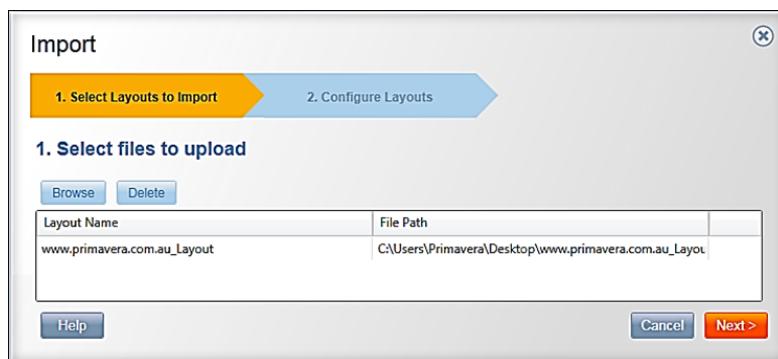
- **Exporting** a Visualizer Layout in VLF format is achieved by:
 - Selecting the layout,
 - Clicking the Export button,
 - Selecting a destination directory.

The **Import** function allows the import of:

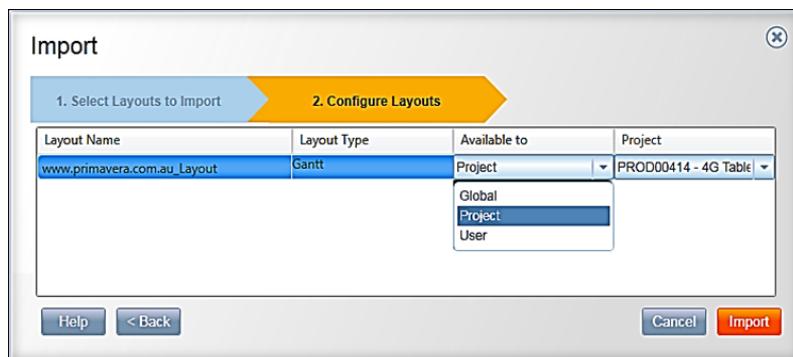
- An existing Professional View that has been exported from the Professional client as a *.PLF or
- A Visualizer report that may have been exported from another system.

To import a layout:

- Select **More, Import**,
- In the first screen select the PLF or VLF file:



- In the second screen select from the options Global, Project or User.

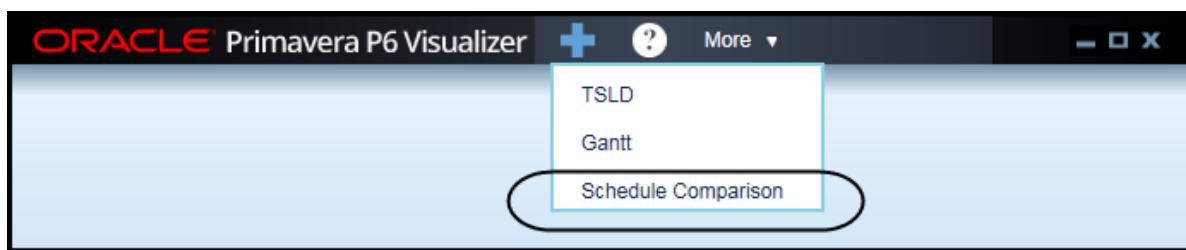


- You should then check the Options to optimize the layout in Visualizer.

14.5 Claim Digger – Schedule Comparison

Schedule Comparison enables a user to compare two schedules and evaluate what changes have been made to a later version and often used in claims analysis.

Version 16.1 moved Claim Digger to Visualizer. From P6 select **Tools, Visualizer** to open Visualizer. There is now an additional menu item named Schedule Comparison. Also the menu has changed from earlier versions.



As with TSLD or Gantt in Schedule Comparison you will need to create a View and then add the projects or project and a baseline for comparison.

14.6 Workshop 12 – Printing



Background

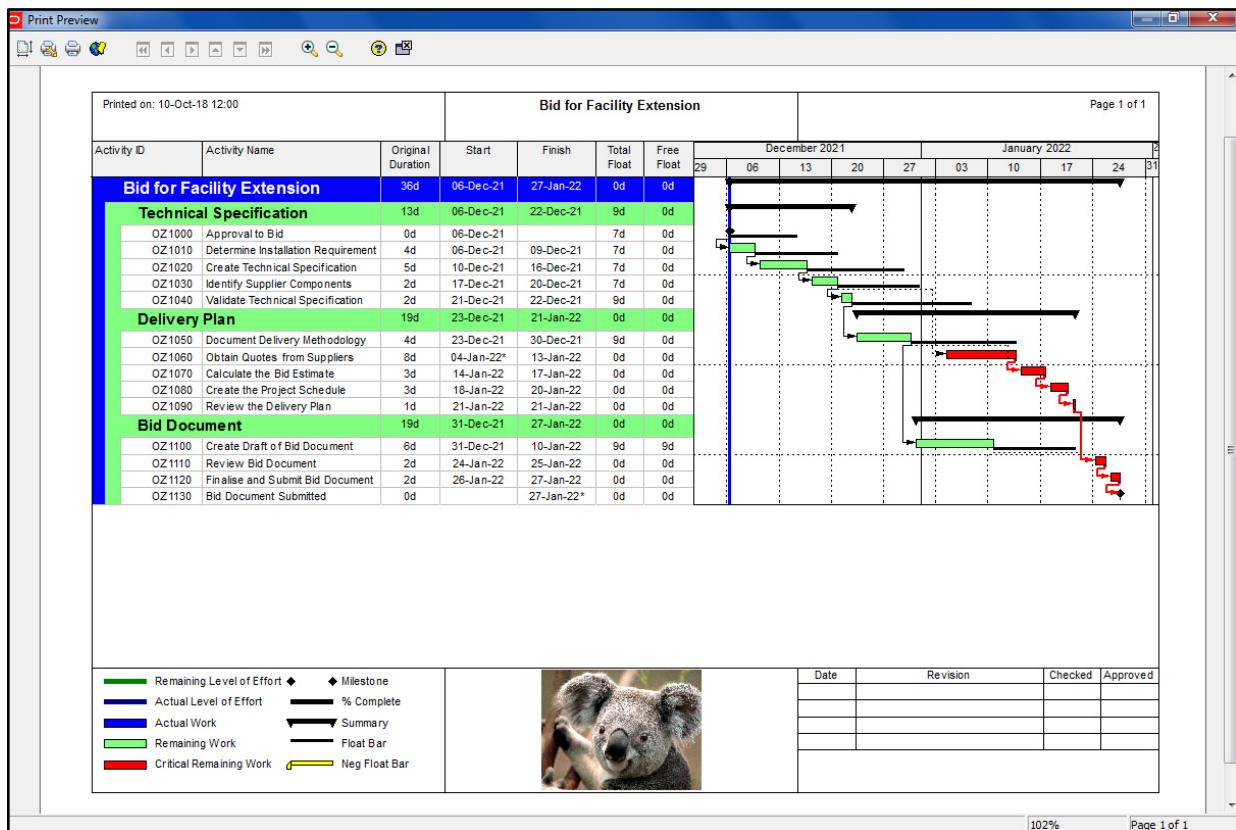
We want to issue a report for comment by management.

Assignment

Open your **OzBuild Bid** project from the previous workshop and complete the following steps:

1. Remove any filter.
2. Apply the **OzBuild Workshop 10 – With Float** layout.
3. From the **User Preferences, Dates** tab select **Do not show time**. It is not normal to display the time when submitting a schedule for review, but it must be displayed when manipulating a schedule.
4. Select **File, Print Preview** and click the  icon on the **Print toolbar** to open the **Page Setup** form.
5. In the **Page** tab select:
 - **Orientation** – Landscape
 - **Adjust to** – 100%
 - **Fit to** – 0 page(s) wide by 0 pages tall
 - **Fit timescale to**: – 1 page wide
 - **Paper size**: – A4 or Letter
6. In the **Margins** tab set all the settings to 0.5", except for the **Top**: settings which should be set to 0.75" to allow space for binding.
7. In the **Header** tab:
 - Divide Into: 3 Sections
 - Include on: All Pages, so this will repeat on every page
 - Height: 0.5
 - Section 1, insert as Text/Logo – **Printed on: [date] [time]** – Arial Regular 8 to the left
 - Section 2, insert as Text/Logo – **[project_name]** – Arial Bold 12 in the middle
 - Section 3, insert as Text/Logo – **Page [page_number] of [total_pages]** – Arial Regular 8, aligned to the right
8. In the **Footer** tab:
 - Divide Into: 3 Sections
 - Include on: First Page, so this will only be printed on the first page
 - Height: 1.25
 - Section 1 – Gantt Chart Legend

- Section 2 – Picture – Find a suitable picture to put in
 - Section 3 – Revision Box
 - Adjust widths as required.
9. In the **Options** tab:
 - Set the Timescale Start: from the Project Start minus 5 days and Timescale Finish: to the Project Finish plus 5 days,
 - Show the Activity Table, All Columns, Grid Lines and Gantt Chart. 10. Apply the Layout and click OK
 11. Compare your result with the picture below:



12. From the **User Preferences**, **Dates** tab select **24 hour (13:00)** and do not check **Show minutes**. This will ensure you know the time that activities will start and finish when you assign progress.

15 SCHEDULE OPTIONS AND SETTING A BASELINE

Tracking Progress is used after you have completed the plan or have completed sufficient iterations to reach an acceptable plan, and the project may be progressing. Now the important phase of regular monitoring and control begins. This process is important to help catch problems as early as possible, and thus minimize their impact on the successful completion of the project. The main steps for monitoring progress are:

- Saving a **Baseline** schedule, also known as a **Target**, holds the dates against which progress is compared. The current project may be copied and used as a baseline or an existing project may be assigned as a baseline.
- A baseline may be used as the contract or revised contract program, last periods status of a copy of a program before delay activities are added or deleted.
- Recording or marking-up progress as of a specific date, titled the **Data Date**. This date is also known as the **Status Date**, **Update Date**, **Current Date**, **Report Date**, and **As-Of-Date**.
- **Updating or Progressing** the schedule.
- Scheduling the project and at the same time moving the **Data Date** to the new **Data Date** and recalculating all the activities dates.
- Comparing and Reporting actual progress against planned progress and revising the plan and schedule, if required.

Comparing the status of an activity against more than one baseline is useful; for example:

- The original plan could be represented as one of the Baselines, to see the slippage against the original plan.
- Last Period, which could be another Baseline, to see the changes since the last update.

Primavera has the following functions:

- Primavera allows an unlimited number of baseline project files to be saved with a project.
- A baseline project may not be opened and viewed. It must be restored to the database to open and edit where it will no longer be a baseline.
- Up to four Baselines may be shown against a current schedule at one time either as bars on the Gantt Chart or in columns of data.
- Baseline comparison is displayed at Activity level in the **Activities Window**, not at resource level. Resource level comparison is available in resource views such as the **Resource Assignments Window**.

Shortcuts:

Topic	Menu Command
• Saving and Deleting and Setting a Baseline	To save a Baseline, select Project, Maintain Baselines... to display the Maintain Baselines form
• Setting a Baseline project	The baselines are assigned from the Project, Assign Baselines... form
• Update a Baseline	<ul style="list-style-type: none"> • Select Project, Maintain Baselines... and select the  icon to open the Update Baseline form.

The AACE RP 78R-13 Original Baseline Schedule Review - As Applied in Engineering, Procurement, and Construction is applicable to this chapter.

15.1 Understanding Date Fields

Primavera has many more date fields for the current schedule than Elecosoft (Asta) Powerproject or Microsoft Project. This section explains how these date fields calculate.

There is very little documentation available on how these dates are calculated and the author has ascertained the information contained in this chapter by trial using an unresourced schedule.

After you understand these date fields, you should look again at the **Bar Timescale** options in the **Bars** form and it will be easier for you to understand how the bar formatting works.

15.1.1 Early Start and Early Finish

These are always the earliest dates that un-started activities or the incomplete portions of in-progress activities may start or finish based on calendars, relationships and constraints.

- The **Early Start** of the completed activity A1010 is set to the **Data Date** and time after the activity has commenced, not to the **Actual Start**, as in most other software,
- The **Early Finish** of the completed activity A1010 is set to the **Data Date** and time when the activity is complete, not to the **Actual Finish**, as in most other software,
- The **Early Start** of an in-progress activity is set to the **Activity Calendar** start after the activity has commenced, not to the **Actual Start**, as in other software, it is effectively the **Remaining Early Start**.

NOTE: Look carefully at the activity A1010 Early Start and Early Finish dates and then look at the Actual Start and Finish of the bar; they are very different:

Activity ID	Activity Name	Early Start	Early Finish	September 2014				October 2014				November 2014				
				25	01	08	15	22	29	06	13	20	27	03	10	17
A1010	Activity A	12-Oct-14 00	12-Oct-14 00													
A1020	Activity B	13-Oct-14 08	24-Oct-14 17													
A1030	Activity C	27-Oct-14 08	21-Nov-14 17													

i Thus, the Early Start and Early Finish dates of completed activities and Early Start of in-progress activities is not displayed in other software in this way and often leads to confusion when converting from other software. Thus, the **Early Bar** is not displayed by default in the Gantt Chart, as the **Early Bar** will not display Actual progress in the same way as other software.

15.1.2 Late Start and Late Finish

- These are the latest dates that **Un-started** activities or the incomplete portions of **In-progress** activities may start or finish based on calendars, relationships, and constraints. It is effectively the **Remaining Late Start**.
- The **Complete** activity has the **Late Dates** set the date that is equivalent to the latest point in time that the activity could be restarted.
- The **Total Float** on the Complete Activity is “Null” but the default Layout displays a Float Bar.

NOTE: The Total Float bar finish is the same as the Late Finish and used to calculate Total Float.

Activity ID	Activity Name	Late Start	Late Finish	Total Float	September 2014				October 2014				November 2014				
					25	01	08	15	22	29	06	13	20	27	03	10	17
A1010	Activity A	20-Oct-14 08	20-Oct-14 08														
A1020	Activity B	20-Oct-14 08	31-Oct-14 17	5d													
A1030	Activity C	03-Nov-14 08	28-Nov-14 17	5d													

15.1.3 Actual Start and Finish

These dates are manually applied, representing when an activity started or finished, and override constraints and relationships. These dates should be set in the past in relation to the **Data Date**.

Activity ID	Activity Name	Actual Start	Actual Finish	September 2014				October 2014				November 2014				
				25	01	08	15	22	29	06	13	20	27	03	10	17
A1010	Activity A	01-Sep-14 08	26-Sep-14 17													
A1020	Activity B	29-Sep-14 08														
A1030	Activity C															



Actual dates should never change after they are assigned but both the **Apply Actuals** when activities are set to **Auto Compute Actuals**, and **Update Progress** functions may change Actual Dates. These functions must be used with extreme caution.

15.1.4 Start and Finish

The **Start** is set to the **Early Start** when the activity has not started and the **Actual Start** when it has started.

The **Finish** is set to the **Early Finish** when the activity has not started or is in-progress and the **Actual Finish** when it is complete.

- An “A” is placed after the date when an **Actual Start** or **Actual Finish** has been set,
- An “*” is placed after the date when a start constraint has been applied to the activity,
- These date fields allow the Early and Actual Start and Finish dates to be displayed as expected when the activity has not started, is in-progress, or complete:

Activity ID	Activity Name	Start	Finish	September 2014				October 2014				November 2014				
				25	01	08	15	22	29	06	13	20	27	03	10	17
A1010	Activity A	01-Sep-14 08 A	26-Sep-14 17 A													
A1020	Activity B	29-Sep-14 08 A	24-Oct-14 17													
A1030	Activity C	27-Oct-14 08	21-Nov-14 17													



Users converting from Elecosoft (Asta) Powerproject or Microsoft Project will be used to displaying the Early Start and Early Finish dates, but the Early Start and Early Finish dates should not be displayed when a schedule has progress, as this will give misleading information. The Start and Finish dates should always be displayed under normal scheduling conditions.

15.1.5 Planned Dates

The **Planned Finish** is calculated from the **Planned Start** plus the **Original Duration**. The **Original Duration** is labeled **Planned Duration** in some Industry Versions. These fields are always linked, therefore:

- A change to the **Planned Start** will change the **Planned Finish** via the **Original Duration**,
- A change to the **Planned Finish** will change permanently the **Original Duration**, and
- A change to the **Original Duration** will change the **Planned Finish**.

When an activity has **NOT** started:

- The **Planned** dates **ARE** normally linked to the **Start** and **Finish**.



The **Original** and **At Completion** durations are **ONLY** linked when an activity has not started and when **Link Budget and At Completion for not started activities** box in the **Projects Window, Calculations** tab is checked.

- They are **NOT** linked to the Early Dates.

Start	Planned Start	Finish	Planned Finish		Jan 09	Jan 16						
M	T	W	T	F	S	S	M	T	W	T	F	S
09-Jan-23 08	09-Jan-23 08	20-Jan-23 16	20-Jan-23 16									

- A **Planned Start** may be manually edited and as the **Start** date is linked it is also changed, but the **Early Start** is **NOT** changed. The **Planned Start** and **Start** are reset to the Early Dates when a project is scheduled.
- The **Planned Finish** may be edited and is linked to the **Finish** date and the **Original Duration**. A change to the **Planned Finish** will change the **Finish** date and **Original Duration**. Rescheduling will recalculate the schedule using the new **Original Duration** and set the **Planned Finish**, **Finish**, and **Early Finish** to the same date.
- Thus a change to the **Planned Start** is reversed by rescheduling, but a change to the **Planned Finish** affects the **Original Duration** and is not reversed by rescheduling.

When an activity is in-progress:

- The **Planned Start** date remains unchanged when an **Actual Start** date is set that is different to the **Planned Start**.
- Therefore, the **Planned Start** remains the same as the **Start Date** before the **Actual Start** was set:

Start	Planned Start	Finish	Planned Finish		Jan 02	Jan 09	Jan 16					
S	M	T	W	F	S	S	M	T	W	T	F	S
02-Jan-23 08 A	09-Jan-23 08	13-Jan-23 16	20-Jan-23 16									

- The **Planned Finish** is calculated from the **Planned Start Date** plus the **Original Duration**.
- A started activity **Remaining Duration** may be edited independently from the **Original Duration**. The **Planned Finish** may have a different date than the **Finish**, which is now set to the **Early Finish**.

When an activity is complete:

- The **Planned Dates** are unlinked from all other date fields.

15.1.6 Planned Dates Issues



This is one of the most important paragraphs in this book and you must be certain that you understand the Planned dates and how to avoid the issues associated with them.

The Planned Dates are very complex to explain and understand, so please read carefully, in summary:

- When an activity has **Not Started** the Planned Dates match the Early Start and Early Finish.
- When an activity is **Complete** or **In-progress** the Planned Dates match the status of the activity immediately before it was marked as Started.

In the situation where a schedule is in the process of being updated:

- Assume the Data Date has been moved to the new Data Date and the project scheduled,

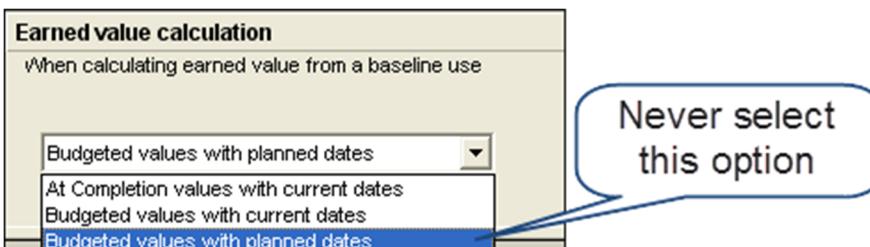
- Now all un-started activities will have their Start and Finish dates in the future,
 - At this point every activity that is marked In-progress by assigning an Actual Start (which should be in the past in relation to the **Data Date**) will have **Planned Dates** that neither:
 - Match the status of the activity before the activity was marked as Started, nor
 - Match the status of the activity after the activity was marked as Started and possibly finished.
-  Thus in this situation and at this point in time the Planned Dates are now holding irrelevant dates that should never be displayed or used for any purpose.

Unfortunately, the Planned Dates are used by default in several places and Database Administrators and Users must be aware of where they are used and how to avoid displaying them.

- The Planned dates are displayed as the **Project Baseline** bars and **Primary User Baseline** bars when no baseline has been assigned,

 Never display a Baseline Bar or columns unless a baseline project has been created and assigned, otherwise the Baseline bar and columns may represent irrelevant data.
- These Planned dates are used by the **Apply Actuals** function, when activities are set to **Auto Compute Actuals**, and the **Update Progress** function. Thus **Actual Start** dates and **Early Finish** dates of in-progress activities will be changed to the Planned Date values without warning.

 Ensure you never ever use the **Update Progress** function on a schedule that has been progressed, otherwise **Actual Start** dates and **Early Finish** dates of in-progress activities will be changed to the Planned Date values without warning.
- The **Planned Dates** from a Baseline schedule will be displayed as the Baseline Bars when the **Admin, Admin Preferences..., Earned Value** tab is set to **Budget values with planned dates**. Thus the Baseline Bars from an in-progress schedule will be incorrect.



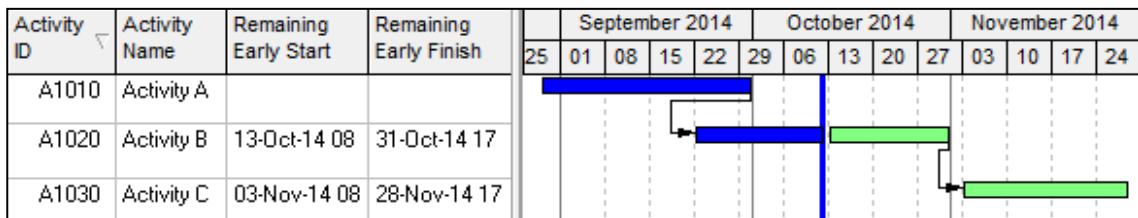
Ensure **Admin, Admin Preferences..., Earned Value** tab has this value set as **At Completion values with current dates** or **Budget Values with current dates**. When the schedule is not resource- or cost-loaded it does not matter which of these two you use. More details on these settings in paragraph 17.3.6.

15.1.7 Remaining Early Start and Finish

These are the earliest dates that the incomplete portions of un-started or in-progress activities may start and finish.

- They are blank when an activity is complete.
- They may be edited in the same way as Planned Dates.
 - When a **Remaining Early Start** is edited to a later than scheduled date, there is an option for constraining the **Remaining Early Start** with a **Start on or After Constraint**. If this is not set, then the activity will move forward to its original position when scheduling.

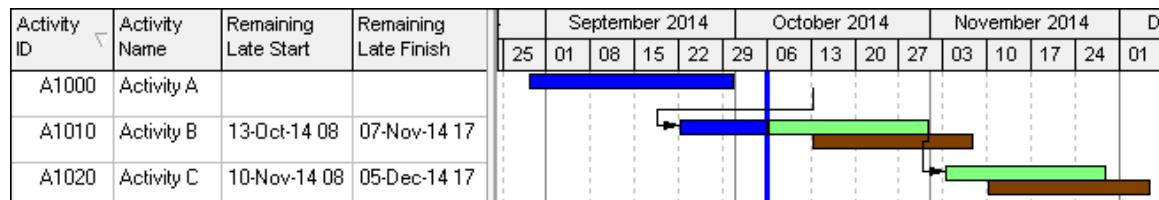
- When a **Remaining Early Finish** is edited, the **Remaining Duration** is also edited and the change is permanent. Scheduling does not take the schedule back to the original position.



15.1.8 Remaining Late Start and Finish

These are the latest dates that the incomplete portions of activities may start and finish.

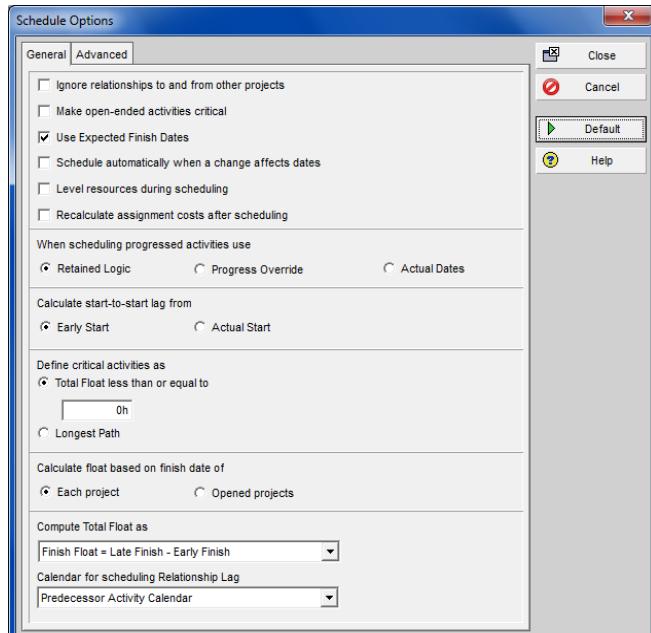
- They are blank when an activity is complete and may not be edited,
- They may not be displayed as a bar,
- They are set to equal the **Late Dates**.



15.2 Schedule Options – General Tab

When a project is rescheduled there are some options available in the **Schedule Options** form which is opened by selecting **Tools, Schedule..., Options** which control how the schedule calculates:

- Pressing the  will set the options back to the P6 defaults, it does not save yours as the default as in other products.
- The default options are good but some need to be changed to suit specific situations.
- These options apply to all activities in the currently opened schedule.
- When more than one schedule has been opened then you should read carefully the **Multiple Project Scheduling** chapter to understand how the **Default Project** function operates.
- If you export a schedule to another database it is prudent to send a copy of the project **Schedule Options** so they may be checked when imported into another database, especially if the schedule is to be opened with other projects. Again, you should read carefully the **Multiple Project Scheduling** chapter to understand how the **Default Project** function operates.



- Changing the **Schedule Options** may change the way the schedule calculates and users must be very careful if considering changing any of them. You may wish to copy the schedule, baseline it, and then change to options to see what the effect is on the schedule calculation.

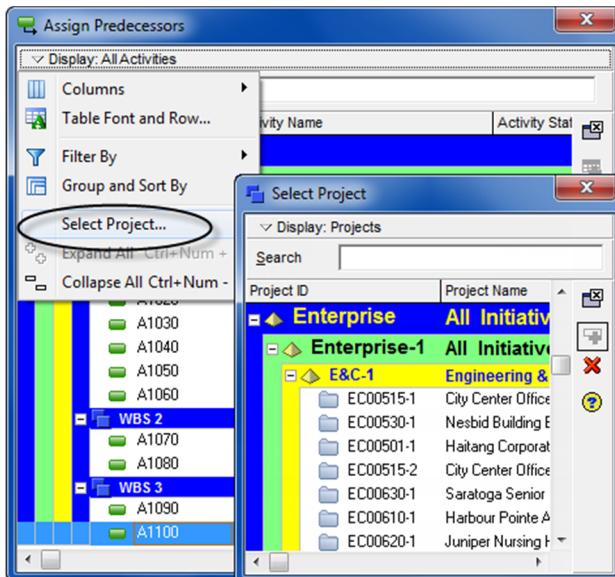


The Primavera **Schedule Options** defaults are good and it is suggested that they should not be changed unless the user has good reason to change them.

15.2.1 Ignore relationships to and from other projects

Relationships may be created between two projects when:

- Two or more projects are opened together, or
- When assigning a relationship another project is opened and a relationship is created to an activity in another project.



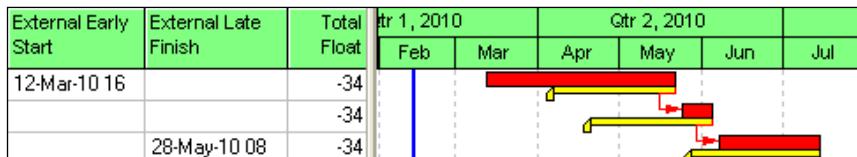
Check the **Ignore relationships to and from other projects** in the Tools, Schedule..., Options form to:

- Ignore relationships with other projects that are currently not open, or
- To ignore **External Dates** that may be created when a P6 project is imported from another database and the imported project has interproject relationships.

This option will also ignore **External Dates**, which are the **External Early Start** and **External Late Finish** dates.

External Dates are constraints created when a project is exported from Primavera Contractor and/or another P6 database and imported into P6. They act like Early Start and Late Finish Constraints and are used to represent the relationships that would have originally provided the Early Start and Late Finish dates to the Critical Path calculations of the imported schedule.

These dates can be very confusing if one is not aware that they have been created or how they operate. The negative float in the picture below is created by these dates after an activity's duration was increased by 34 days:





When you import a project from another database ensure you **ALWAYS** check for External Dates and understand how they operate.

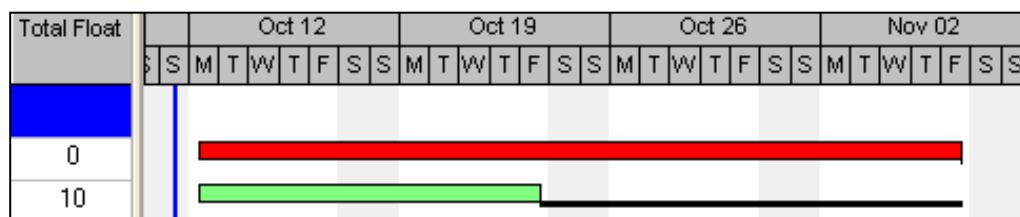
If you export and then import back into the same database, then External dates are not normally created but the relationships are re-established with the original schedule they were linked with.

On the other hand, if the original schedules have been deleted then these External Dates may be created.

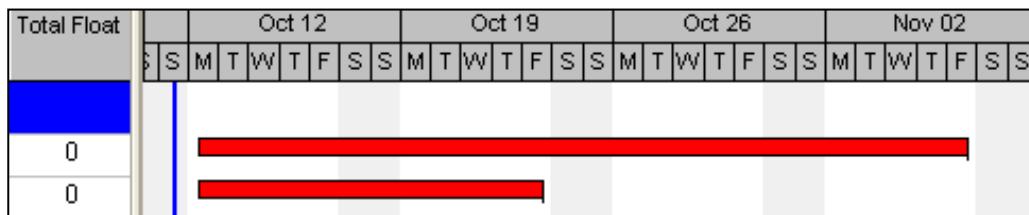
15.2.2 Make open-ended activities critical

An open-ended activity is an activity without a successor and which has float to the end of the project. Checking the box makes these activities critical with zero total float when they do not have a successor.

- Open-ends Not Critical:

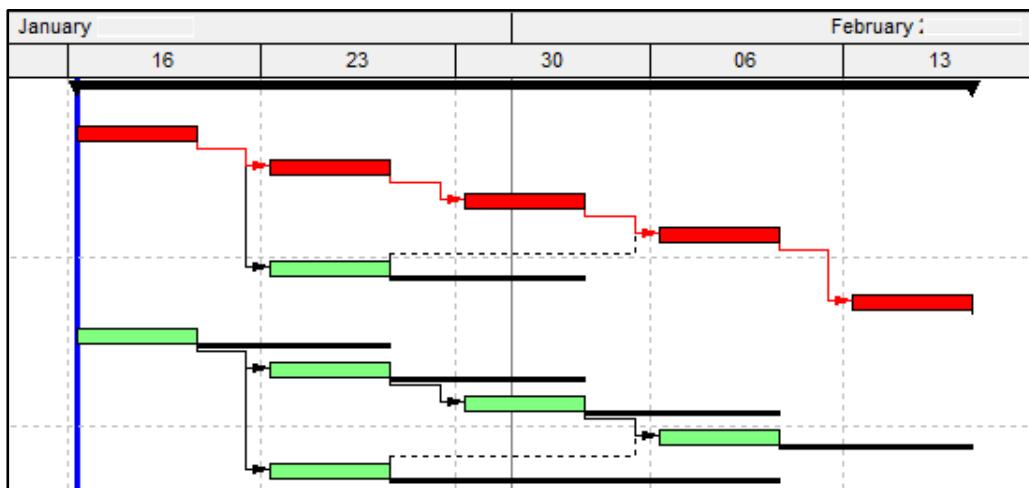


- Open-ends Critical:

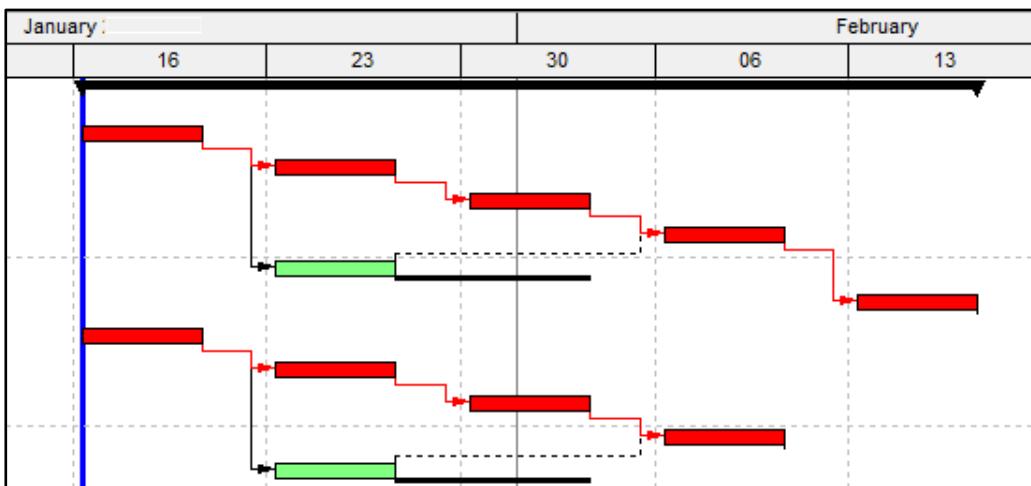


This also allows the user to display multiple critical paths in one project without the use of constraints and is useful should you wish to see the individual critical paths for each area of a project. In order for this function to work the last activity in each chain or events must not have a successor:

- Open-ends Not Critical:



- Open-ends Critical:



15.2.3 Use Expected Finish Dates

The intention of this option is for people using timesheets to be able to set an Expected Finish constraint for an activity.

Once an Expected Finish date is set then the software calculates the Remaining Duration from:

- The Early Start when an activity has not started, or
- The Data Date when an activity has started, or
- A Resume date if a Suspend and Resume date has been set.

Therefore, Expected Finish dates may be assigned from the Timesheets module and this option allows the project manager to ignore these dates submitted with the timesheets.

This is always checked by default and will disable or enable Expected Finish constraints assigned in the **Status** tab of the **Activities Details** tab or from a column.

This is usually not turned off and the pictures below show the effect of this constraint before and after scheduling an activity with an Expected Finish Constraint assigned:

- Before scheduling:

Activity ID	Original Duration	Remaining Duration	Expected Finish	Finish	Jan 26					Feb 02					
					Sun	Mon	Tue	Wed	Thr	Fri	Sat	Sun	Mon	Tue	Wed
A1000	4	4		31-Jan-14 16											
A1010	4	4	07-Feb-14 16	31-Jan-14 16											

- After scheduling:

Activity ID	Original Duration	Remaining Duration	Expected Finish	Finish	Jan 26					Feb 02					
					Sun	Mon	Tue	Wed	Thr	Fri	Sat	Sun	Mon	Tue	Wed
A1000	4	4		31-Jan-14 16											
A1010	9	9	07-Feb-14 16	07-Feb-14 16											

15.2.4 Schedule automatically when a change affects dates

This is similar to automatic recalculation in other products and this recalculates the schedule when data that affects the timing of the schedule is changed.

P6 is a database product and Schedule Automatically will result in the schedule recalculating every time you make a change. This may slow down your work significantly; this option is usually left off.

15.2.5 Level resources during scheduling

Leveling a schedule delays activities until resources become available. This is a form of resource optimization and this option levels the project resources each time it is scheduled. Resource leveling is covered in paragraph 20.6.



This is **NOT** recommended as it slows down the schedule calculation and the schedule often changes each time it is scheduled.

15.2.6 Recalculate resource costs after scheduling

Resource Unit Rates may be set to change over time in the **Units & Prices** tab of the **Resources Window**:

Display: All Resources				
Resource ID	Resource Name	Price / Unit	Resource Type	
Schedulers	Project Managers	\$0/h	Labor	
PE3	Planning Engineer	\$52/h	Labor	
Exec	Executive	\$0/h	Labor	
PEEXEC	Joe Bloggs	\$95/h	Labor	
PMs	Project Managers	\$0/h	Labor	

General	Codes	Details	Units & Prices	Roles	Notes	Progress Reporter
Shift Calendar:		...	Shift:	1	↑	
Effective Date			Max Units / Time		Price / Unit	
30-Jun-09 08			12h/d		\$63/h	
01-Jun-10 08			12h/d		\$75/h	
30-Jun-11 08			12h/d		\$95/h	

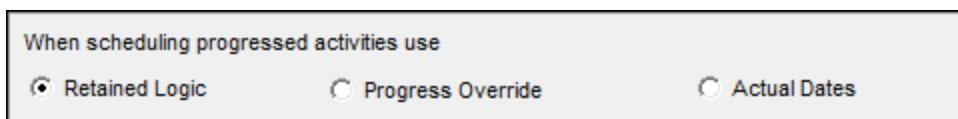
This option recalculates a resource cost when a resource is scheduled into a different cost rates time bracket.

15.2.7 When scheduling progressed activities use

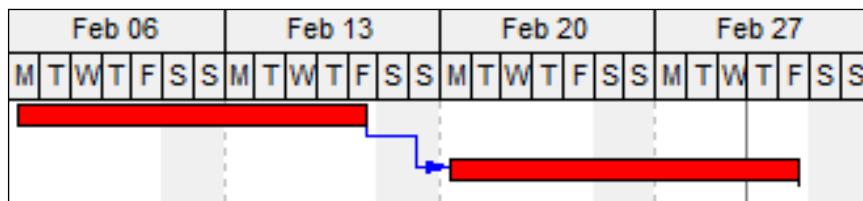
“Out of Sequence Progress” occurs when an activity starts before a predecessor defined by a relationship has finished. Therefore, the relationships have not been acknowledged and the successor activity has started out of sequence. There are three options in P6 for calculating the finish date of a successor when the successor activity has started before the predecessor activity is finished:

- Retained Logic
- Progress Override
- Actual Dates

The selected option is applied to all activities in a schedule when it is calculated. Open the **Schedule Options** form by selecting Tools, Schedule... and clicking on the  icon where the options are found under **When scheduling progressed activities use**:



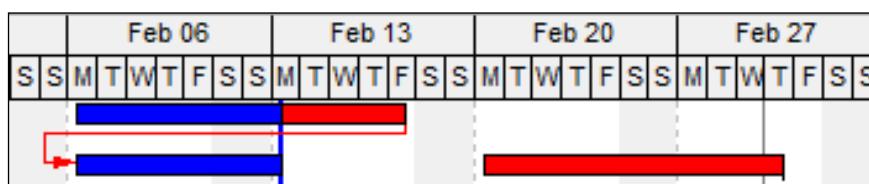
The picture below represents the status of the activities before updating the schedule:



- **Retained Logic.**

In the example following, the relationship is maintained between the predecessor and successor for the unworked portion of the activity (the Remaining Duration) and continued after the predecessor has finished. The relationship forms part of the critical path and the predecessor has no float.

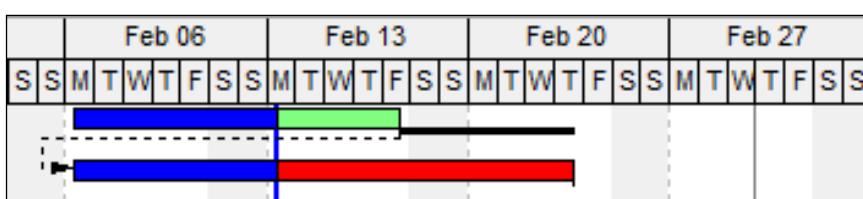
NOTE: This is the recommended option as a more conservative schedule is produced and any relationships may be changed as required:



- **Progress Override.**

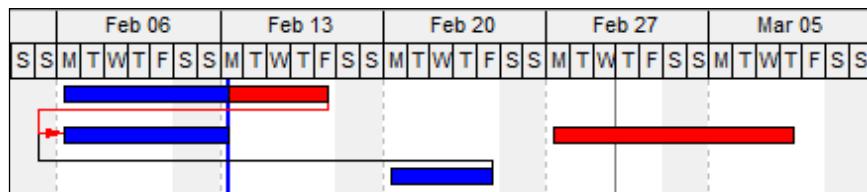
In the example following, the Finish-to-Start relationship between the predecessor and successor is disregarded, and the unworked portion of the activity (the Remaining Duration) continues before the predecessor has finished.

NOTE: The relationship is not a driving relationship and DOES NOT form part of the critical path in the example below and the predecessor has float:



- **Actual Dates.**

This function operates when there is an activity with Actual Start Dates in the future, which is not logical. With this option the remaining duration of an in-progress activity is calculated after the activity with actual start and finish in the future:



When there are no Actual Dates in the future this option calculates as Retained Logic.

This situation with Actuals in the future may happen when two projects are opened together and have different Data Dates. This situation is best avoided and it is best to make the Data Dates of all projects the same.



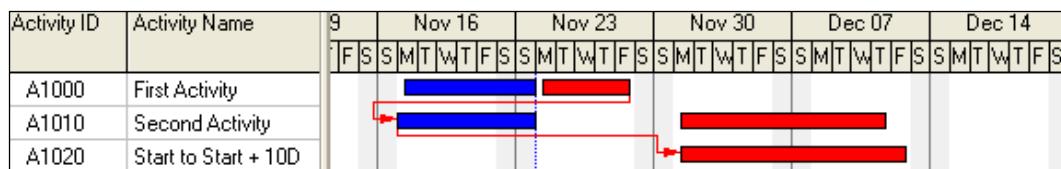
Retained Logic and Progress Override are not terms used by Microsoft Project or Elecosoft (Asta) Powerproject. Microsoft Project uses the term **Split in progress** and Elecosoft (Asta) Powerproject uses two functions titled **Move part completed tasks** and **Relink around completed tasks** and these functions operate in a similar way in Primavera P6. Retained Logic produces a more conservative schedule (a longer duration schedule) and is more likely to place an out-of-progress relationship on the critical path and adjustments may be made as required.

If your schedule has Actual dates in the future of the Data Date (which may occur when the update information is collected at different times and the earlier date is used as the Data Date or multiple projects are open) then the use of Actual Dates would calculate the most conservative schedule.

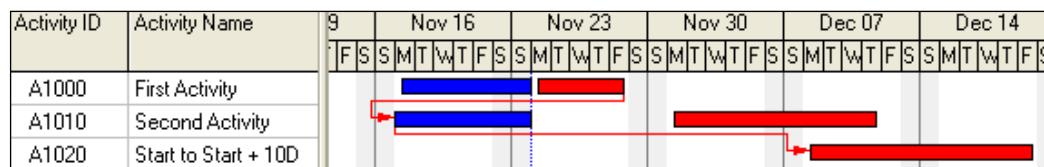
15.2.8 Calculate start-to-start lag from

The successor of an activity with a Start-to-Start and positive lag would start after the lag has expired. When the predecessor commences out of sequence the lag may be calculated from the predecessor calculated Early Start or the Actual Start.

- The Actual Start gives a less conservative schedule:



- The Early Start gives a more conservative schedule:



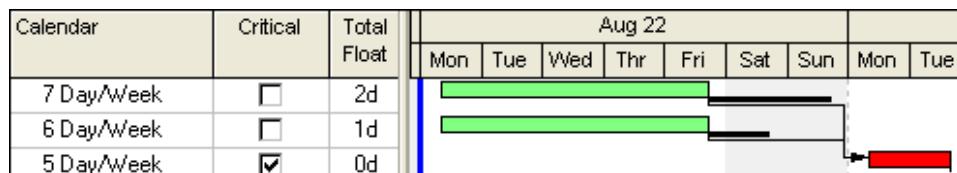
15.2.9 Define critical activities as

Critical Activities Definition criteria is defined in the **Projects Window**, **Project Details**, **Settings** tab:

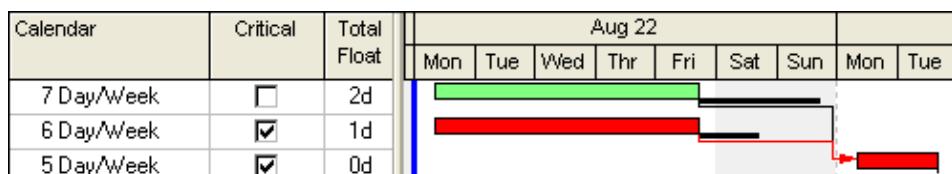
These options are used for analyzing schedules that utilize multiple calendars which may result in activities on the critical path possessing float.

Define critical activities as	
<input checked="" type="radio"/>	Total Float less than or equal to
<input type="text" value="0h"/>	
<input type="radio"/>	Longest Path

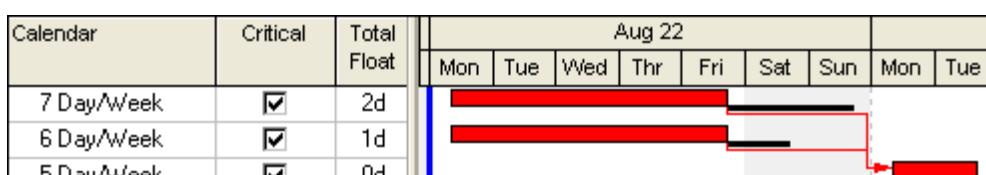
- **Total Float less than or equal to** – Activities may be marked as critical and with a chosen float value. Sometimes a small positive value is used to isolate the near critical activities on schedules or displaying the full critical path on multiple calendar schedules.
- **Longest Path** – This option isolates the longest chain of activities in a schedule and should be used when multiple calendars are in use and some activities, which form part of the critical path, still have float when the successor is assigned a calendar with fewer or different working days. – Oracle define Longest Path in their Help File as “*In a multicalendar project, the longest path is calculated by identifying the activities that have an early finish equal to the latest calculated early finish for the project and tracing all driving relationships for those activities back to the project start date.*”
- In the example below the Total Float has been set to **Total Float less than or equal to zero** and the critical path has disappeared:



- When the Total Float is then set to less than or equal to 1 day results in the picture below:



- When the Total Float is then set to **Longest Path** results in the picture below:

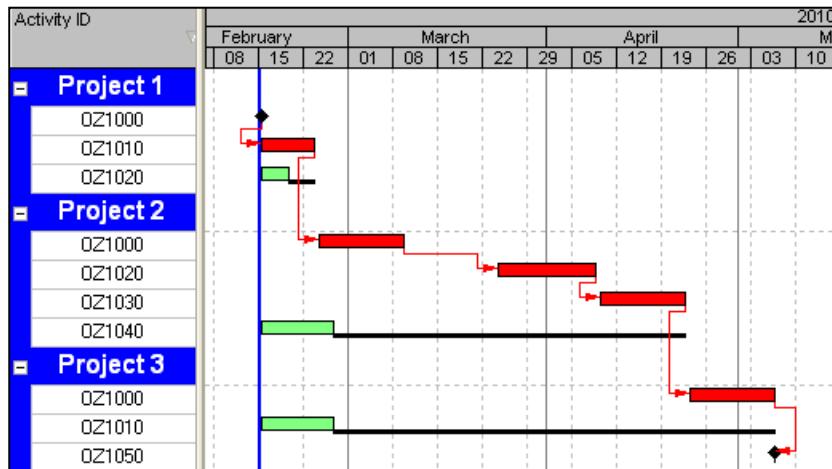


ACTION: Longest path is recommended for projects with multiple calendars.

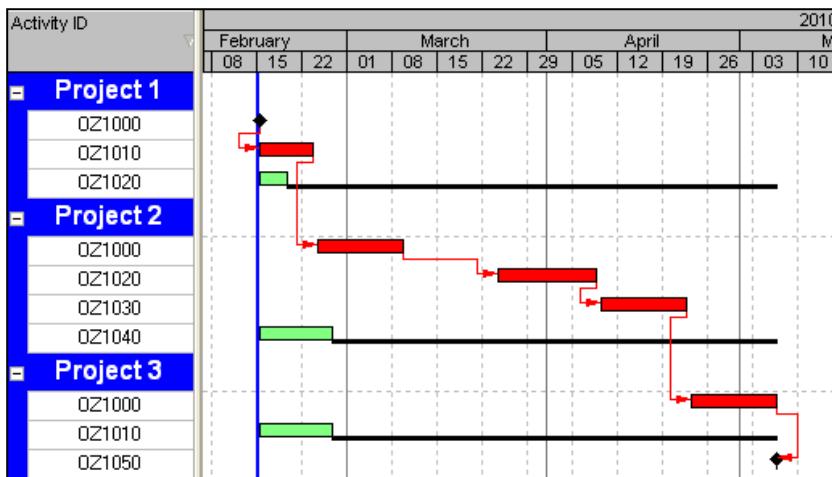
15.2.10 Calculate float based on finish date

This is a new function to Version 6.2. When more than one project is opened the Total Float may be calculated based on each individual project or the longest project:

- Each project – used when each project's critical path is required:



- Opened projects – used when all the P6 projects are related and float is required to be based on the longest project:

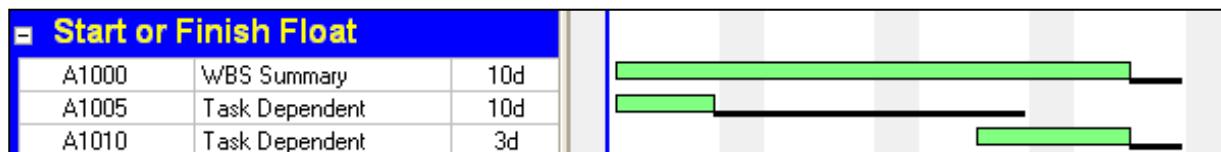


The issue with the **Opened projects** setting is that, depending on what projects are opened, the **Total Float** will calculate differently and is therefore not recommended.

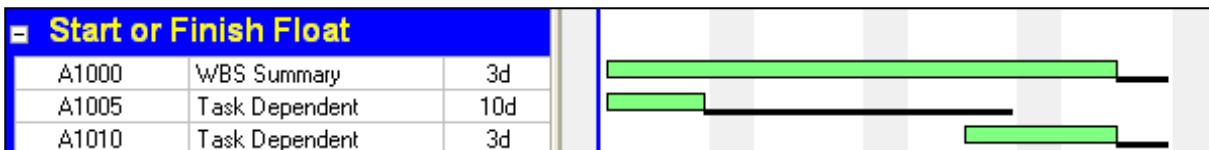
15.2.11 Compute Total Float as

There are three options for the calculation of the Float value displayed in the Total Float column of WBS and LOE activities only:

- Start Float = Late Start – Early Start



- Finish Float = Late Finish – Early Finish



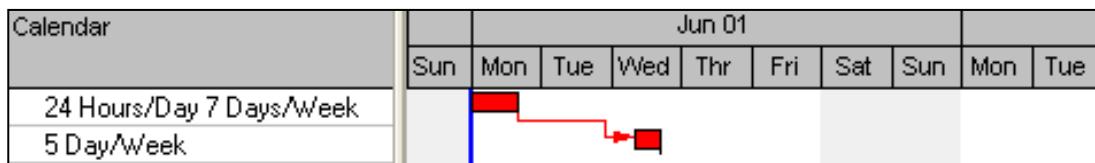
- Smallest of Start Float and Finish Float

i It can be seen from the pictures above that the Total Float bar only displays the Finish Float. The Smallest of Start Float and Finish Float is the most conservative but the Finish Float will always give an answer that is the same as the Total Float bar.

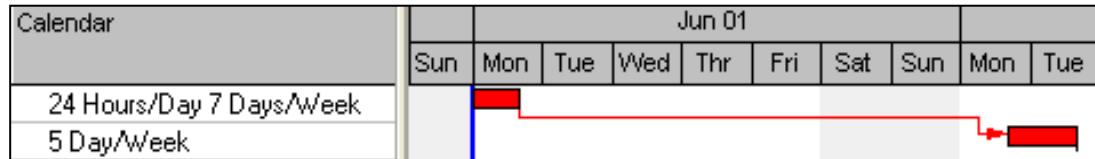
15.2.12 Calendar for scheduling Relationship Lag

- There are four calendar options for the calculation of the lag for all activities:

1. **Predecessor Activity Calendar** is the default, the example below has a 40-hour lag, or



2. **Successor Activity Calendar**. note the change in the successor start, or



3. **24-Hour**, or

4. **Project Default Calendar**.



Microsoft Project 2003 to 2019 uses the successor calendar for lag calculations. Microsoft Project also has the option of an Elapsed lag duration and % Duration lag.

Elecosoft (Asta) Powerproject does not assign lags to the relationship but a lag is assigned to the predecessor or successor activity thus allowing an unlimited number of relationships between two activities and a partial Critical Path, plus it also has a % Duration lag.

15.2.13 Schedule Options – Advanced Tab

This tab selects the options for calculating multiple critical paths and is covered in detail in the **Utilities** chapter.

15.3 Setting the Baseline

Setting the Baseline makes a complete copy of a project, including relationships, notebook entries and codes. You are then able to compare the current project's progress against the baseline.

There are three types of Baselines that are often saved with scheduling software such as P6 – Management, Last Period Status and Claims Analysis to record the status before applying a delay or acceleration to a schedule:

Management Baselines

These are usually a copy of an original unprogressed schedule that has been contractually agreed to as the Baseline or Target schedule and are used to:

- Evaluate progress and report progress to a client or customer,
- Provide a base for Extension of Time claims and other contractual claims that may be made based on these Baseline schedules.

Last Period Status Baselines

These are copies of a schedule at a point in time and are used for the management of a project:

- Usually they are used to measure the loss in time from one reporting period to another,
- They allow management to ascertain performance and make decisions on how to manage the project,
- They are displayed in exactly the same way as Management Baselines with the software,
- These Baselines usually, after the first period update, have progress.

Claims Analysis

- This is used to record the status before applying a delay or acceleration to a schedule.
- Delays may be added by adding activities, changing durations or editing calendars.

Up to 50 baselines per project may be saved in a database in earlier versions but in Version 6.0 and later an unlimited number may be saved.

There is still a restriction of copying a maximum of 50 Baselines when copying a project.

- The number of baselines that may be saved is set in the **Admin Preferences** form by selecting **Admin, Admin Preferences..., Data Limits** and setting the number in the **Maximum baselines per project** box.
- The number of baselines that may be copied when copying a project is set in the **Admin Preferences** form by selecting **Admin, Admin Preferences..., Data Limits** and setting the number in the **Maximum baselines copied with project** box.
- Up to four baselines, one **Project Baseline** and three **User Baselines**, may be displayed and compared to the current project.



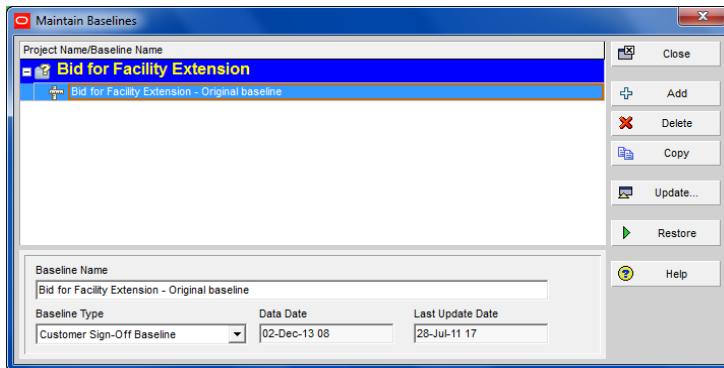
If another user opens the project, they will only see the one **Project Baseline** and not the other **Users Baseline**.

- A baseline project may be restored back into a database as a normal project. Then it may be edited and resaved as a baseline project.

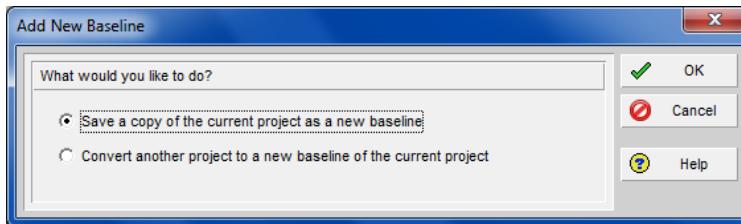
After the Baseline is set, it is possible to compare the progress with the original plan. You will be able to see if you are ahead or behind schedule and by how much. The Baseline schedule should be established before you update the schedule for the first time.

15.3.1 Creating a Baseline

To create a Baseline, ensure the project is open and select **Project, Maintain Baselines...** to display the **Maintain Baselines** form:



- To create a new baseline, click the icon to open the **Add New Baseline** form:



- Select either of the two options in the form:
 - **Save a copy of the current project as a new baseline** will make a copy of the currently open project. P6 adds B1, B2, etc., after the name and returns you to the **Baselines** form, or
 - **Convert another project to a new baseline of the current project** will open the **Select Project** form where another project may be selected to be a baseline. This project will then move from the current projects window into the **Maintain Baselines** form and is not available to be opened from the **Projects Window**.
- Assign a **Baseline Type** from the drop-down box. Baseline Types are defined in the **Admin, Admin Categories...** form, **Baseline Type** tab.

15.3.2 Deleting a Baseline

To delete a project baseline from the database:

- Open the **Maintain Baselines** form by selecting **Project, Maintain Baselines...**,
- Select the baseline project to be deleted, and
- Click on the icon.

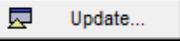
15.3.3 Restoring a Baseline to the Database as an Active Project

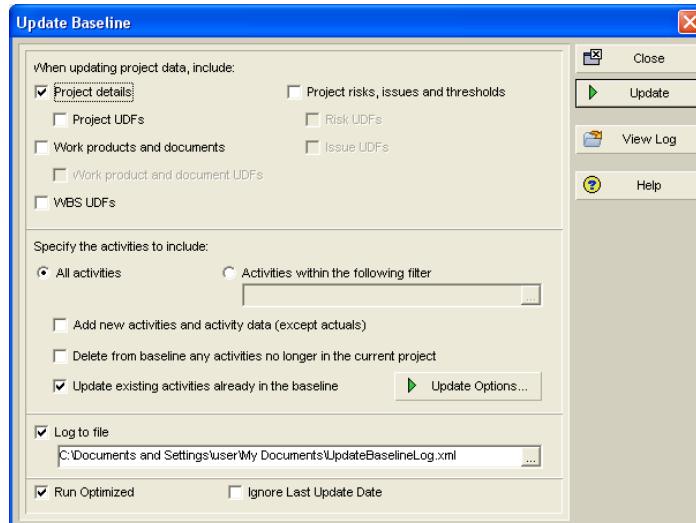
To restore a project back to the database so it may be edited or used as a current project:

- Open the **Maintain Baselines** form by selecting **Project, Maintain Baselines...**,
- Ensure the baseline is not assigned as any baseline in the **Baselines** form,
- Select the baseline project to be restored, and
- Click on the icon.

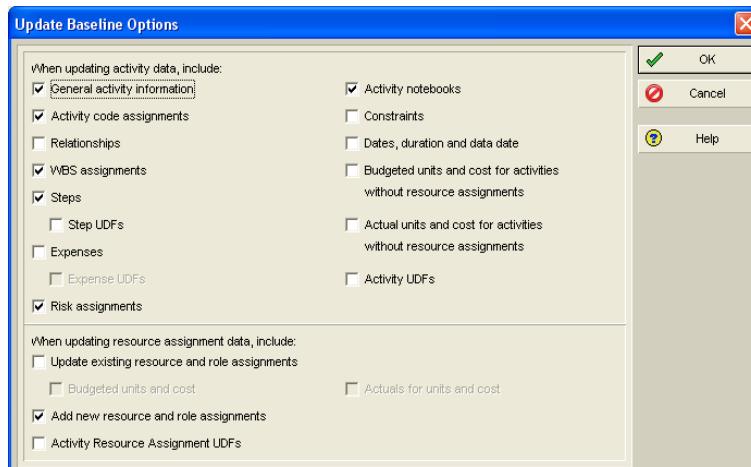
15.3.4 Update Baselines

The new Primavera Version 5.0 **Update Baseline** function enables the Baseline schedule to be updated with data from the current schedule or deleting activities that are no longer in the current schedule without restoring the Baseline schedule:

- Select **Project, Maintain Baselines...** and select the  icon to open the **Update Baseline** form:



- When **Run Optimized** is not checked then an error log is kept during the updating process.
- Ignore Last Update Date** may be used when a project is updated at different times and the last Baseline Update may not be valid for the current schedule although the Baseline has been updated with more recent data.
- Select  to open the **Update Baseline Options** form to select which data items are updated.



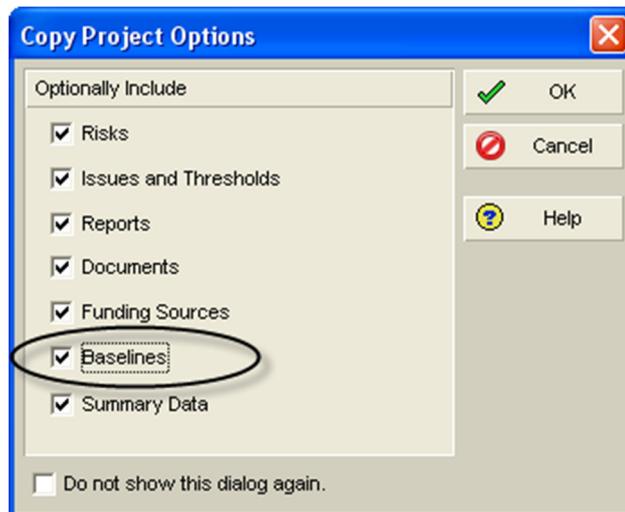
This is a very powerful feature but it is the opinion and experience of the author that the Update Baseline is often the fastest way to destroy a good baseline. A backup of the baseline should be taken before using this function. Furthermore, it is probably best to open edit and review the changes to a Baseline rather than risk using the Update Baseline function.

15.3.5 Copying a Project with Baselines

Primavera Version 6.0 introduced the option of being able to copy baselines when a project is copied in the **Projects Window** using Copy and Paste.

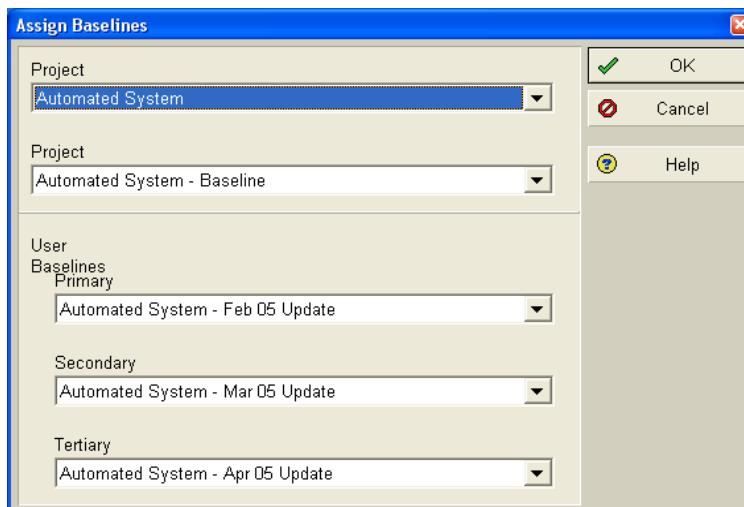


You must manually reassign the baselines after the project has been copied.



15.3.6 Setting the Baseline Project

The baselines are assigned from the [Project, Assign Baselines...](#) form:



- Select from the drop-down box under **Project** which of the open projects is to have a baseline set.
- The **Project Baseline** may be used for calculating **Earned Value**. See [Admin, Admin Preferences..., Earned Value](#) tab for other Earned Value options. This Baseline is seen by any User who opens the project.
- Select which other baseline projects are required to be displayed using the drop-down boxes under **User Baselines**, the options are **Primary**, **Secondary** and **Tertiary** User Baselines.



User Baselines are only seen by the User who has set the Baseline. So other users who open a project and apply, for example, a Project Layout that displays a User Baseline, will have to also make sure that they set the same baseline as the original user.

- Earned Value calculations may be performed using either the **Primary Baseline** values or the **Baseline** values from the current project. Select the **Settings** tab in the **Projects Window**.



- The **Admin, Admin Preferences..., Earned Value tab, Earned value calculation** section has three options. These options decide which Baseline schedule values are read to calculate the Earned Value fields and which dates are selected and used to display the Baseline Bars. The **At Completion values with current dates** is the author's preferred option when resources are assigned.



When the **Budget values with planned dates** is selected, which is often the default value when the software is loaded, then the planned dates are displayed as a baseline bar. This is undesirable when a progressed schedule is displayed as a Baseline, say, for comparing this period's date values with last period's date values. This is because the **Planned Dates** often hold irrelevant data.

15.3.7 Understanding the <Current Project> Baseline



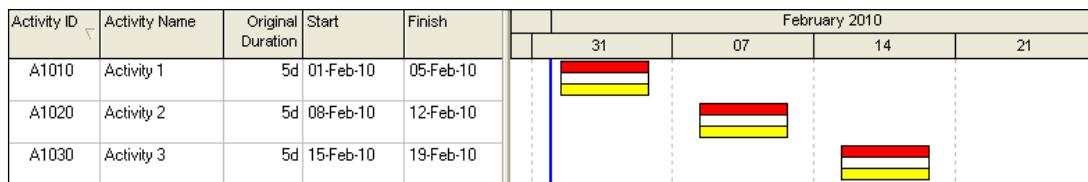
Because **Planned Dates** are difficult to understand and may lead to misinterpretation of the schedule baselines, it is important that you understand the following points:

- The **Planned Dates** are used by the **<Current Project> Baseline** in the **Assign Baseline** form.
- The **<Current Project> Baseline** is the default baseline for both the **Project Baseline** and **Primary User Baseline**.
- When **NO** baseline has been set by a user then the **<Current Project> Baseline** and therefore the **Planned Dates** are displayed as the **Baseline Bars**.
- The **<Current Project> Baseline** is not a true baseline, the dates may change each time a schedule is updated and may hold irrelevant data in a schedule that has been updated.
- The term **Current Schedule** is normally used to describe the activities as they are currently scheduled, and the term **<Current Project> Baseline** is confusing as it is not the **Current Schedule** but the **Planned Dates**, which may be different from the **Current Schedule**.

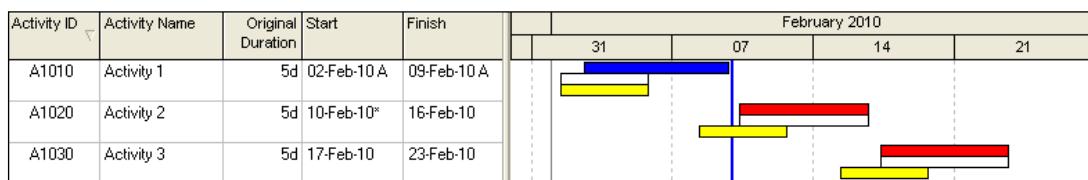
The following picture has three bars:

- The upper bar represents the Start and Finish dates:
 - The **Start** date is set to the **Early Start** when an activity has not started and **Actual Start** when the activity has started.
 - The **Finish** date is set to the **Early Finish** when an activity has not finished and **Actual Finish** when the activity is complete.
- The middle bar is the **<Current Project>baseline**, the **Planned Dates**, and
- The lower bar is a proper baseline made by copying the un-progressed project.

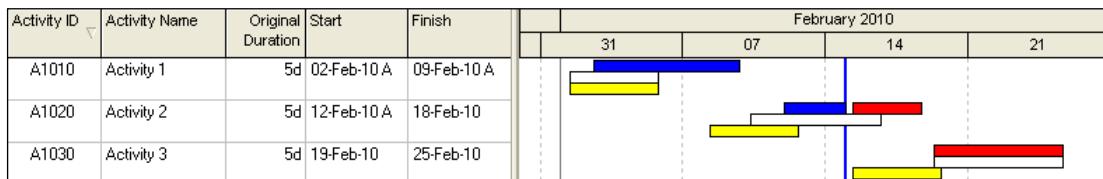
With no progress all bars are the same, see picture below:



Activity 1 has been marked complete and the Data Date moved. The Planned Dates equal the Start and Finish date before the activity was marked as started. The un-started activities, Activity 2 and 3, in the **<Current Project> baseline** have changed their dates to equal the Start and Finish, see picture below:



Activity 2 has been marked in-progress and the Data Date moved, delaying Activity 3. Activity 2 Planned Dates (represented by the **<Current Project> baseline**) match the status of the activity before it was marked Started, not a Baseline. Activity 3 Planned Dates represented by the **<Current Project> baseline** bars have changed a second time and match the new Start and Finish:



When no Baseline is set by the user, the project will **DISPLAY** the **<Current Project>** (from the Planned Dates, not the Current Schedule Start and Finish dates) as the Baseline bars and, in effect:

- All un-started activities are “re-baselined” at each update, and
- Started and Complete activities Planned Dates match the Start and Finish dates of the activity just before an activity was marked as started. Therefore, the Planned Dates of these activities could contain irrelevant data. This happens when a project has been rescheduled and the Data Date moved forward and then activities marked as Started. At this point the Planned Dates now do not represent either a Baseline, or the last period status or the next period status of an activity. They contain irrelevant data that should never be displayed.



There are some significant issues here that need to be carefully managed:

- If no Baseline is set and a layout that displays a baseline bar is applied, then a baseline bar that the user did not set and may contain irrelevant dates from the Planned Dates will be displayed. This may create confusion and these bars may change on each schedule update.
- If one user sets a Primary Baseline, which is a User Baseline and therefore only seen by that user, and a different user opens a project, then this second user will see only the <Current Project> baseline and not the other user's Primary Baseline. This will result in one user seeing something different from another user when two users open a project.

You may wish to restrict the access (see paragraphs 0 and 24.4) to a project schedule to prevent the <Current Project> baseline being displayed inadvertently.

15.3.8 Displaying the Baseline Data

The Baseline Dates may be displayed by:

- Displaying the **Baseline** columns; there are fewer predefined columns for the **Secondary User Baseline** and **Tertiary User Baseline**:
 - BL is the **Project Baseline**
 - BL1 is the **Primary User Baseline**
 - BL2 is the **Secondary User Baseline**
 - BL3 is the **Tertiary User Baseline**

Activity ID	Activity Name	Start	Finish	BL Project Finish	BL Project Start	BL1 Finish	BL1 Start
	Bid for Facility Extension	02-Dec-13	27-Jan-14	27-Jan-14	02-Dec-13	27-Jan-14	02-Dec-13
	Technical Specification	02-Dec-13	18-Dec-13	18-Dec-13	02-Dec-13	18-Dec-13	02-Dec-13
OZ1000	Approval to Bid	02-Dec-13			02-Dec-13		02-Dec-13
OZ1010	Determine Installation Req...	02-Dec-13	05-Dec-13	05-Dec-13	02-Dec-13	05-Dec-13	02-Dec-13
OZ1020	Create Technical Specific...	06-Dec-13	12-Dec-13	12-Dec-13	06-Dec-13	12-Dec-13	06-Dec-13
OZ1030	Identify Supplier Componen...	13-Dec-13	16-Dec-13	16-Dec-13	13-Dec-13	16-Dec-13	13-Dec-13
OZ1040	Validate Technical Specifi...	17-Dec-13	18-Dec-13	18-Dec-13	17-Dec-13	18-Dec-13	17-Dec-13
	Delivery Plan	19-Dec-13	21-Jan-14	21-Jan-14	19-Dec-13	21-Jan-14	19-Dec-13

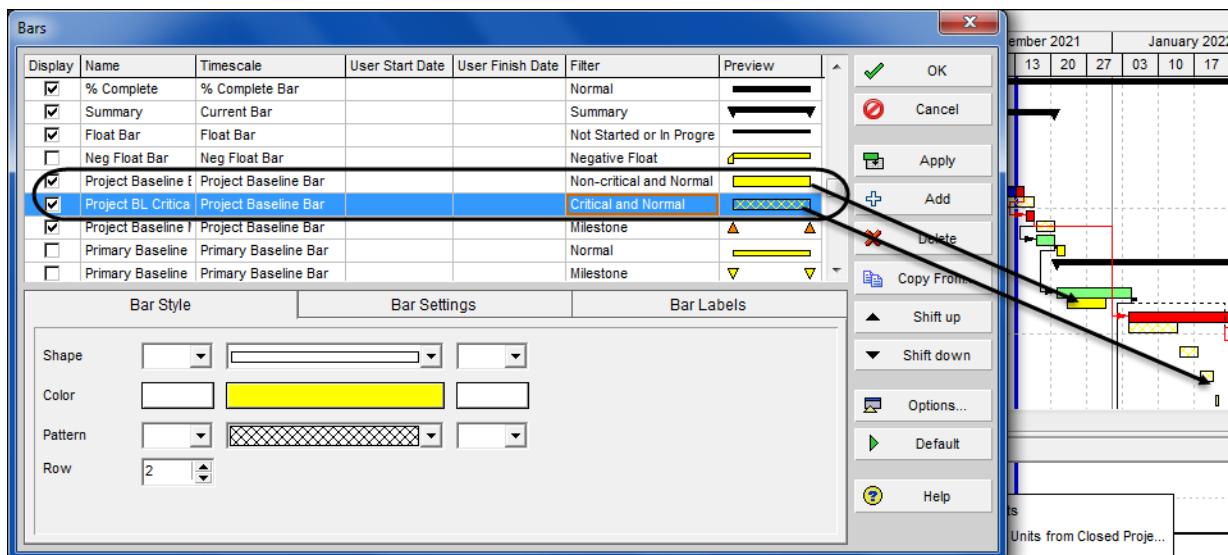
- Showing a baseline bar on the Bar Chart by selecting the appropriate bars in the **Bars** form:

Display	Name	Timescale	Filter	Preview
<input type="checkbox"/>	Project Baseline Bar	Project Baseline Bar	All Activities	
<input type="checkbox"/>	Project Baseline MS	Project Baseline Bar	Milestone	
<input type="checkbox"/>	Project Baseline Summary	Project Baseline Bar	Summary	
<input type="checkbox"/>	Primary Baseline Bar	Primary Baseline Bar	All Activities	
<input type="checkbox"/>	Primary Baseline MS	Primary Baseline Bar	Milestone	
<input type="checkbox"/>	Primary Baseline Summary	Primary Baseline Bar	Summary	
<input type="checkbox"/>	Secondary Baseline Bar	Secondary Baseline Bar	All Activities	
<input type="checkbox"/>	Secondary Baseline MS	Secondary Baseline Bar	Milestone	
<input type="checkbox"/>	Secondary Baseline Summary	Secondary Baseline Bar	Summary	
<input type="checkbox"/>	Tertiary Baseline Bar	Tertiary Baseline Bar	All Activities	
<input type="checkbox"/>	Tertiary Baseline MS	Tertiary Baseline Bar	Milestone	
<input type="checkbox"/>	Tertiary Baseline Summary	Tertiary Baseline Bar	Summary	

15.4 Limitations on Viewing Baseline Data

The following types of data may NOT be read from an Activity window column, table or histogram from a **Project Baseline** and **Primary User Baseline**:

- Relationships,
- Constraints,
- Critical Path, but it is possible to display a critical bar, see the picture below:



- Individual resource or individual Expense costs or units. You may only see:
 - The value of Labor and Non Labor resource costs or units added up to their type, and
 - Material and Expense costs only added up to their type, and

- Total Material Resource and Expense Units.

The following types of data may NOT be read from a Secondary User and Tertiary User Baseline:

- Actual and Remaining Durations,
- Total and Free Float,
- % Complete,
- Any Resource or Expense data.

15.5 Workshop 13 – WBS, LOEs and Setting the Baseline



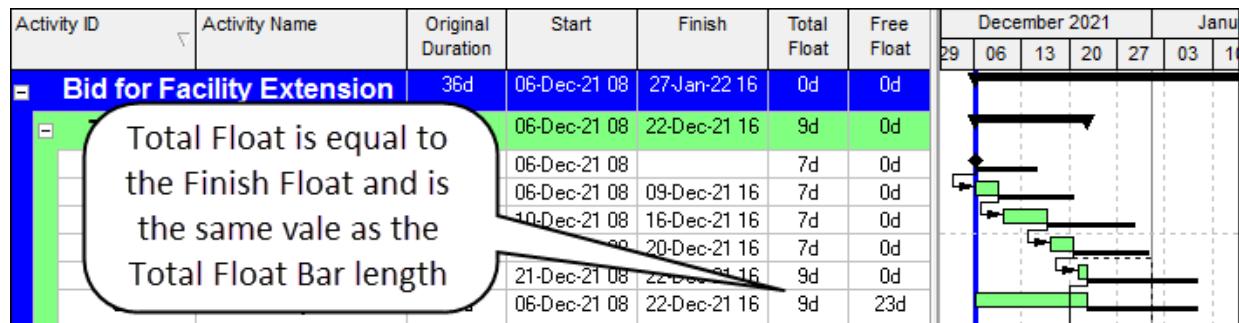
Background

We will first look at how WBS and LOE activities work and then set a Baseline.

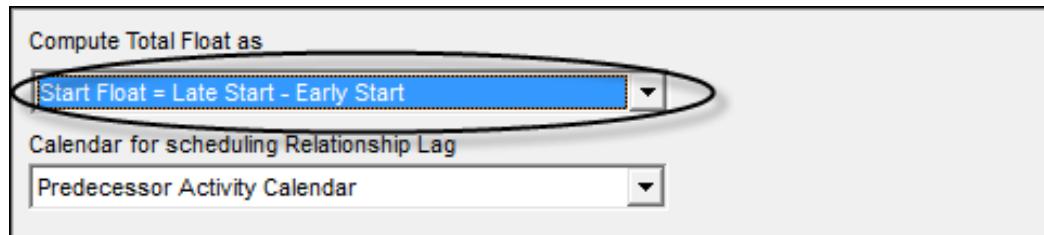
Assignment - WBS Activity

Open your OzBuild Bid project file and complete the following steps:

1. Apply the **OzBuild 10 – With Float** layout
2. From the **User Preferences, Dates** tab select **24 hour**.
3. Create a new activity under the **Bid Document** WBS Node:
 - Activity ID OZ1140
 - Titled **WBS Activity** and
 - Assign it an Activity Type of **WBS Summary** using the **Activities Window, General** tab.
4. Schedule to see how it calculates the Float Bar length.
5. Drag the WBS activity to the **Delivery Plan** WBS Node and schedule to see how it operates.
6. Drag the WBS activity to the **Technical Specification** WBS Node and schedule:



7. Select **Tools, Schedule..., Options** and change the **Compute Total Float to Start Float:** = Late Start – Early Start



continued...

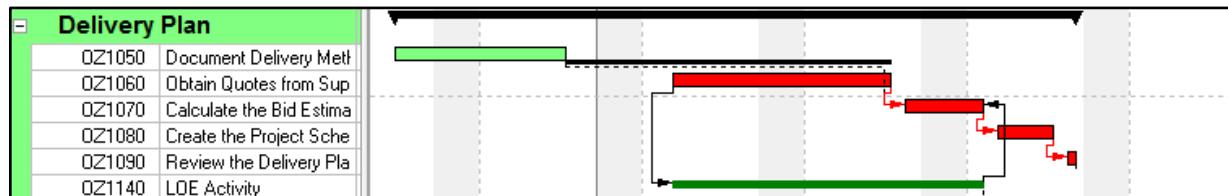
- Schedule and you will see that the float value is now the same value as the Start Float, but the Float Bar still shows the Finish Float Value:

Activity ID	Activity Name	Original Duration	Start	Finish	Total Float	Free Float	December 2021		January 2022	
-	Bid for Facility Extension	36d	06-Dec-21 08	27-Jan-22 16	0d	0d	29	06	13	20
-	Total Float is equal to the Start Float and is NOT the same value as the Total Float Bar length		06-Dec-21 08	22-Dec-21 16	9d	0d		27	03	10
			06-Dec-21 08	09-Dec-21 16	7d	0d			17	24
			10-Dec-21 08	16-Dec-21 16	7d	0d				
			20-Dec-21 16	22-Dec-21 16	7d	0d				
			21-Dec-21 08	22-Dec-21 16	9d	0d				
			06-Dec-21 08	22-Dec-21 16	7d	23d				

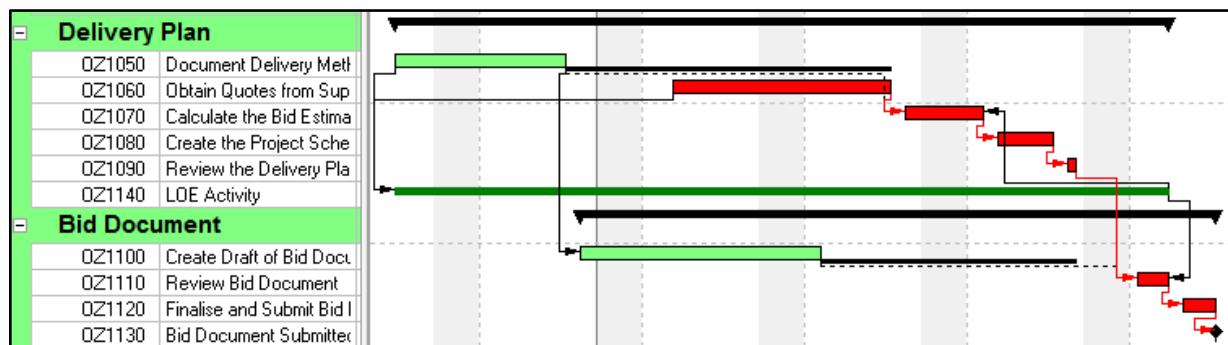
- Go to the Schedule Options form and change the **Compute Total Float** to **Finish Float** and schedule.

Assignment - LOE Activity

- Apply the OzBuild 10 – Without Float Layout
- Change the **Activity Type** of the WBS Activity to a **Level of Effort** and rename it to **LOE Activity**,
- Open the Bars form and ensure LOE bars are displayed,
- Drag activity OZ1140 to the **Delivery Plan** WBS Node and sort on Activity ID,
- Add OZ1060 SS OZ1140 and OZ1140 FF OZ1070 relationships and see how it calculates.



- Add OZ1050 SS OZ1140 and OZ1140 FF OZ1110 relationships and see how it calculates.



- Delete the LOE activity.

Assignment - Setting a Baseline

17. Earned value calculation settings:

- If you are using a PPM database you should check that the **Admin, Admin Preferences...**, **Earned Value tab** has the **Earned value calculation** set to **At Completion values with current dates** or **Budget Values with current dates**. You may not be able to change this if you do not have the necessary access.
- If you are using a EPPM database you should find out what the **Earned value calculation** option is set to. It should be set to **At Completion values with current dates** or **Budget Values with current dates**.
- If the **Earned value calculation** is set to **Budget values with planned dates** or **Planned values with planned dates** the Baseline has progress, then the Planed Dates will be read and the Baseline bars may be wrong.

18. Select **Project, Maintain Baselines...** and save a copy of the current project as a Baseline and title it **Bid for Facility Extension – Baseline**.

19. Assign an appropriate **Baseline Type**, such as **Customer Sign-Off**, (the options may vary depending on your database) and close the form.

20. Select **Project, Assign Baselines...** and make this your **Project Baseline** and **Primary Baseline** and close the **Assign Baselines** form. This ensures that any baseline bar will show a real baseline and not the Planned Dates.

21. Apply the **OzBuild 10 – With Float** layout, do not save the current layout, and save this as a new layout titled **OzBuild Workshop 13 – Baseline**.

22. Create, if required, and display the following bars:

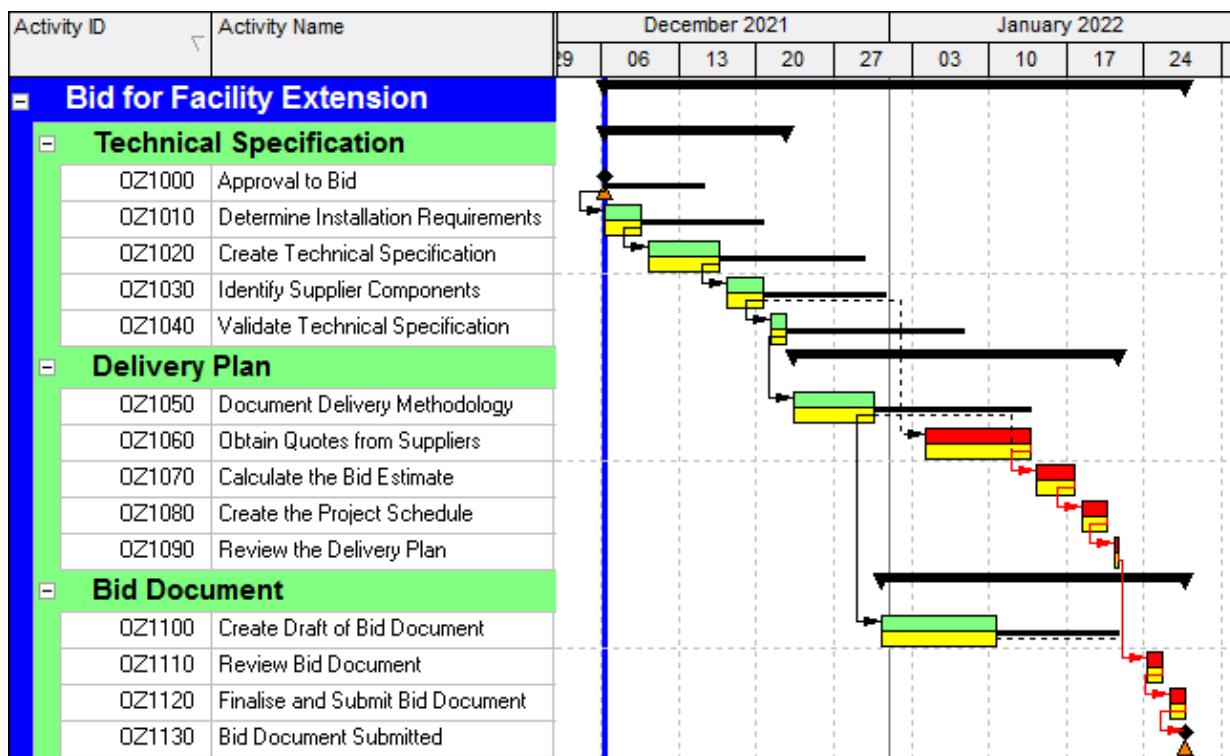
- All current schedule bars which are Actual Work, Remaining Work and Critical Remaining Work, Milestones and Summary,
- % Complete Bar,
- Float Bar (Total Float) and Neg Float Bar (Negative Float),
- The Project Baseline Bar and Project Baseline Milestones,
- For clarity ensure no text is displayed and adjust the row height if required.

23. Display the following columns:

- Activity ID
- Activity Name
- Activity % Complete
- Original Duration
- Remaining Duration
- Start
- Finish
- Total Float
- Variance - BL Project Finish Date

24. Make sure the Timescale is daily or weekly.
25. Show the time in 24-hour format, but do not show the minutes by selecting Edit, User Preferences..., Dates tab.
26. Save your layout.
27. Check your answer against the diagrams below:

Activity ID	Activity Name	Activity % Complete	Original Duration	Remaining Duration	Start	Finish	Total Float	Free Float	Variance - BL Project Finish Date
	Bid for Facility Extension		36d	36d	06-Dec-21 08	27-Jan-22 16	0d	0d	0d
	Technical Specification		13d	13d	06-Dec-21 08	22-Dec-21 16	9d	0d	0d
OZ1000	Approval to Bid	0%	0d	0d	06-Dec-21 08		7d	0d	0d
OZ1010	Determine Installation Requirements	0%	4d	4d	06-Dec-21 08	09-Dec-21 16	7d	0d	0d
OZ1020	Create Technical Specification	0%	5d	5d	10-Dec-21 08	16-Dec-21 16	7d	0d	0d
OZ1030	Identify Supplier Components	0%	2d	2d	17-Dec-21 08	20-Dec-21 16	7d	0d	0d
OZ1040	Validate Technical Specification	0%	2d	2d	21-Dec-21 08	22-Dec-21 16	9d	0d	0d
	Delivery Plan		19d	19d	23-Dec-21 08	21-Jan-22 16	0d	0d	0d
OZ1050	Document Delivery Methodology	0%	4d	4d	23-Dec-21 08	30-Dec-21 16	9d	0d	0d
OZ1060	Obtain Quotes from Suppliers	0%	8d	8d	04-Jan-22 08*	13-Jan-22 16	0d	0d	0d
OZ1070	Calculate the Bid Estimate	0%	3d	3d	14-Jan-22 08	17-Jan-22 16	0d	0d	0d
OZ1080	Create the Project Schedule	0%	3d	3d	18-Jan-22 08	20-Jan-22 16	0d	0d	0d
OZ1090	Review the Delivery Plan	0%	1d	1d	21-Jan-22 08	21-Jan-22 16	0d	0d	0d
	Bid Document		19d	19d	31-Dec-21 08	27-Jan-22 16	0d	0d	0d
OZ1100	Create Draft of Bid Document	0%	6d	6d	31-Dec-21 08	10-Jan-22 16	9d	9d	0d
OZ1110	Review Bid Document	0%	2d	2d	24-Jan-22 08	25-Jan-22 16	0d	0d	0d
OZ1120	Finalise and Submit Bid Document	0%	2d	2d	26-Jan-22 08	27-Jan-22 16	0d	0d	0d
OZ1130	Bid Document Submitted	0%	0d	0d		27-Jan-22 16*	0d	0d	0d



Note: For clarity the baseline above has been made thicker than would be viewed using the primavera.com.au layout and displayed in yellow for people viewing the book in black and white.

16 UPDATING AN UNRESOURCED SCHEDULE

Now that the Baseline has been set we can start tracking progress and the important phase of regular monitoring and control begins. This process is important to help catch problems as early as possible, and thus minimize their impact on the successful completion of the project. The main steps for monitoring progress are:

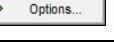
- Saving a **Baseline** schedule, covered in the last chapter,
- Recording or marking-up progress at the **Data Date**.
- **Updating or Progressing** the schedule:
 - Completed activities are assigned **Actual Start** and **Actual Finish** dates,
 - In-progress activities are assigned **Actual Start** dates, and the activity's **Remaining Durations** and **Percent Completes** are adjusted,
 - Adjustments are made to un-started work based on the productivity to-date, and
 - Project scope changes should be added as new activities.
- Scheduling the project and at the same time moving the **Data Date** to the new **Data Date** and recalculating all the activities dates. The **Data Date** may also be moved before updating the activities from the **Project Window, Dates** tab.
- Comparing and Reporting actual progress against planned progress and revising the plan and schedule, if required.

Comparing the status of an activity against more than one baseline is useful; for example:

- The original plan could be represented as one of the Baselines, to see the slippage against the original plan.
- Last Period, which could be another Baseline, to see the changes since the last update.

By the time you get to this phase you should have a schedule that compares your original plan with the current plan, showing where the project is ahead or behind. If you are behind, you should be able to use this schedule to plan appropriate remedial measures to bring the project back on target.

This chapter covers the following topics:

Topic	Menu Command
• Saving and Deleting and Setting a Baseline	To save a Baseline, select Project, Maintain Baselines... to display the Maintain Baselines form.
• Assigning a Baseline project	The baselines are assigned from the Project, Assign Baselines... form.
• Recording Progress	Guidelines on how to record progress.
• Retained Logic and Progress Override	Open the General Schedule Options form by selecting Tools, Schedule..... and clicking the  icon.
• Setting the Current Data Date and Scheduling the project	Open the Schedule form by: <ul style="list-style-type: none"> • Selecting Tools, Schedule...., or • Pressing the F9 key, or • Clicking the  icon.

16.1 Practical Methods of Recording Progress

Normally a project is updated once a week, bi-weekly, or monthly. Very short projects could be updated daily or even by the shift or hour. As a guide, a project would typically be updated between 12 and 20 times in its lifetime. A high-risk project should be updated more often than a low risk project. Progress is recorded on or just after the **Data Date** and the scheduler updates the schedule upon the receipt of the information.

The following information is typically recorded for each activity when updating a project:

- The activity start date and time if required,
- The number of days or hours required to complete the activity or the date and time the activity is expected to finish,
- The percentage complete, and
- If complete, the activity finish date and time.

A printout of the schedule may be used for recording the progress of the current schedule and is often produced prior to updating the project. Ideally progress should be recorded by a physical inspection of the work or by a person who intimately knows the work, although that is not always possible. It is good practice to keep this marked-up record for your own reference. Ensure that you note the Data Date of the mark-up and, if relevant, the time.

Often a Status Report or mark-up sheet, such as the following illustration, which has a 4-week look-ahead filter applied, is distributed to the people responsible for marking up the project progress. The marked-up sheets are returned to the scheduler for data entry into the software and then filed for dispute resolution.

A page break could be placed at each responsible person's band in the **Group and Sort** form, and when the schedule is printed each person could have their own page of activities that are either in-progress or due to commence. This is particularly useful for large projects.

Activity ID	Activity Name	Rem Dur	Orig Dur	Phy % Comp	Start	Actual Start	Suspend Date	Resume Date	Finish	Actual Finish
	Bid for Facility Ext...	34d	38d		03-Dec-13 08 A	03-Dec-13 08			27-Jan-14 16	
	Technical Specific...	9d	13d		03-Dec-13 08 A	03-Dec-13 08			18-Dec-13 16	
OZ1000	Approval to Bid	0d	0d	100%	03-Dec-13 08 A	03-Dec-13 08				
OZ1010	Determine Ins...	0d	4d	100%	03-Dec-13 08 A	03-Dec-13 08			05-Dec-13 16 A	05-Dec-13 16
OZ1020	Create Techni...	5d	3d	40%	05-Dec-13 08 A	05-Dec-13 08			12-Dec-13 16	
OZ1030	Identify Suppli...	2d	2d	0%	13-Dec-13 08				16-Dec-13 16	
OZ1040	Validate Tech...	2d	2d	0%	17-Dec-13 08				18-Dec-13 16	

Other electronic methods, discussed next, may be employed to collect the data. Irrespective of the method used, the same data needs to be collected.

There are several methods of collecting data for the project status:

- By sending a printed sheet to each responsible person to mark up by hand.
- By cutting and pasting the data from Primavera into another document, such as Excel, and E-mailing the document to them as an attachment.
- By giving the responsible party direct access to the schedule software to update it. This approach is not recommended, unless the project is broken into sub-projects. By using multiple projects with one scheduler accessing each project, or assigning access through WBS Nodes, only one person updates each part of the schedule.
- When the Primavera timesheets are implemented this process may be used to update the activities.

Some projects involve a number of people. In such cases, it is important that procedures be written to ensure that the update information is collected:

- In a timely manner,
- Consistently,
- Completely, and
- In a usable format.



It is important for a scheduler to be aware that some people have great difficulty in comprehending a schedule. When there are a number of people with different skill levels in an organization, it is necessary to provide more than one method of updating the data. You even may find that you have to sit down with some people to obtain the correct data, yet others are willing and comfortable to E-mail you the information.

16.2 Understanding the Concepts

There are some terms and concepts used in scheduling and some that are specific to Primavera that must be understood before updating a project schedule.



Users must always display the time when updating a project, otherwise the time of 00:00 is sometimes selected by P6 as the Start or Finish time which is usually not desirable.

16.2.1 Activity Lifecycle

There are three stages of an activity lifecycle:

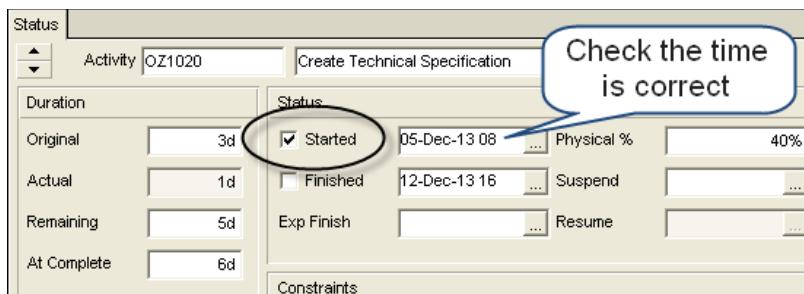
- **Not Started** – The **Early Start** and **Early Finish** dates are calculated from the **Predecessors**, **Constraints**, and **Activity Duration**.
- **In-Progress** – The activity has an **Actual Start** date but is not complete.
 - Assigning an **Actual Start** date overrides the **Start Constraints** and **Start Relationships** which are used to calculate the **Early Start**.
 - The **Finish Date** may be calculated from the **Data Date** or **Resume Date** and the **Remaining Duration**, or an **Expected Finish Constraint**, or a **Finish Relationship**.
- **Complete** – The activity is in the past, the **Actual Start** and **Actual Finish** dates have been entered into Primavera, and they override all logic and constraints.

16.2.2 Assigning an Actual Start Date and Time of an Activity

This section will explain how Primavera assigns the **Actual Start** of a **Complete** or an **In-Progress** activity.

- **Actual Start** date is assigned in the **Actual Start** field by checking the **Started** check box, or
- Entering a date in the **Actual Start** column.

This date overrides the **Early Start date**.



- The activity **Actual Start** date is set to equal the **Start** date when this box is checked.
- The **Actual Start** date calendar is opened by clicking on the icon to the right of the **Started** check box and a different start date may be assigned. This date should not be in the future of the project Data Date. It would not be logical to have an activity assigned a start date in the future.
- An **Actual Start** may also be assigned in an **Actual Start** column.

16.2.3 Assigning an Actual Finish Date and Time of an Activity

This is assigned in the same way as an Actual Start and this should be in the past. An **Actual Finish** date overrides an **Early Finish** date and finish date constraints and finish relationships are ignored.

16.2.4 Calculation of Durations of an In-Progress Activity

Duration Fields

The Primavera has many duration fields, we will discuss four duration fields below:

- An activity **Original Duration (Planned Duration)** in some Industry Versions) is the duration from the **Early Start** to the **Early Finish** calculated over the **Activity Calendar** and is calculated when an activity has not yet started. When an **Actual Start** is entered, this duration is no longer recalculated or directly used for scheduling, but may be edited.
- The **Actual Duration** is the activity's worked duration and is either the duration from:
 - The **Actual Start** to the **Data Date** of an **In-progress** activity, or
 - The **Actual Start** to the **Suspend Date** of a suspended **In-progress** activity, or
 - The **Actual Start** to the **Actual Finish** of a **Completed** activity.
- The **Remaining Duration** is the unworked duration of an **In-progress** activity and is the duration from the **Data Date** or **Resume Date** to the **Early Finish** date of an activity.
- The **At Completion Duration= Actual Duration + Remaining Duration**. Before an activity has started, the **Actual Duration** is zero and the **Remaining Duration** equals the **Original Duration**.
- The **Original Duration** is linked to the **Remaining Duration** when an activity is un-started and **Link Budget and At Completion for not started activities** box in the **Calculations** tab of the **Projects Window** is checked.
- The Remaining bar is based on the **Remaining Duration**, and the Remaining Duration may commence a period of time after the **Data Date** so there is often a gap between the **Data Date** and the **Remaining Start** of an in-progress activity.



The in-built proportional link between **Original Duration**, **Actual Duration**, **Remaining Duration**, and **% Complete** that exists in Microsoft Project does not exist in Primavera.

Percent Complete

As discussed in the **Adding Activities and Organizing Under the WBS** chapter, this section is repeated for completeness of this chapter.

The **Percent Complete** type should be understood if it is intended to update (status or progress) a schedule. In Primavera this option may be set for each activity individually and the default for new activities is set in the **Percent Complete Type** drop-down box. Primavera has many Activity Percent Complete fields that may be displayed in columns and we will discuss four of them now:

Activity % Complete, displayed on the **% Complete Bar**, may be linked to only one of the three % Complete following three fields:

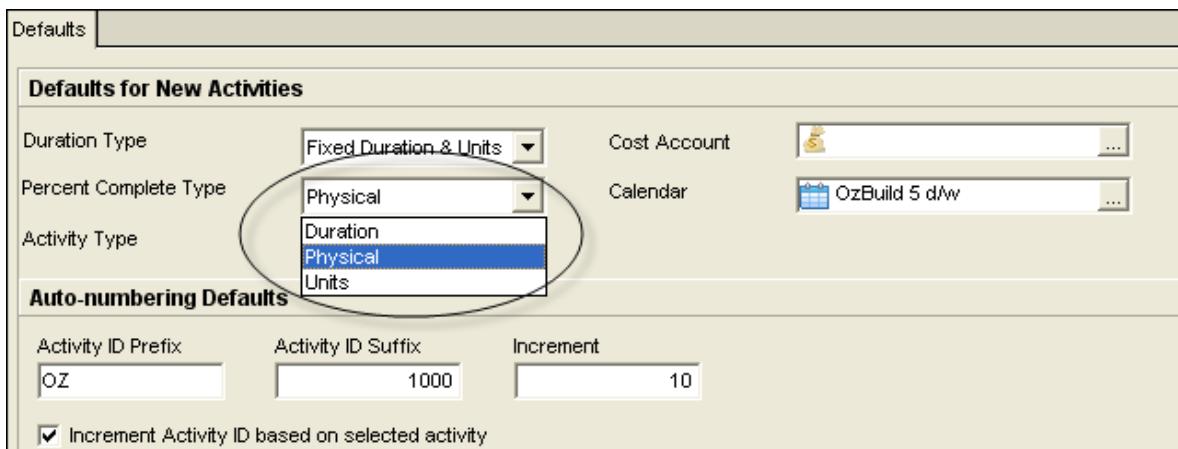
- **Physical % Complete**
- **Duration %Complete**
- **Units % Complete**

There are three Percent Complete options; each new activity is assigned the project default **Percent Complete Type** and then this may be edited for each activity as required.

Therefore, if the option of **Physical % Complete** is selected for an activity then the **Activity % Complete** and the **Physical % Complete** are linked and a change to one will change the other.

Default % Complete

The **Default % Complete Type** for each new activity in each project is assigned in the **Defaults** tab of the **Details** form in the **Project Window**:



- Each new activity **Percent Complete Type** is set to the **Default Percent Complete** and may be changed at any time.

Percent Complete Types

- **Duration % Complete** – This field is calculated from the proportion of the **Original Duration** and the **Remaining Duration** and they are linked and a change to one value will change the other. When the **Remaining Duration** is set to greater than the **Original Duration** this percent complete is always zero.
- **Physical % Complete** – This field enables the user to enter the percent complete of an activity and this value is independent of the activity durations.

- Units % Complete** – This is where the percent complete is calculated from the resources Actual and Remaining Units. A change to one value will change the other and when more than one resource is assigned then all the Actual Units for all resources will be changed proportionally. This will be covered further in The **Updating Resources** chapter. This is similar to the Microsoft Project % Work Complete.

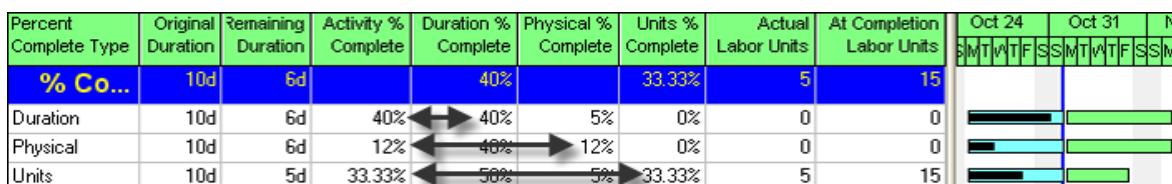


The Units % Complete is calculated from the value of all the Labor and Non-Labor Resources, so be careful when more than one type of resource is assigned to an activity. For example, the software could be adding concrete volumes with labor hours and excavator hours.

Activity % Complete

The **Activity % Complete** field is linked to the **% Complete Type** field assigned to an activity in the **General** tab of the **Details** form in the **Activities Window** or the **% Complete Type** column:

The **Activity % Complete** is also linked to the **% Complete Bar** and this value is represented on the **% Complete Bar**.



16.2.5 Summary Bars Progress Calculation

Summary bars such as WBS Node bars may not be updated, as in Microsoft Project, as they are virtual activities with their data created from summarizing the activities in the band.

16.2.6 Understanding the Current Data Date

The **Current Data Date** is also known as the **Data Date**, **Update Date**, **Status Date**, **Progress Date**, **As At Date**, **Time Now**, **Report Date** and the **Project Data Date**. Primavera has one **Data Date**, titled **Current Data Date**, which operates differently to both the Microsoft Project **Status Date** and Elecosoft (Asta) **Powerproject Report date**.

The Primavera **Current Data Date** is displayed as a vertical line on the schedule; this Data Date vertical line may be formatted in the **Bar Chart Options** form.

In P6 the function of the **Current Data Date** is to:

- Separate the completed parts of activities from incomplete parts of activities.
- Calculate or record all costs and hours to-date before the **Current Data Date**, and to forecast costs and hours to go after the **Current Data Date**.
- Calculate the **Finish Date** of an in-progress activity from the **Current Data Date** plus the **Remaining Duration** over the **Activity Calendar**, when the Suspend and Resume function has not been used.

16.3 Updating the Schedule

The next stage is to update the schedule by entering the mark-up information against each activity.

When dealing with large schedules it is normal to develop a look-ahead schedule by creating a filter to display incomplete and un-started activities commencing in the near future only.

The schedule may be updated using the following methods:

- Using the fields in the **Status** tab of the **Details** form in the lower pane, or
- Displaying the appropriate tracking columns by:
 - Creating your own layout, or
 - Inserting the required columns in an existing layout.

16.3.1 Updating Activities Using the Status Tab of the Details Form

Ensure you are showing the time and then open the **Status** tab:

Status	
Activity	OZ1020
Duration	
Original	3d
Actual	1d
Remaining	5d
At Complete	6d
Status	
<input checked="" type="checkbox"/> Started	05-Dec-13 08
<input type="checkbox"/> Finished	12-Dec-13 16
Exp Finish	
Constraints	

Updating a Complete activity:

- Check the **Started** box and enter the actual **Start Date and Time** if different from the displayed date.
- Check the **Finished** box and enter the actual **Finish Date and Time** if different from the displayed date.

Updating an In-progress activity:

- Check the **Started** box and enter the actual **Start Date and Time** if different from the displayed date.
- When the **Duration Type** is **% Duration** the **% Duration Complete** and **Remaining Duration** are linked, then either:
 - The **Remaining Duration** is edited and the **% Complete** is calculated, or
 - The **% Complete** is entered and the software calculates the **Remaining Duration**, or
 - A **Remaining Duration** greater than the **Original Duration** may be entered and the **% Duration** will remain at zero, until the **Remaining Duration** is less than the **Original Duration**.

Irrespective of the method used to calculate the **Remaining Duration**, after the schedule is recalculated the end date of the activity is calculated from the **Current Data Date** plus the **Remaining Duration** over the **Activity Calendar**.



Be careful that the **% Duration Complete** does not change the **Remaining Duration** to a non-round day and that activity then finishes halfway through a day. This results in all the successor activities starting and finish in the middle of the day.

Updating an Un-started activity:

- The Original Duration, Relationships and Constraints of an un-started activity should be reviewed.

16.3.2 Updating Activities Using Columns

An efficient method of updating activities is by displaying the data in columns. This may be achieved by:

- Inserting the required columns in an existing layout, or better:
- Creating a Layout with the required columns and updating the schedule using these columns.

16.4 Progress Spotlight and Update Progress

Primavera Version 5.0 introduced a new function for highlighting the activities that should have progressed in the update period and is titled **Progress Spotlight**.

The user then has the option of selecting some or all of the activities that should be updated and updating them using the **Update Progress** function as if they progressed exactly as they were Planned. It is sometimes easier to **Automatically update** a project with functions like **Progress Spotlight** and then adjust the Actual dates and Remaining Durations as a second step in the updating process, especially if the project is going to plan.



The **Update Progress** function must be used with caution on schedules with progress as it does not work as one would expect and may change actual dates without warning. This topic is covered in detail later in this chapter.

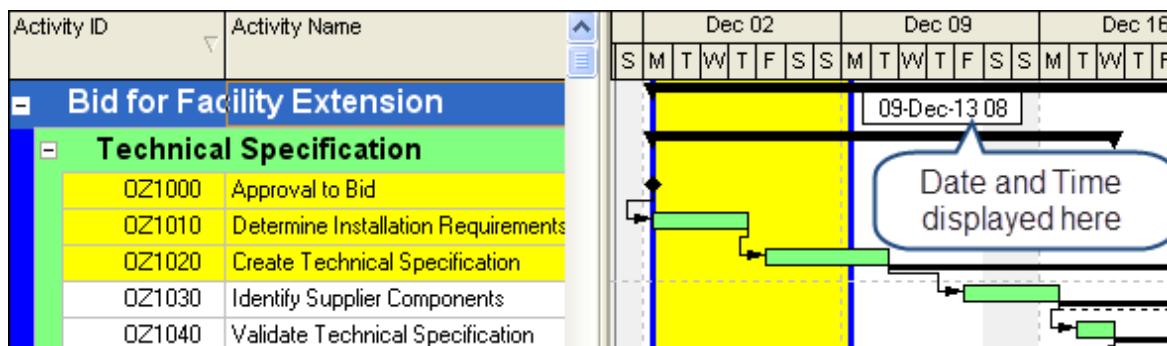
The Spotlight may be moved to reflect the new Data Date by either:

- Dragging the Data Date, or
- Using the **Tools** toolbar, **Spotlight** icon

16.4.1 Highlighting Activities for Updating by Dragging the Data Date

To highlight activities that should have been progressed in the last period by dragging the Data Date:

- Hold the mouse arrow on the Data Date line and display the double-headed arrow , and
- Press the left mouse and drag the Data Date line to the required date.
- All the activities that should have been worked in the time period are highlighted:



16.4.2 Spotighting Activities Using Spotlight Icon

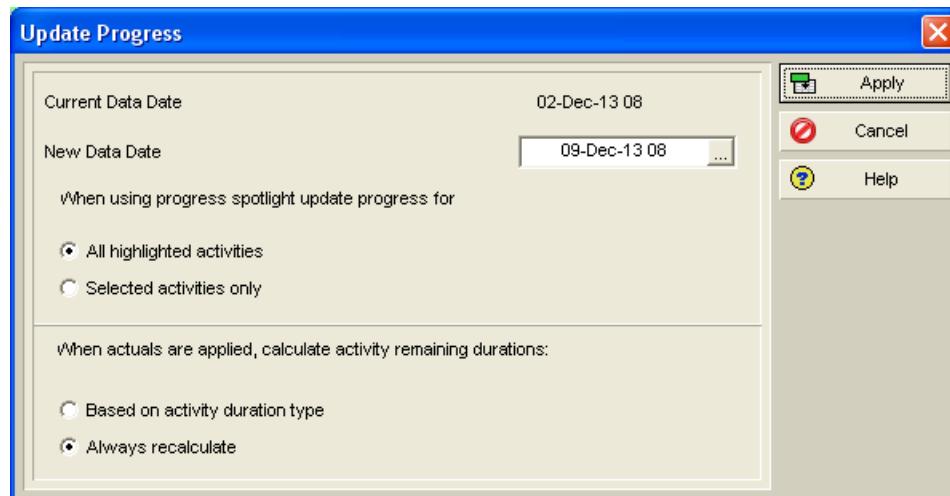
The Spotlight facility highlights all activities that should have progressed in one minor time period of the timescale settings. To use **Progress Spotlight**:

- Set the Timescale to be the same as your Update Periods. If you are updating weekly, then set the time period to weeks in the **Timescale** form.
- Select **View, Progress Spotlight** or click the  icon and the next period of time (one week if your scale is set to one week) will be highlighted.
- Click the **Progress Spotlight**  icon a second time to return the Spotlight back to the Data Date.

You are now ready to update progress.

16.4.3 Updating a Project Using Update Progress

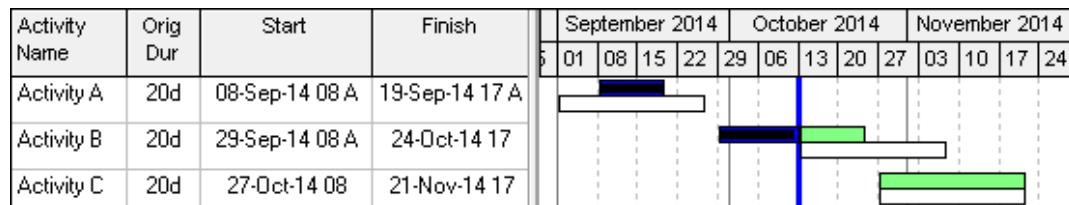
To update a schedule using the **Update Progress** form, select **Tools, Update Progress**:



Unlike Microsoft Project **Update Project** function, this Primavera **Update Progress** facility uses the **Planned Start** and **Planned Finish** dates (not the **Early Start** and **Early Finish**) for setting the **Actual Start** and **Actual Finish** dates of in-progress activities.

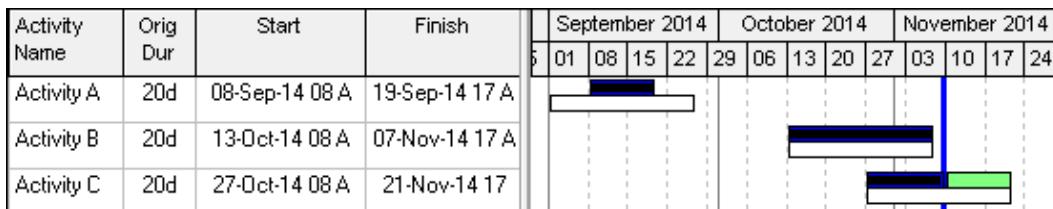
Thus, when the **Planned Dates** of an in-progress activity are different from the **Actual Start** and **Early Finish** dates and the activity is Automatically updated to be complete, then both these dates are set to the **Planned** dates and the **Actual Start** may be changed and the **Actual Finish** not set to the original **Early Finish**.

The following picture displays the Early bar (the upper bar) and the Current Project set as a Baseline (the lower bar) which therefore reflects the Planned Dates:



continued...

The following picture shows the effect of applying **Update Progress** to the schedule above. The Actual Start of Activity 2 has been changed and the Actual Finish of Activity 2 set to the Planned Dates, which is not the same as the original Early Finish:



NOTE: You should not use this facility on a schedule with progress when you wish your activities to be Automatically updated to the Early dates (as in Microsoft Project) and not the Planned dates.

You may consider using a Global Change to set the Planned Dates to the Start and Finish dates before running Progress Spotlight, but this will also change the Original Duration and the % Duration will not calculate correctly.

There are several options for setting the **New Data Date**:

- Select a new Data Date in the **Project Window, Dates** tab,
- Select a new Data Date when scheduling from the **Schedule** form,
- You may use the **Progress Spotlight** facility before opening the **Update Progress** form and the **New Data Date** will be set to the highlighted Data Date, or
 - You may select the **New Data Date** when opening the form.
 - Either all the activities that are Spotlighted may be updated or if some were selected before opening the form then just the selected ones may be updated.
 - To update all the activities, select the **All highlighted activities** button, or
 - To update selected activities, highlight the activities (hold the **Ctrl** key and click the ones you wish to select) before selecting **Tools, Update Progress...** and then clicking on the **Selected activities only** button in the **Update Progress** form.

The option **When actuals are applied from timesheets, calculate activity remaining durations:** decides how the Remaining Duration is calculated:

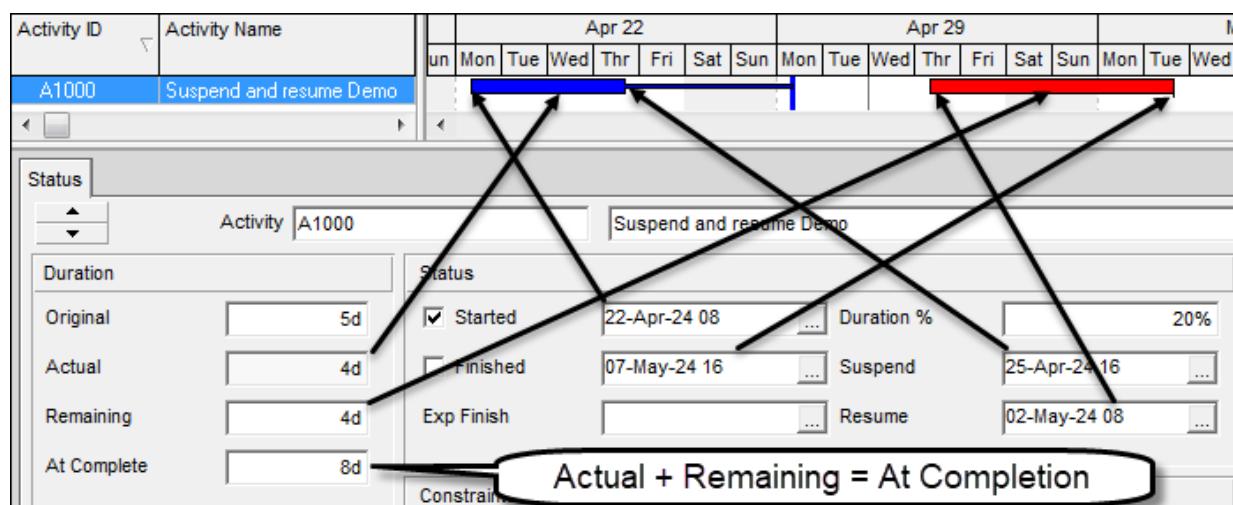
- **Based on the activity duration type** will take into account activity type and hours to-date and reschedule the Remaining Duration in accordance with the activity Duration Type.
- **Always recalculate** will override the activity Duration Type and calculate the activity Remaining Durations and Hours as if the activity were a Fixed Units and Fixed Units/Time activity.
- Click and the schedule will be updated as if all activities were completed according to the schedule.

16.5 Suspend and Resume

The Primavera Version 5.0 Suspend and Resume function enables the work to be suspended and the activity resumed at a later date. Open the **Activity Details** form **Status** tab and enter the **Suspend** and **Resume** dates. This function only one break in an activity unlike Elecosoft (Asta) Powerproject and Microsoft project that both allow multiple breaks in the past and future.

The following example shows an activity with a Suspend date and Resume date set:

- This feature works when an activity has commenced and normally the Suspend date is in the past and the Resume date in the future.
- The activity must have an actual start date before you can record a Suspend date.
- Only Resource Dependent and Task Dependent activities may be suspended and resumed.
- The suspended period is not calculated as part of the activity duration and resources are not scheduled in this period.
- The Actual bar has been necked for **Activity nonwork intervals** to show the non work in the past.

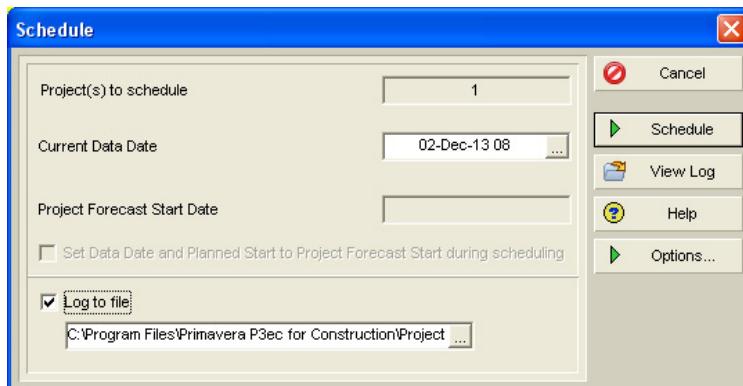


! The Suspend and Resume time may be set at the incorrect time of the day. The author has found that the Suspend is usually set at the start of the day and Resume usually at the end of the day; therefore, the defaults for both are illogical. Therefore, you **SHOULD ALWAYS** display the time when setting Suspend and Resume dates to ensure that they are correct.

16.6 Scheduling the Project

At any time, but usually after some or all the activities have been updated, the project is scheduled:

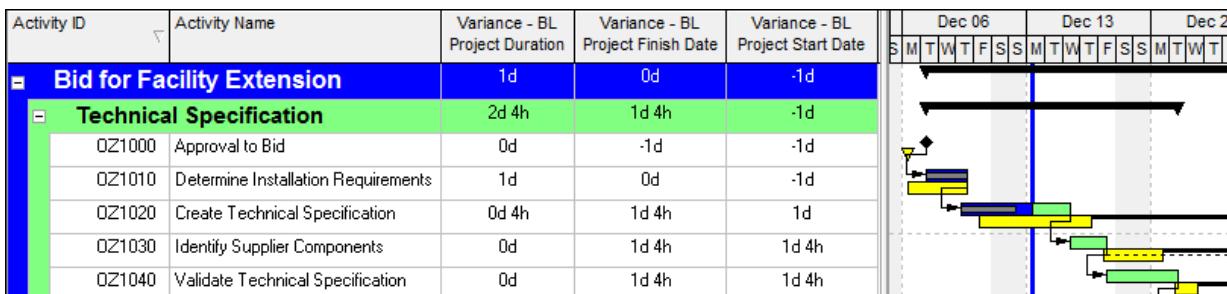
- Open the **Schedule** form:
 - Select **Tools, Schedule...**, or
 - Press the **F9** key, or
 - Click on the  icon.
- Select the revised **Current Data Date and Time** from the box and click the  icon.
- The software will recalculate all the early finish dates from the remaining durations and the new **Current Data Date**, taking into account the relationships and the **Schedule Options**.



16.7 Comparing Progress with Baseline

There will normally be changes to the schedule dates and more often than not there are delays. The full extent of the change is not apparent without having a Baseline bar to compare with the updated schedule.

To display one or more of the **Baseline Bars** in the **Bar Chart** you must open the **Bars** form and check the **Display** box of one or more baseline bars.



If you want to see the Start and Finish Date variances, they are available by displaying the **Variance – BL Project Start Date**, **Variance – BL Finish Date**, **Variance – BL1 Start Date**, and **Variance – BL1 Finish Date** columns.



Variance columns for Secondary and Tertiary Baseline Dates are not standard columns but could be calculated with a Global Change.



As discussed earlier in this chapter, when a **Project Baseline** or a **Primary User Baseline** bar is displayed without a baseline being set and the <Current Project> (which is based on the **Planned Dates**) will be displayed. The <Current Project>/Planned Dates of an in-progress projects are not Baselines and may hold irrelevant data.

16.8 Progress Line Display on the Gantt Chart

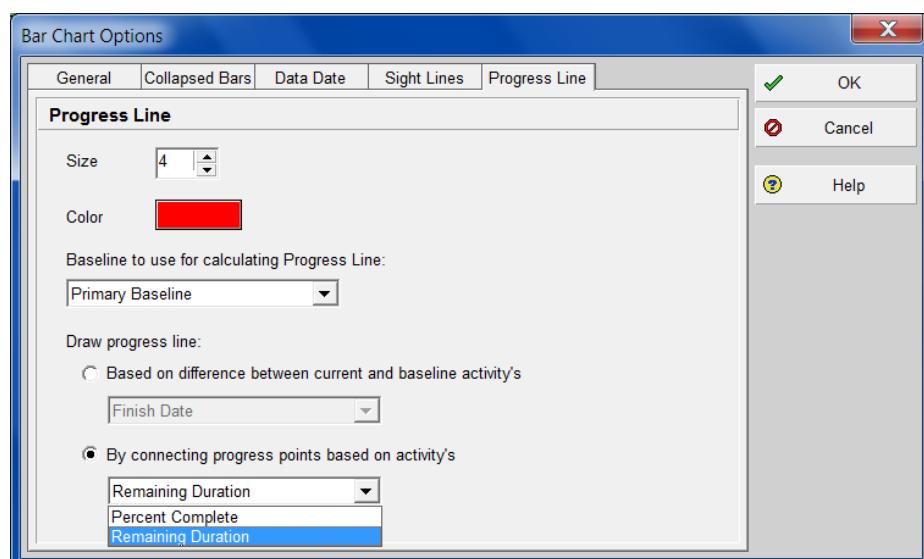
This is a new feature to Primavera P6 Version 7.

A progress line displays how far ahead or behind activities are in relation to the Baseline. Either the Project Baseline or the Primary User Baseline may be used and there are four options:

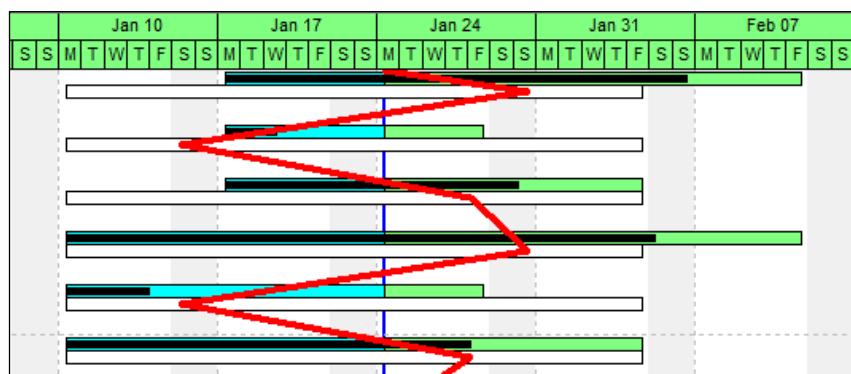
- Difference between the **Baseline Start Date** and **Activity Start Date**,
- Difference between the **Baseline Finish Date** and **Activity Finish Date**,
- Connecting the progress points based on the **Activity % Complete**,
- Connecting the progress points based on the **Activity Remaining Duration**.

There are several components to displaying a Progress Line:

- Firstly, the progress line is formatted using the **View, Bar, Options...** form, **Progress Line** tab, which may also be opened by right-clicking in the Gantt Chart area:



- Selecting **View, Progress Line** to hide or display the **Progress Line**.
- If you use either of the options of Percent Complete or Remaining Duration, then you must display the appropriate Baseline Bar that has been selected as the **Baseline to use for calculating Progress Line**:
- The picture below shows the option highlighted above of **Percent Complete**:



16.9 Check List before Updating a Schedule

You should check the following items before updating a schedule:

- Ensure you are showing the time from the **Edit, User Preferences..., Dates** tab and check that all Start and Finish dates and times are logical. You can see that these times make sense when you are updating a project.
- Check the **% Complete Type** for all the activities; the author recommends that this be set to **Physical**.
- Check the **Tools, Schedule..., Options....** The defaults are usually good, but if you have multiple calendars you should consider using the **Longest Path** option and if you wish to display **Multiple Critical Paths** then select **Make open-ended activities critical**.
- Check that the **Admin, Admin Preferences..., Earned Value** tab is **NOT** set to **Budget values with planned dates**, so you will not read the **Planned Dates** from a Baseline Schedule.
- After creating a Baseline, ensure that you have not left a <Current Project> as the Project or Primary Baseline.
- Ensure all **Actual Dates** are in the past as they are assigned.
- **NEVER EVER** use **Update Progress** on a schedule with progress, as this will change your Actual Start dates and Finish dates of in-progress activities to the Planned Dates.
- Take a complete copy of your schedule including all Baseline projects after update for claim analysis at a later date.

16.10 In-Progress Schedule Check List

The following check list may be used to check an in-progress schedule.

Complete Activities

- All activities have an Actual Start and an Actual Finish before the Status Date.

In-Progress Activities

- Actual Start dates should all be in the past and Early Finish dates in the future.
- Check activities with Constraints, are the constraints still valid?
- Do all activities have Finish successors?
- Are there any activities with progress greater than planned and require the duration shortened?
- Are there any activities that have progressed slower than planned and require the duration lengthened or split.

Not Started Activities

- All Start dates should be in the future.
- Check that all the constraints on these activities are still valid.
- All activities should have Finish successors except the Project Finish Milestone(s).

Open Ends and Total Float

- Confirm that all activities have successors and review float. Activities with excessive float should be assigned dummy successors or delayed if they are not scheduled in a realistic timeframe with sequencing logic or Early Start constraints.

Critical and Near Critical Path

- Check the Critical Path is realistic and aligned with what project personnel consider critical.

Scope Changes

- Ensure that all project changes have been reflected in the schedule.
- It is good practice to add new activities for new work and cross reference the activity to the change documentation using the Notes or a Text column.

Performance

- Has the performance of complete and in-progress activities been reflected in un-started activities, thus revising the un-started work durations based on achievements to date.

Baseline Comparison

- Review the Baseline dates with the current schedule and confirm that any delays are legitimate.
- Have there been many changes and delays and therefore should the schedule be re-baselined?

16.11 Corrective Action

Date slippage occurs when an activity is rescheduled to finish later than originally planned. There are two courses of action available:

- The first is to accept the slippage. This is rarely acceptable, but it is the easiest answer.
- The second is to examine the schedule and evaluate how you could improve the end date.

Solutions to return the project to its original completion date must be authorized by a responsible person.

Suggested solutions to bring the project back on track include:

- Reducing the durations of activities on, or near, the critical path. When activities have applied resources, this may include increasing the number of resources working on the activities. Changing longer activities is often more achievable than changing the length of short duration activities.
- Providing more work time and changing calendars, say from a five-day to a six-day calendar, so that activities are being worked on for more days per week.
- Reducing the project scope and deleting activities.
- Changing activity relationships so activities take place concurrently. This may be achieved by introducing negative lags to Finish-to-Start relationships, which maintains a Closed Network. A negative lag will allow the successor activity to start before the predecessor is complete, which is often what happens in reality.
- Replacing Finish-to-Start relationships with Start-to-Start relationships. Activities are now progressing in parallel and therefore at the same time. This has the potential of creating an open network as the predecessor activity may no longer have a finish successor and an extension in the duration of this activity may not affect the critical path. To maintain the critical path then this option should be avoided or a Finish-to-Finish successor added to complete a closed network.
- Changing the plan and therefore changing the logic to reduce the overall length of the critical path.

16.12 Workshop 14 – Progressing and Baseline Comparison



Background

At the end of the first week you have to update the schedule and report progress and slippage.

Assignment

1. We are now going to update the schedule as at the end of the first week.
2. Update the activities in the **Activities**, bottom pane **Status** tab or by adding the **Actual Start** and **Actual Finish** columns with the following information; ensure all activities are Physical % Complete:

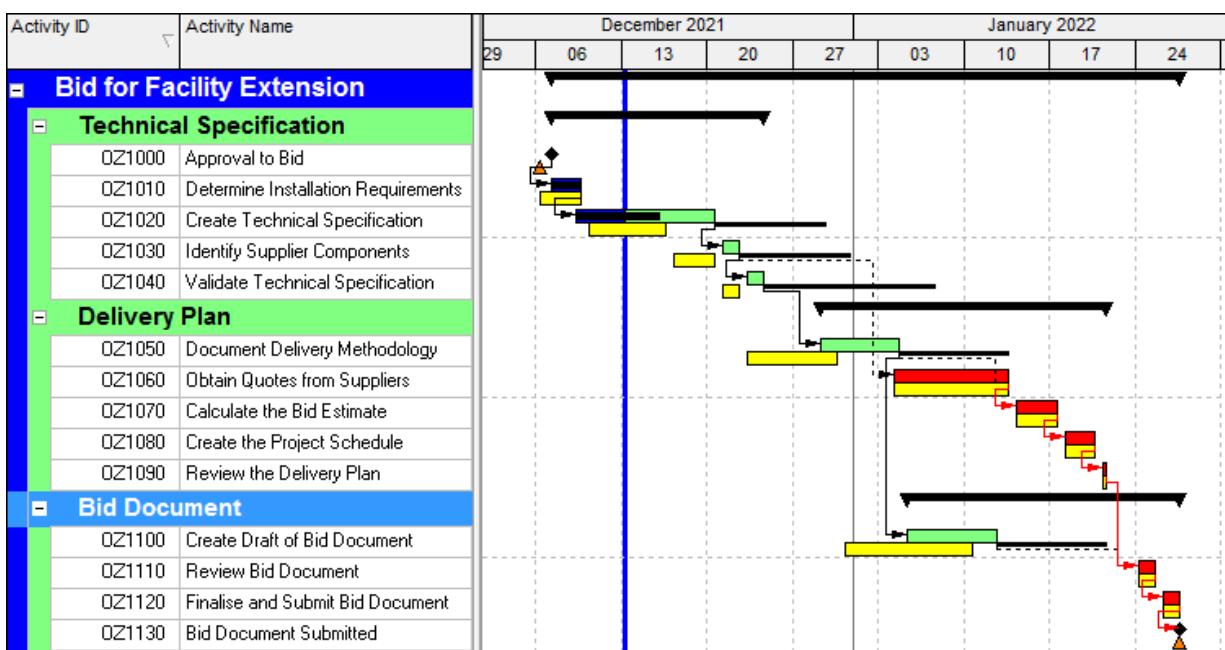
Activity ID	Activity Name	Actual Start	Actual Finish	Activity % Complete	Remaining Duration
	Bid for Facility Extension	07-Dec-21 08			31d
	Technical Specification	07-Dec-21 08			10d
OZ1000	Approval to Bid	07-Dec-21 08		100%	0d
OZ1010	Determine Installation Requirements	07-Dec-21 08	09-Dec-21 16	100%	0d
OZ1020	Create Technical Specification	09-Dec-21 08		60%	6d
OZ1030	Identify Supplier Components			0%	2d

3. Reschedule the project by pressing **F9** to open the **Schedule** form:

- Change the Current Data Date to 13-Dec-21 08:00, that will be Monday morning,
- Open the **Schedule Options** form by clicking on the icon and ensure **Retained Logic** is selected,
- Close the **Schedule Options** form and
- Click on the to reschedule,
- Check the answer in the following pictures.

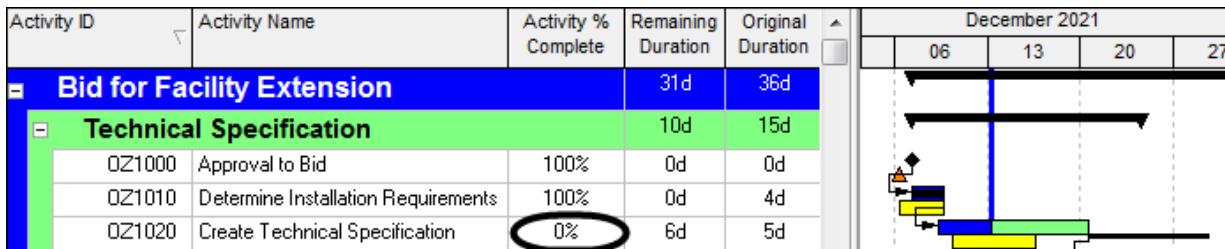
Activity ID	Activity Name	Activity % Complete	Remaining Duration	Original Duration	Start	Finish	Total Float	Free Float	Variance - BL Project Finish
	Bid for Facility Extension		31d	36d	07-Dec-21 08 A	27-Jan-22 16	0d	0d	0d
	Technical Specification		10d	15d	07-Dec-21 08 A	24-Dec-21 16	7d	0d	-2d
OZ1000	Approval to Bid	100%	0d	0d	07-Dec-21 08 A				-1d
OZ1010	Determine Installation Requirements	100%	0d	4d	07-Dec-21 08 A	09-Dec-21 16 A			0d
OZ1020	Create Technical Specification	60%	6d	5d	09-Dec-21 08 A	20-Dec-21 16	5d	0d	-2d
OZ1030	Identify Supplier Components	0%	2d	2d	21-Dec-21 08	22-Dec-21 16	5d	0d	-2d
OZ1040	Validate Technical Specification	0%	2d	2d	23-Dec-21 08	24-Dec-21 16	7d	0d	-2d
	Delivery Plan		17d	17d	29-Dec-21 08	21-Jan-22 16	0d	0d	0d
OZ1050	Document Delivery Methodology	0%	4d	4d	29-Dec-21 08	04-Jan-22 16	7d	0d	-2d
OZ1060	Obtain Quotes from Suppliers	0%	8d	8d	04-Jan-22 08*	13-Jan-22 16	0d	0d	0d
OZ1070	Calculate the Bid Estimate	0%	3d	3d	14-Jan-22 08	17-Jan-22 16	0d	0d	0d
OZ1080	Create the Project Schedule	0%	3d	3d	18-Jan-22 08	20-Jan-22 16	0d	0d	0d
OZ1090	Review the Delivery Plan	0%	1d	1d	21-Jan-22 08	21-Jan-22 16	0d	0d	0d
	Bid Document		17d	17d	05-Jan-22 08	27-Jan-22 16	0d	0d	0d
OZ1100	Create Draft of Bid Document	0%	6d	6d	05-Jan-22 08	12-Jan-22 16	7d	7d	-2d
OZ1110	Review Bid Document	0%	2d	2d	24-Jan-22 08	25-Jan-22 16	0d	0d	0d
OZ1120	Finalise and Submit Bid Document	0%	2d	2d	26-Jan-22 08	27-Jan-22 16	0d	0d	0d
OZ1130	Bid Document Submitted	0%	0d	0d		27-Jan-22 16*	0d	0d	0d

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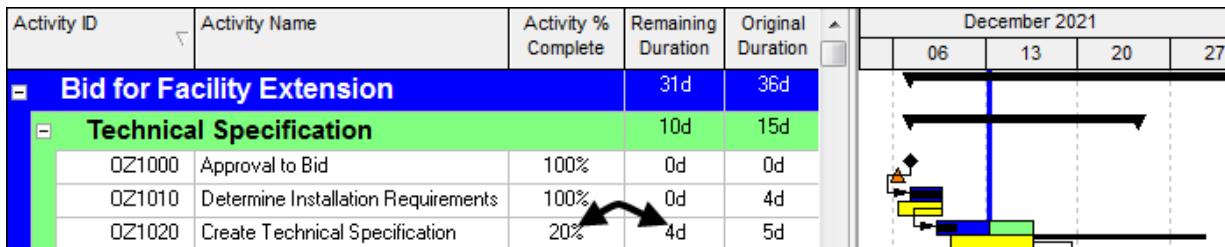


NOTE: The lower bar is the Baseline and delays to activities created by the late scheduling of the **Create Technical Specification** activity is clear in the picture above.

4. If you do not receive the same answer then check that all your activities are Physical % Complete.
5. Open the **General** tab of the **Create Technical Specification** activity and change the % Complete Type to **Duration**. Reschedule and the % Complete will change to 0%. A link is now established between the % Complete and Remaining Duration and therefore the % Complete and Remaining Duration may not be entered independently from the Activity % Complete. The Activity % Complete Value is zero because the Remaining Duration is greater than the original duration.



6. Enter 20% Complete against the **Create Technical Specification** activity in the **Status** tab, the Remaining Duration will reduce to 4 days and you will notice the link between the Activity % Complete and Remaining Duration.



7. Now change the % Complete for the **Create Technical Specification** activity to 50%.
8. Reschedule.
9. Ensure you are showing the Duration Sub-unit of Hours by opening the **Edit, User Preferences... Time Unit** tab and check the **Duration Format Sub-unit Hours** box and check **Show Duration label**.
10. This has resulted in the Remaining Duration no longer being expressed in whole days and activities which are two days long, for example Activity OZ1030, now spanning three days because they start and finish at midday.

Activity ID	Activity Name	Activity % Complete	Remaining Duration	Original Duration	Start	Finish	Total Float	Free Float	Variance - BL Project Finish
	Bid for Facility Extension		31d	36d	07-Dec-21 08 A	27-Jan-22 16	0d	0d	0d
	Technical Specification		6d 4h	11d 4h	07-Dec-21 08 A	21-Dec-21 12	10d 4h	0d	1d 4h
OZ1000	Approval to Bid	100%	0d	0d	07-Dec-21 08 A				-1d
OZ1010	Determine Installation F	100%	0d	4d	07-Dec-21 08 A	09-Dec-21 16 A			0d
OZ1020	Create Technical Spec	50%	2d 4h	5d	09-Dec-21 08 A	15-Dec-21 12	8d 4h	0d	1d 4h
OZ1030	Identify Supplier Compa	0%	2d	2d	15-Dec-21 12	17-Dec-21 12	8d 4h	0d	1d 4h
OZ1040	Validate Technical Spe	0%	2d	2d	17-Dec-21 12	21-Dec-21 12	10d 4h	0d	1d 4h
	Delivery Plan		20d 4h	20d 4h	21-Dec-21 12	21-Jan-22 16	0d	0d	0d
OZ1050	Document Delivery Ma	0%	4d	4d	21-Dec-21 12	29-Dec-21 12	10d 4h	0d	1d 4h
OZ1060	Obtain Quotes from Su	0%	8d	8d	04-Jan-22 08*	13-Jan-22 16	0d	0d	0d
OZ1070	Calculate the Bid Estim	0%	3d	3d	14-Jan-22 08	17-Jan-22 16	0d	0d	0d
OZ1080	Create the Project Sch	0%	3d	3d	18-Jan-22 08	20-Jan-22 16	0d	0d	0d
OZ1090	Review the Delivery Pl	0%	1d	1d	21-Jan-22 08	21-Jan-22 16	0d	0d	0d
	Bid Document		20d 4h	20d 4h	29-Dec-21 12	27-Jan-22 16	0d	0d	0d
OZ1100	Create Draft of Bid Doc	0%	6d	6d	29-Dec-21 12	07-Jan-22 12	10d 4h	10d 4h	1d 4h
OZ1110	Review Bid Document	0%	2d	2d	24-Jan-22 08	25-Jan-22 16	0d	0d	0d
OZ1120	Finalise and Submit Bid	0%	2d	2d	26-Jan-22 08	27-Jan-22 16	0d	0d	0d
OZ1130	Bid Document Submitt	0%	0d	0d		27-Jan-22 16*	0d	0d	0d

11. The situation of having durations that are not round days is often not desirable and may be prevented by using Physical % Complete and entering the Remaining Duration in whole days.
12. Save the layout as **OzBuild Workshop 14 –Baseline Comparison**.

17 USER AND ADMINISTRATION PREFERENCES

This chapter will look at the following topics:

- User Preferences
- Admin menu, not displayed when opening an EPPM database
- Admin Preferences, not displayed when opening an EPPM database
- Admin Categories, not displayed when opening an EPPM database
- Miscellaneous Defaults, Set Default Project and Language

Functions that are not displayed when opening an EPPM database are accessed with the EPPM Web tool.

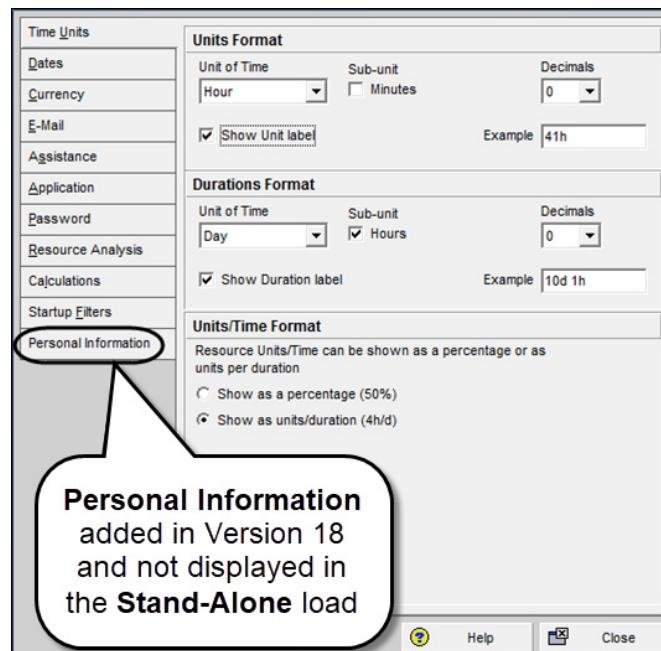
17.1 User Preferences

Select **Edit, User Preferences...** to open the **User Preferences** form.

This form is used to set up a number of user defined parameters, which will determine how data is displayed.

The **User Preferences** form may also be opened by right-clicking in the right side of the bottom views when the **Resource Usage Spreadsheet** or **Resource Usage Profile** are displayed.

The **Stand-Alone** version does not have the **Personal Information** tab as it does not have users.



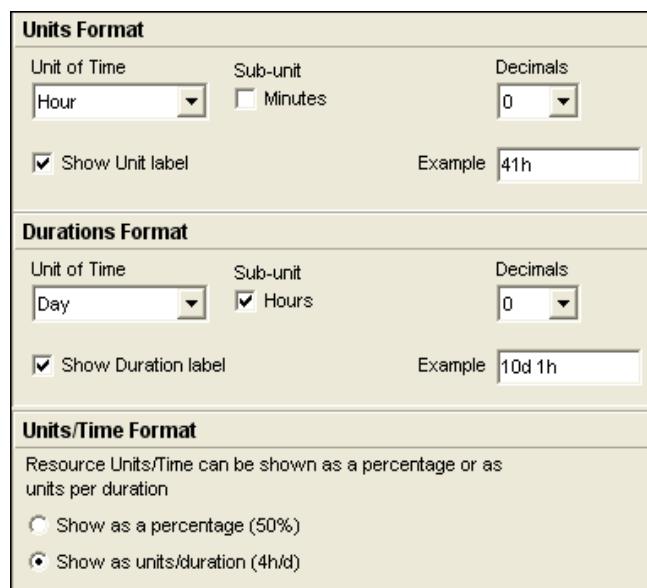
17.1.1 Time Units Tab

The **Units Format** section of the tab is used to define the **Unit of Time** format that resource information and resource assignments are displayed with, e.g., days or hours.

The **Durations Format** section of the tab is used to define the **Unit of Time** format that activity durations are displayed with, e.g., days or hours.



The picture to the right shows the author's recommended settings.



The **Units/Time Format** section of the form enables the Microsoft Project-type formatting options of **Resource/Time Format** to show Resource utilization as a percentage (50%) or as units per duration (4h/d). Therefore, there are several options here; for example, three people assigned to an activity may be displayed in many formats including:

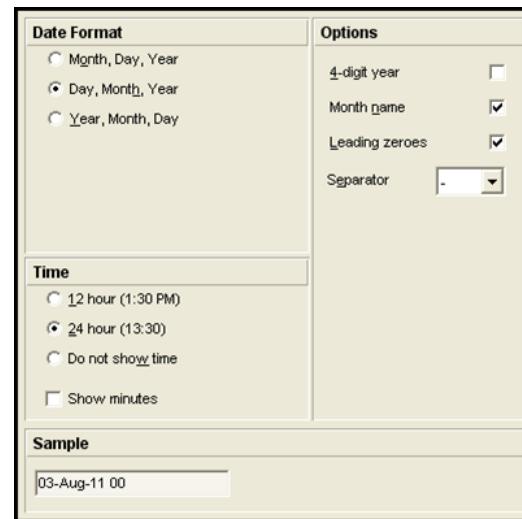
- 300%
- 24h/d
- 3d/d
- 3h/h

17.1.2 Dates Tab

The **Dates** tab is self-explanatory and is used to format the display of dates and time.

NOTE: It is not possible to display the years with 2 characters or hide the year and there always has to be a date separator, thus leading to wider date columns than otherwise could be achieved. It is also not possible to display the days in characters such as Mon or Monday with the date.

 The picture to the right shows the author's recommended settings. People in the US may wish to use their local **Date Format**.



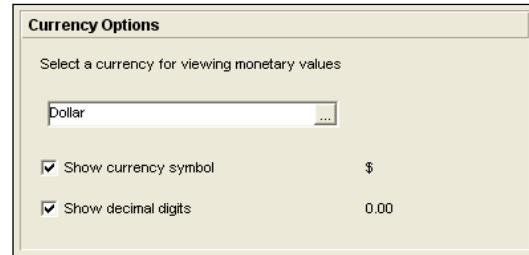
 The author recommends that the **Time** should always be displayed so a user may see what time Primavera has selected when assigning Actual dates, Constraint dates, Suspend and Resume dates. Often Primavera selects 00:00, which is midnight on the morning of the selected date.

The author recommends that the **Month** name should always be displayed to avoid confusion between the US date format of mm/dd/yy and the ROW (Rest of World) format of dd/mm/yy.

17.1.3 Currency Tab

The **Currency Options** tab selects the currency symbol used to display costs.

The **Currencies** form, available from the **Admin** menu item, is used to define the Base Currency. All costs are stored in the **Base Currency** and all other **Currencies** are calculated values using the **Base Currency** value and conversion rate.



 It is possible to have two currencies with the same symbol and if a user selects a different currency then all costs displayed by the user will be converted to a different value.

This option must be carefully monitored and if you do not need multiple currencies then it is suggested that you should delete all but one currency, to avoid any possible problems. If you are using multiple currencies, then make sure that all have a different sign so there is no confusion.

17.1.4 E-Mail Tab

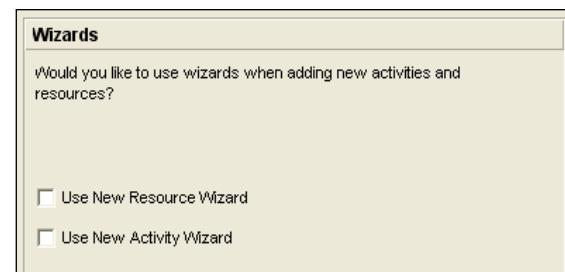
The **E-mail Protocol** tab sets up the current user's E-mail system.



17.1.5 Assistance Tab

The **Assistance** tab specifies which wizards are run when creating **Resources** and **Activities**.

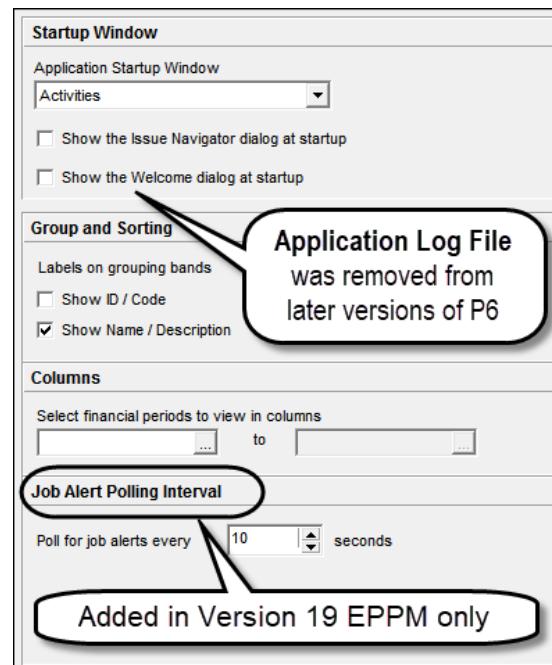
NOTE: It is suggested to turn both off as it is quicker to type the information straight into the required fields when you know how to use the software.



17.1.6 Application Tab

Startup Window

- **Application Startup Window** specifies which Primavera window is displayed when the software is started.
 - If you work in the same project all the time, then set this to **Activities** and do not close the project when closing Primavera. The next time you open Primavera you will be taken to your project in the **Activities Window**.
 - If you work in different projects all the time, then select **Projects** and you will be taken to the **Projects Window**.



- **Show the Issue Navigator dialog at startup** should only be checked if you wish to view the Issues when the software starts.
- **Show the Welcome dialog at startup** displays a Welcome dialog box on startup and would not usually be displayed as it slows down the user's access to the software.

Application Log File – Removed from later versions of P6 and the **Write trace of internal functions to log file** creates a log of all data entries titled ERRORS LOG. This would be used by support staff and should not be turned on unless requested by support staff.

Group and Sorting

- This specifies what information is displayed in the bands; one or both options of Description or Code may be selected. This setting is effective in situations where a Group and Sort form is not available, such as the **Predecessor** and **Successors** forms.
- Primavera Version 5.0 introduced a function titled **Reorganize Automatically**: this was removed in Version 8.1 and replaced by the **Auto-Reorganization** command.

Columns

- Primavera Version 5.0 introduced **Financial Periods** where the periods that may be displayed in columns is specified.

Job Alert Polling

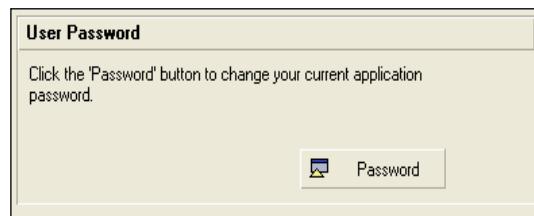
Some operations like copy and paste a project are now carried out as background jobs and when you open an EEPM database this option sets how often the database is checked and will inform the user if a process has finished or failed.

- i** When many Financial Periods have been created, you may have to scroll down hundreds of rows to find a data field in forms such as the **Filter** form. You should limit the number of Financial Periods that are displayed to those that are currently being used.

17.1.7 Password Tab

The **User Password** tab is used to change the user password. It is not available to the Administrator.

The **Admin, Admin Preferences..., General** tab has an option for your corporate Password Policy.



17.1.8 Resource Analysis Tab

The **Resource Analysis** tab has two sections:

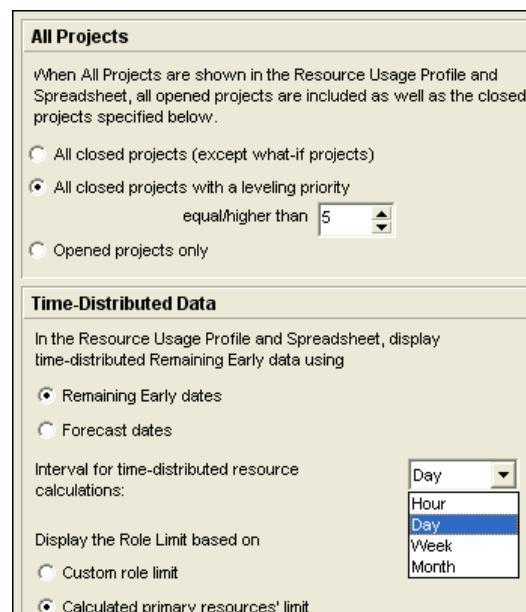
All Projects

- The **All Projects** option specifies which projects are used to calculate the Resources Remaining Values in **Resource Usage Profiles**.

NOTE: Projects must be Summarized for this function to operate.

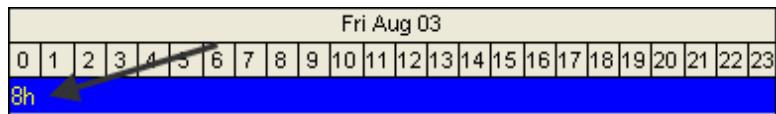
Time-Distributed Data

- It is possible to drag a project forward or backwards in time in the **Tracking Window** or **Portfolio Analysis**. This action creates a new set of dates titled **Forecast dates**. The **Resource Usage Profile** and **Resource Usage Spreadsheet** may be calculated using either the Current Schedule **Remaining Early Dates** or the revised **Forecast dates**.



- Interval for time-distributed resource calculations:** This option determines the time increment for displaying the Resource Usage Profile and Resource Usage Spreadsheet data.

When this is set to days and you display time-distributed data in hours, all the hours will be displayed on the first hour:



Selecting hours will spread the resource where they are scheduled but this consumes computer resources.



The **Interval for time-distributed resource calculations:** must be equal to or smaller than the timescale or the resource data will be displayed in the first time increment of the timescale and not distributed over the whole time period.

- Display the Role limit based on** – Primavera introduced **Role Limits** in Version 6.0 and this enables options for displaying the **Role Limits** in **Resource Profiles**. For example a role may have been defined a limit of six resources but only have four Resources assigned to the Role. This option allows you to decide if you wish to display a limit of four based on the resources available or six based on the limit assigned to the Role.

17.1.9 Calculations Tab



IT IS IMPORTANT TO UNDERSTAND THIS OPTION.

The **Calculations** tab, Resource Assignments section has two options:

- Preserve the Units, Duration, and Units/Time for existing assignments.** With this option, as Resources are added or deleted the total number of hours assigned to an Activity increases or decreases. The hours assigned for each resource are calculated independently.
- Recalculate the Units, Duration, and Units/Time for existing assignments based on the activity Duration Type.** The total number of hours assigned to an activity will stay constant as second and subsequent resources are added or removed from an Activity, except when the Duration Type is **Fixed Duration and Units/Time**.

Resource Assignments
When adding or removing multiple resource assignments on activities
<input checked="" type="radio"/> Preserve the Units, Duration, and Units/Time for existing assignments <input type="radio"/> Recalculate the Units, Duration, and Units/Time for existing assignments based on the activity Duration Type
Assignment Staffing
When assigning a resource to an existing activity assignment:
<input checked="" type="radio"/> Always use the new resource's Units per Time and Overtime factor <input type="radio"/> Always use current assignment's Units per Time and Overtime factor <input type="radio"/> Ask me to select each time I assign
When a resource and role share an activity assignment:
<input type="radio"/> Always use resource's Price per Unit <input type="radio"/> Always use role's Price per Unit <input checked="" type="radio"/> Ask me to select each time I assign
Dissolving Activities
<input checked="" type="checkbox"/> Retain Lag

Recalculate the Units, Duration, and Units/Time for existing assignments based on the activity Duration Type is similar to making an activity Effort Driven in Microsoft Project.



With this option as you assign or remove resources to or from an activity the total number of hours of work stay constant and the work is divided amongst all the resources.

Thus, assigning resources will reduce the work for each resource and either the activity duration will reduce or the Units per Time Period for each resource assignment will reduce. This calculation is dependent on the Duration Type.

The author prefers as a default **Preserve the Units, Duration, and Units/Time for existing assignments**. In this situation each resource work is independent on other resources assigned to an activity.

- **Assignment Staffing** are new functions to Primavera Version 5.0 options available on the **Calculations** tab of the **User Options** form allowing the user to set the defaults for:
 - Selecting the Units per Time when assigning a substitute resource to an existing resource assignment.
 - Selecting the Price per Unit for a resource which is being assigned to a Role.

The options are to select the existing resource, the new resource, or to be prompted each time a resource/role is substituted.

Dissolving Activities, Retain Lag was new to P6 Version 19 and this function introduced the ability to retain lag when dissolving activities. When **Retain Lag** is selected from the **User Preferences, Calculations** tab, the dissolved activities predecessor and successor lags are be added to the new relationship.

17.1.10 Startup Filters Tab

The **Startup Filters** option enables the selection of filters for Resources, Roles, OBS, Activity Codes and Cost Accounts, which may be applied to the current project or to all data.

You may find when you open up a window, such as the **Resources Window**, that no data is displayed. This may be due to the settings in this tab.

ACTION: The author recommends selecting **View all data (No Filter)** so you will not end up with a blank screen when you open windows such as the **Resources Window**.

Resource Summary data should be checked if a user wishes to view summarized resource spread data after a project is Summarized. This data is viewed in the **Tracking** window.

Startup Filters		
Choose the default filters to start the application. If you choose to view all data the application may take longer to start. These filters can be modified in the individual views.		
	Current project	View all data (No Filter)
<input type="checkbox"/> Resources	<input type="radio"/>	<input checked="" type="radio"/>
<input type="checkbox"/> Roles	<input type="radio"/>	<input checked="" type="radio"/>
<input type="checkbox"/> OBS	<input type="radio"/>	<input checked="" type="radio"/>
<input type="checkbox"/> Activity Codes	<input type="radio"/>	<input checked="" type="radio"/>
<input type="checkbox"/> Cost Accounts	<input type="radio"/>	<input checked="" type="radio"/>
Use the following setting to determine whether this type of data will load at startup. If you choose to load the data, the application may take longer to start and some views may take longer to load. If using a P6 Professional database, this setting will also affect whether to use resource and role data during summarization.		
<input checked="" type="checkbox"/> Resource Summary data		

17.1.11 Personal Information Tab

The **Personal Information** tab is new to P6 Version 18 and displays your personally identifiable information (PII) that the administrator enters when the user was created.

This information is available from the **Admin** menu when a PPM database is opened. The Admin menu has been removed when the user opens an EPPM database and this tab enables users to see their Personal Information without requiring access to the Web client.

This personal information may be exported with project data and this function was introduced at the same time as **Admin Preferences**, **Consent Notice** functions.

Personal Information

Login Name
harrispe

Personal Name
Paul E Harris

Phone
+61 (0)41 118 7701

Email
harrispe@eh.com.au

Associated Resource
Paul E Harris

Forget User Acceptance

Your personal information is updated by User Admin. You may get in touch with User Admin to update it.

17.2 Admin Menu- Create Users

The links between Users, OBS, and Projects is covered in more detail in the **Managing the Enterprise Environment** chapter. This module is an introduction to the contents of the Admin Menu.

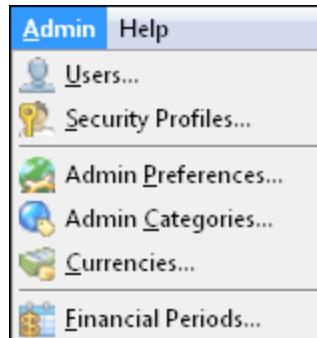
The Admin menu is available in P6 Professional but has been removed from the P6 Optional Client and has to be accessed through the Web module when using the Optional Client.

A **Stand-Alone** version does not have the ability to create users and thus does not have **Users** and **Security Profiles** menu items.

P6 Professional

The **Admin** command opens the **Admin** form.

Depending on how Primavera has been installed and your access rights set, you may or may not have access to some or all of these menus.



P6 Optional Client Version 16, 17 & 18

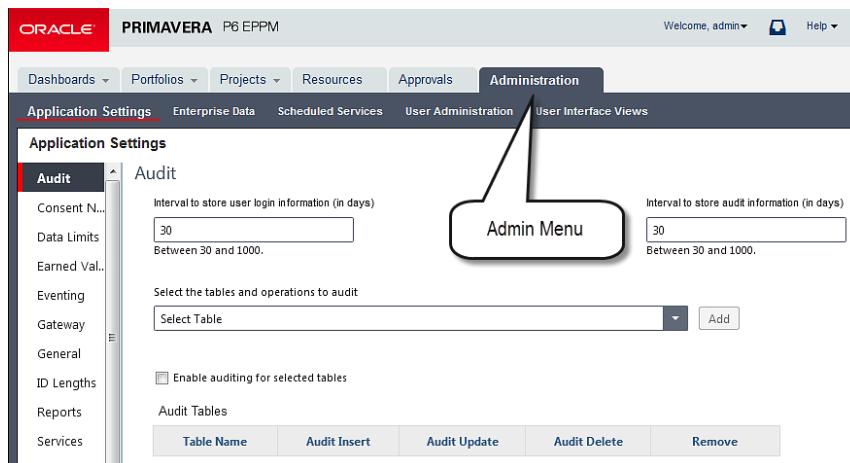
The P6 EPPM Web **Administer** menu is where the Admin commands are located and these are all very similar to the Professional Client.

The EPPM Web commands will not be covered in this book but they operate in exactly the same way.

The P6 Version 16 Administer menu is shown on the left and Version 17 and 18 below:



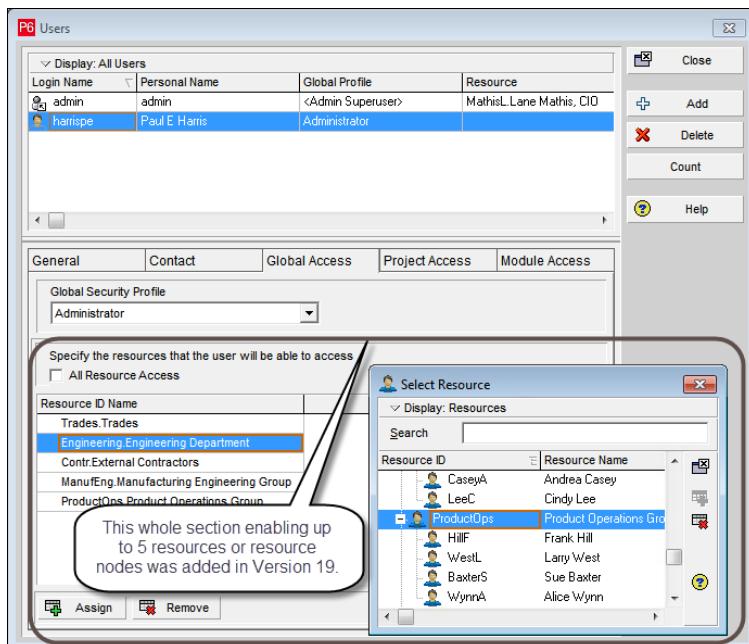
Version 17, 18 and 19



17.2.1 Users

The **Users** form is used to add and delete system users. The following information may be recorded:

- **General tab:** The Personal Name (the person's name), Login Name, Password and the Users Resource ID in the **Resources Window**.
- **Contact tab:** The person's telephone number and e-mail.
- **Global Access tab:** The Global information a user may change is specified here by assigning a **Global Profile**.



The **Global Access** tab is the location where user access to resources may be restricted. Earlier versions only allowed one resource or resource node to be assigned to a user. P6 Version 19 introduced the ability to allow a user to be assigned up to five resources or resource nodes when defining resource access. A user may view and assign the selected resources and the child resources from resources assigned here:

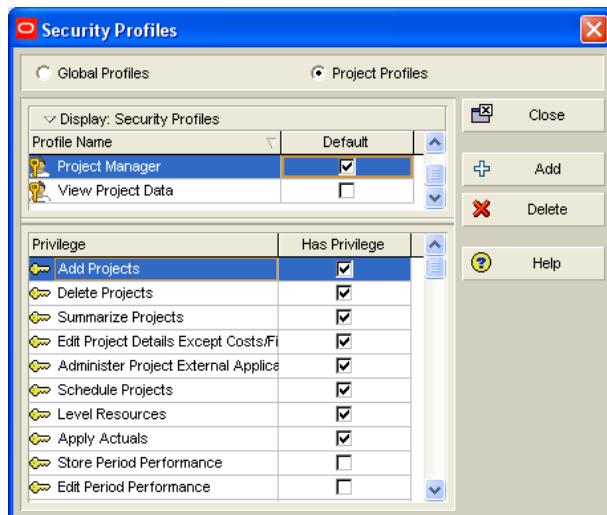
- **Project Access tab:** This is where the **User** is assigned to one or more OBS Nodes and may only access Projects associated with those OBS Nodes. The level of user access to is projects controlled by the designated **Security Profile**.
- **Module Access tab:** This is where a person is assigned a license. A license needs to be assigned before the person may operate the system.

The User may also be assigned to an OBS Node in the **Organizational Breakdown Structure** form.

17.2.2 Security Profiles

The **Security Profiles** form is used to set up security.

- **Global Profile and Project Profiles** may be established in this form.
- **Global Profiles** are created and/or edited to enable access to specific Enterprise functions and are assigned to users.
- **Project Profiles** are created and/or edited to enable access to specific Project functions.
- A **Project Profile** is assigned to a user when they are assigned to one or more **Organization Breakdown Structure** Nodes.
- A different **Project Profile** may be assigned to each user for each OBS Node, but an EPS Node and Projects may only be assigned to one OBS Node.



It is critical that the **Security Profiles** be carefully evaluated and each person assigned an appropriate level.

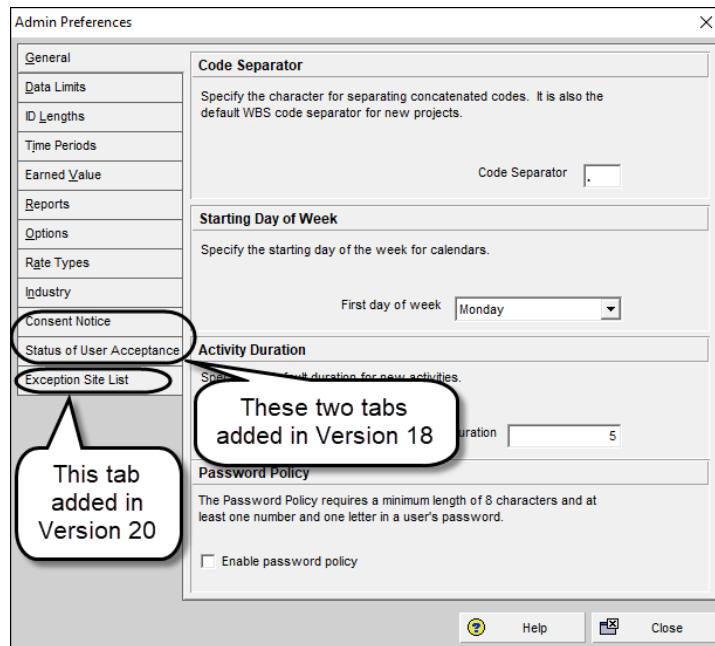
No one except the Administrator/s should be able to delete critical data such as project and EPS Nodes.

17.3 Admin Preferences

This form sets the default preferences for Primavera.

The **Admin Preferences** form has a number of tabs, which will be covered in more detail in the next section of this chapter.

If you do not have access to the **Admin Preferences**, then these options would have been set up by the system administrator for your organization.



Some preferences may only be changed in this form. Items described as **defaults** may also be changed in other windows.

Select **Admin, Admin Preferences...** to open the **Admin Preferences** form.

17.3.1 General Tab

- **Code Separator** sets the default separator for new project WBS Codes and other codes such as Cost Accounts. The **Code Separator** may also be set for each project in the **Project Window, Setting** tab.
- **Starting Day of Week** sets the **First day of week** that is shown on the timescale and the left column of calendars.
- **Activity Duration** sets the default Activity duration for new activities.
- **Password Policy**, introduced in Version 6.2, allows the requirement for a password of a minimum of 8 characters including a letter and number.

Code Separator
Specify the character for separating concatenated codes. It is also the default WBS code separator for new projects.
Code Separator: ,

Starting Day of Week
Specify the starting day of the week for calendars.
First day of week: Monday

Activity Duration
Specify the default duration for new activities.
Default Duration: 5d

Password Policy
The Password Policy requires a minimum length of 8 characters and at least one number and one letter in a user's password.
 Enable password policy



The default is usually Sunday and should be changed to a Monday, which results in the calendar day in the timescale representing a working day, which is often a lot more useful than a nonwork day date.

17.3.2 Timesheets Tab

The **Timesheets** tab was removed in Version 8.1 Professional, but is available in the Web application.

17.3.3 Data Limits Tab

The **Data Limits** tab specifies:

- The maximum number of levels allowed in all hierarchical code structures,
- The maximum number of Activity Codes per project, and
- The maximum number of Baselines per project.

Primavera Version 6.0 added the **Maximum baselines copied with project**.

Level Type	Maximum Value
EPS/WBS tree maximum levels	10
OBS tree maximum levels	10
Resources tree maximum levels	10
Role tree maximum levels	20
Cost Account tree maximum levels	10
Activity Code tree maximum levels	10
Resource Code tree maximum levels	20
Project Code tree maximum levels	10
Maximum activity codes per project	10
Maximum baselines per project	500
Maximum baselines copied with project	50

17.3.4 ID Lengths Tab

The **ID Lengths** tab specifies the maximum number of characters in the Code ID fields, not the Code Description.

Field Type	Maximum Characters
Project ID maximum characters	20
WBS Code maximum characters	20
Resource ID maximum characters	20
Activity ID maximum characters	20
Cost Account ID maximum characters	20
Role ID maximum characters	20

17.3.5 Time Periods Tab

- **Hours per Time Period** values are used to convert from one time period Unit to another, for example, from days to hours. Therefore, a 40 hours activity would be calculated as 5-day with the setting displayed in the picture.
- **NOTE:** It is important that these conversions are understood. Please refer to the **Calendar** chapter for more details.

Hours per Time Period			
Specify the number of work hours for each time period.			
Hours/Day	Hours/Week	Hours/Month	Hours/Year
<input type="text" value="8.0"/>	<input type="text" value="40.0"/>	<input type="text" value="172.0"/>	<input type="text" value="2000.0"/>
<input checked="" type="checkbox"/> Use assigned calendar to specify the number of work hours for each time period			
Time Period Abbreviations			
Specify the abbreviation for each time period.			
Minutes	Hours	Days	
<input type="text" value="n"/>	<input type="text" value="h"/>	<input type="text" value="d"/>	
Weeks	Months	Years	
<input type="text" value="w"/>	<input type="text" value="m"/>	<input type="text" value="y"/>	

- Checking **Use assigned calendar to specify the number of work hours for each time period** enables users to edit the **Hours per Time Period** in each calendar.



It is very important when multiple calendars with different hours per day are being used that this check box is checked and the user correctly sets the **Hours per Time Period** in each calendar.

- **Time Period Abbreviations** are used to indicate the display durations.

17.3.6 Earned Value Tab

See the **Earned Value** chapter for more information.

This tab sets the WBS defaults for calculating Earned Value and may be changed individually for each WBS and apply to all activities within each WBS Node.

- The **Technique for computing performance percent complete** selects the formula for calculating the Earned Value.
- The **Technique for computing Estimate to Complete (ETC)** selects the formula for calculating the ETC. The ETC is a calculated field and is independent of the **At Completion Fields** but may contain the same value.
- **Earned value calculations** selects some options for calculating the Earned Value and displaying the Baseline Bar. The Primavera default is usually set to **Budgeted Values with Planned Dates**. This setting must never be used and please read the warning below.

Technique for computing performance percent complete	
<input type="radio"/> Activity % Complete	<input checked="" type="radio"/> 50/50 % Complete
<input type="radio"/> Use WBS Milestones	<input type="radio"/> Custom % Complete
<input type="radio"/> 0/100 % Complete	<input type="button" value="4"/>
Technique for computing Estimate to Complete (ETC)	
<input checked="" type="radio"/> ETC = remaining cost for activity	
or	
ETC = PF * (Budget at Completion - Earned Value), where:	
<input type="radio"/> PF = 1	
<input type="radio"/> PF = 1 / Cost Performance Index	
<input type="radio"/> PF = 1 / (Cost Performance Index * Schedule Performance Index)	
<input type="radio"/> PF = <input type="text" value="0.88"/>	
Earned value calculation	
When calculating earned value from a baseline use	
<input type="button" value="At Completion values with current dates"/>	



It is very important that users read the sections on Planned Dates as leaving the setting at **Budgeted Values with Planned Dates** will result in the risk that all in-progress Baselines may display irrelevant dates as Baseline dates.

17.3.7 Reports Tab

The **Report Headers and Footers** form sets the default labels for reports.

These may also be accessed in printouts.

Report Headers and Footers

Specify three sets of header, footer, and custom labels to place on application reports.

First Set Second Set Third Set

Header Label 1
Header 1

Footer Label 1
Oracle Primavera

Custom Label 1
User Variable 1

17.3.8 Options Tab

- The **Specify the interval to summarize and store resource spreads** tab sets the time period, such as week or month, for storing Summarized activity data at WBS and Resource/Role Assignment Levels vied in the **Tracking window**.
- The **Project Architect** and **Web Access Server URL** check boxes were removed from the Professional Client.
- **Enable Link to Contract Management** Module (originally called Expedition) enables linking to this module when installed, removed in Version 19.
- **Professional Online Help URL** sets the URL for accessing help and should not normally be changed, unless your company has produced its own help files.
- In P6 Version 20 You may prevent people from uploading harmful files in the **Admin Preferences, Options, Document Security** by listing the file types users may not upload.

Version 18

Specify the interval to summarize and store resource spreads

Select summarization periods

By calendar

WBS Level Week

Resource/Role Assignment Level Week

By financial period

Contract Management URL

Enable Link to Contract Management

P6 Professional Online Help URL

https://docs.oracle.com/cd/E90748_01/client_help/

Always launch Online Help for the F1 shortcut key and context-sensitive help

Version 20

Specify the interval to summarize and store resource spreads

Select summarization periods

By calendar

WBS Level Week

Resource/Role Assignment Level Week

By financial period

P6 Professional Online Help URL

https://docs.oracle.com/cd/F25600_01/client_help/

Always launch Online Help for the F1 shortcut key and context-sensitive help

Document Security

Show security warning when launching these types of files.

.exe, .com, .bat, .cmd, .vbs, .js, .msi

17.3.9 Rate Types Tab

Primavera has five resource rates types and the **Resource Rate Types** form enables you to rename the titles of the rates. You may have, for example, rates for:

- Internal consulting,
- External consulting,
- Preparing evidence, and
- Giving evidence.

Resource and Role Rate Types	
Specify titles for Resource and Role Rate Types.	
Default Title	User-defined Title
 cost_per_qty	Standard Rate
 cost_per_qty2	Internal Rate
 cost_per_qty3	External Rate
 cost_per_qty4	Do Not Use 4
 cost_per_qty5	Do Not Use 5



In the building and construction industries a resource pool is created for each project and only one resource rate is used. In this situation it is recommended that the administrator renames the **cost_per_qty2** to **cost_per_qty4** to **DO NOT USE 2** to **DO NOT USE 4** to ensure there is no confusion about which rate to use on projects, especially when a project is created and a rate has to be selected when running the Create New Project wizard

17.3.10 Industry Tab

The Industry Type determines the terminology used in some fields. In earlier versions this was set when the software was loaded. It may now be set Admin, Admin Preferences..., Industry tab.

You will need to restart P6 for a change to take effect:

Industry Selection	
The industry you choose will determine terminology and default settings for calculations in the software that most closely align with the selected industry.	
<input checked="" type="radio"/>	Engineering and Construction
<input type="radio"/>	Government, Aerospace and Defense
<input type="radio"/>	High-Technology, Manufacturing and Others
<input type="radio"/>	Utilities, Oil and Gas

The following table displays the terminology:

Industry Type	Terminology	Name of Project Comparison Tool
Engineering and Construction	Budgeted Units & Cost Original Duration	Claim Digger
Government, Aerospace, and Defense	Planned Units & Cost Planned Duration	Schedule Comparison
High-Technology, Manufacturing and Others	Planned Units & Cost Planned Duration	Schedule Comparison
Utilities, Oil, and Gas	Budgeted Units & Cost Original Duration	Claim Digger

Engineering and Construction:

Status		Activity EC1490		Rough-In Phase Begins		Project EC00515-1	
Duration		Status		Labor Units			
Original	0	Started	12-Mar-12	Physical %	0%	Budgeted	0
Actual	0	Finished		Suspend		Actual	0
Remaining	0	Exp Finish		Resume		Remaining	0
At Complete	0					At Complete	0

Government, Aerospace, and Defense:

Status		Activity EC1490		Rough-In Phase Begins		Project EC00515-1	
Duration		Status		Labor Units			
Planned	0	Started	12-Mar-12	Physical %	0%	Planned	0
Actual	0	Finished		Suspend		Actual	0
Remaining	0	Exp Finish		Resume		Remaining	0
At Complete	0					At Complete	0

17.3.11 Consent Notice

Consent notices alert users to any corporate policies designed to protect personally identifiable information that may be stored or transmitted when using P6.

There are five **Consent Notices** that may be enabled and each notice may be edited as required:

- [Add resources consent notice](#)
- [Add users consent notice](#)
- [Download data consent notice](#)
- [Login page consent notice](#)
- [Visualizer login consent notice](#)

The consent notice should be created to reflect corporate policies and/or government regulations.

A **Consent Notice** is displayed when a user first operates one of the functions enabled as a Consent Notice. The user must accept the consent notice before being allowed to progress.

Consent Notice

Consent Type

Add resources consent notice

Enable consent notice

Consent Notice Message

The company policy is not to add any personal information when creating a resource in the Resource window which includes personal email, phone or home address and age.

Modify Print Copy

Preview

Add Resources Consent Notice

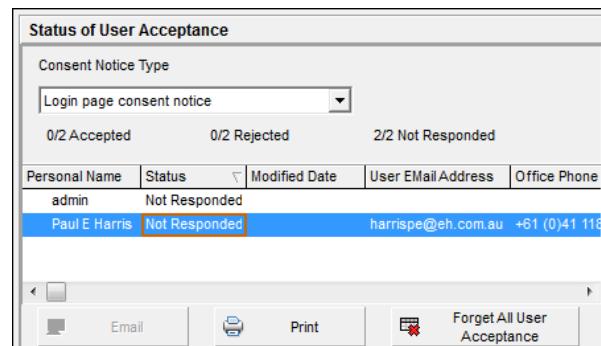
Please read the following agreement:

The company policy is not to add any personal information when creating a resource in the Resource window which includes personal email, phone or home address and age.

Reject Accept

17.3.12 Status of User Acceptance

This tab shows how many **Consent Notices** have been displayed and accepted by users

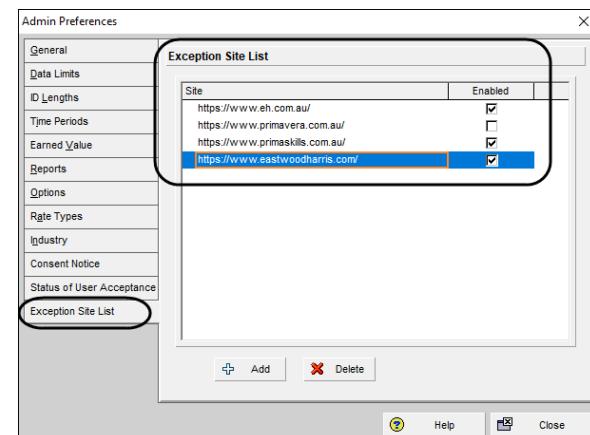


17.3.13 Exception Site List

In P6 Version 20 a list of web sites may be added to **Admin Preferences**, **Options**, **Exception Site List**.

The URLs may then be added to Notebook Topics and UDFs and permitted URLs may be launched from P6 by clicking on the URL and selecting Launch.

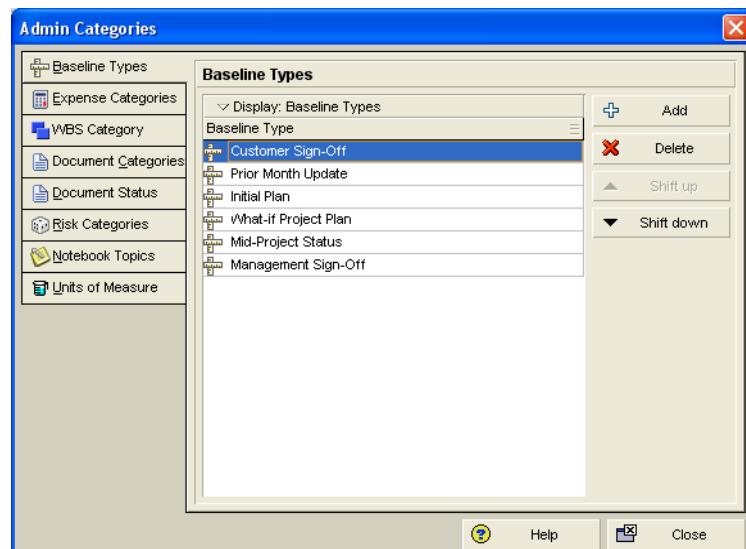
Other URLs in P6 fields may be copied and pasted into a browser but not run from P6.



17.4 Admin Categories

The **Admin**, **Admin Categories** form is where the global data items are defined. This form is self-explanatory and will not be explained in detail. The following categories are defined:

- Baseline Types
- Expense Categories
- WBS Categories
- Document Categories
- Document Status
- Risk Categories
- Notebook Topics
- Units of Measure – for Material Resources



The WBS Category defines a set of codes that may be assigned to WBS Nodes allowing the WBS structure to be reorganized under a different set of codes.

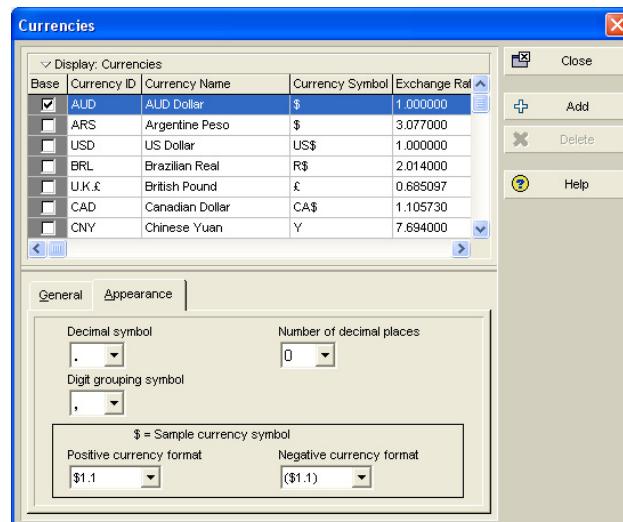
17.5 Miscellaneous Defaults

17.5.1 Currencies

The **Currencies** form is used to define system currencies. Currency fields are:

- **Currency ID**
- **Currency Name**
- **Currency Symbol**
- **Exchange Rate**

To make the Base currency into your country's currency you will need to edit the **Currency ID** and **Currency Symbol** as the first currency is permanently checked.



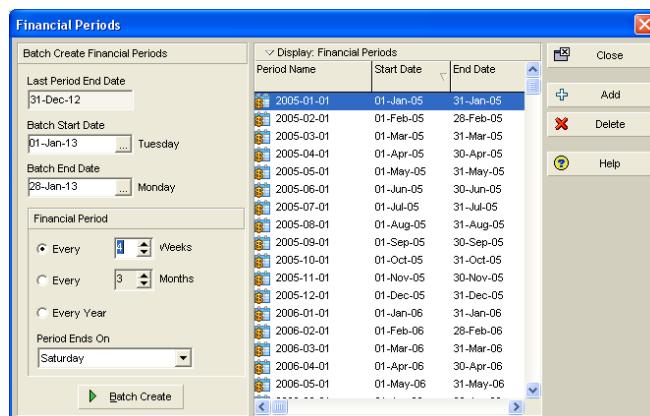
See the warning under **Currency** earlier in this chapter. The author recommends that all unwanted currencies are deleted and make all **Currency Symbols** unique.

17.5.2 Financial Periods and Financial Period Calendars

This is where the Financial Periods associated with Storing Period Performance are created.

Additional functionality was added in P6 Version 20 allowing different project to have different Financial Periods and the function was renamed **Financial Period Calendars**.

For details on this function see the section on Store Period Performance in the **Earned Value** chapter.



Financial Periods have to be used when it is important to have data that reflects how much work was completed or costs spent in each period and not just averaged over the periods to date. Period data is often used to create S-Curves.

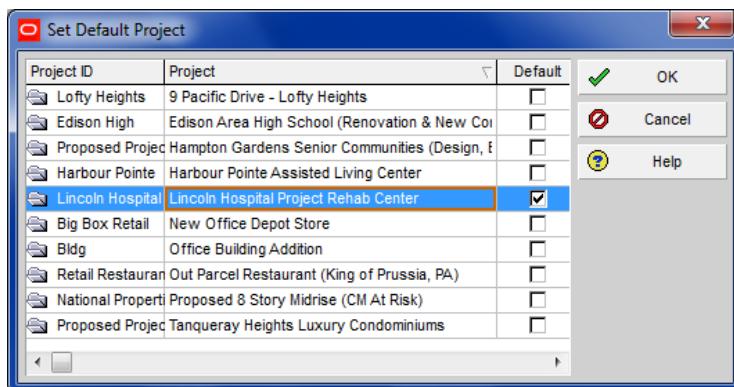
17.5.3 Timesheet Dates

This option has been removed from P6 Professional. **Timesheets** may be managed in the Web application.

17.5.4 Default Project

Select **Project, Set Default Project...** to open the **Set Default Project** form. When multiple projects are opened the default project's settings are used to:

- Schedule and level all open projects.
- New data items, such as issues, are assigned to the default project when they are added to the database.



When multiple projects are scheduled all the Schedule Options of all the projects are changed to the **Default Project**. This issue must be well thought through by the Database Administrator and is covered in more detail in the **Multiple Project Scheduling** chapter.

17.6 Set Language

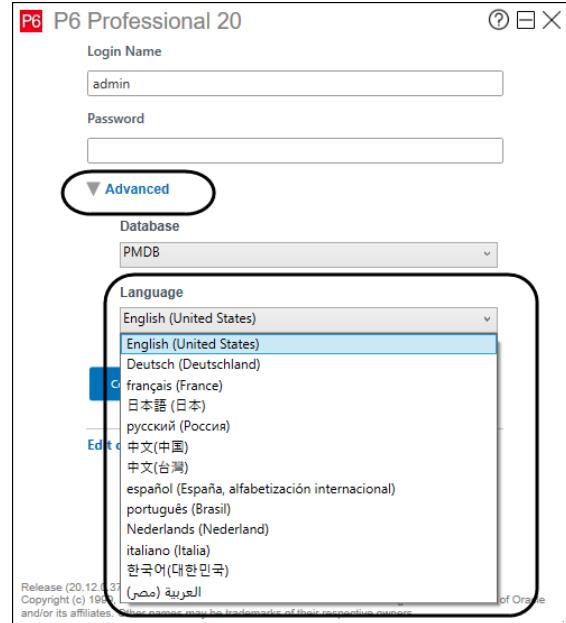
In P6 Version 15.1 select **Tools, Set Language...** to open the **Set Language** form and select the language that the column headers and menu items are displayed in.



P6 Version 15.2 move the selection of the menu language from the **Tools** menu to the **Login screen**.

Both P6 Version 18 and 20 changed the Login screen format but the content remains the same. Supported languages are:

- English
- French
- German
- Simplified Chinese
- Traditional Chinese
- Russian
- Japanese
- Spanish
- Brazilian Portuguese
- Italian
- P6 Version 20 added Arabic



Note: The menus are in the nominated language but in some P6 versions some languages are not translated in the Help.

18 CREATING ROLES AND RESOURCES

Traditionally, planning and scheduling software defines a **Resource** as something or someone that is required to complete the activity and sometimes has limited availability. This includes people or groups of people, materials, equipment and money.

Primavera is able to assign Costs, a Calendar, one or more Roles and some personal information to a **Resource**.

Primavera has a function titled **Roles**. A Role is normally used at the planning stage of a project and represents a skill or position. Later, and before the activity begins, a Role would be filled by assigning a specific individual who would be defined as a Resource. Roles may be assigned to both Resources and Activities. A search by Role may be conducted on all the Resources when it is required to replace an Activity-Assigned Role with an individual from the Resource pool. Primavera allows rates to be assigned to Roles.

There are a large number of resource functions available in Primavera. Without getting into too much detail, this publication will outline the important resource-related functions that will enable you to create and assign Roles and Resources to your schedules.

This chapter will concentrate on:

Topic	Menu Command
Creating Roles	Select <u>Enterprise</u> , <u>Roles</u> ... to open the Roles form.
Creating Resources	Open the Resources Window : <ul style="list-style-type: none"> • Select Enterprise, Resources, or • Click on the  icon on the Enterprise toolbar.
Editing Resource Calendars	Select <u>Enterprise</u> , <u>Calendars</u> ... to open the Calendars form.

The following steps should be followed to create and use resources in a Primavera schedule:

- Create the resources in the **Resources Window**.
- Create the **Roles**, if required, in the **Roles** form.
- Assign Resources to Roles from either the **Resources Window** or the **Roles** form.
- Manipulate the Resource Calendars if resources have special timing requirements.

18.1 Understanding Resources and Roles

There are typically two methods of using the Resource function for resource planning:

- Individual Resources, and
- Group Resources

18.1.1 Individual Resources

These resources are individual people who are often responsible for completing the activity or activities to which they have been assigned. They are identified by name in P6.

This is typically work undertaken in an office environment, such as an IT development project, where timesheets are often completed by the people undertaking the work and the timesheet system is directly linked to the scheduling system.

In this situation, the updating of Activities that are in-progress is completed by the person assigned as a Resource to an Activity, often via the timesheet system, and the scheduler has a review function in the project updating.

18.1.2 Group Resources

These resources represent groups of people, such as trades or disciplines on a construction site. Very large projects gangs or crews, which would be made up of equipment and a number of different trades, could also be considered. The person responsible for the work is not a resource assigned to an activity and individual people doing the work will not be assigning their timesheets directly to activities in the schedule.

Also, in this environment the scheduler normally updates the activities and the resources. In this situation it is recommended that a minimum number of resources be assigned to activities. This is because every resource added to the schedule will need to be updated and as more resources are added, the scheduler's workload will increase.

Resource minimization simplifies a schedule and makes it easier to manage large schedules. This is achieved by not cluttering the schedule with resources that are in plentiful supply or are of little importance, and/or by grouping trades or disciplines into crews and gangs on large projects.

When Group Resources are used the Role function tends to become redundant but could be used to plan the contractor type and/or the actual contractor to be used on the project.

18.1.3 Input and Output Resources

When you create your resources, you may also consider them within the context of the following headings:

- **Input Resources** – These resources are required to complete the work and represent the project costs:
 - Individual people by name.
 - Groups of people by trade, discipline, or skill.
 - Individual equipment or machinery by name.
 - Groups of equipment or machinery by type.
 - Groups of resources such as Crews, Gangs, or Teams made up of equipment and machinery.
 - Materials.
 - Money.

Output Resources – These could be the project deliverables or outcomes and could have a direct relationship to the project income:

- Specifications completed.
- Bricks laid.
- Tons/Tonnes of material loaded with an excavator.
- Lines of code written.
- Tests completed.

This type of resource is often used in the mining environment where the output in tones/tonnes or volume is scheduled and/or leveled.

The analysis of and difference between the Input and the Output resources' value and timing may be used to represent the Cash Flow, Cash Position and Project Profit (or loss).

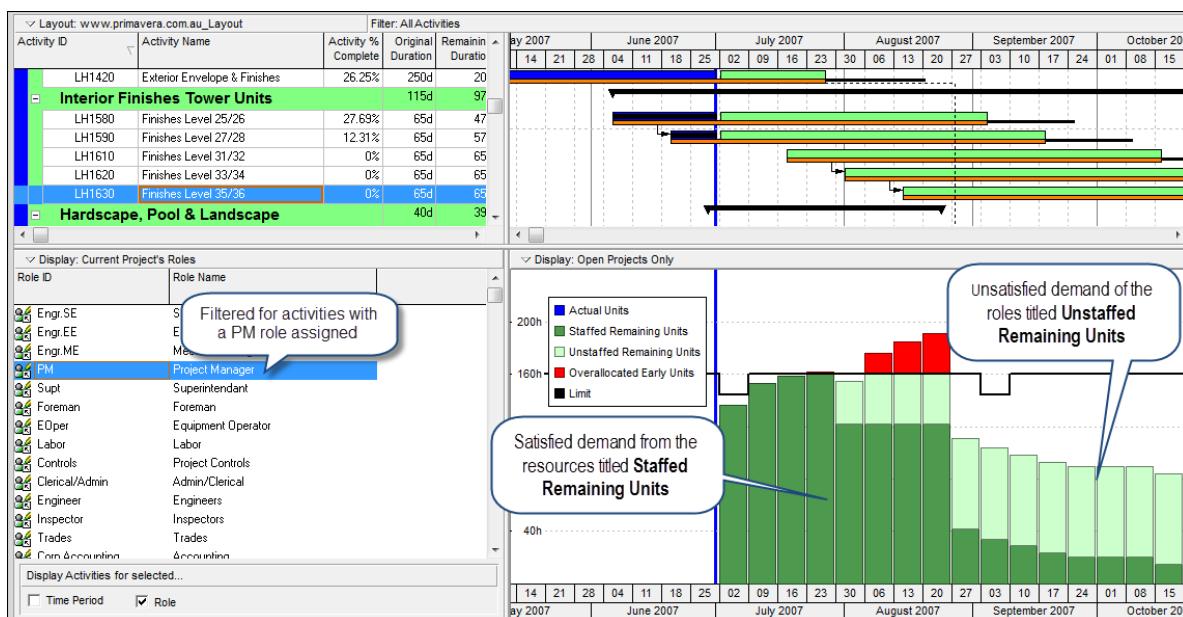
The type of contract that the work is being conducted under would often determine if the client is more interested in the Input or Output Resources.

18.1.4 Understanding Roles

An evaluation at project or enterprise level in order to understand the long-term demand for resources may be made by a combination of Roles for long term planning and Resources for short term planning.

Roles are assigned to activities for long term planning and Resources represent individual people are assigned to roles for short term planning and would represent activity assignment.

The light area to the right of the histogram below shows the unsatisfied demand of the roles titled **Unstaffed Remaining Units** and the satisfied demand from the resources is in the dark area to the left and are titled **Staffed Remaining Units**.



If you are a construction contractor and not assigning work to individual people then you may consider using resources only as they have more functions than roles.

18.2 Creating Roles

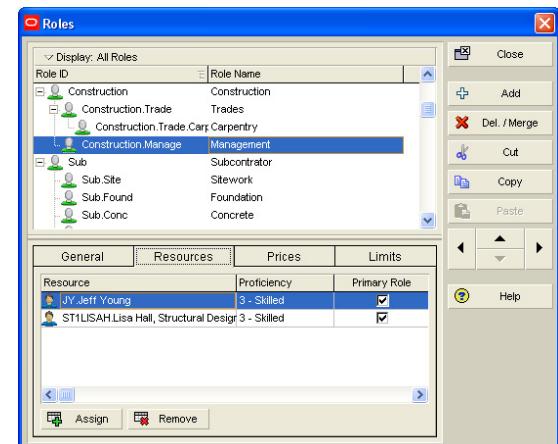
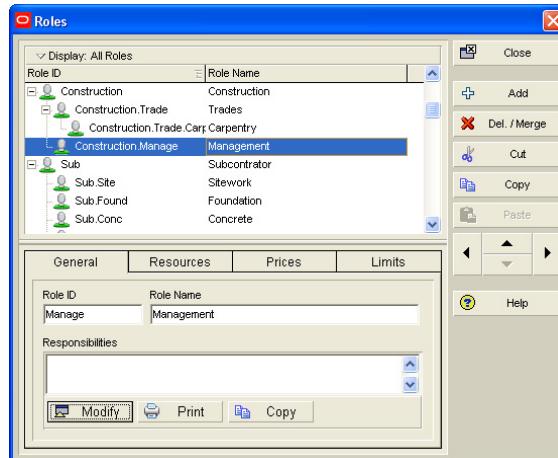
18.2.1 P6 Version 19 and Earlier 20 – Roles Rate may not be varied over time

Roles are created, edited, and deleted in a similar method as WBS.

To create, edit, or delete a **Role** select **Enterprise, Roles...** to open the **Roles** form:

The following formatting, filtering, and sorting functions are available in the **Roles** form:

- Click on **Display: All Roles** and then the **Filter By** tab to open a menu where the roles can be filtered by **All Roles** or **Current Projects Roles**.
- Click on the **Role ID** title or the **Role Name** title to sort the Roles by Role ID or Role Name.
- Roles may also be displayed by the **Chart** view. The **Roles** form will have to be resized to use this function effectively.
- The **Find** function (or **Ctrl+F**) enables a Role name to be searched.
- The **Print** function opens the **Print Preview** form allowing the printing of the current list of Roles.



In the **General** tab each Role may be assigned a:

- **Role ID**, a unique code used to assign the Role to an Activity.
- **Role Name**, the Name of the Skill or Trade.
- **Responsibilities**, where you may enter text, hyperlinks, and pictures about the Role Responsibility.

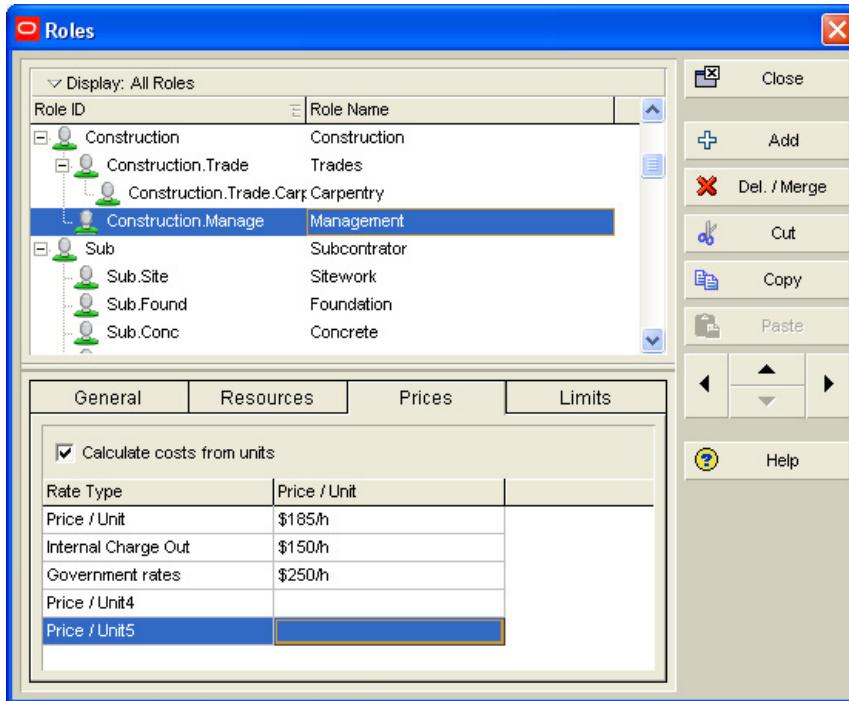
In the **Resources** tab each Role may be assigned:

- To one or more Resources.
- The Resource is assigned by default a **Proficiency** of "3 – Skilled" which may then be changed to any of the options shown in the list.
- The Resource may be assigned a **Primary Role** which would represent the activity or job they would normally be assigned.
- The **Primary Role** also links to Role availability when the option in the **Edit, User Preferences..., Resource:Analysis tab, Display the Role Limit based on** is set to **Calculate primary resources' limit**.

Proficiency
3 - Skilled
1 - Master
2 - Expert
3 - Skilled
4 - Proficient
5 - Inexperienced

Primavera supports **Rates for Roles**. Up to 5 rates (the same number of rates as resources) may be assigned to roles which may be used for estimating and cash flow forecasting of projects before the actual resource completing the work is assigned to the activity.

- Click on the **Prices** tab to edit the Role Price/Unit, and
- The **Role Rate Type** is adopted from the **Resource Rate Type** set in the [Admin, Admin Preferences..., Rate Type](#) tab.
- In P6 Version 19 and earlier Role rates may not be varied over time or leveled but Resources may be.



- The data columns in the **Prices** tab and **Limits** tab forms may be sorted by clicking on the column titles.
- The default rate for a project is selected when a project is created and may be changed in the **Projects Window, Resources tab, Assignment Defaults** area:



Different rates may be required for different clients such as internal project rates and rates for different types of external clients.

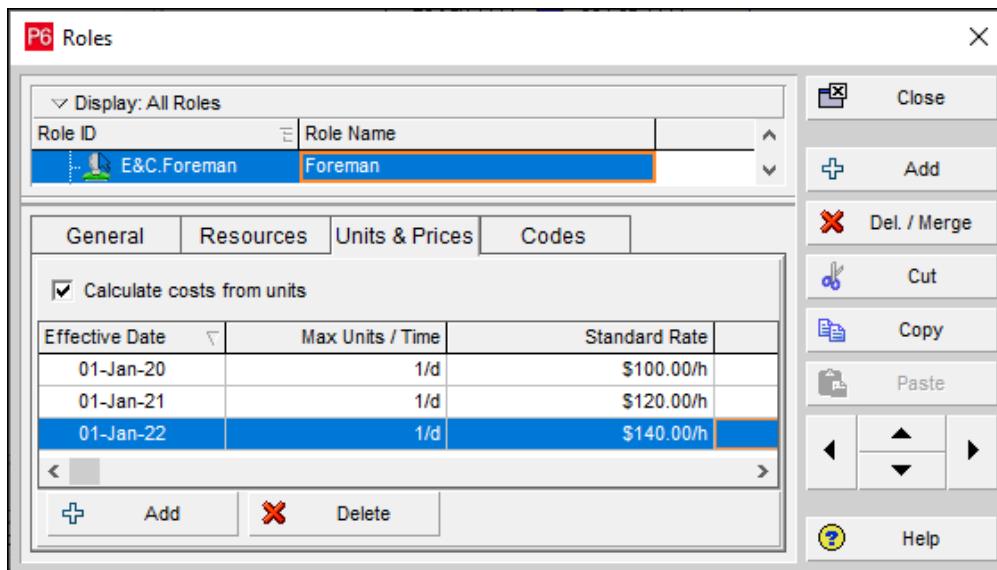


Five resource and role rates may not be sufficient when a company has a number of clients. There are some options which include creating a new set of resources for each project, or a new database for each project, or not selecting the option of linking costs and units.

18.2.2 P6 Version 20 – Roles Rate may now be varied over time

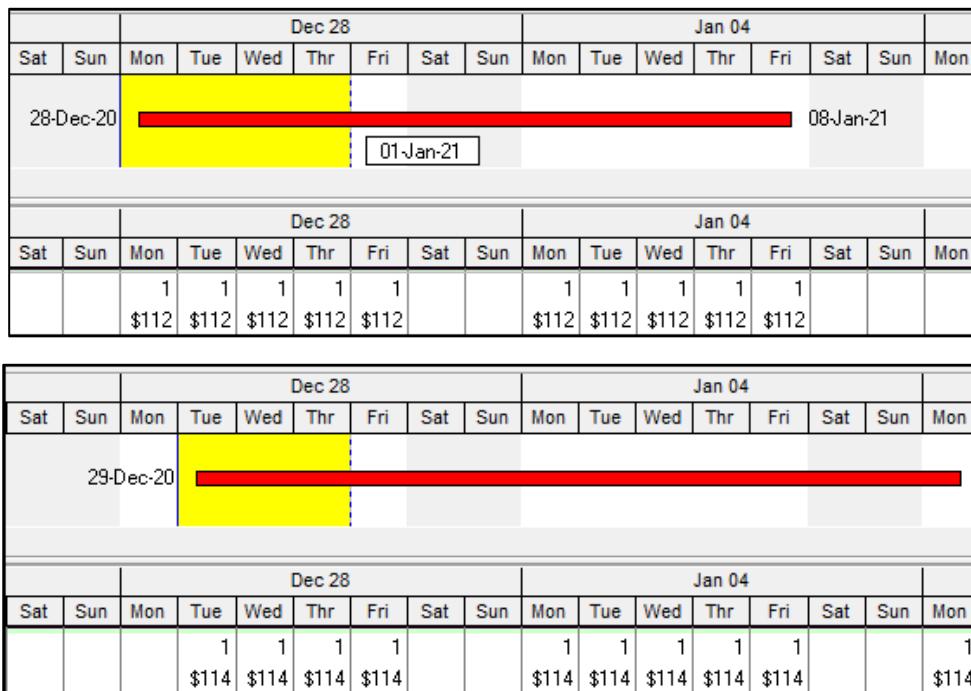
Resources have always been able to vary their rate over time but Roles were not and this was one of the drivers to use resources and not roles on projects.

P6 Version 20 now allows Role rates to Vary over time:



When an activity spans two periods then P6 calculates a proportional rate based on the activity duration in each period. You must use the **Recalculate Cost Assignment** function during or after rescheduling.

The pictures below show the result of assigning the Role Foreman above and has 4 days work in 2020 and 6 in 2021 and then 3 and 7 days. They demonstrate how the cost are calculated which are not entirely correct as the costs should be lower in 2021 and higher in 2022.

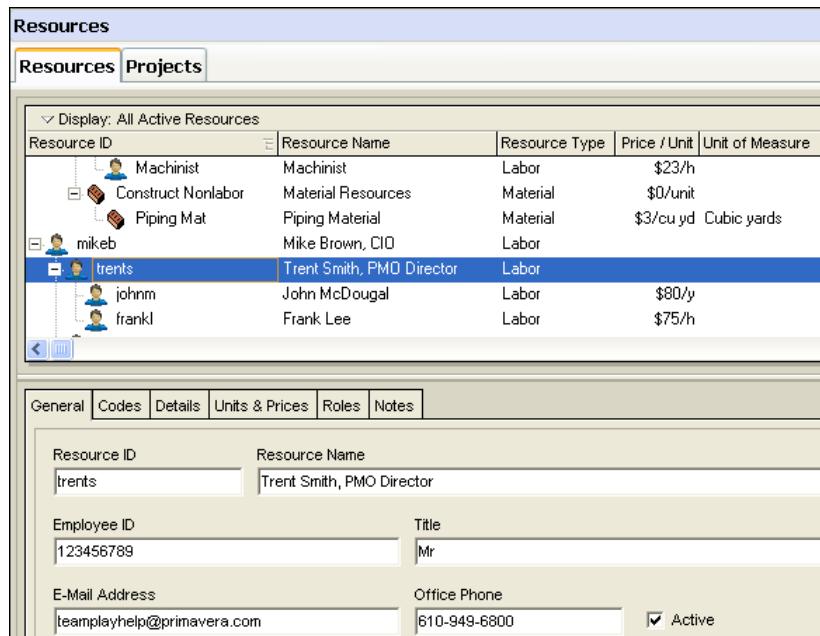


Note: This is the same way that resources calculate when an Activity spans an Effective Date.

18.3 Creating Resources and the Resources Window

To create, edit, or delete resources open the **Resources Window**:

- Select **Enterprise, Resources...**, or
- Click on the  icon on the **Enterprise** toolbar,

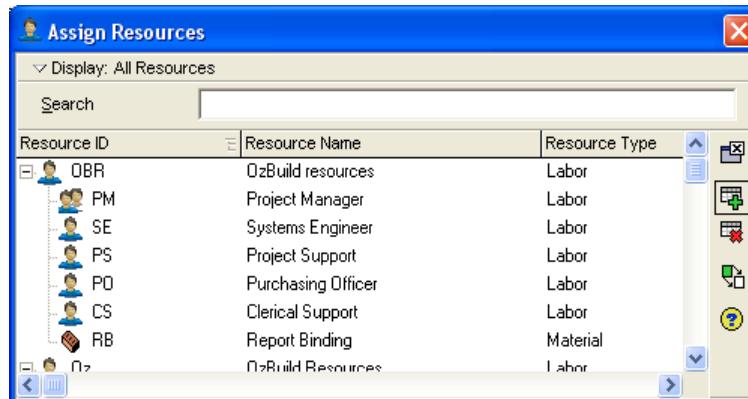


The screenshot shows the 'Resources' window with the 'Resources' tab selected. The main pane displays a hierarchical tree of resources under 'Display: All Active Resources'. The tree includes nodes for 'Machinist', 'Construct Nonlabor', 'Piping Mat', 'mikeb', and 'trents'. The 'trents' node is expanded, showing 'John McDougal' and 'Frank Lee' as children. The bottom pane shows a detailed view for 'Trent Smith, PMO Director' with tabs for General, Codes, Details, Units & Prices, Roles, and Notes. The 'General' tab is selected, displaying fields for Resource ID ('trents'), Resource Name ('Trent Smith, PMO Director'), Employee ID ('123456789'), Title ('Mr'), E-Mail Address ('teamplayhelp@primavera.com'), Office Phone ('610-949-6800'), and Active status (checked).

- In the **Resources Window**:
 -  indicates a **Resource** which is not assigned to an open project,
 -  indicates a **Resource** assigned to an open project,
 -  and  indicate an unassigned and assigned **Nonlabor Resource**, and
 -  and  indicate an unassigned and assigned **Material Resource**.

18.3.1 Resource Breakdown Structure – RBS

Resources may be added and organized hierarchically in a similar method to creating a WBS.



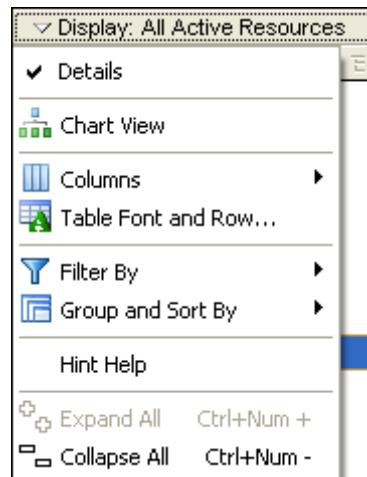
The screenshot shows the 'Assign Resources' dialog box. The main pane displays a hierarchical tree of resources under 'Display: All Resources'. The tree includes nodes for 'OzBuild resources', 'PM', 'SE', 'PS', 'PO', 'CS', 'RB', and 'OzBuild Resources'. The 'OzBuild resources' node is expanded, showing its sub-nodes. The right side of the dialog box features a toolbar with icons for adding (+), deleting (-), moving up (^), moving down (^), and help (?) symbols.

The OzBuild resources in the picture above are listed under a higher-level node titled **OzBuild Resources**. Primavera Systems calls this structure a **Resource Breakdown Structure** or **RBS**.

18.3.2 Formatting the Resources Window

The menu under the **Display: All Active Resources** has many functions that are similar to other forms:

- The **Details** check box displays or hides the **Details** form in the lower pane.
- **Chart View** displays the resources as a Chart. To use this format, **Group and Sort By** must be set as **Default** or have the **Customize...** option grouped by Resources.
- **Columns, Table Font and Row..., Filter By** and **Group and Sort By** options work in a similar way to the formatting of the **Activities Window**. Click on the menus to see the options available with each.
- When the **Resources** are organized hierarchically, the **Expand All** and **Collapse All** options work in a similar way to other windows and rolls up the Resources.



18.3.3 Adding Resources

New Resources are added and deleted in a similar method to adding Activities in the **Activities Window**. Use the **Insert** key, right-click and select **Add**, or use the Add  icon on the **Edit** toolbar.

18.3.4 General Tab

The fields in this tab are self-explanatory:

- The **Resource ID** has to be unique within a database and a **Resource Name** is mandatory,
- The **Employee ID, E-Mail Address, Title** and **Office Phone** are optional, and
- When the **Active** box is unchecked, the Resource is inactive and indicates that the resource is not available. When assigning Resources to Activities there is a filter to display only active Resources.

General	Codes	Details	Units & Prices	Roles	Notes	
Resource ID ARL	Resource Name Angela Lowe					
Employee ID 12345678	Title Ms					
E-Mail Address angela.lowe@eh.com.au	Office Phone 03 9846 7700					<input checked="" type="checkbox"/> Active

18.3.5 Codes Tab

Resource Codes are assigned to Resources allowing additional facilities to sort and report on them in the **Resource Usage Spreadsheet** and **Resources Window**.

- **Resource Codes** may be defined in the **Resource Code Definition** form, which is opened by selecting **Enterprise, Resource Codes...** and clicking on the  icon.
- Individual **Resource Code Values** may be added to a **Resource Code** in the **Resource Codes** form by selecting **Enterprise, Resource Codes....**
- Resource Codes may then be selected in a layout to sort and group Resources.

General	Codes	Details	Units & Prices	Roles	Notes	
Resource Code	Code Value	Code Description				
 Clearance	S	Secret				
 Classification	FTE	Full Time Employee				
 Office Location	EUR.LON	London				

18.3.6 Details Tab

General	Codes	Details	Units & Prices	Roles	Notes	
Resource Type		Profile				
<input checked="" type="radio"/> Labor <input type="radio"/> Nonlabor <input type="radio"/> Material Unit of Measure <input type="button" value="..."/>		Calendar  Standard <input type="button" value="..."/> Create Personal Calendar Default Units / Time <input type="text" value="8h/d"/> <input checked="" type="checkbox"/> Auto Compute Actuals <input checked="" type="checkbox"/> Calculate costs from units				
Currency and Overtime						
Currency  AUD Dollar <input type="button" value="..."/> <input type="checkbox"/> Overtime Allowed Overtime Factor <input type="text"/>						

Resource Types

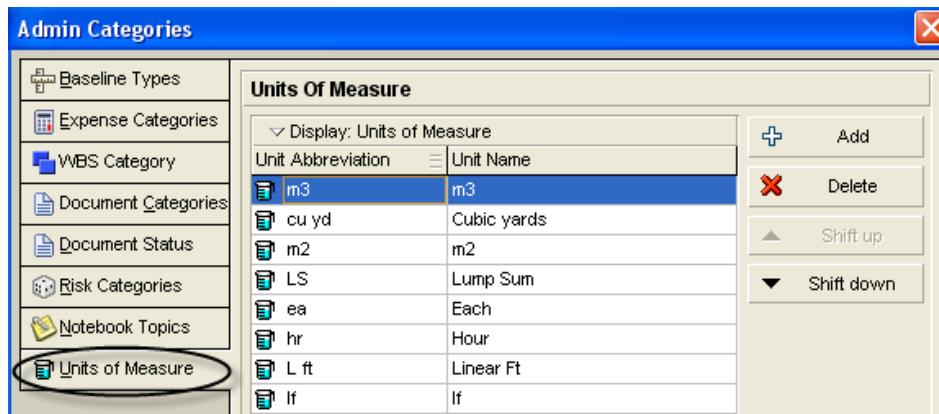
There are three types of Resources:

- **Labor**, intended for people
- **Nonlabor**, intended for equipment used to perform project work
- **Material**, intended for materials/supplies.

Material Resources

May be leveled and have the following differences from other resources:

- They may be assigned a **Unit of Measure**, which is created in the **Admin, Admin Categories..., Unit of Measure** tab. This is not available to Labor and Nonlabor resources.



- They may not be assigned a Role.
- They may not log Overtime.



Material resources do not display units (quantities) in the **Activities Window**, as with many other products like Microsoft Project and Elecosoft (Asta) Powerproject. These values may be displayed in other views such as the **Resource Assignments Window** and in reports.

Currency

An alternate **Currency** may be associated with a resource. This will not affect how the Resource Unit Rates costs are entered but provides a further tagging mechanism for sorting and reporting. The costs are stored in the default currency but are displayed using the conversion rate in the currency selected for the resource.

Overtime

A **Labor Resource** may be allowed to record **Overtime** in the **Primavera timesheet** system when the **Overtime Allowed** box is checked and the costs derived from the **Unit Rates** are multiplied by the **Overtime Factor**.

Calendar

The Resource is assigned a **Global** or a **Shared Resource Calendar** in this form.

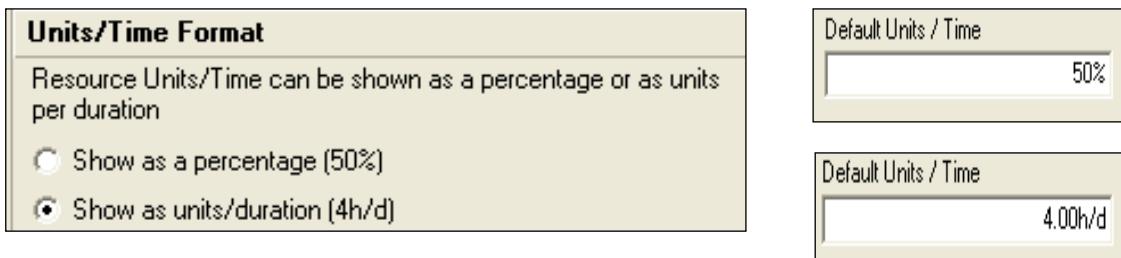
- A **Shared Resource Calendar** may be created and assigned to more than one Resource. This topic is covered in more detail in the next section of this chapter.
- Click on the **Create Personal Calendar** icon to create a **Personal Calendar** for this resource.

NOTE: The **Resource** calendar is used to display the resource limits irrespective of the calendar assigned to an activity.

Default Units/Time

The **Default Units/Time** is the value that a resource adopts when it is first assigned to an activity. In a similar way to Microsoft Project, the **Units per Time Period** may be displayed as a **Percentage** or in **Units/Time**.

- Select Edit, User Preferences..., Time Units tab and select the preferred display from the **Units/Time Format** section:



For example, you may have a fleet of 12 trucks and you usually assign four trucks to each loader. In this situation you would assign the **Default Units/Time** as 400%, or 4 d/d, or 32h/d if the trucks are working 8 hours per day.

Resource and Activity Auto Compute Actuals

When a **Resource Auto Compute Actuals** field is unchecked, the work for a resource may be read from the Primavera Timesheet system or manually entered.

But when the **Activity Auto Compute Actuals** field is checked, this makes all the activity resource assignments to be **Auto Compute Actuals** irrespective of their settings in the Resource Window.

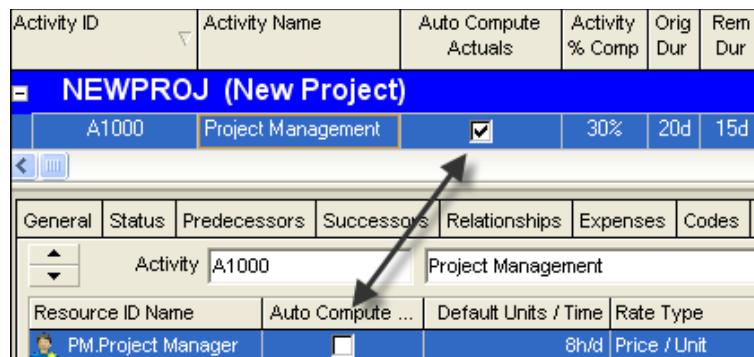
When the User uses the **Apply Actuals** function and activities or resources are set to **Auto Compute Actuals** Primavera calculates the Remaining Units based on the Remaining Duration and the Actual Units by subtracting the Remaining Units from Budgeted Units.

There are several places where the **Resource Auto Compute Actuals** field in Primavera is displayed:

- Against each resource in the **Resources Window, Details** tab,
- In a column in the **Resources Window**, when displayed, and
- Against each resource after it has been assigned to an activity and is displayed in the **Resources** tab of the bottom window in the **Activities Window**.

The option may **ONLY** be switched on or off against a resource in the **Resources Window** and if changed in the **Resources Window** it will affect all resource assignments for all projects for this resource.

The **Activity Auto Compute Actuals** field may be displayed as a column in the **Activities Window**:



A screenshot of the Oracle Primavera P6 Activities Window. The window title is "NEWPROJ (New Project)". The main grid shows an activity row for "A1000" with "Project Management" assigned. An arrow points to the "Auto Compute Actuals" checkbox, which is checked. Below the grid, there are tabs for General, Status, Predecessors, Successors, Relationships, Expenses, and Codes. Under the General tab, there is a sub-grid for "Activity A1000" with columns for Resource ID Name, Auto Compute..., Default Units / Time, and Rate Type. A resource named "PM.Project Manager" is listed with the "Auto Compute..." checkbox unchecked.

Activity ID	Activity Name	Auto Compute Actuals	Activity % Comp	Orig Dur	Rem Dur
NEWPROJ (New Project)					
A1000	Project Management	<input checked="" type="checkbox"/>	30%	20d	15d
General	Status	Predecessors	Successors	Relationships	Expenses
Activity A1000	Project Management				
Resource ID Name	Auto Compute...	Default Units / Time	Rate Type		
PM.Project Manager	<input type="checkbox"/>	8h/d	Price / Unit		

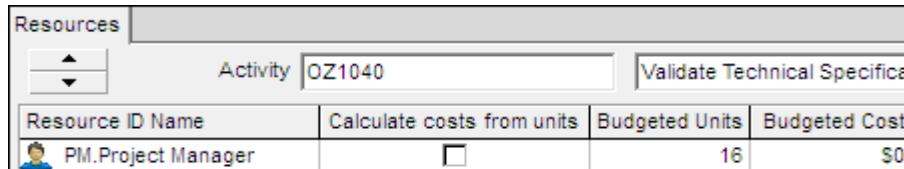
Calculate Costs from Units

With this option checked, the costs for a resource are calculated from the **Resource Unit/Time** when a resource is assigned to an activity. When unchecked, the costs remain at zero when a resource is assigned to an activity. This was called **Cost Units Linked** in earlier versions of P6.

When a resource has been assigned to an activity, there is a Resource Assignment field available in the **Resources** tab of the **Activities Window** titled **Calculate Costs from Units**. This is checked to match the **Calculate Costs from Units** field in the **Resources Window**.

The **Activities Window** field titled **Calculate Costs from Units** is not linked to the **Calculate Costs from Units** field in the **Resources Window** and only adopts the setting when a resource is assigned to an Activity.

The following picture shows a resource with the **Calculate Costs from Units** field unchecked; therefore, the costs are not calculated from the **Resource Unit Rate**.



A screenshot of the Oracle Primavera P6 Resources window. The window title is "Resources". The main grid shows a resource row for "OZ1040" with "Activity OZ1040" assigned. An arrow points to the "Calculate costs from units" checkbox, which is unchecked. Below the grid, there are tabs for Validate Technical Specifica. Under the Validate Technical Specifica tab, there is a sub-grid for "Activity OZ1040" with columns for Resource ID Name, Calculate costs from units, Budgeted Units, and Budgeted Cost. A resource named "PM.Project Manager" is listed with the "Calculate costs from units" checkbox unchecked.

Resources			
Activity OZ1040 Validate Technical Specifica			
Resource ID Name	Calculate costs from units	Budgeted Units	Budgeted Cost
PM.Project Manager	<input type="checkbox"/>	16	\$0

18.3.7 Units and Prices Tab

Effective Date and Rates

Each Resource may have up to five rates (Price/Unit) and these rates may be varied over time.

- The **Effective Date** represents a change in Rate or availability at that point in time.
- To display the other rates their columns should be displayed in the **Units and Prices** tab.
- The column titles of **Price/Unit 1** to **Price/Unit 5** may have their descriptions edited in the **Admin, Admin Preferences..., Rate Type** tab. These titles are shared with Roles.
- When a rate is added the effective date is the date from which the rate is applied.

Shifts

Resource Shifts are used in conjunction with leveling and should not be assigned unless they are being used. **Resource Shifts** are covered in the **Resource Optimization** chapter:

- **Resource Shifts** are created in the **Resource Shifts** form which is opened by selecting **Enterprise, Resource Shifts...**,
- The **Resource Shifts** and the number of shifts a resource works are assigned in the **Units and Prices** tab, **Shifts Calendar**.

18.3.8 Roles Tab

- A Resource may be assigned more than one Role, and their **Proficiency** for the Role, in this tab.
- When multiple Roles are assigned, one is assigned as the **Primary Role**.

Role ID	Role Name	Proficiency	Primary Role
 Oz.BM	Bid Manager	3 - Skilled	<input checked="" type="checkbox"/>
 Oz.SC	Scheduler	4 - Proficient	<input type="checkbox"/>

18.3.9 Notes Tab

Notes may be added here but there are no Notebook topics available.

18.3.10 Progress Reporter Tab

Originally called **Progress Reporter** tab then changed to **Timesheets** and now back to **Progress Reporter** and has been removed from P6 Professional.

When Timesheets are implemented, the user must be added as a system user through the **P6 Web Administer, User Access** form where the user is assigned to a P6 Resource, thus providing the link from the timesheet user to the Primavera resource. This is covered in the **Admin Menu, Users** section.

For timesheets to operate, the **Uses timesheets** box in the **Progress Details** tab must also be checked and the **Timesheet Approval Manager** selected.

18.4 Workshop 15 – Adding Resources to the Database



Background

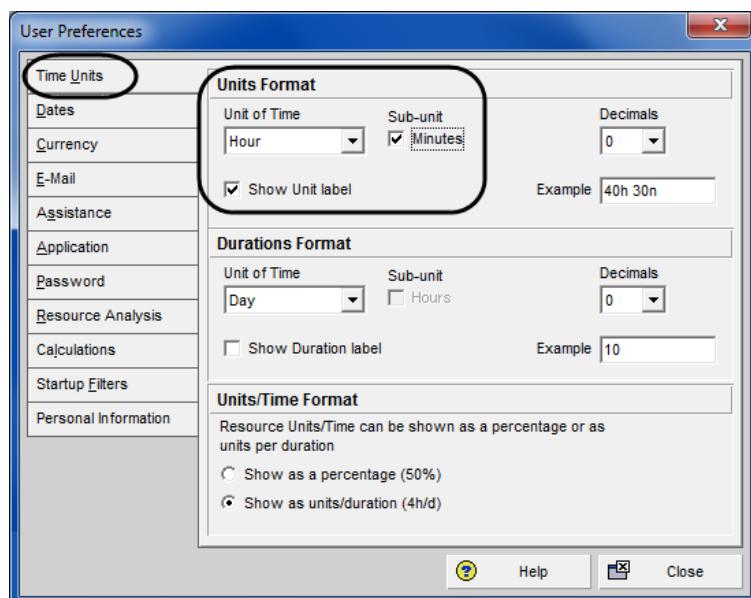
This workshop will only use Resources and these must now be added to the database.

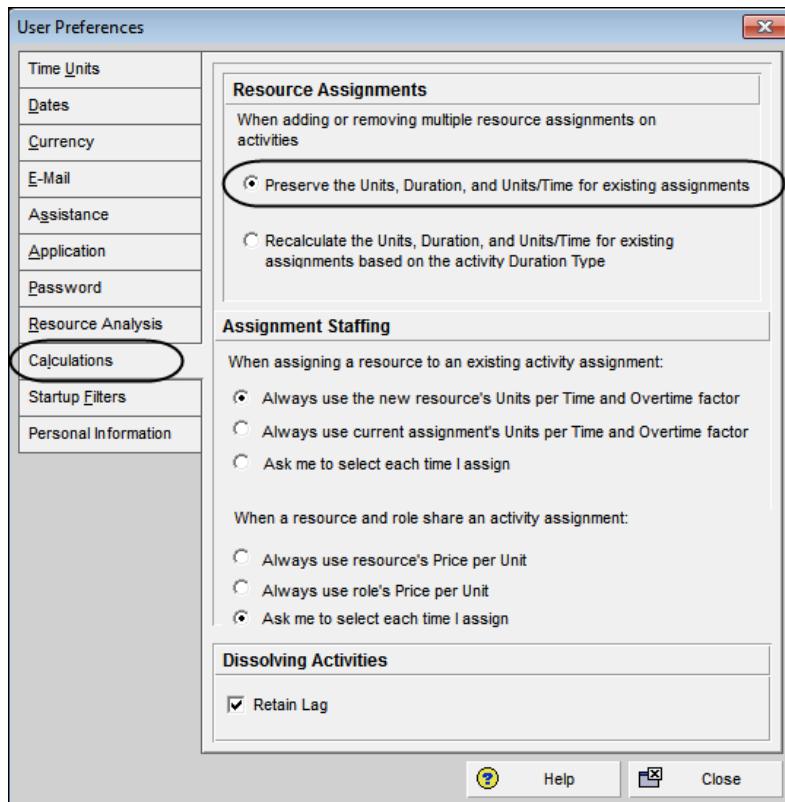
We have updated our current project, but we need a project that has not been updated for the next activity of assigning resources. Therefore, we will have to restore the Baseline schedule saved prior to updating the current schedule to provide an un-progressed schedule for this exercise.

NOTE: If you are working in a database with other people completing this workshop then each person's Resource ID will have to be unique, say by adding your initials at the end of each Resource ID. A training course leader or database administrator should advise here.

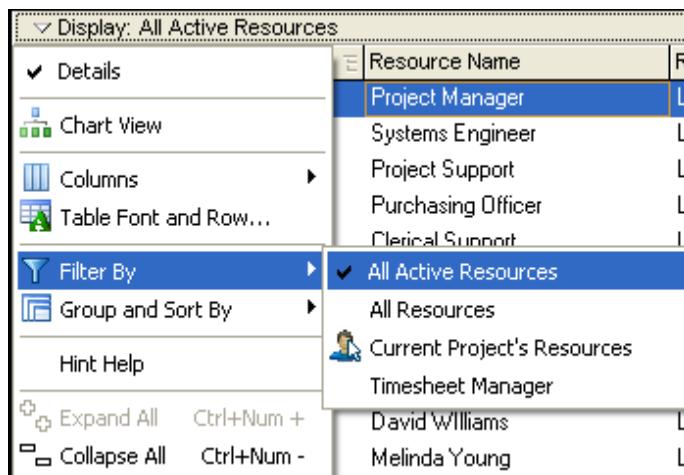
Assignment

1. Select **Project, Assign Baselines...** and remove all project Baselines by setting the Baselines to the <Current Project>.
2. **NOTE:** Baseline Bars in the Gantt Chart will now display the Planned Dates and these should be removed, using the Bars dialogue box.
3. Restore the project using **Project, Maintain Baselines....**
4. Go to the **Projects Window** where the restored baseline file will be visible.
5. Rename the restored Baseline project **Bid for Facility Extension – Resourced Schedule** and change the Project ID to **OZB-R**.
NOTE: Users sharing a database will need to use unique Project IDs.
6. Open the restored project.
7. Open the **User Preferences** form, set the **Calculations** and **Time Units** tab as per the following pictures.





8. Now open the **Resource Window**.
9. If no resources are displayed, then select all resources from the **Display:** menu:



10. Format the columns in the **Resources Window** as in the following picture.

11. Add the resources as in the following picture:

- If the **New resource Wizard** is displayed then close it as it is quicker just to type in resources.
- The **Unit of Measure** may not be available in your database, so either add it in the **Admin, Admin Categories...**, or do not assign one if you do not have the access right to create a **Unit of Measure**.
- **Price/Unit** must be entered in the bottom pane, it may be viewed but not added in a column.

NOTE: If you are working in a database with other people completing this workshop then each person's Resource ID will have to be unique, say by adding your Initials at the end of each Resource ID.

Resource ID	Resource Name	Resource Type	Price/Unit or Standard Rate	Unit of Measure
OZB	OzBuild Resources	Labor		
PM	Project Manager	Labor	\$120.00/h	
SE	Systems Engineer	Labor	\$90.00/h	
PS	Project Support	Labor	\$80.00/h	
PO	Purchasing Officer	Labor	\$70.00/h	
CS	Clerical Support	Labor	\$50.00/h	
RB	Report Binding	Material	\$100.00/ea	Each

12. You may need to use the arrows on the **Move** toolbar to move the resources to the correct indent location:



13. Set the **Default Units/Time** to 8 hours per day for all the resources.
14. Set the calendar for all resources to be a Global 5-Day Workweek, with 8 hours per day, yours may be called a Standard 5 Day/Week or similar.
15. Check **Calculate Costs from units** and **Auto compute actuals** for each resource.
16. Ensure that the resource **Effective Date** in the **Units & Prices** tab is set to 1 December 2021 or earlier otherwise the Resource will be delayed beyond this date when Leveling the resources in the Resource Optimization Workshop.

19 ASSIGNING ROLES, RESOURCES AND EXPENSES

During the planning stage, **Roles** may be assigned to Activities to gain an understanding of the long-term resource demand and they are later replaced by a **Resource** when it is known who will be undertaking the work. If you are not using named resources then you should consider not using Roles, as Resources have more functionality than Roles. A Resource may be assigned:

- Directly to an Activity, or
- To a Role which has been assigned to an Activity.

There are three types of resources, **Labor**, **Nonlabor** and **Material**, as discussed in the previous chapter. A Labor Resource has additional functionality including Overtime, Resource Calendars, Shifts and user defined Autocost rules. The **Labor** and **Nonlabor** resources are similar to the Microsoft Project **Work Resources**. A **Material** resource is similar to Microsoft Project **Material Resources**, but may not have the units displayed in **Activities Window** columns.

Primavera also has a function titled **Expenses**, where costs may be assigned to activities without resources and may be assigned a quantity and the default quantity is one. This function is similar to the **Cost Resource** function in Microsoft Project. As the project progresses, Actual and To Complete Units and Costs may be assigned to Expenses in the same way as resources. Expense units may not have the units displayed in **Activities Window** columns, may not be assigned Resource Curves, but may have costs assigned before the activity has started, may have Remaining Costs when the activity is complete, and may be assigned to Milestones.

This chapter will cover the following topics:

- Understanding Resource Calculations and Terminology
- Project and Activities Windows Resource and Role Preferences
- Details Status Form
- Activity Types and Duration Types
- Assigning and Removing Roles and Assigning Resources
- Resource and Activity Duration Calculation and Resource Lags
- Expenses
- Suggested Setup for Assigning Resources

Topic	Menu Commands
• Set Units/Time Format and Resource Assignments	Select Edit, User Preferences... to open the User Preferences form and select the Time Units tab and Calculations tab.
• Set Default Duration Type and Default Activity Type	Set these defaults in the Defaults tab in the Projects Window .
• Assign a Role to an Activity	Select the Resources tab in the Activity Details form and click on the  icon on the Assign toolbar to open the Assign Roles form.
• To assign a Resource to a Role that has been assigned to an activity	Select the Role to be assigned a Resource from the Resources Details tab and click the  icon on the Assign toolbar to open the Assign Resources By Roles form.
• To assign a Resource to an activity without a Role	Select the Activity to be assigned the Resource and click the  icon on the Assign toolbar to open the Assign Resource form.

19.1 Understanding Resource Calculations and Terminology

A Resource has three principal components after it has been assigned to an Activity:

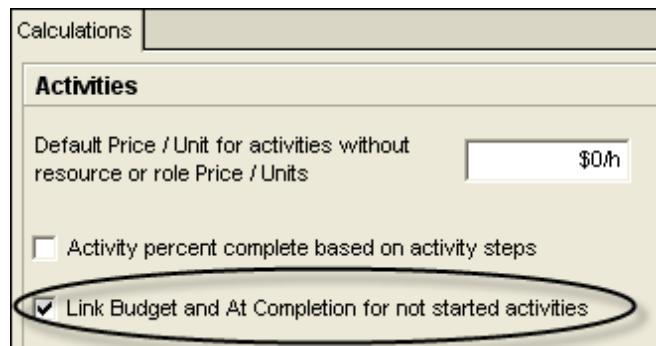
- **Quantity**, in terms of **Work** in hours or days or **Material** quantities required to complete the activity, which are referred to as **Units** by Primavera,
- The **Resource Unit Rate** is termed **Price/Unit** in Primavera, and
- **Cost**, which is calculated from the **Resource Unit Rate x Units**.

Each Resource and Expense has the same four fields for **Costs** and **Units**, which are **Budget**, **Remaining**, **Actual** and **At Completion**. The relationship among these fields changes depending on whether the activity is Not Started, In-Progress or Complete.

- When an activity is Not Started and the % Complete is zero then:
 - **Budget** is normally linked to **Remaining** and **At Completion** and therefore a change to one will change the other two and they will always be equal, and
 - **Actual** will be zero.
- When the activity is marked Started and would normally be In-Progress and the % Complete is between 0.1% and 99.9% then:
 - **Budget** becomes unlinked from **Remaining** and **At Completion**, thus allowing progress and the **At Completion** value to be compared to the **Budget** value (of the current schedule), or a **Baseline Budget** value or a **Baseline At Completion** value, and
 - **At Completion = Actual + Remaining** and have a link to **Units % Complete**, where a change in value to one will result in a change to the other values.
- When the activity is Complete and the **Units % Complete** is 100% then:
 - **Remaining** is set to zero, and
 - **At Completion = Actual**.

The Budget values for Costs and Units are linked to the At Completion values until:

- An Activity has been marked as Started or has a % Complete, or
- The **Link Budget and At Completion for not started activities in the Project Window Calculations tab** is unchecked, see the following picture:



This function in P6 also unlinks the **Original Duration** from the **At Completion Duration** for un-started activities which adds another complication that should be avoided.

The comparison of the current At Completion Costs is normally made with the Baseline project Budget or Baseline project At Completion values. Therefore the Budget value in the current schedule is effectively a redundant value and probably should not be displayed.

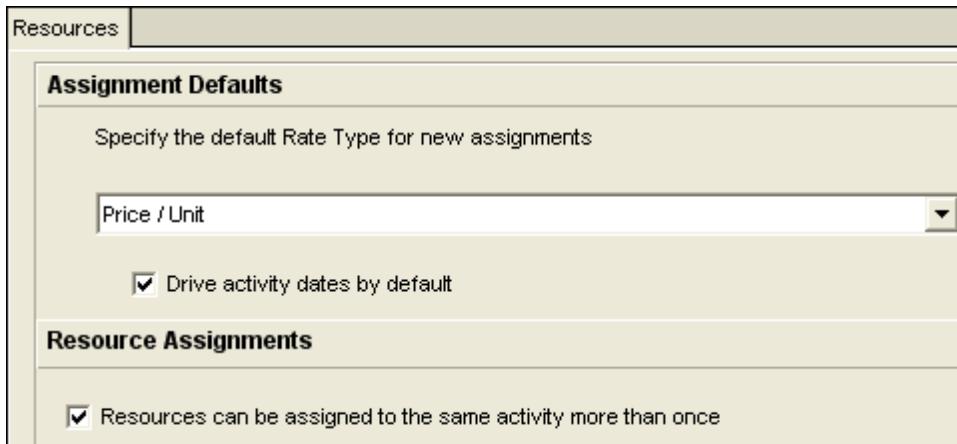
19.2 Project Window Resource Preferences

Preferences set in the **Activities Window** decide how each individual activity and resource is calculated and are covered in the next section.

Preferences and defaults (which may be changed for each resource assignment) affect how all resources in a project are calculated and are set in the **Project Window** and pertain to all activities and resources.

19.2.1 Resources Tab

The **Resources** tab in the P6 Professional **Projects Window** has had the Progress Reporter (called Timesheets in Version 6.2 and earlier) removed.



Assignment Defaults

- There are five Resource Rates available in Primavera. One rate may be set as a project default. After assignment to an activity, the Resource Rate may be changed using the **Rate Type** field in the **Resources** tab of the **Activities Window**.

Drive activity dates by default

- This is covered in more detail in the next section.

Resource Assignments

- Checking the **Resources can be assigned to the same activity more than once** box enables a resource to be assigned to an activity more than once. This is useful if it is required to assign a resource at the beginning of an activity and later at the end of an activity with a lag.

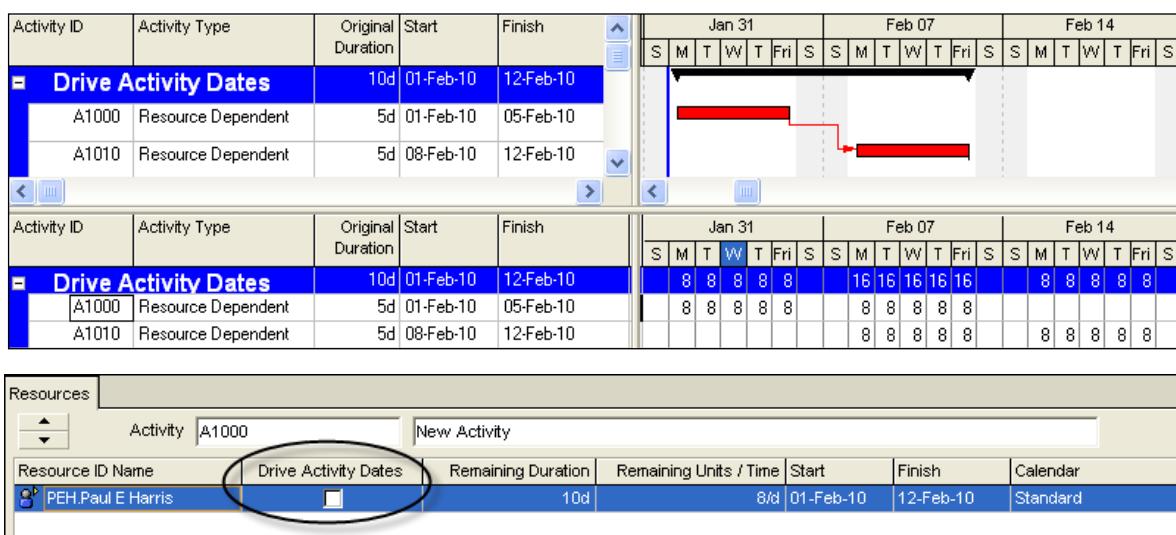
For example, one may want to assign a crane on the first day of the activity to assist in erecting and one the last day to assist in dismantling. This check box needs to be checked for a resource to be assigned twice to an activity.

19.2.2 Understanding Resource Option to Drive Activity Dates

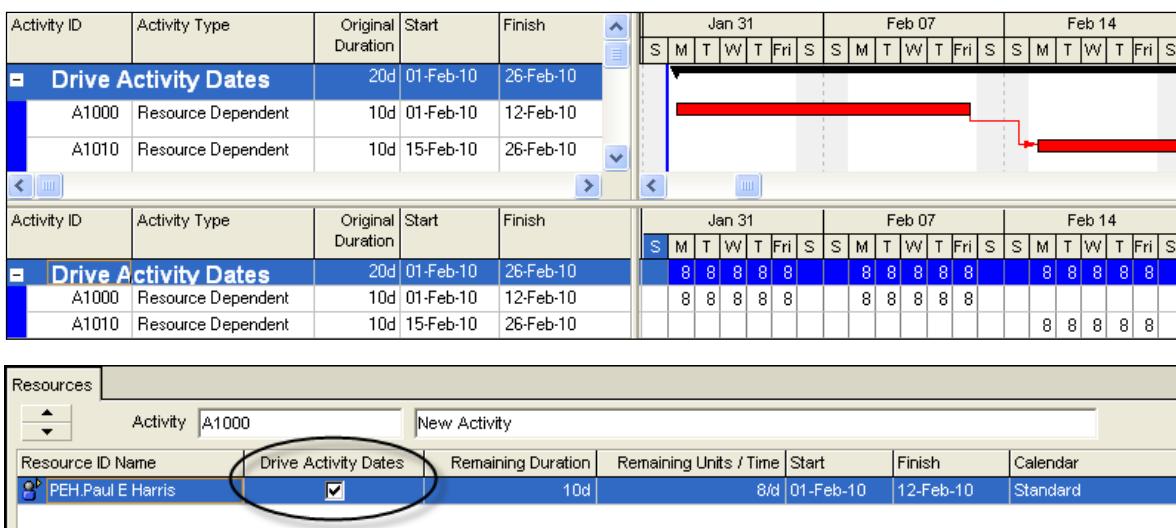
A resource has the following fields that are linked and a change to the **Original lag** or **Original Duration** will make a change to one or both dates:

- **Original Lag.** The duration from the Activity Start Date to the Resource Start Date, which is the date the resource commences work.
- **Original Duration.** The duration that a resource is working.
- **Start.** The Resource Start Date=Activity Start Date + the Resource Original Lag.
- **Finish.** This date is calculated by the addition of the Activity Start Date + Original Lag + the Original Duration.

When the **Drive Activity Dates** option is switched off it is possible for a resource to calculate outside the activity duration. In the following example the activities are 5 days long and the resources assigned to each activity are working for 10 days. This has resulted in the resource being overloaded. The Resources acknowledge the activity Start date but not the Finish Date.



Now the **Drive Activity Dates** option has been checked against each activity, the activities are now 10 days long, and the resource is not overloaded.





It is recommended that the **Drive activity dates by default** box is always checked, thus Resources will be assigned as **Drive Activity Dates** and this ensures that all work is contained within the duration of an activity.

The Activity Start is controlled by the Activity Calendar, therefore when an activity is Resource Driven it is important to set an Activity Calendar that will allow the resource to start work when it is required to start. Thus if there is a morning shift starting at 4:00 am, the Activity Calendar should start at 4:00 am or earlier.

In schedules with complex resource calendars may wish to consider placing all the Resource Driven activities on a 24x7 calendar and then all resource work will be controlled by the resource calendars.

19.2.3 Calculations Tab

The **Calculations** tab in the **Projects Window**:

Calculations	
Activities	Resource Assignments
Default Price / Unit for activities without resource or role Price / Units <input type="text" value="\$50/h"/>	When updating Actual Units or Cost <input type="radio"/> Add Actual to Remaining <input checked="" type="radio"/> Subtract Actual from At Completion <input checked="" type="checkbox"/> Recalculate Actual Units and Cost when duration % complete changes <input type="checkbox"/> Update units when costs change on resource assignments <input checked="" type="checkbox"/> Link actual to date and actual this period units and costs
<input type="checkbox"/> Activity percent complete based on activity steps <input checked="" type="checkbox"/> Link Budget and At Completion for not started activities <input type="radio"/> Reset Original Duration and Units to Remaining <input checked="" type="radio"/> Reset Remaining Duration and Units to Original	

Activities – Default Price/Unit for activities without resource Price/Units.

This rate is also used to calculate the resource costs when an activity is not assigned roles or resources but is assigned a quantity in the **Activities Window, Status** tab.

The other functions in this tab affect the updating of resourced activities and are covered in the **Updating a Resourced Schedule** chapter.

19.3 User Preferences Applicable to Assigning Resources

Select Edit, User Preferences... to open the User Preferences form:

19.3.1 Units/Time Format

Select the **Time Units** tab. The **Units/Time Format** enables Microsoft Project-style formatting of **Resource/Time Format** showing Resource utilization as a percentage or as units per duration.

Units/Time Format

Resource Units/Time can be shown as a percentage or as units per duration

- Show as a percentage (50%)
 Show as units/duration (4h/d)

19.3.2 Resource Assignments

The **Calculations** tab has two **Resource Assignment** options:

- **Preserve the Units, Duration, and Units/Time for existing assignments.** With this option, as Resources are added or deleted the total number of hours assigned to an activity increases or decreases. Each Resource's hours are calculated independently.
- **Recalculate the Units, Duration, and Units/Time for existing assignments based on the activity Duration Type.** The total number of hours assigned to an activity will stay constant as second and subsequent resources are added or removed from an activity.

Resource Assignments

When adding or removing multiple resource assignments on activities

- Preserve the Units, Duration, and Units/Time for existing assignments
 Recalculate the Units, Duration, and Units/Time for existing assignments based on the activity Duration Type

NOTE: This function does not work when the Activity Type is **Fixed Duration** and **Units/Time**.



The **Recalculate the Units, Duration, and Units/Time for existing assignments based on the activity Duration Type** function is similar to the Microsoft Project Effort Driven function and the **Preserve the Units, Duration, and the Units/Time for existing assignments** is the same as Non Effort Driven.

It is recommended that **Preserve the Units, Duration, and Units/Time for existing assignments** be used as a default as each individual resource assignment does not change as resources are added or removed from an activity.

19.3.3 Assignment Staffing

The **Assignment Staffing** option is self-explanatory and should be considered carefully when resources and roles have different rates. If it is not understood and set correctly the resource may end up with the incorrect unit rate when assigned to a Role or existing Resource.

When two users have different settings this may result in a schedule having two different rates for the same resource.

Assignment Staffing	
When assigning a resource to an existing activity assignment:	
<input type="radio"/>	Always use the new resource's Units per Time and Overtime factor
<input type="radio"/>	Always use current assignment's Units per Time and Overtime factor
<input checked="" type="radio"/>	Ask me to select each time I assign
When a resource and role share an activity assignment:	
<input type="radio"/>	Always use resource's Price per Unit
<input type="radio"/>	Always use role's Price per Unit
<input checked="" type="radio"/>	Ask me to select each time I assign

19.4 Activities Window Resource Preferences and Defaults

19.4.1 Details Status Form

This form has a section titled **Labor Units** at the right side as seen in the following picture. The drop-down menu enables you to select which data is to be displayed in this section of the form.

The screenshot shows the 'Status' tab of the Details Status Form. At the top, there are fields for 'Activity' (W1120), 'Negotiate Component Work Packages', and 'Project' (RFP181004). Below these are sections for 'Duration' (Original: 3d, Actual: 0d, Remaining: 3d, At Complete: 3d) and 'Status' (Started: 18-Jan-05, Physical %: 0%, Finished: 20-Jan-05, Total Float: 0d, Exp Finish: [empty], Free Float: 0d). To the right, a dropdown menu is open under the heading 'Labor Units'. The options shown are: Labor Units (selected, indicated by a checkmark), Nonlabor Units, Labor Cost, Nonlabor Cost, and At Complete (which also has a value of 32.00h). A circular arrow highlights the 'Labor Units' section.

There is a link between the entries in this form and the values that are assigned to resources:

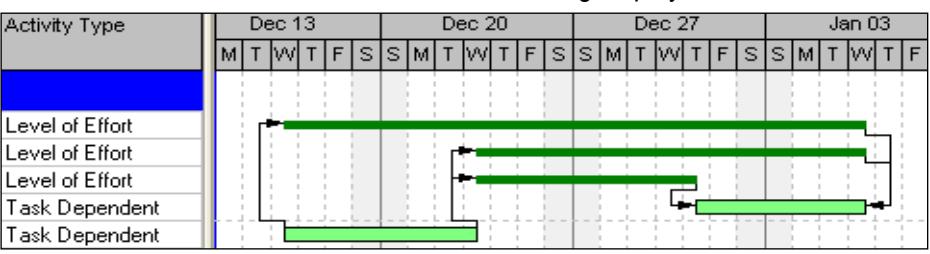
- The values in this form are the sum of the values assigned to Resources and Roles.
- When these values are edited, they will change the values assigned to Resources and Roles.

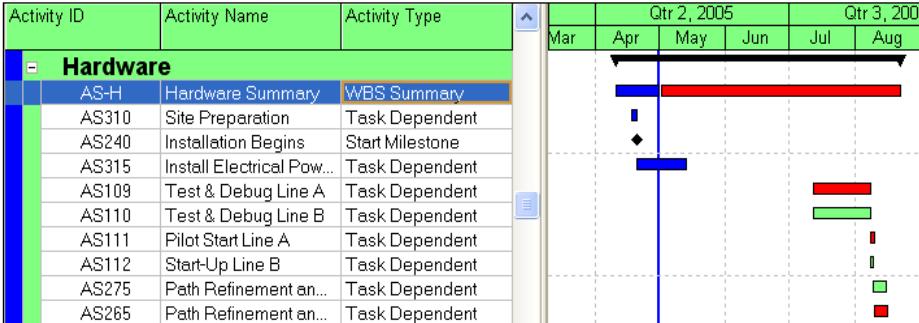
NOTE: It is possible to enter a **Labor Unit** value in the **Status** tab and not assign a resource. When a resource is assigned the resource will adopt this value in the **Status** tab. This rate is set in the **Calculations** tab in the **Projects Window, Activities tab – Default Price/Unit for activities without resource or Roles Price/Units** field.

19.4.2 Activity Type

There are five **Activity Types** assigned in the **General** tab in the **Activities Window**:

Activity Type	Notes
Task Dependent	Activities assigned as Task Dependent acknowledge their Activity Calendar when scheduling and the Finish Date is calculated from the Activity Calendar. Resources ignore their Resource Calendar and scheduled on the Task Calendar.
Resource Dependent	<p>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 do not have to be available at the same time.</p> <p>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.</p>  <div style="border: 1px solid #ccc; padding: 5px; display: inline-block;"> This activity is scheduled to start on the project start date ONLY when both the resource and activity are assigned 24x7 calendars </div> <p>NOTE: The activity start date calculated on the activity calendar, not the resource calendar, may delay the start of an activity when the resource calendar has longer working hours than the activity calendar.</p>
Start Milestone	<p>This Activity Type is used to indicate the commencement of a Phase, Stage, or a major event in a project.</p> <ul style="list-style-type: none"> • It has only a Start Date and no Duration or Finish Date. • It may only have Start Constraints assigned. • It may not have time-dependent resources assigned but may have: <ul style="list-style-type: none"> ➢ An Owner assigned from the list of users to indicate who is responsible for the activity. "Owner," enables a user who is NOT a resource to be assigned responsibility for an activity. ➢ A Primary Resource assigned from the Activities Window, General tab who may update the Milestone, but no effort is assigned or recorded.

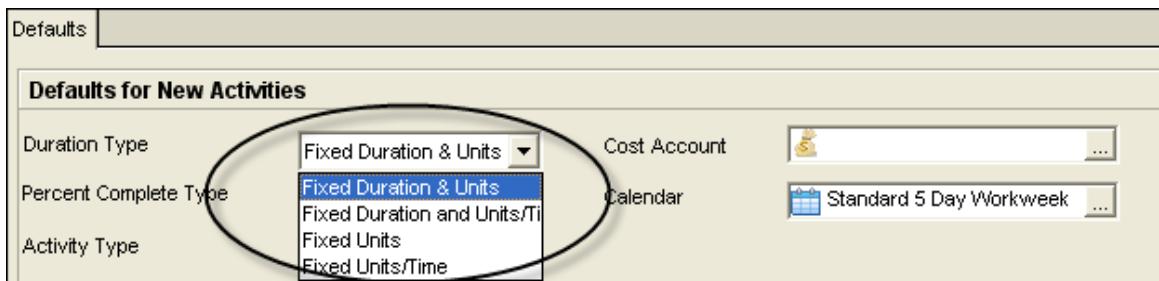
Activity Type	Notes
Finish Milestone	<p>This Activity Type is used to indicate the completion of a Phase, Stage, or a major event in a project.</p> <ul style="list-style-type: none"> • It has only a Finish Date and no Duration or Start Date. • It may only have Finish Constraints assigned. • It may not have time-dependent resources assigned but may have: <ul style="list-style-type: none"> ➤ An Owner assigned from the list of users to indicate who is responsible for the activity. "Owner," the new activity field in Primavera Version 6.0, enables a user who is NOT a resource to be assigned responsibility for an activity. ➤ A Primary Resource assigned from the Activities Window, General tab who may update the Milestone, but no effort is assigned or recorded.
Level of Effort (LOE)	<p>This Activity Type spans other Activities. Therefore, the Start Date, Finish Date, and Durations may change as the start or finish date of activities that it is dependent upon change during scheduling or updating. There is no equivalent in Microsoft Project. Elecosoft (Asta) Powerproject has Hammock tasks and Buffer Tasks which calculate differently but may achieve the same results.</p> <p>This type of activity does not create a critical path irrespective of the float calculations that are displayed.</p> <p>The Start Date may be controlled by the following relationships:</p> <ul style="list-style-type: none"> • Finish-to-Start predecessors • Start-to-Start predecessors • Start-to-Finish successors • Start-to-Start Successors <p>The Finish Date may be controlled by the following relationships:</p> <ul style="list-style-type: none"> • Finish-to-Finish predecessors • Start-to-Finish predecessors • Finish-to-Start successors • Finish-to-Finish successors <p>Resources assigned to a Level of Effort activity are not considered in calculations when a schedule is Leveled.</p> <p>Level of Effort activities may not be assigned a Constraint.</p> <p>When creating a LOE activity and the bar is not displayed, check the Bars form to ensure a LOE bar has been created and is being displayed.</p> 

Activity Type	Notes																																	
WBS Summary Activity	<p>The new Primavera Version 5.0 WBS Summary Activity is an activity that spans the duration of all activities which are assigned exactly the same WBS Code and, unlike a Level of Effort Activity, do not have any predecessors or successors.</p>  <table border="1"> <thead> <tr> <th>Activity ID</th> <th>Activity Name</th> <th>Activity Type</th> </tr> </thead> <tbody> <tr> <td>AS-H</td> <td>Hardware Summary</td> <td>WBS Summary</td> </tr> <tr> <td>AS310</td> <td>Site Preparation</td> <td>Task Dependent</td> </tr> <tr> <td>AS240</td> <td>Installation Begins</td> <td>Start Milestone</td> </tr> <tr> <td>AS315</td> <td>Install Electrical Pow...</td> <td>Task Dependent</td> </tr> <tr> <td>AS109</td> <td>Test & Debug Line A</td> <td>Task Dependent</td> </tr> <tr> <td>AS110</td> <td>Test & Debug Line B</td> <td>Task Dependent</td> </tr> <tr> <td>AS111</td> <td>Pilot Start Line A</td> <td>Task Dependent</td> </tr> <tr> <td>AS112</td> <td>Start-Up Line B</td> <td>Task Dependent</td> </tr> <tr> <td>AS275</td> <td>Path Refinement an...</td> <td>Task Dependent</td> </tr> <tr> <td>AS265</td> <td>Path Refinement an...</td> <td>Task Dependent</td> </tr> </tbody> </table> <p>Therefore, a WBS activity will change duration when either the earliest start or latest finish of activities that it spans is changed. This may happen as the project progresses and activities do not meet their original scheduled dates, or the duration of an activity is changed, or logic is changed, or the schedule is leveled.</p> <p>This function calculates the WBS Activity Duration in the same way a WBS or Summary activities in Elecosoft (Asta) Powerproject. This is similar also to the way Summary activity durations are calculated in Microsoft Project and Elecosoft (Asta) Powerproject, except the activities do not need to be demoted below the detailed activities in as Microsoft Project and Elecosoft (Asta) Powerproject.</p> <p>WBS activities may be used for:</p> <ul style="list-style-type: none"> • Reporting at summary level by filtering on WBS activities, • Entering estimated costs at summary level for producing cash flow tables while the detailed activities are used for calculating the overall duration for the WBS and day-to-day management of the project, and • Recording costs and hours at summary level when it is not desirable or practical to record at activity level, especially when the detailed activities are liable to change. <p>It does not matter how activities are Grouped as they always span activities with the same WBS Code.</p>	Activity ID	Activity Name	Activity Type	AS-H	Hardware Summary	WBS Summary	AS310	Site Preparation	Task Dependent	AS240	Installation Begins	Start Milestone	AS315	Install Electrical Pow...	Task Dependent	AS109	Test & Debug Line A	Task Dependent	AS110	Test & Debug Line B	Task Dependent	AS111	Pilot Start Line A	Task Dependent	AS112	Start-Up Line B	Task Dependent	AS275	Path Refinement an...	Task Dependent	AS265	Path Refinement an...	Task Dependent
Activity ID	Activity Name	Activity Type																																
AS-H	Hardware Summary	WBS Summary																																
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AS315	Install Electrical Pow...	Task Dependent																																
AS109	Test & Debug Line A	Task Dependent																																
AS110	Test & Debug Line B	Task Dependent																																
AS111	Pilot Start Line A	Task Dependent																																
AS112	Start-Up Line B	Task Dependent																																
AS275	Path Refinement an...	Task Dependent																																
AS265	Path Refinement an...	Task Dependent																																

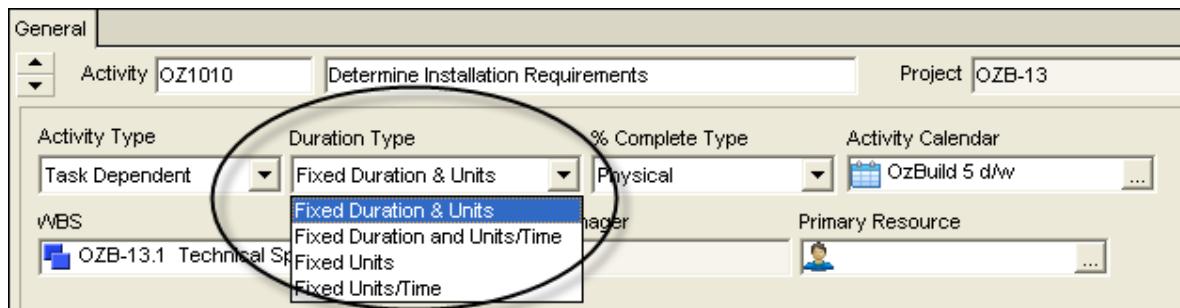
19.4.3 Duration Type

The Duration Type becomes effective after a resource has been assigned to an activity.

The **Duration Type** for all new activities is set in the **Defaults** tab in the **Projects Window** and all new activities are assigned this Duration Type.



The **Duration Type** for each new activity may be changed in the **General** tab in the **Activities Window** or by displaying the **Duration Type** column:



The Duration Type determines which of the following variables change when one of the others is changed in the equation:

- Resource Units = Resource Units per Time Period x Duration

For example, a 40-hour activity with 2 people working 8 hours per day will take 20 hours or 2.5 days:

- 40 hours of work = 2 people per hour x 20 hours

When an activity is in-progress this equation is modified to:

- Remaining Resource Units = Resource Units per Time period x Remaining Duration

Primavera has four options for Duration Type, Microsoft Project has three options

The Primavera terminology that describes the way the software treats the relationship between Durations, Resource Units and Resource Units/Time Period is different from Microsoft Project and Elecosoft (Asta) Powerproject. Primavera has more options than all the other products and this gives the product more flexibility. The following table should clarify these options.

Purposes of the Duration Types

Duration Type	Purpose
• Fixed Duration & Units	<p>Option 1</p> <p>This option is used when the Duration of an activity should not change when Resources are added or removed or Units/Time changed.</p> <p>For example, when the time to complete an activity is fixed, the resources may be manipulated until a satisfactory resource loading is established without the activity duration changing.</p> <p>Option 2</p> <p>A change to the Duration will change the Units/Time; however, the Units will remain constant.</p> <p>If one person is assigned to an activity for 8 hours per day and the activity is doubled in duration, there will be now be one person working on the activity for 4 hours per day and the activity will require the same number of hours to complete.</p> <p>IMPORTANT POINT: The Estimate at Completion WILL NOT change when the activity duration is changed and the number of resources WILL change.</p>
• Fixed Duration & Units/Time	<p>This Duration Type disables the User Preferences, Calculations tab option Recalculate the Units, Duration, and Units/Time for existing assignments based on the activity Duration Type.</p> <p>Option 1</p> <p>This option is used when the Duration of an activity should not change when Resources are added or removed or Units/Time changed.</p> <p>For example, when the time to complete an activity is fixed, the resources may be manipulated until a satisfactory resource loading is established without the activity duration changing.</p> <p>Option 2</p> <p>A change in the Duration will change the Units; however, the Units/Time will remain constant.</p> <p>For example, when there are two people assigned to an activity and the activity is increased in duration, there will still be two people working but for a longer period of time.</p> <p>IMPORTANT POINT: The Estimate at Completion WILL change when the activity duration is changed and the number of resources WILL NOT change.</p>
• Fixed Units	<p>This option is used when the amount of work required to finish an activity is constant.</p> <p>For example, if there are 8,000 bricks to be laid and a bricklayer is able to lay 100 bricks per hour, there are 80 hours of work for one bricklayer, 40 hours for 2 bricklayers and 20 hours for 4 bricklayers. Changing the Duration or the Units/Time will not change the number of hours required to complete the activity.</p>
• Fixed Units/Time	<p>This option is used when the same number of people are required to complete an activity irrespective of the activity duration.</p> <p>For example, if a machine requires two people to operate it and therefore a Resource is assigned to the Activity at 200%, changing either the Units or the Duration will not change the Units/Time and there will always be two people operating the machine.</p>



The duration of both **Fixed Units** and **Fixed Units/Time** activities will change if the resource Units/Time Period or Remaining Units are changed. It is the author's preference to use:

- **Fixed Duration & Units** when the estimate at completion must not change, and
- **Fixed Duration & Units/Time** when the crew size must remain constant.

The following table displays what happens to the relationship in each of the four options when one variable is changed and

- The **User Preferences, Calculations** tab option **Preserve the Units, Duration, and Units/Time for existing assignments** is selected:

Duration Type	Labor Units Change in Status Tab	Activity Duration Change	Resource Units Change	Units/Time Period Change	Add or Remove Resources
Fixed Units/Time	Duration Change	Units Change	Duration Change	Duration Change	Activity Units Change, Resource Units Constant, Duration Constant
Fixed Duration & Units/Time	Units/Time Change	Units Change	Units/Time Change	Units Change	Activity Units Change, Resource Units Constant, Duration Constant
Fixed Units	Duration Change	Units/Time Change	Duration Change	Duration Change	Activity Units Change, Resource Units Constant, Duration Constant
Fixed Duration & Units	Units/Time Change	Units/Time Change	Units/Time Change	Units Change	Activity Units Change, Resource Units Constant, Duration Constant

The following table displays what happens to the relationship in each of the four options when one variable is changed and

- The **User Preferences, Calculations** tab option **Recalculate the Units, Duration, and Units/Time for existing assignments based on the activity Duration Type** is selected:

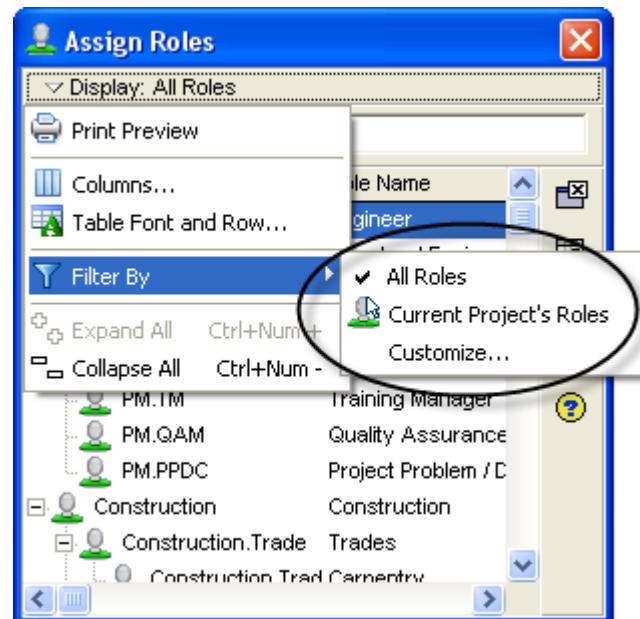
Duration Type	Labor Units Change in Status Tab	Activity Duration Change	Resource Units Change	Units/Time Period Change	Add or Remove Resources
Fixed Units/Time	Duration Change	Units Change	Duration Change	Duration Change	Activity Units Constant, Resource Units Change, Duration Change
Fixed Duration & Units/Time	Units/Time Change	Units Change	Units/Time Change	Units Change	Activity Units Change, Resource Units Constant, Duration Constant
Fixed Units	Duration Change	Units/Time Change	Duration Change	Duration Change	Activity Units Constant, Resource Units Change, Duration Change
Fixed Duration & Units	Units/Time Change	Units/Time Change	Units/Time Change	Units Change	Activity Units Constant, Resource Units Change, Duration Constant

- Bold descriptions in the right column in the table indicate the differences from the upper table.
- The **User Preferences, Calculations** tab option **Preserve the Units, Duration, and Units/Time for existing assignments** will not freeze the Activity Units when the Duration Type of **Fixed Units** is selected.

19.5 Assigning and Removing Roles

To assign a Role to an activity:

- Select the one or more activity to be assigned the Role,
- Select the **Resources** tab in the **Activity Details** form,
- Click on the  **Roles... Assign** toolbar icon to open the **Assign Roles** form,
- Use the **Display:, Filter By** menu to select either:
 - **All Roles**, which will display all Roles in the database,
 - **Current Project's Roles**. This option will only display Roles that have been assigned to this project, or
 - **Customize**, which opens a **Filter** form enabling the user to limit the number of displayed Roles by creating a filter.
- Select one or more Roles to be assigned to an activity using the **Ctrl-click** function,
- Then to assign a Role:
 - Click on the  icon, or
 - Double-click one of the Roles.



To achieve the following picture, you may need to format the columns in the **Resources Details** form.

General	Resources	Summary	Status	Successors	Predecessors	
				Project RFP181004		
Role Name	Resource ID Name	Budgeted Units	Actual Units	Remaining Units	Completion Units	
Bid Manager		8.00h	0.00h	8.00h	8.00h	
Sales Engineer		8.00h	0.00h	8.00h	8.00h	
System Engineer		8.00h	0.00h	8.00h	8.00h	

At this point, the Roles hours and costs may be edited as required.

To remove a Role:

- Select the Role, and
- Click on the  icon.

19.6 Assigning and Removing Resources

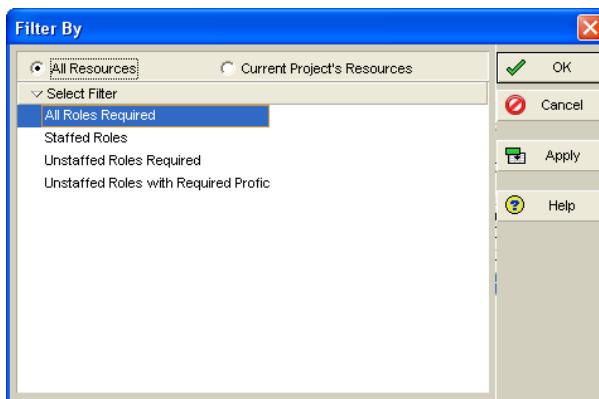
Resources may be assigned directly to:

- An activity that has an Assigned Role, or
- An Activity without a Role.

19.6.1 Assigning a Resource to an Assigned Role

To assign a Resource to a Role assigned to an activity:

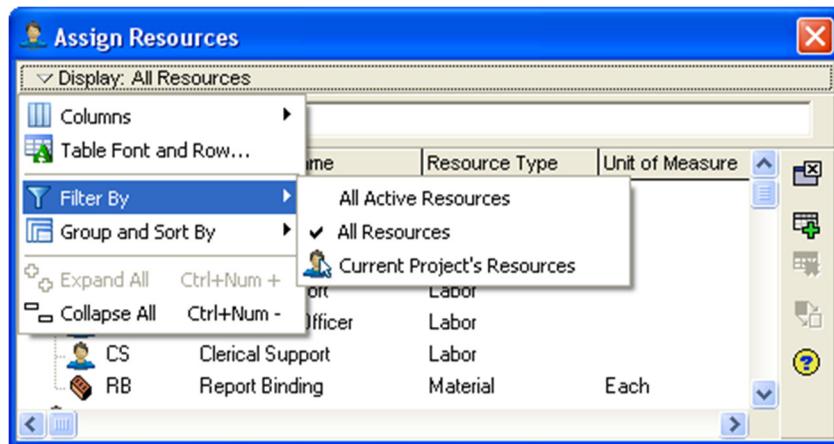
- Select the activity to be assigned a Resource,
- Select the Role to be assigned a Resource from the **Resources Details** tab,
- Click on the **Resources by Role... Assign** toolbar icon to open the **Assign Resources By Roles** form,
- Click on the **Display:** menu and select **Filter By** to open the **Filter By** form,
 - **All Roles Required:** Chooses to view all roles assigned to the activity.
 - **Staffed Roles:** Displays Roles with an assigned resource.
 - **Unstaffed Roles Required:** Displays Roles without an assigned resource.
 - **Unstaffed Roles with Required Proficiency:** Displays Roles without an assigned resource and requires a resource with a specific proficiency level.
- Select which Resources you wish to have displayed in the **Assign Roles** form from the **Filter By** form,
- Select to return to the **Assign Resources By Role** form,
- From the **Assign Resources By Role** form click the Resource you wish to assign,
- To assign the Resource either:
 - Double-click the Resource, or
 - Click on the icon.



19.6.2 Assigning a Resource to an Activity Without a Role

To assign a Resource to an activity:

- Select the activity to be assigned the Resource,
- Click on the Resources... Assign toolbar icon to open the **Assign Resource** form,
- Click on the **Display:** menu and select **Filter By** and then select from the three options which resources you wish to display in the **Assign Resources** form,



- To assign the Resource either:
 - Double-click the Resource, or
 - Click on the icon.

You may now edit the hours or Units/Time Period for each resource.

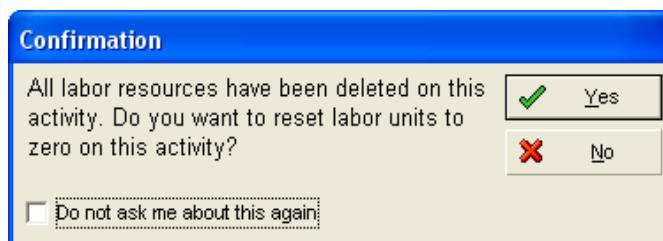
19.6.3 Removing a Resource

Before you remove a Resource from an activity that has more than one resource assigned to it, you must be aware of your **Resource Assignment** preferences. These preferences determine if the total number of Units assigned to the activity (or work) will be reduced or remain constant as resources are deleted.

To remove a resource, select one or more Resources in the bottom pane Resource tab and either:

- Strike the **Del** key, or
- Click on the Remove icon at the bottom of the screen, not the icon on the Edit toolbar.

After the last resource is removed there will be the message:



- If you select Yes then the Resource Units values in the **Activities Window, Status tab** will be set to zero, and the Resource Costs in the **Activities Window, Status tab** will be calculated from the value entered.

If you select  No then:

- The Units values in the **Activities Window, Status tab** will be set to equal the Resource values before they were deleted, and
- The Cost values in the **Activities Window, Status tab** will be calculated from the value set in **Calculations** tab in the **Projects Window**.

Calculations	
Activities Default Price / Unit for activities without resource or role Price / Units <input type="text" value="\$50/h"/> <input type="checkbox"/> Activity percent complete based on activity steps <input checked="" type="checkbox"/> Link Budget and At Completion for not started activities <input type="radio"/> Reset Original Duration and Units to Remaining <input checked="" type="radio"/> Reset Remaining Duration and Units to Original	Resource Assignments When updating Actual Units or Cost <input type="radio"/> Add Actual to Remaining <input checked="" type="radio"/> Subtract Actual from At Completion <input checked="" type="checkbox"/> Recalculate Actual Units and Cost when duration % complete changes <input type="checkbox"/> Update units when costs change on resource assignments <input checked="" type="checkbox"/> Link actual to date and actual this period units and costs

- At this point you will have Units and Costs assigned to an activity that may be seen in the **Activities Window, Status tab** without any assigned resources, which may not be desirable.

 Labor Units		 Labor Cost	
Budgeted	80h	Budgeted	\$4,000
Actual	0h	Actual	\$0
Remaining	80h	Remaining	\$4,000
At Complete	80h	At Complete	\$4,000



When you assign a resource to an activity in this condition the resource will adopt the Units value from the **Activities Window, Status tab**, ignoring the **Default Units /Time Period** set in the **Resource Window**, but normally calculate the resource value from the resource Rate.

19.6.4 Assigning a Resource to an Activity More Than Once

The option in the **Projects Window Resources** tab under the **Resources Assignments** heading enables a resource to be assigned more than once to an activity.

A resource could be assigned to work at the start of an activity and then in conjunction with **Resource Lag** work again at the end of an activity.

Resources	
Resource Assignments <input checked="" type="checkbox"/> Resources can be assigned to the same activity more than once	

19.7 Resource and Activity Duration Calculation and Resource Lags

19.7.1 Activity Duration

An Activity Duration (or Activity Remaining Duration of an In-Progress Activity) is adopted from the longest Resource Duration (or Resource Remaining Duration of an In-Progress Activity) when more than one resource has been assigned to an activity.

In a situation where more than one Resource has been assigned to an activity with different Units and/or Units/Time, the Resources may have different durations.

In the following example the Activity Duration is 10 days, which is calculated from David William's **Resource Original Duration** of 10 days:

Activity ID	Activity Name	Original Duration	Oct 13		
A1050	Duartion Type - Fixed Units	10d	un Mor Tue We Thr Fri Sat Sun		
General	Resources	Status			
	Activity A1050 Duardion Type - Fixed Units				
Role ID	Resource ID Name	Original Lag	Original Duration	Remaining Units	Remaining Units / Time
Oz.SE	ARL.Angela Lowe	0d	5d	40.00h	100%
Oz.BM	DTW.David Williams	0d	10d	40.00h	50%
Oz.CS	MAY.Melinda Young	0d	5d	40.00h	100%

19.7.2 Resource Lag

A Resource may be assigned a Lag, the duration from the start of the activity to the point at which the Resource commences work.

In the following example the Activity Duration is 12 days, which is calculated from Angela Lowe's **Resource Original Lag** of 7 days and **Resource Original Duration** of 5 days:

Activity ID	Activity Name	Original Duration	Oct 13		
A1050	Duardion Type - Fixed Units	12d	un Mor Tue We Thr Fri Sat Sun		
General	Resources	Status			
	Activity A1050 Duardion Type - Fixed Units				
Role ID	Resource ID Name	Original Lag	Original Duration	Remaining Units	Remaining Units / Time
Oz.SE	ARL.Angela Lowe	7d	5d	40.00h	100%
Oz.BM	DTW.David Williams	0d	10d	40.00h	50%
Oz.CS	MAY.Melinda Young	0d	5d	40.00h	100%

19.8 Expenses

Expenses are intended to be used for one off non-resource type costs and could include:

- Purchase of office equipment to set up a project office,
- Travel costs,
- Payment for a consultant's report,
- Insurance costs, and
- Training courses.

Expenses may be created using the:

- **Expenses Window** and assigned to an activity, or
- Created in the **Expenses tab** of an activity.

19.8.1 Expenses Window

The **Expenses Window** is opened by:

- Clicking in the  icon on the **Project** toolbar, or
- Selecting **Project, Expenses**.

Creating a new **Expense** is similar to creating a new activity:

- Select **Edit, Add**, and
- The **Select Activity** form will then be displayed and the activity the expense is to be associated with is selected.

Expense Item	Expense Category	Vendor
Training Manuals	Training	Eastwood Harris Pty Ltd
Primavera Training Course	Training	Eastwood Harris Pty Ltd

General **Activity** **Costs** **Description**

Expense Item Training Manuals	Expense Category Training
Vendor Eastwood Harris Pty Ltd	
Cost Account Con.11.4 Training	Document Number 110803 P6V81S

Enter the following Information in the tabs in the bottom window:

- **General Tab**
 - **Expense Item** – A free form field to enter the description of the Expense.
 - **Vendor** – A free form field to enter the vendor or supplier name.
 - **Expense Category** – Select the Expense Category; these are created in the **Admin Categories** form.
 - **Cost Account** – Select a Cost Account should you wish to see or report the costs against a Cost Account. Costs accounts are created in a similar method to other hierarchical structures in Primavera, such as the WBS, by selecting **Enterprise, Cost Accounts....**

- **Document Number** – A free form field to enter the document number that could represent the Purchase Order, Contract, or Invoice Number.
- **Activity** tab displays information mainly adopted from an activity, the Accrual Type, is editable:
 - **Accrual Type** – this enables you to select if the costs are accrued or cash flowed at the beginning, end, or uniformly over the duration of the activity.
- **Costs** tab is mainly self-explanatory. The following information is entered:
 - **Budgeted Units, Actual Units, Remaining Units and At Completion Units** – the quantity of the Expense item. When an Expense is created it is set a default value of 1. If set to zero then the costs are set to zero and costs may now not be entered.
 - **Price/Unit** – the cost per Expense item,
 - **Unit of Measure** – the units of the Expense; for example, each, foot, meter, etc.
 - Check **Auto Compute Actuals** to allow the software to calculate the Actual and Remaining Costs and Units (quantities) based on the **Remaining Duration**,
 - The remainder of the fields are used when the activity is progressed.

General		Activity		Costs		Description	
Budgeted Units		Actual Units		Remaining Units		At Completion Units	
10.000		0.000		10.000		10.000	
Price/Unit		Unit of Measure					
\$100		each					
Budgeted Cost		Actual Cost		Remaining Cost		At Completion Cost	
\$1,000		\$0		\$1,000		\$1,000	
Expense % Complete							
0%							
				<input type="checkbox"/> Auto Compute Actuals			

- **Description** tab is where you enter an extended description of the Expense item.

19.8.2 Expenses Tab in the Activities Window

This tab may have all the columns of data available in the **Expenses Window** displayed. All the fields may be edited from this tab:

Activity ID	Activity Name	January 2014				February 2014				March 2014																																											
		06	13	20	27	03	10	17	24	03	10	17	24																																								
P6 Training																																																					
A1000	Primavera Training Course																																																				
<table border="1"> <thead> <tr> <th colspan="2">Expenses</th> <th colspan="4">Project</th> <th colspan="4">Training</th> </tr> <tr> <th>Activity</th> <th>Primavera Training Course</th> <th>Accrual Type</th> <th>Price / Unit</th> <th>Unit of Measure</th> <th>Remaining Units</th> <th>Budgeted Cost</th> <th></th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td>Primavera Training Course</td> <td>Uniform over Activity</td> <td>\$1,600</td> <td>day</td> <td></td> <td>3.000</td> <td>\$4,800</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Training Manuals</td> <td>Uniform over Activity</td> <td>\$100</td> <td>each</td> <td></td> <td>10.000</td> <td>\$1,000</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>														Expenses		Project				Training				Activity	Primavera Training Course	Accrual Type	Price / Unit	Unit of Measure	Remaining Units	Budgeted Cost				Primavera Training Course	Uniform over Activity	\$1,600	day		3.000	\$4,800				Training Manuals	Uniform over Activity	\$100	each		10.000	\$1,000			
Expenses		Project				Training																																															
Activity	Primavera Training Course	Accrual Type	Price / Unit	Unit of Measure	Remaining Units	Budgeted Cost																																															
Primavera Training Course	Uniform over Activity	\$1,600	day		3.000	\$4,800																																															
Training Manuals	Uniform over Activity	\$100	each		10.000	\$1,000																																															

19.9 Suggested Setup for Creating a Resourced Schedule

The order that topics are introduced in this chapter is also a satisfactory order of actions that should be considered when preparing to assign resources to activities.

The simplest calculation options should be used as a default, and more complex options considered only when there is a specific scheduling requirement.

The table following lists processes and suggested options that could be considered when creating a resourced schedule. It is important to set all the parameters before the activities are added otherwise a lot of time is wasted changing parameters on a number of activities. These are not intended to suit every project but are a starting point for less experienced users.

Step	Suggested Settings
<ul style="list-style-type: none"> Set the Units/Time format by selecting Edit, User Preferences... to open the User Preferences form and select the Time Units tab. 	<p>There is a choice of percentage (50%) or units/duration (4h/d). This should be set on personal preference. The author prefers (4h/d) as this reduces typing. The User Preferences, Time Units setting affects how these are displayed and 16h/d or 2d/d or 200% is two people.</p>
<ul style="list-style-type: none"> Set the Resource Assignments option by selecting Edit, User Preferences... to open the User Preferences form and select the Calculations tab. 	<p>It is suggested that the Preserve the Units, Duration, and Units/Time for existing assignments is selected. With this option as Resources are added or deleted the total number of hours assigned to an Activity increases or decreases. Each Resource's hours are calculated independently.</p> <p>The options under Assignment Staffing need to be carefully considered and understood so that when Resources are assigned to Roles and resource assignments are changed that the user understands which Unit Rate and which Unit Cost will remain against the activity.</p>
<ul style="list-style-type: none"> In the Project Window, Defaults tab set the default Activity Type. 	<p>It is suggested that Task Dependent is used, as with this option Resource calendars are not used making the schedule simpler.</p>
<ul style="list-style-type: none"> In the Project Window, Defaults tab set the default Duration Type. 	<p>It is suggested that Fixed Duration & Units is used. With this option the Activity Duration does not change when resource assignments are altered, and when an Activity Duration is changed the Units do not change, so your estimate of hours and costs will not change.</p> <p>When you wish the crew size to remain the same when the activity duration is changed then you should select Fixed Duration & Units/Time. The cost and units will change proportionally.</p>
<ul style="list-style-type: none"> In the Project Window, Defaults tab set the default Percent Complete Type. 	<p>The author prefers to use Physical as this enables the Activity Percent Complete to be independent of the Activity Durations.</p>
<ul style="list-style-type: none"> In the Project Window, Resource tab set the default Resource Assignment Defaults. 	<p>Unless multiple Rates are being used then Price/Unit should be selected.</p> <p>Check Drive activity dates by default.</p>

19.10 Workshop 16 – Assigning Resources and Expenses to Activities



Background

The Resources must now be assigned to their specific activities.

Assignment

Open the OzBuild with Resources project and complete the following steps.

1. Apply the **OzBuild Workshop 10 – Without Float** layout and save as **OzBuild Workshop 16 – Assigning Resources** layout.
2. In the **Activities Window** display the **Gantt Chart** in the top view and **Resources** and **Expenses** tab of the **Activities Details** form in the bottom view.
3. Assign an Expense to the **Create Technical Specification** activity as per the picture below:

Expenses				
		Activity	Create Technical Specification	
Expense Item	/	Accrual Type	Price / Unit	Budgeted Cost
Specialists Consultant		Uniform over Activity	\$5,000.00	\$5,000.00

4. Format the **Resources** tab with the columns shown in the following picture:

Resources				
		Activity	Determine Installation Requirements	
Resource ID	Name	Price / Unit	Default Units / Time	At Completion Units
PM.Project Manager		\$120.00/h	8/d	32
SE.Systems Engineer		\$90.00/h	8/d	32

5. Set your **User Preferences** as in the picture below:

User Preferences	
Time Units <hr/> <u>Dates</u> <u>Currency</u> <u>E-Mail</u> <u>Assistance</u>	Units Format <hr/> <p>Unit of Time: Hour Sub-unit: Minutes</p> <input checked="" type="checkbox"/> Show Unit label Decimals: 0 Example: 40h 30n

continued....

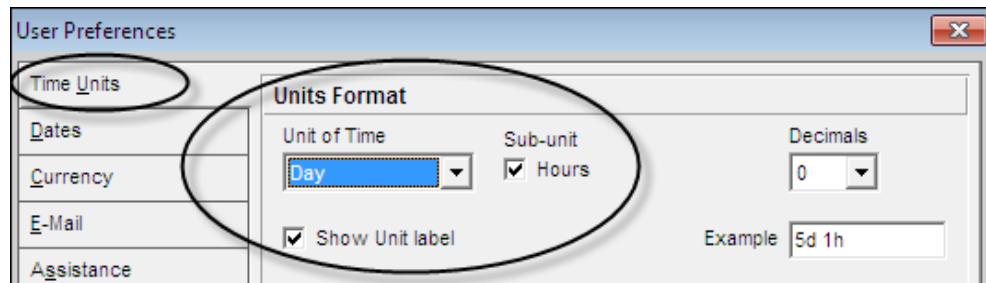
6. Add the **Resources** column to the Gantt Chart per the picture below.
7. Assign the following Resources to the Activities using the **Resource tab**  icon:

Activity ID	Activity Name	Resources
Bid for Facility Extension		
Technical Specification		
OZ1000	Approval to Bid	
OZ1010	Determine Installation Requirements	Project Manager, Systems Engineer
OZ1020	Create Technical Specification	Systems Engineer
OZ1030	Identify Supplier Components	Purchasing Officer
OZ1040	Validate Technical Specification	Project Manager, Systems Engineer
Delivery Plan		
OZ1050	Document Delivery Methodology	Project Manager
OZ1060	Obtain Quotes from Suppliers	Purchasing Officer, Project Manager
OZ1070	Calculate Bid Estimate	Project Support
OZ1080	Create the Project Schedule	Project Support
OZ1090	Review the Delivery Plan	Project Manager, Systems Engineer
Bid Document		
OZ1100	Create Draft of Bid Document	Clerical Support, Project Manager
OZ1110	Review Bid Document	Project Manager, Systems Engineer
OZ1120	Finalise and Submit Bid Document	Project Manager, Report Binding
OZ1130	Bid Document Submitted	

8. Enter 3 as the Budgeted Units and At Completion Units for the Report Binding.
9. Add the columns per below and your answer should look like this:

Activity ID	Activity Name	Resources	At Completion Labor Units	At Completion Labor Cost	At Completion Expense	At Completion Material Cost	At Completion Total Cost
Bid for Facility Extension			520h	\$49,760.00	\$5,000.00	\$300.00	\$55,060.00
Technical Specification			152h	\$14,800.00	\$5,000.00	\$0.00	\$19,800.00
OZ1000	Approval to Bid		0h	\$0.00	\$0.00	\$0.00	\$0.00
OZ1010	Determine Installation Requirements	Project Manager, Systems Engineer	64h	\$6,720.00	\$0.00	\$0.00	\$6,720.00
OZ1020	Create Technical Specification	Systems Engineer	40h	\$3,600.00	\$5,000.00	\$0.00	\$8,600.00
OZ1030	Identify Supplier Components	Purchasing Officer	16h	\$1,120.00	\$0.00	\$0.00	\$1,120.00
OZ1040	Validate Technical Specification	Project Manager, Systems Engineer	32h	\$3,360.00	\$0.00	\$0.00	\$3,360.00
Delivery Plan			224h	\$21,520.00	\$0.00	\$0.00	\$21,520.00
OZ1050	Document Delivery Methodology	Project Manager	32h	\$3,840.00	\$0.00	\$0.00	\$3,840.00
OZ1060	Obtain Quotes from Suppliers	Purchasing Officer, Project Manager	128h	\$12,160.00	\$0.00	\$0.00	\$12,160.00
OZ1070	Calculate Bid Estimate	Project Support	24h	\$1,920.00	\$0.00	\$0.00	\$1,920.00
OZ1080	Create Project Schedule	Project Support	24h	\$1,920.00	\$0.00	\$0.00	\$1,920.00
OZ1090	Review the Delivery Plan	Project Manager, Systems Engineer	16h	\$1,680.00	\$0.00	\$0.00	\$1,680.00
Bid Document			144h	\$13,440.00	\$0.00	\$300.00	\$13,740.00
OZ1100	Create Draft of Bid Document	Clerical Support, Project Manager	96h	\$8,160.00	\$0.00	\$0.00	\$8,160.00
OZ1110	Review Bid Document	Project Manager, Systems Engineer	32h	\$3,360.00	\$0.00	\$0.00	\$3,360.00
OZ1120	Finalise and Submit Bid Document	Project Manager, Report Binding	16h	\$1,920.00	\$0.00	\$300.00	\$2,220.00
OZ1130	Bid Document Submitted		0h	\$0.00	\$0.00	\$0.00	\$0.00

10. Change the User Preferences, Time Units, Units Format, Units of Time to Days and see the difference:



11. You will notice that there is no column to display the Materials quantity at completion.

Activity ID	Activity Name	Resources	At Completion Labor Units	At Completion Labor Cost	At Completion Expense	At Completion Material Cost	At Completion Total Cost
		Bid for Facility Extension	65d	\$49,760.00	\$5,000.00	\$300.00	\$55,060.00
		Technical Specification	19d	\$14,800.00	\$5,000.00	\$0.00	\$19,800.00
OZ1000	Approve		0d	\$0.00	\$0.00	\$0.00	\$0.00
OZ1010	Determine	Project Manager, Systems Engineer	8d	\$6,720.00	\$0.00	\$0.00	\$6,720.00
OZ1020	Create T	Systems Engineer	5d	\$3,600.00	\$5,000.00	\$0.00	\$8,600.00
OZ1030	Identify :	Purchasing Officer	2d	\$1,120.00	\$0.00	\$0.00	\$1,120.00
OZ1040	Validate	Project Manager, Systems Engineer	4d	\$3,360.00	\$0.00	\$0.00	\$3,360.00
		Delivery Plan	28d	\$21,520.00	\$0.00	\$0.00	\$21,520.00
OZ1050	Docume	Project Manager	4d	\$3,840.00	\$0.00	\$0.00	\$3,840.00
OZ1060	Obtain C	Purchasing Officer, Project Manager	16d	\$12,160.00	\$0.00	\$0.00	\$12,160.00
OZ1070	Calculat	Project Support	3d	\$1,920.00	\$0.00	\$0.00	\$1,920.00
OZ1080	Create tl	Project Support	3d	\$1,920.00	\$0.00	\$0.00	\$1,920.00
OZ1090	Review	Project Manager, Systems Engineer	2d	\$1,680.00	\$0.00	\$0.00	\$1,680.00
		Bid Document	18d	\$13,440.00	\$0.00	\$300.00	\$13,740.00
OZ1100	Create E	Clerical Support, Project Manager	12d	\$8,160.00	\$0.00	\$0.00	\$8,160.00
OZ1110	Review	Project Manager, Systems Engineer	4d	\$3,360.00	\$0.00	\$0.00	\$3,360.00
OZ1120	Finalise	Project Manager, Report Binding	2d	\$1,920.00	\$0.00	\$300.00	\$2,220.00
OZ1130	Bid Doc		0d	\$0.00	\$0.00	\$0.00	\$0.00



In a multi-user environment it is important that all users have the same User Preferences otherwise each person may display different Quantities at completion.

12. Change the User Preferences, Time Units, Units Format, Units of Time to Hours.

13. Save your layout as OzBuild Workshop 16 – Assigning Resources.

20 RESOURCE OPTIMIZATION

The schedule may now have to be resource optimized to:

- Reduce peaks and smooth the resource requirements, thus reducing the mobilization and demobilization costs, or to reduce the demand for site facilities, or
- Reduce resource demand to the available number of resources, or
- Reduce demand to an available cash flow when a project is financed on income.

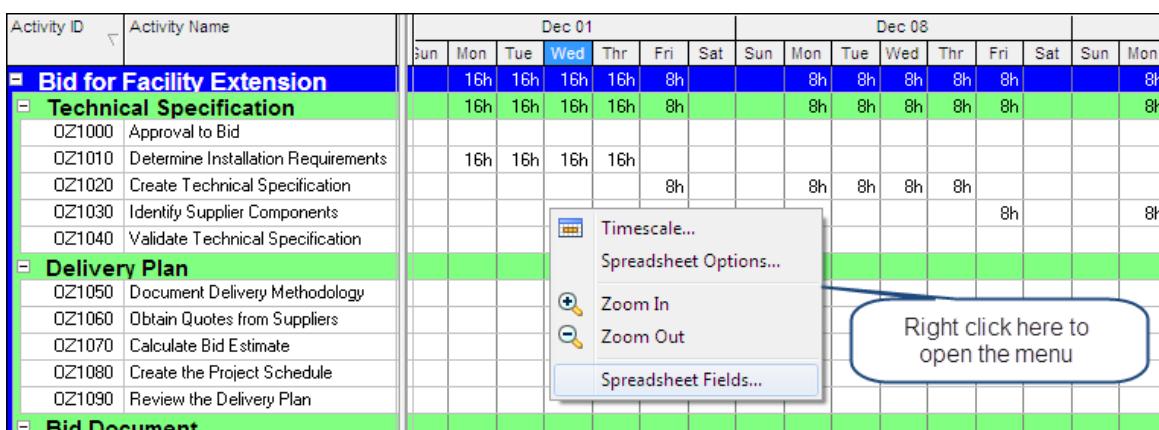
20.1 Reviewing Resource Loading

There are a number of facilities for reviewing resource loading which consist of either displaying a Layout or running a report. The Timescale interval affects the displays. Layouts will not be covered in detail, as they are self-explanatory.

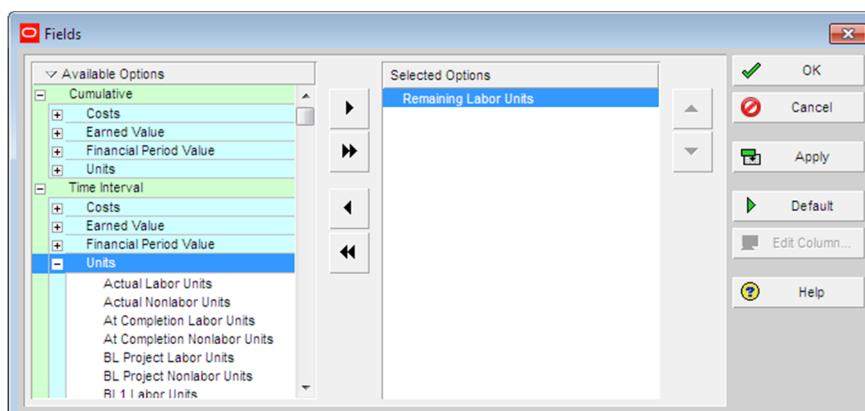
20.1.1 Activity Usage Spreadsheet

This window is displayed by clicking on the  icon or selecting **View, Show on Bottom, Activity Usage Spreadsheet**.

- This displays a total of all the resource costs or units assigned to activities:



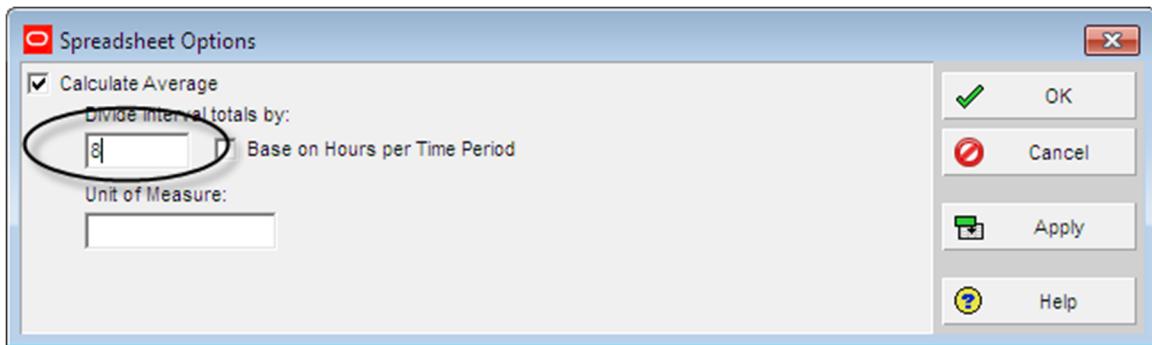
- Right-clicking will display a menu and the **Spreadsheet Fields...** option allows the selection of Cumulative and Time Interval display of Resource and Expenses information.



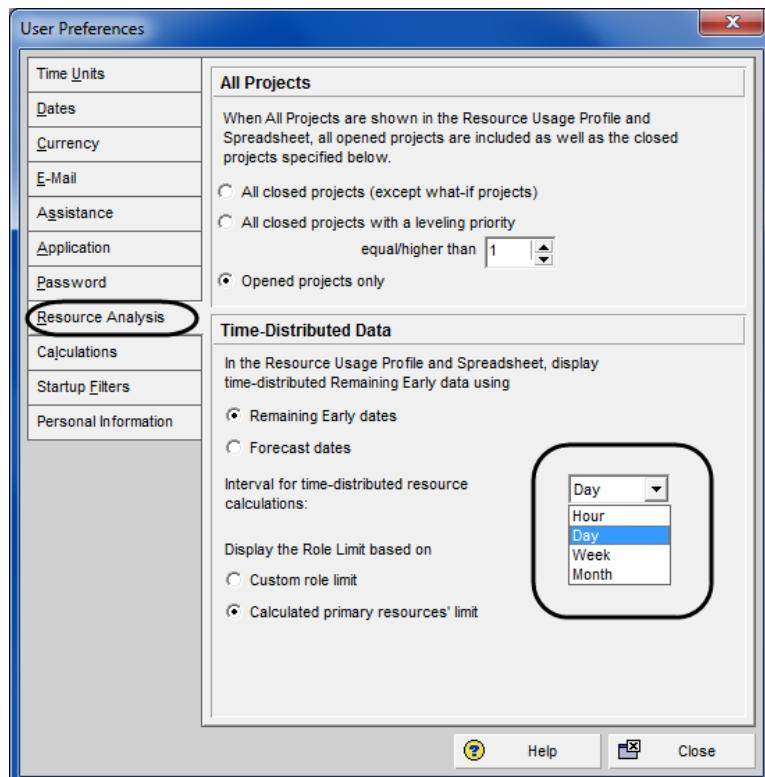
Cumulative Expense Units and Material Resources Units are not available in this view.



- **Spreadsheet Options...** allows the calculation of the average number of resources:



i The units are formatted using the **User Preferences, Time Units** tab. If the minimum time unit is an hour, ensure the **User Preferences, Resource Analysis Interval for time-distributed resource** calculations is set to one hour; otherwise, the data will not be displayed correctly when the timescale is opened up to hours:



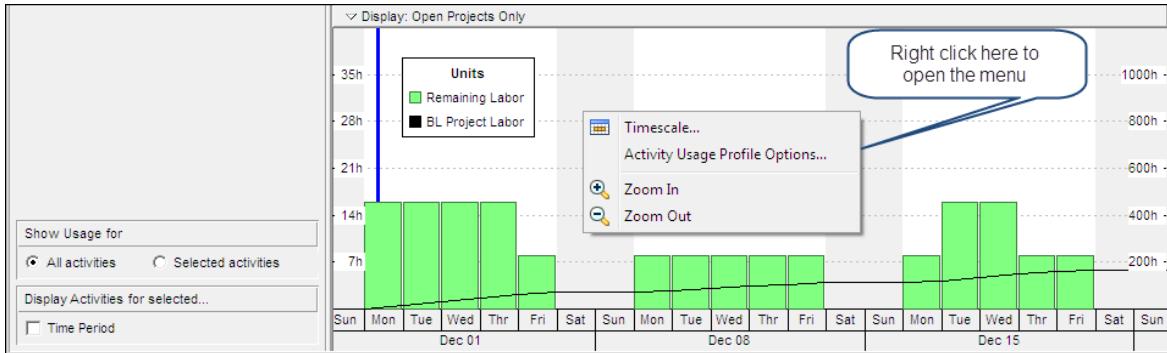
Activity ID	Activity Name	20	21	22	23	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	0	1			
Bid for Facility Extension						16h																												
Technical Specification						16h																												
0Z1020	Create Technical Specification					16h																												
0Z1010	Determine Installation Requirements					16h																												

Activity ID	Activity Name	Mon Dec 02	20	21	22	23	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	0	1
Bid for Facility Extension							2h																									
Technical Specification							2h																									
0Z1020	Create Technical Specification						2h																									
0Z1010	Determine Installation Requirements						2h																									

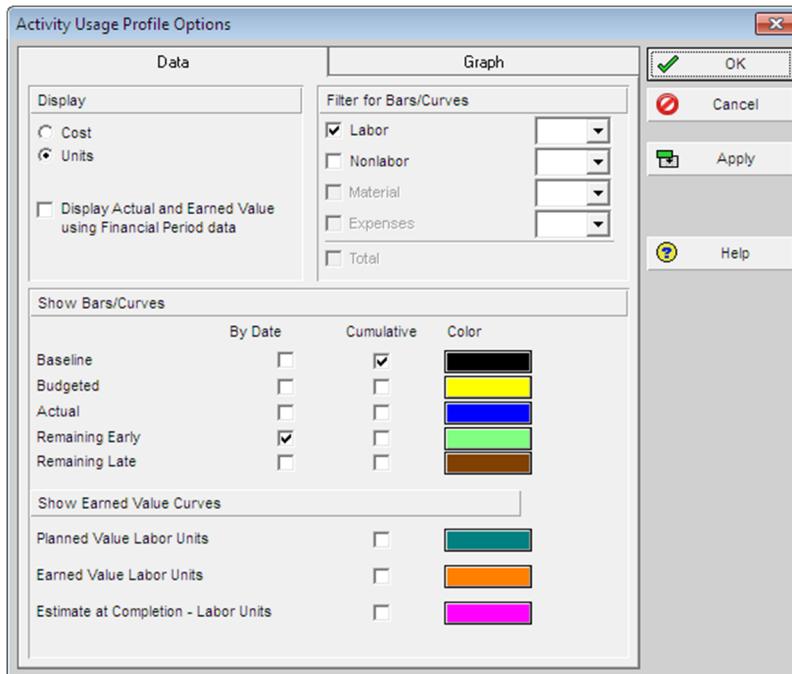
20.1.2 Activity Usage Profile

This is displayed by clicking on the  icon or selecting **View, Show on Bottom, Activity Usage Profile**.

- It displays the total resource histogram for selected or all activities. Right-click the Histogram for the display options:



- The **Activity Usage Profile Options...** menu opens up the **Activity Usage Profile Options** form:



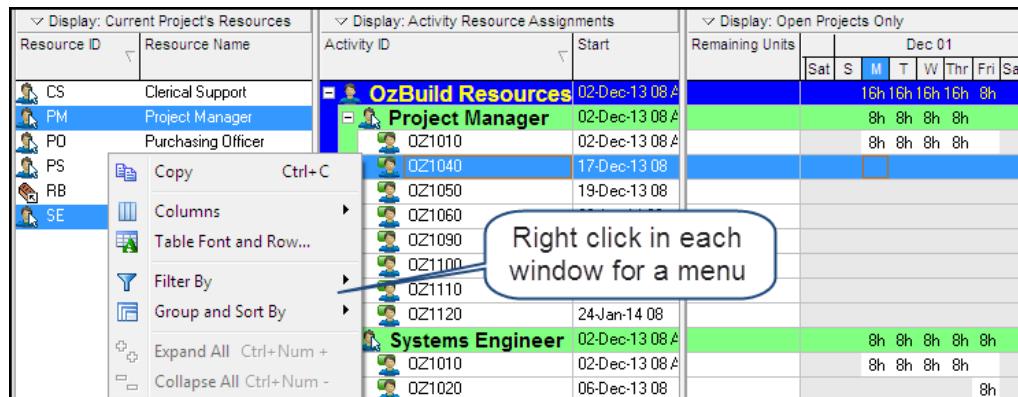
It may not be clear where these options are drawing their information from by reading the descriptions in the **Activity Usage Profile Options** form. The **Earned Value** chapter covers these options in more detail. The following functions affect the graphs display:

- The project Baseline/s,
- User Preferences, Time Units** settings,
- Projects Window, Settings tab, Project Settings section, Baseline for earned value calculations,**
- Admin, Admin Preferences..., Earned Value Tab, Earned value calculation** section.

20.1.3 Resource Usage Spreadsheet

This is displayed by clicking on the  icon or selecting **View, Show on Bottom, Resource Usage Spreadsheet**.

- This form has three windows showing the resources that are assigned to activities.
- Each window has a menu when right-clicking in the window.
- The units are formatted using the **User Preferences, Time Units** tab.
- As with the **Activity Usage Spreadsheet**, when the minimum time unit is an hour, ensure that the **User Preferences, Resource Analysis Interval for time-distributed resource** calculations is set to one hour; otherwise, the data will not be displayed correctly.
- When multiple resources are selected on the left-hand window then the corresponding Resource activities are displayed in the center and right-hand side window:



Display: Current Project's Resources		Display: Activity Resource Assignments		Display: Open Projects Only	
Resource ID	Resource Name	Activity ID	Start	Remaining Units	Dec 01
CS	Clerical Support	OzBuild Resources	02-Dec-13 08 A		16h 16h 16h 16h 8h
PM	Project Manager	Project Manager	02-Dec-13 08 A		8h 8h 8h 8h
PO	Purchasing Officer	OZ1010	02-Dec-13 08 A		8h 8h 8h 8h
PS		OZ1040	17-Dec-13 08		
RB		OZ1050	19-Dec-13 08		
SE		OZ1060			
		OZ1090			
		OZ1100			
		OZ1110			
		OZ1120	24-Jan-14 08		
		Systems Engineer	02-Dec-13 08 A		8h 8h 8h 8h 8h
		OZ1010	02-Dec-13 08 A		8h 8h 8h 8h
		OZ1020	06-Dec-13 08		8h

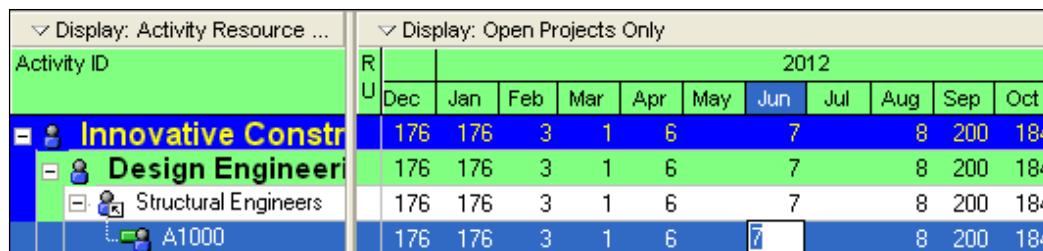
Version 15.2 introduced saving the selected Resources in both the **Resource Spreadsheet** and **Resource Histogram** when you save a Layout.

20.1.4 Editing the Resource Usage Spreadsheet – Bucket Planning

This new option in Primavera Version 6.0 enables resource assignment values to be manually edited. This enables more control over the assignment of resources that are working intermittently on an activity.

This is similar to editing a Microsoft Project Resource Usage table and making a resource assignment “Contoured.”

The following picture shows the edited values in the **Resource Usage Spreadsheet**.



Display: Activity Resource ...		Display: Open Projects Only										
Activity ID		2012										
		Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
Innovative Constr		176	176	3	1	6		7		8	200	184
Design Engineers		176	176	3	1	6		7		8	200	184
Structural Engineers		176	176	3	1	6		7		8	200	184
A1000		176	176	3	1	6		7		8	200	184

Each time period, therefore, may contain a different value.

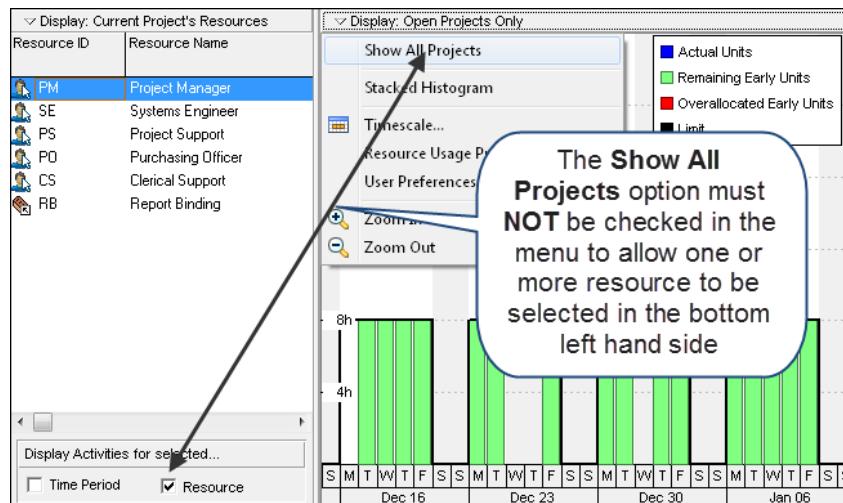


It is recommended that you experiment with this function if you plan to progress Bucket Planned Resources as the author has found this process gives some interesting results for the incomplete portion of an in-progress activity.

20.1.5 Resource Usage Profile displaying a Resource Histogram

Click on the  icon or select **View, Show on Bottom, Resource Usage Profile**.

- The options in this form are similar to the ones covered in the previous paragraphs,
- A **Stacked Histogram**, which require a filter to be created in the **Resource Usage Profile Options** to select the resources to be displayed, or individual histograms are available from the menu:

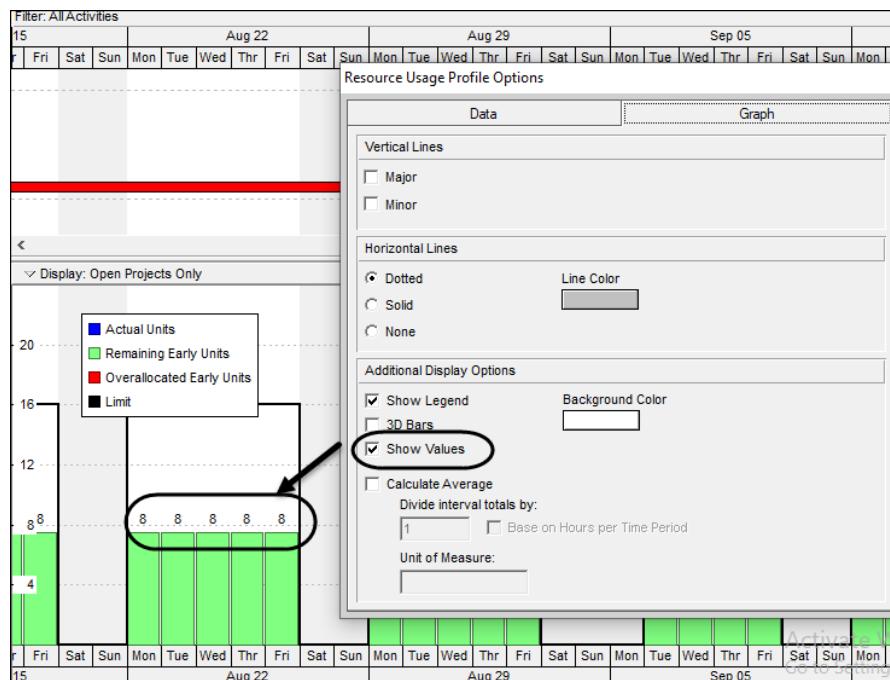


Version 15.2 introduced saving the selected Resources in both the **Resource Spreadsheet** and **Resource Histogram** when you save a Layout.

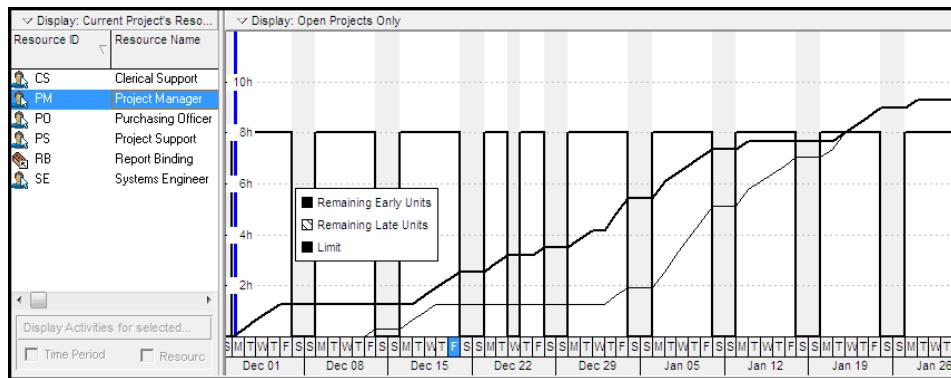


The resource availability is displayed using the Resource Calendar when the **Activity Type** is set to **Task Dependent** and the activity is scheduled using the Activity Calendar.

In P6 Version 20 value of histograms may be displayed on histograms in the Resource Usage Profile, Activity Usage Profile, and Tracking View by selecting the **Show Values** option in the **Profile Option** form, **Graph** tab:



20.1.6 Activity Usage Profile Displaying S-Curves



You must be prepared to experiment with the formatting menus by right-clicking in each of the windows of the above displays to understand all the many options, which include:

- Roles or Resources,
- All Resources, All Active Resources and Current Projects Resources only,
- Options to show period and cumulative values, or an average by dividing by a number,
- Options to filter, and
- Options to Group and Sort.

20.2 Resource Assignments Window

The **Resource Assignments Window** has some functions that are very useful especially when you wish to copy and paste data into Excel.

This view is essentially a time-phased view that is grouped by default by Resource, Role, or Activity and allows the display of:

- Cumulative and Period totals
- Cost of all Resource Types
- Units of all Resource Types



This view does not show either Expense Costs or Expense Units. So using this view for a cash flowing project with Expenses will not give the full value of the project. Resource Units Totals, say at project level, are only available when one resource type is displayed by using a filter.

Activity ID	Activity Name	Resource Type	Start	Finish	December 2013				January 2014			
					11	08	15	22	29	05	12	19
OzBuild Resources			02-Dec-13 08 A	12-Feb-14 16
Project Manager			02-Dec-13 08 A	12-Feb-14 16	00 P	12 00	12 00	12 00	12 00	12 00	12 00	12 00
Systems Engineer					16	56	24	12	28	52	20	16
Project Support							8					
OZ1070	Calculate Bid Estimate	Labor										
OZ1080	Create the Project Schedule	Labor										
Purchasing Officer												
OZ1030	Identify Supplier Components	Labor	11-Dec-13 08	12-Dec-13 16								
OZ1060	Obtain Quotes from Suppliers	Labor	02-Jan-14 08	23-Jan-14 16								
Clerical Support												
OZ1100	New Task	Labor	02-Jan-14 08	09-Jan-14 16								
Report Binding												
OZ1120	Finalise and Submit Bid Document	Material	09-Dec-13 08	09-Dec-13 16								
Non Labour Resource												
OZ1060	Obtain Quotes from Suppliers	Nonlabor	02-Jan-14 08	23-Jan-14 16								

Project total not available with mixed Resource Types

Multiple Resource Types may be displayed

20.3 Copying and Pasting into Excel

The following data may be copied and pasted into Excel:

- Activity data from the Activities Window
- Activity Usage Spreadsheet
- Tables in the Tracking Window
- Resource Assignments Window

It has been the author's experience that data from the Resource Usage Spreadsheet may NOT be copied and pasted into Excel but similar data may be obtained in the Resource Assignments Window and copied and pasted into Excel.



You should be aware of the following issues:

- The **User Preferences** need to be appropriate especially for date formatting if you wish the data to be pasted as dates into Excel.
- Dates that are pasted with an "A" at the end may be removed with the Excel command of **Find and Replace**. You may need to put a space before the "A" so you do not lose the "A" in front of August.
- To remove the "*" at the end of a date you must use the syntax of "~*" in the Find and Replace command as a "*" on its own will replace all the data in the spreadsheet.

20.4 Other Tools for Histograms and Tables

Oracle Primavera also sells a reporting add-on software package titled **Primavera Earned Value Management** which allows the production of a number of reports such as time-phased table, bubble, and period variance.

Contact your local Oracle Primavera distributor or go to the Oracle Primavera web site for more information.

20.5 Methods of Resolving Resource Peaks and Conflicts

Methods of resolving resource overload problems are:

- **Revising the Project Plan.** Revise a project plan to mitigate resource conflicts, such as changing the order of work, contracting work out, or using off-site pre-fabrication, etc.
- **Duration Change.** Increase the activity duration to decrease the resource requirements, so a 5-day activity with 10 people could be extended to a 10-day activity with 5 people.
- **Resource Substitution.** Substitute one resource with another available resource.
- **Increase Working Time.** This may release the resource for other activities earlier and is created by working more days per week or hours per day.
- **Split an activity around peaks in demand.** Some software enables the splitting of activities, which in turn enables work to be split around peaks in resource demand. The split function is not available in Primavera, however, an activity may be split in two individual activities to allow the work to cease in times of peak demand. If one needs to relate back to a baseline then two new activities may be created to represent the split and the original activity made into a hammock to span the two new activities, but remember to display the LOE Baseline Bar.
- **Leveling the schedule.** This technique delays activities until resource(s)are available.
- **Resource Curves or Manually Editing the Resource Spreadsheet** may assist in some instances.

20.6 Resource Leveling

20.6.1 Methods of Resource Leveling

After resource overloads or inefficiencies have been identified with Resource and Tables, the schedule may now have to be leveled to reduce peaks in resource demands. Leveling is defined as delaying activities until resources become available. There are several methods of delaying activities to level a schedule:

- **Turning off Automatic Calculation and Dragging Activities.** This option does not maintain a critical path and reverts to the original schedule when recalculated. This option should not be used when a contract requires a critical path schedule to be maintained, as the schedule will no longer calculate correctly.
- **Constraining Activities.** A constraint may be applied to delay an activity until the date that the resource becomes available from a higher priority activity. This is not a recommended method because the delay of the higher priority activity may unlevel the schedule.
- **Sequencing Logic.** Relationships may be applied to activities sharing the same resource(s) in the order of their priority. In this process, a resource-driven critical path is generated. If the first activity in a chain is delayed, then the chain of activities will be delayed. But the schedule will not become unleveled and the critical path will be maintained. In this situation, a successor activity may be able to take place earlier and the logic will have to be manually edited.
- **Leveling Function.** The software Resource Leveling function levels resources by delaying activities without the need for Constraints or Logic and finds the optimum order for the activities based on user defined parameters. Again, as this option does not maintain a critical path developed by durations and relationships, it should not be used when a contract requires a critical path schedule developed in this way. The Leveling function may be used to establish an optimum scheduling sequence and then Sequencing Logic applied to hold the leveled dates and to create a critical path.

The Resource Leveling function enables the optimization of resource use by delaying activities until resources become available, thus reducing the peaks in resource requirements. This feature may extend the length of a project.

The leveling function should be used by novices with extreme caution.

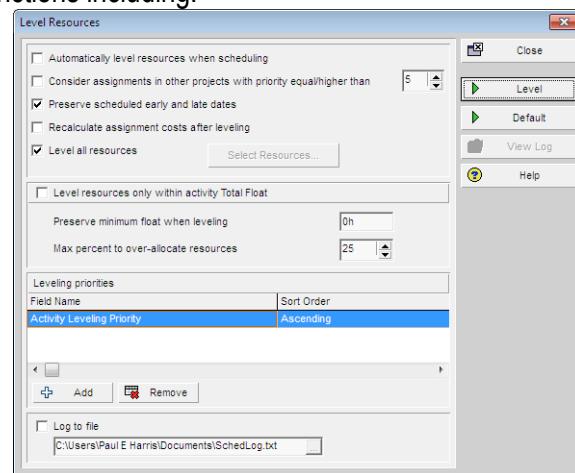
- It requires the scheduler to have a solid understanding of how the software resourcing functions calculate.
- Leveling increases the complexity of a schedule and requires a different approach to building a schedule. In principle, the sequencing logic is replaced by Priorities but a Closed Network should still be maintained.

Your ability to understand how the software operates is important for you to be able to utilize the leveling function with confidence on larger schedules. It is recommended that you practice with small simple schedules to gain experience in leveling and develop an understanding of the leveling issues before attempting a complex schedule.

20.6.2 Resource Leveling Function

This section outlines the software Resource Leveling functions including:

- **Level Resources** form,
- Leveling Examples, including Resource Shifts,
- Guidelines on Leveling, and
- What to look for if resources are not leveling.



20.6.3 Level Resources Form

The **Level Resources** form enables you to assign most of the Leveling prerequisites. Select **Tools**, **Level Resources...** to open the **Level Resources** form:

- **Automatically level resources when scheduling** – levels the schedule each time the schedule is recalculated and is not recommended.
- **Consider assignments in other projects with priority equal/higher than**. – levels resources and at the same time considers the demands of other projects. The leveling priority is set in the **Projects Window, General** tab.
- **Preserve scheduled early and late dates** – in simple terms, when unchecked enables the option of **Late Leveling**. This is explained in more detail in the following paragraphs as the computations are a little more complicated. **Late Leveling** pushes forward in time activities from their late dates to meet the resource availability and provides the latest dates the activities may be started and finished without delaying the finish date of the project.
- **Recalculate assignment costs after leveling** – is used with the resource **Effective date** and **Price/Unit**. These facilities allow a change in the cost of a resource over time. The Resource Costs are recalculated based on the resource **Price/Unit** if an activity is moved into a different price bracket when this check box is marked.
- **Level all resources** – if checked, the schedule levels all the resources; if unchecked, enables the **Select Resources** form to be opened and one or more resources selected for leveling.
- **Level resources only within activity Total Float**
 - When checked, the leveling process will not generate negative float but may not completely level a schedule. Thus, the activities will only be delayed until all float is consumed and leveling will not extend the finish date of the project. This option will also check the **Preserve scheduled early and late dates** option.
 - When unchecked, leveling will allow activities to extend beyond a **Project Must Finish By date**, when assigned in the **Projects Window Dates** tab, or beyond the latest date calculated by the schedule and may create **Negative Float**.
 - **Preserve minimum float when leveling** – works with **Level resources only within Total Float** and will not level activities if their float will drop below the assigned value.
 - **Max percent to over-allocate resources** – works with **Level resources only within activity Total Float** and enables the doubling of the resource availability, although this new limit is not displayed in the histogram limits.

- **Leveling priorities** – sets leveling the priorities, and activities are assigned resources according to the Data item chosen in the first line. If two activities have the same value in the first line then the priority in the second line is used. The Activity ID is the final value used to assign resources. There are many options for leveling priority and the following are some to consider:
 - **Activity Leveling Priority** is a field that may be set from 1 Top to 5 Lowest; the default is 3 Normal. Those with a priority 1 Top are assigned resources first.
 - **Activity Codes or User Defined Fields** and many other data fields such as **Remaining Duration, Early Start, Total Float, and Late Start** may be used to set the priority for leveling.

20.7 Leveling Examples

Two simple examples can assist you in understanding how the software works:

- The first will allow the schedule to level with positive float, and
- The second will NOT allow the schedule to level with positive float and may generate negative float.



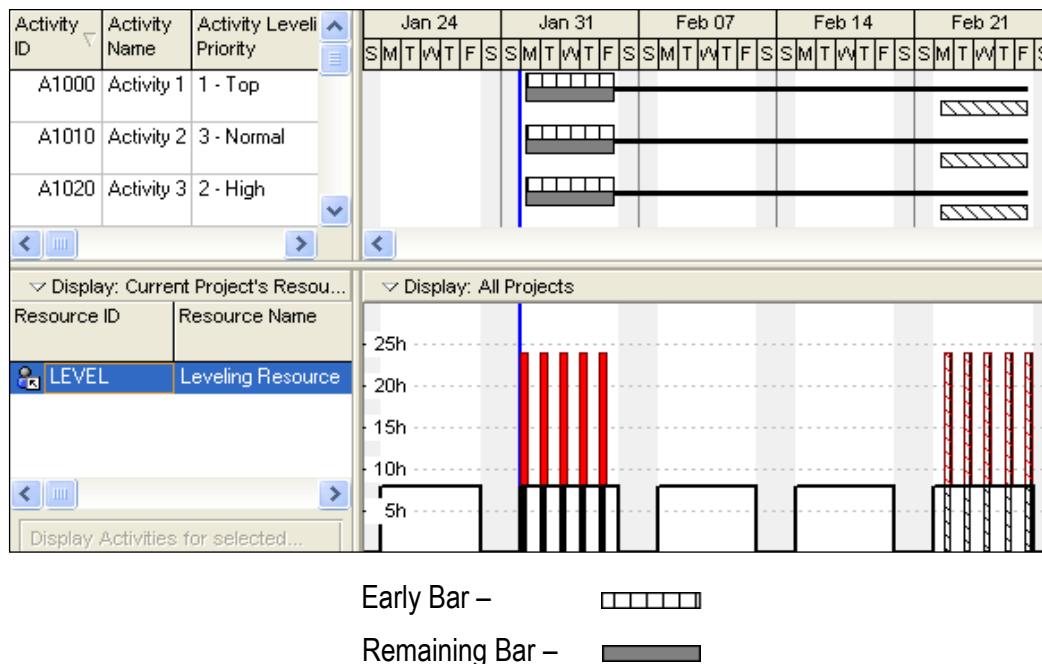
It is recommended that you set up a small schedule and try the various options until you understand what the software is doing and how it operates before trying your hand with a large schedule.

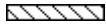
You should then look at leveling more complex schedules only after you have mastered leveling a small schedule like the examples in this chapter.

20.7.1 Leveling with Positive Float

The following picture displays the schedule unleveled:

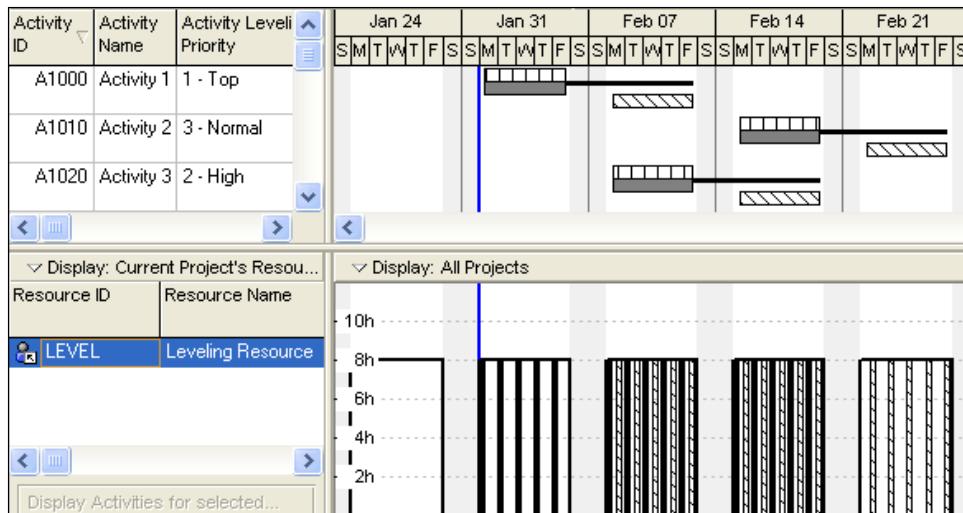
- A project **Must Finish By Date** of 27 Feb has been set.
- The histogram shows both the Early and Late resource histogram is overloaded.
- The bars displayed are the **Early, Remaining, the Late and Total Float**:



Late Bar – 

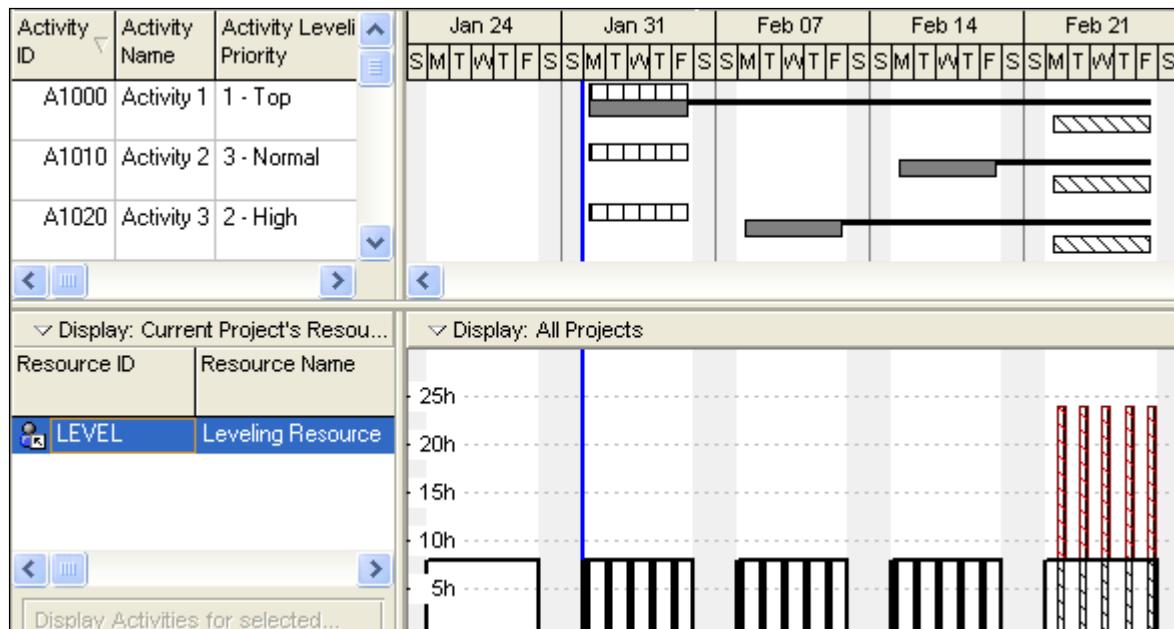
After Leveling with all the Leveling options off except the **Select Resource...** option:

- Early and Late leveling has taken place and the Early and Late histogram are leveled.
- The Early and Remaining Bars have the same dates and are leveled.
- The Total Float is the difference between the Late and Early Finish and provides a similar result if there is a relationship between the activities.



With **Preserve scheduled early and late dates** option checked:

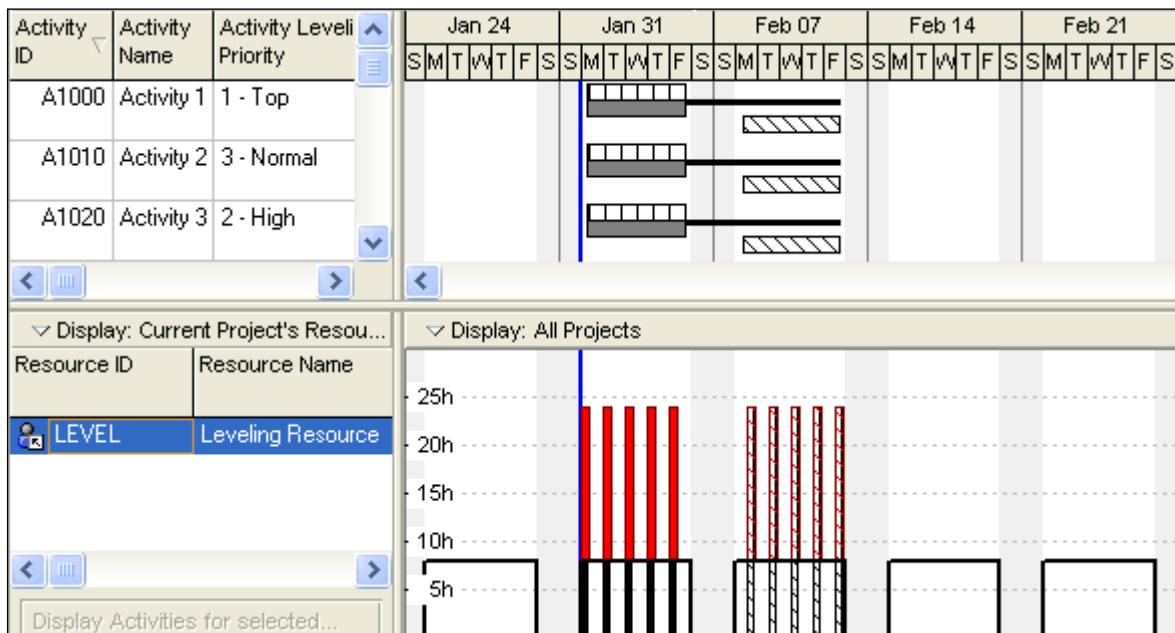
- Early leveling of the Remaining dates has taken place and the Early histogram is leveled.
- Late leveling has NOT taken place and the Late histogram is NOT leveled.
- The Early and Late Bar have NOT been leveled.
- The Total Float is the difference between the Late and Remaining Finish dates and provides a similar result if there is NO relationship between the activities.



20.7.2 Leveling without Positive Float

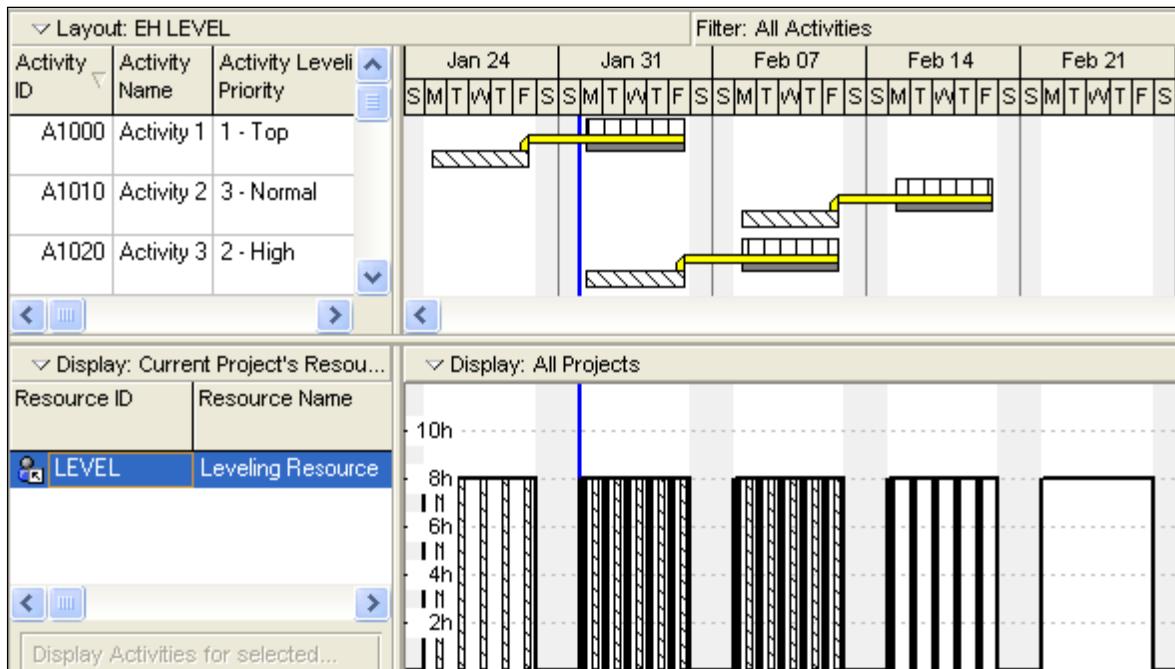
The following picture displays the schedule unleveled:

- A project **Must Finish By Date** of 13 Feb has been set.
- The histogram shows both the Early and Late resource histogram are overloaded.



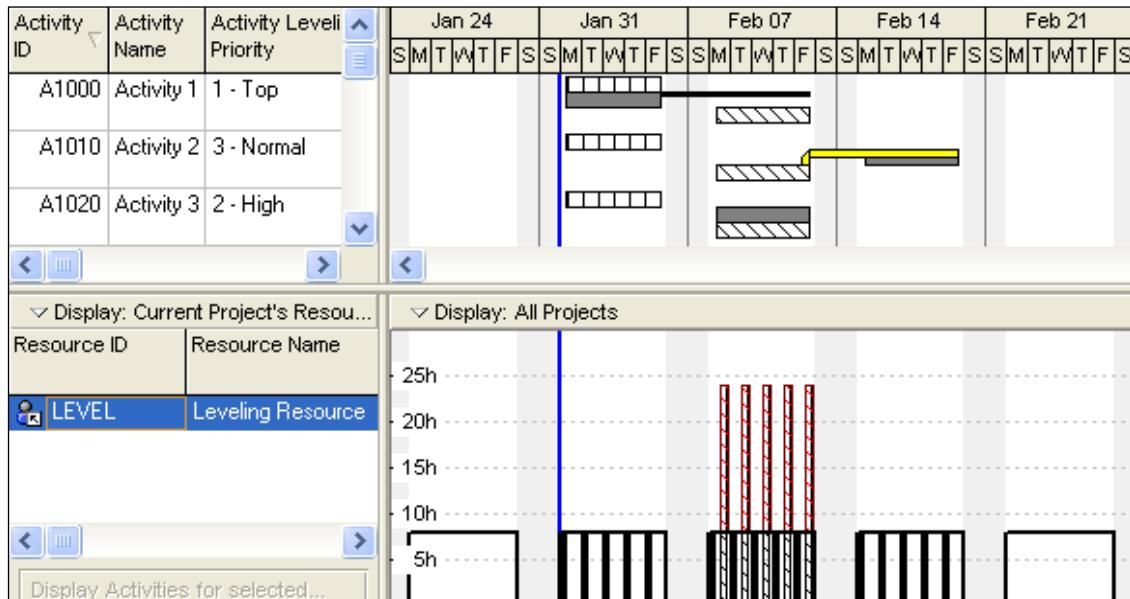
After Leveling with all the options off except the **Select Resource...** option:

- Early and Late leveling has taken place and the Early and Late histogram is leveled.
- The Early and Remaining Bars have the same dates and are leveled and Negative Float developed.
- The Total Float is the difference between the Late and Early Finish and provides a similar result if there is a relationship between the activities.



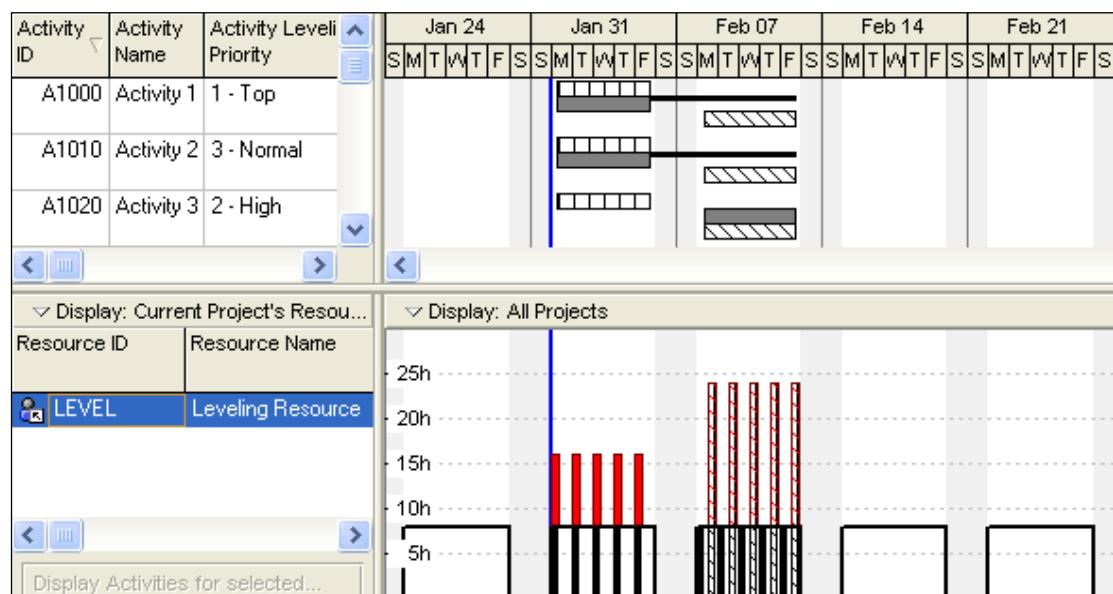
With **Preserve scheduled early and late dates** option checked:

- Early leveling has taken place and the Early histogram is leveled.
- Late leveling has NOT taken place and the Late histogram is NOT leveled.
- The Early and Late Bar have NOT been leveled.
- The Remaining Bar has been leveled and Negative Float developed.



With **Preserve scheduled early and late dates** and the **Level resources only within activity Total Float** option checked:

- Early leveling on the Remaining dates has taken place as much as possible without creating Negative Float.
- Activity 2 with the lowest priority has been left on the Data Date.
- Late leveling has NOT taken place and the Late histogram is NOT leveled.
- The Early Bar has NOT been leveled.



20.8 Resource Shifts

Resource shifts enable the modeling of resource availability when a different number of resources may be available on various shifts. Resource shifts should be used with:

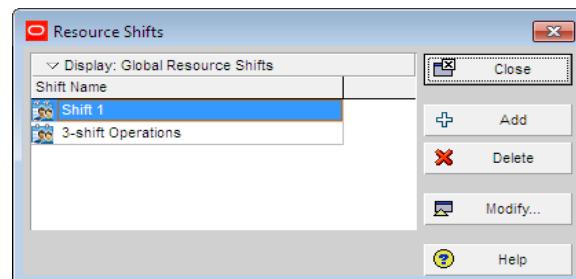
- Resource Dependent activities, and
- Resources set to Drive Activity Dates after they have been assigned to activities.

Unlike other products, when an Activity is made Resource Dependent the Activity Calendar is still acknowledged for the start of an activity, but not the finish.

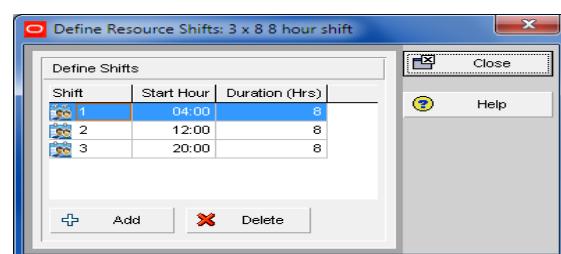
Before attempting to use shifts, a user should have considerable familiarity with the software or work with someone experienced.

20.8.1 Creating Shifts:

Select **Enterprise, Resource Shifts...** to open the **Resource Shifts** form:



When a shift is added it must total 24 hours:



20.8.2 Assigning Shifts to Resources

A shift may be assigned to a resource in the **Resource Window Units & Prices** tab, with a different availability (**Max Units/Time**) and rate (**Price/Unit**) assigned for each shift.

This example shows there are no resources assigned to shift 3, therefore representing a two-shift environment.

General	Codes	Details	Units & Prices	Roles	Notes	Timesheets
Shift Calendar:	EH 2 x 8 hr shifts	...	Shift:	<input type="button" value="Up"/>	<input type="button" value="Down"/>	
Effective Date			Max Units / Time		Price / Unit	

01-Jan-07 8/d \$60/h

General	Codes	Details	Units & Prices	Roles	Notes	Timesheets
Shift Calendar:	EH 2 x 8 hr shifts	...	Shift:	<input type="button" value="Up"/>	<input type="button" value="Down"/>	
Effective Date			Max Units / Time		Price / Unit	

01-Jan-07 16/d \$80/h

General	Codes	Details	Units & Prices	Roles	Notes	Timesheets
Shift Calendar:	EH 2 x 8 hr shifts	...	Shift:	<input type="button" value="Up"/>	<input type="button" value="Down"/>	
Effective Date			Max Units / Time		Price / Unit	

01-Jan-07 0/d \$0/h

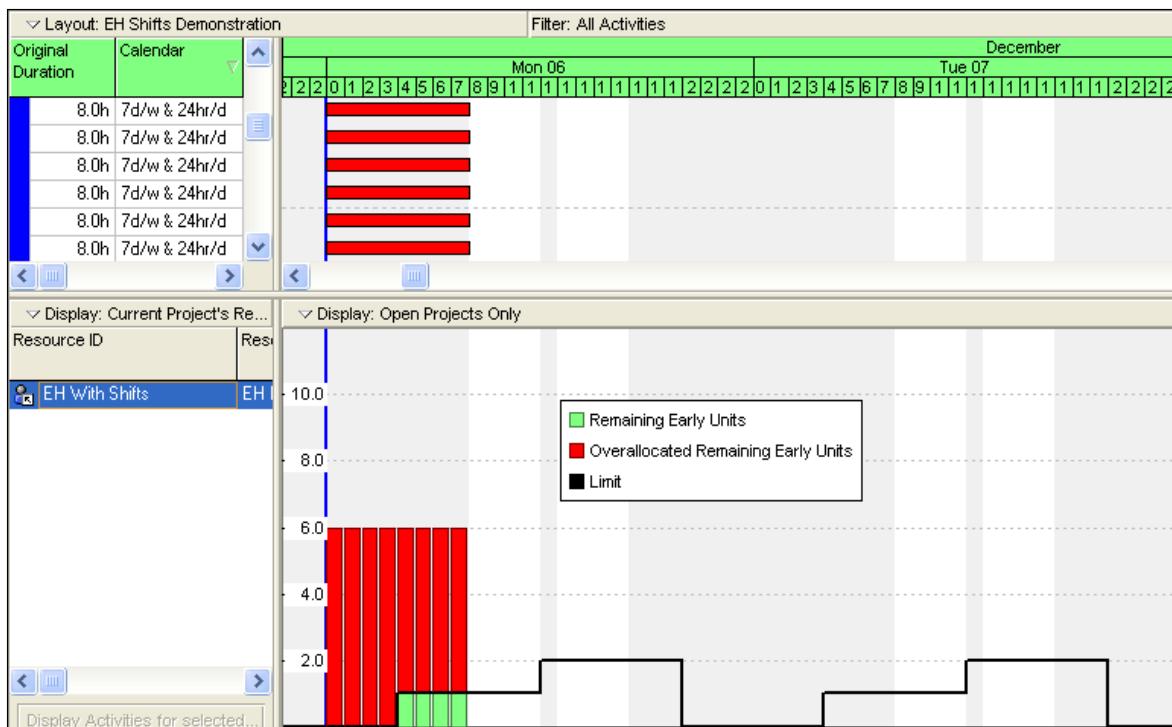
Resource ID	Resource Name	Resource Type
OZ	OzBuild Resources	Labor
PM	PM	Labor
SE	SE	Labor
PS	PS	Labor
PO	PO	Labor

Arrow indicating this resource has been assigned to an activity

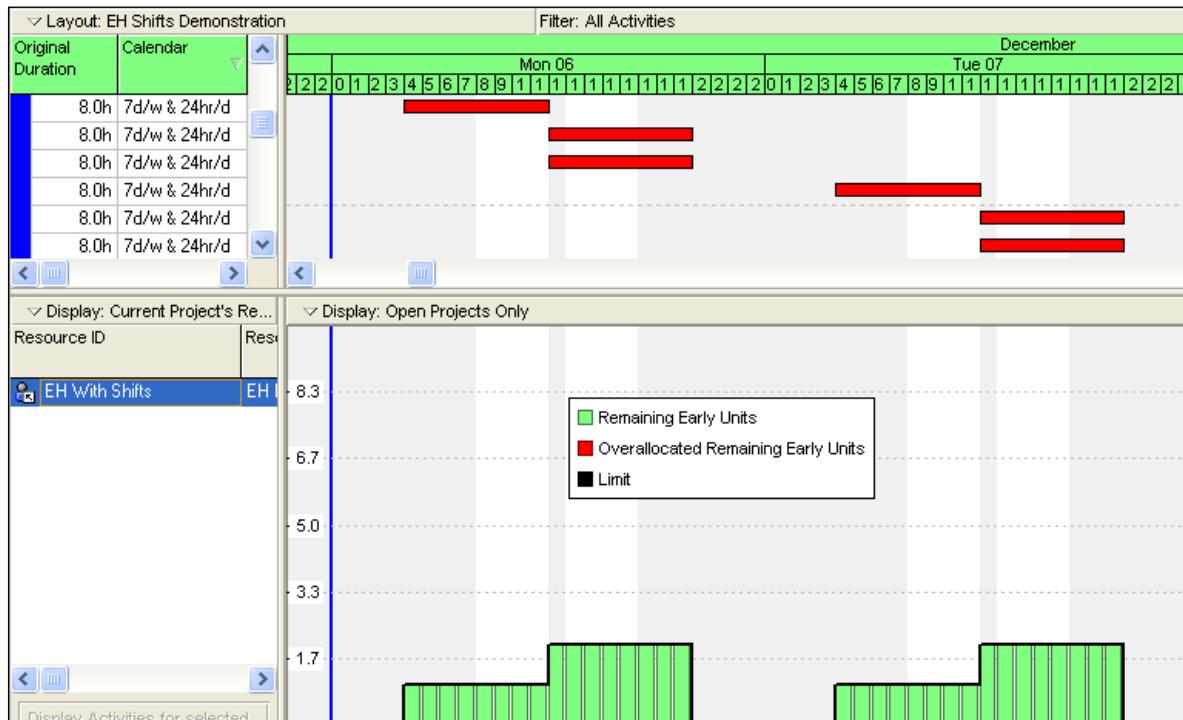
A Resource will have a little arrow in a box pointing to its head when assigned to an activity of an open project:

20.8.3 Leveling with Shifts

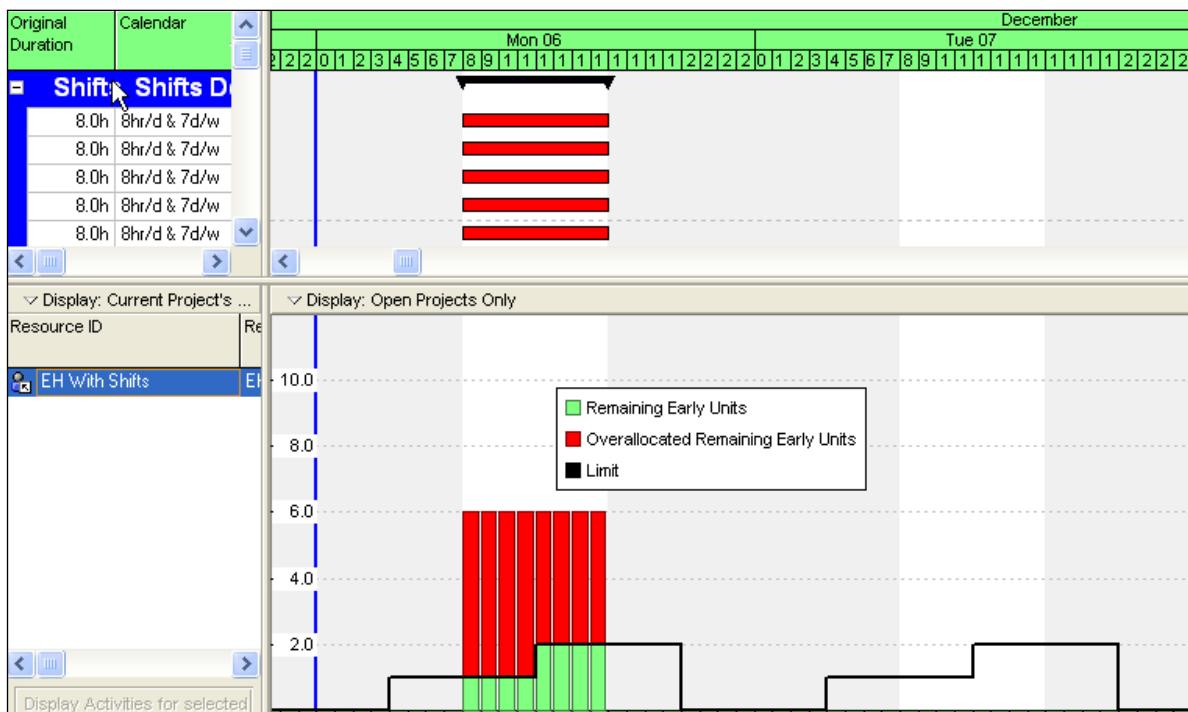
Shifts are acknowledged when the leveling function is used. The following example shows activities on a 24-hour per day, 7-day per week activity calendar, with shifts set up as on the previous page, with all activities set as Resource Dependent and Drive Activity Dates. The situation before leveling with the Resource Limit displayed according to shift availability:



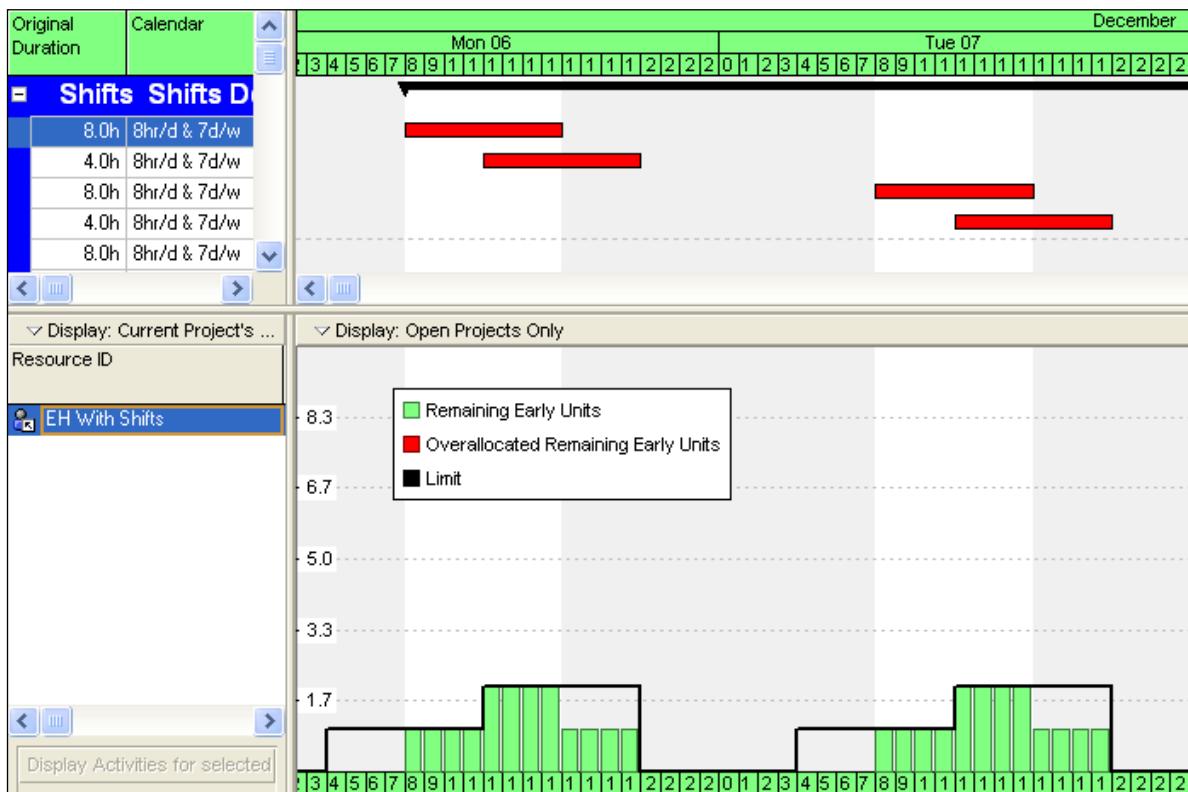
After Leveling with all leveling options NOT checked:



The following example has the activities on an 8-hour per day, 7-day per week calendar:



In this situation, the leveling takes into account the Activity Calendar for each Start of each activity and the Shifts operated after the activity Start time. Even though the activities are Resource Driven:



When the Resources are set to **NOT Drive Activity Dates** the resources still level, but:

- Work begins on the start date and time of the first activity, not at the start of the resource shift.
- The Activity Bars do not show when the work is taking place.
- The activities also do not begin on the shift start time when the **Default Calendar** is set 7 days per week, 24 hours per day.



It appears the best option to make resources calculate correctly when using shifts is to:

- Put the activities on a calendar that has the same or greater working hours than the Resource Shifts, so the start of the resource work is not delayed,
- Set the resources to **Resource Driven**, to acknowledge the resource calendars,
- Set the resources to **Drive Activity Dates**, to ensure the Activity Bars move with the Leveled Resources,
- Create a small schedule and experiment to make sure the schedule is behaving the way you think it should and you understand what is happening.

20.9 Guidelines for Leveling

Leveling a schedule is a skill that is acquired through practice and experience and there are a few fundamentals that a user must bear in mind before attempting to level a complex schedule.

- If you are not an experienced scheduling software user then it is strongly suggested that you obtain some serious experience in using Primavera with resources before attempting to use leveling on a complex schedule, especially if you are trying to level a progressed schedule. You will need this experience to resolve some of the complex issues that are often present when leveling a schedule.
- You need to approach the structure of the schedule differently at the beginning of schedule construction. Without leveling, schedulers normally apply soft logic (sequencing logic) to prevent a number of activities occurring at the same time. If leveling is your method of scheduling, then soft logic should be omitted from the beginning of the construction of the schedule.
- All users and reviewers of the schedule must understand that a leveled schedule may dramatically change with the addition or removal or change to activities or change in priorities.
- There are some principles that should be considered when leveling:
 - Only level resources that are overloaded and that you are unable to supplement easily or that have an absolute limit.
 - Try leveling one resource at a time and view the histograms to ensure each resource is leveling. If a resource is not leveling and the histograms display overload, you will need to go through the check list on the next page and level again. This process often finds a driving overload resource and leveling that resource levels the whole project.
 - After all resources are leveling individually, you should start leveling with two resources and then three. Do not start leveling with all the resources at once, as the schedule will often do some drastic things and extend the project end date unrealistically.
 - Do not expect a perfect result; be satisfied with an average resource usage that meets your requirements over periods, such as months. Sort out small peaks in future resource requirements nearer to the start of the activity.

To understand how leveling will delay or change durations of activities you will need to be aware of which of the above combinations you have employed in your schedule, and you will then need to understand how each combination calculates under a non-leveling environment.

20.10 What to look for if Resources are Not Leveling

It is very frustrating if you have a project that will not level. Try some of these options when your schedule will not level:

- Have you selected a resource to level in the **Select Resources** form? The resources to be leveled must be selected in the **Select Resources** form.
- Have you set the **Limits** in the **Resource Window**? A resource needs a limit to level.
- A resource will not be leveled when you assign a resource to an activity with a Units per time period greater than value set in the resource dictionary. This may occur when:
 - The **Resource Limit** in the **Resource Window** is reduced, or
 - An activity has been assigned a resource with a **Unit per Time Period** that is greater than the **Limit**, or
 - When the activity has **Fixed Units** and the duration of an activity has been reduced, thus increasing the assigned **Units per Time Period** over the maximum available in the **Resource** form.
- Have you assigned a **Mandatory Constraint** to an unleveled activity? Activities with a **Mandatory Constraint** will not be leveled.
- Have you checked **Level resources only within activity Total Float** option? This option enables activities without float to level.
- Have you assigned resources to WBS or LOE activities? These will not be leveled.

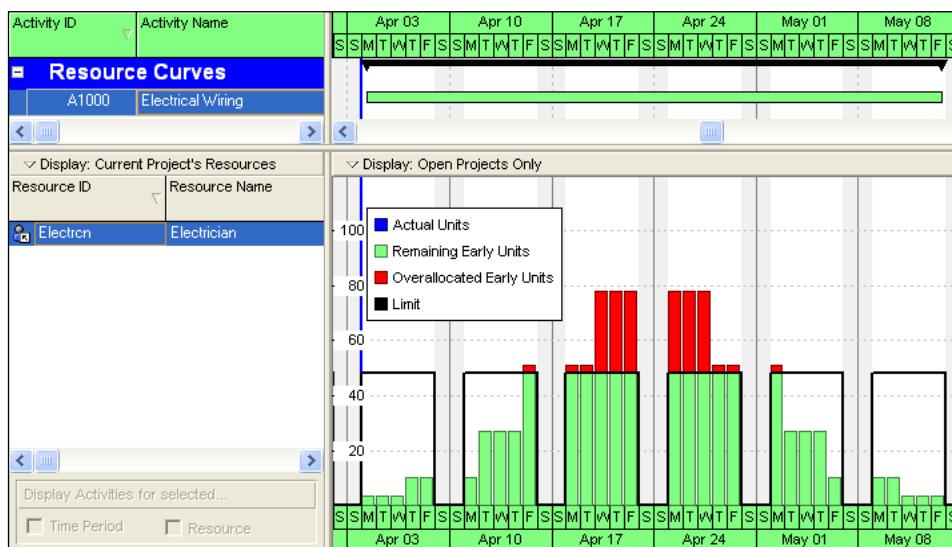
20.11 Resource Curves

Resource Curves enable a non-linear assignment of resources to schedules in the same way as Microsoft Project and Elecosoft (Asta) Powerproject. These are often used on long activities where there is not a requirement for a linear assignment of resources.

Resource curves are assigned in the **Curve** column in the **Resources** tab of the **Activities Window**:

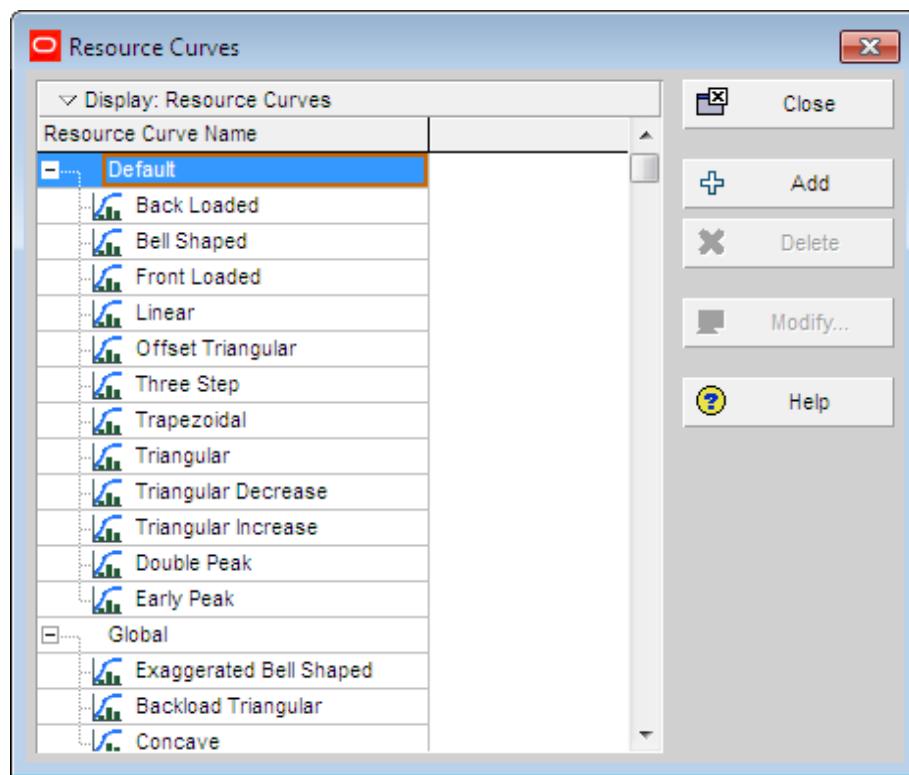
The Electrical wiring activity in the following picture has a bell-shaped Resource Curve assigned to it:

Resources		
Activity	A1000	Electrical Wiring
Resource ID Name	Curve	
Electron Electrician	Bell Shaped	

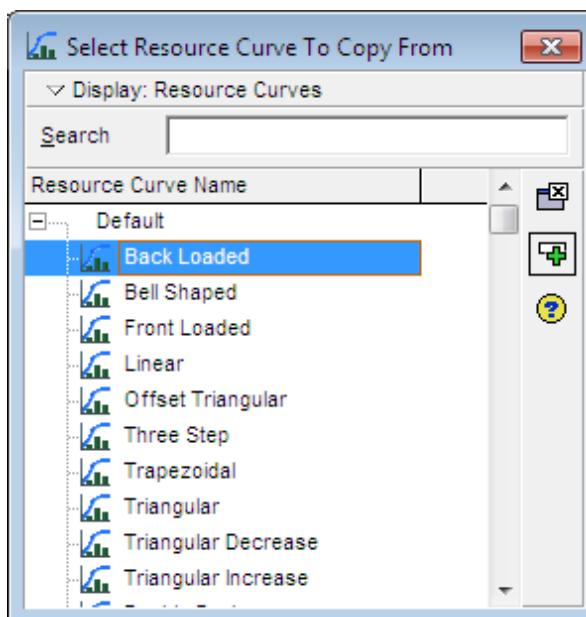


To create and use Resource Curves:

- Select **Enterprise, Resource Curves...** to open the Resource Curves form:

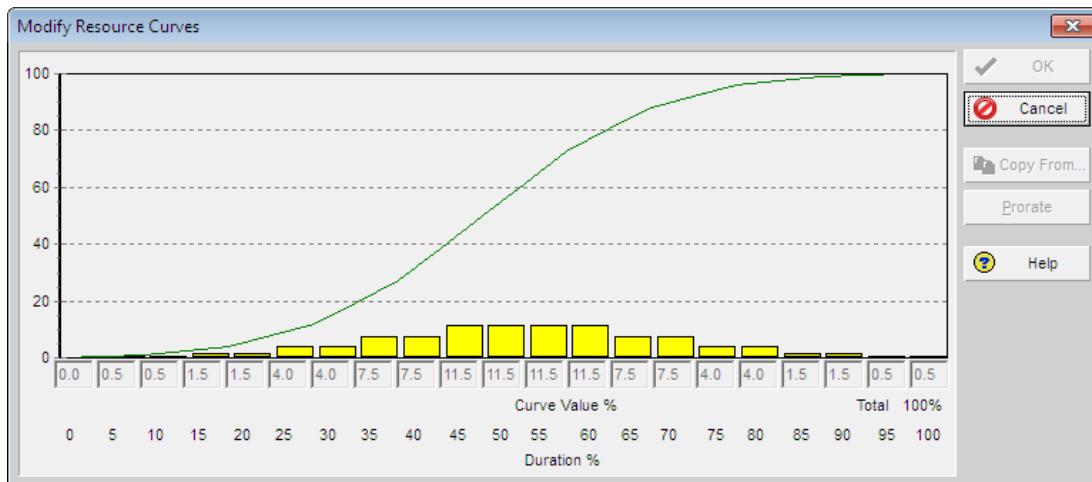


- **Default** curves may not be deleted or edited but may be copied in the **Modify Resource Curves** form.
- **Global** curves may be edited, copied or deleted.
- To create a new curve, select **Add** to open the **Select Resource Curve To Copy From** form and select a curve to copy.

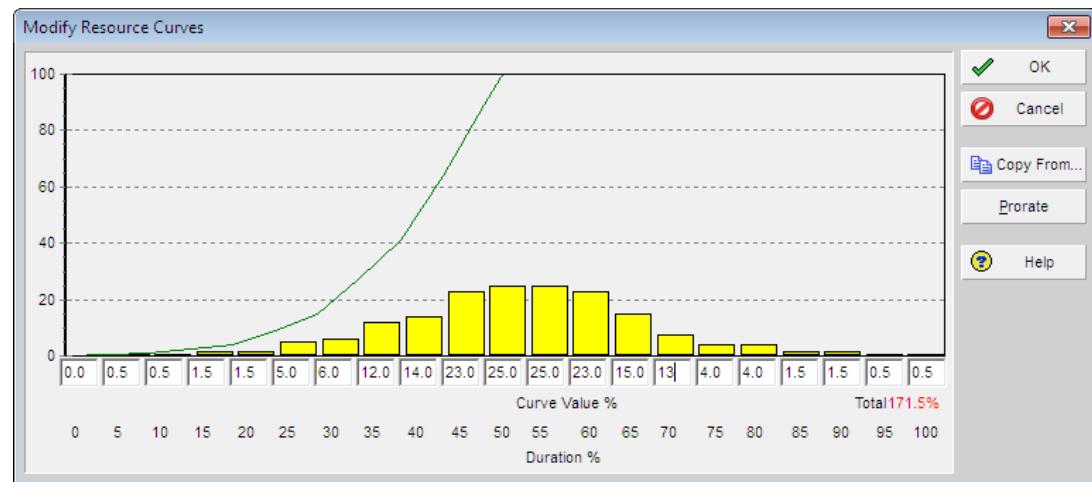


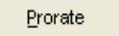
- You will be returned to the **Resource Curves** form where the title may be edited.

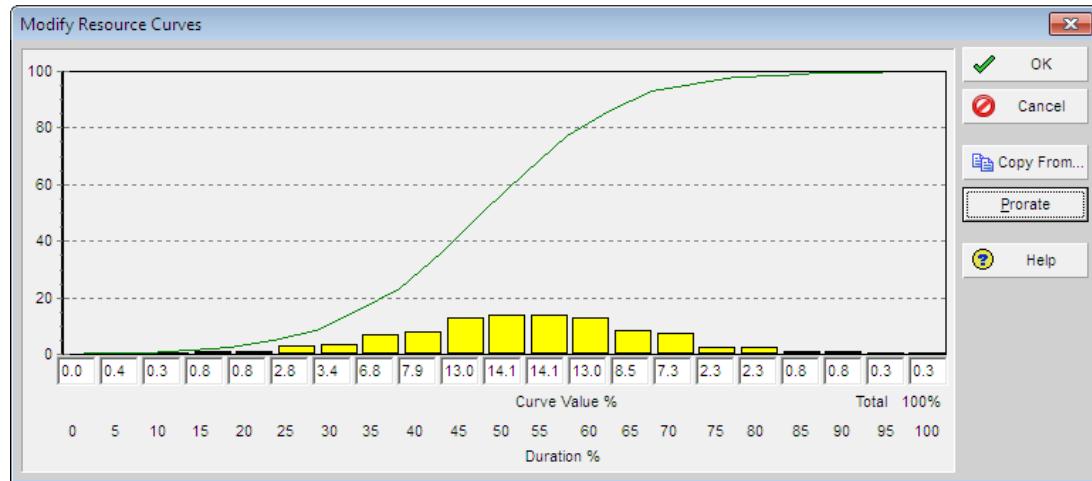
- Click the  icon to open the **Modify Resource Curves** form:



- Edit the percentages to achieve the desired shape:



- Click on  to make the percentages add to 100%:



You may now assign this curve to an activity.

20.12 Workshop 17 – Resources Optimization



Assignment

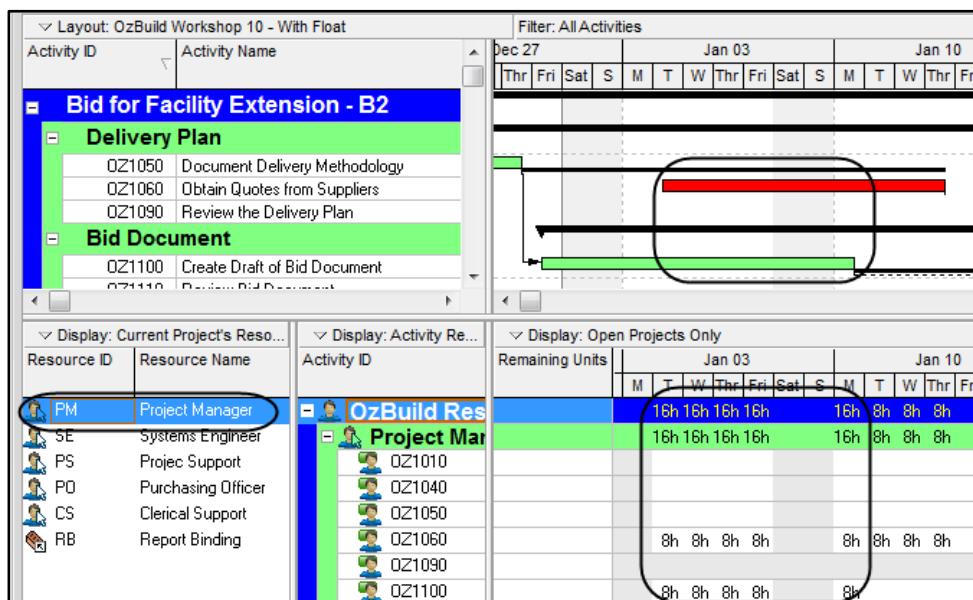
1. Open the OzBuild schedule and apply the **OzBuild 10 – With Float** Layout,
 2. Display the **Activity Usage Spreadsheet** by clicking on the  icon. The following picture shows the number of hours per week per activity, adjust the timescale to weeks:

3. Display the **Resource Usage Sheet** by clicking on the  icon.
 4. Use the **Display, Filter** option in the bottom left window to display the **Current Project's Resources** only,

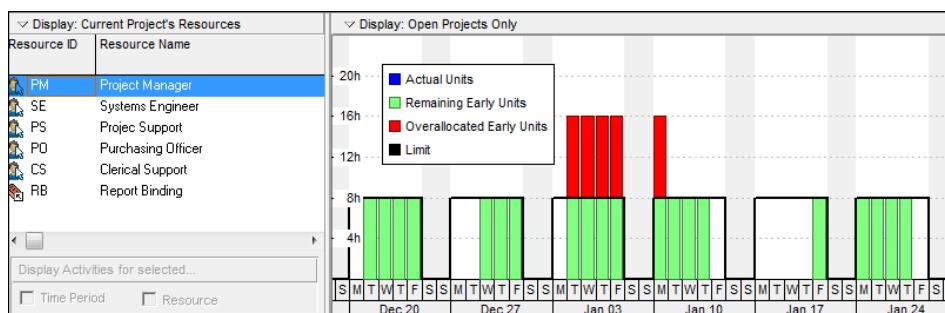
5. Select **Resource** for the option **Display Activities for selected...** (in the bottom left corner of the screen), this will display only the activities assigned to this resource.
 6. Increase the timescale to a daily interval.

continued...

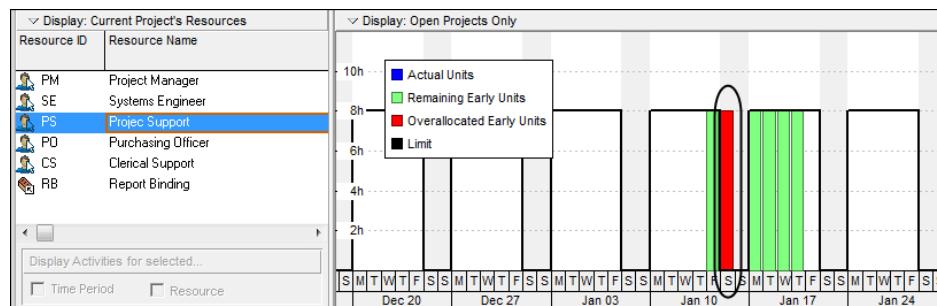
7. Select the **Project Manager** (in the bottom left window), which will display the Project Managers Resource Table,
8. Select **Resource** (at the bottom of the bottom left window), which will select the activities Project Manager is assigned,
9. The **Projects Manager** is overloaded (16 hours per day) on a number of days where he/she is working two activities at a time:



10. Display the **Resource Usage Profile** by clicking on the icon; you will also see that the Project Manager is overloaded from the end of December to start of January.



11. Check the other resources. Project Support appears overloaded on Saturday 15 January. This is because some activities are on a 6-day per week calendar and the resource calendar is a 5-day per week:



12. At this point in time resources may be optimized by a number of methods including:

- Assigning a different resource, or
- Reducing the assignment against the activities, or
- Adding sequencing logic to level the schedule, or
- Splitting activities, this has to be done by creating two activities in P6, or
- Using the Bucket Planning function, or
- Using the Primavera leveling function.

13. We will try using the leveling function to resolve the Project Managers overload.

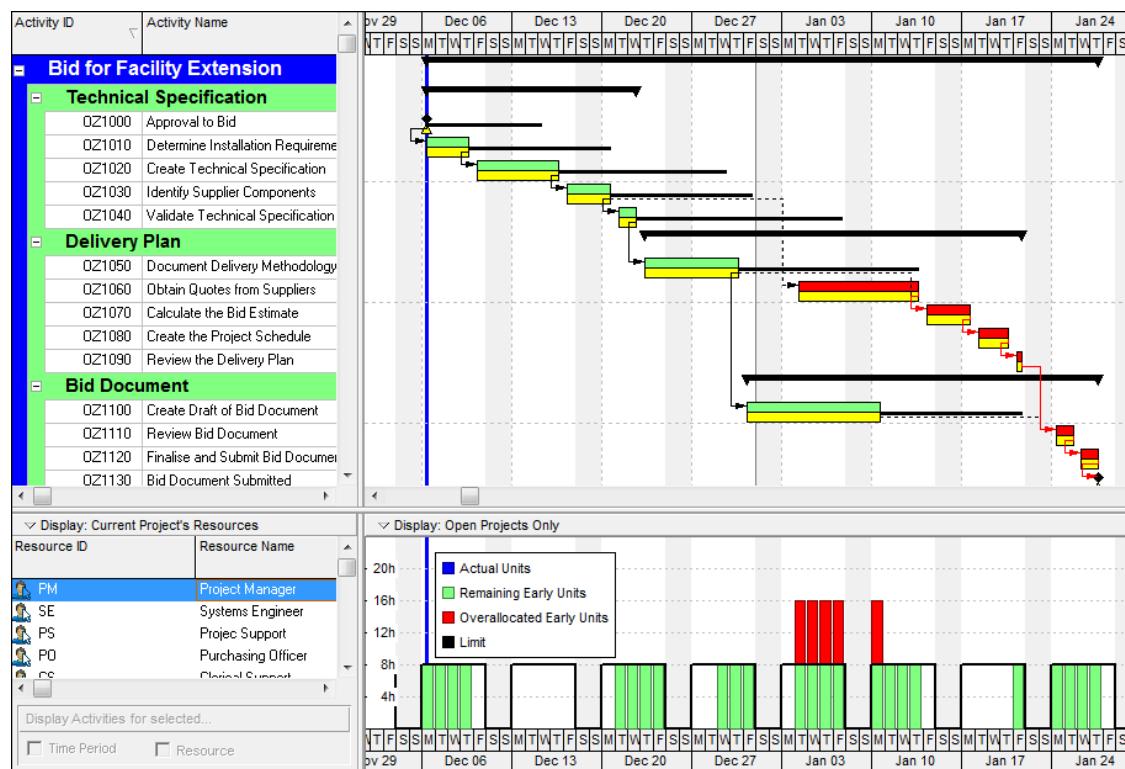
14. Firstly we will create and assign a baseline and display the Baseline bar by:

- Select **Project, Maintain Baselines...** and create a Baseline by saving a copy of the existing project,
- Select **Project, Assign Baselines...** and select this as both your **Project Baseline** and **Primary User Baseline**, thus ensuring the baseline bar will either be blank or display the **Baseline** and not the **Planned Dates**.
- Apply your **OzBuild Workshop 13 – Baseline** layout and the Baseline bar should be displayed,
- If there is a yellow vertical band then this is created by the **Progress Spotlight** line. Drag the **Progress Spotlight** line back to the **Data Date**.

15. Display the **Resource Usage Profile** by clicking on the  icon,

16. Select **Current Projects Resources**.

17. Increase the timescale to a daily timescale.

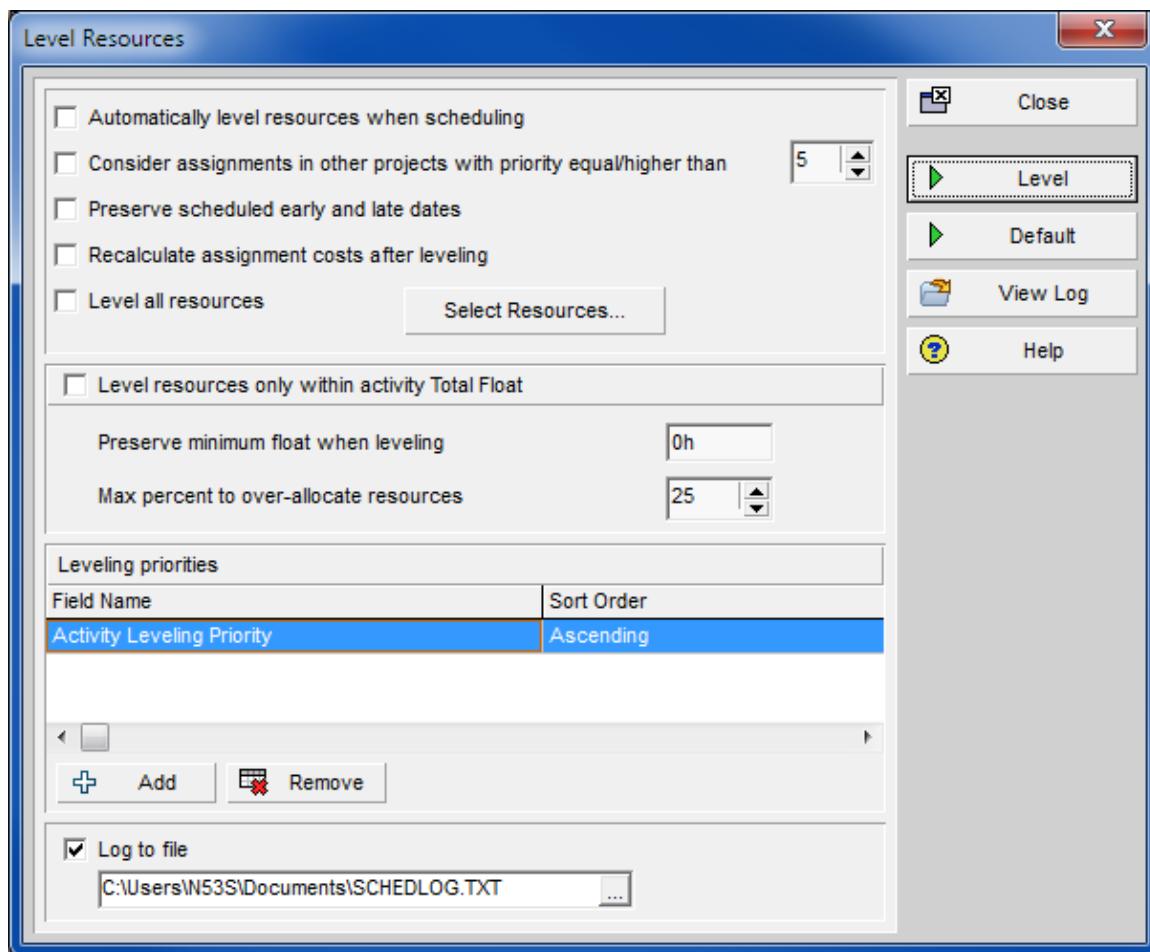


continued...

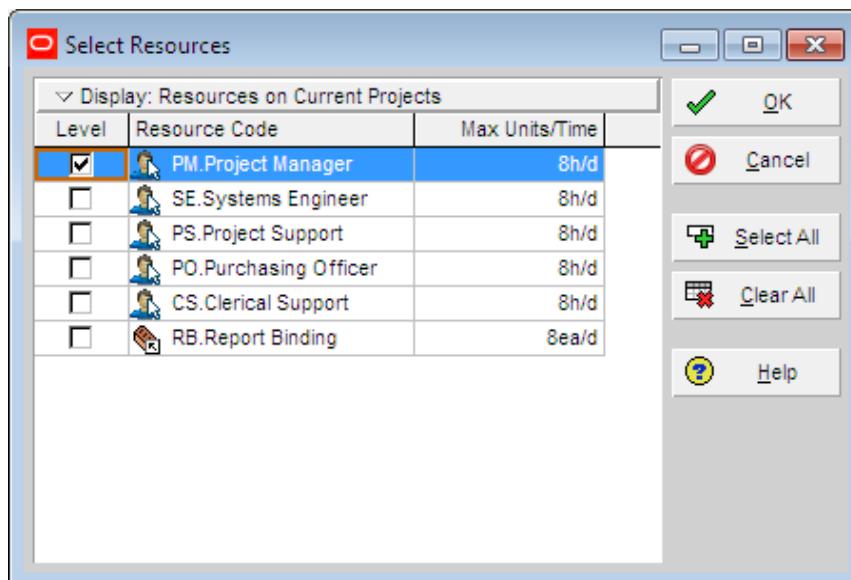
18. Save the layout as OzBuild Workshop 17 – Leveling.

19. Select Tools, Level Resources.

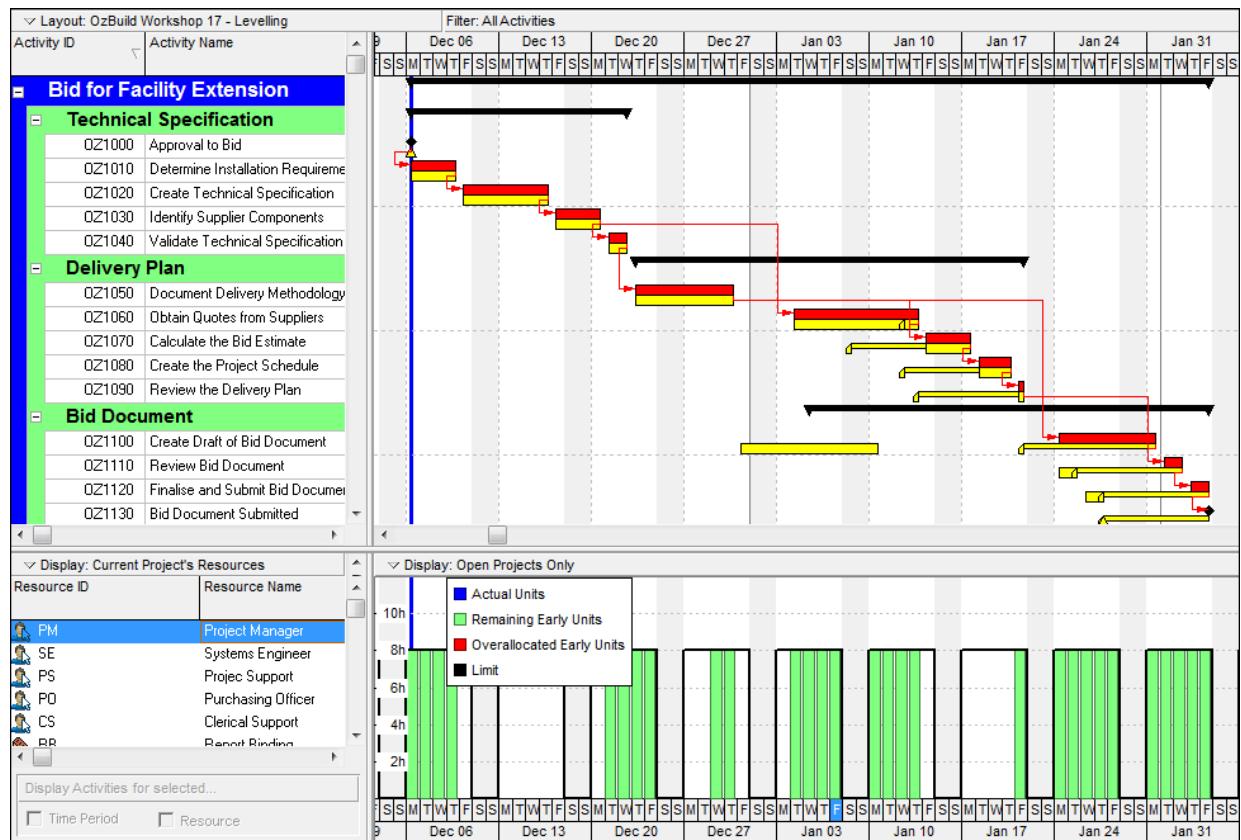
20. Set options as per the picture below:



21. Click on the **Select Resources...** icon and select only Project Manager to level:



22. Click on the icon to return to the **Level Resources** form,
23. Click on the icon to level **Project Manager's** resource assignment:
- The **Project Manager's** assignment will be leveled,
 - There should be Negative Float as your schedule should have a **Late Finish Constraint** on the last activity, and
 - There will be a Baseline variance.



24. Reschedule and therefore un-level by pressing **F9**.
25. You may now wish to work through and recreate some of the other examples in this chapter.
26. At the end of the workshop, schedule the project so it is not leveled.

21 UPDATING A RESOURCED SCHEDULE

It is often considered best practice to update a project between 10 and 20 times in its lifecycle. Some companies update schedules to correspond with accounting periods, which are normally every month. This frequency is often too long for projects that are less than a year in duration, as too much change may happen in one month. Therefore, more frequent updating may identify problems earlier.

Updating a project with resources employs a number of preferences and options, which are very interactive and will require a significant amount of practice by a user to understand and master them.

After reading this chapter and before working on a live project, inexperienced users should gain confidence with the software by:

- Creating a new project and setting the **Defaults**, **Preferences**, and **Options** to reflect the method in which you wish to enter information and how you want Primavera to calculate the project data.
- Creating two or three activities and then assigning two or three resources to each activity.
- Updating the Activities and Resources as if you were updating a schedule and observe the results.
- Alter the preferences and defaults if you are not receiving the result you require. Re-update and note the preferences and defaults for future reference.

Some of these settings may have been set by your organization and you may not be assigned access rights to change the settings. You should still go through the updating process in a test project with dummy data similar to your real project data and be prepared to change those settings to which you do have access, as required.

Updating a project with resources takes place in two distinct steps:

- The dates, durations and relationships are updated using the methods outlined in the **Updating an Unresourced Schedule** chapter, and
- The Resource, Expenses Units (hours and quantities) and Costs, both the Actual to Date and To Complete, are then updated. These resource values may be automatically updated by Primavera from the % Complete or imported from accounting and timesheet systems or updated by the Primavera Timesheet system.

A decision needs to be made about what data is to be entered or imported into the schedule and what data is to be calculated by the software and the software options set appropriately.

This chapter covers the following topics:

- Understanding **Budget Values** and **Baseline Projects**
- Understanding the **Current Data Date** with respect to resources
- Information required to update a resourced schedule
- Project and Activities Windows Defaults
- Updating Resources and Expenses
- Reviewing the updated schedule

21.1 **Understanding Budget Values and Baseline Projects**

21.1.1 Cost and Units Budget Values

The Budget Values in Primavera are assigned to both Units and Costs for each Resource and Expense at the time the Resource or Expense is assigned to an Activity.

Budget Values reside in the current project and in all Baseline Projects.

The Budget values normally by default are linked to the At Completion values when an activity has not commenced but after the activity is in-progress by being marked as Started or having a % Complete these values become unlinked.



Should you wish to re-estimate the cost of a project and compare it to a previous value when activities have not started you could either:

1. Create a Baseline Project before re-estimating the project and compare your revised costs to the Baseline, or
2. In the **Project Window, Calculations** tab and uncheck the **Link Budget and At Completion for non-started activities** which will unlink:
 - **Budget Costs from At Completion Costs**
 - **Budget Units from At Completion Units**
 - **Original (Planned) Durations from At Completion Durations**

This option to unlink Original and At Completion Durations may not be desirable, but this option does not involve setting a baseline. This therefore adds further complications and it is recommended that it is not used except in advanced scheduling.

21.1.2 Baseline Project and Values

A Baseline project is a complete copy of a project including the relationships, resource assignments and expenses.

The creation and assignment of a Baseline Project was covered in the **Updating an Unresourced Schedule** chapter.

- **Baseline Dates** are also known as Target Dates and are normally considered to be the approved Project Early Start and Early Finish dates of an progressed project, which are recorded by saving a Baseline project.
- **Baseline Duration** is the original planned duration of an activity, calculated from the Early Start to the Early Finish of an Activity. This is not the P6 Planned Duration Value.
- **Baseline Costs** are also known as Budgets and represent the original project cost estimate. These are the figures against which the Actual Costs and Cost at Completion (or Estimate at Completion) may be compared.
- **Baseline Units** are also known as Budgeted Quantity and represents the original estimate of the project quantities. These are the quantities against which the consumption of resources may be compared.

The Baseline values are values against which project progress is measured. All these values may be read by and compared with the current project values and show variances from the original plan.

A Baseline would normally be created prior to updating a project for the first time.

The Primavera Variance columns use Baseline data from Baseline Projects to calculate variances.

21.2 Understanding the Current Data Date

The **Data Date** is a standard scheduling term. It is also known as the **Review Date**, **Status Date**, **Report Date**, **As of Date**, **Time Now**, and **Update Date**.

- The **Data Date** is the date that divides the past from the future in the schedule. It is not normally in the future but is often in the recent past due to the time it may take to collect the information required to update the schedule.
- **Actual Costs** and **Quantities/Hours** or **Actual Work** occur before the Data Date.
- **Costs** and **Quantities/Hours to Complete** or **Work to Complete** are scheduled after the Data Date.
- **Actual Duration** is calculated from the **Actual Start** to the **Current Data Date**.
- **Remaining Duration** is the duration required to complete an activity. It is calculated forward from the **Current Data Date** and the Early Finish date or an in-progress activity is calculated from the **Current Data Date** using the:
 - **Activity Calendar** when the Activity Type is Task Dependent or is Resource Dependent but no Resources have been assigned, or
 - **Resource Calendar** when the Activity Type is Resource Dependent and uses the longest Resource Duration.



Primavera has one Data Date, the **Current Data Date**. Microsoft Project has four dates associated with updating a schedule. The Microsoft Project **Status Date** is similar in functionality to the Primavera **Current Data Date** but calculates very differently because Microsoft Project by default does not force incomplete work into the future. Elecosoft (Asta) Powerproject supports multiple Data Dates which are termed **Report Dates**, these are set up at the start of a project and has many schedule option enabling the mimicking of either P6 or Microsoft Project scheduling calculations.

21.3 Information Required to Update a Resourced Schedule

A project schedule is usually updated at the end of a period, such as each day, week, or month. One purpose of updating a schedule is to establish differences between the plan, which is usually saved as a Baseline, and the current schedule.

The following information is required to update a resourced schedule:

Activities completed in the update period:

- **Actual Start** date of the activity.
- **Actual Finish** date of the activity.
- **Actual Costs** and **Quantities** (Units) consumed or spent on **Labor Resources**, **Material Resources** and **Expense**. These may be calculated by the software or collected and entered into the software.

Activities commenced in the update period:

- **Actual Start** date of the activity,
- **Remaining Duration** or **Expected Finish** date,
- **Actual Costs** and/or **Actual Quantities**. Only when these are to be entered into the software,
- **Quantities to Complete** and **Costs to Complete**. Only when these are to be entered into the software,
- **% Complete**.

Activities Not Commenced:

- Changes in Logic, Constraints, or Duration, or
- Changes in estimated **Costs, Hours or Quantities** and
- Add or remove activities to represent scope changes.

The schedule may be updated after this information is collected.

Other Considerations

Primavera normally by default calculates:

- The Units to Complete and in turn the Actual Units by the relationship between the Remaining Duration and Resource Units.
- The Costs to Complete and the Actual Costs by the relationship between the Resource Unit Rate and Resource Units.

When these relationships are turned off then the Units and Costs may be entered manually.

A marked-up copy of the schedule recording the progress of the current schedule is often produced prior to updating the data with Primavera. Ideally, the mark-up should be prepared by a physical inspection of the work or by a person who intimately knows the work, although that is not always possible. It is good practice to keep this marked-up record for your own reference. Ensure that you note the date of the mark-up (i.e., the data date) and, if relevant, the time.

Often a Status Report or mark-up sheet is distributed to the people responsible for marking up the project's progress. A page break could be placed at each responsible person's band, and when the schedule is printed, each person would have a personal listing of activities that are either in-progress or due to commence. This is particularly useful for large projects. The marked-up sheets are then returned to the scheduler for data entry into the software system.

Other electronic methods, such as the Primavera Timesheet system or an e-mail based system with spreadsheet or pdf attachments, may be employed to collect the data. Irrespective of the method used, the same data needs to be collected.

It is recommended that only one person update each schedule. There is a high probability for errors when more than one person updates a schedule.

21.4 Project Window Defaults for Updating a Resourced Schedule

The **Project Window** settings affect all activities in a project that is being updated. When more than one project is open, the settings of the **Default Project** are used to calculate all open projects when they are scheduled or leveled. The Default Project is set in the **Set Default Project** form opened by selecting **Project, Set Default Project....** Please read the **Multiple Project Scheduling** chapter for more details.

The **Calculations** tab in the **Projects Window** sets some important resource defaults:

Calculations													
<table border="1"> <thead> <tr> <th colspan="2">Activities</th> <th colspan="2">Resource Assignments</th> </tr> </thead> <tbody> <tr> <td colspan="2"> <input type="text" value="Default Price / Unit for activities without resource or role Price / Units"/> \$0.00/h </td> <td colspan="2"> <input type="radio"/> Add Actual to Remaining <input checked="" type="radio"/> Subtract Actual from At Completion <input checked="" type="checkbox"/> Recalculate Actual Units and Cost when duration % complete changes <input type="checkbox"/> Update units when costs change on resource assignments <input checked="" type="checkbox"/> Link actual to date and actual this period units and costs </td> </tr> <tr> <td colspan="2"> <input type="checkbox"/> Activity percent complete based on activity steps <input checked="" type="checkbox"/> Link Budget and At Completion for not started activities <input type="radio"/> Reset Original Duration and Units to Remaining <input checked="" type="radio"/> Reset Remaining Duration and Units to Original </td> <td colspan="2"></td> </tr> </tbody> </table>		Activities		Resource Assignments		<input type="text" value="Default Price / Unit for activities without resource or role Price / Units"/> \$0.00/h		<input type="radio"/> Add Actual to Remaining <input checked="" type="radio"/> Subtract Actual from At Completion <input checked="" type="checkbox"/> Recalculate Actual Units and Cost when duration % complete changes <input type="checkbox"/> Update units when costs change on resource assignments <input checked="" type="checkbox"/> Link actual to date and actual this period units and costs		<input type="checkbox"/> Activity percent complete based on activity steps <input checked="" type="checkbox"/> Link Budget and At Completion for not started activities <input type="radio"/> Reset Original Duration and Units to Remaining <input checked="" type="radio"/> Reset Remaining Duration and Units to Original			
Activities		Resource Assignments											
<input type="text" value="Default Price / Unit for activities without resource or role Price / Units"/> \$0.00/h		<input type="radio"/> Add Actual to Remaining <input checked="" type="radio"/> Subtract Actual from At Completion <input checked="" type="checkbox"/> Recalculate Actual Units and Cost when duration % complete changes <input type="checkbox"/> Update units when costs change on resource assignments <input checked="" type="checkbox"/> Link actual to date and actual this period units and costs											
<input type="checkbox"/> Activity percent complete based on activity steps <input checked="" type="checkbox"/> Link Budget and At Completion for not started activities <input type="radio"/> Reset Original Duration and Units to Remaining <input checked="" type="radio"/> Reset Remaining Duration and Units to Original													

- **Activities**

- **Default Price/Unit for activities without resource or role Price/Units.** When an activity is assigned a quantity in the **Activities, Status** tab but no resource is assigned, then this rate is used to calculate the cost against Labor and Nonlabor units.
- **Activity percent complete based on activity steps.** The Primavera **Step** function enables activities to be broken down into elements called Steps. Each element earns a designated % Complete when the Step is marked as complete. Physical % Complete Type must be selected to use Steps.
- Unchecking **Link Budget and At Completion for not started activities** enable the user to re-estimate the cost or quantities of un-started activities while preserving the **Original Budget** of an activity. This also unlinks the **Original Duration** from the **At Completion Duration** for un-started activities.
- The next two options **Reset Original Durations and Units to Remaining** and **Reset Remaining Duration and Units to Original** determine how the Original Duration and Units are set when progress is removed from activities. This was new to Primavera Version 4.1.

- **Resource Assignments**

- **When updating Actual Units or Costs.** There are two options:
 - Add Actual to Remaining.** When Actual Costs are entered, the At Completion increases by the amount of the Actual Costs.
 - Subtract Actual from At Completion.** When Actual Costs are entered, the At Complete does not change and the To Complete is reduced by the value of the Actual. This is the author's preferred option, as the At Completion does not change until the At Completion is exceeded by the Actual.
- **Recalculate Actual Units and Cost when duration % complete changes.** This option links the Duration % Complete to the Budget and To Complete, thus an increase in Duration % Complete will increase the Actual and decrease the To Complete values keeping the At Completion constant.
- **Update units when costs change on resource assignments.**

With this option checked a change in Costs will recalculate the Units.

With this option unchecked, a change in costs may be made independently of units after units have been changed.

This allows the importation of Costs from an accounting system and hours from a timesheet system separately.
- **Link Actual to date and Actual This Period Units and Cost.** With this option checked, when you enter an **Actual this period**, the **Actual to date** will be calculated by increasing the original value by the value of the **Actual this period**. Alternatively, you may enter the **Actual to date** and Primavera will calculate the **Actual this period**. When unchecked, the two fields are unlinked and you may enter any figure in each field. This option is grayed out if the project is not open and is used to fix errors in data entry.

This allows the fixing up of data errors when the **Store Period Performance** function is being used.

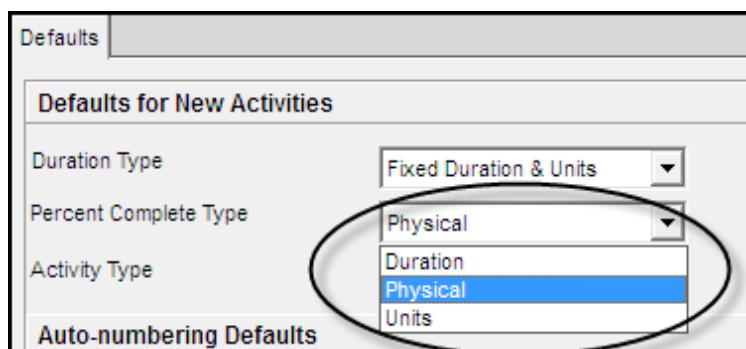
21.5 Activities Window – Percent Complete Types

There are three % Complete types which may be assigned to each activity. The default is adopted from the setting in the **Defaults** tab in the **Projects Window**.

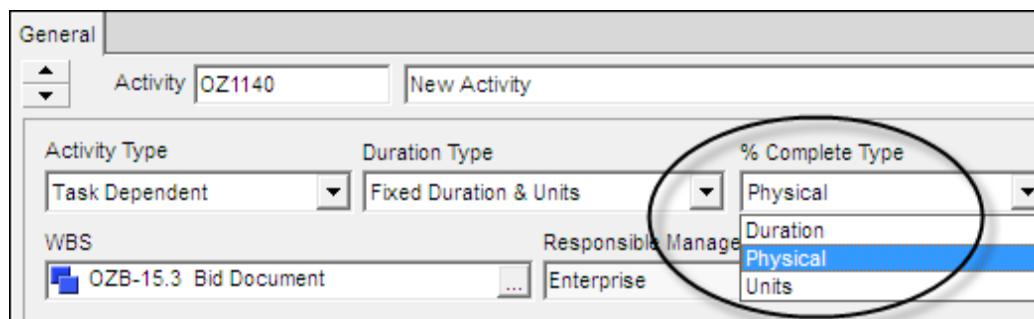
- Physical
- Duration
- Units

21.5.1 Assigning the Project Default Percent Complete Type

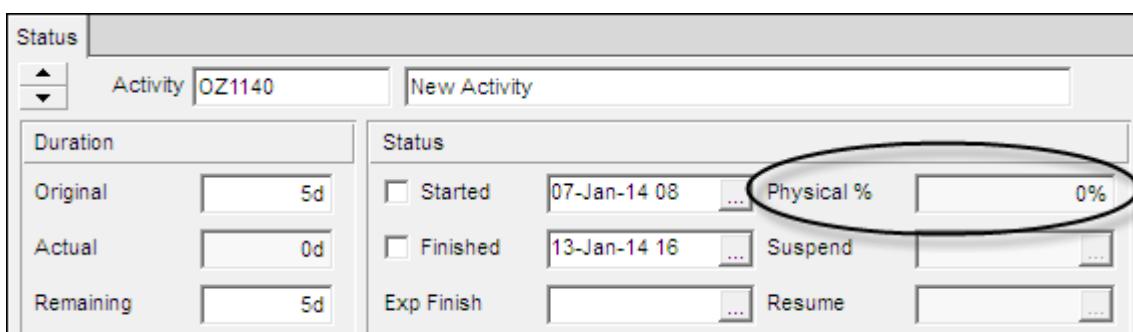
A project default Percent Complete Type is assigned in the **Defaults** tab of the **Projects Window** to each new activity created in a project. This may be changed at any time and only affects new activities created from that time onward:



After an activity has been created, the **Percent Complete Type** may be changed in the **General** tab of the **Activities Window**:



The Activity Percent Complete may be updated in the **Status** tab of the **Activities Window** where the **Percent Complete Type** is also displayed:



Each **Percent Complete Type** has its own data column and is always calculated.

There is also an **Activity % Complete** column which is linked to and displays the value from the **Percent Complete Type** column that has been assigned to the activity. See the following picture:

Activity ID	Activity Name	Percent Complete Type	Activity % Complete	Physical % Complete	Duration % Complete	Units % Complete
AA1000	% Complete Physical	Physical	50%	50%	0%	0%
AA1010	% Complete Duration	Duration	50%	0%	50%	0%
AA1020	% Complete Units	Units	50%	0%	0%	50%

The **Activity % Complete** is in turn linked to the Bar Percent Complete, therefore in effect the **Percent Complete Type** determines the way the percent complete is displayed on the bars.

21.5.2 Physical Percent Complete Type

An activity assigned Physical Percent Complete Type may have the % Physical Complete entered in the **Physical % Complete** or the **Activity % Complete**. This field has no impact on schedule calculations and is not linked to either the Resource Units or the Actual and Remaining Durations of the Activity.

Physical % Complete must be used when **Steps** are being used to record progress.

The **Physical Percent Complete** type is often used when the progress of an Activity is being measured outside Primavera. For example, an activity representing the installation cable that is measured by length of cable installed would have the percent complete calculated by:

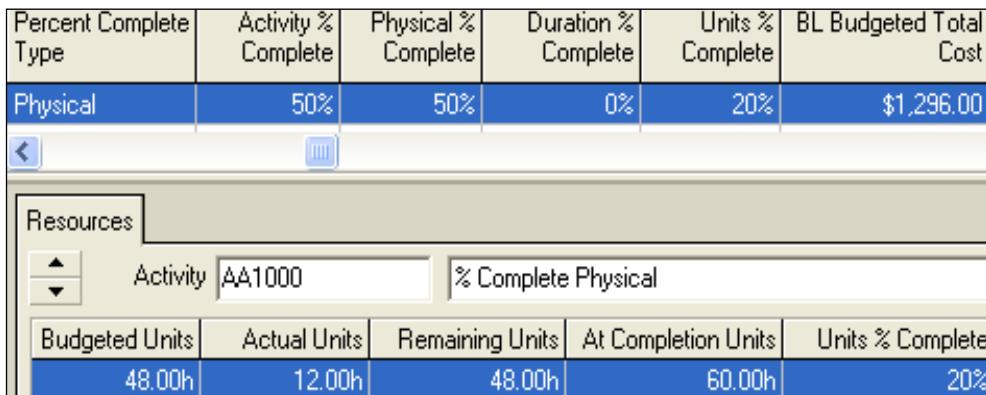
- % Complete = Qty. of Cable Installed/Total Qty. of Cable to be Installed

For example, the activity may only have the installation labor assigned to it, and therefore the installation labor parameter may not be used for the measurement of the Activity % Complete. In addition, because the percent complete of the activity is based on the length of cable installed, the Activity % Complete (the progress of the work) may be compared to the resource **Units % Complete** (the amount of labor used) which is calculated from the formula:

- Units % Complete = Actual Units/At Completion Units

This example is demonstrated in the following picture:

- The Activity Physical % Complete is set at 50%.
- The Activity Unit % Complete of 20% is calculated from the At Completion Units of 12.00 hrs and At Completion Units of 60.00 hrs and not the Budget Units of 48.00 hrs.



After a second resource is added, the Activity Units % Complete of 40% is calculated from the addition of the two resource Actual Units and At Completion Units:

- Activity Unit % Complete = Actual Labor Units/At Completion Labor Units
- Therefore, 40% = (12 + 36)/(60 + 60)

Percent Complete Type	Activity % Complete	Physical % Complete	Duration % Complete	Units % Complete	Actual Labor Units	At Completion Labor Units
Physical	50%	50%	0%	40%	48.00h	120.00h
Activity AA1000	% Complete Physical					
Budgeted Units	Actual Units	Remaining Units	At Completion Units	Units % Complete		
48.00h	12.00h	48.00h	60.00h	20%		
48.00h	36.00h	24.00h	60.00h	60%		

21.5.3 Duration Percent Complete Type

With Duration Percent Complete there is a link established between:

- Duration % Complete
- Original Duration
- Remaining Duration

A Duration % Complete may only be entered after an Actual Start Date has been assigned and should be in the past with respect to the Current Data Date.

A change in one parameter will change one other:

- A change in the Duration % Complete will change the Remaining Duration, and
- A change in the Original Duration or Remaining Duration will change the Duration % Complete:

Percent Complete Type	Activity % Complete	Physical % Complete	Duration % Complete	Units % Complete	Actual Labor Units	At Completion Labor Units
Duration	40%	0%	40%	50%	16.00h	32.00h
Activity AB1080	Duration % Complete					
Duration	Status					
Original	5d	<input checked="" type="checkbox"/> Started 27-Jun-03	Duration %	40%		
Actual	1d	<input type="checkbox"/> Finished 02-Jul-03	Total Float			
Remaining	3d	Evp Finish	Free Float			

The **Actual Duration** is calculated from the duration of **Actual Start** to the **Current Data Date**.

The Activity **Units Percent Complete** is still calculated from the Resource Units.

21.5.4 Units Percent Complete Type

When **Units Percent Complete** type is selected:

- This option creates a link between the **Activity % Complete** and the activity **Units % Complete**, and
- The **Units % Complete** is calculated from the relationship between the **Actual Units** and **At Completion Units**.

Percent Complete Type	Activity % Complete	Physical % Complete	Duration % Complete	Units % Complete	Actual Labor Units	At Completion Labor Units
Units	50%	0%	33.33%	50%	24.00h	48.00h

The screenshot shows the Oracle Primavera P6 software interface. In the main window, an activity named "AA1020" is selected. The "Status" tab is open, showing the following information:

- Duration:** Original: 6d, Actual: 2d, Remaining: 4d, At Complete: 6d.
- Status:** Started (checkbox checked), Started Date: 26-Jun-03, Finished (checkbox unchecked), Finished Date: 03-Jul-03.
- Step Details:** Shows "Exp Finish" and "Free Float" fields.

21.6 Using Steps to Calculate Activity Percent Complete

An activity percent complete may be defined by using steps. A Step is a measurable or identifiable task required to complete an activity. Steps are useful to update activities that have many components, where the order of completion is not important but the measurement of progress is. Examples of the use of Steps:

- Driving of piles, with the **Step Weight** of each pile being the length of the pile,
- Pouring of footings, with the **Step Weight** being the m³ of concrete for each footing,
- Pulling of electrical cable, with the **Step weight** being the weight or length of each cable.

In summary, to use steps:

- A Step template may be created by selecting **Enterprise, Activity Step Template...** to open the **Activity Step Templates** form.
- Add as many steps as required and assign their weight which will be used to apportion the percent complete of an activity.
- Check the **Activity percent complete based on steps** check box in the **Projects Window, Calculations** tab,
- Select the **Physical** in the **% Complete Type** for each activity that is to be measured by steps in the **General** tab of **Activities Window**,
- Select the **Steps** tab in the **Activities Window**,
- Format the columns you wish to display,
- Add the number of steps you require or import from a Step Template,
- Edit the descriptions as required,
- Edit the **Step Weight** so the **Step Weight Percent** reflects the desired value of the Step,
- Check the **Completed** check box as each step is completed and this will update the percent complete.

- The Remaining Duration may be updated from the Step % Complete via the Physical % Complete using a Global Change.

Step Name	% Complete	Step Weight	Step Weight Percent	Completed
Specify Document Composition	100%	10.0	10.0	<input checked="" type="checkbox"/>
Document First Draft	100%	40.0	40.0	<input checked="" type="checkbox"/>
Final Draft and Internal Approval	0%	25.0	25.0	<input type="checkbox"/>
Client Approval	0%	25.0	25.0	<input type="checkbox"/>

21.7 Updating the Schedule

21.7.1 Preferences, Defaults and Options for Updating a Project

Most Primavera Options are good, but there are some that should be changed. The options to be considered and checked before updating a schedule:

Function	Discussion
• % Complete Type	<p>It is the author's preference to use Physical % Complete when the resources are Input resources, i.e., those doing the work. This allows the % of deliverables complete to be measured independently of the resource(s) doing the work, thus allowing a comparison of the deliverables completed against the resources consumed.</p> <p>Physical % Complete must be used with steps.</p>
• Activity Type	<p>Activities with known durations should be set as Task Dependent and will use the Activity calendar (not the Resource Calendar) for calculating the finish date of the activity.</p> <p>Resource Dependent activities should only be used if there are resource availability issues which may only be resolved by the use of Resource Calendars.</p> <p>Level of Effort and WBS activities are useful but should be avoided by the novice user as these add an additional level of complexity that is not required.</p>
• Project Window Calculations tab	<p>The Calculations tab in the Projects Window sets some important resource defaults that should be reviewed, understood, and set so the schedule calculates the desired way.</p> <p>The Link actual to date and actual this period units and Costs option found in the Calculations tab of the Project Window should be checked if it is intended to Store Period Performance.</p>
• Duration Type	<p>It is the author's preference to use Fixed Duration and Units because the estimate to complete is not altered by changing the Activity Duration or Units/Time.</p>
• User Preference Calculation Tab	<p>This duration type also sets the Resource Assignments option in the User Preferences, Calculation tab to Recalculate the Units, Duration, and Units/Time for existing assignments based on the activity Duration Type. Thus, adding and removing resources will not change existing resource assignments</p>

Function	Discussion
<ul style="list-style-type: none"> • Timesheets 	<p>Timesheets may be used to update actuals for none, some, or all resources. Organizations using timesheets should have procedures managing their use. Timesheets are out of the scope of this publication but if they are being used the actual values should be carefully checked before being applied to ensure they are logical.</p>
<ul style="list-style-type: none"> • Resources Cost Calculation 	<p>Resource Costs may be calculated from the Resource Unit Rates for each individual resource assignment.</p> <p>Each resource assignment has a field titled Calculate cost from units. When this is checked the resource costs are calculated from the resource units.</p> <p>The Calculate costs from units check box in the Resource Window, Details tab sets the default value for Calculate cost from units for new resource assignments.</p> <p>The two fields are not linked and the resource assignment setting may be changed at any time.</p>
<ul style="list-style-type: none"> • Resource Window Details Tab 	<ul style="list-style-type: none"> • Auto Compute Actuals <p>This field is linked to all resources assignments. When this option is checked for a resource Primavera calculates the Remaining Units based on the Remaining Duration and the Actual Units by subtracting the Remaining Units from Budgeted Units.</p> <p>An unchecked resource assignment option may be overridden by applying the Activity Auto Compute Actuals option.</p> <ul style="list-style-type: none"> • Calculate Costs from Units <p>There is a field available when a resource is assigned to an activity titled Calculate cost from units. With this option checked the costs for a resource are calculated from the Resource Unit/Time when a resource is added to an activity and whenever the Resource Units are changed.</p>
<ul style="list-style-type: none"> • General Schedule Options 	<p>One of the more important options to review is the When scheduling progressed activities use options, as these affect how out-of-progress sequence is handled. These options should be reviewed to ensure that when the schedule is recalculated you will understand what is happening.</p> <p>The author prefers Retained Logic as this gives a more conservative schedule and those relationships that need editing may be edited to reflect retained logic as required.</p>
<ul style="list-style-type: none"> • Steps 	<p>Should it be decided to use Steps to update a schedule the Projects Window Calculations tab should have the Activity percent complete based on activity steps option checked and the Activity must be assigned Physical % Complete Type in the General tab of the Activities Window for each activity.</p>

Function	Discussion
• Earned value calculation	The <u>Admin, Admin Preferences...</u> , Earned Value tab, MUST NOT BE SET TO “Budgeted values with planned dates” when a Baseline has progress, otherwise the Planned Dates will be displayed in the Baseline and these may contain irrelevant data when the schedule has progress. The author recommends using At Completion values with current dates . Then you are comparing the At Completion of the current schedule with the At Completion Values of the Baseline schedule.

21.7.2 Updating Dates and Percentage Complete

The schedule should be first updated as outlined in the **Updating an Unresourced Schedule** chapter. In summary, this is completed by entering:

- The **Actual Start** and **Actual Finish** dates of **Complete** activities.
- The **Actual Start**, **% Complete** and/or **Remaining Duration** of **In-Progress** activities.
- Adjust **Logic, Constraints** and **Durations** of **Un-started** activities.

Before updating the **% Complete**, the **% Complete Type** should be checked to ensure that the Actual and Remaining Durations, Costs, and Units calculate as required. This ideally should be done by setting the project defaults at the time the project is created and adjusting the settings as activities are added and resources assigned.

21.8 Updating Resources

There are many permutations available for calculating resource data. Due to the number of options available in Primavera, it is not feasible to document all the combinations available for resource calculation.

Resource units and costs may be updated using one of the following methods:

- Entering Progress Automatically from the timesheets, a process titled **Applying Actuals**, or
- Using the function titles **Update Progress**. This is **NOT** recommended due to the risk that your **Actual Start** and **Early Finish** may be changed by P6 when the schedule has progress, or
- Entering the data using the **Resource** tab in the **Activities Window**, or
- Entering the data using the right section of the **Status** tab in the **Activities Window**, or
- Importing from Excel. Actual dates and Remaining Durations may be imported but Suspend and Resume may not.

21.8.1 Resources Tab

The **Resources** tab may be used to update the resource **Units** (and Costs if the Units and Costs have been unlinked with the **Calculate cost from units** field). An updating layout could be created and the columns in the Resources tab formatted to your updating method; see the following picture:

Resources							
Activity OZ1020		Create Technical Specification			Project OZB-20		
Resource ID Name	Auto Compute Actuals	Calculate costs from units	Budgeted Cost	Actual Cost	Remaining Cost	Budgeted Units	Actual Units
PM Project Manager	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	4,800	1,440	1,440	40h	12h
SE Systems Engineer	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	3,600	1,080	1,080	40h	12h

21.8.2 Status Tab

The right window may be used for updating the resources.

- When there is one resource there will be a direct link between this form and the values assigned to the resource.
- When there is more than one resource there will be a proportional change to all the resource values when a change is made in this form.

Budgeted	80.00h
Actual	20.00h
Remaining	20.00h
At Complete	40.00h

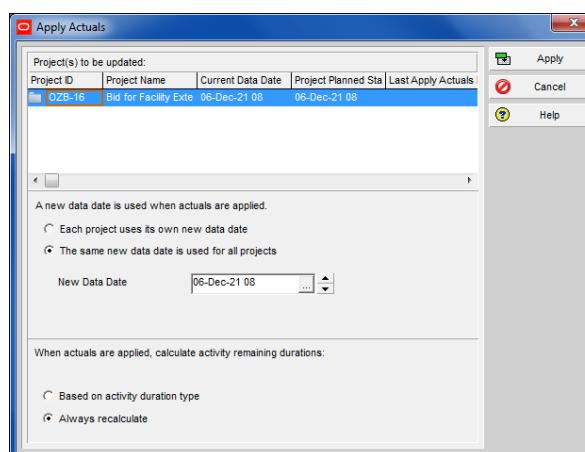
21.8.3 Applying Actuals

This functions automatically:

- Statuses activities with resources as if they went according to the Planned Dates (this may change Actual Dates and current schedule dates) and only updates activities in the period from the old to the New Data Date, or
- Applies actuals entered in the Primavera Timesheet system.

To Apply Actuals:

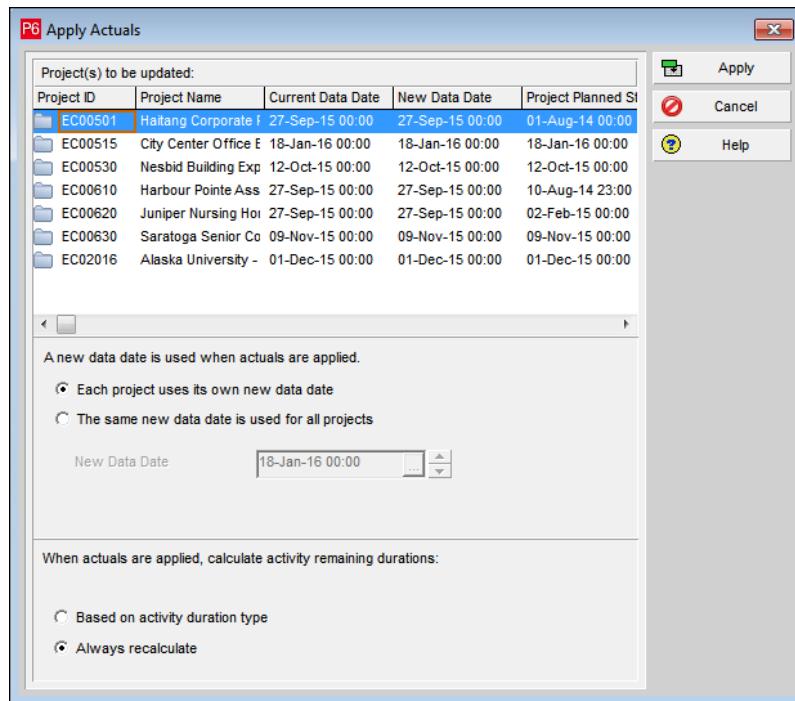
- Select **Tools, Apply Actuals...** to open the **Apply Actuals** form,
- Enter the **New Data Date** and click icon.
- If more than one project is open a different data date may be selected for each project.
- The Activity requires the **Activity Auto Compute Actuals** field checked for this function to apply to an Activity and all the Resources assigned to an activity.



- When the **Activity Auto Compute Actuals** field is not checked only the resources that have the **Resource Auto Compute Actuals** field checked in the **Resource Window** will be updated. If one resource is checked and one not, then the checked resource will be updated and the unchecked resource work will be delayed until after the **Current Data Date**.

There are some important issues with using **Apply Actuals** that must be understood:

- P6 Version 19 allows project to use their own **Data Date** when applying actuals. In earlier versions all projects were set to the same **Data Date**.



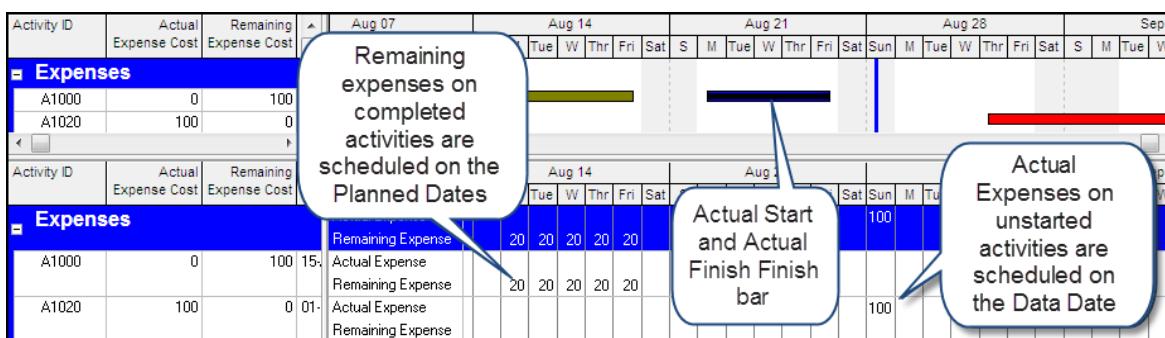
- This function uses the **Planned Dates**, not the current schedule dates, to progress a schedule so Actual Start Dates and the Early Finish dates may be changed by this function. This calculation process makes this function of little use to most schedulers.
- The Apply Actuals function does not work in the same way as the Microsoft Project function **Update Project** which both update all activities and resource assignments as if the project progressed exactly according to current schedule. They do not change any existing Actual Dates in the way the Primavera Update Progress and Apply Actual functions change dates to the Planned Dates which may hold irrelevant data.
- When the **Activity Auto Compute Actuals IS NOT** checked only activities with resources that are assigned **Auto Compute Actuals** will have their dates updated to their Planned Dates and resource assignments recalculated. Unresourced activities are scheduled after the Data Date.
- When the **Activity Auto Compute Actuals IS** checked then these activities will have their dates updated to their Planned Dates and resource assignments recalculated.
- With the introduction of **Progress Spotlight** there would initially appear to be no need to use **Apply Actuals** to automatically update a project and **Update Progress** and/or **Progress Spotlight** could be used. But as the **Update Progress** function also resets **Actual Dates** to **Planned Dates** this feature makes this function also of little use to many schedulers.
- A **Global Change** may be run first to set the **Planned** dates to the **Start and Finish** dates before Applying Actuals or Updating Progress, but this results in a change to the Original Duration and therefore the % Duration will calculate incorrectly and there is a risk that the user will forget to run the Global Change.

21.9 Updating Expenses

Expenses are updated in a similar way to resources in the **Activities Window**, **Expense** tab. Expenses will not be covered in detail, but here are some notes about Expenses that you may find useful:

- Expenses do not automatically update from any % Complete and have to be manually updated.
-  The Expense **Auto Compute Actuals** option works only with the **Apply Actuals** function, which is used when bringing in data from the Primavera Timesheets module.
- Expenses may have a cost assigned before their activity is marked started or complete; resources may not. This is useful to represent contractor's mobilization costs. These are scheduled on the Data Date.
 - Expenses may have a cost to complete before their activity is NOT marked started; resources may not. This is useful to represent contractor back charges or retention. These are scheduled on the Planned Dates,

Expenses may have a negative cost to complete after the activity is marked complete; resources may not. This is useful to represent contractor back charges. These are scheduled on the Planned Dates:



- Expenses must be assigned a quantity and unit rate. The quantity is by default a value of one.
- Expense quantities may not be displayed in the:
 - **Activities Window** columns, or
 - **Resource Usage Spreadsheet**, or
 - **Resource Usage Profile**, or
 - **Activity Usage Spreadsheet**, or
 - **Tracking Window**, or
 - **Resource Assignment Window**.
- Expense Quantities may be displayed in:
 - **Reports**, or
 - **Activity Details, Expenses** tab, or
 - **Expenses Window**.



Thus, it is simple to get Expense Data into the system but difficult to get **Expense Quantity** data out of the system.



Remaining Expenses assigned to a complete activity are Cash Flowed on the Planned dates, which would normally result with an incorrect Cash Flow with Remaining Costs in the past.

21.10 Workshop 18 – Updating a Resourced Schedule



Background

We now need to update the activities and resources as of 13 Dec 21.

Assignment

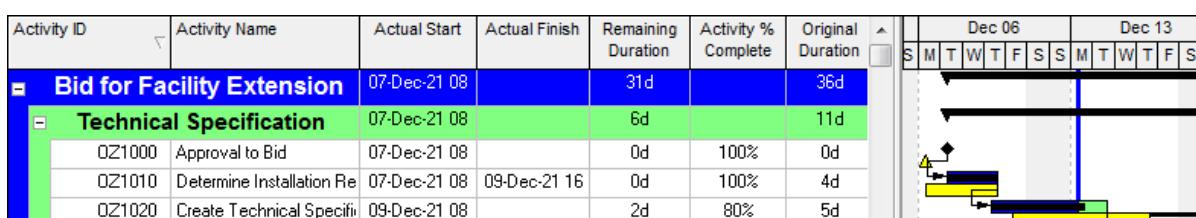
1. If you did not complete the previous Leveling Workshop you will need to create and assign a baseline and display the Baseline bar:
 - Select **Project, Maintain Baselines...** and create a Baseline by saving a copy of the existing project,
 - Select **Project, Assign Baselines...** and select this as both your **Project Baseline** and **Primary User Baseline**, thus ensuring the baseline bar will either be blank or display the Baseline and not the **Planned Dates**.
2. Apply your OzBuild Workshop 13 – Baseline layout and the Baseline bar should be displayed.
3. Go to the **Project Window, Calculations** tab ensure your settings are as per the following picture. These are the standard settings:

Calculations	
Activities	Resource Assignments
Default Price / Unit for activities without resource or role Price / Units <input type="text" value="\$0/h"/> <input type="checkbox"/> Activity percent complete based on activity steps	When updating Actual Units or Cost <input type="radio"/> Add Actual to Remaining <input checked="" type="radio"/> Subtract Actual from At Completion <input checked="" type="checkbox"/> Recalculate Actual Units and Cost when duration % complete changes <input type="checkbox"/> Update units when costs change on resource assignments <input checked="" type="checkbox"/> Link Actual and Actual This Period Units and Cost
<input checked="" type="checkbox"/> Link Budget and At Completion for not started activities <input type="radio"/> Reset Original Duration and Units to Remaining <input checked="" type="checkbox"/> Reset Remaining Duration and Units to Original	

4. Assign the **Project Manager** to the **Create Technical Specification** activity as this resource was missed out at the estimating stage and will give an immediate difference between the Current Schedule and the Baseline Units and Costs.
5. Save the Layout as **OzBuild Workshop 18 – Updating Resources** and format the columns as in the following picture. Display the Primary Baseline bar.
6. Update this schedule manually by entering the following data in the **Activities, Status** tab or columns. Ensure all activities are Physical % Complete.

Activity ID	Activity Name	Actual Start	Actual Finish	Remaining Duration	Activity % Complete
	Bid for Facility Extension	07-Dec-21 08		32d	
	Technical Specification	07-Dec-21 08		9d	
OZ1000	Approval to Bid	07-Dec-21 08		0d	100%
OZ1010	Determine Installation Requirements	07-Dec-21 08	09-Dec-21 16	0d	100%
OZ1020	Create Technical Specification	09-Dec-21 08		2d	80%

7. As you work through this workshop you should create several layouts, one for Actual Dates and Durations, one for Units, one for Costs, and one for Percentages. The Costs layout would display costs in the Activity columns and the Resources tab. The Units layout would display units in the Activity columns and the Resources tab.
8. Schedule and move the **Data Date** to 13-Dec-21 08:00.



9. Create an **OzBuild Workshop 18 – Units** layout and display the columns shown in the Resources tab as shown below. See how the resources have been updated.
10. OZ1010 is complete so there are no Remaining Costs or Remaining Units and the Actuals have been set to equal the Budget but may be manually adjusted.

Resources						
Activity		Determine Installation Requirements				
Resource ID	Name	Remaining Units / Time	Budgeted Units	Actual Units	Remaining Units	At Completion Units
PM.Project Manager		8h/d	32h	32h	0h	32h
SE.Systems Engineer		8h/d	32h	32h	0h	32h

11. Now create an **OzBuild Workshop 18 – Costs** layout, format the columns and check the costs:

Resources						
Activity		Determine Installation Requirements				
Resource ID	Name	Price / Unit	Budgeted Cost	Actual Cost	Remaining Cost	At Completion Cost
PM.Project Manager		\$120/h	\$3,840	\$3,840	\$0	\$3,840
SE.Systems Engineer		\$90/h	\$2,880	\$2,880	\$0	\$2,880

12. OZ1020 is in progress and the Remaining Units and Costs have been calculated from the Remaining Duration and the Remaining Units/Time, but may be manually adjusted.

Resources						
Activity		Create Technical Specification				
Resource ID	Name	Price / Unit	Budgeted Cost	Actual Cost	Remaining Cost	At Completion Cost
PM.Project Manager		\$120/h	\$4,800	\$2,880	\$1,920	\$4,800
SE.Systems Engineer		\$90/h	\$3,600	\$2,160	\$1,440	\$3,600

13. Now display the **Workshop 18 – Units** layout and check the units:

Resources						
Activity		Create Technical Specification				
Resource ID	Name	Remaining Units / Time	Budgeted Units	Actual Units	Remaining Units	At Completion Units
PM.Project Manager		8h/d	40h	24h	16h	40h
SE.Systems Engineer		8h/d	40h	24h	16h	40h

14. Check the expenses for the Specialist Consultant assigned to OZ1020; they do not auto update. Update the Actual Costs to \$2,000.00 and the remaining to \$4,500.00.

Expenses					
Activity		Create Technical Specification			
Expense Item	Budgeted Cost	Actual Cost	Remaining Cost	At Completion Cost	
Specialist Consultant	\$5,000	\$2,000	\$4,500		\$6,500

15. Now create an **OzBuild Workshop 18 – Percentages** layout and display the Percent Complete columns as per the following picture. Ensure Group Totals are displayed:
16. Enter 40% against the Physical % Complete of Create Technical Specification and see the Activity % Complete change to 40% as the activity % Complete Type is Physical:

Activity ID	Activity Name	Activity % Complete	Physical % Complete	Duration % Complete	Units % Complete
	Bid for Facility Extension			13.89%	20%
	Technical Specification			45.45%	58.33%
OZ1000	Approval to Bid	100%	100%	100%	0%
OZ1010	Determine Installation Requirements	100%	100%	100%	100%
OZ1020	Create Technical Specification	40%	40%	60%	60%

17. Select the Create Technical Specification activity, open the Status tab, and change the Actual Labor Units from 48h to 24h in the box on the right side. Notice the Units % Complete change to 30% as fewer hours have been used, but the Remaining has changed to 56 hours:

Activity ID	Activity Name	Activity % Complete	Physical % Complete	Duration % Complete	Units % Complete
	Bid for Facility Extension			13.89%	15.71%
	Technical Specification			45.45%	45.83%
OZ1000	Approval to Bid	100%	100%	100%	0%
OZ1010	Determine Installation Requirements	100%	100%	100%	100%
OZ1020	Create Technical Specification	40%	40%	60%	30%

18. Now open the **OzBuild Workshop 18 – Units** layout and both resources now show 12h Actual and 28h remaining each. The Remaining Units/Time is now 14 hours/day because the **Activity Type** is **Fixed Duration and Units**:

Resources					
Activity		Create Technical Specification			
Resource ID	Name	Remaining Units / Time	Budgeted Units	Actual Units	Remaining Units
	PM.Project Manager	14h/d	40h	12h	28h
	SE.Systems Engineer	14h/d	40h	12h	28h

19. Now open the **OzBuild Workshop 18 – Costs** layout and the Actual Costs and Remaining Costs are recalculated:

Resources					
Activity		Create Technical Specification			
Resource ID	Name	Price / Unit	Budgeted Cost	Actual Cost	Remaining Cost
	PM.Project Manager	\$120/h	\$4,800	\$1,440	\$3,360
	SE.Systems Engineer	\$90/h	\$3,600	\$1,080	\$2,520

20. Now open the OzBuild Workshop 18 – Units layout and change the Remaining Units of Create Technical Specification in the Status tab from 56 to 24. Note the change in the Units and Costs against the resources.

Resources						
Activity OZ1020		Create Technical Specification				
Resource ID	Name	Remaining Units / Time	Budgeted Units	Actual Units	Remaining Units	At Completion Units
PM.Project Manager		6h/d	40h	12h	12h	24h
SE.Systems Engineer		6h/d	40h	12h	12h	24h

21. Now open the OzBuild Workshop 18 – Costs layout and the Actual Costs and Remaining Costs should have been recalculated:

Resources						
Activity OZ1020		Create Technical Specification				
Resource ID	Name	Price / Unit	Budgeted Cost	Actual Cost	Remaining Cost	At Completion Cost
PM.Project Manager		\$120/h	\$4,800	\$1,440	\$1,440	\$2,880
SE.Systems Engineer		\$90/h	\$3,600	\$1,080	\$1,080	\$2,160

22. Create a new View titled OzBuild Workshop 18 – Baseline Compare and edit the columns so you are able to see the At Completion Variances against activity OZ1020, the Technical Specification WBS Node, and the Project:

Activity ID	Activity Name	Activity % Complete	BL Project Labor Units	At Completion Labor Units	Variance - BL Project Labor Units	BL Project Total Cost	At Completion Total Cost	Variance - BL Project Total Cost
- Bid for Facility Extension			520h	528h	-8h	\$55,060.00	\$58,000.00	(\$2,940.00)
- Technical Specification			152h	160h	-8h	\$19,800.00	\$22,740.00	(\$2,940.00)
OZ1000	Approval to Bid	100%	0h	0h	0h	\$0.00	\$0.00	\$0.00
OZ1010	Determine Installation Re	100%	64h	64h	0h	\$6,720.00	\$6,720.00	\$0.00
OZ1020	Create Technical Specifi	40%	40h	48h	-8h	\$8,600.00	\$11,540.00	(\$2,940.00)
OZ1030	Identify Supplier Compon	0%	16h	16h	0h	\$1,120.00	\$1,120.00	\$0.00
OZ1040	Validate Technical Spec	0%	32h	32h	0h	\$3,360.00	\$3,360.00	\$0.00
- Delivery Plan			224h	224h	0h	\$21,520.00	\$21,520.00	\$0.00
OZ1050	Document Delivery Meth	0%	32h	32h	0h	\$3,840.00	\$3,840.00	\$0.00
OZ1060	Obtain Quotes from Supp	0%	128h	128h	0h	\$12,160.00	\$12,160.00	\$0.00
OZ1070	Calculate the Bid Estimat	0%	24h	24h	0h	\$1,920.00	\$1,920.00	\$0.00
OZ1080	Create the Project Sched	0%	24h	24h	0h	\$1,920.00	\$1,920.00	\$0.00
OZ1090	Review the Delivery Plar	0%	16h	16h	0h	\$1,680.00	\$1,680.00	\$0.00
- Bid Document			144h	144h	0h	\$13,740.00	\$13,740.00	\$0.00
OZ1100	Create Draft of Bid Docu	0%	96h	96h	0h	\$8,160.00	\$8,160.00	\$0.00
OZ1110	Review Bid Document	0%	32h	32h	0h	\$3,360.00	\$3,360.00	\$0.00
OZ1120	Finalise and Submit Bid C	0%	16h	16h	0h	\$2,220.00	\$2,220.00	\$0.00
OZ1130	Bid Document Submitted	0%	0h	0h	0h	\$0.00	\$0.00	\$0.00

23. At this point you may experiment with this activity. Uncheck Auto Compute Actuals will allow you to change the Costs and they are not recalculated from the Resource Rate.
24. You may also look at some of the other tabs such as the Summary tab.

22 OTHER METHODS OF ORGANIZING PROJECT DATA

The **Work Breakdown Structure – WBS** function was discussed earlier as a method of organizing projects and activities under hierarchical structures. There are alternative features available in Primavera for grouping, sorting and filtering activities, resources, and project information:

- Activity Codes
- User Defined Fields (UDF)
- WBS Categories
- Resource Codes
- Cost Accounts
- EPS Level Activity Codes
- Assignment Codes – new to Primavera P6 Version 20



There are no Activity ID Codes in Primavera like the function found in P3 and SureTrak. In Primavera each activity must have a unique Activity ID but no logical code system may be associated with the Activity ID. Some users double-code activities so some Activity ID characters are the same as an Activity Code.

22.1 Understanding Project Breakdown Structures

A Project Breakdown Structure represents a hierarchical breakdown of a project into logical functional elements. Some organizations have highly organized and disciplined structures with “rules” for creating and coding the elements of the structure. Some clients also impose a WBS code on a contractor for reporting and/or claiming payments. The following are examples of such structures:

- WBS **Work Breakdown Structure** breaks down the project into the elements of work required to deliver a project.
- COA **Code of Accounts**, also known as **Cost Breakdown Structure**. Often this contains costs that are not included in a schedule, such as insurances and overheads. The WBS would in this situation represent part of the COA.
- OBS **Organization Breakdown Structure** shows the hierarchical management structure of a project. Primavera has a predefined field for this breakdown structure.
- CBS **Contract Breakdown Structure** shows the breakdown of contracts into elements.
- SBS **System Breakdown Structure**, a **System Engineering** method of breaking down a complex system into elements.
- PBS **Product Breakdown Structure**, a **PRINCE2** term used for the breakdown of project deliverables under two headings of Project Management and Specialist products.

22.2 Activity Codes

Activity Codes may be used to Group, Sort, and Filter activities from one or more open projects.

- **Activity Codes**, such as Phases, Trades, or Disciplines, are often defined in the **Enterprise, Activity Codes , Activity Codes Definition** form.

- **Activity Code Values** are defined in the **Enterprise, Activity Codes...** form, such as:
 - Phases of Design, Procure, Install and Test,
 - Trades of Brickwork, Plumbing and Electrical, and
 - Disciplines of Concrete, Mechanical, Pipework.
 - **Activity Codes** are assigned from the **Activities Window** using the **Codes** tab in the lower pane or displaying the appropriate Activity Code column.
- i** Microsoft Project 2002 introduced Custom Outline Codes, which is a hierarchical coding structure that may be assigned to activities and enables the activities to be Grouped under these codes. There are 10 Custom Outline Codes available with every project that may be renamed to suit the project requirement. The Primavera Activity Code function operates similarly to both the Elecosoft (Asta) Powerproject Code functions and the Microsoft Project Custom Outline Codes, but in addition enables an unlimited number of Code Dictionaries and Values for each Code Dictionary and may be hierarchical. Elecosoft (Asta) Powerproject codes work in a similar way to P6 but a task may be assigned multiple values from one code dictionary which is very useful and not possible in other products. For example, a column may be assigned all three floors that it is associated with.

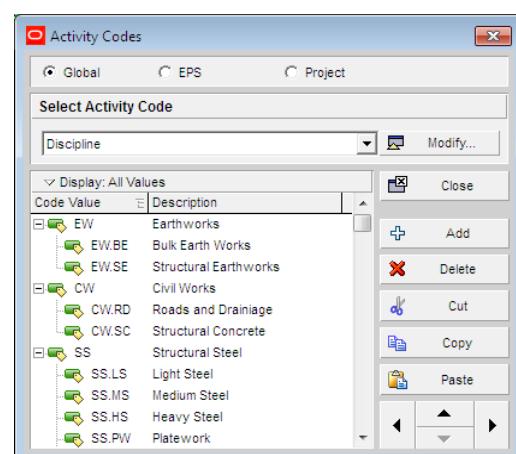
22.2.1 Understanding Activity Codes

There are three types of Activity Codes:

- **Global Activity Codes** that may be created at any time and applied to any project.
- **EPS** which are created for projects associated with one EPS Node and may only be assigned to project activities that are associated with that EPS Node. Thus, you may wish to create Railway EPS Activity Codes for projects in the Railway EPS and Software Development EPS Activity Codes for projects in the Software Development EPS.
- **Project Activity Codes** that may only be created when a project is opened and applied only to the project they were created for. These may be made Global by clicking the  icon in the **Activity Codes Definition – Project** form.

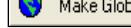
Activity Codes may be added, deleted, or modified in the **Activity Codes** form:

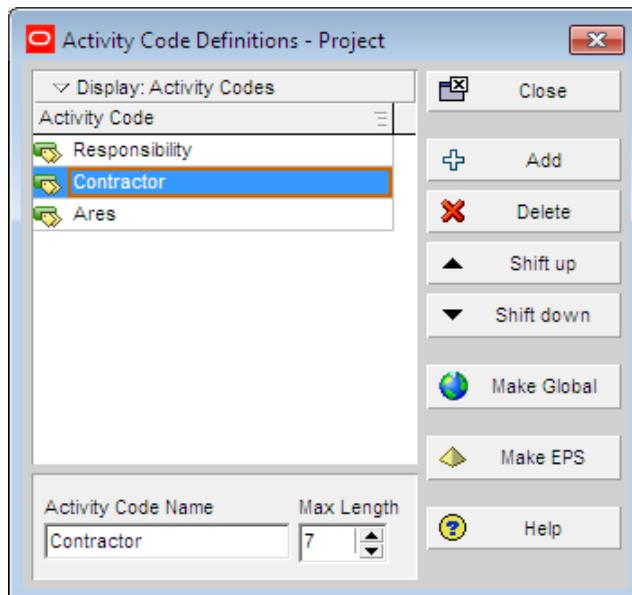
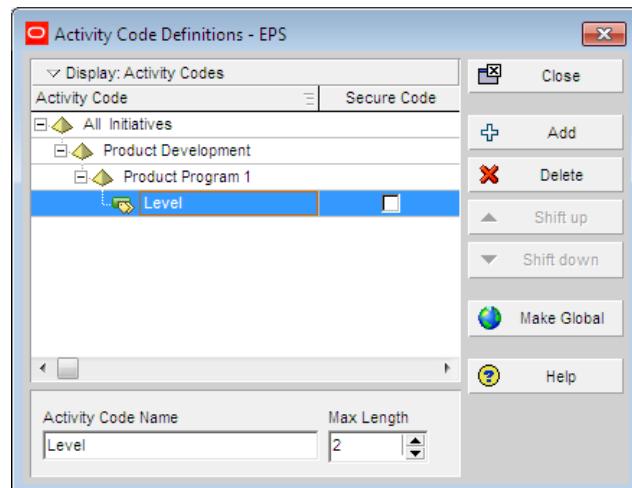
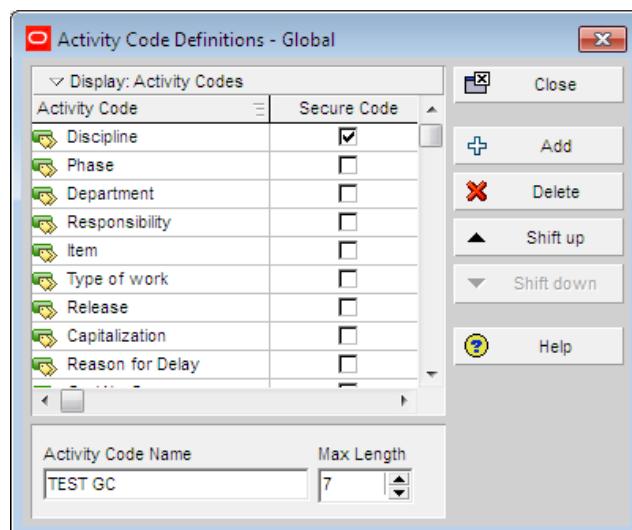
- Select **Enterprise, Activity Codes...** to open the **Activity Codes** form,
- Select either **Global, EPS** or **Project** radio button depending on whether the codes are for a specific project or available to all projects,
- Select from the drop-down box under **Select Activity Code** which code structure is to be edited.
- The code structure is modified in a similar way to WBS codes.
- Each Activity Code has a Code value and a Description. The length of the Code is defined when the code is created; see the next section.



22.2.2 Activity Code Creation

This process creates a field in the database where the Activity Codes may be added.

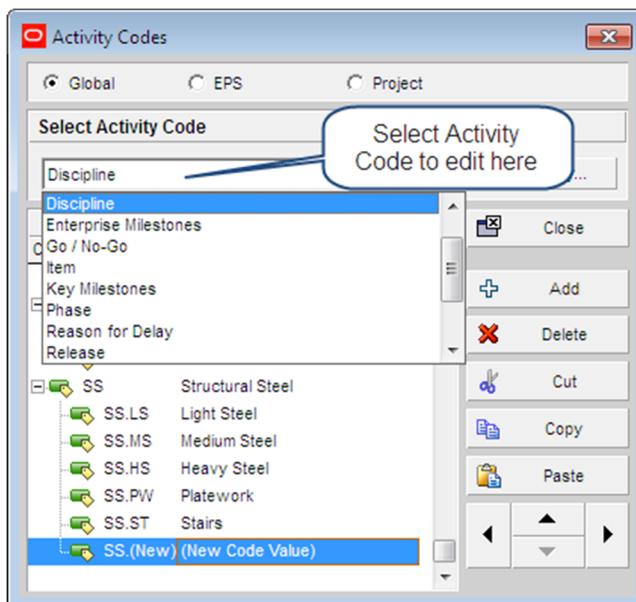
- Open an **Activity Codes Definition** form from the **Activity Codes** form by selecting either:
 - **Global**,
 - **EPS**, or
 - **Project**,
 Each form is slightly different.
- Click the  icon to open the **Activity Codes Definition** form.
- The Activity Codes may be created, deleted, or made into Global and reordered in these forms.
- The **Maximum Length** is the maximum number of characters a code may be assigned when it is created in the **Activity Codes form**.
- The **Secure Code** allows access to be controlled through the Users Security Profile.
- The **Activity Codes Definition – Project** form has the following icons:
 -  that makes a Project Activity Code a Global Activity Code, and
 -  that makes a Project Activity Code an EPS Activity Code.



22.2.3 Defining Activity Code Values and Descriptions

Defining an Activity Code is similar to creating a Codes in and Elecosoft (Asta) Powerproject or renaming a Microsoft Project Custom Outline Code:

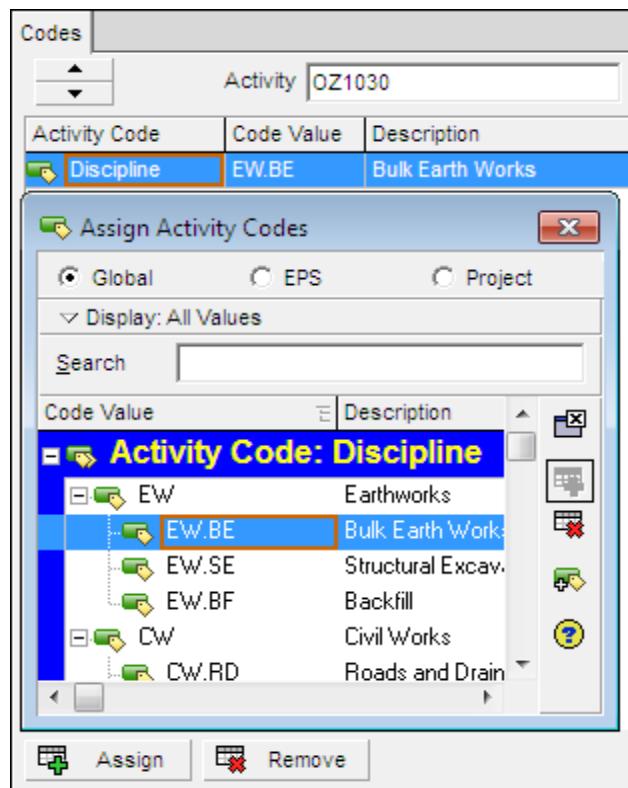
- From the **Activity Codes** form select **Global**, **EPS** or **Project**,
- Select the **Activity Code** to edit from the drop-down box,
- Add **Activity Codes Values and Descriptions** in the same way as WBS Codes and descriptions.
- The **Activity Code Color** may be used with the **Timescaled Logic Diagram** in Version 8.1 and 8.2 or **Visualizer** in Version 8.3 and later versions.



22.2.4 Assigning Activity Code Values to Activities

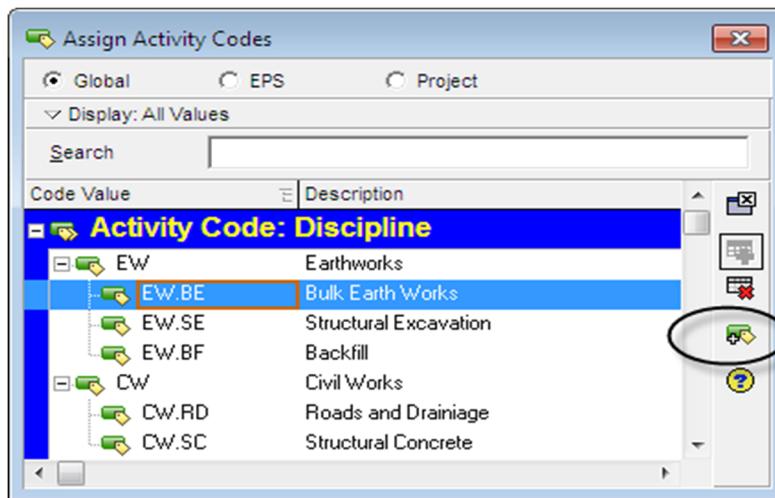
Activity Codes may be assigned to an activity:

- Select the **Codes** tab in the lower pane by clicking the icon to open the **Assign Activity Codes** form and assign an Activity Code, or
- Display the appropriate activity code column and either:
 - Type in the code, or
 - Click twice on the Activity Code cell and open the **Select "Code"** form.

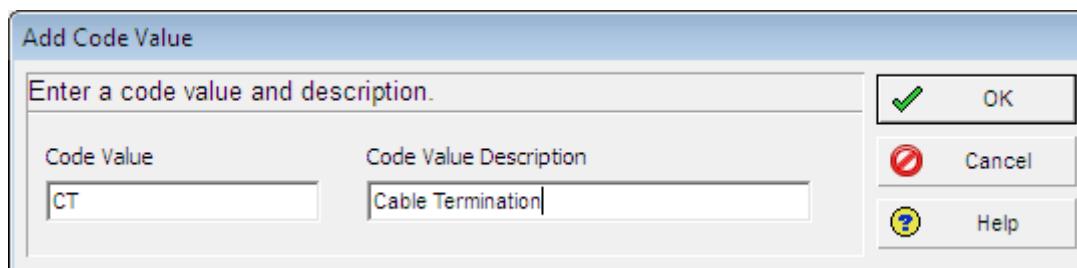


22.2.5 Add Activity Codes When Assigning Codes

Activity Codes may be added on the fly, as there is a new icon titled **New** on the **Assign Activity Codes** form that allows Activity Codes to be created as they are assigned:



Click on the icon to open the **Add Code Value** form and enter the new Code Value and Code Value Description.



22.2.6 Grouping, Sorting and Filtering with Activity Codes

When more than one project is open an Activity Code may be used to group activities from all the open projects under one code structure.

Activity Codes are Grouped and Filtered in the same way as WBS codes.

22.2.7 Importing Activity Codes with Excel

If an Activity Code is to be imported with activities using the Primavera Excel Import function, it must exist in the database before it is imported; otherwise, the code will not be imported.

In earlier versions Activity Codes may be imported by loading the Software Development Kit (SDK) and using an Excel spreadsheet available from the Oracle Primavera Knowledgebase. Instructions for loading the SDK are available from the Administration Guide. This is not supported in Version 8.4 and later,

22.3 User Defined Fields

User Defined Fields are similar to **Custom Fields** in Microsoft Project or **User Fields** in and Elecosoft (Asta) Powerproject and provide the ability to assign additional information to database records. They may be used for recording information about the data field as an alternative to Activity Codes and other predefined Primavera fields. The type of data that may be assigned to User Defined Fields would be equipment number, order number, variation or scope number; road, railway or pipeline changes; address and additional costs data.

Activity data may be filtered, grouped, and sorted using these User Defined Fields in a similar way to Activity Codes.

Data may be imported into the fields and, unlike Activity Codes, the data item does not have to exist in the database before importing.

There are a number of predefined fields that may be renamed and new ones may be created. User Defined Fields may be defined for:

- Activities
- Activity Resource Assignments
- Activity Steps
- Issues
- Project Expenses
- Projects
- Resources
- Risks
- WBS
- Work Products and Documents

The fields are assigned a **Data Type** from the following list:

- Text – maximum of 255 characters
- Start Date and Finish Date – which may be used to create bars
- Cost
- Indicator – select from
- Integer
- Number

After some data has been entered against a field in any project, the **Data Type** may not be changed.

P6 Version 19 added a new **Details, User Defined Fields** tab, similar to the **Codes** tab, displaying the assigned User Defined Fields (UDFs). It is available in the following windows: Projects, WBS, Activities, Resource Assignments, Project Expenses, Issues, and Work Products, Risks and Documents.

- The user must add the UDF Field to the **User Defined Fields** tab by clicking on the **Customize User Defined Fields** button.
- The displayed UDF Fields are saved as part of the View, thus the user will not automatically see which UDFs a data item such as a Project or Activity are being utilized.
- The picture below shows that the activity has been assigned a Parts Availability date but this is not displayed in the **User Defined Fields** tab as this UDF field has not been added by clicking on the **Customize User Defined Fields** button.

- The **Hide empty rows** will hide any blank UDF fields, so the Deadline line in the picture below would be hidden if the **Hide empty rows** was checked.

The screenshot shows a Gantt chart with one activity named "Design and Engineering" (Activity ID EC100) and its sub-task "Design Building Addition" (Activity ID EC124). The "Deadline" field for the sub-task is highlighted with a yellow box. Below the Gantt chart is a "User Defined Fields" dialog box. It contains a table with two rows: "Work Order" (Text type, value 8124) and "Deadline" (Finish Date type, value empty). At the bottom of the dialog box is a checkbox labeled "Hide empty rows".

Activity ID	Activity Name	Work Order	Parts Availability	Start
Design and Engineering			13-Jan-16 00:00	18-Jan-16 08:00
EC100 Design Building Addition		8124	13-Jan-16 00:00	18-Jan-16 08:00
User Defined Fields				
Activity	EC1000	Design Building Addition		
User Defined Field	Data Type	Value		
Work Order	Text	8124		
Deadline	Finish Date			

Hide empty rows



One advantage of **User Defined Fields** over **Notebook Topics** is that they may be also displayed in columns and be cut and pasted into other programs like Excel.

Also User Definable Field data may easily be imported from Excel and will not change your project data. You may consider importing data into User Defined Fields and then Global Change the information into the appropriate location as a second step.

- Thus Resource data needs to be imported into Resource User Defined Fields, and
- Activity data needs to be imported into Activity User Defined Fields.

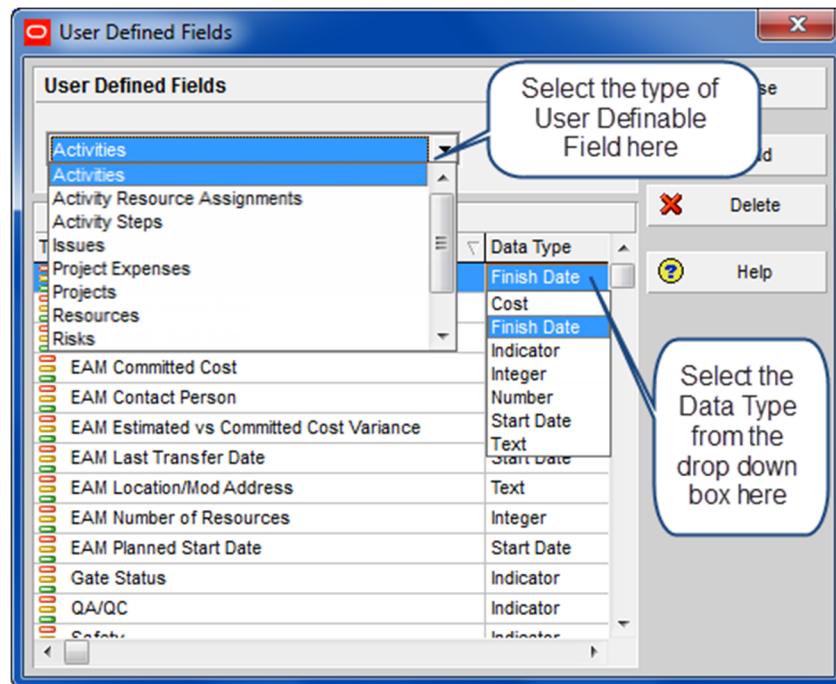


You must be careful that you do not make a User Definable Field with the same name as a P6 field, otherwise you will not know which is which when creating filters.

You may consider adding a full stop at the end of each User Definable Field name so it is clear which is a User Definable field and which is a P6 field.

Select **Enterprise, User Defined Fields...** to open the **User Defined Fields** form:

- Select the **Subject Area** in the drop-down box in the top left-hand side of the form.
- Use the **Add** and **Delete** icons to create and delete fields.
- Select the **Data Type** from the drop-down list.



The list of User Defined Fields will re-sort as soon as a new field is added or the title edited and you may have to scroll up or down to find it in the list

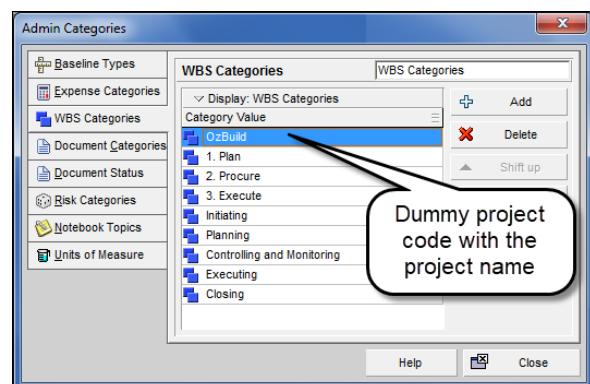
To display or edit data in a User Defined Field the column should be displayed in the appropriate window. For example, if an Activity User Defined Field has been created then the Activities Window should be selected and the field will be displayed under **User Defined**.

22.4 WBS Category or Project Phase

The **WBS Categories** is assigned to **WBS Nodes** in the **WBS Window** and may be used to Group and Sort WBS Nodes under a different set of headings.

This would enable, for example, all design WBS Nodes that were distributed throughout a project WBS to be grouped together under one heading without assigning an Activity Code to each activity. WBS Codes are to a WBS in same way as Activity Codes are to Activities and Project Codes to Project but there is only one dictionary or set of WBS Codes.

Separate set of project WBS Codes can be listed under a dummy code as the project name, see paragraph 6.5 for more details



22.5 Resource Codes

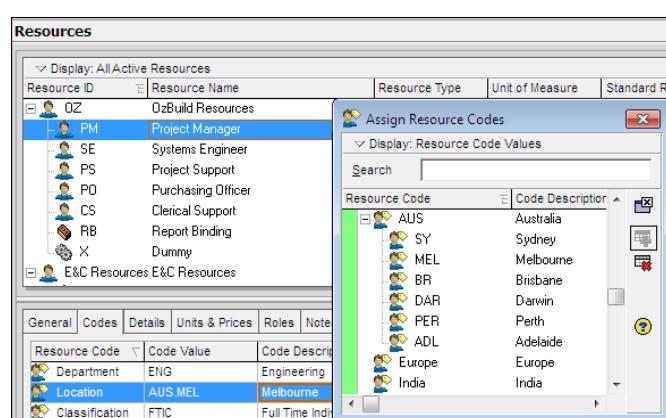
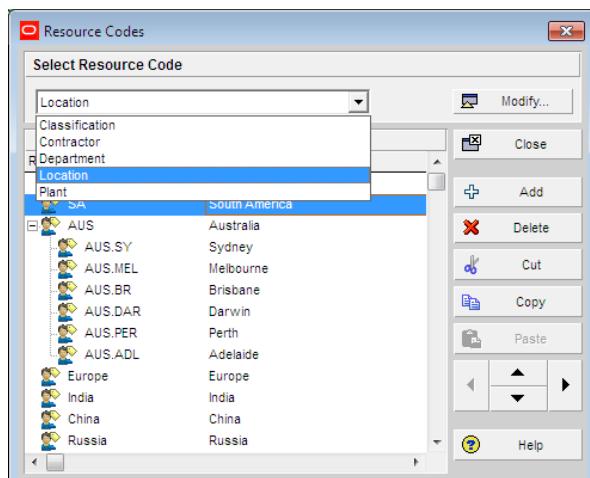
Resource Codes are to resources as Activity Codes are to activities and allow resources to be Grouped, Sorted, and Filtered by these codes. Resources may have codes such as Office, Location, or Employment Status assigned to them.

To create a Resource Code:

- Select **Enterprise, Resource Codes...** to open the **Resource Codes** form.
- The Resource Codes are created, edited, and deleted in a similar way to Activity Codes.

Resource Codes may be Assigned to Resources in a similar way to Activity Codes by:

- Opening the **Resources Window**,
- Displaying the appropriate Code Column,
- Opening the **Codes** tab in the **Resources Window**.

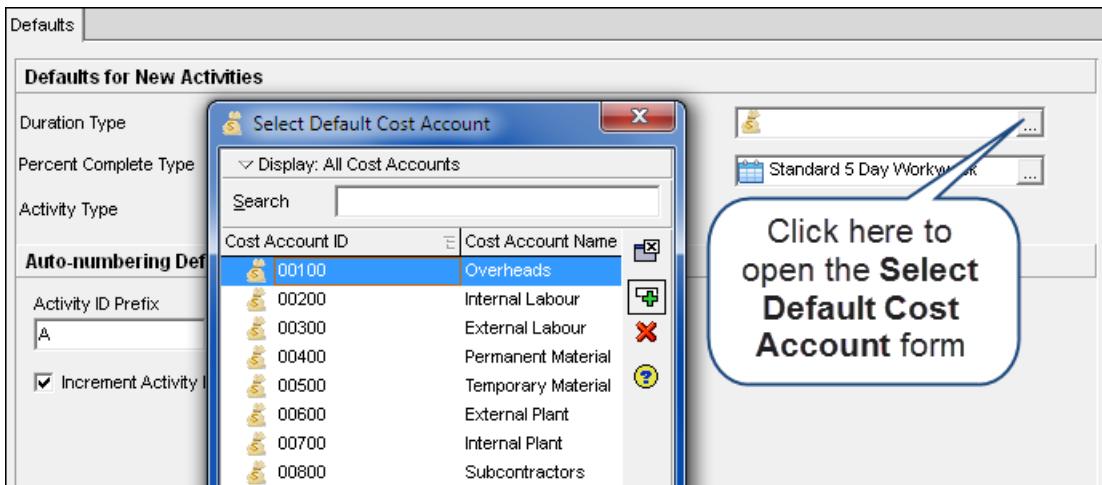


22.6 Cost Accounts

Cost Accounts are to resource assignments as Activity Codes are to activities and are intended to reflect the accounting code structure of a project. Cost Account in Primavera is assigned to a resource. They enable the grouping and reporting of resource data into Cost Accounts which would allow budgets to be calculated and used to update Corporate Budgets.

Cost Accounts have additional functions that Activity Codes do not have:

- A default Cost Account for each new Resource or Expense may be specified in the **Projects Window, Defaults** tab. This is used for each new Resource or Expense and does not affect existing assignments. The **Project Default Cost Account** may be changed at any time:



- Cost Accounts may be reassigned and merged.
- Cost Accounts may have descriptive fields when they are created.

Costs accounts are created:

- In the Professional version **Cost Accounts** form by selecting **Enterprise, Cost Accounts...** and opening the **Cost Accounts** form, and
- In the Optional Client by selecting **Administer, Enterprise Data, Activities, Cost Accounts**.

Cost Accounts are assigned to Resources or Expenses by displaying the Cost Account column in the **Activities Window** lower pane **Resources** and **Expenses** tabs.



The drawback of the **P6 Cost Account** function is that all resources are assigned the same value, which is normally undesirable. Cost accounts are normally used to group costs by parameters required by the accounts department, such as permanent or temporary materials, and used for depreciation etc.

It is more normal to assign a Cost Account to a resource and when a resource is assigned to an activity, it automatically has the desired Cost Account. If you wish a more traditional Cost Account set-up then you may wish to consider using a Resource Code to represent a Cost Account.

22.7 Owner Activity Attribute

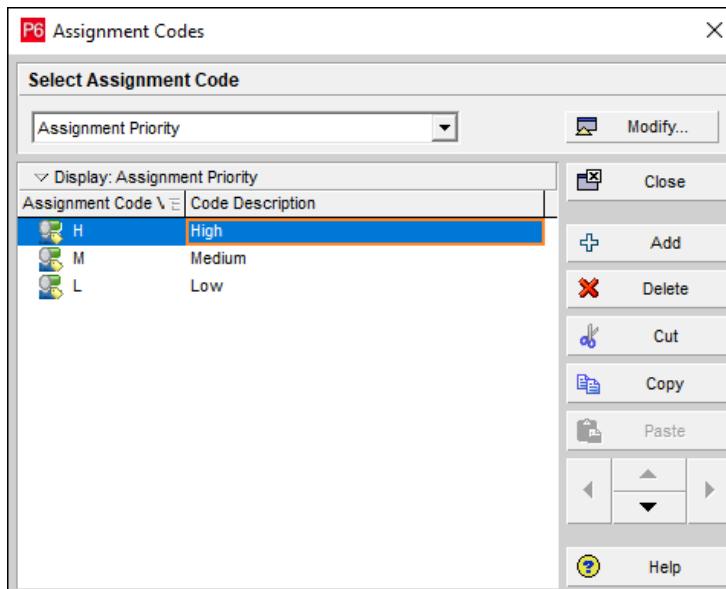
“Owner,” the new activity field in Primavera Version 6.0, enables a user who is not a resource to be assigned to an activity. This now enables the person responsible for an activity to be assigned from the list of users. This function may be used in combination with a Reflection project.

22.8 Assignment Codes

There is a new function titled **Assignment Codes** allowing users to code up assignments so resource assignments may be Grouped or Filtered. This function could be used for:

- Assigning priority to resource assignments against tasks,
- When there is one generic resource in the database that is being supplied by multiple subcontractors and this could be used to identify the subcontractor,
- When there is one generic resource in the database and you require a specific skill or qualification for the resource then this could be identified with an **Assignment Code**.

Assignment Codes are created in the same way as other codes by selecting **Enterprise, Assignment Codes**:



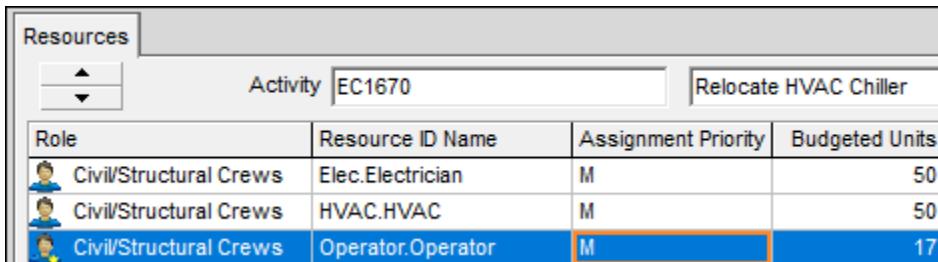
Assignment Codes are assigned to Resource or Role Assignments in the:

- **Codes** tab in the **Resource Assignment** window, or

Layout: Bucket Planning		
Activity ID	Activity Name	Assignment Priority
Assignment Priority: H High		
EC1500	Install HVAC Ducts	H
EC1680	Startup and Test HVAC	H
EC1830	Test and Balance HVAC Equipment	H
Assignment Priority: M Medium		
EC1630	Insulate Ducts	M
Assignment Priority: L Low		
EC1650	Set Heat Pump	L

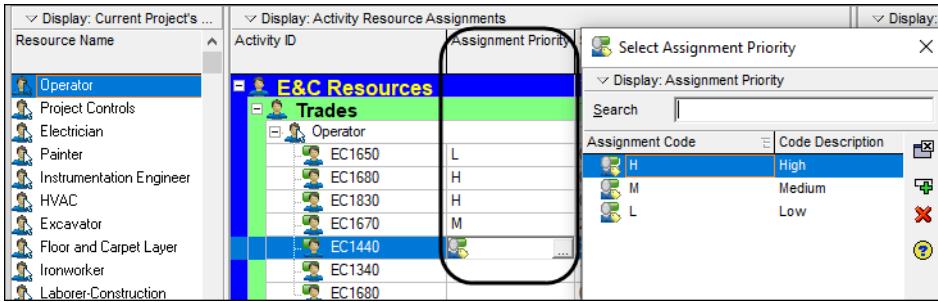
Assignment Code	Assignment Code Value	Code Description
Assignment Priority	M	Medium

- Displaying the **Assignment Code** column in the **Activities** window **Details** pane, **Resources** tab, or



Resources			
Role	Resource ID Name	Assignment Priority	Budgeted Units
Civil/Structural Crews	Elec.Electrician	M	50
Civil/Structural Crews	HVAC.HVAC	M	50
Civil/Structural Crews	Operator.Operator	M	17

- Displaying the **Assignment Code** column in center section of the **Resource Usage Spreadsheet**.



Activity ID	Assignment Priority
EC1650	L
EC1680	H
EC1830	H
EC1670	M
EC1440	
EC1340	
EC1680	

Select Assignment Priority

Display: Assignment Priority

Search

Assignment Code	Code Description
H	High
M	Medium
L	Low

22.9 Workshop 19 – Activity Codes and User Defined Fields



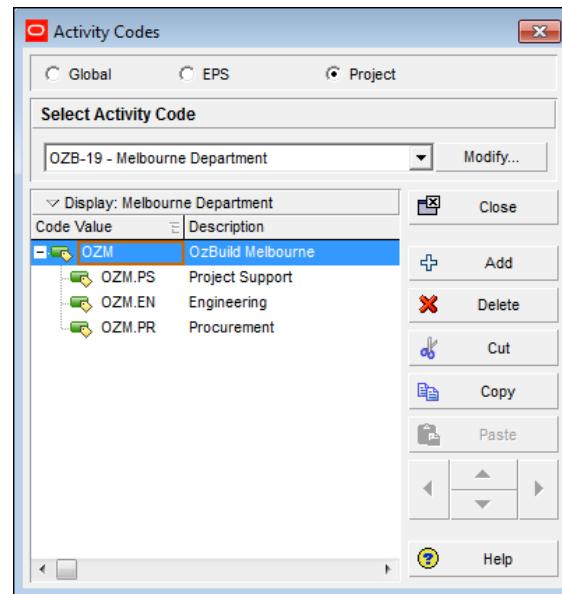
Background

This workshop will look at creating an Activity Code and some UDFs. In the next workshop you will populate the UDFs using a Global Change.

We will create an activity code to represent the departments' responsibilities for the Project.

Assignment – Activity Codes

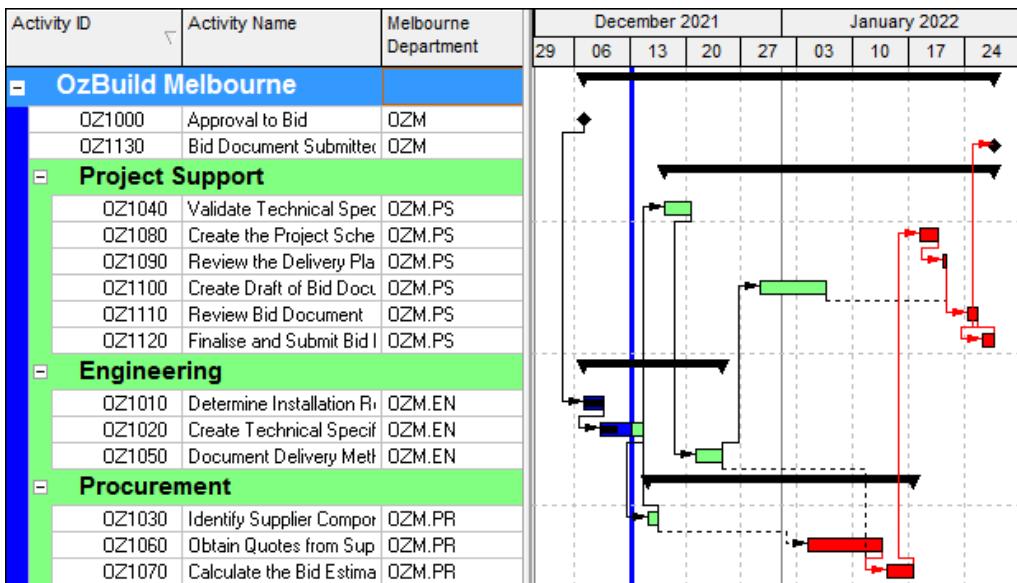
1. Select **Enterprise, Activity Codes...** to open the **Activity Code** form,
2. Click on the **Project** button at the top of the form.
3. Select to open the **Activity Code Definitions – Project** form.
4. Select to create a new code titled **Melbourne Department** and assign a **Max Length** of 3.
5. Click on to close the form.
6. Create the Activity Code Values and Descriptions as in the picture on the right.
7. Apply the **OzBuild Workshop 10 – Without Float** layout.
8. Add the **Melbourne Department** column per the picture and save the layout as **OzBuild Workshop 19 – Assign Codes** layout.
9. Assign the **Melbourne Departments** using all the methods available as in the following picture:



Activity ID	Activity Name	Melbourne Department
Bid for Facility Extension		
OZ1000	Approval to Bid	OZM
OZ1010	Determine Installation Requirements	OZM.EN
OZ1020	Create Technical Specification	OZM.EN
OZ1030	Identify Supplier Components	OZM.PR
OZ1040	Validate Technical Specification	OZM.PS
Delivery Plan		
OZ1050	Document Delivery Methodology	OZM.EN
OZ1060	Obtain Quotes from Suppliers	OZM.PR
OZ1070	Calculate the Bid Estimate	OZM.PR
OZ1080	Create the Project Schedule	OZM.PS
OZ1090	Review the Delivery Plan	OZM.PS
Bid Document		
OZ1100	Create Draft of Bid Document	OZM.PS
OZ1110	Review Bid Document	OZM.PS
OZ1120	Finalise and Submit Bid Document	OZM.PS
OZ1130	Bid Document Submitted	OZM

continued...

10. Now Group and Sort by the **Activity Code: Melbourne Department**, sort by Activity ID. The Milestones are now at the top of the screen.
11. Display the Project Baseline Bars and Project Baseline Milestones and move them both to the bottom of the form to ensure the relationships would be displayed on the Current Schedule bars:



12. Save the layout as **Workshop 19 – Activity Codes**.

13. Now Group and Sort by the **WBS**, sort by **Activity ID**.

Assignment – UDFs

14. We will create some UDFs which we will populate using a Global Change.

NOTE: If you are in a shared database the instructor will create these UDFs.

15. Select **Enterprise, User Defined Fields...** to open the **Used Defined Fields** form,

16. Select **Activities** in the drop-down box at the top of the form,

17. Add three UDFs titled:

- **Last Period Start** as a **Data Type of Start Date**
- **Last Period Finish** as a **Data Type of Finish date**
- **Last Period AC Dur** (**Last Period At Completion Duration**) as a **Data Type of Number**.

18. Display the columns and Group by WBS as in the following picture:

Activity ID	Activity Name	At Completion Duration	Last Period AC Dur	Start	Last Period Start	Finish	Last Period Finish
Bid for Facility Extension		35d	0.00	07-Dec-21 08 A		27-Jan-22 16	
Technical Specification		10d	0.00	07-Dec-21 08 A		20-Dec-21 16	
OZ1000	Approval to Bid	0d		07-Dec-21 08 A			
OZ1010	Determine Installation R	3d		07-Dec-21 08 A		10-Dec-21 16	
OZ1020	Create Technical Specif	4d		09-Dec-21 08 A		14-Dec-21 16	
OZ1030	Identify Supplier Compor	2d		15-Dec-21 08		16-Dec-21 16	
OZ1040	Validate Technical Spec	2d		17-Dec-21 08		20-Dec-21 16	
Delivery Plan		21d	0.00	21-Dec-21 08		21-Jan-22 16	

19. Save the Layout as **Workshop 19 – UDF**.

23 GLOBAL CHANGE

23.1 Introducing Global Change

Global Change is a facility for changing more than one data item in one step. Examples of uses of Global Change are:

- Assigning Resources to Roles
- Increasing or decreasing durations of selected activities by a factor
- Creating new activity descriptions by placing activity codes at the beginning or at the end of the original description
- Removing constraints
- Changing Calendars.

At the time of writing this publication, Global Change could not be used in the **Projects Window** as this project data may not be accessed by Global Change.

This chapter is intended as an introduction to **Global Change** and covers the following topics:

- The Basic Concepts of Global Change
- Specifying the Change Statements
- Simple Examples of Global Change
- Selecting the Activities for the Global Change
- Temporary Values and Global Change Functions
- More Advanced Examples of Global Change.

After you understand the basics you will then develop some interesting ways of using Global Change.

It is very easy to specify a Global Change that will not change data in the way you intended.

You must consider your Autocost rules when using Global Change on resources, percentages complete, and durations. For example, changing Original Durations will have no effect on the Early Finish of activities that have commenced when Remaining Duration and Percent Complete are unlinked.



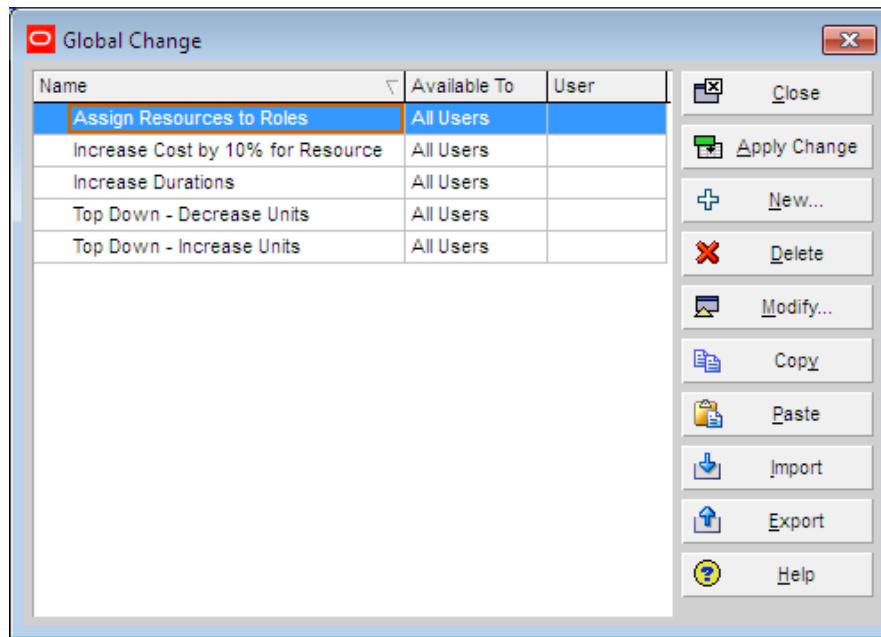
Be careful when using Global Change, as the changes may not be undone. Consider copying your project or making a Reflection project if you are using Primavera before making Global Changes. Study the **Global Change Report** to review your changes before making permanent changes.

23.2 The Basic Concepts of Global Change

A Global Change may be created, saved, and used at a later date.

A Global Change may not be “Undone.”

Select **Tools, Global Change...** to open the **Global Change** form:



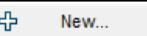
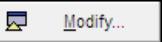
The **Global Change** form displays the list of Global Changes available in the project.

- enables the effects of a Global Change in the **Global Change Report** before finalizing changes to the project data by selecting in the **Global Change Report**.
- creates a new Global Change.
- enables you to modify the highlighted Global Change.
- deletes the highlighted Global Change.
- and create a copy of an existing Global Change that may then be edited.
- and are used to import from or export to a Global Change from another database in the **Primavera Change File pcf** file format.

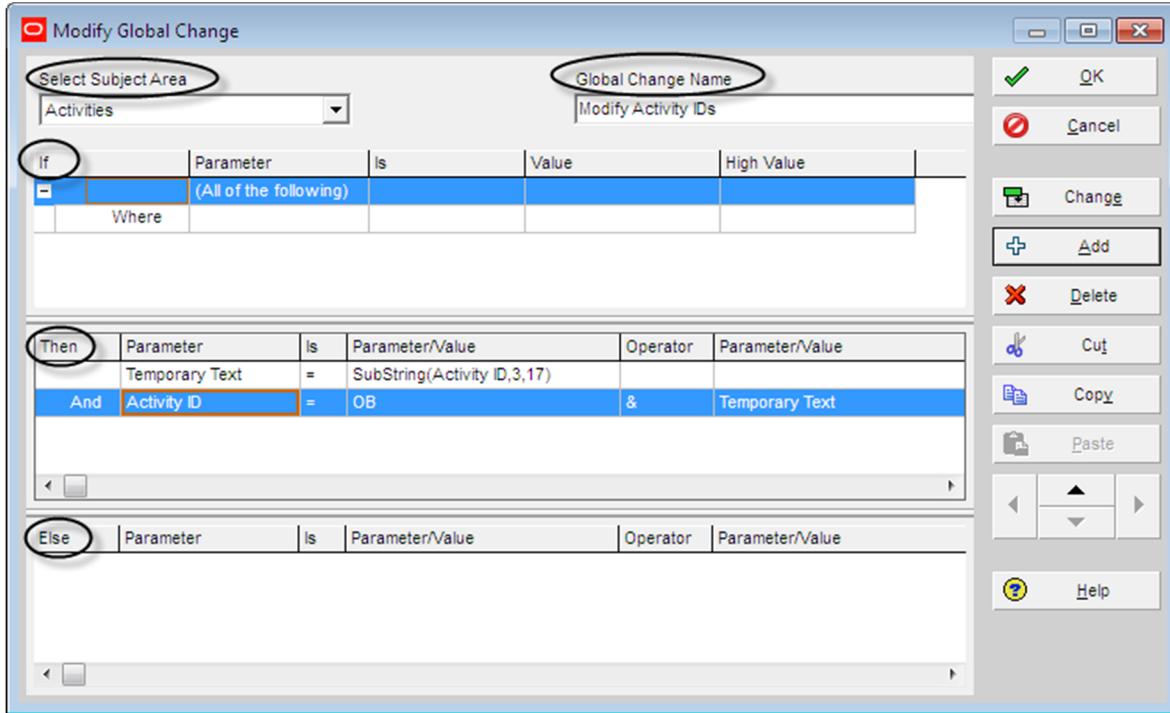


It is **STRONGLY** recommended that you always review the **Global Change Report** to review your changes before making permanent changes by running a Global Change.

It is **STRONGLY** recommended that you consider making a copy of your project before using a Global Change, copy the project in the Enterprise Window, make a Baseline or use a Reflection Project.

After creating Global Change using the  option or  and  or by selecting , you will be presented with the second **Modify Global Change** form.

This is where you select the data to be changed and where the operation to the data is specified.



There are boxes at the top of the form:

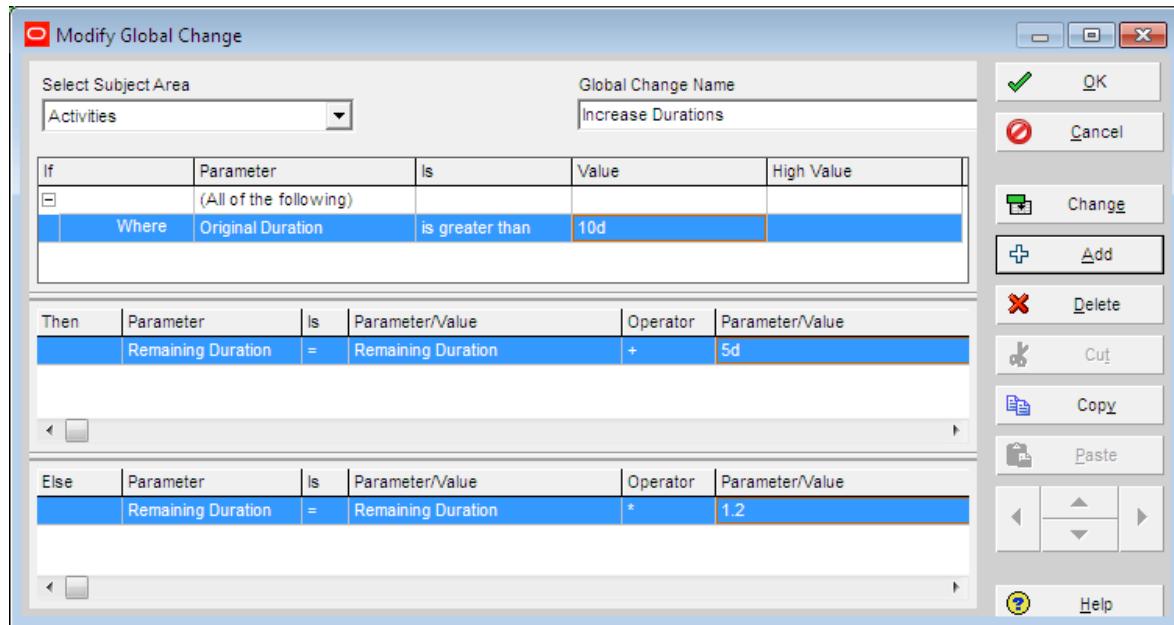
- **Select Subject Area** enables the option of Activities, Activity Resource Assignments, or Project Expenses, and
- **Global Change Name** is the name displayed in the **Global Change** form.

The form has three lower sections. You will need to click into each area and then use  and  icons to add or remove criteria or operation lines:

- **If** area is where you create a criteria for selecting the data on which to be operated. This is similar to creating a filter.
- **Then** area is where you specify the operation to be applied to the selected data.
- **Else** area is where you have an option to specify an operation to data that has not been selected.
-  accepts edits to the Change but does not execute it.
-  cancels any edits to the Change.
-  enables you to see the results of your action in a **Global Change Report** before changing the database.
- The other commands are self-explanatory and are used to create and edit lines in the Global Change, but you will need to click into the **If** or **Then** or **Else** sections that you wish to work on.

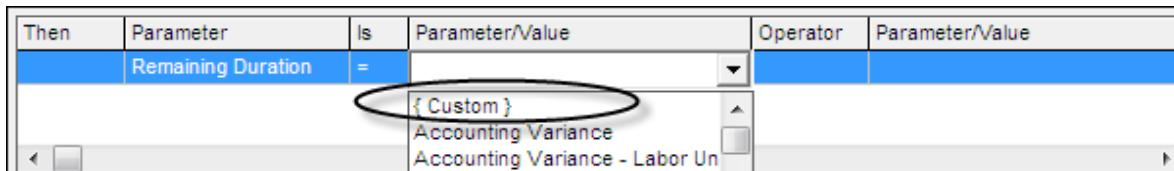
23.3 Specifying the Change Statements

The basic Global Change in the following picture will add 5 days to the Remaining Durations of activities, where the Original Duration is greater than 10 days, and increase all others by 20%.



There are three areas in the **Modify Global Change** form:

- The **If** section has 5 fields and works in the same way as a Filter. It is used to select the data to be changed.
- The **Then** section has 5 fields:
 - **Parameter** – This is the data field(s) that is(are) to be modified when the **If** statement is satisfied.
 - **Is** – This is a statement.
 - **Parameter/Value** – This is the source data for the change and may be the same field as the **Parameter** when it is intended to change the parameter value.
 - **Operator** – This is how the Parameter Value is to be changed.
 - **Parameter/Value** – This is the value or other parameter that will be used to make the change. To enter a number, text, or value you will need to select **{Custom}** from the **Parameter/Value** drop-down box:



- The **Else** section operates in the same way as the **If** section when the **If** statement is NOT satisfied.

23.4 Examples of Simple Global Changes

The following examples are very simple Global Changes.

Increase Original Durations

This Global Change will increase the Original Duration field value by 20% by multiplying the original duration by 1.2.

Select Subject Area			Global Change Name		
Activities			Increase Durations by 20%		
If	Parameter	Is	Value	High Value	
-	(All of the following)				
	Where				
Then	Parameter	Is	Parameter/Value	Operator	Parameter/Value
	Original Duration	=	Original Duration	*	1.2

Copying Dates and Durations

This example will copy the Start, Finish, and Original Durations into custom data item fields:

Select Subject Area			Global Change Name		
Activities			Copy Dates and Durations		
If	Parameter	Is	Value	High Value	
-	(All of the following)				
	Where				
Then	Parameter	Is	Parameter/Value	Operator	Parameter/Value
	Last Period Start Date	=	Start		
And	Last Period Finish Date	=	Finish		
And	Last Period AC Dur	=	At Completion Duration		

Removing Actual Dates

Setting a field to be blank will remove data in some situations:

Select Subject Area			Global Change Name		
Activities			Remove Actual Dates		
If	Parameter	Is	Value	High Value	
-	(All of the following)				
	Where				
Then	Parameter	Is	Parameter/Value	Operator	Parameter/Value
	Actual Start	=			
And	Actual Finish	=			

23.5 Selecting the Activities for the Global Change

Often you will want to make a Global Change to data that meets a specific criterion. The **If** statement lines are used to select the data. The operations defined in the **Then** lines will be executed. Data that does not meet the **Then** criteria may be changed with operations defined in the **Else** statement lines.

The following example will double Remaining Durations if the percent complete is greater than 50%.

Select Subject Area			Global Change Name		
Activities			Increase Remaining Durations		
If	Parameter	Is	Value	High Value	
[]	(All of the following)				
Where	Activity % Complete	is within range of	50%	99.9%	

Then	Parameter	Is	Parameter/Value	Operator	Parameter/Value
	Remaining Duration	=	Remaining Duration	*	2

The following example will add 5 days to the Original Duration of activities over 10 days and increase by 20% those less than 10 days

Select Subject Area			Global Change Name		
Activities			Increase Duratiops by 20% or add 5D		
If	Parameter	Is	Value	High Value	
[]	(All of the following)				
Where	Original Duration	is greater than or equals	10d		

Then	Parameter	Is	Parameter/Value	Operator	Parameter/Value
	Original Duration	=	Original Duration	+	5d

Else	Parameter	Is	Parameter/Value	Operator	Parameter/Value
	Original Duration	=	Original Duration	*	1.2

23.6 Duration Calculations with Global Change



When calculating Durations remember that P6 calculates in hours and if you are displaying durations in days then you will need to divide or multiply as appropriate the durations by 8 to obtain the correct duration.

23.7 (Any of the following) and (All of the following)

There are two options under the **Parameter** title in the **If** section, (**Any of the following**) and (**All of the following**). These are used with the **If** statements in the same way as with filters.

Select Subject Area			Global Change Name	
Activities			Change Original Durations	
If	Parameter	Is	Value	High Value
-	(All of the following)			
Where	(All of the following)	equals	2d	
And	(Any of the following)	is under	OZB.2	

When (**Any of the following**) is selected, the Global Change will operate when any of your selection criteria is met.

In the example following, any activity with the Original Duration greater than 2 days, or an activity that is assigned to the WBS Node OZB.2, will be doubled.

Select Subject Area			Global Change Name		
Activities			Change Original Durations		
If	Parameter	Is	Value	High Value	
-	(Any of the following)				
Where	Original Duration	is greater than	2d		
Or	WBS	equals	OZB.2		

Then	Parameter	Is	Parameter/Value	Operator	Parameter/Value
	Original Duration	=	Original Duration	*	2

Every selection criteria has to be met when (**All of the following**) is selected for the Global Change to operate on the data.

In the example following, only activities with the Original Duration greater than 2 days and an activity that is assigned to the WBS Node OZB.2, will be doubled.

Select Subject Area			Global Change Name		
Activities			Change Original Durations		
If	Parameter	Is	Value	High Value	
-	(All of the following)				
Where	Original Duration	is greater than	2d		
And	WBS	equals	OZB.2		

Then	Parameter	Is	Parameter/Value	Operator	Parameter/Value
	Original Duration	=	Original Duration	*	2

23.8 Temporary Values

Some calculations require more than one operation to achieve the required change. A **Temporary Value** may be stored in a **User Defined Field**. This **Temporary Value** may then be used on a subsequent line. Any **User Defined Field** may be created and used as a **Temporary Value**.

The following example is used to calculate Cost to Complete (CTC) based on a unit cost calculated from the Actual Cost divided by the Actual Quantity and the **Temporary Value UDF** is used to store the unit cost used in the second line calculation.

Select Subject Area			Global Change Name	
Activity Resource Assignments			Calculate Costs to Complete	
If	Parameter	Is	Value	High Value
-	(All of the following)			
Where	At Completion Labor U	is not equal to	0h	
And	Units % Complete	is greater than	30%	
Then	Parameter	Is	Parameter/Value	Operator
	Temporary Value	=	Actual Cost	/
And	Remaining Cost	=	Temporary Value	*
				Remaining Labor Units

In this example, Actual Costs /Actual Regular Labor Units calculates the actual unit rate in the **Temporary Value** field, and the Remaining Cost is the unit rate x the Remaining Labor Units.

- The percent complete must be greater than 30%.
- The resource must have a quantity.
- **Temporary Value**, a temporary value, is cost per unit calculated by dividing Actual Cost by Actual Regular Labor Units and represents the resource actual unit rate.
- Remaining Cost is equal to Remaining Labor Units multiplied by the actual unit rate.

It is important that you consider the Autocost rules that you have assigned to the activities and resources, otherwise your Global Change may not work. In this situation you would not want **Cost Linked** checked.

Resource ID Name	Calculate costs from units
PM.Project Manager	<input type="checkbox"/>

23.9 Global Change Functions

There are some functions that may be used with Global Change in the **Parameter/Value** field under **Then** and **Else**. These functions may be used to populate User Defined Fields from other data fields as part of the process of editing Activity Descriptions and Activity IDs.

Global Change Function	Function Operation
• DayOfWeek (Parameter)	Selects the weekday number of the date.
• LeftString (Parameter,*)	Selects * of characters from the start of a field.
• RightString (Parameter,*)	Selects * of characters from the end of a field.
• SubString (Parameter,a,b)	From character "a" selects "b" number of characters.

23.10 More Advanced Examples of Global Change

At the time of writing this publication, Global Change may be used to assign resources to roles, replace resources, but not assign resources to activities.

Changing Activity ID by Adding a Middle Character

The following Global Change adds a "C" after the second character of the Activity ID:

Select Subject Area			Global Change Name		
Activities			Modify Activity ID's		
If	Parameter	Is	Value	High Value	
-	(All of the following)				
Where					
Then	Parameter	Is	Parameter/Value	Operator	Parameter/Value
	Temporary 1	=	LeftString(Activity ID,2)	&	C
And	Temporary 2	=	SubString(Activity ID,3,20)		
And	Activity ID	=	Temporary 1	&	Temporary 2

Adding Resources with Global Change

The following example assigns a resource, ARL Angel Lowe, to the Sales Engineer Role when the Start Date is greater than the Current Data Date.

Select Subject Area			Global Change Name		
Activity Resource Assignments			Assign Resources to Roles		
If	Parameter	Is	Value	High Value	
-	(All of the following)				
Where	Role	equals	Sales Engineer		
And	Start	is greater than	CD		
Then	Parameter	Is	Parameter/Value	Operator	Parameter/Value
	Resource ID Name	=	AR.Angel Lowe		

Other Global Change Uses

Global Changes may be used for the following purposes and you may wish to inspect some of the sample Global Changes provided in the sample database:

- Add a middle character in an Activity ID or other field by using two User Defined fields and the **Concatenation** operator, which is the "&" character.
- Add a prefix to an Activity ID.
- Replace a resource with another. Ensure that you check the **Assignment Staffing** setting in the **User Preferences, Calculations** tab.
- Update the **Remaining Duration** from a **Step Percent Complete** by setting the **Duration Percent Complete** equal to the **Physical Percent Complete**.
- Edit the Activity Name using Global Change Functions.
- To set the **Planned Dates** to equal the **Start** and **Finish** dates before applying **Update Progress** so **Actual** dates are not changed by **Update Progress**.

23.11 Workshop 20 – Global Change



Background

We wish to copy the current update information to the User Defined Fields created in the previous workshop.

Assignment

1. Apply the **Workshop 19 – UDF Layout**.
2. Create a Global Change titled **Set Last Period Data** and add the following parameters:

- Last Period Start to equal Start
- Last Period Finish to equal Finish
- Last Period AC Dur to equal At Completion Duration divided by 8 as P6 calculates in hours:

Select Subject Area			Global Change Name		
<input type="button" value="Activities"/>			Set Last Period data		
If	Parameter	Is	Value	High Value	
<input checked="" type="checkbox"/> (All of the following)					
Where					
Then	Parameter	Is	Parameter/Value	Operator	Parameter/Value
	Last Period Start	=	Start		
And	Last Period Finish	=	Finish		
And	Last Period AC Dur	=	At Completion Duration	/	8.00

3. Run the Global Change and commit the changes with the icon at the bottom of the screen:

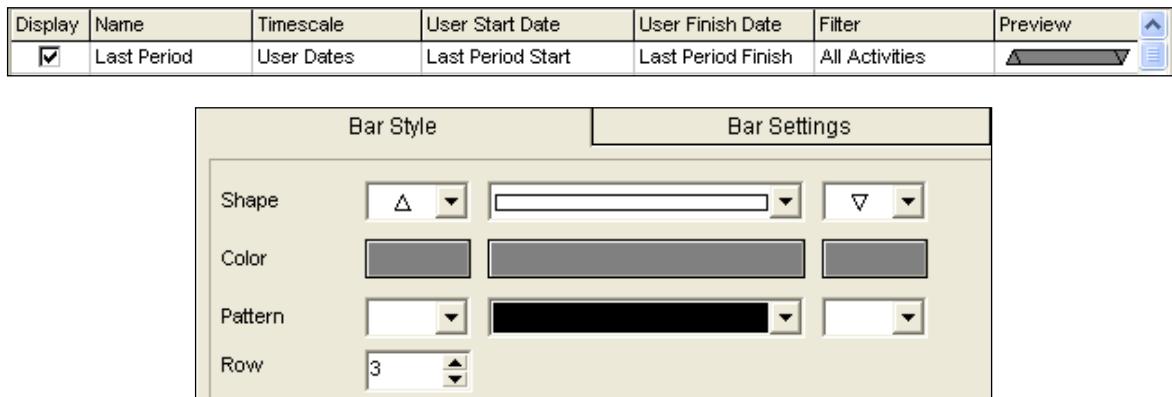
Activity ID	Activity Name	At Completion Duration	Last Period AC Dur	Start	Last Period Start	Finish	Last Period Finish
-	Bid for Facility Extension	35d	40.00	07-Dec-21 08 A	07-Dec-21 08	27-Jan-22 16	27-Jan-22 16
-	Technical Specification	10d	11.00	07-Dec-21 08 A	07-Dec-21 08	20-Dec-21 16	20-Dec-21 16
OZ1000	Approval to Bid	0d	0.00	07-Dec-21 08 A	07-Dec-21 08		07-Dec-21 08
OZ1010	Determine Installation Requirements	3d	3.00	07-Dec-21 08 A	07-Dec-21 08	09-Dec-21 16 A	09-Dec-21 16
OZ1020	Create Technical Specification	4d	4.00	09-Dec-21 08 A	09-Dec-21 08	14-Dec-21 16	14-Dec-21 16
OZ1030	Identify Supplier Compliers	2d	2.00	15-Dec-21 08	15-Dec-21 08	16-Dec-21 16	16-Dec-21 16
OZ1040	Validate Technical Specification	2d	2.00	17-Dec-21 08	17-Dec-21 08	20-Dec-21 16	20-Dec-21 16
+ Delivery Plan		21d	19.00	21-Dec-21 08	21-Dec-21 08	21-Jan-22 16	21-Jan-22 16
+ Bid Document		21d	10.00	29-Dec-21 08	29-Dec-21 08	27-Jan-22 16	27-Jan-22 16



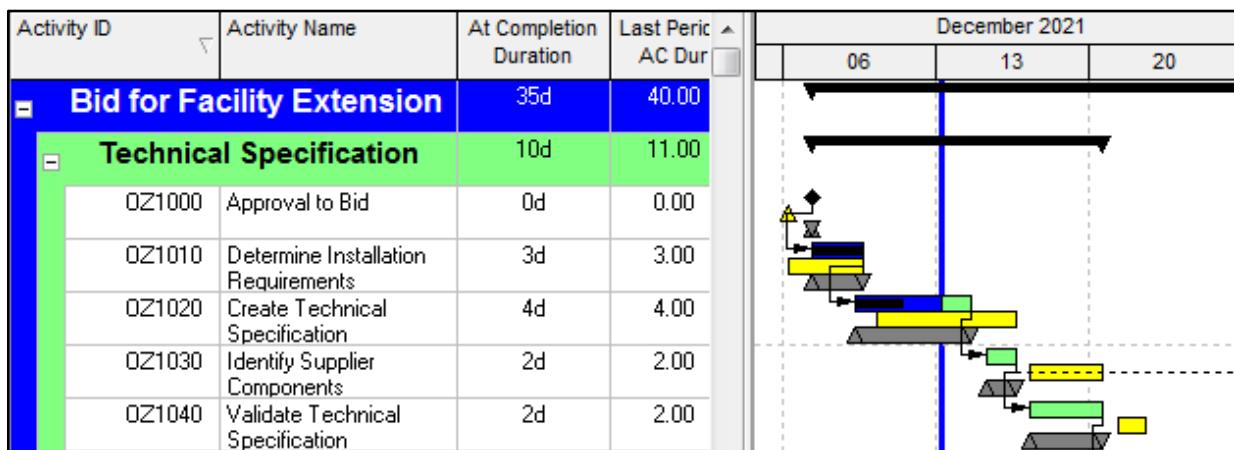
You will notice that the WBS and Project Last Period Durations are not correct and are a mathematical addition of the values below. To resolve this you may either:

- Hide the **Group Total** in the **Group and Sort** form, or
- Use a further Global Change Line to put the Durations in a Text UDF that will not add up in the WBS and Project fields.

4. Create and display a gray bar showing from **Last Period Start** to **Last Period Finish** and place in position 3.



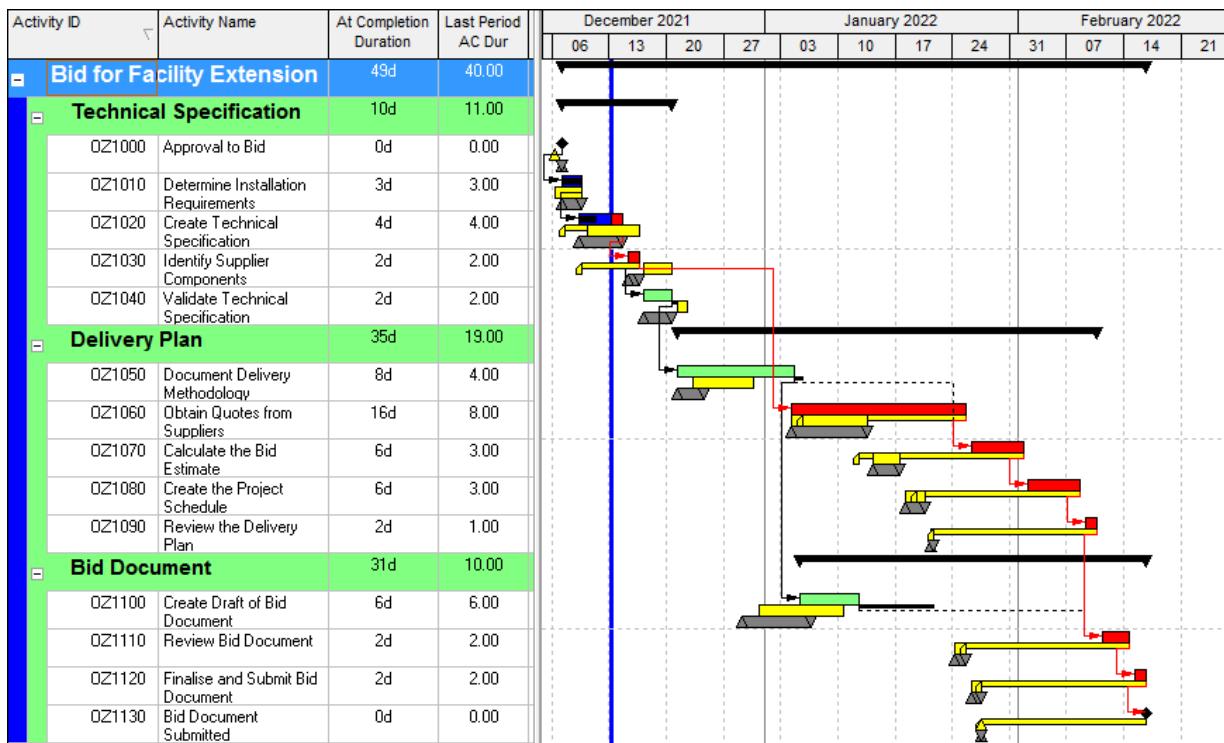
5. Display the Project Baseline, Total Float and Negative Float bars.
 6. Adjust the row height as required and your schedule may look like the following picture with three bars.
 7. Save the layout as OzBuild Workshop 20 – Last Period Bars.



8. Create and run a Global Change to multiply the Original Durations of Activities in the Delivery Plan Phase by 2.

Select Subject Area		Global Change Name			
<input type="button" value="Activities"/>		Increase Durations by 2			
If	Parameter	Is	Value	High Value	
<input type="checkbox"/>	(All of the following)				
Where	WBS	equals	OZB.2		
Then	Parameter	Is	Parameter/Value	Operator	Parameter/Value
	Original Duration	=	Original Duration	*	2

9. Schedule your project:



10. You will notice that Negative Float has been created and the change in durations is observed in the bars and from the differences in the Duration values.

24 MANAGING THE ENTERPRISE ENVIRONMENT

This section introduces the management of an Enterprise environment and discusses more thoroughly some subjects that have been addressed earlier.

It is important to appoint a database manager who is responsible for security and maintenance of the database for all databases that have more than one user. A database will very quickly degenerate into a mess if it is not strictly controlled. Typical problems include multiple Resources representing the same person, excessive numbers of Layouts, Filters, Calendars and other codes, the deletion of important data, and a misunderstanding or total ignorance of how the software works. The database manager should be responsible for maintaining the database, including but not limited to the following responsibilities:

- Ensuring all users are trained in the software
- Users and Security Profiles
- Enterprise Breakdown Structure
- Organizational Breakdown Structure
- Project Codes
- User Defined Fields
- Global and Resource Calendars
- Roles and Resources
- Global Layouts and Filters
- Creating Projects including setting defaults
- Importing Projects and other data.

Some areas of responsibility that are frequently used by administrators are:

Topic	Menu Commands
• Users	A User is created by selecting Admin, Users....
• Security Profiles	Security Profiles are created by selecting Admin, Security Profiles....
• Enterprise Project Structure (EPS)	Select Enterprise, Enterprise Project Structure... to open the Enterprise Project Structure (EPS) form.
• Portfolios	To create, edit or delete a Portfolio select Enterprise, Project Portfolios... to open the Portfolio form. The File, Open (project) form also allows the selection of a Portfolio .
• Organizational Breakdown Structure – OBS	Select Enterprise, OBS.... to open the Organizational Breakdown Structure form..
• Project Codes	Select Enterprise, Project Codes... to open the Project Codes form.
• Job Services	A Job Services may be set up by selecting Tools, Job Services to open the Job Services form.

24.1 Multiple User Data Display Issues

The following issues **MUST** be managed by the Database Administrator and have been covered in this publication in other sections:

- Any user, with access rights, may reset the database **Default Calendar** in the **Enterprise, Calendar** form, but this option will reset all users to the same calendar. When an organization has projects with different hours per day and days per week then you may wish to select a Default Calendar of 5 days per week and 8 hours per day.
- By default, more than one person may open a project unless the **File, Open, Read Only** option is used or access is limited through **Security Profiles**. Thus, two people may make changes and create two versions of a project. Depending on who closes what and when, the final saved version may not be what it is thought to be. The **File, Refresh Data** option enables a user to refresh project data to see what other users changed. Trials by the author indicate that only changed data is saved, thus the final version of the project may be a hybrid of both users' versions.
- When multiple projects are opened together and each project has different **Schedule Options**, then the **Schedule Options** of all the projects will be changed and set to the same as the **Default Project** permanently without warning. If you are intending to open multiple projects together then it is best to ensure all projects have the same Schedule Options.
- **User Baselines** are not **Project Baselines**. When a second user opens a project which has a **Primary User Baseline** set by the first user, then this baseline will not be assigned to the second user. When the same layout is used to display the project, the **<Current Project> Baseline**, which displays the **Planned Dates**, will be displayed as the **Primary User Baseline**. Again, two users opening the same project and using the same Layout may display different data.
- It is possible to have two **Currencies** with the same symbol and if a user selects a different currency then all costs displayed by the user will be converted to a different value. This option must be carefully monitored and if you do not need multiple currencies then it is suggested that you should delete them all, to avoid any possible problems. If you are using multiple currencies then make sure that all currencies have a different sign so there is no confusion.
- Users with different **Units Format** in their **User Preferences** will display different values for their units values which may be confusing when two users report two different resource values for the same project.



It is critical for organizations to appoint a database manager who understands these issues and keeps an eye on what is being sent to clients and makes sure that any display issues are either hidden or explained to the client in writing. Organizations may wish to consider making the system user and the project the same, as this resolves a number of issues. For example, User Filters and Layouts, including headers and footers, are by default the project's, reducing the possibility of sending out a report with the incorrect header or footer. User defaults become project defaults resolving display issues. Access to the project may be easily restricted to the one user and therefore only one person may have the project open at one time.

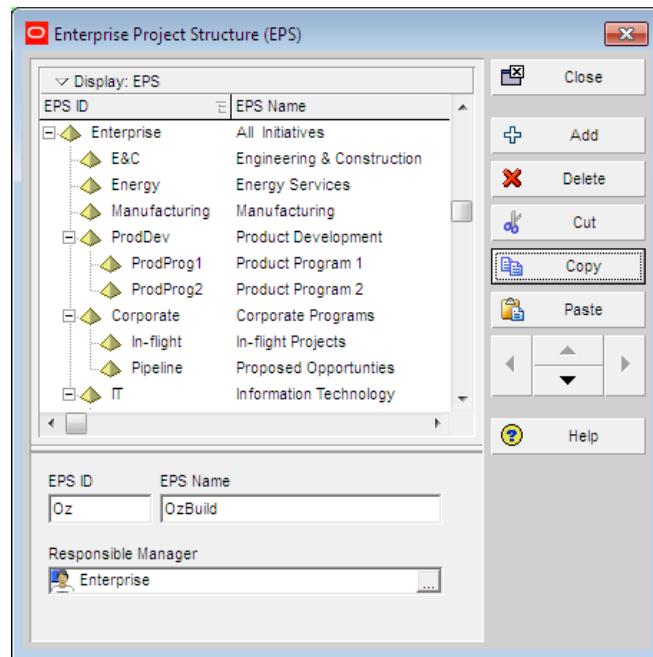
24.2 Enterprise Project Structure (EPS)

It is likely that your organization has defined an EPS (unless you have a standalone load of Primavera) that is available for new projects to be created in, but:

- You may need to add an additional EPS Node for your project, or
- If you are starting with a blank database and an EPS has not been defined, you will need to create at least one EPS Node to assign to your projects.

To add, delete, or modify the EPS Node structure:

- Select **Enterprise, Enterprise Project Structure...** to open the **Enterprise Project Structure (EPS)** form, or
- **Project, EPS, Add Sibling EPS** in the Web for the Optional Client users.
- The picture shows the EPS of a demonstration database supplied with Primavera.
- The  icon is used to create a new EPS Node.
- The node is then assigned an:
 - **EPS ID**,
 - **EPS Name**, and
 - **Responsible Manager**.



- The arrows under the  icon are used to reorganize the EPS Nodes.
- The remainder of the icons are for modifying the structure, as you require.

24.3 Project Portfolios

The **Project Portfolio** function reduces the number of Projects that are viewed in the **Projects Window**:

- To create, edit, or delete a **Portfolio** select **Enterprise, Project Portfolios...** to open the **Portfolio** form.
- Create a portfolio and add projects using this form. A **Portfolio** may be **Global** and all users have access or just be available to the assigned user.
- The **File, Open...** (project) form also allows the selection of a **Portfolio**, which reduces the number of projects that are displayed in the **Open** (project) form.
- After a **Portfolio** has been selected using **File, Open..., Select Project Portfolio...**, only those projects in the Portfolio will be displayed in the **Projects Window**.



This feature is essential when you have a database with a large number of projects.

24.4 Organizational Breakdown Structure – OBS

The OBS is an Enterprise hierarchical structure that is intended to represent the company's OBS.



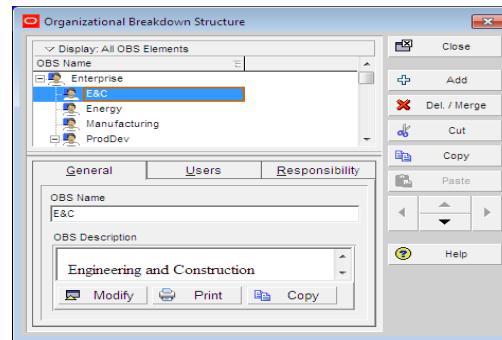
- The OBS function is the security gateway and does not have to mirror your company's OBS.
- Any structure that enables you to assign user access to projects is usually satisfactory and some companies just duplicate their EPS as the OBS and use a project code for the OBS.

- A user may be assigned to projects or nodes in the EPS or to a WBS Node from the OBS form.
- A user assigned an EPS is normally responsible for projects associated with all elements of the EPS.
- The OBS may also be used to assign access by individual people to projects and WBS Nodes.

24.4.1 Creating an OBS Structure

To create, edit, or delete an OBS:

- Select **Enterprise, OBS...** to open the **Organizational Breakdown Structure** form, or
- Select **Administer, User Access**, OBS from the Web for the Optional Client users.
- Add, delete, and edit the OBS Nodes in a similar way to a WBS.



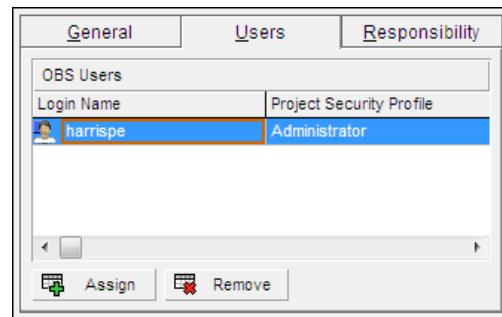
24.4.2 General Tab

The description of the OBS may be added in the **OBS General** tab.

24.4.3 Users Tab

The Login Name is assigned to the OBS in the OBS **Users** tab. Users should therefore be assigned:

- A resource for when they are assigned to work on an activity, and
- An OBS Node for the work they are responsible for or should have access to, and
- A Security Profile assigning their access rights.



24.4.4 Responsibility Tab

The OBS **Responsibility** tab is used to indicate to which EPS or WBS Node a person has been assigned. The person is assigned to:

- A Project in the **General** tab of the **Projects Window**.
- An EPS Node in the **General** tab of the **Projects Window**.
- A WBS Node in the **General** tab of the **WBS Window**. Assigning responsibility at the WBS Node controls access to the activities under the WBS Node but does not prevent the user from seeing the entire project's data.

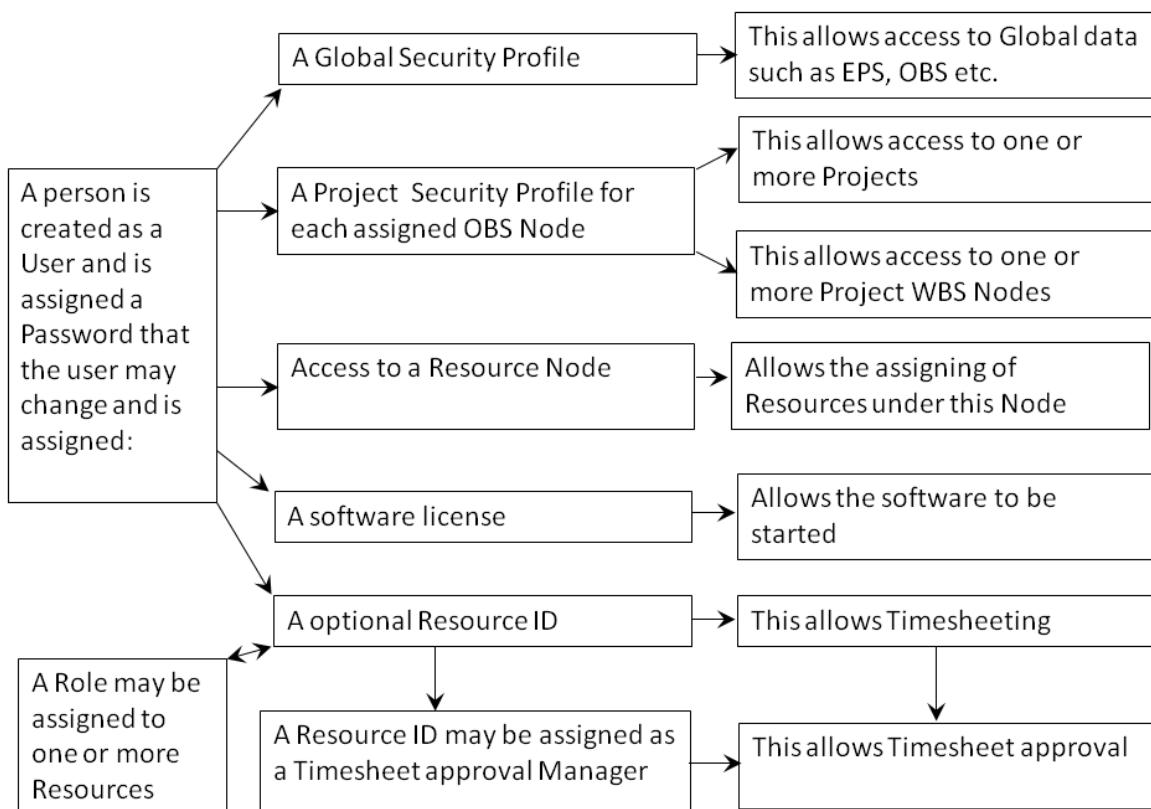
Project ID / WBS Code	Project Name / WBS Name
E&C	Engineering & Construction
EC00515	City Center Office Building A
EC00515.Mechanicals	Mechanical/Electrical System
EC00515.Ex-Finish	Exterior Finishes
EC00515.Int-Finish	Interior Finishes
EC00515.D&E	Design and Engineering
EC00515.Found	Foundation

24.5 Create Users, Security Profiles and Organizational Breakdown Structure

This section is intended to introduce this topic. Please refer to the Primavera Administration Manual for full details.

The full picture and processes for creating users and assigning access are:

- The **EPS** is created, allowing projects to be created under each Node. This often mirrors the company's network drive hierarchy.
- The **OBS** is created and acts as a security gateway for users to access projects. This may not need to represent your company's **OBS** and often this is set up to mirror the **EPS**.
- A **User** is created by selecting Admin, Users... and each User is assigned:
 - A **Global Security Profile** which allows access to Global data such as EPS, OBS, etc.
 - A **Project Security Profile** for each assigned OBS Node which allows access to one or more EPS Nodes, Projects, or WBS Nodes within a project.
 - Access to all or one **Resource Nodes** is assigned to a user from the **Resource Window**. The user can only see and assign resources from this node but may see any resources and their associated costs once they are assigned to activities. P6 Version 19 introduced the ability to allow a user to be assigned up to five resources when defining resource access. A user may view and assign the selected resources and the child resources.
 - Access to a software license, allowing the user to login and start the software.
 - The user may be assigned to a resource in the **Resource Window**, thus allowing timesheets to be used.
 - One or more **Resources** may be assigned to one or more **Roles**.

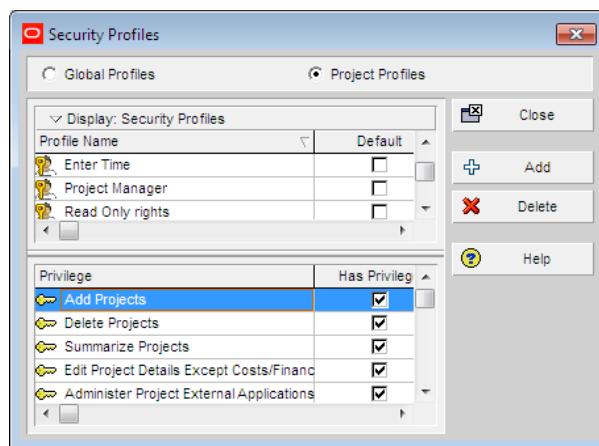


Security Profiles are created by selecting:

- **Admin, Security Profiles...., or**
- **Administer, User Access, Global or Project Security profiles from the Web for Optional Client users.**

There are two types of profiles, **Global Profiles** and **Project Profiles**, which are assigned to Users allowing access such as Read Only, Create, Delete, etc.:

- Access to **Global Data** is controlled through **Global Profiles**, and
- Access to one or more **OBS Nodes** is controlled through **Project Profiles** by assigning **Users** to one or more **OBS Nodes** and assigning an applicable **Project Profile**.

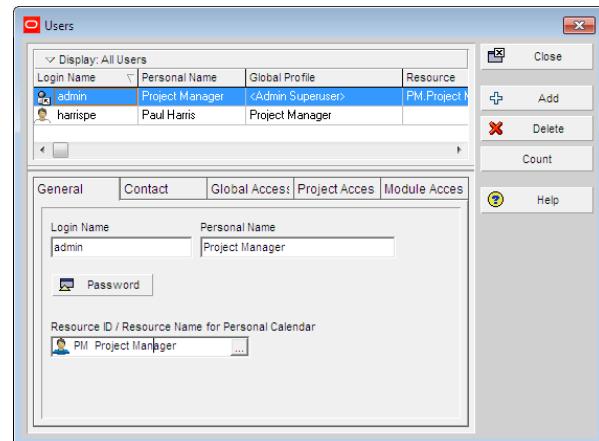


A **User** is created by selecting:

- **Admin, Users..., or**
- **Administer, User Access, Users in the Web for Optional Client users.**

Each User is assigned:

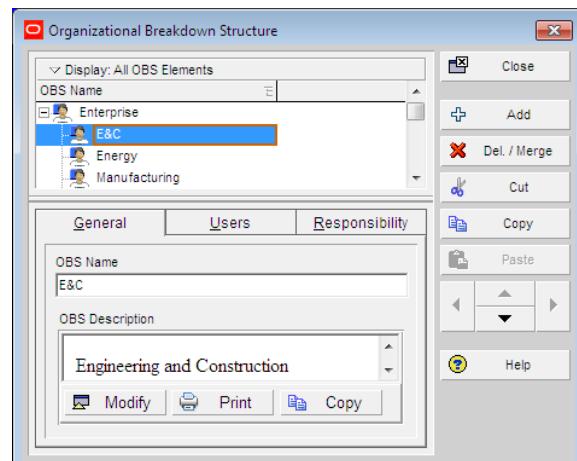
- A **Global Profile** that enables access to Global data,
- An optional **Resource Node** thus limiting access to an area of the **Resource Window**, and
- One or more **OBS Nodes** and an applicable **Project Profile** for each **OBS Node**.



Therefore, access to projects is controlled through the **OBS**. Each **OBS Node** that is assigned to a User may be assigned a different **Project Profile**.

As a result, a User may have read-write access to some projects and read-only to others.

The OBS is edited by selecting **Enterprise, OBS....**



Projects are assigned to an OBS when they are created and the OBS Node must provide the required access rights to the project data.

WBS Nodes may be assigned to individual users which, although does not prevent them from viewing all the project data, will limit their access to just the node they have been assigned to in the **WBS Window**.

24.6 Project Codes

The codes are assigned to projects and enable projects to be Grouped and Sorted under an alternative structure to the EPS.

For example, when an EPS represents the physical location of offices by country, state/county and city, the Project Codes enables projects to be given tags, such as Reason for the Project, Safety, Compliance, New Product, and Increase Production. The Projects may be grouped under these headings.

Therefore, project codes are used to Filter, Group and Sort Projects in a similar way that Activity Codes are used to Filter, Group and Sort Activities.

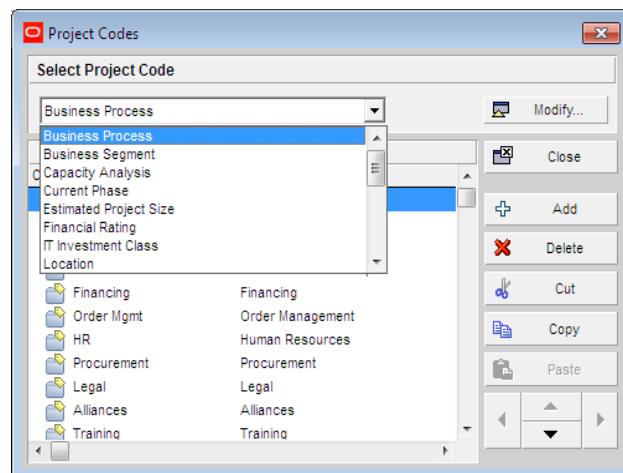
To create a Project Code:

- Select **Enterprise, Project Codes...** to open the **Project Codes** form, or
- **Administer, Enterprise Data, Project, Project Codes** from the Web for Optional Client users.
- The Project Codes are created, edited, and deleted in a similar way to Activity Codes.

Project Codes may be assigned to projects in the **Projects Window** in a similar way as Activity Codes are assigned to activities by:

- Displaying the appropriate Code Column, or
- Opening the **Codes** tab in the **Projects Window**.

Projects may be Grouped, Sorted and Filtered in the **Projects Window** using the Group and Sort and Filter functions.



24.7 Filtering, Grouping and Sorting Projects in the Projects Window

Projects are Grouped and Sorted and filtered in the **Projects Window** in the same way as activities are in the **Activities Window**. Layouts, Filters, columns and bar formatting work in the same way in both windows.

Projects may be Grouped by fields such as **OBS, Responsibility, Project Codes** and many other fields. See the **Group, Sort and Layouts** chapter for more detail on this subject.

Projects may be filtered by similar fields, but some of the more useful fields to filter projects by are the **Status, Responsible Manager**, and **Project Code** fields.

24.8 Project Durations in the Projects Window

The project durations in both the **Projects Window** and **Activities Window** are calculated based on the Project Default calendar.

The summary durations of bands in the **Projects Window** are calculated on the **Enterprise, Calendars..., Default Calendar**.

Project ID	Project Name	At Completion Duration	Total Activities	Strategic Priority
- ◇ Enterprise	All Initiatives	1178d		
- ◇ E&C	Engineering & Construction	1112d 7h		
EC00501	Haitang Corporate Park	601d 5h		
EC00515	City	681d 1h		
EC00530	Ne	585d 4h		
EC00610	Ha	1039d 3h	131	100
EC00620	Ju	812d 5h	132	100
EC00630	Sara	922d 7h	132	100
- ◇ Energy	Energy Services	439d 15h	689	500
NRG00800	Sunset Gorge - Routine Maintenance Work	57d 15h	132	500

Bands in the Projects window calculated on the Enterprise Default Calendar

24.9 Why Are Some Data Fields Gray and Cannot Be Edited?

If you are unable to edit data then consider the following points:

- You may not have access. Discuss your access rights with your administrator.
- Some data, e.g., the project **Status**, needs the project open before the data may be edited.
- The field may be calculated, such as **Actual Duration**, and cannot be edited.

24.10 Summarizing Projects

When projects are not **Summarized** then the information from unopened P6 projects seen in the **Projects, Activities** and **Tracking** windows will be:

- Blank when the project has never been **Summarized**, or
- Out of date if the project has been updated since it was last **Summarized**.

Projects or a database are summarized in the following ways:

- Selecting **Tools, Summarize** where you may Summarize either **Open Projects** or all **All Projects**,
- Right click on one or more unopened projects and select **Summarize**,
- As a large database takes a significant amount of time to summarize and may be summarized automatically using **Job Services** and this is usually set to run every night.

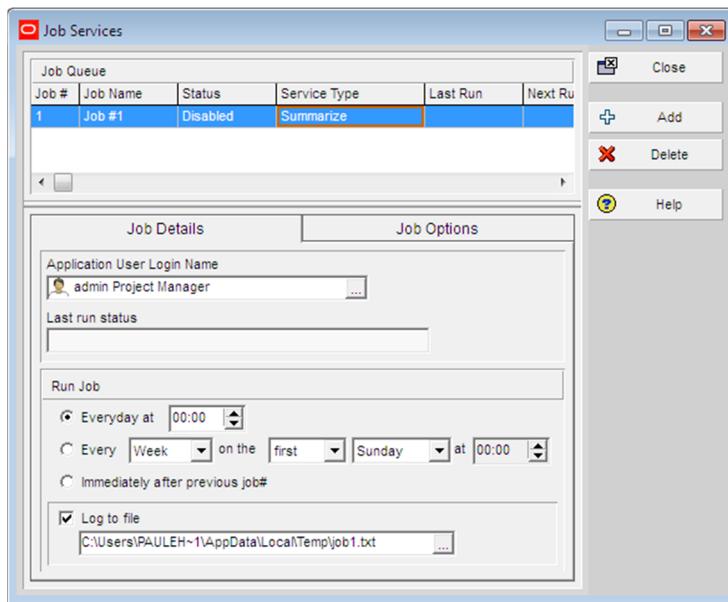
The following functions control the summarization and availability of data:

- The **Projects** window, **Setting** tab, **Summarized Data** determines how many levels of the WBS is Summarized, a level of zero will summarize all levels,
- The **Admin Preferences, Options, Specify the interval to summarize and store resource spreads** decides at what time interval that Summarized data is saved.

A project's Summerized data may be deleted by selecting a project, right clicking and selecting **Delete Project Summaries...**

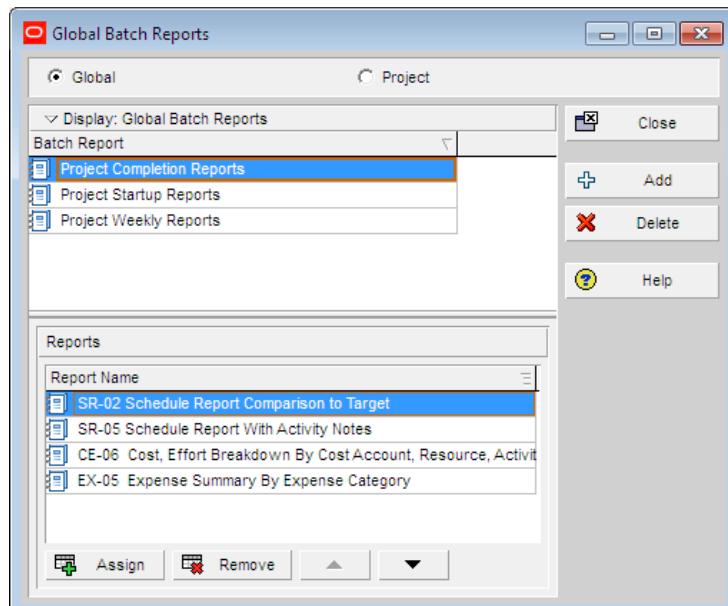
24.11 Job Services

A Job Services may be set up by selecting **Tools, Job Services...** to open the **Job Services** form, which can perform the following functions on one or more selected projects or EPS Nodes:



Select **Administer, Global Scheduled Services** in the Web for Optional Client users.

- **Apply Actuals** to projects when timesheets are used,
- **Batch Reports**. In the **Reports Window** a **Batch** may be created by selecting **Tools, Reports, Batch Reports...** to open the **Batch Reports** form. This creates one or more reports simultaneously. A Batch may be run on a regular basis using a job service:



- **Export** one or more projects on a regular basis, or
- **Schedule** one or more projects on a regular basis.
- **Summarize** projects, this should be set up to run nightly.

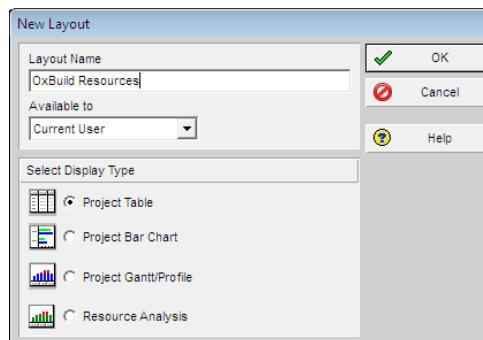
24.12 Tracking Window

Tracking Layouts are used for resource, cost, and schedule analysis of multiple projects. This section introduces the concepts but does not go into the detail of using this function. You should experiment with the Group, Sort, and Filtering options available, which all function in a similar way to other windows.

- These layouts typically display summarized data to EPS or Project and WBS Node level. The data must be summarized using **Tools, Summarize** or using **Job Services** to display the latest current data,
- The **Settings** tab in the lower **Projects Window** allows you to see or reset the WBS level to which data is summarized or to reset the Level to Summarize a project, and
- The time interval that data is summarized at is set in the **Admin Preferences, Options, Specify the interval to summarize and store resource spreads**,

There are four **Tracking Layout** types and a new layout is created by:

- Saving an existing layout, saving with a new name and editing it, or
- Selecting **View, Layout, New Layout...** which opens the **New Layout** form:

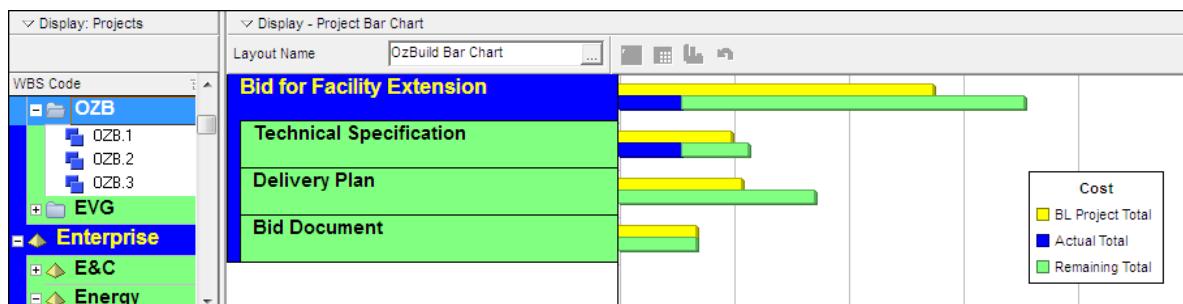


The following pictures indicate the type of data a **Tracking Layout** will display:

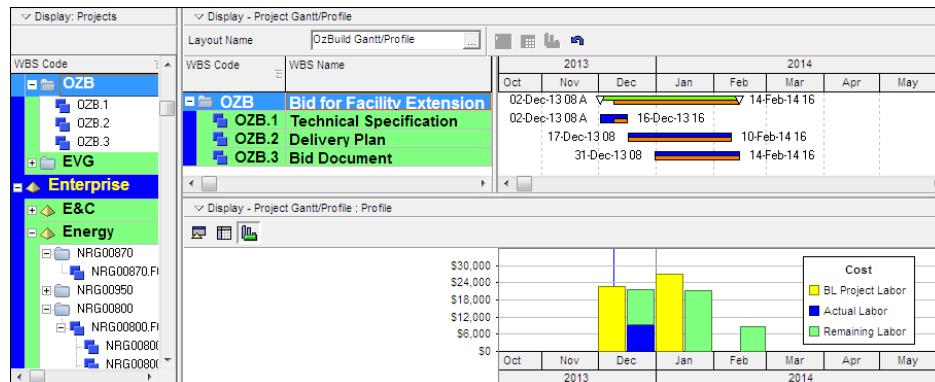
- **Project Tables** display columns of data for selected Projects or WBS Nodes:

Display: Projects		Display - Project Table						
WBS Code	WBS Name	Start	Finish	Budget At Completion	Actual Cost	Earned Value Cost	Planned Value Cost	
OZB 19	Bid for Facility Extension	02-Dec-13 08	27-Jan-14 16	\$55,060	\$11,240	\$13,600	\$8,440	
OZB 19.1	OZB 19 Technical Specification			\$0	\$0	\$0	\$0	
OZB 19.2	OZB 19 Delivery Plan			\$0	\$0	\$0	\$0	
OZB 19.3	OZB 19 Bid Document			\$0	\$0	\$0	\$0	
OZB	Bid for Facility Extension	02-Dec-13 08	14-Feb-14 16	\$55,060	\$11,240	\$13,600	\$8,440	
OZB.1	OZB.1 Technical Specification	02-Dec-13 08	16-Dec-13 16	\$19,800	\$11,240	\$13,600	\$8,440	
OZB.2	OZB.2 Delivery Plan	17-Dec-13 08	10-Feb-14 16	\$21,520	\$0	\$0	\$0	
OZB.3	OZB.3 Bid Document	31-Dec-13 08	14-Feb-14 16	\$13,740	\$0	\$0	\$0	
EVG								

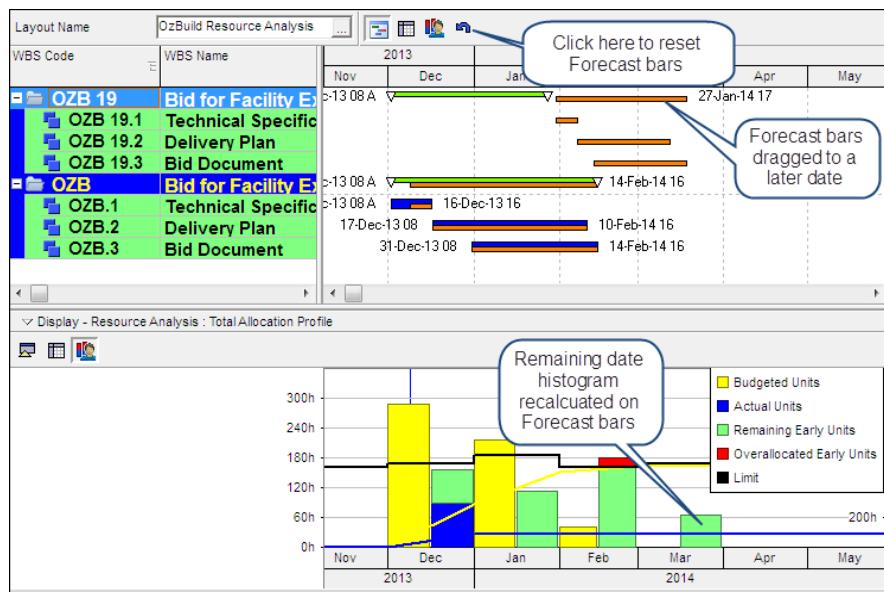
- **Project Bar Charts** display selected projects of WBS Node data in horizontal bars:



- Project Gantt/Profiles display three panes, with bars in the top right pane and either a spreadsheet or a profile in the bottom pane.



- Resource Analysis displays four panes:
 - The projects to be analyzed are selected in the top left-hand pane,
 - The resources to be analyzed are selected in the bottom left-hand pane,
 - Bars, Resource Profiles or a Resource Table may be displayed in the top right-hand pane, and
 - The bottom right-hand pane may display either a Resource Profile or a Resource Table:



- An existing layout may be seen by opening the **Open Layout** form. Select **View, Layout** or click the icon in the top right-hand pane.
- A **Stacked Histogram** must have a filter created selecting resource(s) to operate,
- The **Forecast Bars** have been dragged to a new location and the **Edit, User Preferences..., Resource Analysis, Time-Distributed Data** option set to **Forecast dates** allows the **Resource Remaining Early units/costs** to be recalculated on the **Forecast dates**.
- **Forecast Bars** only draw new histograms when the project is open.
- The **Reset Forecast Dates** button resets the **Forecast Dates** back to the Start and Finish dates.
- The bottom pane of a Tracking Layout may be hidden, as with other windows.
- You should experiment by right-clicking in all the panes to see all the display options.

25 MULTIPLE PROJECT SCHEDULING

25.1 *Multiple Projects in One Primavera Project*

When there are many small projects that need to be managed, it would be logical to create a Primavera Project for each project.

On the other hand, one should also consider putting a number of small projects in one Primavera Project and have the projects identified by the first level WBS Node or some other coding, such as Activity Codes or Project Phase/WBS Category. This is especially practical when there are many projects with a very small number of activities or when an organization only realizes benefits from a number of completed projects when they are all finished. This option is also practical when one scheduler is managing all the small projects. The only problem with this approach is that P6 does not allow partial projects to be Baseline. This issue may be overcome by using User Defined Field Dates and a Global Change to set Baseline Dates for parts of a P6 project.

25.2 *Multiple P6 Primavera Projects Representing One Project*

Normally, one Primavera Project would be created for each of an organization's projects. There may be a requirement to break a Project down into Sub-projects, these reasons include:

- The project is large enough to require a number of schedulers and therefore a Primavera Project could be created for each scheduler to delineate each scheduler's area of responsibility.
-  Two or more schedulers may open one project and access may be assigned down to WBS Node but the User Access has to be set up to allow them to be able to schedule and they are not able to link to other WBS Nodes.

There could be a requirement to keep an individual organization's financial information confidential and as security and access is set at project level, information in one project may be hidden from specific users. This situation may exist when there are two or more contractors scheduling parts of a project and they require their cost to be kept confidential from other contractors.

- A project may have separable parts or multiple clients but it is necessary to report the project parts separately, yet allow resource management project-wide. Again, a Primavera project could be created for each separate part of the project. In this situation each user may be given access to only one **Resource Node** from the **Global Access** tab of the **Admin, Users** form.
- A sub-project could be created as a Primavera Project for the security of sensitive financial information. The cost may be assigned to resources in the financial sub-project with access given to specific individuals. Activities in the financial sub-project may be LOE (Level of Effort) activities, spanning activities in other non-cost sub-projects. This method is generally suitable for high level cost planning and management while allowing the detailed planning of a project in a non-financial sub-project without the burden of managing costs.

When a Primavera Project is created for each sub-project, it would be logical to keep all the Primavera Projects located under one "project" EPS Node and assigned a single Project Code. All the Primavera Projects could be opened at one time for scheduling and reporting by selecting the EPS Node.

The decision to break a project into two or more Primavera Projects must have a sound basis and be well thought out. The environment chosen should be well piloted and tested to ensure the desired results are obtained from the software. Planning and scheduling software is hard enough to use without adding the burden of creating multiple projects. There is a large amount of analysis that may be completed without using multiple projects. Filters may be used to isolate parts of a project and sub-net critical paths may be generated a number of ways, such as using the **Calculating Multiple Paths** function. You must ensure

that the requirement to break a project into sub-projects using individual Primavera projects is well-founded.

Some people suggest that sub-contractors should run their own sub-projects within a master schedule. My experience is that smaller or new sub-contractors often are very inexperienced at scheduling and many do not know the basics of scheduling. It is therefore unreasonable and risky to expect sub-contractors to drive strange and complex scheduling software and get it right. Some industries are better equipped to manage complex software, with skills found more likely in industries such as IT, but less likely to be found in the construction-related sector.

It is also my experience that it is better to reduce the number of schedulers working on a project schedule to the absolute minimum required to manage a project. In large complex projects, these people need to be trained in the use of the software, be reasonably experienced running the software (or working under a person who is experienced) and run the schedule by an agreed-upon and documented set of guidelines.

Managing the inclusion of sub-contractors' schedules always becomes an issue. Alliances tend to help resolve this problem as the schedules then become a joint responsibility and all located in one database. Another option is to have the contractors create and manage their schedules in your database, but this option is often resisted by IT.

When a single WBS is required for multiple P6 projects representing a project or contract then a Global Activity Code must be used as a WBS may not be shared over multiple P6 projects.

25.3 Setting Up Primavera Projects as Sub-projects

There are a number of issues to be considered when moving to this environment. Be aware that Primavera does not have the sub-project options that are found in other products. For example, there are EPS Activity Codes but there are no EPS Filters, Layouts, Resources or Schedule Options and a WBS may not be shared with more than one P6 project. There is no inbuilt "P3 Project Group" calculation option, which may result in some interesting float calculations that result from inter-project relationships. This section explains some workarounds.

25.3.1 Opening One or More Projects

Enterprise and Project data may be accessed in the **Projects Window**. To access Project activity information, such as activities, resources, and relationships, a project must be opened and the **Activities Window** displayed. One or more projects may be opened at the same time by selecting one or more projects and/or selecting one or more EPS levels and then:

- Right-click and select **Open Project**,
- Select **Ctrl+O**,
- Select **File, Open...** to open the **Open Project** form:

The **Open** form enables the options of opening as **Exclusive**, **Shared** or **Read Only**.

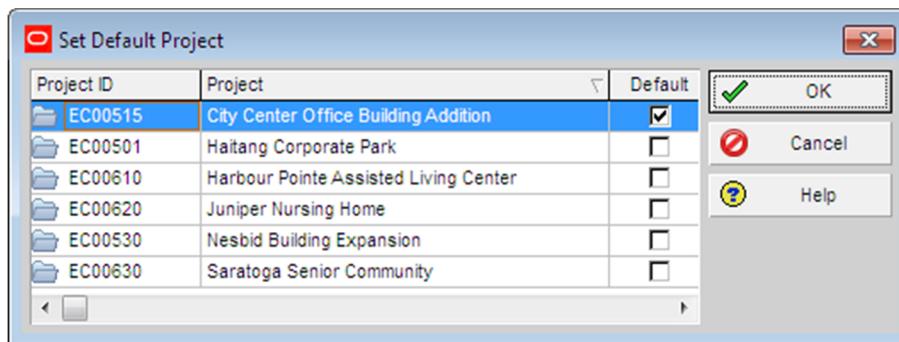


A project may only be opened as **Exclusive** (meaning that only the current user may edit it) by using the **Open Project** form. All other methods will result in the project's being opened in the **Shared** mode and all users with access to the project may open and edit the project(s) at the same time. The **Shared** option may result in one user's edits overwriting another user's edits, depending on who saved what and when. In addition, opening in the **Shared** option may result in different users seeing different values for Activity, WBS Nodes, and Project durations in days or hours if the users have different **User Preferences Time Units**.

25.3.2 Default Project

When multiple projects are opened:

- The system selects the **Default Project** when two or more projects have been opened at the same time.
- The **Default Project Schedule Options** are used to calculate all the open projects.
- Select Project, Set Default Project... to open the **Set Default Project** form where you may change the default project:



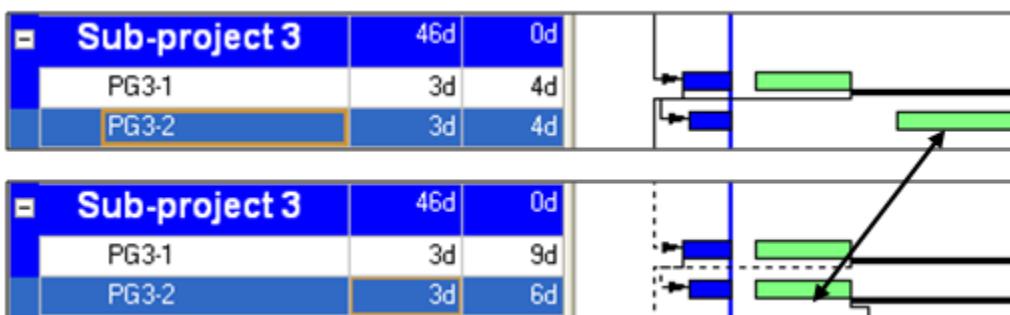
- All open projects **WILL** have their **Schedule Options** set to the same as the **Default Project** after the projects have been scheduled.

The Help file indicates that the **Default Projects** scheduling and leveling settings are used for scheduling. It is also the default project for new data such as activities or issues when the projects are not grouped by WBS.



NOTE: When more than one Primavera project is opened at the same time and each project has different Schedule Options, then the non-default project's Schedule Options are changed to be the same as the default project's, without warning. These non-default projects may calculate differently when opened with other projects. In addition, the next time a non-default project is opened in isolation it may calculate very differently from the previous time it was opened in isolation. To prevent this, either all projects in each database must have the same Schedule Options, or access to projects carefully restricted, or ensure users only open one project at a time.

An example of changing the default project when each project has different options is demonstrated in the following picture. The first has retained logic and the second has progress override. Activity PG3-2 has moved forward in time as it is now being scheduled with Progress Override after initially being scheduled with Retained Logic. These types of unexpected changes may significantly affect your project and may occur when two or more projects, each with different Schedule Options, are opened together.

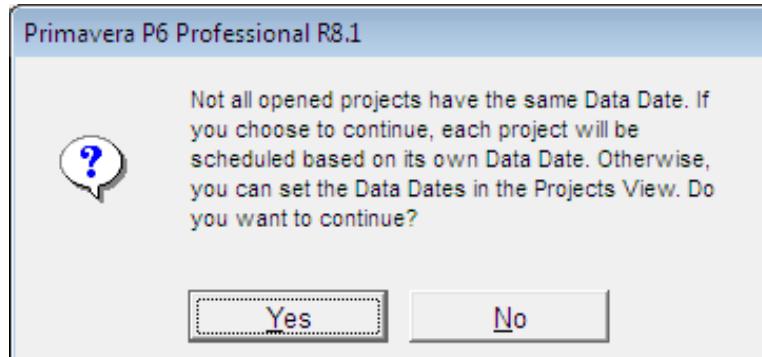


25.3.3 Setting the Projects Data Dates P6 Version 19 and Earlier

The default project does not set the **Data Date** for all projects. In the example following:

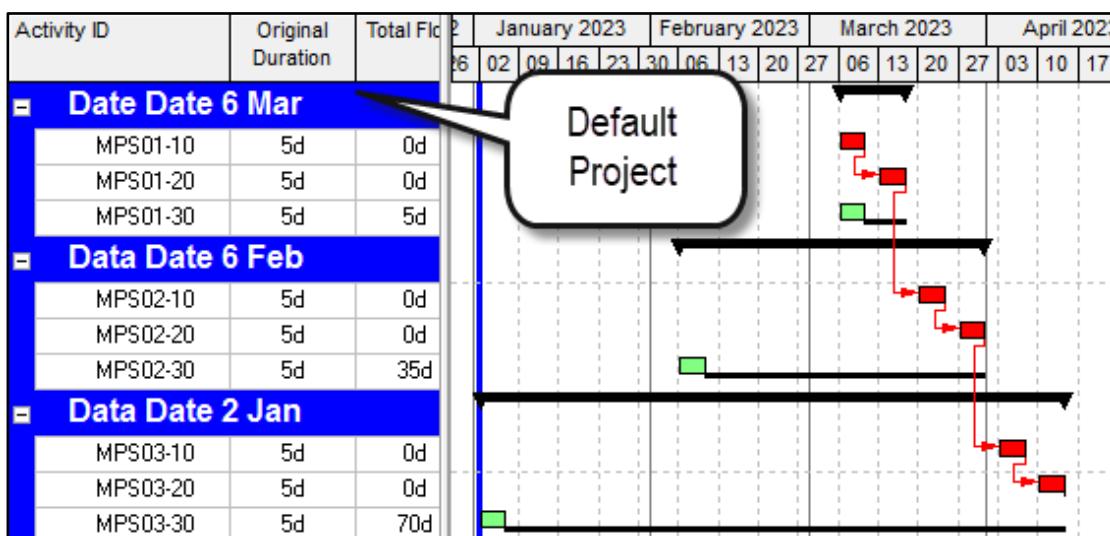
- The default project is Data Date 6 Mar and
- The other two projects have their Data Dates set as per their names.

When scheduling, the following message is received:



There are unlinked activities, MPS01-30, MPS02-30 and MPS03-30 in each project and it may be seen in the picture:

- All projects are scheduled with their own **Data Dates**,
- The **Data Date** line is shown on the earliest project **Data Date**, not the **Default Project Data Date**.



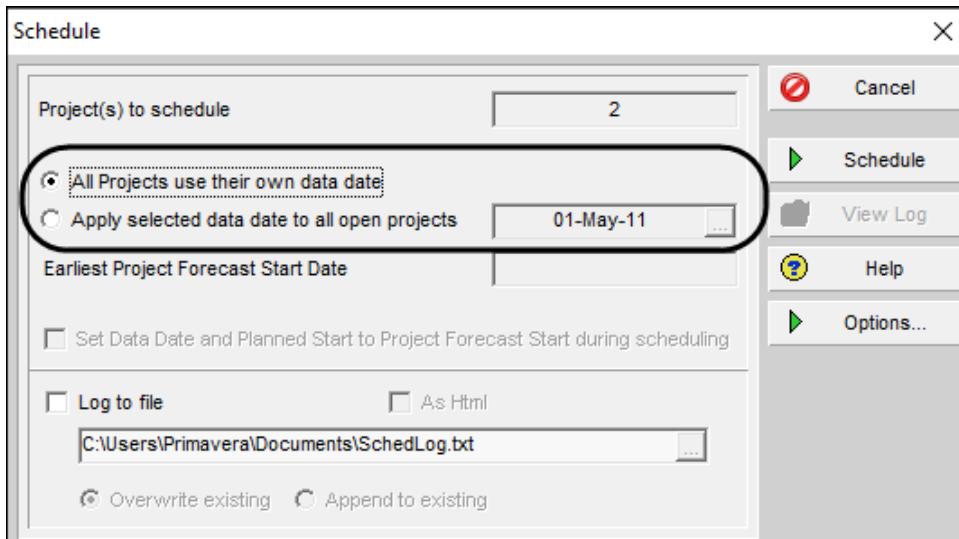
The **Data Dates** of multiple projects may be set using a column in the **Projects Window** and utilizing the **Fill Down** function.

25.3.4 P6 Version 20 Data Date Selection in Multiple Project Scheduling

Primavera P6 Version 20 introduced some additional functions when scheduling multiple projects.

When scheduling multiple projects you now have a choice of the **Data Date** used for calculating:

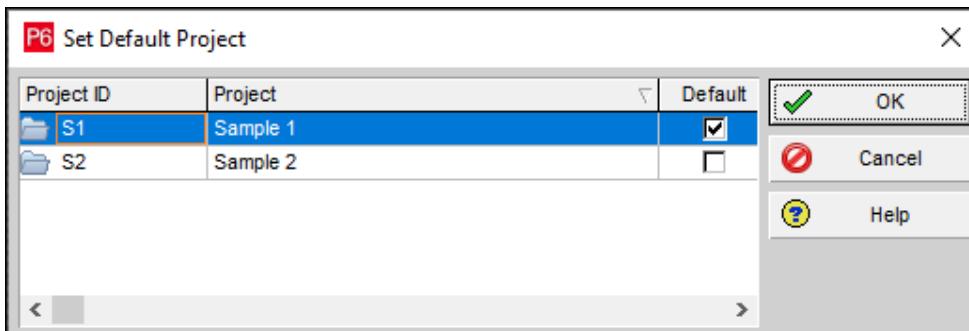
- All projects may be assigned a new **Data Date** in the **Schedule** form, or
- New in P6 Version 20, you may schedule all projects with their own **Data Date**.



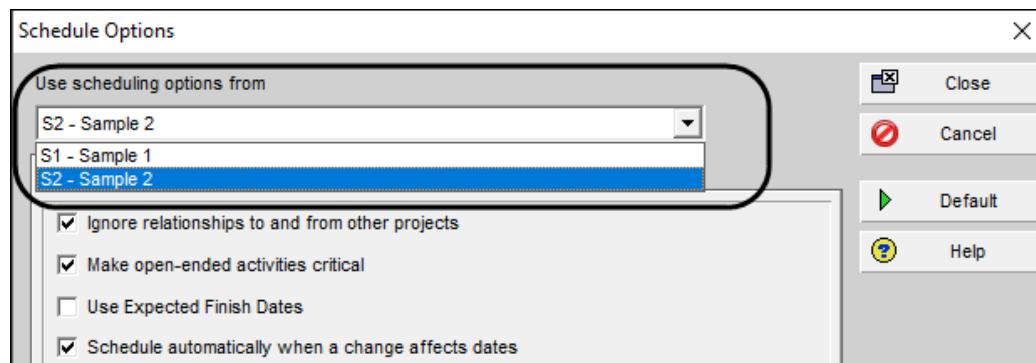
25.3.5 P6 Version 20 Multiple Project Scheduling Options Selection

In the P6 Version 19 and earlier when multiple projects were scheduled together and they had different **Scheduling Options**, which could happen when users change them from default or when you imported a project, then all the different **Scheduling Options** of all the projects being scheduled were changed to the **Default Project** on a permanent basis and changed projects would calculate differently from then on.

The **Default Project** may still be set by selecting **Project, Set Default Project**:



But now you may select which project **Scheduling Options** are used when scheduling multiple project in the **Scheduling Options** form which is opened by selecting **Tools, Schedule, Options**:



What happens now in P6 Version 20?

- The **Default Project** is ignored,
- The **Scheduling Options** from the project selected in the **Scheduling Options** are used to calculate all the project, and
- The other project(s) **Scheduling Options** are changed permanently to the project selected the **Scheduling Options** form on a permanent basis.



Thus, the problem of **Scheduling Options** being changed when scheduling multiple projects has **NOT** been solved. You now have two options to mess up your **Scheduling Options** of projects when scheduling multiple projects with different options.

Again, I reiterate you should make all the **Scheduling Options** in one database the same when you schedule multiple projects and be careful when importing projects.

25.3.6 Total Float Calculation

In P6.1 and earlier versions the Total Float of each project is calculated to the last activity of each individual project schedule. In Primavera 6.2 a new function was created under **Tools, Schedule..., Options..., Calculate float based on either** which resolves this problem.

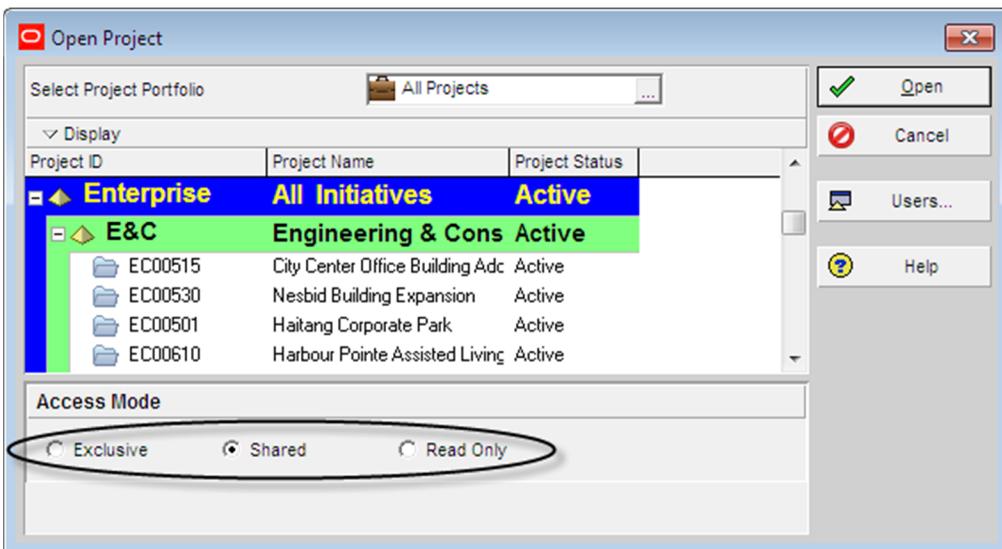
25.4 Refresh Data F5 and Commit Changes F10

The **File, Refresh Data** option or **F5 key** is used when two or more people are working on the same project. It ensures that the latest data is displayed, which enables one user to see the latest edits made by another user. This includes resetting the Global Calendar if another user changes it.

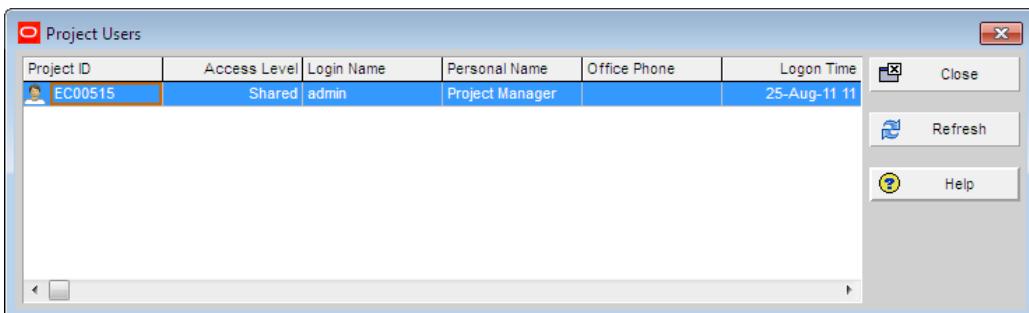
The **File, Commit Changes** option or **F10 key** is used to write any schedule changes to the database.

25.5 Who Has the Project Open?

When a project is opened with Primavera using the **File**, **Open** option the **Open Project** form has Access Mode options to open the project as **Exclusive**, **Shared**, or **Read Only**.



Select **Users...** to open the **Project Users** form and see who else has the file open.

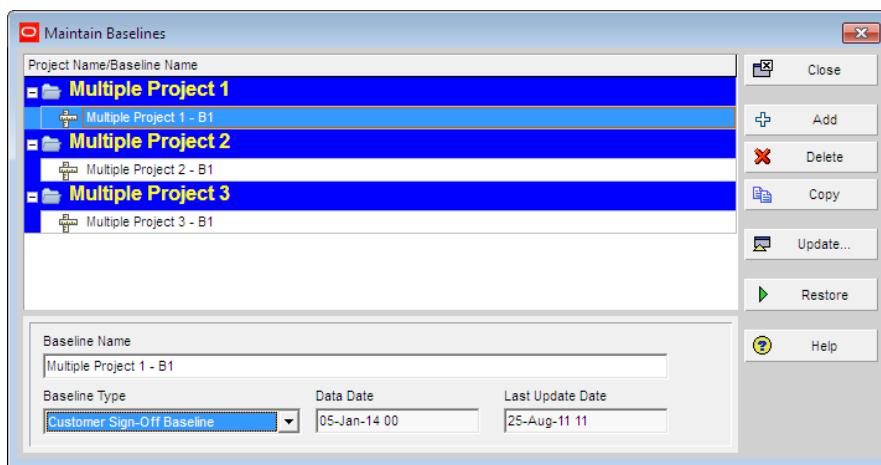


The default option is **Shared** and that means any project that is not opened with the **Open Project** form will be opened as Shared. Anyone who has access may also open the project, calculate and display with their **User Preferences**, and report different data from the same project at the same time.

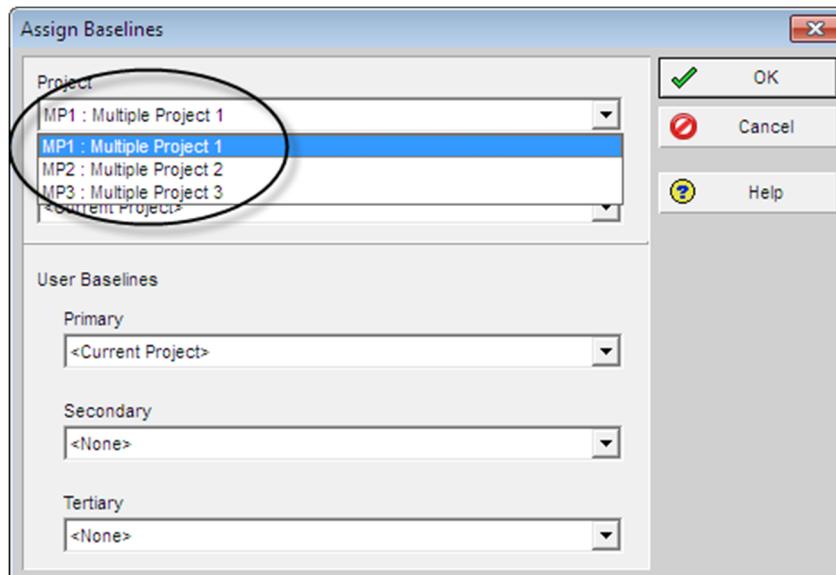
25.6 Setting Baselines for Multiple Projects

The following process is **NOT RECOMMENDED** because issues covered next when restoring baselines set this way. The Baselines may be set for all the projects using the **Maintain Baselines** form (when multiple projects are open) and the **Assign Baselines** form. The following picture show the process of setting multiple project baselines:

- Open the **Maintain Baselines** form by selecting **Project, Maintain Baselines...**:
 - Either all projects may be selected and a copy of all projects set as the Baselines at one time, or
 - Other current projects may be converted from the database one at a time.
- Select  **Add** to open the **Add New Baseline** form and create the new baselines,



- Select **Project, Assign Baselines...** to open the **Assign Baselines** form and select one project at a time to assign the baselines.



Remember, a **User Baseline** set by one user will not be displayed when another user opens the project. The **<Current Project> Baseline** displays the **Planned Dates** from the current schedule and will be shown as a baseline.

25.7 Restoring Baselines for Multiple Projects

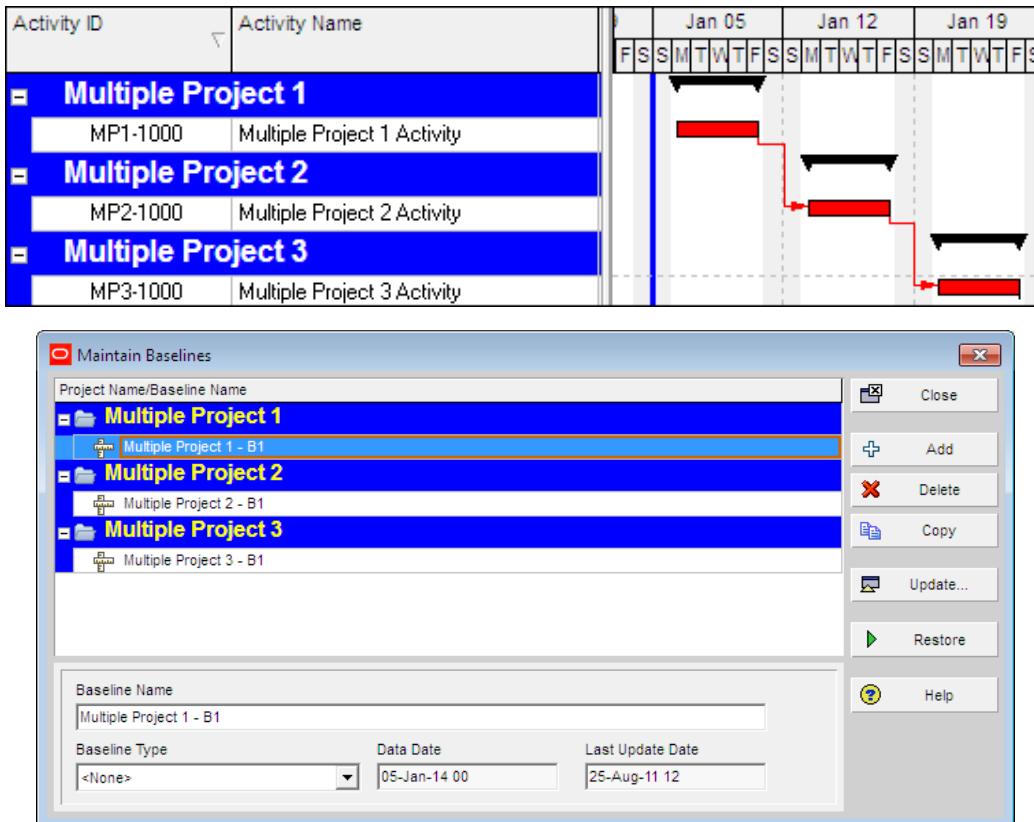
Schedulers often wish to restore baselines to inspect or review the original schedule.



The process using **Save a copy of the current project as a new baseline** identified in the previous page results in one interesting issue when Baseline projects are restored. The software creates **Ghost Relationships** between the Current Schedules and Baseline schedules which must be avoided because there is a high risk that neither the Baseline nor Current projects will calculate correctly once Multiple Project Baselines are restored.

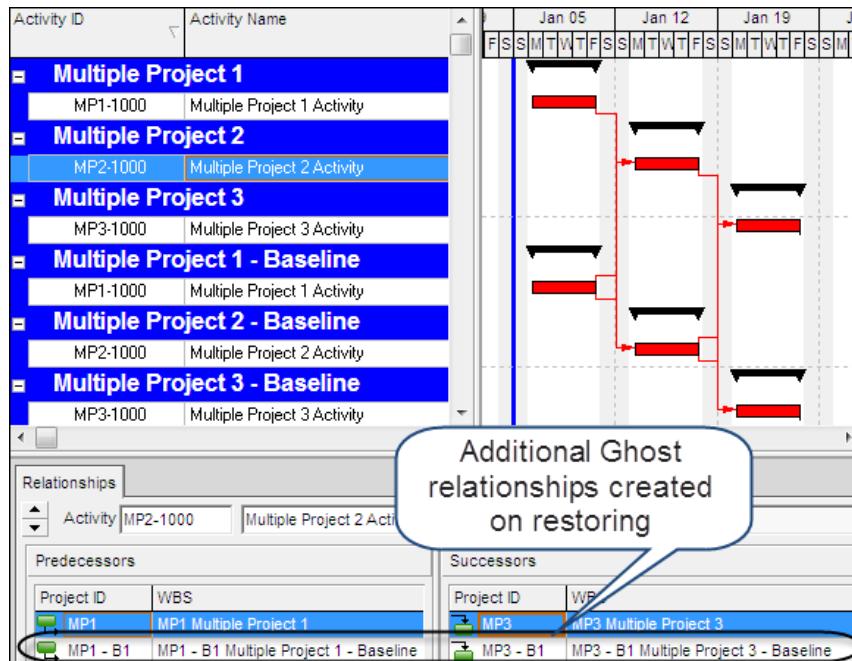
The example below explains what happens when three simple projects are baselined together:

- The three projects were opened together and baselined and restored:

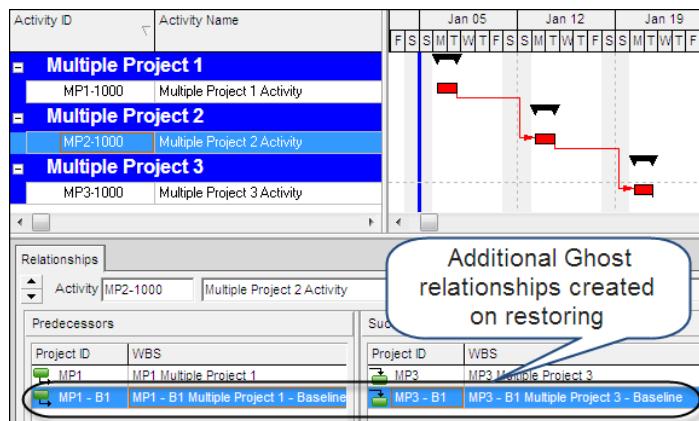


- The baselines were unlinked and restored,

- When the current and baseline projects are opened together there are unwanted **Ghost Relationships** created by the software, without warning, between the Current and Baseline projects:



- When the current projects are opened on their own and activity durations shortened you will see that the schedule does not calculate correctly because of the **Ghost Relationships**:



Therefore, if you wish your baseline projects to maintain the relationships to other baselined projects only and not have **Ghost Relationships** created with the current projects when the multiple current projects with relationships amongst them are baselined, then you must:

- Open the **Projects Window**,
- Copy the multiple projects in this view **Projects Window**,
- Then set the baselines using the **Convert another project to a new baseline** of the current project option in the **Maintain Baseline** form.

Now if the baselined projects are restored there will be no **Ghost Relationships** created.

26 UTILITIES

26.1 Reflection Projects

Primavera Version 6.0 created a Reflection project function. A Reflection is a “What-if” copy of a project that may be edited and then merged back into the original project, as the changes made to be kept may be incorporated into the original project and those not required may be ignored.

The **Reflection project** may be shared with a wider audience and people asked to view and make changes to the project. The **Reflection project** may be exported and sent to a customer who may make changes and then imported back into the database.

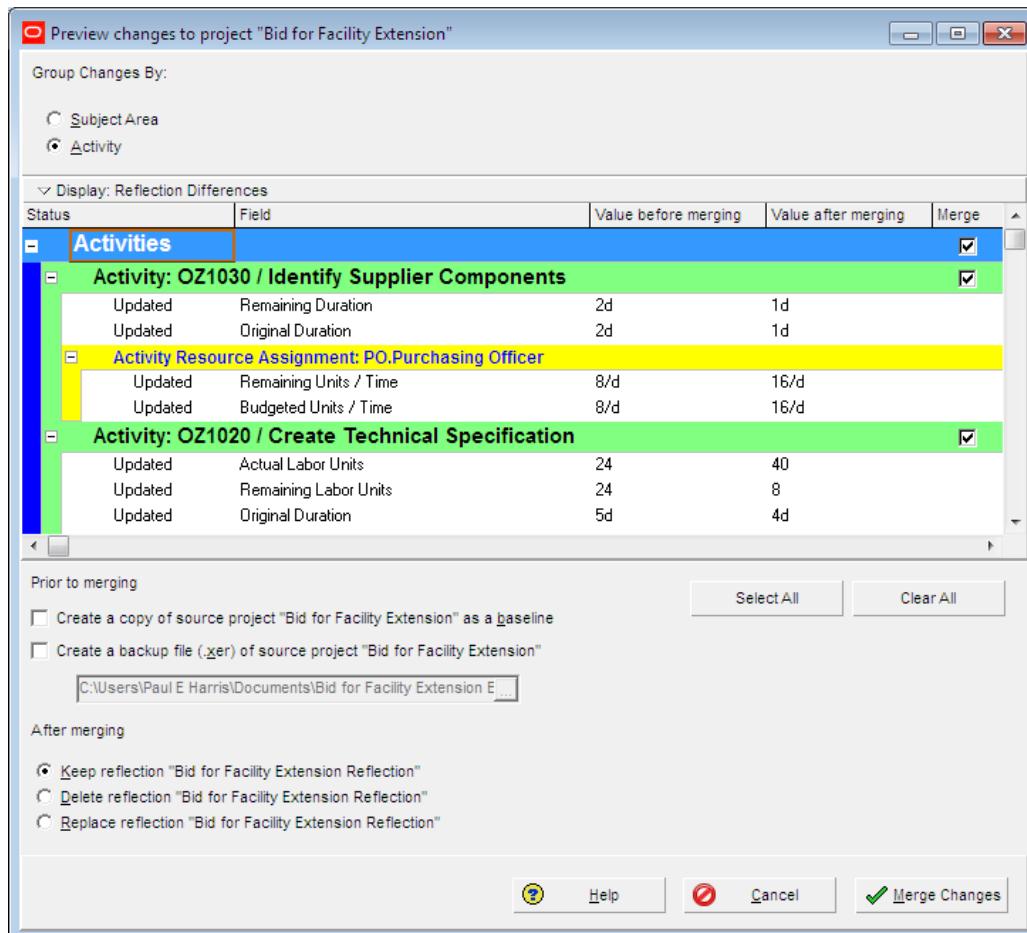
To create a Reflection:

- In the **Project Window** highlight the project and right-click,
- Select **Create Reflection....**

The Reflection project is created with a new ID and the term Reflection added to the Project Name.

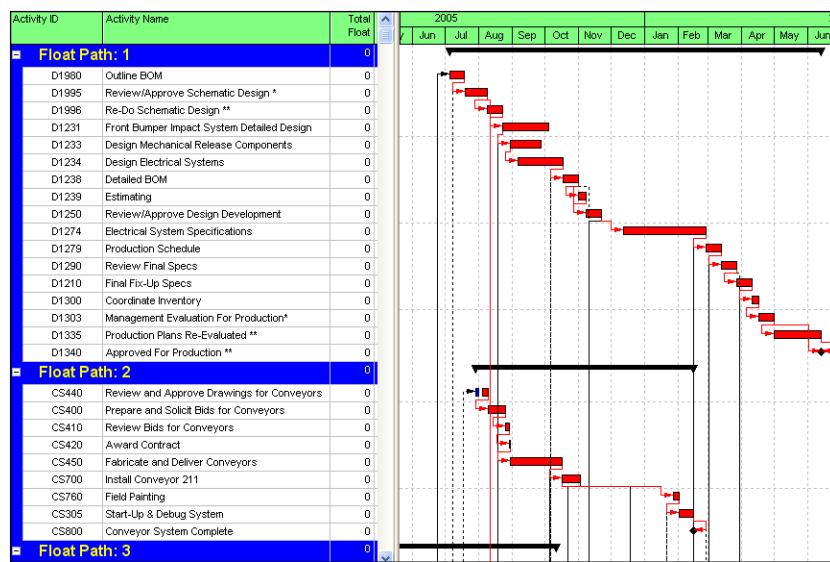
To merge an edited Reflection project:

- Open the Reflection project,
- Highlight the Reflection project and right-click,
- Select **Merge Reflection into source project....**,
- This opens a form that will allow a choice to be made about which changes should be kept, if a backup XER file should be made, and if the Reflection project is to be kept or deleted:



26.2 Advanced Schedule Options

Primavera Version 5.0 has a new option that enables individual critical paths to be banded as in the following picture and is useful when analyzing larger projects that have more than one critical path. This is similar to Grouping by Total Float but this function numbers the Paths and each path contains activities that are linked, whereas banding by Total Float may group unlinked activities.

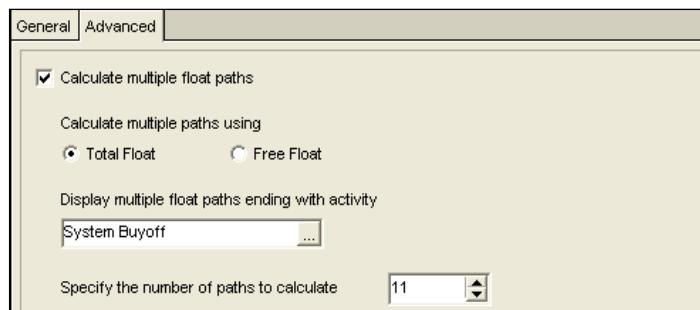


There are two steps involved, firstly calculating the multiple paths and secondly displaying the multiple paths:

26.2.1 Calculating Multiple Paths

To calculate multiple critical paths:

- Select **Tools**, **Schedule...**, **Options...**, **Advanced** tab,
- Click on **Calculate multiple float paths**,
- Select if you wish the software to use the **Total Float** or **Free Float** to calculate the multiple paths.
- The **Display multiple float paths ending with activity** is used to select an activity that is in the middle of a schedule and the driving paths of this activity are calculated.
- Select the number of paths for the software to calculate in the **Specify the number of paths to calculate** box.
- Select and schedule the project.

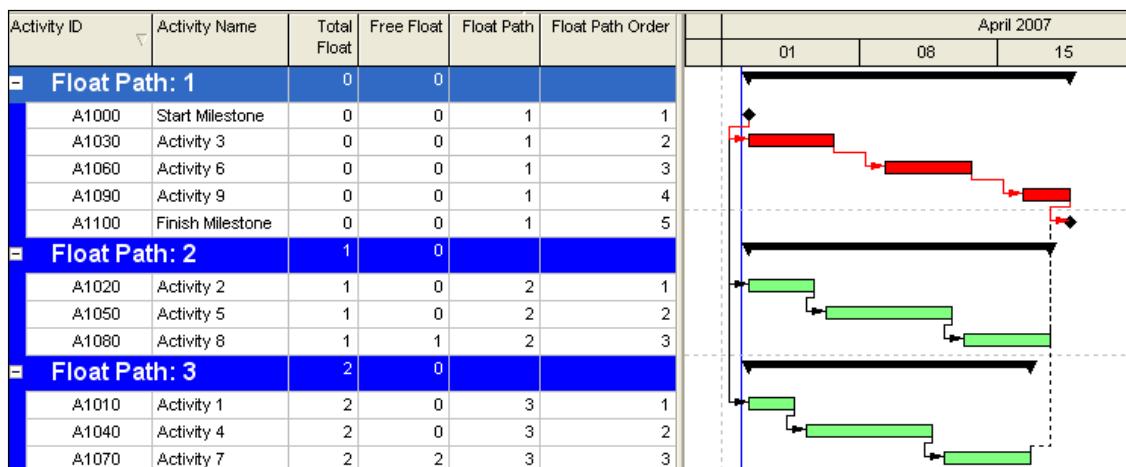
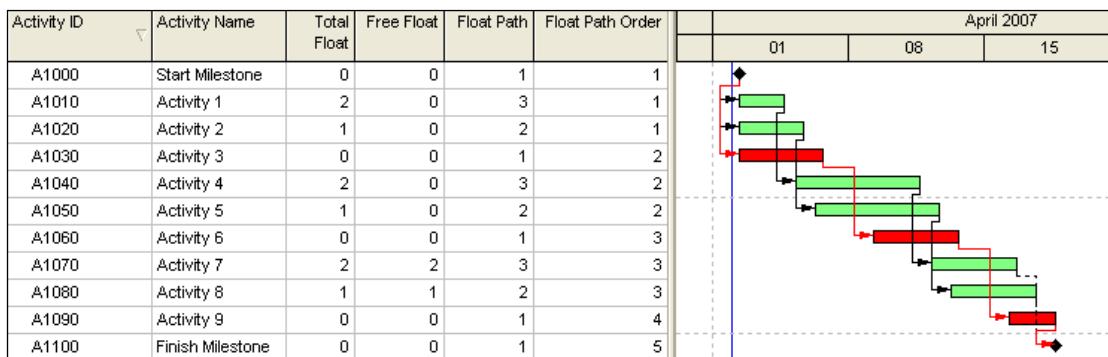


26.2.2 Displaying Multiple Paths

There are two fields that are populated in this process:

- **Float Path**, and
- **Float Path Order**

Either select multiple path Layout or create a Layout that Groups by **Float Path** and Sorts by **Float Path Order**, as in the following examples which show a before and after grouping:



The reader may wish to read the Help file or experiment with the software to see the results.

26.3 Audit Trail Columns

Primavera Version 5.0 introduced four basic audit trail columns that may be displayed in the Activities Window, which display the date and user who added the activity and by whom and when it was modified:

- **Added By** – the user who added the activity,
- **Added Date** – the date the activity was added,
- **Last Modified By** – the user who last modified the activity, and
- **Last Modified Date** – the date the activity was last modified.

Primavera Version 6.0 introduced two new resource assignment fields available in the **Activities** Window, **Activity Details**, **Resources** tab:

- **Assigned by**, and
- **Assigned Date**.

26.4 Excel Import and Export Tool

Primavera has a built-in tool for importing to and exporting from Excel the following data when the user is assigned a Superuser security profile:

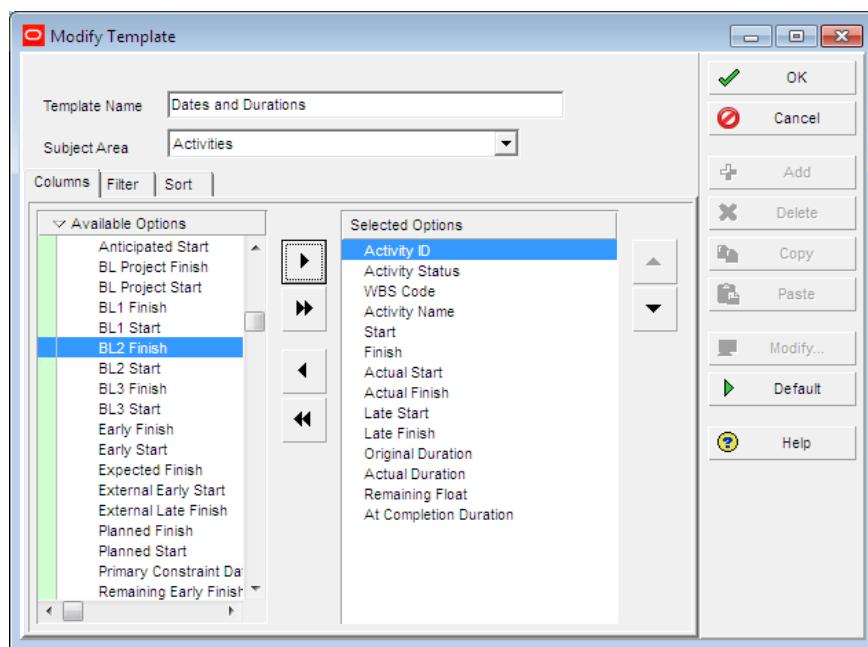
- Activities
- Relationships
- Resources
- Resources Assignments, and
- Expenses.

To import or export data to Excel select **File**, **Import...** or **Export...** and follow the instructions in the wizards. **Export Templates** may be created and re-used at a later date with this tool.

The following sheets are created upon export and these sheet names must not be changed:

- **TASK** containing Activity data
- **TASKPRED** containing Activity Relationships data
- **PROJCOST** containing Expenses data
- **RSRC** containing Resources data
- **TASKRSRC** containing Resource Assignments data
- **USERDATA** containing user data that should not be changed.

These templates allow the user to specify what data is to be imported and exported; an example is below:



26.4.1 Notes and/or Restrictions on Export

A few points to understand when using the Primavera Excel Import function:

- The following sheets are created on export and these sheet names must not be changed:
 - **TASK** containing Activity data
 - **TASKPRED** containing Activity Relationships data
 - **PROJCOST** containing Expenses data
 - **RSRC** containing Resources data
 - **TASKRSRC** containing Resource Assignments data
 - **USERDATA** containing user data that should not be changed.
- Do not change the language between importing and exporting.
- The first row of data in each sheet that is exported contains the database field name. The first row must not be changed otherwise the data will not be imported.
- The second row in the spreadsheet contains **Captions** that are deleted on spreadsheet import by the “**Delete This Row**” entry in the right column of the spread sheet. The “**Delete This Row**” entry may be copied to and line of data that is to be deleted from the project.
- Dictionary data such as Activity Codes being imported must exist before the data is imported.
- Only Activity Codes may be imported, if you wish to import the Activity Code descriptions then you will have to use the Software Developers Kit (SDK) in P6 Version 8.3 or earlier or a third-party tool.
- Only a maximum of 200 columns of data may be exported.
- **Sub-units** of time are not supported and the Sub-unit check boxes in the Edit, User Preferences..., Time Units tab should be unchecked.
- **Percent Completes** must be a value of between 0 and 100.
- Anything listed as a field may be exported.
- The User Preferences will affect how your data is exported and may give different values for resources.

26.4.2 Notes and Restrictions on Import

When attempting to import data using this type of tool there are some guidelines that apply to many applications, not just to this Primavera tool:

- Create a test project and experiment with this function before using it on a live project.
- Export some data first as this exports the correct column headings and sheet names.
- Change or add data to the exported spreadsheet and import new data into the test environment. Then review that the data is importing correctly and that the schedule is calculating as expected.
- Back up or take a copy of your live project before importing into a live project.
- It is often better to import into User Defined Fields to ensure the data gets into the database and then Global Change into the desired place.
- Activity data must have the Activity ID and WBS Code as these are the unique identifiers for each activity within a database.
- The **delete_record_flag**, in the far-right hand column, titled **Delete titled this row** against line 2 of the Excel spreadsheet deletes the line 2 activity on import.

- The **Delete This Row** flag may be placed against any spreadsheet line and the activity will be deleted on import.
- Calculated fields may not be imported and are marked with an (*). See picture below:

	A	B	C	D	E	F	G
1	task_code	status_code	wbs_id	task_name	start_date	end_date	act_start_date
Activity ID	Activity Status	WBS Code	Activity Name	(*)Start	(*)Finish		Actual Start
OZ1030	Not Started	OZB.1	Identify Supplier Components	11/12/2013 8:00:00 AM	12/12/2013 4:00:00 PM		
OZ1040	Not Started	OZB.1	On	13/12/2013 8:00:00 AM	16/12/2013 4:00:00 PM		
OZ1000	Completed	OZB.1	on	2/12/2013 8:00:00 AM	4/12/2013 4:00:00 PM	2/12/2013 8:00:00 AM	
OZ1010	Completed	OZB.1	ments	2/12/2013 8:00:00 AM	4/12/2013 4:00:00 PM	2/12/2013 8:00:00 AM	
OZ1020	In Progress	OZB.1	on	4/12/2013 8:00:00 AM	10/12/2013 4:00:00 PM	4/12/2013 8:00:00 AM	

These may not
be imported

- To see if the data field you wish to import may be imported, export the field and see if the field has an (*) by the second line description in the spreadsheet. Fields that may not be imported include but are not limited to:
 - Most dates except the Actual Start and Actual Finish
 - Expected Finish
 - Actual, Remaining, and At Completion Durations
- Therefore if you wish to import dates to create un-started activities without importing the Original Duration then you will have to import the activity with **Actual Start** and **Actual Finish** dates where you want the activity to lie and use a Global Change to take-off the Actual Dates:

A	B	C	D	E	F
1	task_code	wbs_id	task_name	act_start_date	act_end_date
Activity ID	WBS Code	Activity Name	Actual Start	Actual Finish	Delete This Row
OZ1140	OZB.3	New Activity	5/01/2014 8:00:00 AM	17/01/2014 4:00:00 PM	

Then	Parameter	Is	Parameter/Value	Operator	Parameter/Value
	Original Duration	=	Actual Duration		
And	Primary Constraint	=	Start On		
And	Primary Constraint Dat	=	Actual Start		
And	Actual Start	=			
And	Actual Finish	=			

- When only exporting some data on an occasional basis then it may be easier just to copy and paste the data into a spreadsheet.

i If you wish to bring across the band headings into Excel then the Activity ID must be displayed in the first column.

There is more information in the Help file under **Reference, Importing and Exporting**.

i P6 Version 8.3 and earlier allowed Activity Codes and other data may be imported by loading the Software Developers Kit (SDK) and using a spreadsheet available from the Oracle Primavera Knowledgebase. You will need to create a Support Login at the Oracle web site.

There is an article at www.primavera.com.au or www.eh.com.au under Technical Papers that describes in detail how to use the SDK.

26.5 Project Import and Export

Whenever you import a project there is a big risk of importing and over writing existing data in your database with values for attributes like resources, roles and calendars, thus there is a risk that importing a file will affect existing data and project in your database. Make sure that you understand the import options when importing a project into a database. Techniques such as:

- Assigning all resources, roles, calendars, codes and UDFs in the imported project unique names not being used in the target database will assist in preventing unintended over writing.
- Using a separate database to import files into for inspection to prevent importing unwanted data into your database could be used.
- Using third party clean-up tools, some listed on www.primavera.com.au, may be used to remove unwanted data.
- Using products like **Schedule Viewer** to inspect P6 XER and XML files before importing could be considered.

Project data may be imported and exported from and to the following formats:

- **XER**, which is a Primavera proprietary format, used to exchange projects between Primavera P6 databases regardless of the database type in which it was created.

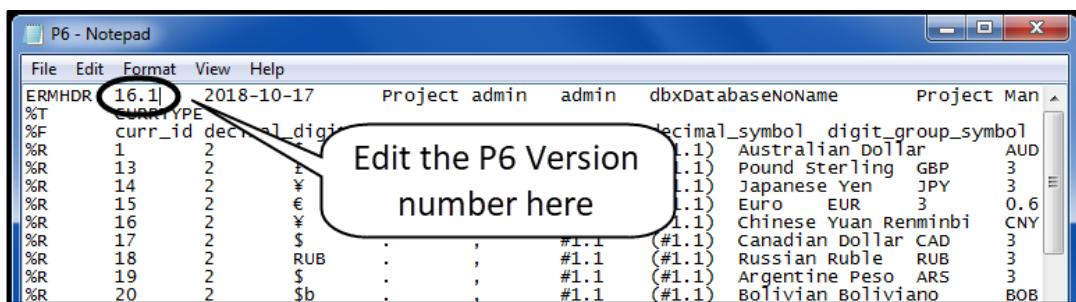
The XER format is the original format that Eagle Ray, who developed the software, used to export files from one database and import them into another. XER stands for Export Eagle Ray.

An XER file is a simple text file that does not include Layouts or baselines and therefore is just a simple text file containing project data. Some key points:

- No Baseline projects may be exported or imported with this tool and Baselines have to be exported and imported separately.
- A layout (formatting) is not part of an XER file.
- Baselines are not exported with an XER. The web tool does not import or export XER file.
- Earlier versions of **XER** files may be imported into later version databases.



If you try to import a later version of an XER file with an earlier version of P6 you may receive a message stating that the file may not be imported. To resolve this issue open the XER file with **Notepad** and edit the version number to the version of your version of P6:



- XER file may be opened up either in Notepad or using Excel and if you open one with Excel you may data parse it and if you edit it carefully you can add data or remove data before importing the file into another database. This is particularly useful if you want to add a whole lot of codes interface 6 as you can create a dummy project had the codes in Excel and importantly. On the other hand there are a number of tools available to do the same, many listed a www.primavera.com.au.

- **Primavera Contractor XER.** This is the format produced by Primavera Contractor.
- **Project (*.XML).** This is the file format that Microsoft Project now recommends for export and import from other products like Primavera. Version 8.3 included some enhancements to this function which are outlined in the What's New chapter.
- **MPX (*.mpx).** This is a text format data file created by Microsoft Project 98 and earlier versions. MPX is a format that may be imported and exported by many other project scheduling software packages.
- **Primavera Project Planner P3 and SureTrak files saved in P3 format.** A SureTrak project should be saved in Concentric (P3) format before importing. Importing P3 files requires P3 to be installed on the same computer as P6 and later Windows operating systems do not support the loading of P3, effectively making this function inoperable on some operating systems. With Primavera Version 6.0 the importation of P3 files has been improved:
 - One or more individual sub-projects may now be imported, and
 - The import EPS locations specified, which may be different for each sub-project.



To import files saved in **P3** format you need Btrieve loaded on your PC. Btrieve is loaded when P3 is installed. A demonstration version of P3 will load Btrieve onto your machine and enable P3 files to be imported. P3 may not be loaded on more recent operating systems such as Windows 7 make the use of this function difficult without an old operating system. The author maintains a Windows XE Virtual Machine with SureTrak, P3 and an old version of P6 loaded to convert files from P3 or SureTrak to XER format.

- **Primavera PM – (XML)** is a new format introduced with Primavera Version 6.0 which is industry standard and enables the import and export of project data. This tool is continually being developed and different versions of P6 have different functions. It allows the import and export of a single projects with their Baselines and Layouts, both of which are not available with XML files. A Template is used to manage data which may exist in the database and the project to be imported so the user may decide to use the existing database data, import the new project data, update the existing project data or not import the data.

The XML import/export functionality has been improved in Version 8.3.

The XML import/export functionality has been improved in Version 15.1 allowing the import and export of Baseline projects. Previously Baseline projects had to be Restored, before they could be exported.

P6 Version 19 introduced the ability to:

- In Standalone and PPM databases to update baselines when importing Primavera XML file.
- To export projects in Primavera XML format in a compressed ZIP file.
- Scheduling and Leveling Options may be imported and exported.
- Scheduling and leveling options are included and when importing the user may select to import with the Update Existing or Keep Existing import settings for the scheduling and leveling options or Keep Existing import settings for the scheduling and leveling options.



A P6 and MSP XML file will look the same as both will have the format *.XML. You should consider putting P6 or MSP in the file name so you know which files are P6 XM files and which are MSP XML files.

- **UN/CEFACT XML** format. P6 Version 8.3 supports UN/CEFACT XML format. This format is mandated by many US Government agencies.



Project (*.mpp). This is the default file format that Microsoft Project uses to create and save files is not supported by later version of P6.



When projects are imported or exported to other scheduling packages they will often calculate differently due to the different methods of calculation of each package. Do not expect to import from Microsoft Project or any other software and expect to see the same dates when scheduling. There are some articles on www.primavera.com.au and www.eh.com.au that explain the issues.

Importing a file from another Primavera database may give different results depending on the database and user preferences in each database and these should be carefully checked.

Importing a project into a working P6 database must be carefully planned to ensure that existing projects are not impacted by the imported data and the options available on the import wizard are fully understood. Updating or overwriting existing data may affect existing schedules.

A sacrificial database may be the best option for reviewing schedule submitted by subcontractors so as to not corrupt your own working database.

26.6 Check In and Check Out

Check In and Check Out function enables a project to be copied from a database, worked on in a remote location such as a client's database, and then be checked in to the original database at a later date and the original schedule updated with the changes.

- Select from the **Project Window**, **General** tab, File, **Check Out...** to check out a project:

General		
Project ID PROJ001	Project Name Checked Out Project	
Status Active	Responsible Manager Enterprise	Project Leveling Priority 10
Check Out Status Checked Out	Checked Out By admin	Date Checked Out 25-Aug-11 15

- The project XER file may then be sent to another person or organization, imported into another database and edited.
- P6 Version 19 introduced the ability **Check In** and **Check Out** projects to XML.
- On import to another database, **External Dates** are created where there are inter-project relationships in the source database.

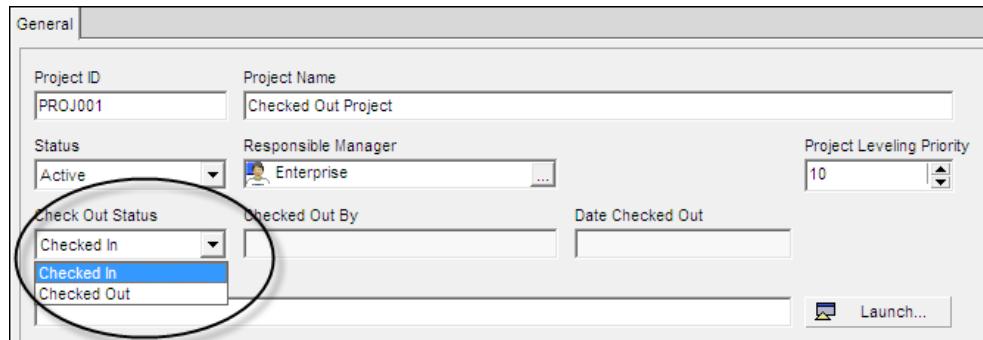


These **External Dates** act like Early Start and Late Finish constraints and will affect the schedule calculation. You should always check for **External Dates** when importing a project. See paragraph 15.2.1 for an example of External date.

The file format of a Checked Out file is the same as a project exported in XER format, but checking out a project places a **Read Only** attribute on the project, and then it may be opened but not edited.

To remove the **Read Only** attribute on the project either:

- Select **File, Check In...** to check in a project, or
- Select change the status to **Checked In** in the **Project Window, General tab**:



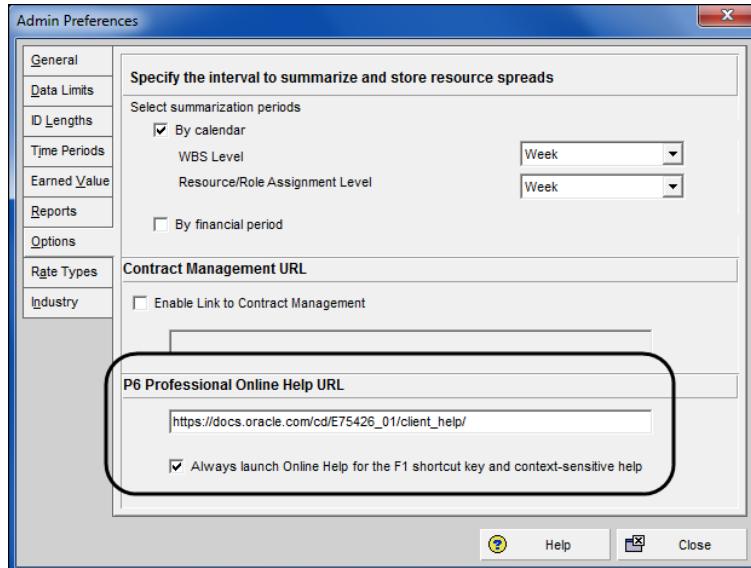
Also ensure you check what has happened to any original external relationships on re-import of a Checked Out project.

- The original inter-project relationships normally get re-linked on import, and
- Then your project may calculate differently when you have Checked In a Checked Out project that now has External Dates and different calculated dates.

26.7 Online HTML Help

The Help menu in P6 Version 8.3 has an additional menu option titled **Online Help** which will display the information in HTML format assisting people with disabilities who may access additional browser functions.

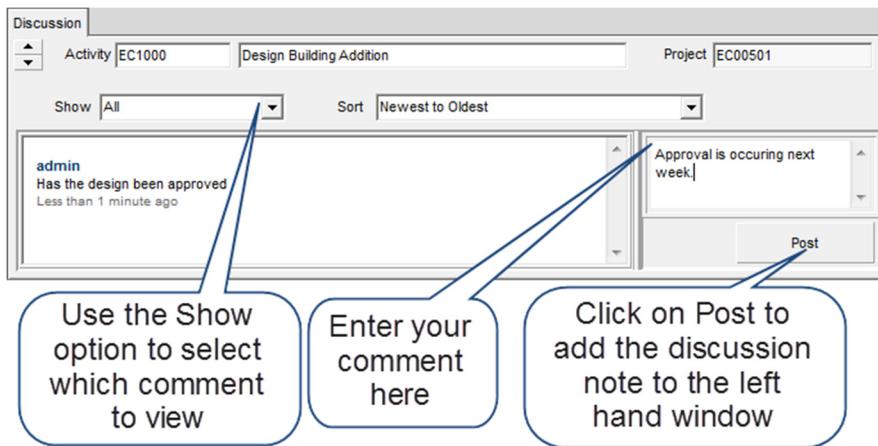
The **Admin Preferences, Options** tab has a new P6 Online Help section which sets the default for the F1 key. The URL is set to the Oracle Technology Network (OTN):



26.8 Activity Discussion Feature

A new tab has been added to the **Activities Window** in P6 Version 8.3, titled **Discussion** which enables:

- Users to create a discussion thread for each activity,
- Each entry is saved with the date of entry and user name and the entire thread is recorded allowing and interactive discussion between users who have access to P6,



A new field titled **Unread Comments** has been created so users may identify activities with new comments that they have not read. This may be accessed through Team Member Web, the Team Member for iPhone app, and P6.

Activity ID	Activity Name	Unread Comments	Original Duration	Start
	Design and Engineering	0	92d 4h	01-Sep-10 08 A
EC1000	Design		Sep-10 08 A	
EC1010			Sep-10 08 A	
EC1030			Sep-10 10 A	
EC1050			Sep-10 09 A	
EC1160	Review		13-Dec-10 13 A	

i This function has limited use in the environment where only the project scheduler has access to P6.

26.9 Lean Tasks may be imported using an XML file

Primavera Cloud allows activities to be broken down into tasks. **Lean Tasks** are similar to the P6 **Steps** function but with more functionality such as allowing the assignment of tasks to subcontractors. Lean Tasks may have the following attributes:

- Assignment of a duration,
- May be made "Private" so other people do not see them,
- Tasks may have logic between them which are called "Handoffs",
- A Task's Float is called "Slack".
- The planning of Tasks is completed on a **Planning Board** that may be shared between team members. This is a tool designed for short term planning by the people completing the work.

When you are using an EPPM database you may Import Lean Tasks through an XML file from Primavera Cloud.

27 EARNED VALUE MANAGEMENT WITH P6

This chapter does not teach Earned Value but it explains how P6 Earned Value functions operate. Therefore, before you read this chapter you will need to have a very good understanding of Earned Value Performance Measurement and the associated terminology. If you do not, then you should consider reading some of the following documents:

- Some current EVM Standards:
 - AS 4817 Project performance using Earned Value 2006
 - Defence Material Supplement to AS 4187
 - ANSI/EIA-748-A-1998 Earned Value Management Systems
 - PMI Practice Standard for Earned Value Management
- Other material:
 - Earned Value Management APM Guidelines
 - Earned Value Project Management – Quentin W. Fleming and Joel M. Koppelman
 - AACE 82R-13 - Earned Value Management (EVM) Overview and Recommended Practices Consistent with EIA-748-C

Furthermore, readers must have a clear understanding of and experience with the following topics:

- The P6 options and preferences associated with resources, and
- Updating a resourced schedule.

This chapter will outline:

- Which P6 functions may be used for EVM,
- What P6 settings are used in these calculations,
- What options are available and how Earned Value calculations may be performed in P6,
- How this information may be reported.

The main Curves that are used in EVM are:

- **Performance Measurement Baseline (PMB)** which is a time-phased BAC.
- **Planned Value (PV)**, or Budgeted Cost of Work Scheduled (BCWS), is the value of planned work at a point in time derived from the PMB.
- **Earned Value (EV)**, or Budgeted Cost of Work Performed (BCWP), is the value of work completed at a point in time.
- **Actual Costs (AC)**, or Actual Cost of Work Performed (ACWP), is the expenditure at a point in time to complete the work.
- **Estimate to Complete (ETC)**, a revised estimate of the remaining work.

Some important points:

- No cost or resource data may be held at WBS level. All cost, resource, and expense data is held at Activity Level and summarized at WBS Node.
- If Actual Costs and Units are to be collected at WBS level then it may be appropriate to use a WBS or LOE activity to store this information and detail timing activities created under these.
- P6 will easily create the Planned and Earned values.

- If P6 is used to record Actual Values then your organization will require some mature system to import actual values from other corporate systems (accounting, procurement, time sheeting and contract management) in order that the scheduler does not become a data entry clerk.



Users should design their system and test their system with P6 to ensure that it is producing the expected results before working on a live project.

27.1 Performance Measurement Baseline

The PMB in Primavera may be read from either the Budget or At Completion values of a Baseline Project.

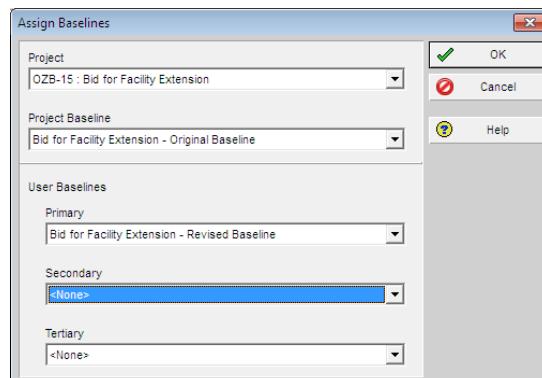
- At the start of a project the Performance Measurement Baseline (PMB) is usually read from the Baseline project Budget values, which normally are equal to the At Completion values.
- When a project is re-baselined in the mid-point of the project from a project that has progress, then at this point in time some activities will have progress and the At Completion values would normally be different from the Budget values.



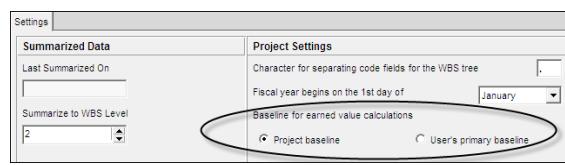
Careful consideration needs to be given here as to which Baseline setting is to be used to ensure the correct values are reported as the PMB.

The P6 functions that decide which value is read as the Performance Measurement Baseline:

- The **Project, Assign Baselines...** form selects the Baselines projects to be read as the **Project Baseline** and the **Primary User Baseline**:

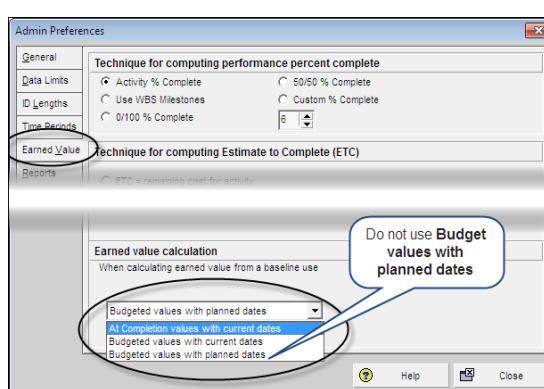


- The **Projects Window, Settings tab, Project Settings, Baseline for earned value calculations** decides which of the **Project baseline** or **User's primary baseline** is read for P6 Planned Values:



The **Admin, Admin Preferences..., Earned Value tab, Earned value calculation section, When calculating earned value from a baseline use**, you should select either the:

- **At Completion values with current dates**, or
- **Budgeted values with current dates**.





It is recommended that you do not select or use **Budgeted values with planned dates**, see paragraph 15.1.5 for details of the P6 Planned Dates issues. You should always use the Project Baseline as all users will all see correct data. Using the Primary User Baseline will require each user to set their baseline the same as other users.

27.2 Planned Value

The Planned Value is the value of the work at a point in time that was planned to be completed and is usually represented by the value calculated at the **Current Data Date**.

In P6 there are several options for displaying Planned values that may be confusing. They are:

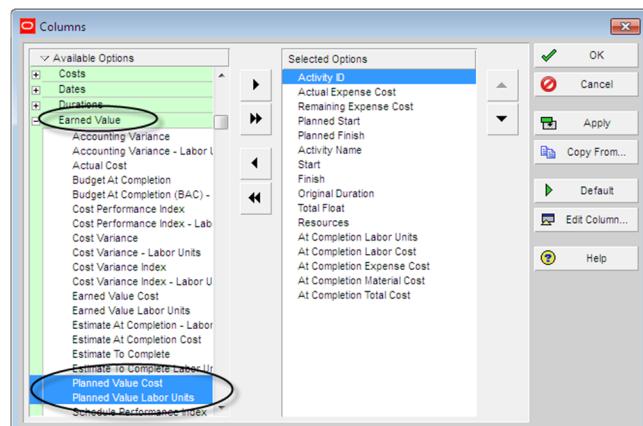
- **Planned Value Cost** and **Planned Value Units** are read from the Performance Measurement Baseline settings as outlined in the previous paragraph:
 - These values acknowledge the **Admin Preferences, Baseline for earned value calculations**, and
 - These values acknowledge the **Project Settings, Baseline for earned value calculations**
- **BL Project** and **BL1** which may display **Expense, Labor, Nonlabor, Material** and **Total Costs** or **Labor and Nonlabor Units**. (**Expense Units** or **Material Units** are usually not available).
 - These values acknowledge the **Admin Preferences, Baseline for earned value calculations**, and
 - These **DO NOT** acknowledge the **Project Settings, Baseline for earned value calculations** and read the **Project Baseline** and **Primary User Baseline** values, respectively.
- **Budgeted Expense Costs, Budgeted Labor Costs, Budgeted Nonlabor Costs, Budgeted Material Costs, Budgeted Labor Units** and **Budgeted Nonlabor Units** (**Budgeted Expense Units** or **Budgeted Material Units** are usually not available) are **NOT** read from a Baseline schedule as one might expect but from the **Current Schedule Budget** and the **Current Schedule Planned Dates**.



All **Budgeted** values should be used with caution as they are always read from the current schedule Baseline and Planned Dates.

The **Planned Value** may be displayed as:

- **Tabulated Data** in locations such as the:
 - **Activity Usage Spreadsheet**
- **Graphical Data** in locations such as the:
 - **Activity Usage Profile**
 - **Tracking Window** by creating a **Project Gantt/Profile**.
- **Columns Data** in locations such as the:
 - **Tracking Window** by creating a **Project Table**,
 - **Activities Window** using **Planned Value Cost** or **Planned Value Labor Units**:





There are no options for selecting and displaying from a progressed schedule for the following:

- The **Late Baseline** values as a standard option. Many people like to show the Early and Late Baseline curve to display an envelope that progress should stay within.
- **Planned Material Units**
- **Planned Expense Units**

Planned data in the following windows or panes display the Budgeted field values which read the **Current Schedule Planned** dates and **Current Schedule Budget** values and should be used with caution:

- **Resource Usage Spreadsheet**
- **Resource Usage Profile**
- **Resource Assignments**

27.3 Earned Value

The Earned Value is the value of completed work expressed in terms of the budget. The normal calculation is **Earned Value = Budget x % Complete**.

27.3.1 Performance % Complete

P6 has a field titled **Performance % Complete** which is used to calculate the **Earned Value** for each activity. This may be displayed as a column or a bar in the Gantt Chart.

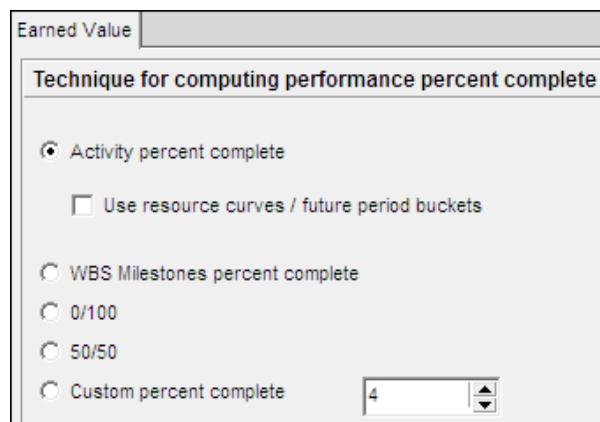
In P6 there are some options for calculation of the **Performance % Complete** for all activities in each **WBS Node** which is, in turn, used to calculate the **Earned Value**.

- The defaults are set in the [Admin, Admin Preferences...](#), **Earned Value** tab,
- The options are managed at WBS Node value for all activities assigned to a WBS Node, and each WBS Node may have different values.
- Open the **WBS Window, Earned Value** tab to see the options which are mainly self-explanatory:

27.3.2 Activity percent complete

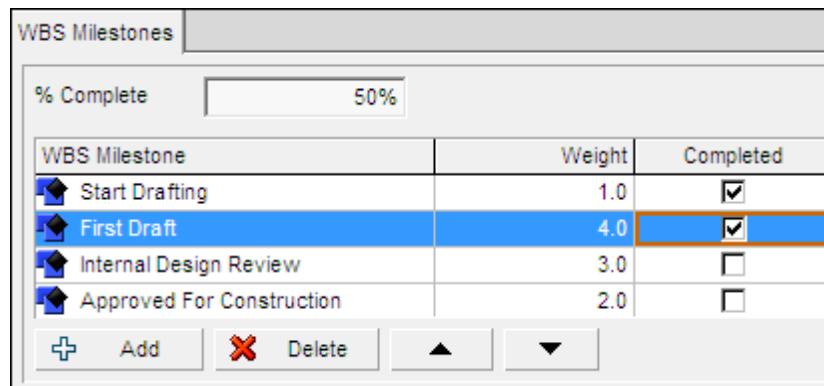
This uses the **Activity percent complete** assigned to an activity. If **Steps** are being used then this will have to be set to **Physical**. See paragraph 21.6.

The **Use resource curves/future period buckets** is checked to allow either **Resource Curves** or **Future Period Buckets** to be used for calculating the Earned Value.



27.3.3 WBS Milestones percent complete

WBS Milestones are created in the **WBS Window**, **WBS Milestones** tab and enable a predefined way of measuring progress against all the work assigned to a WBS Node.



27.3.4 0/100

The **0/100** option assigns a value of zero for an in-progress activity and assigns 100% when the activity is complete.

27.3.5 50/50

The **50/50** option assigns a value of 50% for an in-progress activity and assigns 100% when the activity is complete.

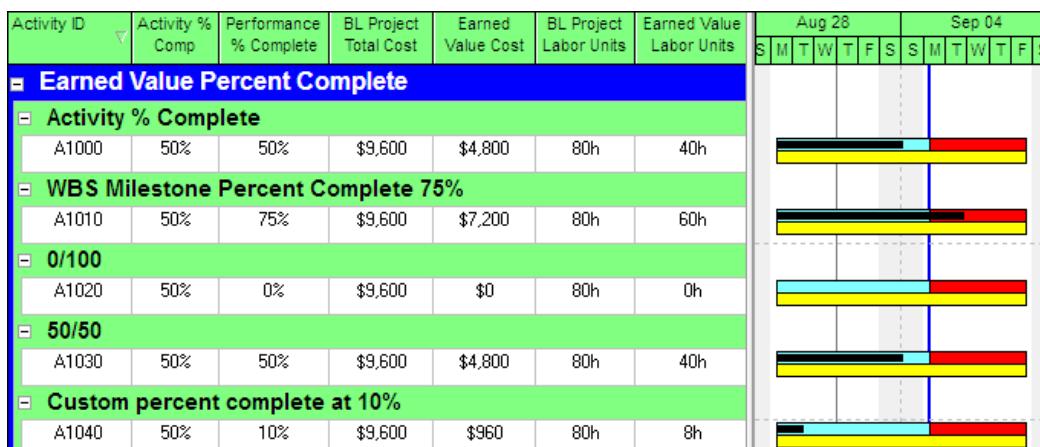
27.3.6 Custom percent complete

The Custom percent complete allows a further percent complete option if the others do not suit your requirements.

27.3.7 Example of the Calculation of the Earned Value

The example below displays:

- 5 WBS Nodes with their description identifying the option for the **Technique for computing performance percent complete**, i.e., the method of calculating the Earned Value,
- 5 activities, one for each WBS Node each progressed by 50% in duration, hours, and cost,
- The % Complete bar displays the **Performance % Complete**.



27.4 Actual Costs

These are the costs actually incurred in performing the work. This is often calculated from the amount paid plus accruals. Actual Costs and Actual Units may be recorded in Primavera and displayed in two methods:

- The total to date, or
- Calculated from the **Financial Periods** values when Period values are stored.

27.4.1 Total to Date

When the total to date is selected then the total cost or units are assigned to each resource or expense and these are spread linearly from the activity **Actual Start** date to the **Data Date**.

Once the total to date has been entered no more action need to be taken.

27.4.2 Financial Periods

Primavera P6 Version 8 to 19 allowed only one set of Financial periods to be assigned to all projects, thus if you required some project to have monthly periods and some weekly periods you would have to create two databases. Version 20 enhancements added in the ability to have multiple financial periods.

Thus, there are two sub-sections in this paragraph:

- Version 8 to 19 and
- Enhancements introduced in Version 20

27.4.3 Version 8 to 19

A more accurate option is to use **Financial Period** values to see a true picture of how much was spent in each period.



The decision to use **Financial Periods** must be made early as the period values must be saved at each schedule update.

This process takes substantially more time and should have a procedure for people to follow so no steps are missed.

This new function to Primavera Version 5.0 enables:

- The creation of user definable financial periods, say monthly or weekly, and
- The ability to record the actual and earned costs and quantities for each period.

Therefore, actual costs and quantities which span over more than one past period will be accurately reflected per period in all reports. If **Store Period Performance** is not used then the actual costs or units are spread equally over the actual duration of an activity, which may not accurately reflect when the work was performed and what was achieved in each period.

These Periods apply to all projects in the database.



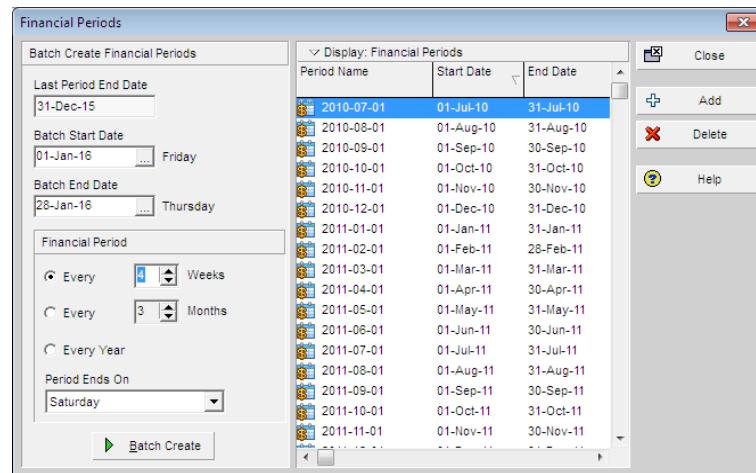
If one project requires financial periods of months and one of weeks then it would be best to consider setting up two databases, one for each project.

To display **Financial Period data** then two steps are required:

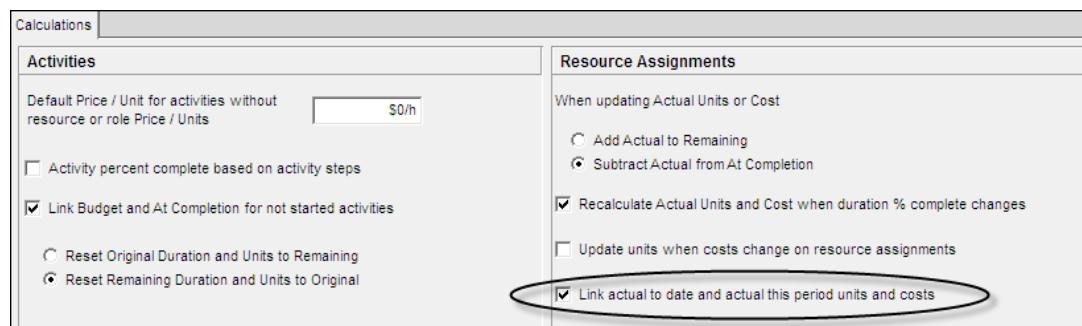
- The **Financial Periods** must be set up using Admin, Financial Periods..., and
- The period data is stored after each schedule update using Tools, Store Period Performance....

The steps required to store period performance are:

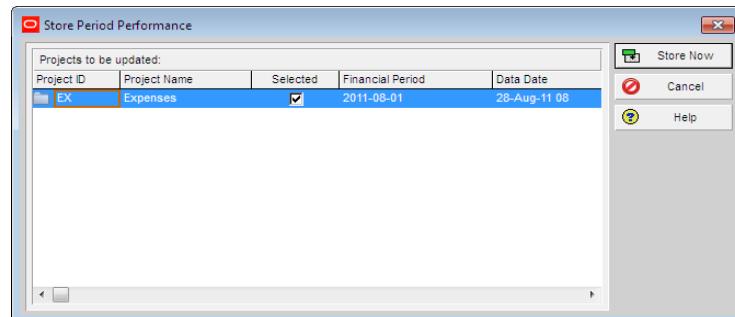
- Ensure that the user has the necessary privileges to edit **Financial Period Dates**, **Store Period Performance**, and **Edit Period Performance** when past actuals need to be edited.
- Create the **Financial Periods**:
 - In the Professional Version by selecting Admin, Financial Periods.... which will open the **Financial Periods** form:



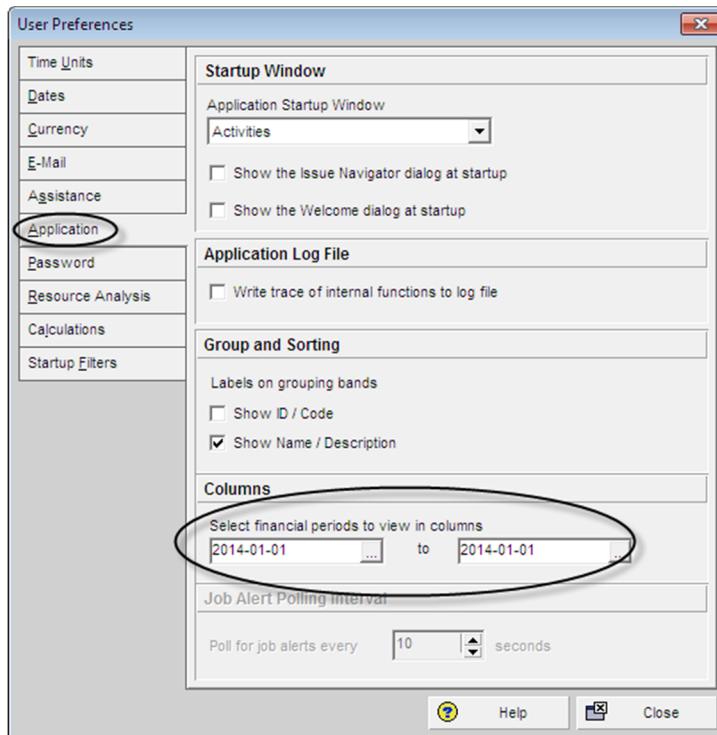
- In the Optional Client from the Web using **Administer**, **Enterprise Data**, **Financial Data** menu.
- Open the appropriate project, select the **Calculations** tab in the lower pane of the **Projects Window**, and ensure **Link Actual to date and Actual This Period Units and Cost** is enabled by checking the check box. This option is grayed out if the project is not open:



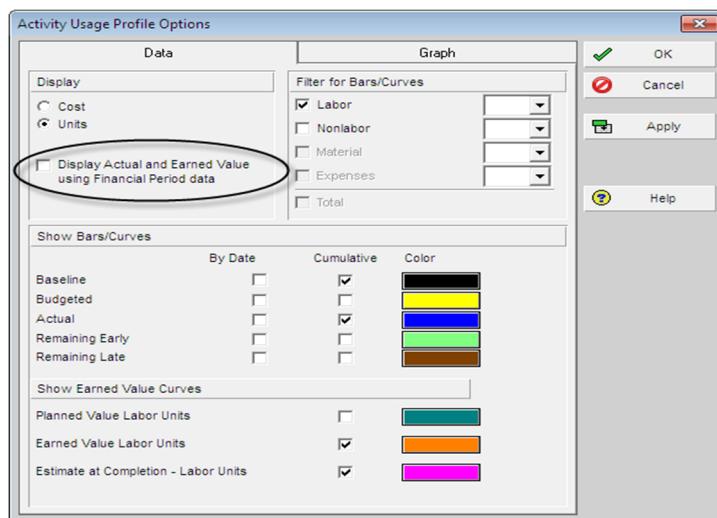
- To store the period performance select **Tools**, **Store Period Performance**... to open the **Store Period Performance** form, select the projects to have the period performance stored and click the **Store Now** icon.



- The **Edit, User Preferences, Application tab, Columns** section, **Select financial periods to view in columns** enables the user to restrict the number of columns that are displayed in forms such as the **Columns** form, thus reducing the amount of scrolling required to find a specific column:



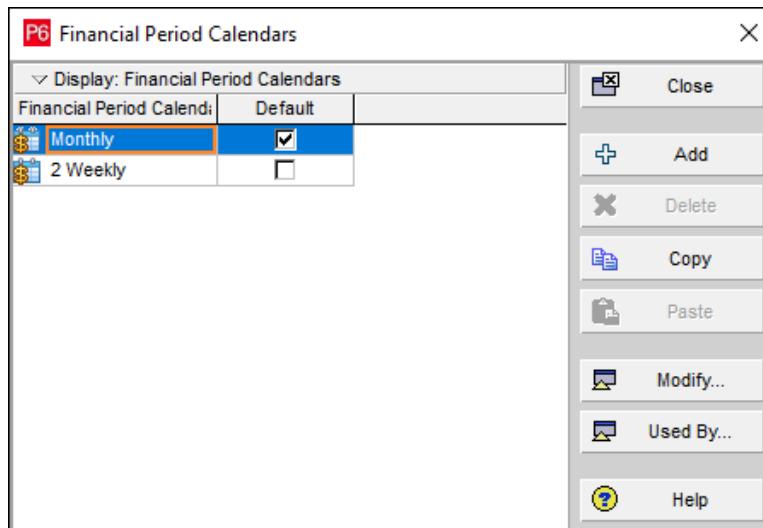
- Finally, these results may be viewed and edited in the **Past Period Actuals** columns of the **Resources Assignments Window**, **Activity Details Resources** tab, the **Activity Table**, etc.
- The options to display **Financial Period** values is clear in forms like the **Activity Usage Profile Options**:



27.4.4 Enhancements Introduced in Version 20

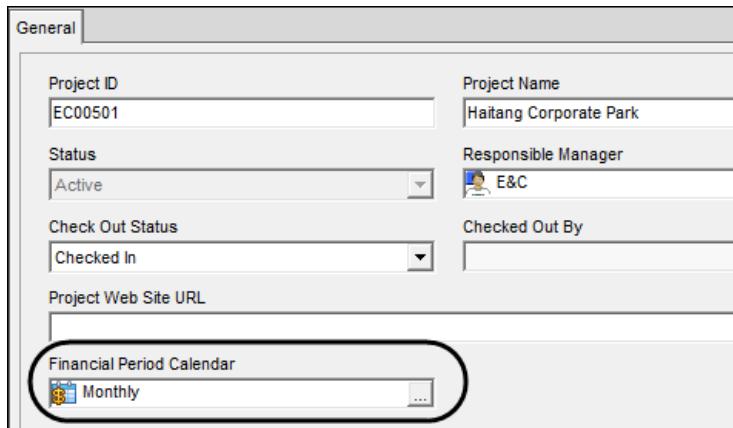
You may now assign different Financial Period to projects in P6 Version 20 by the use of **Financial Period Calendars**.

When you select **Admin, Financial Period Calendars** you may create multiple **Financial Period Calendars** and each may have different Financial Periods:



The **Financial Period Calendar** is assigned to a Project in:

- The **Projects Window, General** tab, or
- By displaying the **Financial Period Calendar** column:



This function did not work in the authors P6 Version 20.12.0.37740, but updates should fix this issue. As an interim you may change the **Default Financial Period Calendar** before creating a project.

27.5 Estimate to Complete

P6 has two separately calculated estimate to complete fields:

- Estimate to Complete from Resource and Expense Units and Costs, usually titled **Remaining Costs** or **Remaining Units**.
- Estimate to Complete from P6 Earned Value Calculations, titled **Estimate to Complete** (costs) or **Estimate to Complete Labor Units**.

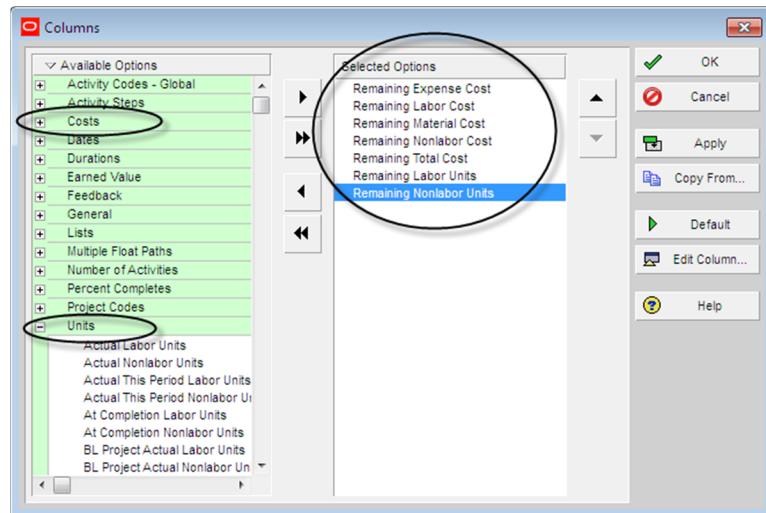


It is very important that users understand the differences between these two fields and know which they are using and displaying.

27.5.1 Estimate to Complete from Resource Data

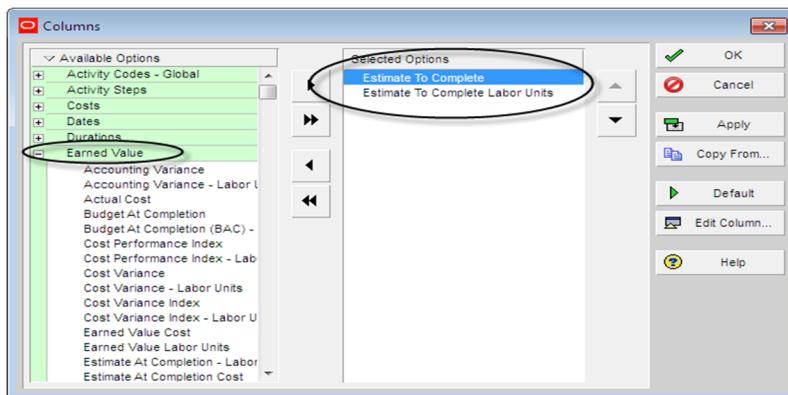
This process calculates the Estimate to Complete directly from Activity Resource Assignments and Expense Remaining Costs and Units.

- The **Remaining Cost** and **Remaining Units** columns read from Resource and Costs values:



27.5.2 Estimate to Complete from P6 EV Calculations

- The Earned Value **Estimate To Complete (Cost)** and **Estimate To Complete Labor Units**:



These values are calculated from the **WBS Window, Earned Value tab, Techniques for computing Estimate to Complete (ETC)** options, which are mainly self-explanatory if you understand Earned Value. PF stands for **Performance Factor**.

Earned Value	
Technique for computing performance percent complete	
<input checked="" type="radio"/> Activity percent complete <input type="checkbox"/> Use resource curves / future period buckets <input type="radio"/> WBS Milestones percent complete <input type="radio"/> 0/100 <input type="radio"/> 50/50 <input type="radio"/> Custom percent complete <input type="text" value="6"/>	
Technique for computing Estimate to Complete (ETC)	
<input type="radio"/> ETC = remaining cost for activity or $\text{ETC} = \text{PF} * (\text{Budget at Completion} - \text{Earned Value}), \text{ where:}$	
<input type="radio"/> PF = 1 <input checked="" type="radio"/> PF = 1 / Cost Performance Index <input type="radio"/> PF = 1 / (Cost Performance Index * Schedule Performance Index) <input type="radio"/> PF = <input type="text" value="0.88"/>	

27.6 Activity Usage S-Curves

This section will shed some light on the graphical capabilities of P6 with some examples.



Users must spend a significant amount of time experimenting with the software so they are confident that the software is doing what they expect it to do. A small schedule with predictable results should be used to gain confidence with the software.

Then write some procedures and follow the procedures on each update.

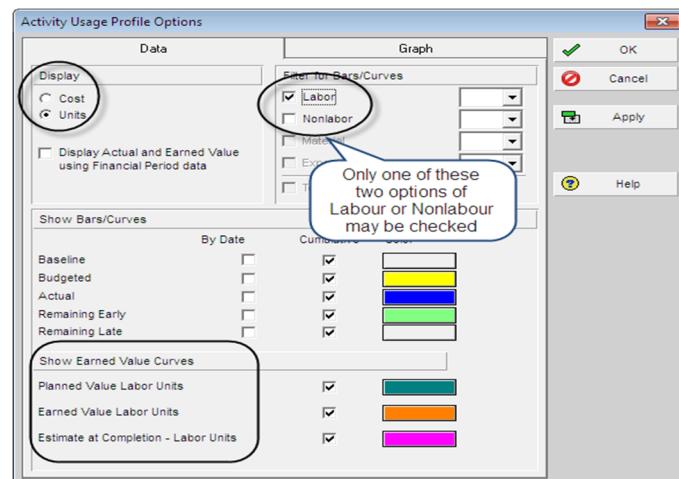
27.6.1 Activity Usage Profile Bars and Curves

The **Activity Usage Bars** are also commonly called **Histograms** and **Activity Usage Curves** are commonly called **S-Curves**. The activity usage options are displayed in the picture below:

- The **Display** and **Filter for Bars/Curves** are self-explanatory. **Material Units** and **Expense Units** may not be selected and this creates significant reporting restrictions.
- The **Show Bars/Curves** and **Show Earned Value Curves** are not necessarily obvious and will be explained below:
 - **By Date** will display a **Histogram**, and
 - **Cumulative** will display **S-Curves**, in the same color as the Histogram so it may be difficult to read when both sets of data are displayed.

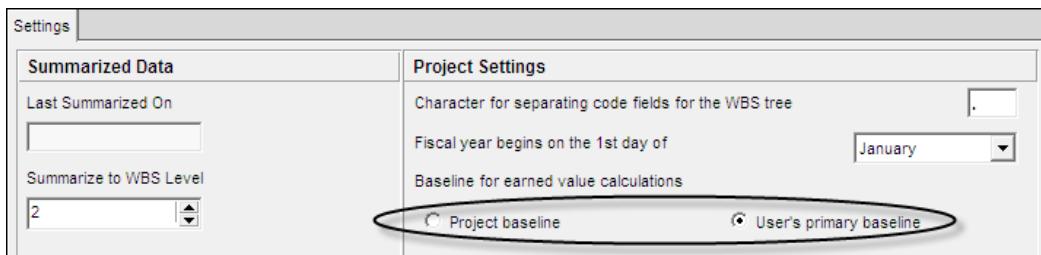
Show Bars/Curves

- **Baseline** uses the Baseline data as specified in the [Admin, Admin Preferences..., Earned Value tab, Earned value calculation section tab](#). This is an Early Curve only and drawn from the **Project Baseline** dates.
- **Budgeted** uses the Current schedule Planned dates and Current schedule Budget, not Baseline dates and Budget as might be expected. It is recommended that this is not displayed.
- **Actual** uses the actual Costs and Units as expected. This curve will change shape if **Financial Periods** and **Store Period Performance** are used.
- **Remaining Early** using Current schedule dates and Remaining Costs, but are drawn from the zero value of the Y-axis, therefore is of limited value for creating traditional S-Curves where one would draw them from the end of the Actual Curve.
- **Remaining Late** using Current schedule dates and Remaining Costs, but are drawn from the zero value of the Y-axis, therefore of limited value for creating traditional Earned Value S-Curves drawn from the end of the Actual Curve.

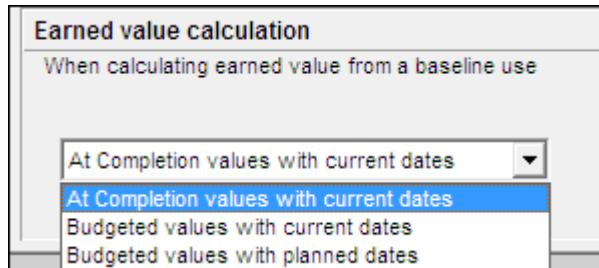


27.6.2 Show Earned Value Curves

- Planned Value Cost is determined by the combination of two functions:
 - The Project Window, Settings tab, Project Settings section Baseline for earned value calculations option selects which Baseline is being read. This curve is usually the same as the Baseline curve when the Project Baseline is selected but will read different values if the default option is changed to the User's primary baseline as shown in the picture below:



- The Baseline Dates and Costs selected from the Baseline for earned value calculations option as set in the Admin, Admin Preferences, Earned Value tab Earned value calculation section and may be one of the following options:



- When the Display option of Units is selected the Show Earned Value Curves description changes to Labor units.



Thus, in addition to Expense units and Material units, Nonlabor units may also not be displayed as P6 Earned Value Curves in the Activity Usage Profile.

Restrictions with the Graphical Display

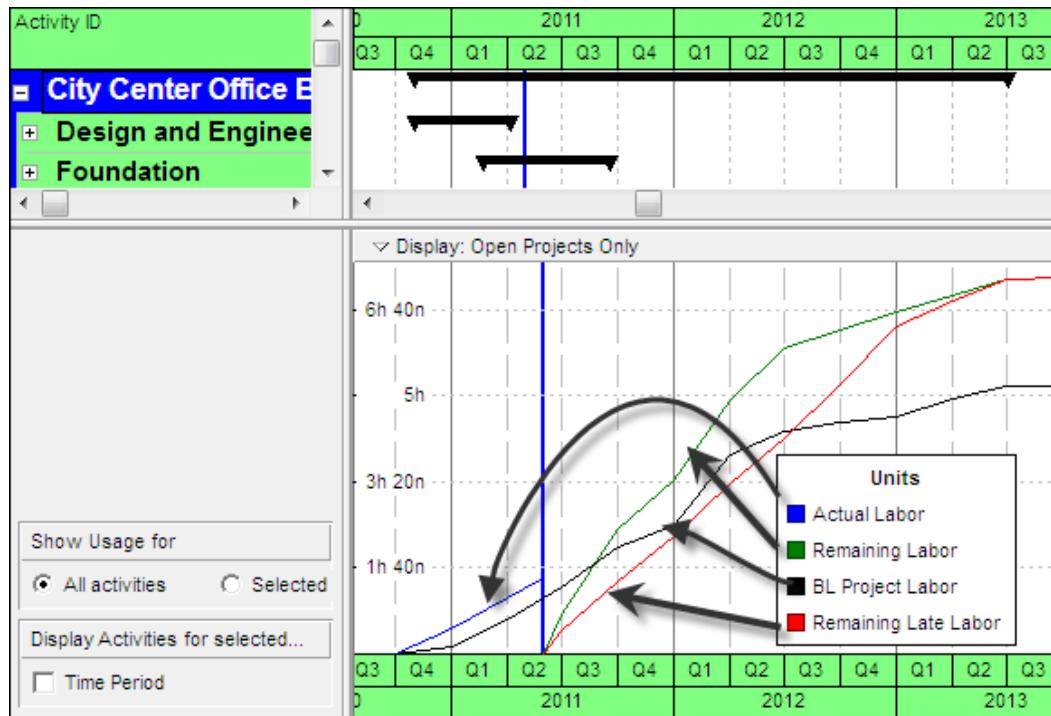
It is easier to plan your EV System if you understand the system restrictions at the start, the following restrictions should be considered when planning your system:

- Multiple Histograms may not be created through the user interface.
- Late Planned data read from Baselines is restricted and the drawing Late curves difficult to achieve in the user interface.
- Time-Phased Material Resource Units are only available in the Resource Assignment Window where no EV data is available. Thus, the traditional Commodity based EV curves used in the Process Industry are difficult to produce with Material resources. In this situation, users revert to using Nonlabor resources for materials.
- The Bars and Curves functions have some formatting restrictions, such as a low level of control on the vertical axis, colors, and gridline formatting.

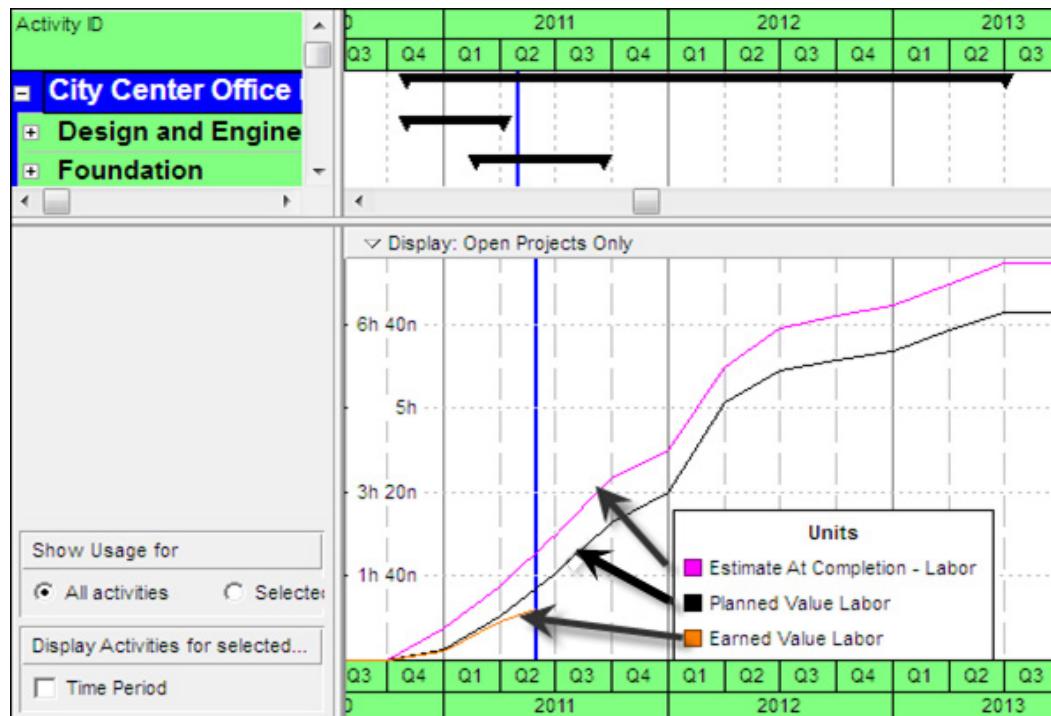
27.7 Sample Graphical S-Curves

The following pictures are created from the City Center Office Building Addition project available from the demonstration database available when the software is loaded:

- The curves in the picture below show that the **Remaining** and **Late Remaining** curves are drawn from the zero point not from the end of the **Actual** curve:



- The picture below is displaying the traditional Earned Value Curves.



28 WHAT IS NEW IN P6 VERSIONS 8, 15, 16, 17, 18, 19 and 20

This chapter lists the main functional changes in the software since P6 Version 7. Oracle release detailed documents for each release which are available on their web site for all details and a full description of the software changes.

28.1 Databases and Tool

There are essentially three types of databases that the PPM Windows client may open:

- Standalone, where the database is installed on a PC and only accessed by one user in an organisation.
- PPM, aimed at small companies where all users access the same database and there is limited inbuilt integration with other Oracle products.
- EPPM, aimed at larger companies where all users access the same database. This database may also be opening by the Web client and has inbuilt integration with many other Oracle tools.

Depending what type of database you are opening and what version of the software you have, there will be different menu options when using the PPM Windows client. In summary with later versions of P6:

- When you open a Standalone database you will not have functions to create users etc.
- When you open an EPPM database you will not have the administration functions.

28.2 User Interface Update

The user interface in the Client has been overhauled in Primavera Version 8.1 to allow user defined toolbars and menus and includes:

- As multiple windows are opened they are displayed as tabs, as in Elecosoft (Asta) Powerproject,
- New Customizable Toolbars, and
- Customizable menus

28.3 Admin Preferences - Set Industry Type

The Industry Type determines the terminology used in some fields and in earlier versions was set when the software was loaded. In earlier versions this was set when loading the software and in Primavera Version 8.1 and later, this is set in the Admin, Admin Preferences..., Industry tab:

28.4 Tabbed Window Layouts

In Primavera Version 8.1, when the windows are opened they are displayed as tabs.

28.5 Personal and Shared Resource Calendars

Primavera Version 8.1 introduced two types of resource calendars: **Personal**, new to Primavera Version 8.1, and **Shared**, which is the same as the earlier Resource calendar.

28.6 Auto-Reorganization

Primavera Version 8.1 introduced Auto-Reorganization. This function reorganizes data based on the current **Group and Sort** order when an activity's attributes are changed. This function may be turned on or off.

28.7 Set Page Breaks in the Group and Sort Form

In earlier version of P6, page breaks could only be set at the first band in the **Group and Sort** form, from the **Page Setup, Options** tab. The option of being able to set page breaks at any level has been added to P6 Version 8.1.

28.8 HTML editor

Primavera Version 8.1 introduced a new HTML editor which provides additional formatting options in forms such as the Notes tab, Steps tab, and many other Details tabs.

28.9 E-mail when printing a report or report batch

In Primavera Version 8.1 when printing a report or printing a report batch, you can elect to automatically e-mail the report as an attachment. See Print a report and Print a report batch.

28.10 Timescaled Logic Diagram

Primavera Version 8.1 introduced Timescaled Logic Diagram, which exports open projects from the Activities Window to the Primavera Timescaled Logic Diagram application and creates a Timescaled logic diagram in a separate application. This was superseded by Visualizer in Version 8.3.

28.11 Removal of Fields

Primavera Version 8.1 removed the following fields:

- Review Finish,
- Review Status,
- Integrated Project,
- Estimated Weight.

28.12 Export Projects or Run a Report Batch from the Command Line as a Service

In Primavera Version 8.1 it is now possible to run export projects and batch reports from the window's command line, a service using an XML editor to create the command.

28.13 Activity Details Feedback Tab

In Primavera Version 8.1 enhancements have been made to the **Activities Window, Details Feedback** tab to allow additional information to be entered.

28.14 Risk Module Rewrite

In Primavera Version 8.1 the risk module has been rewritten allowing compliance with more internationally recognized standards.

28.15 Line Numbers

Version 8.2 introduced a Microsoft Project style **Line Numbers**. Select **View, Line Numbers** to display or hide the Line Number.

28.16 Lag and Relationship Type Displayed in the Activity Table

Version 16.1 has added two more columns to the Activity View titled **Predecessor Details** and **Successor Details**.

These columns display the relationship type and leads or lag in the Activity Table, in a similar way to Microsoft Project and Elecosoft (Asta) Powerproject.

28.17 Visualizer

Visualizer is new to P6 Version 8.3 and is an update of the P6 Version 8.2 **Timescaled Logic Diagram** module. It is an add on piece of software that allows a higher level of Gantt Chart customization than is available from the Activities Window.

28.18 Claim Digger – Schedule Comparison in Visualizer

Version 16.1 moved Claim Digger to Visualizer and depending on your Industry Version, may be called either Claim Digger or Schedule Comparison.

28.19 Activity Discussion Feature

A new tab has been added to the **Activities Window** in P6 Version 8.3, titled **Discussion** which enables:

- Users to create a discussion thread for each activity,
- Each entry is saved with the date of entry and user name and the entire thread is recorded allowing an interactive discussion between users who have access to P6,
- A new field titled **Unread Comments** has been created so users may identify activities with new comments that they have not read. This may be accessed through Team Member Web, the Team Member for iPhone app, and P6.

28.20 XML Import/Export Enhancements

The XML import/export functionality has been improved in Version 8.3.

The XML import/export functionality has been improved in Version 15.1 allowing the import and export of Baseline projects. Previously Baseline projects had to be Restored, before they could be exported.

P6 Version 19 introduced the ability to:

- In Standalone and PPM databases to update baselines when importing Primavera XML file.
- To export projects in Primavera XML format in a compressed ZIP file.
- Scheduling and Leveling Options may be imported and exported.
- Scheduling and leveling options are included and when importing the user may select to import with the Update Existing or Keep Existing import settings for the scheduling and leveling options.

28.21 UN/CEFACT XML format

P6 Version 8.3 supports UN/CEFACT XML format from the **File, Export** menu. This format is mandated by many US Government agencies.

Version 15.1 added additional functionality supporting UN/CEFACT XML Format 6.

28.22 Loading Resource Summary Data on Startup

The **User Preferences, Startup Filters** tab in P6 Version 8.3 has a new **Resource Summary Data** check box which allows the operator to select if this Resource Summary data is loaded on start up. This may slow down the starting up of software and some views may take longer to load.

28.23 SQLite Database Available for Stand Alone Installation

SQLite database is used instead of an Oracle XE database for Standalone installations in Version 8.4. This should make it simpler to install a Standalone version of P6.

The following functions have been disabled:

- Users and Security Profiles, as there is only one user
- Options to select All Users and Another User
- Project Issues e-mail notifications
- XML import Advanced options
- Project Check In and Check Out
- Job Services
- Update Baseline
- Risk Analysis
- Claim Digger
- Projects are opened in Shared mode.

28.24 Job Service Enhancements – Version 8.4 and 15.2 Enhancements

28.24.1 Manage Baselines

In Version 8.4 you may now Update, Copy or Add a Baseline using Job Services. You will receive a notification when the process is complete allowing you to continue working during the processing. This function is accessed from the Maintain Baselines form and is not available with standalone installs.

28.24.2 XML File Import

In Version 8.4 both P6 and Microsoft Project XML files may be imported as a Job Service.

28.24.3 Copy Project as a Job Service

Version 15.2 introduced the copying of projects as a job service, allowing you to continue working as projects are being copied. You will need to press F5 Refresh data to see the new project in the Projects view after P6 notifies that the process is complete.

28.25 Primavera Unifier and Primavera Prime Integration

Primavera Unifier is an Oracle acquisition that is used for the Cost management of projects and is intended to replace Contract Manager.

Primavera Prime Capital Plan Management is an Oracle acquisition that is used for the management of portfolios and projects, allowing senior management to plan, select, execute and monitor projects. The Prime interface allows the exchange of data between P6 and the Prime Scope Management and Risk Analysis modules.

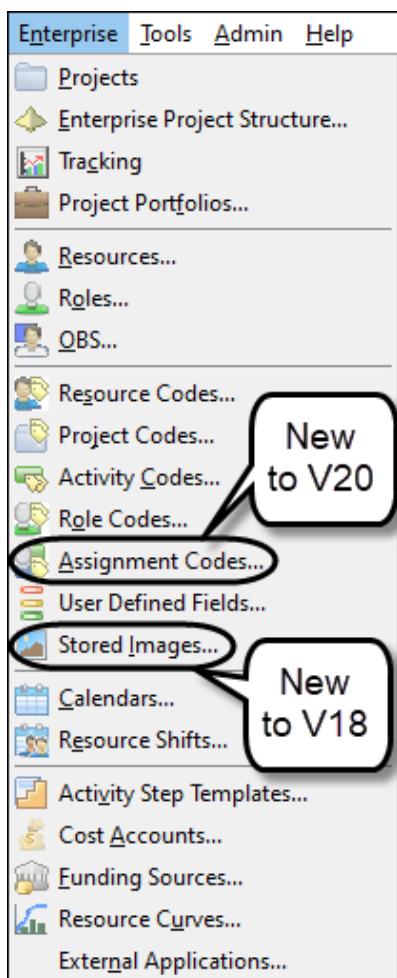
- Risk data must be entered using the Web interface and the modified dates from the Risk Analysis in Prime are available in P6.
- Activity Costs in Primavera are mapped to Prime Work Packages allowing cost and scope data to be exchanged.

28.26 Administration Menu Changes in Version 15.1

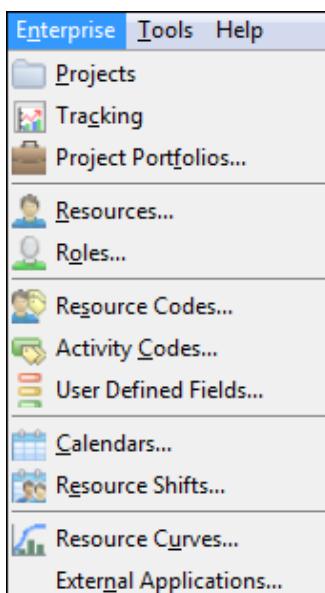
Originally when P6 Professional was connected to a EPPM database, many of the enterprise administration functions were lost and these functions had to be administered from the Web tool. P6 Professional was originally called “P6 Optional Client” when it was used to open an EPPM database. The following Enterprise functions lost in Version 8.1 have been returned to Version 15.1 when it is connected to an EPPM Database in the Optional Client mode.

- EPS
- OBS
- Project codes
- Activity step templates
- Cost accounts
- Funding sources

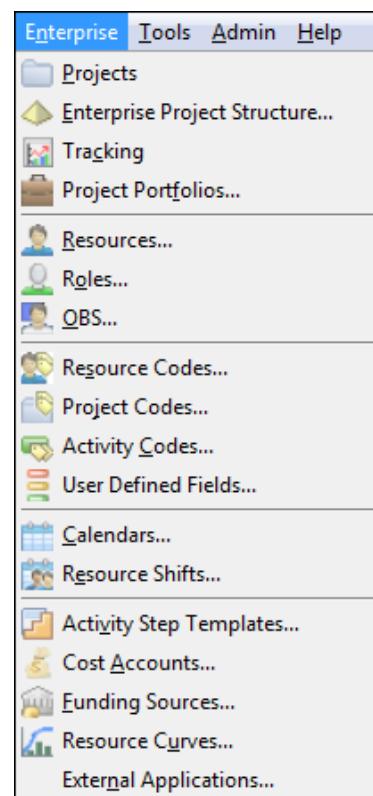
Opening a PPM Database with all Versions



Opening a EPPM Database with Versions 8



Opening a EPPM Database with Versions 15.1 and later



REMOVED IN VERSION 8 WHEN OPENING AN EPPM DATABASE:

Enterprise Project Structure
OBS
Project Codes
Activity Steps
Cost accounts
Funding Sources

28.27 Microsoft Project Compatibility

Version 15.2 introduced Microsoft Project 2013 compatibility with the export of Microsoft Project files in XML format.

28.28 Set Language

Version 15.2 moved the selection of the menu language from the **Tools** menu to the Login screen.

Arabic support was added in P6 Version 20.

28.29 Consent Notice and Status of User Acceptance

Consent Notices were introduced in P6 Version 18 and alert users to any corporate policies designed to protect personally identifiable information that may be stored or transmitted when using P6.

A Consent Notice is displayed when a user first operates one of the functions enabled as a Consent Notice. The user must accept the consent notice before being allowed to progress.

Consent Notices are set up in **Admin Preferences**.

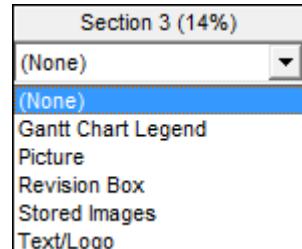
Status of User Acceptance shows how many Consent Notices have been displayed and accepted by users.

The **User Preferences, Personal Information** tab allows users to see the personal information entered by the administrator when the user was created.

28.30 Stored Images

This function is new to P6 Version 18. This solved the issue of when one user had embedded a picture in a Layout Header and a second user did not have access to the same directory and was thus unable to display the same picture when applying the same Layout.

Up to 20 pictures at a max of 500x500 dpi may be saved in a database and are available for any user to access.



- Pictures are uploaded using **Enterprise, Store Image....**

- Pictures are inserted into headers and footers from **Page Setup**:

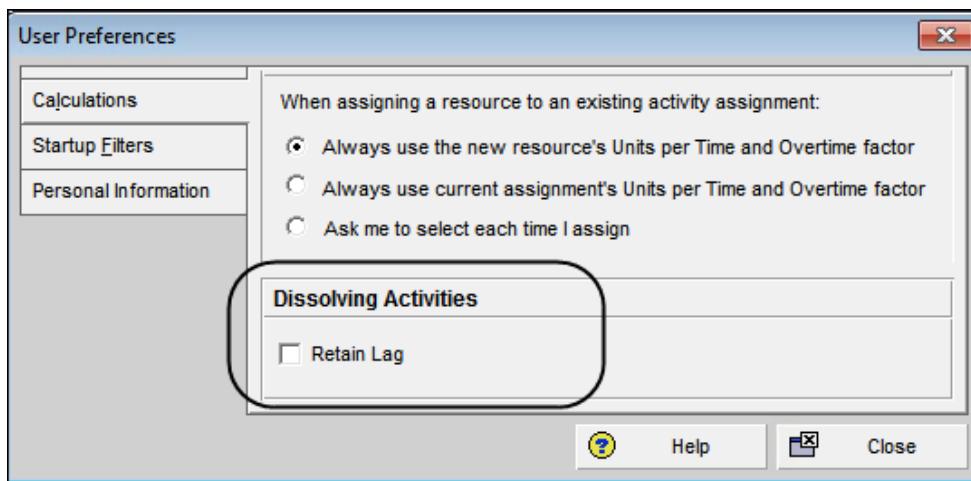
Version 19 introduced the ability to upload multiple images at one time.

28.31 XML Check In and Check Out

P6 Version 19 introduced the ability **Check In** and **Check Out** projects to XML.

28.32 Dissolve Activities with Lag using Retain Lag

This function was new to P6 Version 19 and introduced the ability to retain lag when dissolving activities. When **Retain Lag** is selected from the **User Preferences, Calculations** tab then the dissolved activities predecessor and successor lags are added together in the new relationship:



- Before Dissolving Activity 2:

Activity Name	Orig Dur	Predecessor Details	Mar 31	Apr 07	Apr 14	Apr 21	Apr 28	May 05												
			T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F
Activity 1	5d																			
Activity 2	5d	A1000: FS 5d																		
Activity 3	5d	A1010: FS 5d																		

- After Dissolving Activity 2 in P6 Version 19 without **Retain Lag** checked or in earlier versions of P6:

Activity Name	Orig Dur	Predecessor Details	Mar 31	Apr 07	Apr 14	Apr 21	Apr 28	May 05												
			T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F
Activity 1	5d																			
Activity 3	5d	A1000: FS																		

- After Dissolving Activity 2 in P6 Version 19 with **Retain Lag** checked:

Activity Name	Orig Dur	Predecessor Details	Mar 31	Apr 07	Apr 14	Apr 21	Apr 28	May 05												
			T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F
Activity 1	5d																			
Activity 3	5d	A1000: FS 10d																		

NOTE: The predecessor and successor lags are added together.

28.33 Project Code Maximum Length Increase

P6 Version 19 increased the maximum length in PPM databases for Project Codes to 60 characters.

28.34 Details, User Defined Fields tab

P6 Version 19 added a new **Details, User Defined Fields** tab, similar to the **Codes** tab, displaying the assigned User Defined Fields (UDFs). It is available in the following windows: Projects, WBS, Activities, Resource Assignments, Project Expenses, Issues, and Work Products, Risks and Documents.

- The user must add the UDF Field to the **User Defined Fields** tab by clicking on the **Customize User Defined Fields** button.
- The displayed UDF Fields are saved as part of the View, thus the user will not automatically see which UDFs a Project or Activity as utilized.
- The picture below shows that the activity has been assigned a Parts Availability date but this is not displayed in the **User Defined Fields** tab as this UDF field has not been added by clicking on the **Customize User Defined Fields** button.
- The **Hide empty rows** will hide any blank UDF fields, so the Deadline line in the picture below would be hidden if the **Hide empty rows** was checked.

Activity ID	Activity Name	Work Order	Parts Availability	Start
	Design and Engineering		13-Jan-16 00:00	18-Jan-16 08:00
EC100	Design Building Addition	8124	13-Jan-16 00:00	18-Jan-16 08:00

User Defined Fields

User Defined Field	Data Type	Value
Work Order	Text	8124
Deadline	Finish Date	

28.35 Data Date Default for Apply Actuals

P6 Version 19 allows project to use their own **Data Date** when applying actuals.

In earlier versions all projects were set to the same **Data Date**.

P6 Apply Actuals

Project ID	Project Name	Current Data Date	New Data Date	Project Planned Start
EC00501	Haltang Corporate F	27-Sep-15 00:00	27-Sep-15 00:00	01-Aug-14 00:00
EC00515	City Center Office E	18-Jan-16 00:00	18-Jan-16 00:00	18-Jan-16 00:00
EC00530	Nesbid Building Exp	12-Oct-15 00:00	12-Oct-15 00:00	12-Oct-15 00:00
EC00610	Harbour Pointe Ass	27-Sep-15 00:00	27-Sep-15 00:00	10-Aug-14 23:00
EC00620	Juniper Nursing Hoi	27-Sep-15 00:00	27-Sep-15 00:00	02-Feb-15 00:00
EC00630	Saratoga Senior Co	09-Nov-15 00:00	09-Nov-15 00:00	09-Nov-15 00:00
EC02016	Alaska University -	01-Dec-15 00:00	01-Dec-15 00:00	01-Dec-15 00:00

A new data date is used when actuals are applied.

Each project uses its own new data date
 The same new data date is used for all projects

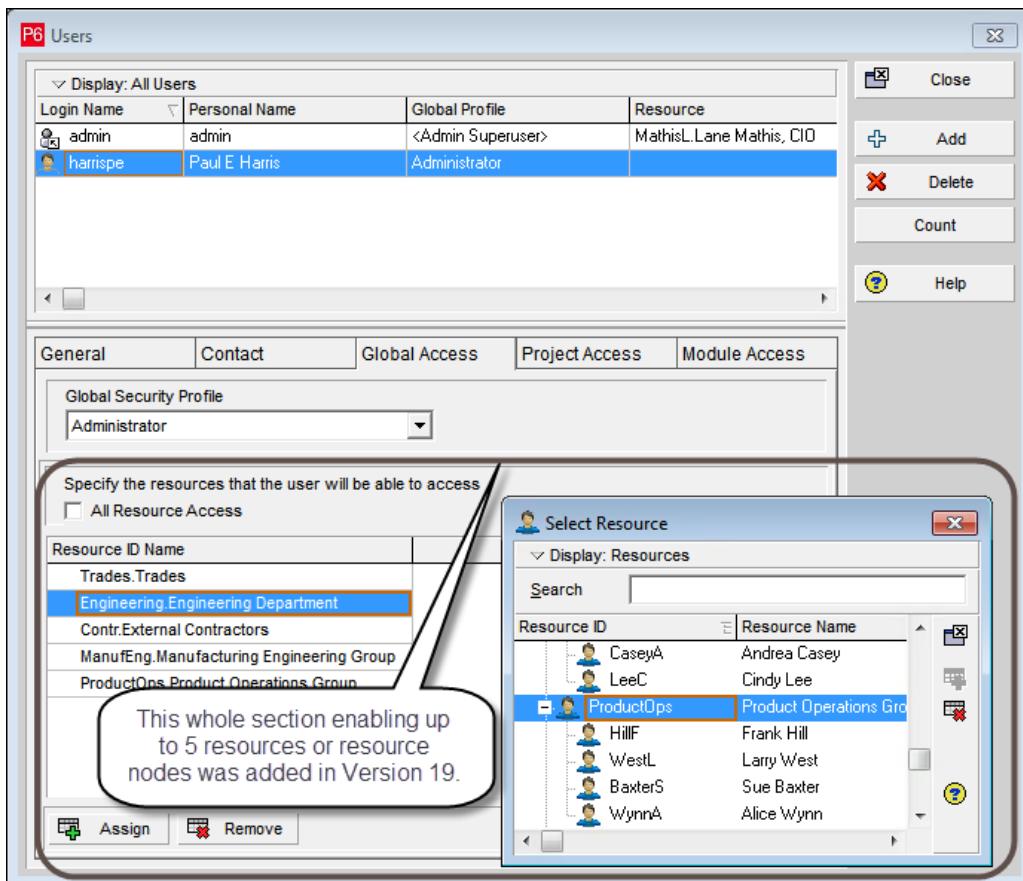
New Data Date:

When actuals are applied, calculate activity remaining durations:

Based on activity duration type
 Always recalculate

28.36 Allow or Restrict Access to Resources from Multiple Parent Resources

Earlier versions only allowed one resource or resource node to be assigned to a user. P6 Version 19 introduced the ability to allow a user to be assigned up to five resources or resource nodes when defining resource access. A user may view and assign the selected resources and the child resources from resources assigned here:



28.37 Activity Details, Task tab

Tasks are a new function in P6 Version 19 allowing users to VIEW ONLY Tasks created in Primavera Cloud when a project integrated from Primavera Cloud to an EPPM database. Tasks are a function in Primavera Cloud where an activity may be broken down into Tasks which do not drive dates but allow a further granulation of an activity into more detailed work, but they are different to Steps.

28.38 Relationship Comments

Primavera P6 Version 20 introduced a **Comments** column may be added to the **Activities** window Relationships, Predecessor and Successor tabs:

Relationships		Activity	EC1490	Rough-In Phase Begins
Predecessors				
Project ID	WBS	Activity ID	Comments	Activity Name
EC00501	EC00501.Mech	EC1440	Lag to allow for slow delivery	Set Mechanical and Electrical Equipment

The comment is seen in both the Predecessor and Successor window of each relationship assigned a comment:

Successors						
		Activity EC1440		Set Mechanical and Electrical Equipment		
Project ID	WBS	Activity ID	Activity Name	Comments	Relations	Lag
EC00501	EC00501.Mech	EC1500	Install HVAC Ducts		FS	0
EC00501	EC00501.Mech	EC1490	Rough-In Phase Begins	Lag to allow for slow delivery	FS	10

This is a very useful function and in the past one had to either use a Note or a UDF assigned to either the predecessor or successor activity to record notes about a relationship.

This function is also useful for recording changes to relationships.

The **Comments** column is available in the Activity Relationship report:

The screenshot shows the 'Reports' configuration dialog. In the 'Selected Subject Areas' list, 'Activity Relationships' is selected. In the 'Available Options' tree, 'General' is expanded, and 'Comments' is selected and highlighted with a red circle. The 'Selected Options' list includes 'Activity ID (Predecessor ID)', 'Successor Project', and 'Comments'. The 'Comments' option is also highlighted with a red circle. The 'OK' button is visible at the bottom right.

28.39 Role Rate Change Over Time

Resources have always been able to vary their rate over time but Roles were not and this was one of the drivers to use resources and not roles on projects.

The screenshot shows the 'P6 Roles' dialog. The 'Role Name' dropdown is set to 'Foreman'. The 'Units & Prices' tab is selected. A table shows the effective date, max units/time, and standard rate for three periods: 01-Jan-20 (\$100.00/h), 01-Jan-21 (\$120.00/h), and 01-Jan-22 (\$140.00/h). The 'Calculate costs from units' checkbox is checked. The 'Add' and 'Delete' buttons are at the bottom. The right side of the dialog has standard Windows-style buttons for Close, Add, Del./Merge, Cut, Copy, Paste, and Help.

Effective Date	Max Units / Time	Standard Rate
01-Jan-20	1/d	\$100.00/h
01-Jan-21	1/d	\$120.00/h
01-Jan-22	1/d	\$140.00/h

When an activity spans two periods then P6 calculates a proportional rate based on the activity duration in each period. You must use the **Recalculate Cost Assignment** function during or after rescheduling.

The pictures below show the result of assigning the Role Foreman above and has 4 days work in 2020 and 6 in 2021 and then 3 and 7 days. They demonstrate how the cost are calculated which are not entirely correct as the costs should be lower in 2021 and higher in 2022.

		Dec 28							Jan 04							
Sat	Sun	Mon	Tue	Wed	Thr	Fri	Sat	Sun	Mon	Tue	Wed	Thr	Fri	Sat	Sun	Mon
28-Dec-20																08-Jan-21
																01-Jan-21
		Dec 28							Jan 04							
Sat	Sun	Mon	Tue	Wed	Thr	Fri	Sat	Sun	Mon	Tue	Wed	Thr	Fri	Sat	Sun	Mon
			1	1	1	1	1			1	1	1	1	1		
			\$112	\$112	\$112	\$112	\$112			\$112	\$112	\$112	\$112	\$112		

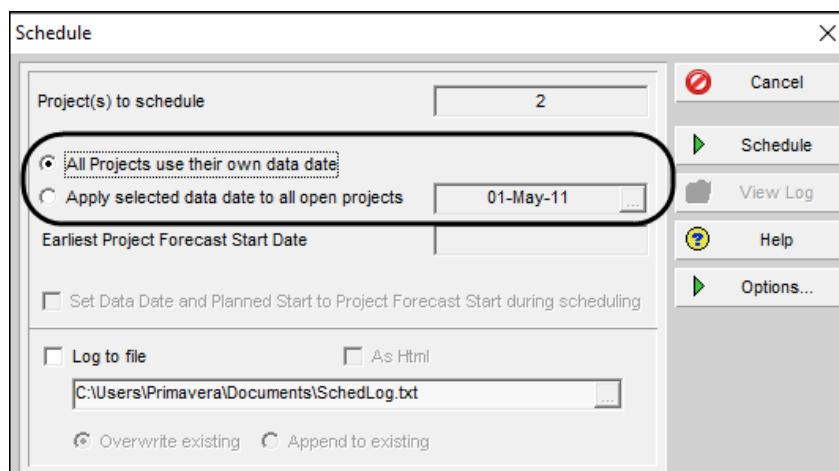
		Dec 28							Jan 04							
Sat	Sun	Mon	Tue	Wed	Thr	Fri	Sat	Sun	Mon	Tue	Wed	Thr	Fri	Sat	Sun	Mon
29-Dec-20																
		Dec 28							Jan 04							
Sat	Sun	Mon	Tue	Wed	Thr	Fri	Sat	Sun	Mon	Tue	Wed	Thr	Fri	Sat	Sun	Mon
				1	1	1	1			1	1	1	1	1		1
				\$114	\$114	\$114	\$114			\$114	\$114	\$114	\$114	\$114		\$114

Note: This is the same way that resources calculate when an Activity spans an Effective Date.

28.40 Data Date Selection in Multiple Project Scheduling

Primavera P6 Version 20 introduced a choice of the **Data Date** used for calculating when scheduling multiple projects:

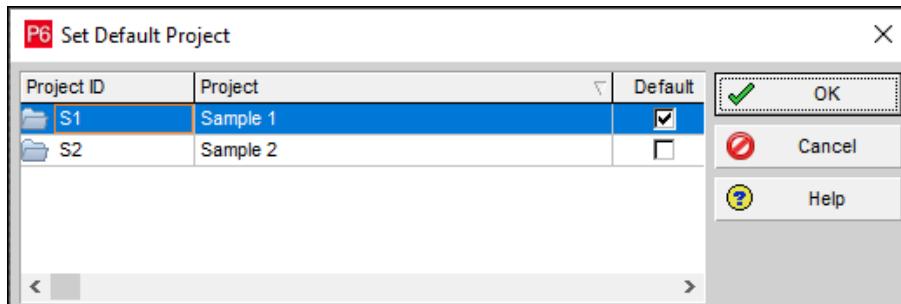
- All projects may be assigned a new **Data Date** in the **Schedule** form, or
- New in P6 Version 20, you may schedule all projects with their own **Data Date**.



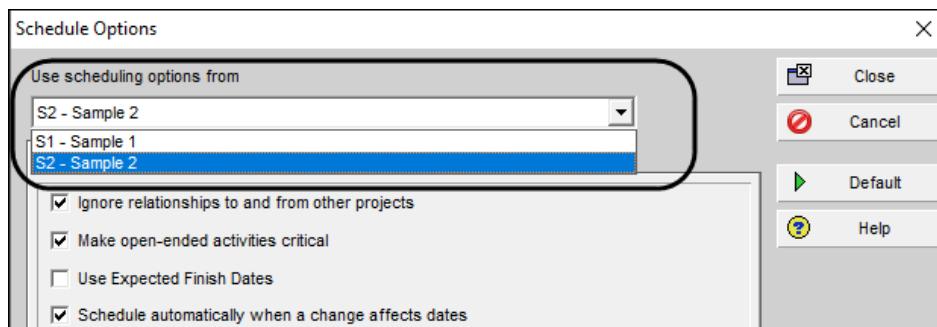
28.41 Multiple Project Scheduling Options Selection

In the P6 Version 19 and earlier when multiple projects were scheduled together and they had different **Scheduling Options**, which could happen when users change them from default or when you imported a project, then all the different **Scheduling Options** of all the projects being scheduled were changed to the **Default Project** on a permanent basis and changed projects would calculate differently from then on.

The Default Project may still be set by selecting **Project, Set Default Project**:



Primavera P6 Version 20 introduced an option where you may select which project **Scheduling Options** are used when scheduling multiple projects in the **Scheduling Options** form which is opened by selecting **Tools, Schedule, Options**:



What happens now?

- The **Default Project** is ignored,
- The **Scheduling Options** from the project selected in the **Scheduling Options** are used to calculate all the project, and
- The other project(s) **Scheduling Options** are changed permanently to the project selected the **Scheduling Options** form on a permanent basis.

Thus, the problem of **Scheduling Options** being changed when scheduling multiple projects has NOT been solved. You now have two options to mess up your Scheduling Options of projects when scheduling multiple projects with different options.

Again, I reiterate you should make all the **Scheduling Options** in one database the same when you schedule multiple projects and be careful when importing projects.

28.42 Lean Tasks may be imported using an XML file

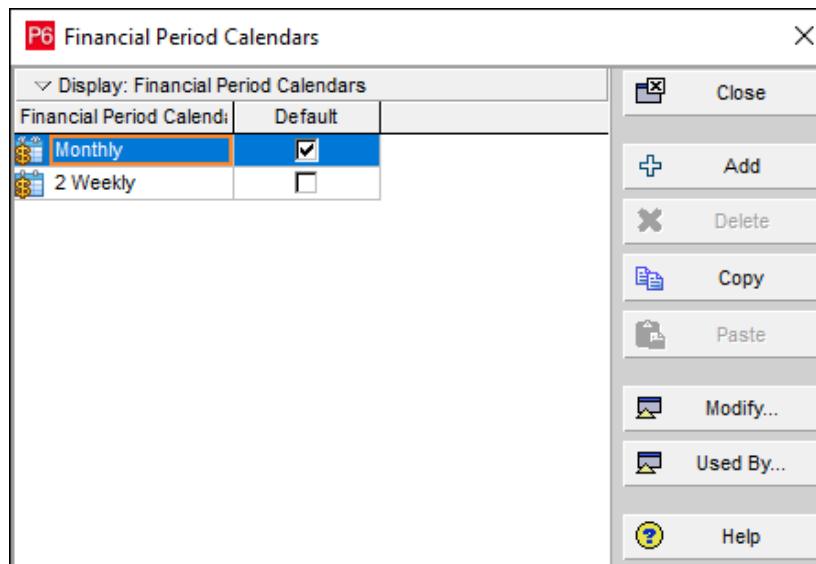
Primavera Cloud allows activities to be broken down into tasks. **Lean Tasks** are similar to the P6 **Steps** function but with more functionality such as allowing the assignment of tasks to subcontractors. Lean Tasks may have the following attributes:

- Assignment of a duration,
- May be made “Private” so other people do not see them,
- Tasks may have logic between them which are called “Handoffs”,
- A Task’s Float is called “Slack”.
- The planning of Tasks is completed on a **Planning Board** that may be shared between team members. This is a tool designed for short term planning by the people completing the work.

Primavera P6 Version 20 introduced a option when you are using an EPPM database you may import **Lean Tasks** through an XML file from Primavera Cloud.

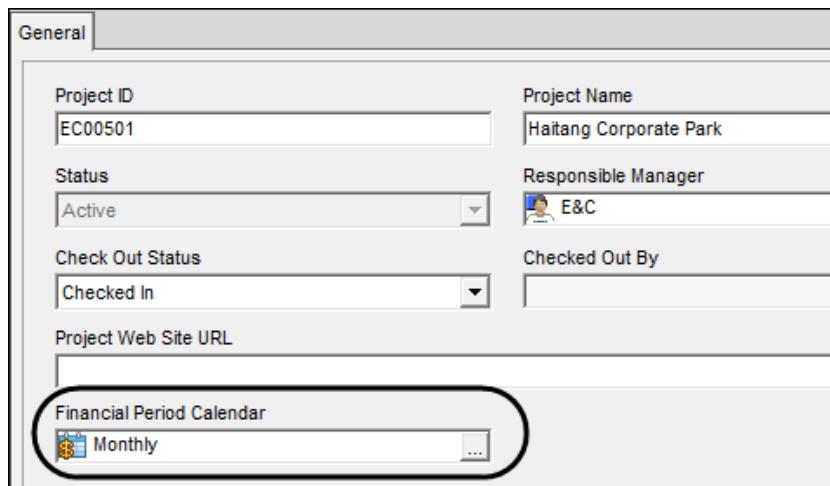
28.43 Different Projects may have different Financial Periods

Primavera P6 Version 20 introduced an option where you may now assign different Financial Period to projects in P6 Version 20 by the use of **Financial Period Calendars**. When you select **Admin, Financial Period Calendars** you may create multiple **Financial Period Calendars** and each may have different Financial Periods:



The Financial Period Calendar is assigned to a Project in:

- The Projects Window, General tab, or
- By displaying the Financial Period Calendar column:



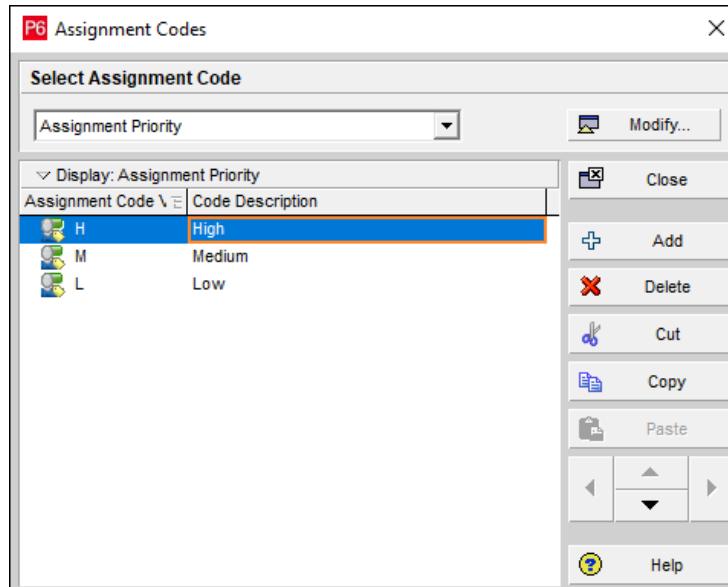
Note: This function did not work in the authors P6 Version 20.12.0.37740, but updates should fix this issue. As an interim you may change the **Default Financial Period Calendar** before creating a project.

28.44 Assignment Codes

Primavera P6 Version 20 introduced a new function titled **Assignment Codes** allowing users to code up assignments so resource assignments may be Grouped or Filtered. This function could be used for:

- Assigning priority to resource assignments against tasks,
- When there is one generic resource in the database that is being supplied by multiple subcontractors and this could be used to identify the subcontractor,
- When there is one generic resource in the database and you require a specific skill or qualification for the resource then this could be identified with an **Assignment Code**.

Assignment Codes are created in the same way as other codes by selecting **Enterprise, Assignment Codes**:



Assignment Codes are assigned to Resource or Role Assignments in the:

- **Codes** tab in the **Resource Assignment** window, or

The screenshot shows the 'Resource Assignments' window. At the top, there's a tree view under 'Layout: Bucket Planning'. Below it is a table with columns: Activity ID, Activity Name, and Assignment Priority. The table is organized into three sections based on priority: 'Assignment Priority: H High', 'Assignment Priority: M Medium', and 'Assignment Priority: L Low'. The 'M Medium' section contains an item for 'EC1630 Insulate Ducts'. At the bottom of the window, there are tabs: General, Planning, User Defined Fields, and Codes. The 'Codes' tab is highlighted with a yellow oval. Below the tabs is another table showing Assignment Code (H, M, L), Assignment Code Description (High, Medium, Low), and Code Description (High, Medium, Low).

Assignment Code	Assignment Code Description	Code Description
H	High	High
M	Medium	Medium
L	Low	Low

- Displaying the **Assignment Code** column in the **Activities** window **Details** pane, **Resources** tab, or

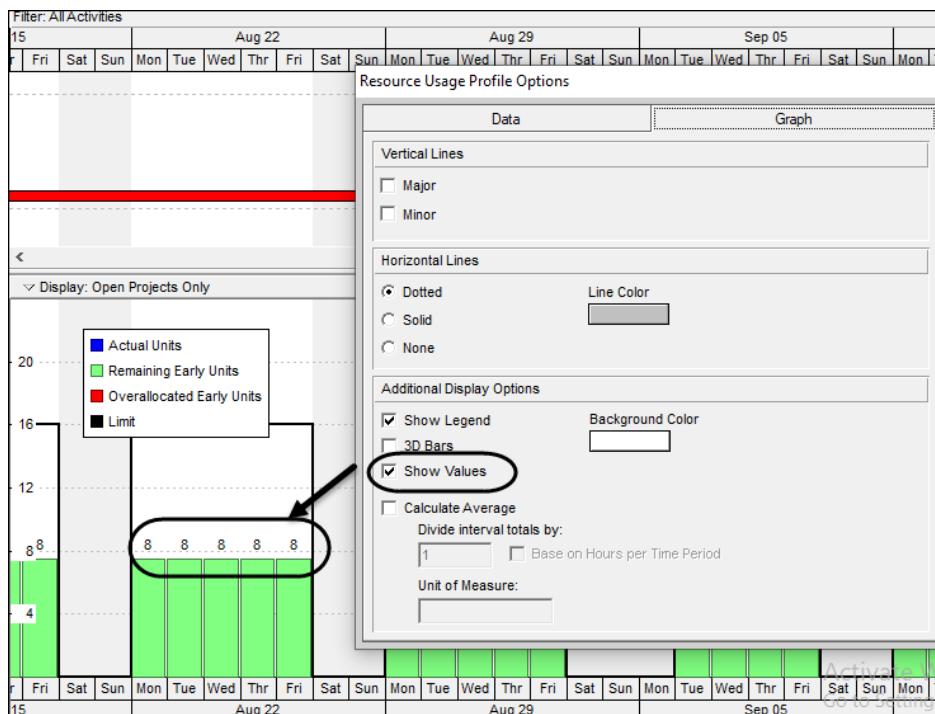
The screenshot shows the 'Activities' window with the 'Resources' tab selected. It displays a table with columns: Role, Resource ID Name, Assignment Priority, and Budgeted Units. The 'Assignment Priority' column is highlighted with a yellow oval. The table includes rows for Civil/Structural Crews (Elec.Electrician, M, 50), Civil/Structural Crews (HVAC.HVAC, M, 50), and Civil/Structural Crews (Operator.Operator, M, 17).

- Displaying the **Assignment Code** column in center section of the **Resource Usage Spreadsheet**.

The screenshot shows the 'Resource Usage Spreadsheet' window. On the left is a tree view of Resource Names. In the center, there's a table with columns: Activity ID and Assignment Priority. The 'Assignment Priority' column is highlighted with a yellow oval. To the right of the table is a 'Select Assignment Priority' dialog box showing options: H (High), M (Medium), and L (Low). There are also buttons for Add (+), Remove (-), and Edit (Edit icon).

28.45 Histogram Bars Exact Values

In P6 Version 20 value of histograms may be displayed on histograms in the Resource Usage Profile, Activity Usage Profile, and Tracking View by selecting the **Show Values** option in the **Profile Option** form, **Graph** tab:



28.46 Other Enhancements In P6 Version 20

28.46.1 Resource Assignment Window now allows Grouping and Filtering by Codes and UDFs

Data in the Resource Assignment window may be filtered and/or grouped using Project, Activity and WBS User Defined Fields (UDFs) and Project Codes in P6 Version 20.

28.46.2 Fill down available in Activities Window Resource Usage Spreadsheet

Fill down is available in the Activities Window Resource Usage Spreadsheet in P6 Version 20.

28.46.3 P6 Continues Working when there is a Network Failure

Users may continue working in some circumstances when connected to an EPPM Cloud Connect database and configured to allow this when there is a network failure.

28.46.4 Prevent Risk Categories being Imported into a PPM Database

When exporting to an XER file Risk Categories are exported but in P6 Version 20 you are able to prevent the Categories being imported into a PPM or SQLite database.

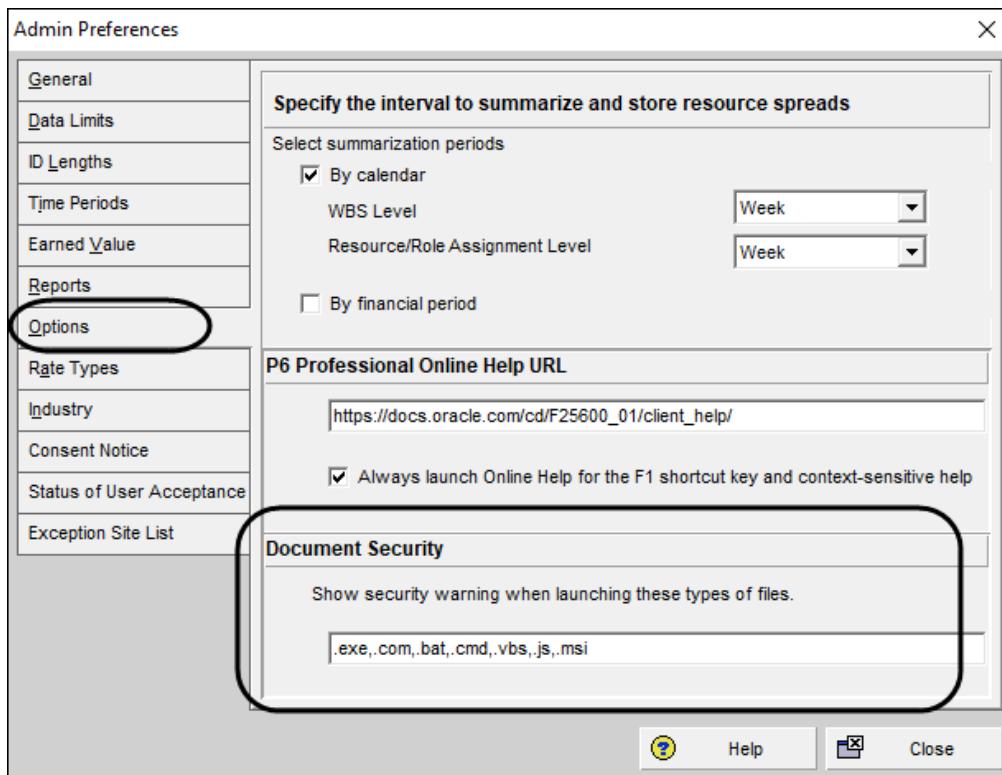
Risk Categories are not imported or exported to an EPPM database.

28.46.5 Reset Locked Users

In the EPPM version users locked out of P6 or Visualizer may be reset.

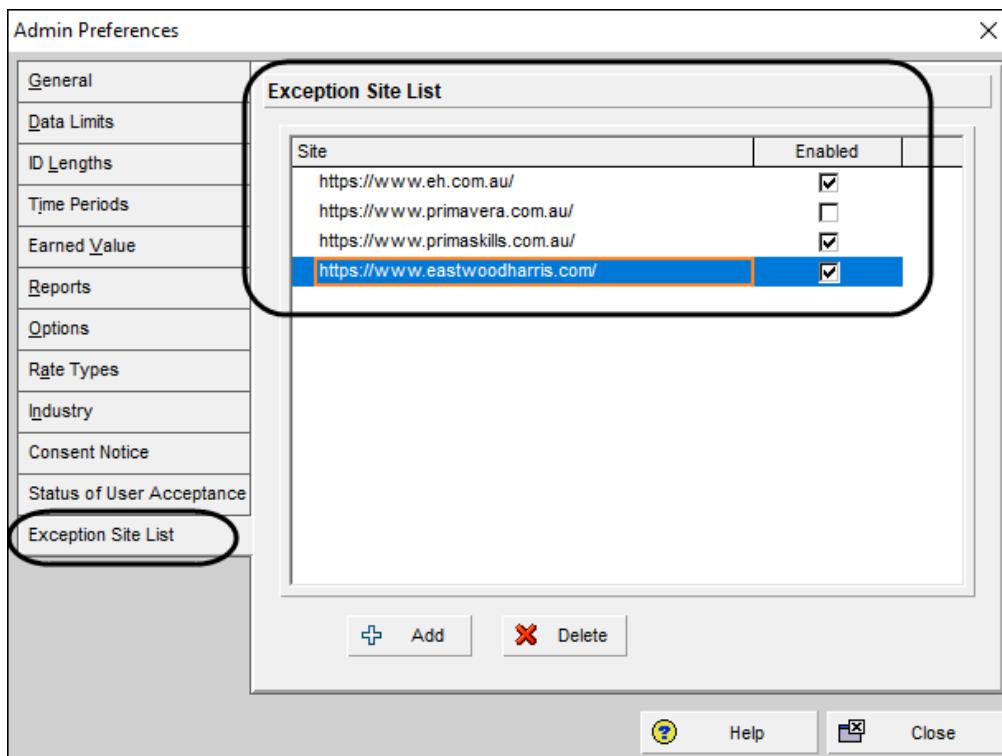
28.46.6 Uploading of Harmful Files

You may prevent people from uploading harmful files in the **Admin Preferences, Options, Document Security**:



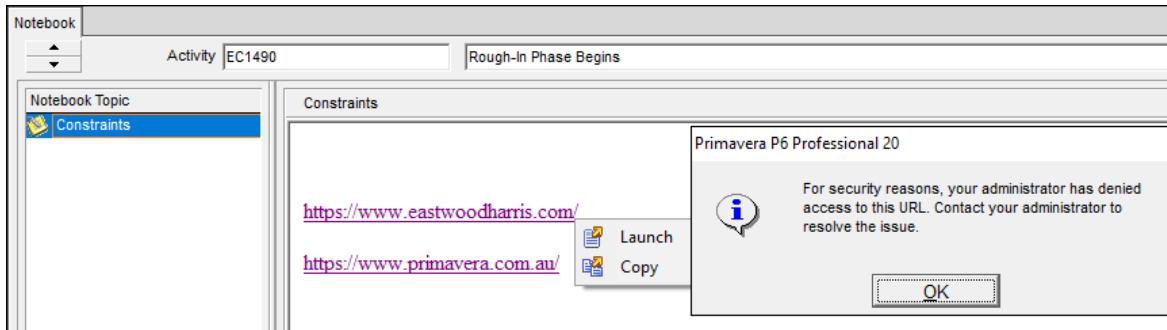
28.46.7 Exception Site List

A list of web sites may be added to **Admin Preferences, Options, Exception Site List**:



The URLs may then be added to Notebook Topics and UDFs and permitted URLs may be launched from P6 by clicking on the URL and selecting Launch.

URLs not listed or not permitted may not be launched but may be copied and pasted into a browser. The picture below demonstrates what happens when a URL that has not been enabled has been selected for Launching:



29 TOPICS NOT COVERED IN THIS PUBLICATION

The following topics are not covered in this publication:

- Budgets, including:
 - Budget Summary
 - Budget Log
 - Funding
 - Spending Plan
- Thresholds
- Issues
- Risks and Risk Calculation
- External Applications
- Timesheets
- Timesheet Date Administration
- Claim Digger also known as Schedule Comparison.

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