

4D SCHEDULING & CONSTRUCTION PROJECT MANAGEMENT SOFTWARE



Synchro Scheduler Training 2015



The screenshot displays the Synchro Scheduler software interface. On the left is a Navigator pane with filters for Task Filters (Started, Finished, Key Dates, One Week Look Ahead, Two Week Look Ahead, Start Filter) and General (Company, Filter Tasks by Name/ID, External Data, Resource Appearance Profiles, Filters, 3D Sets, 3D Paths, Cutting Planes, Viewpoints, Animations, Spatial Coordination, 3D Grids, Project). The main area is divided into three panes: a Task List, a Gantt chart, and an Earned Value Graph.

ID	Name	Planned Duration	Start	Finish	Downstream Total Float
16	ST00220 FRP Footings 1	4d	3/12/12 (A)	3/15/12 (A)	
17	ST00230 FRP Footings 2	2d	3/16/12 (A)	3/19/12 (A)	
18	ST00240 FRP Footings 3	2d	3/20/12 (A)	3/21/12 (A)	
19	ST00090 Slabs	6d	3/22/12	3/29/12	0 Days
20	ST00250 FRP Basement Slab 1	2d	3/22/12 (A)	3/23/12 (A)	
21	ST00260 FRP Basement Slab 2	2d	3/26/12 (A)	3/27/12 (A)	
22	ST00270 FRP Basement Slab 3	2d	3/28/12 (A)	3/29/12 (A)	
23	ST00100 Structure	16d, 8h...	3/30/12	4/15/12	53d, 6m
24	ST00110 Level 00-01	11d, 8h...	3/30/12	4/10/12	58d, 6m
25	ST00280 Erect Steel	9d	3/30/12 (A)	4/7/12	58d, 6m
26	ST00290 Plumb, Bolt & Weld	3d	4/7/12	4/10/12	58d, 6m
27	ST00120 Level 01-02	5d	4/10/12	4/15/12	53d, 6m
28	ST00310 Erect Steel	2d	4/10/12	4/12/12	53d, 6m
29	ST00330 Plumb, Bolt & Weld	3d	4/12/12	4/15/12	53d, 6m
30	ST00130 Interiors	39d	4/16/12	6/7/12	0 Days
31	ST00140 Level 00	13d	4/16/12	5/2/12	26d
32	ST00300 OH MEP Rough-in	5d	4/16/12 (*)	4/20/12	26d
33	ST00320 Framing/Drywall	5d	4/23/12	4/27/12	26d
34	ST00340 Trim Out	3d	4/30/12	5/2/12	26d
35	ST00150 Level 01	13d	5/3/12	5/21/12	13d
36	ST00360 OH MEP Rough-in	5d	5/3/12	5/9/12	13d
37	ST00380 Framing/Drywall	5d	5/10/12	5/16/12	13d
38	ST00400 Trim Out	3d	5/17/12	5/21/12	13d
39	ST00160 Level 02	13d	5/22/12	6/7/12	0 Days
40	ST00410 OH MEP Rough-in	5d	5/22/12	5/28/12	0 Days
41	ST00430 Framing/Drywall	5d	5/29/12	6/4/12	0 Days
42	ST00450 Trim Out	3d	6/5/12	6/7/12	0 Days

The Gantt chart shows task bars with a '35% Complete' indicator. The Earned Value Graph plots PV (Planned Value), EV (Earned Value), and AC (Actual Cost) against time, with values of \$66,560.00, \$45,434.07, and \$14,560.00 respectively.

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1. Overview

1.1. Why Synchro?

At Synchro Software, we are passionate about improving construction project performance because we understand the impact construction has on global resources, and we recognize the importance of the industry to quality of life and economic prosperity. We have also experienced how significantly digital technology improves results over the tried and true methods that have been standard in the industry for generations. Imagine crystal clear communications and engaged team collaboration. Imagine the ability to easily create a shared vision of the project among your stakeholders, the ability to identify spatial and resource clashes in the planning phase rather than the costly construction phase, imagine a project schedule that gives you confidence to deliver according to plan!

1.2. Why 4D?

Scheduling and planning is critical to safe, efficient, high quality construction. While using 4D, the computer becomes a practice field where sequences, safety, special relationships and more can be viewed and discussed continuously before and throughout the project lifetime. Because Synchro links 3D Resources (human, material, equipment, and space) to the associated schedule tasks, making changes and comparing baselines to alternatives is quick and easy. Testing sequencing and running “what if” scenarios is highly efficient and engaging. Communications are crystal clear, because you can see each step in the process. Cooperative knowledge sharing creates innovation and unique approaches that build competitive advantage. The result is an efficient, reliable and safe project delivery process that saves time and money.

1.3. Who uses Synchro?

Contractors, Subcontractors, Specialty Supplies, Consultants and Owners use Synchro for the construction of buildings, infrastructure, roads and bridges, healthcare facilities, Industrial, Oil and Gas, Power, Alternative Energy, Marine, as well as Mining Projects.

1.4. How does Synchro PRO apply to you?

Synchro PRO and Synchro Scheduler are both complete CPM scheduling tools for construction – users can create a schedule from scratch, calculate the critical path, manage resources and costs, create baselines, track progress, and compare schedules. Synchro Scheduler is essentially Synchro PRO without 3D/4D capability and is available for free. In this tutorial, you will learn how to create a resource- and cost-loaded CPM schedule. Using Synchro PRO, you can integrate your schedule with 3D models from most CAD systems to produce a 4D schedule and visualization in virtual reality. Whether you like to see the schedule through the model or see the model through the schedule, the ability to visualize your plan while maintaining its integrity allows project delivery performance to consistently and reliably exceed today’s performance standards in an immediate and dramatic way.

1.5. Course Description

This course will take you through the basics of scheduling in Synchro PRO and Synchro Scheduler. This course is appropriate for schedulers, project planner, construction manager, and VDC teams. Those without scheduling experience will benefit from the brief introductions to terminology and theory throughout the course. The course will introduce you to the mechanics of creating a schedule from scratch within Synchro. It will cover everything you need to get started scheduling in Synchro, including creating calendars, tasks, and WBS summaries; linking tasks with logic and introducing delay between tasks; editing tasks; creating and assigning activity codes. At the end of the course you will be able to create a CPM schedule, assign resources and costs, compare planned against actual using baselines, analyse costs using the Earned Value graph, and customise and sort the columns in the Gantt chart and print the Gantt Chart.

It is time to Synchronise your projects. As always, we welcome your feedback at any time, we look forward to seeing your results and we hope you will share your experience with Synchro Software with others to spread the word. Thank you for investing your time in learning Synchro Scheduler, together we will make a positive change in how projects are planned and delivered.

2. Workspace Layout

This section will present the various windows in Synchro and how to reorganize and manage your workspace.

2.1. Windows in Synchro

Quick Access Toolbar



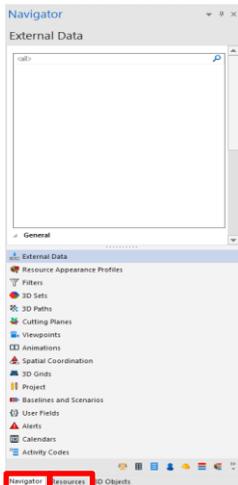
Ribbon



Toolbars



Navigator, Resources, & 3D Objects



Gantt Window

Task List

ID	Name	Duration	Start	Finish
1	Pre Construction	20d	9:00 AM 3/22/15	5:00 PM 3/22/15
2	ST00020 Notice to Proceed	0 Days	9:00 AM 3/2/15 (7)	
3	ST00029 Building Permit	20d	9:00 AM 3/2/15	5:00 PM 3/27/15
4	ST00040 Award Subcontractors	5d	9:00 AM 3/2/15	5:00 PM 3/6/15
5	ST00050 Install Perimeter Fence	3d	9:00 AM 3/23/15 (7)	5:00 PM 3/26/15
6	ST00060 Install Temporary Hard Standing	1d	9:00 AM 3/26/15	5:00 PM 3/26/15
7	ST00070 Install Office Trailers	2d	9:00 AM 3/26/15	5:00 PM 3/27/15
8	Material Procurement	75d	9:00 AM 3/9/15	5:00 PM 6/18/15
9	Structural Steel	75d	9:00 AM 3/9/15	5:00 PM 6/18/15
10	Curain Wall	75d	9:00 AM 3/9/15	5:00 PM 6/12/15
11	Elevator	65d	9:00 AM 3/9/15	5:00 PM 6/5/15
12	MEP Equipment	65d	9:00 AM 3/9/15	5:00 PM 5/28/15
13	Construction	222d	9:00 AM 3/26/15	5:00 PM 2/2/16
14	Site Construction	212d	9:00 AM 3/26/15	5:00 PM 1/19/16
15	ST00120 Foundation Excavation	5d	9:00 AM 3/30/15	5:00 PM 4/3/15
16	ST00130 Structural Piles	20d	9:00 AM 4/6/15	5:00 PM 4/27/15

Gantt Chart

3D Window

Properties



Resources tab
Navigator tab

3D Window

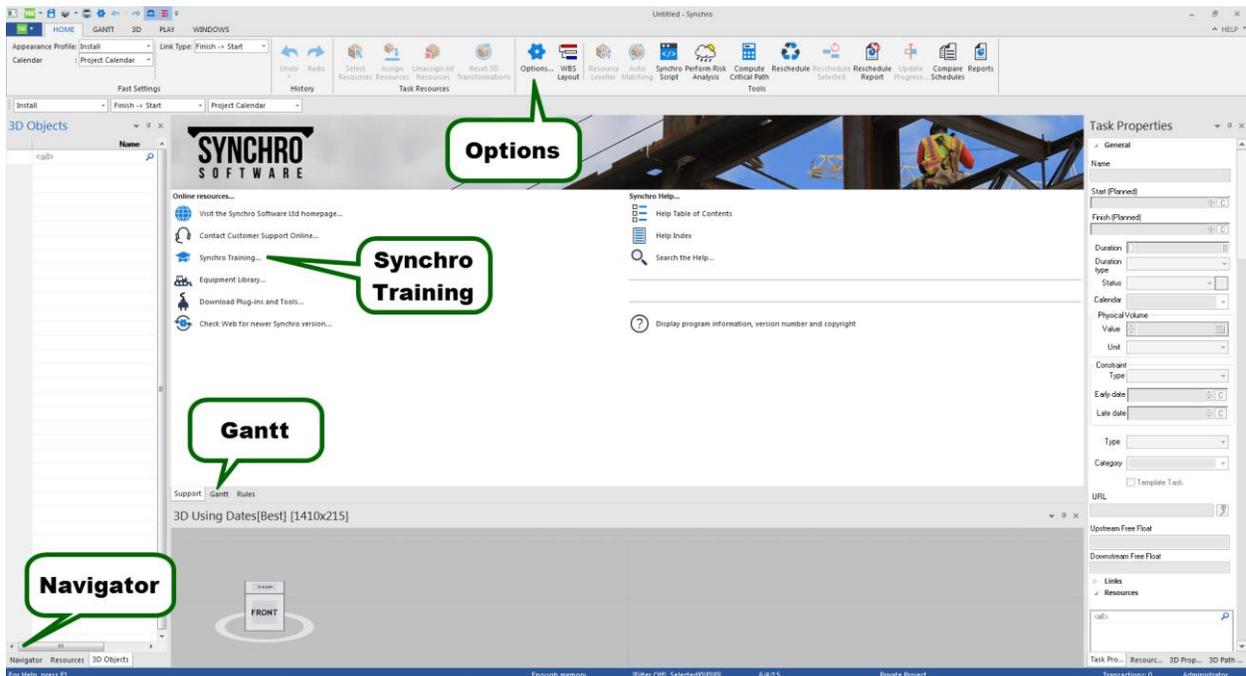
Task Properties
Resource Properties

- **Quick Access Toolbar** contains commonly used icons. The Quick Access toolbar can be customized by left clicking on the down arrow and selecting **More Commands**.
- **Ribbon** contains commands, sorted by category. In the top right corner of the Ribbon is the **Help** menu which can be used to find more information about a particular feature
- **Toolbars** contain shortcuts and useful commands found in Synchro. Right click in the blue space below the Ribbon to view and select available toolbars. Select **Customise** to create your own custom toolbar of commonly used commands
- **Gantt** window is split into the Task List on the left which displays the list of tasks and properties in columns and the Gantt Chart on the right which displays the task bars with logic links
- **3D Window** displays the modelled resources at any defined point in time. This window is not available in Synchro Scheduler.
- **Navigator** contains project-wide datasets logically grouped by the categories shown above; for example Project Details, Task and 3D Filters, Viewpoints
- **Resources** contains the list of Resources (including those imported and those created in Synchro)
- **Task Properties** contains data related to the selected Task(s) including Task Status (in the General panel), assigned Resources, and Budgeted Costs
- **Resource Properties** contains data related to the selected Resource(s) including Costs, assigned to Tasks, and User Fields

2.2. Workspace Management

1. Start **Synchro PRO** or **Synchro Scheduler** by double clicking on the icon on your desktop

If you are using Synchro PRO, you will be presented with the following opening Synchro screen layout:



NOTE: If you need to download the training files, select **Synchro Training** to access the training page of the Synchro website to download the latest material

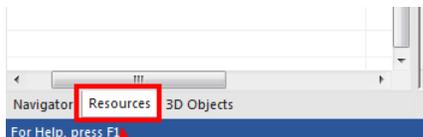
2. Select (left mouse click) the **Gantt** Tab to display the Gantt Chart
3. Select the **Navigator** Tab
4. If you are working in Synchro PRO, close the **3D** View by selecting the 'X' in the top right corner of the 3D window. If you are working in Scheduler, there is no 3D window, so skip this step.

2.2.1. Resizing Windows

5. Place the cursor over the divider between the **Task List** and the **Gantt Chart** so the double arrow icon  appears.
6. Select it with a left mouse click, hold down and drag to the right so you can see all of the column headings in the Task List. All windows in Synchro can be resized by this method

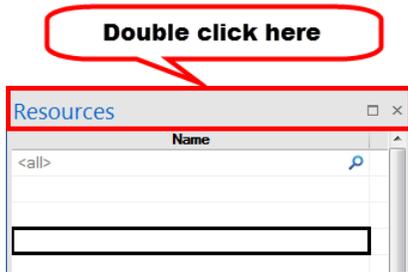
2.2.2. Undocking and Relocating Windows

7. To undock a single tab, left click on the tab and keep holding the mouse button while moving the mouse. The tab will be undocked as a new window. To undock a window, double click in the window header.

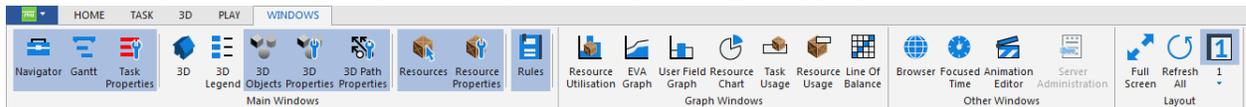


8. If you are using multiple monitors, you can then move the new window to another screen.

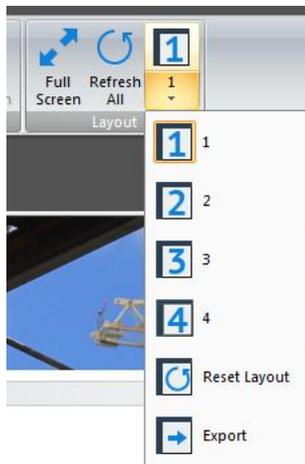
9. To resize the undocked window, hover over a corner until a diagonal arrow appears, then left click and drag to the desired size.
10. To re-dock the window in the previous location, simply double click the window header.



11. If you close any of these windows, you can re-open them by selecting the appropriate icons in the **Windows** ribbon



12. To reset the window layout to the default, select **Windows>Layout>Reset Layout**



This command is particularly useful if you cannot locate a particular window or the layout is changed when switching from multiple monitors to only one.

3. Options and Set-Up

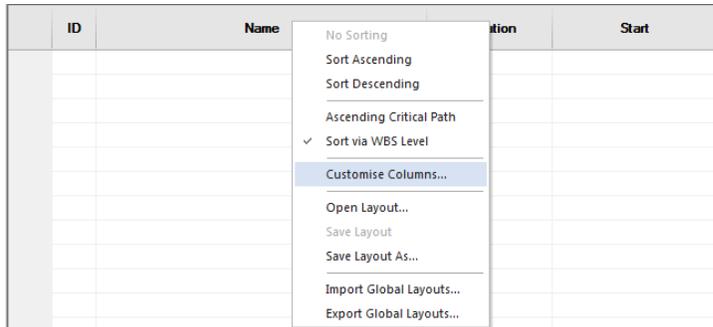
In this section, you will learn how to customise the Task List and Gantt Chart display (including visible columns, date and duration display and WBS colours), as well as set up the critical path and rescheduling options

3.1. Customise Columns

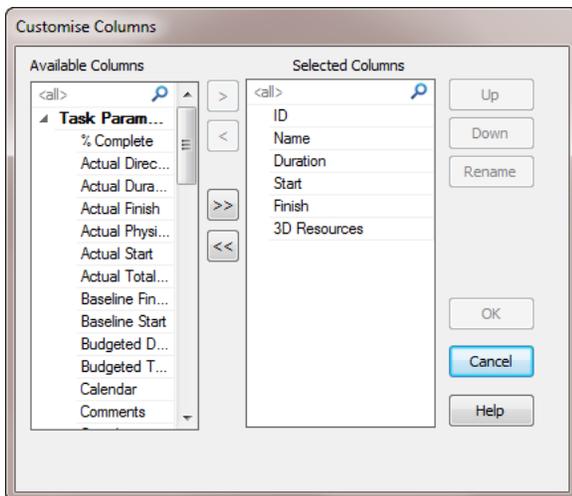
Synchro has the default columns **ID**, **Name**, **Duration**, **Start**, **Finish** (and **3D Resources**, if you are using PRO).

You can add more columns to the Task List using the Customise Columns window

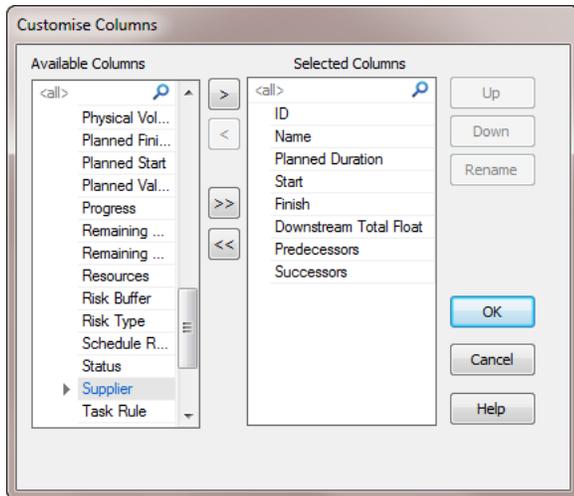
1. Right click in the heading field of the Task List and select **Customise Columns** as shown below



You will be presented with the **Customise Columns** window.



2. Under **Task Parameters** in **Available Columns**, select **Planned Duration**, **Predecessors**, **Successors**, and **Downstream Total Float** and move them from **Available Columns** to **Selected Columns** by using the **>** button. Remove the **Duration** and **3D Resources** columns by using the **<** button. Move the columns using the **Up** and **Down** buttons so the Customise Column window looks as shown below and then select OK. This will create extra columns in the task list. You can add or remove other columns in a similar manner.



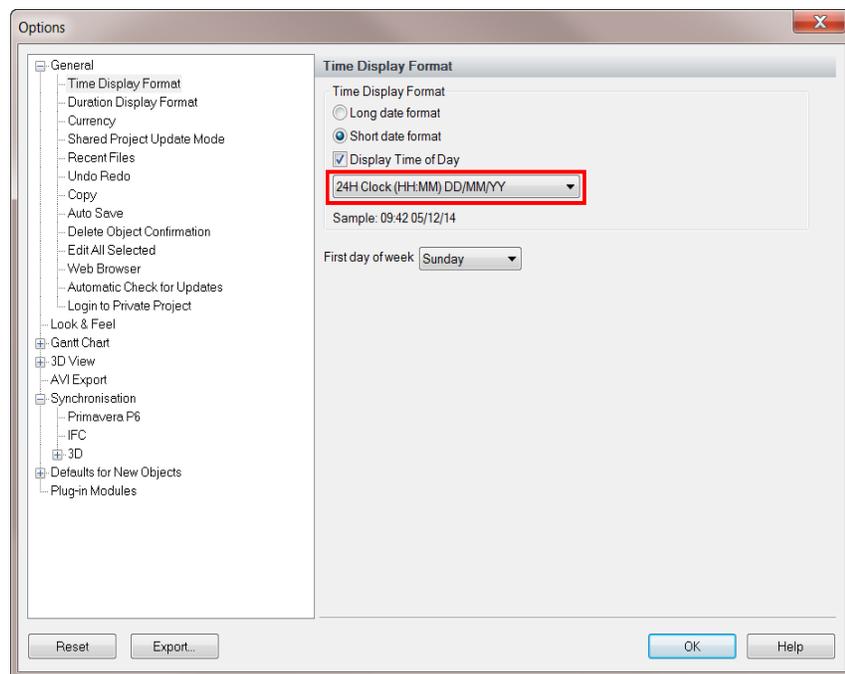
NOTE: The **Planned Duration** is the original duration of the activity. The **Planned Duration** (original duration) can be revised until the task has been stautused. The **Duration** is the current estimated duration of a task based on the task's actual duration to date plus its remaining duration.

- To resize the columns, hover between the column titles until the double arrow icon appears, then hold down the left mouse button and drag to the left or right

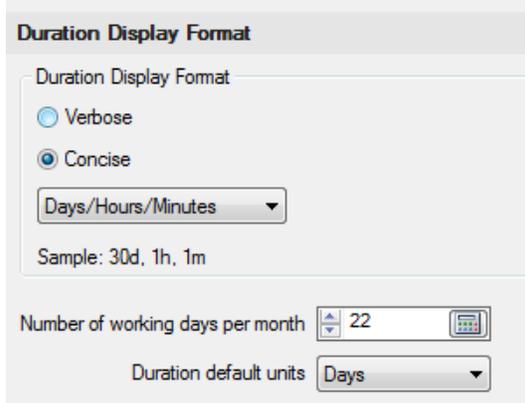
3.2. Date & Duration Display

The time and date format can be changed to match the local convention.

- From the **Home** ribbon or the **Quick Access Toolbar**, select the **Options** icon. This will open the Options dialog which contains many settings related to all aspects of Synchro including the customization of the Gantt Chart, as well as scheduling and synchronisation preferences.
- Expand the **General** tab, and select **Time Display Format**.
- From the first drop down menu, select **24H Clock** for this training. This will set the date format to DD/MM/YY. There is also the option to hide the time of day, but we will leave it on for this training.
- The first day of the week can also be chosen from the drop down menu – keep this as **Sunday** as shown above.



5. Select **Duration Display Format** from the Options menu. Set to **Concise** and **Days/Hours/Minutes**.



6. The **Number of working days per month** and **Duration default units** can be also be set – the defaults will be used, as shown above.

You can leave the **Options** dialog open for the next section

3.3. Auto Save

At this stage it is worth activating the **Auto Save** and **Backup** functions.

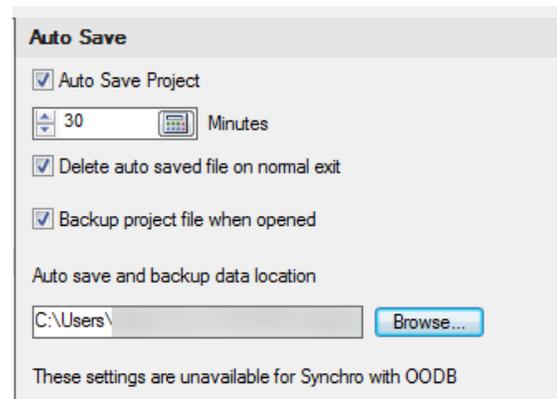
1. In **Options>General>Auto Save**, enable **Auto Save Project** and designate 30 minutes (optional)

NOTE: The time specified for the Auto Save will depend on the size on the file. Larger files take longer to save and the file will be un-editable during the auto save process, so you should pick a frequency that balances time waiting and amount of work you are willing to lose if the file or computer crashes.

2. Enable **Backup project file when opened** and **Browse** to select a convenient location.

NOTE: You will need to empty this folder from time to time as a time-stamped backup file is created every time you open a project. These automatically generated backups can be very useful to return to an older copy if you find a mistake later on or want to access work you have since deleted. The Auto Save file and any DMP (dump) files will also save in this folder

3. If Auto Save is enabled, it is recommended to enable **Delete auto saved file on normal exit**. This command will delete the Auto Saved files (but not the Backup file) when you close Synchro normally. Otherwise, the file will be available to the last Auto Save point if necessary.



3.4. Rescheduling Options

Still in **Options**, expand **Gantt Chart** and select **Rescheduling>Parameters**. **Enable Automatic Rescheduling**, **Confirm Rescheduling Results** and **Snap To Hour** options should be set as shown for this tutorial.

The screenshot shows the 'Parameters' dialog box for rescheduling. It contains the following settings:

- Enable Automatic Rescheduling
- Confirm Rescheduling results
- Snap To: Hour
- Link Calendar to use during rescheduling:
 - Own
 - Project
 - Upstream Task
 - Downstream Task
 - None (use Elapsed)
- On scheduling progressed Tasks use:
 - Retained Logic
 - Progress Override
 - Actual Dates
 - Own

NOTE:

- When **Enable Automatic Rescheduling** is disabled, reschedule will not be proposed when a link is unscheduled.
- To reschedule manually, disable Automatic Rescheduling and press F9 (This will be used later in the tutorial.)
- **“Snap To”** defines how the tasks are rescheduled. When a task is rescheduled it will snap to the specified time increment. For example if **Snap To** is set to **Day** and you have two tasks of 1.5 days linked in a chain with Finish to Start relationship, the second task will not be able to start immediately after the first task (half way through the day). Instead its start time will “snap” to the beginning of the next full day. Therefore the second task would finish 3.5 days after the start of the first. On the other hand, if **Snap To** is set to **Hour**, the second task can start at the beginning of the next hour after the first finishes. Therefore it will start immediately after the first and will finish 3 days after the start of the first.
- The **Confirm Rescheduling results** option, when selected, will prompt the user to confirm that project rescheduling should take place whenever a change is made to the schedule that affects other tasks. This option only applies when Automatic Rescheduling is enabled.
- The **Link Calendar to use during rescheduling** options allows the user to choose how Synchro calculates the link delays each time the project is rescheduled. When the **Own** option is selected, task link delays will be calculated using the calendar assigned to that particular link. (See the Help in Synchro for a more thorough description of each option)
- The **On scheduling progressed Tasks use** options allow the user to choose how Synchro calculates the schedule. Each scheduling calculation may produce different planned dates and/or float depending on the tasks’ actual dates and if any tasks are out-of-sequence. (See the Help in Synchro for a more thorough description of each option)

3.5. Critical Path Options

Still in **Options**, the Critical Path default options can be viewed by selecting **Rescheduling>Critical Path**. The default settings are shown below along with a brief description of all the settings. The default settings will be used in this tutorial.

NOTE:

Critical Path update options determine when the Critical Path display will be updated:

- **Don't Update** – The Critical Path is not displayed.
- **Update Manually** – Update the Critical Path displayed by selecting the **Home >Tools > Compute Critical Path** or Ctrl + F5.
- **Update Automatically (slowest)** – The Critical Path displayed is updated automatically.

Critical Path method options determine how the critical path is calculated:

- **Longest path** - the critical path is calculated as the longest chain of tasks with zero float.
- **Least total float** – the critical path is calculated as the longest chain of tasks that match the float criteria you define using the following:
 - **Maximum for critical Tasks** defines the maximum total float allowed for a task to be considered critical.
 - **Maximum for subcritical Tasks** defines the maximum total float allowed for a task to be considered near-critical.
 - **Duration units** define the units being specified in previous options.

3.6. Task ID Options

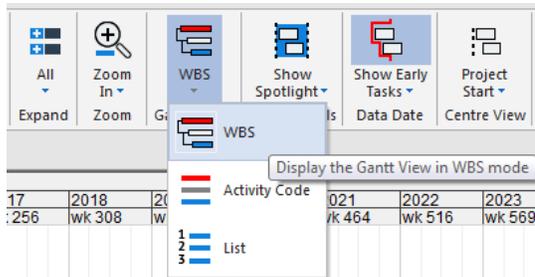
Still in **Options**, open **Defaults for New Objects> Task ID**

The task ID settings are used on all new tasks that are created. These settings can be edited. Keep the default settings displayed in this window for this tutorial.

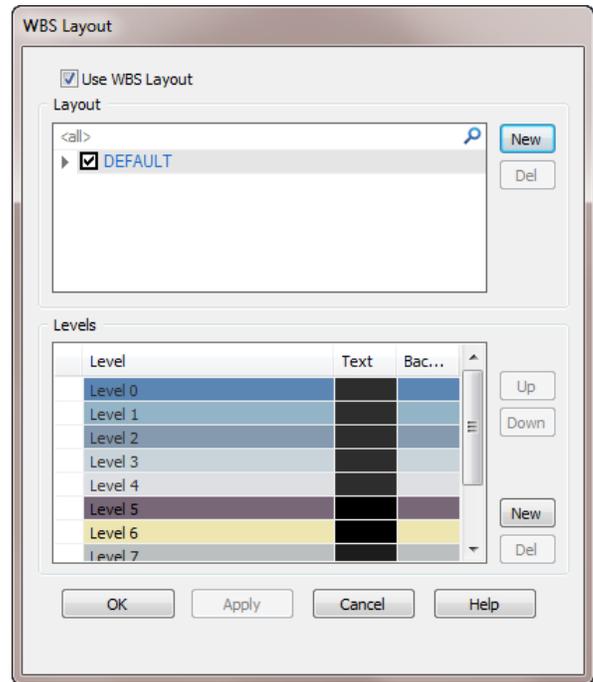
Press **OK** to exit the **Options** window

3.7. WBS Layout

1. The schedule in this training will be organized by Work Breakdown Structure (WBS). In the **Task** ribbon, ensure that **Gantt Mode** is set to **WBS**. Schedules may also be structured via **Activity Codes** or **List** (no summaries or indent structure).

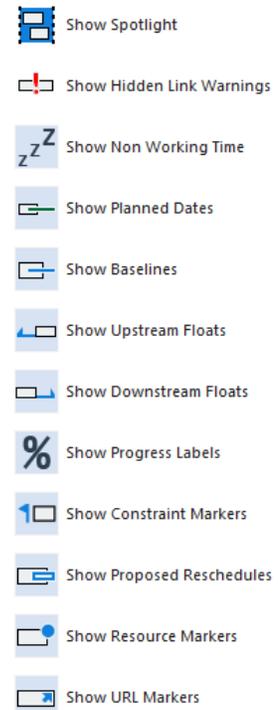


2. To customise the WBS colour scheme, select **Home > WBS Layout**
3. The WBS Layout window will be displayed. In this window, you can:
 - Enable/disable the Default WBS Layout colours
 - Select **New** to design your own layout
 - Modify colours/order of Levels for a layout



3.8. Gantt View Options

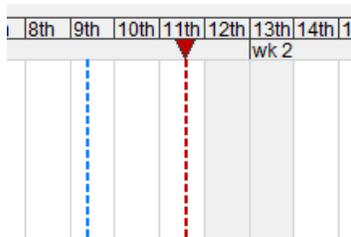
1. To manage which schedule details are displayed visually in the Gantt Chart select **Task > Gantt Details** and use the drop down arrows to access the menu
2. The commands act like a toggle button which can be turned on or off. *Please refer to the Help for definition of terms.*
3. By default all Gantt details are displayed except **Show Spotlight**. Disable **Show Hidden Link Warnings**



3.9. Project Details

1. Select **Navigator** > **Project** and open the **Details** tab
2. The Project Start, Finish and Duration will be automatically calculated:
 - **Project Start** – the start date of the first (earliest) task
 - **Project Finish** – the latest finish date
 - **Project Duration** – the estimated project duration
3. **Project Date Zero** is the actual progress start date used for progress monitoring. It defines the start of the 1st week of the project. For the purpose of this training set the **Project Date Zero** to **06 Mar 16**.
4. The **Data Date** is the date used to define the project reporting date when calculating the schedule. Parameters such as Percent Complete and Earned Value are computed using the Data Date. This date is usually not the current calendar date - it is typically set to the end of the current reporting period. This date can also be modified to the required date for “what-if” analysis. The Data Date for calculation purposes can be set to:
 - **Automatic** – to use the current date when the project is opened
 - **Manual** – to enter your own date (Industry standard)
 For the purpose of this training, choose **Manual** and set the **Data Date** to **09 Mar 16**

NOTE: The Blue dotted line displayed in the Gantt Chart is the Data Date. The Red dotted line with the red triangle is the Focus Time (used in 4D Projects)



5. The **Schedule** setting defines whether a task should be scheduled to its Early Dates (**ASAP** – As Soon as Possible) or scheduled to its Late Dates (**ALAP** – As Late as Possible). For the purpose of this training leave it set to the default – **ASAP**.
6. The **Schedule From/To** settings tell the software the time frame that you want the schedule calculations to pass through. Set **Schedule From** to **Data Date** and **Schedule To** to **Early Project Finish**

NOTE:

- **Schedule From** defines the date to use when **Schedule** is set to **ASAP** and when scheduling tasks which are constrained to **Start as soon as possible**.
- **Schedule To** defines the date to use when **Schedule** is set to **ALAP** and when scheduling tasks which are constrained to **Start as late as possible**.
- It is NOT necessarily recommended that constraints be used, but if they are this is how the associated tasks will be scheduled.

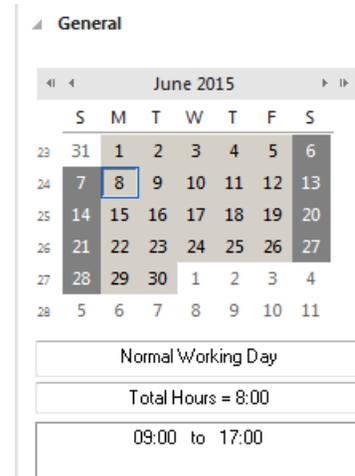
4. Calendars

In this section, you will learn how to create and modify project calendars.

Calendars are used to assign working time and non-working time to an activity. Every project will have a default calendar that is used when new tasks are created or scheduled. Other calendars can be added to define different working periods for different Tasks or Resources. For example, you can have one calendar that defines a 5 day work week for concrete placement and another calendar that defines a 7 day work week for concrete curing.

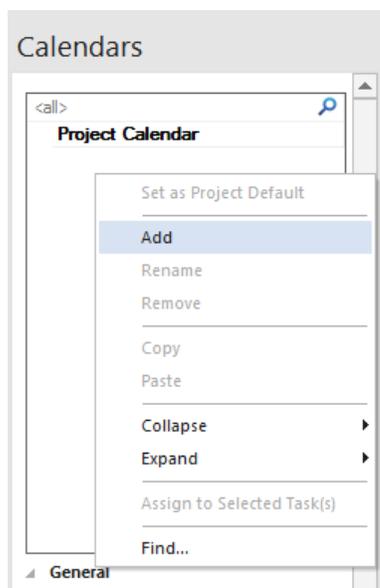
4.1. Project Calendar

1. Select **Navigator>**  **Calendars**
2. You will see that Synchro creates a default calendar - **Project Calendar**
3. Select and highlight **Project Calendar**, then open the **General** tab below.
You will see the current month - the working days lightly shaded; and the working hours listed below. This **Project Calendar** is a 5 day week with working hours between 09:00 and 17:00
4. Select the calendar and rename it **5 day work week**



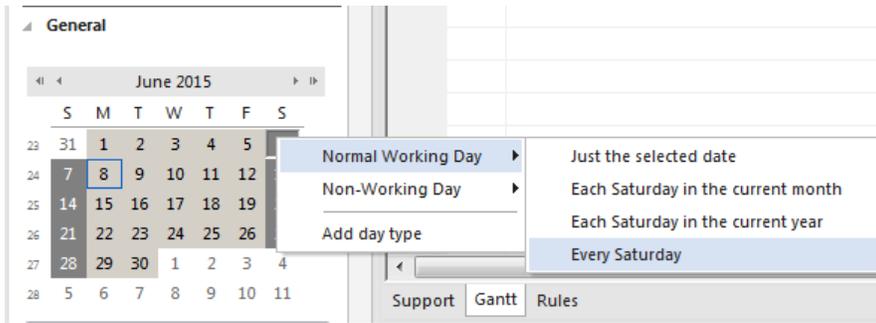
4.2. Adding Calendars

1. A new calendar will be added for training. Scroll back up to the calendar list (above the General panel), right click and select **Add**



2. Rename the new calendar to **7 day work week**
3. Select and highlight the **7 day work week** and open the **General** tab

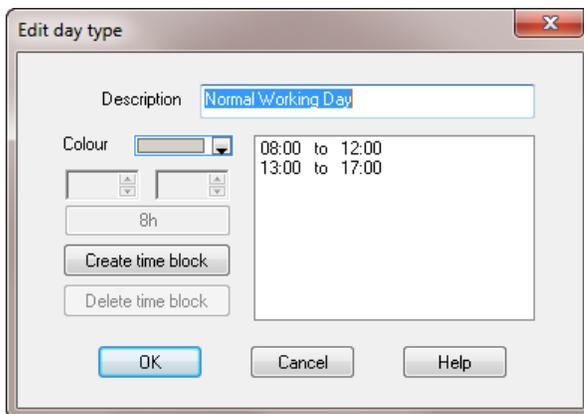
- Any day can be changed to a working day. Right click on any Saturday date and select **Normal Working Day >Every Saturday**. This will change all Saturdays to work days.



- Repeat this for **Every Sunday**
Non-working days can be assigned as well as specific day types that may be utilized on a project - for example, holidays or owner restricted work days.

4.3. Modifying Calendar Work Hours

- To change the working hours in a day, right click on any day and select **Edit day type**.
- Once the edit window opens, the working hours can be changed. For this tutorial, a lunch break will be added to the **7 day work week** calendar. Adjust the morning work hours by selecting the working hours (**09:00 to 17:00**) then change the start and end times to **08:00 to 12:00** as shown below
- Multiple working blocks of time can be created for each working day. To create multiple working time blocks, select **Create time block** to enter another block of time. For the **7 day work week** calendar enter the afternoon work hours **13:00 to 17:00** as shown below then select **OK** to save the changes



The **Normal Working Day** will be an 8 hour day with 2 work periods for the **7 day work week** calendar for all dates as shown



Normal Working Day
Total Hours = 8:00
08:00 to 12:00 13:00 to 17:00

5. Gantt Chart Navigation

In this section you will learn how to pan and zoom in the Gantt Chart and collapse/expand the WBS.

The training material contains a template file with calendars created, Task List columns set up, and a basic Work Breakdown structure entered. We will open this file and continue from there. See [Appendix A](#) for more about using templates.

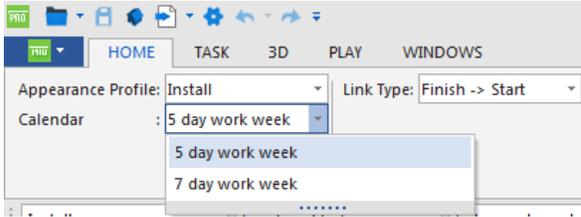
NOTE: If you need to download the training material, select the Support tab in the Synchro application (next to Gantt) and click on **Synchro Training** which will direct you to the [website](#) where the files can be downloaded

1. Open *SCH Training - Template.SP*
2. Select **File** >  **Save As** and rename the file to *SCH Training Project.SP*
3. Move the mouse into the **Gantt Chart** area.
4. To pan, hold down the middle mouse button then move the mouse up, down, left and right.
5. To zoom, roll the middle mouse button wheel forward and back to zoom in and out respectively.
6. Click on the  minus button or  arrow next to any WBS summary to collapse the schedule to that level. When collapsed, click the  plus button or  arrow to expand the summary task.
7. Right click in the **Task List** and choose **Collapse > All** to view only the top level Tasks.
8. Right click again and choose **Expand > All** to see all the tasks again.

6. Creating Tasks

In this section, you will learn how to create new tasks in a Work Breakdown Structure, how to copy and paste tasks, and how to change task calendars, as well as where to find task properties.

1. Open the **Home** ribbon and use the **Calendar** dropdown box under the fast settings to select a calendar to use for all new tasks or use the **Calendar** dropdown box from the **Fast Options** toolbar. Select **5 day work week** as shown



2. With all the tasks expanded, in the Task List select the first empty **Name** cell (after *Interiors Level 02*) by left clicking on the cell so it is highlighted. This allows you enter a new activity name.

NOTE: To edit the current activity name, highlight the cell and left click, or right click and choose **Rename Task** from the context menu. Selecting **F2** on the keyboard when the cell is highlighted also enables editing of the cell.

3. Type **"MEP Rough-in"** in this **Name** cell then press **Enter** on the keyboard
4. You will see the following cells populated-

ID	Name	Planned Duration	Start	Finish	Downstream Total Float	Predecessors	Successors
32	ST00250	MEP Rough-in	1d	09/03/16	09/03/16	3d	

- **ID** (derived from the values given in **Options>Default for New Objects>Task ID**) **NOTE:** Don't worry if the IDs in your schedule doesn't match the ones shown in the training
- **Name** (manually entered)
- **Planned Duration** (Defaults to 1 day)
- **Start** (Same as Data Date)
- **Finish** (Start plus Planned Duration)
- Gantt bar created

5. To edit the duration of the task, left click in the **Planned Duration** cell and type 5. Days are the default units so simply press Enter to set the duration to **5d**.

NOTE: To override the default units when entering a duration value, simply append one of the following characters to specify the required duration:

- m** for Minutes
- h** for Hours
- d** for Days
- w** for Weeks

6. Create 2 more tasks below **MEP Rough-in** by typing **"Framing/Drywall"** and **"Trim-out"** in the empty rows below
7. If you want to set the same duration for multiple tasks, you can use the drag down method. In the duration cell for **MEP Rough-in** hover over the grey box in the bottom right hand corner and a crosshair icon will appear

Name	Planned Duration	Start
MEP Rough-in	5d	09/03/16
Framing/Drywall	1d	09/03/16
Trim-out	1d	09/03/16

8. Select this crosshair icon with a left mouse click, hold and drag over the duration cell below until both durations read 5d
9. Set the Planned Duration of **Trim-out** to 3d

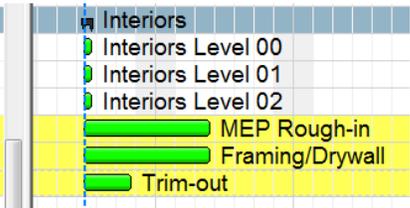
6.1. Creating WBS (Parent-Child) relationships

Work Breakdown Structure is a way of organizing a schedule into deliverables or work packages. It is organized in a tree structure; the nodes of the tree are called parent or summary tasks, and the leaves of the tree are called child tasks.

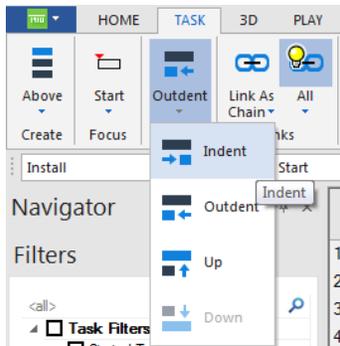
The new tasks were created at the top level of the Work Breakdown Structure. One way to create parent-child relationships is to use the **Move>Indent** command.

1. Left click the **MEP Rough-in** task, hold **Shift** on the keyboard and select the **Trim-out** task. The 3 new tasks should be highlighted yellow in the Task List.

▲ Interiors	1d	09/03/16	09/03/16	4d		
Interiors Level 00	1d	09/03/16	09/03/16	4d		
Interiors Level 01	1d	09/03/16	09/03/16	4d		
Interiors Level 02	1d	09/03/16	09/03/16	4d		
MEP Rough-in	5d	09/03/16	15/03/16	0 Days		
Framing/Drywall	5d	09/03/16	15/03/16	0 Days		
Trim-out	3d	09/03/16	11/03/16	2d		

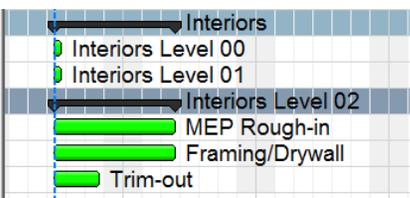


2. From the **Task** ribbon, select the **Move** drop down menu and select **Indent**



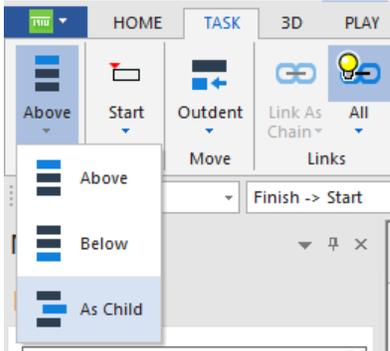
3. The **Indent** command is now the default **Move** command. Press **Indent** (no need to open the drop-down menu) two more times until the task **Interiors Level 02** changes colour to indicate that it is now a summary task, and its Gantt bar changes to a summary bar.

▲ Interiors	5d	09/03/16	15/03/16	0 Days		
Interiors Level 00	1d	09/03/16	09/03/16	4d		
Interiors Level 01	1d	09/03/16	09/03/16	4d		
▲ Interiors Level 02	5d	09/03/16	15/03/16	0 Days		
MEP Rough-in	5d	09/03/16	15/03/16	0 Days		
Framing/Drywall	5d	09/03/16	15/03/16	0 Days		
Trim-out	3d	09/03/16	11/03/16	2d		



Another way to create a parent-child relationship is to use the **Create>As Child** command.

4. Select the task **Footings** under **Concrete** so that it is highlighted
5. In the Task ribbon, select **Create>As Child**



NOTE: The **Create>As Child** command is only available when the **Gantt Mode** is set to **WBS**

6. A **New Task** will be inserted in the row below the selected task and indented one level so that the selected task becomes a summary.

▲ Concrete	1d	09/03/16	09/03/16
▲ Footings	1d	09/03/16	09/03/16
New Task	1d	09/03/16	09/03/16
Slabs	1d	09/03/16	09/03/16

7. Rename the new task to **Footings, Area 1** and enter 4d for the Planned Duration.
8. To create another child task of the **Footings** summary, we will add another new task below the **Footings, Area 1** task. With **Footings, Area 1** highlighted, select **Task>Create>Below**. The new task will be at the same level as the selected task.

NOTE: The **Above**, **Below**, and **As Child** commands for creating new tasks are also available under **Insert New Task** via a right click in the Task List

9. Insert one more task **Below** so that there are 3 child tasks beneath the **Footings** summary.
10. Use the same method for renaming tasks as you used for copying duration values.
 - Hover over the grey box  in the bottom right hand corner of the **Footings, Area 1** Name cell until a crosshair icon appears
 - Select this with a left mouse click, hold and drag over the name cells below and they will be named in numerical order **Footings, Area 1, 2 and 3**
 - The result should be as shown

▲ Footings	4d
Footings, Area 1	4d
Footings, Area 2	1d
Footings, Area 3	1d

NOTE: All task names that end in a number can be incremented this way

6.2. Copy & Paste Tasks

If your schedule includes repeated sequences of tasks (e.g. the same series of finishes on every level of a building), rather than re-typing the Tasks over and over again, you can use **Copy & Paste**.

1. Holding **Ctrl** on the keyboard, select **Interiors Level 00** and **Interiors Level 01**
2. From the Task ribbon, select **Create>As Child**. Each of the selected tasks will now have a new task underneath.
3. Left click the **MEP Rough-in** task, hold **Shift** on the keyboard and select the **Trim-out** task so all 3 adjacent tasks are highlighted yellow in the Task List.
4. Right click on one of the selected tasks and choose **Copy Task(s)** from the context menu.

NOTE: Copy Task(s) as Text is also available in the Task List context menu. Use this command to copy and paste the visible columns in the Task List as plain text into another program, such as Microsoft Excel.

5. Right click on one of the **New Tasks** (it should now be highlighted) and choose **Paste Task(s)** from the context menu. All 3 copied tasks will be inserted in place of the **New Task**.
6. Repeat Step 5 with the other **New Task**. The final result should look as below. Notice that the durations were copied as well as the task names

Name	Planned Duration
▲ Interiors	5d
▲ Interiors Level 00	5d
MEP Rough-in	5d
Framing/Drywall	5d
Trim-out	3d
▲ Interiors Level 01	5d
MEP Rough-in	5d
Framing/Drywall	5d
Trim-out	3d
▲ Interiors Level 02	5d
MEP Rough-in	5d
Framing/Drywall	5d
Trim-out	3d

NOTE: If a copied task has child tasks, those will also be copied. If the copied tasks had logic links, those would be copied and pasted according to the settings in **Options>Defaults for New Objects>Copying Tasks**

Copying Tasks

Don't copy Links

Copy Links within branch

Copy Links within selection

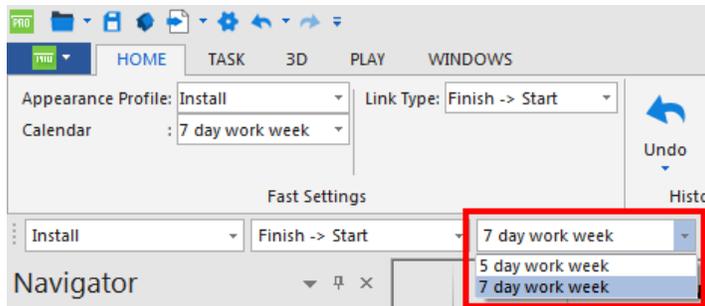
Copy all Links

6.3. Changing Task Calendars

There may be tasks in a project schedule that need to be scheduled with different work periods. For example concrete will be placed during the normal 5 day work week but the curing of the concrete will occur over the 7 days (including weekends) following a concrete pour. In this case the concrete tasks would be assigned to a 5 day normal work day calendar and the curing would be assigned to a 7 day – 24 hour calendar.

In this training, it has been decided that the steel structure activities will use a 7 day work week calendar.

1. It is best to choose the calendar to be used before creating the tasks. From the **Home** ribbon or **Fast Options** toolbar, select **7 day work week** for the default **Calendar**

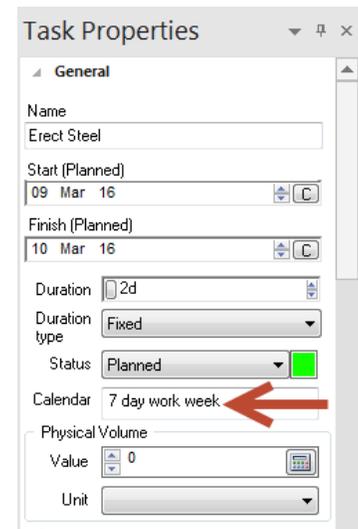


2. Select the task **Steel Level 00-01** and insert 2 child tasks under it. Edit the names and durations of the new tasks as follows:

▲ Steel	3d
▲ Steel Level 00-01	3d
Erect Steel	2d
Plumb, Bolt & W...	3d

When the project is scheduled, these tasks will continue through the weekend if they happen to fall on one even though the other tasks will stop over the weekend.

3. On the right hand side of the screen, open **Task Properties>General**. If the Task Properties window is not open, you can open it from the **Windows** ribbon.
4. Here you can confirm the task calendar for the selected task



NOTE: The task calendar can be changed after the task is created using the **Calendar** drop-down in **Task Properties>General**. Changing the calendar in the **Home** ribbon or **Fast Options** toolbar does not affect tasks that have already been created. If the new calendar has a different number of hours per day, the task duration will be updated accordingly to retain the same amount of work time, in minutes. For example, if the task was originally planned as 4 days with a calendar that has 10-hour work days, and the task **Calendar** is changed to one with 8 hour days, the new duration will be 5 days in order to retain a duration of 40 working hours.

6.4. Task Properties>General

The **Task Properties > General** tab allows the Task Properties for a selected activity to be viewed and modified if needed.

Under this tab you can-

- Edit the Task Name
 - Change Planned Start/Finish
 - Edit the Duration and Duration type
 - Enter a Physical Volume (used to calculate duration and estimated rate when production rate Rules are applied)
 - Change the status of the Task
 - Change the Assigned Calendar
 - Add a Task Constraint
- NOTE:** Task Constraints are limiting dates that control a Task's start or finish. Use of constraints should be limited. It is best to use them only for contractual milestones. For a thorough description of the constraint types, please see [Appendix B](#)
- Choose the Task Type (i.e. work, key dates, hammocks, etc.)
 - Connect a URL to the Task (viewed in browser)
 - Add Comments
 - Review Upstream & Downstream Float

All of the tasks we have created thus far are **Work** Type tasks. Synchro also has the capacity to create other types of tasks, including key dates (milestones) and hammocks. **Key Dates** are divided into **Start Key Date** and **Finish Key Date** types.

NOTE: Start Key Dates cannot be scheduled for the end of a work day and Finish Key Dates cannot be scheduled for the Start of a work day.

1. Insert a new task below **Project Start**
2. Rename the new task **Building Watertight**
3. Select the **Building Watertight** task, and open **Task Properties>General**
4. From the **Type** drop-down, change from **Work** to **Finish Key Date**
5. The Task's **Planned Duration** now changes to **0d** because a Key Date cannot have a duration

In Section 8, you will learn how to add logic links to the schedule to drive the key date's planned date. For key dates that are contractually mandated, you may add a **Constraint**.

NOTE: Constraints may cause the task **Float** to be calculated incorrectly

6. In the Task List, select the Start Key Date **Project Start**
7. In **Task Properties>General**, change the **Constraint Type** to **Mandatory Start**. The Early Date will be automatically populated from the Planned Start (but this could be changed if necessary by pressing the "C" button to open a calendar)

Task Properties

General

Name: Building Watertight

Start (Planned): 09 Mar 16

Finish (Planned): 09 Mar 16

Duration: 0 Days

Duration type: Fixed

Status: Planned

Calendar: 5 day work week

Physical Volume

Value: 0

Unit:

Constraint

Type: No Constraint

Early date:

Late date:

Type: Finish Key Date

Category:

Template Task

URL:

Upstream Free Float: 1d

Downstream Free Float: 3d, 7h

Constraint

Type: Mandatory Start

Early date: 09 Mar 16

Late date:

7. Linking Tasks

In this section, you will learn how to create logic links between tasks and add a lag or lead to a link.

Links between tasks allow the scheduler to specify the order in which tasks must take place; for example, walls must be built before they can be painted. Rather than specifying a start date for each task, the links allow those dates to be calculated automatically based on the logic. Links also make sure that if one task is modified (e.g. changed duration or delayed start) all other tasks update accordingly. There are several ways that tasks can be linked to each other in the project schedule. This section will discuss the options that are available.

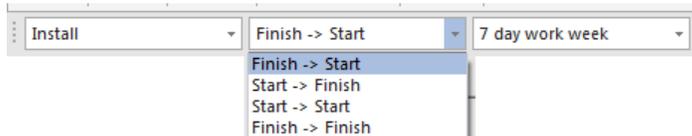
Consider two tasks with a link between A->B. A is called the **Predecessor** and B is the **Successor**. There are four link types as described below

- **Finish to Start (FS)** – A must finish before B can start. This is the most common link type. E.g. Excavate Foundation FS Pour Foundation; Frame walls FS Drywall
- **Start to Finish (SF)** – B cannot finish until A starts. This type is rarely used.
- **Start to Start (SS)** – A must start before B can start.
- **Finish to Finish (FF)** – A must finish before B can finish

7.1. Link Tasks in a Chain with Automatic Rescheduling Enabled

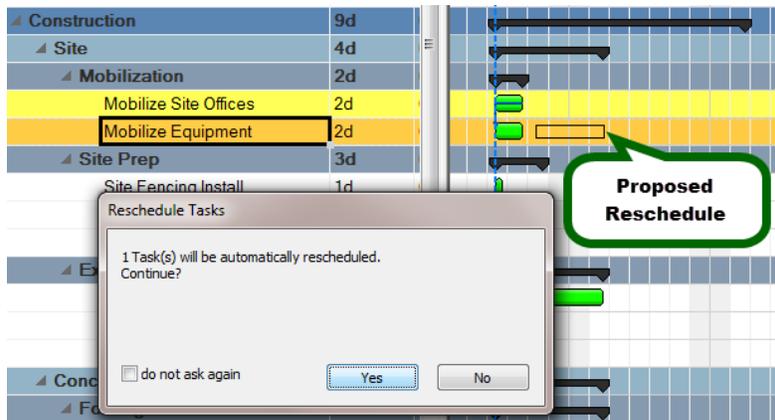
Linking tasks in a chain allows several activities to be linked together in the order they are selected with minimal key strokes. With **Automatic Rescheduling** enabled, once a task is linked it will be rescheduled to a new planned date. Earlier in this tutorial we ensured that Automatic Rescheduling was enabled, but if you need to, you can check that setting in **Options>Gantt Chart>Rescheduling>Parameters**

1. Open the file *SCH Training – Links.SP* from the training material. The remaining tasks have been added for you.
2. Select task - *Mobilize Site Offices* then hold down **Shift** on your keyboard and select task - *Mobilize Equipment* so they are both highlighted in that particular sequence
3. Ensure that the link type is **Finish to Start** in the **Fast Settings** toolbar.



4. From the **Task Tab** select **Links>Link As Chain**. With each link change the **Reschedule Task** dialog box will open since both the **Automatic Rescheduling** and **Confirm Rescheduling results** options are enabled. The Gantt Chart will show a preview of the proposed new position of the Task Bar outlined in black.

NOTE: **Ctrl + L** is the keyboard shortcut for **Link As Chain**



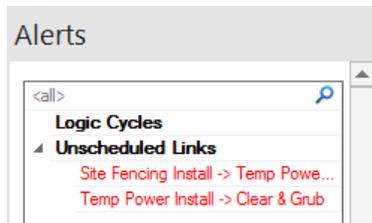
5. If the preview is acceptable click **Yes** and the project will be rescheduled.

NOTE: If the **Automatic Rescheduling** is enabled and **Confirm Rescheduling results** is *not* enabled, the project will reschedule with no warning with each link change.

7.2. Link Tasks in a Chain with Automatic Rescheduling Disabled

Disabling **Automatic Rescheduling** allows you to choose when the project should be rescheduled. When working in a schedule with a large number of tasks, this is especially helpful as it is time consuming for the computer to reschedule all tasks every time a change is made to one task. Disabling **Automatic Rescheduling** allows you to reschedule just once after making many changes.

1. In **Options>Gantt Chart >Rescheduling**, deselect the box next to **Enable Automatic Rescheduling** and select **OK**
2. Select the **Site Fencing Install** task, hold down **Shift** and select **Clear & Grub** so that all three tasks Site Prep sub-tasks are highlighted
3. From the Task ribbon select **Link As Chain**, or press **Ctrl + L** on the keyboard
4. Links have been created between the 3 tasks but they have not been rescheduled. Any links created and not rescheduled are called “unscheduled links”.
5. Select **Options> Gantt Chart > Rescheduling > Report**. Under **Checks** enable **Unscheduled links**. The other options can be checked as well and they will be included in the Reschedule Report. Select **OK** when complete.
6. Select the **Home** tab and click **Reschedule Report**. The scheduling report will be created. The unscheduled links will be listed towards the bottom of the report. If desired, the report can be copied to a clipboard and pasted into a document. Once complete select **OK**.
7. Once you have run the **Reschedule Report** option, the unscheduled link will appear under **Alerts**. Open **Navigator>▲ Alerts**. The two unscheduled links appear in the **Alerts** window under **Unscheduled Links**.



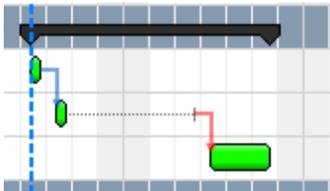
8. When an alert instance is selected, the Gantt chart is refocused to the tasks and the link in question.
9. Manually reschedule by pressing **F9**. The schedule will be recalculated, the unscheduled links will be corrected, and the alerts will be removed.

NOTE: Remember to press **F9** to reschedule periodically and/or run a **Reschedule Report** to find any unscheduled links

7.3. Introducing Delay between Tasks

Finish to Start links have been created thus far. Links can also contain a delay (lag) between the two tasks. This delay can be created by editing the **Delay** box **Amount** under **Task Properties>Links**.

1. Select task - **Temp Power Install** then open **Task Properties>Links**
The Link information is shown on the right of this page
2. Select and highlight the **Successor** link listed. You will see the ID, Name, Type, and Delay of the successor selected
3. The link type can be modified under **Type**. For now keep the link type as **Finish -> Start**
4. Under **Delay** enter **3 Days** for **Amount** and retain the **5 day work week** calendar and **Positive** delay
5. Press **F9** on the keyboard to reschedule and see the result as shown below-



NOTE:

- If you want to remove an individual link, right click on the predecessor or successor in **Task Properties>Links**, then select **Remove**
- If you want to remove all links on that task, right click in either the **Predecessors** or **Successors** box and select **Remove All**

Task Properties

General

Links

Predecessors

ID	Name	Type	Delay
ST00055	Site Fencing Install	Finish -> Start	0 Days

Successors

ID	Name	Type	Delay
ST00058	Clear & Grub	Finish -> Start	3d

Type

Finish -> Start
 Finish -> Finish
 Start -> Start
 Start -> Finish

Delay

Amount

3d

Calendar

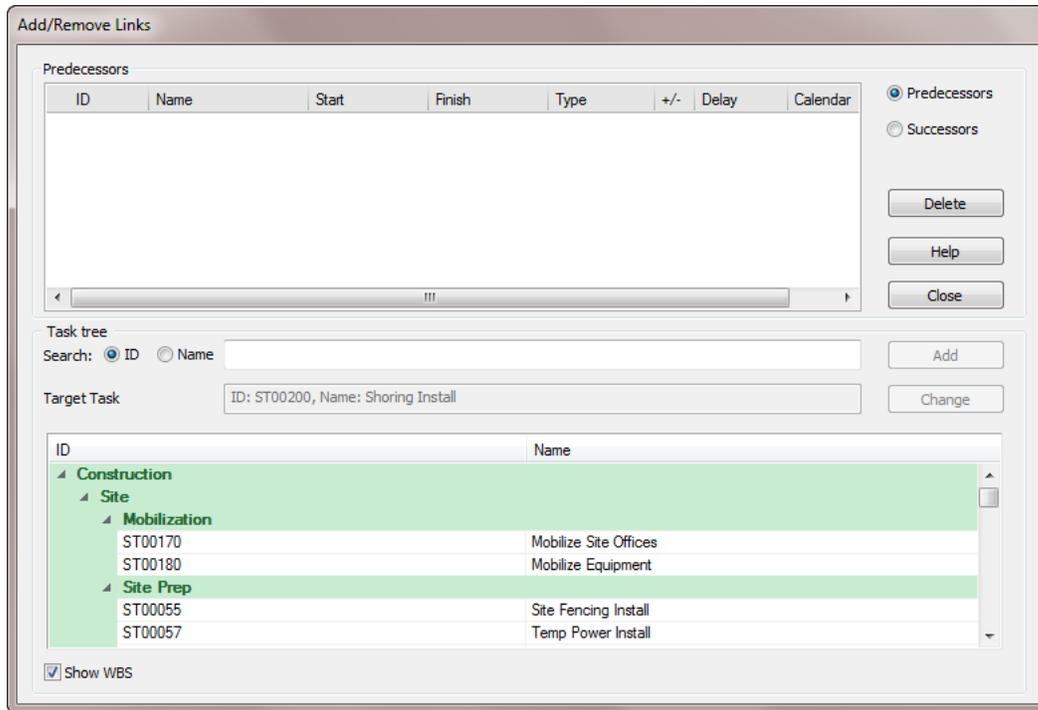
5 day work week

Positive
 Negative

7.4. Creating Links from Task Properties>Links

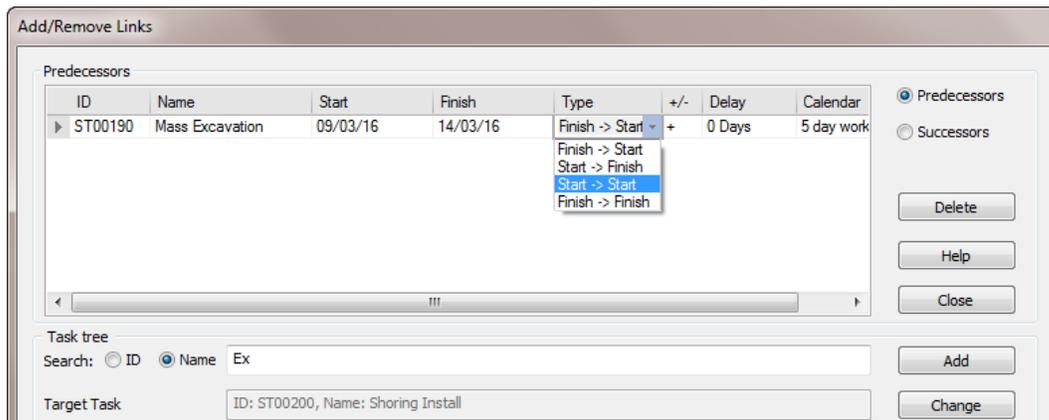
1. Select the task **Shoring Install** under **Excavation**, then open **Task Properties>Links**
2. Right click in the **Predecessors** window and select **Add**.

The **Add/Remove Links** window will appear



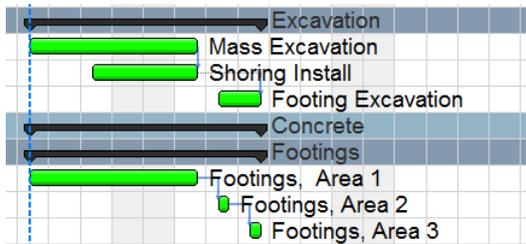
NOTE: The **Add/Remove Links** dialog can also be accessed by double clicking in either the **Predecessors** or **Successors** columns in the Task List

3. Enable **Name** and type "Ex" in the Search bar to find the Excavation tasks. The list filters automatically as you type.
4. Select the task **Mass Excavation** from the list and then select **Add**
5. The Predecessor Link options above will be populated. Change **Link Type** to **Finish -> Finish** using the drop down menu



6. In the top right of the **Add/Remove Links** window, select **Successors**. You can now add Successors to **Shoring Install** which is still listed as the **Target Task**
7. Select **Footing Excavation** and select **Add**. Modify the **Link Type** to a **Finish -> Finish** and the **Delay** to **2 days**.

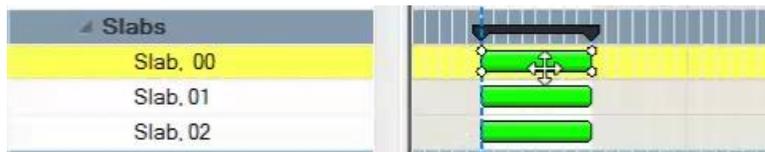
8. You can change the Target Task from within this dialog to continue adding Predecessors/Successors to other tasks. To do so, clear “Ex” from the Search bar and type, “Footing” instead
9. Select the task **Footings , Area 2** in the list then select **Change**. The task you are editing will be listed in the **Target Task** box.
10. Notice that you are still adding **Successors**, so select **Footings, Area 3** then **Add** - keep the link settings as default (FS, 0d Delay)
11. Switch to adding **Predecessors**
12. Select **Footings, Area 1** then **Add** - keep the link settings as default, then **Close** the Add/Remove Links window
13. Press **F9** on the keyboard to reschedule. The result should look like this:



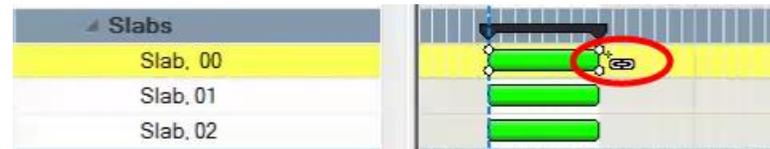
7.5. Creating Links from Task Bars

One additional method for adding links is to drag and drop them between tasks in the Gantt Chart. It is a good idea to zoom in on the task bars in the Gantt Chart when creating the links using this method

1. Move over the centre of the task bar for the task **Slab , 00** – the cursor will change into a crosshair as shown below, then left click on the task bar to select



2. Move to the far right of this task bar and it will change into a chain-link icon



3. Hold down the left button on the chain-link, and then drag the mouse until you see a black link line with an arrow that you will snap to the front of the next task. This creates a Finish to Start link



NOTE: Depending on where the linked has been “snapped from” and “snapped to” will determine the Link Type (FS, FF, SS or SF).

4. Link the task **Slab, 01** to the task **Slab, 02** in the same manner with a FS relationship
5. Press F9 on the keyboard to reschedule

NOTE: Please see **Options >Gantt Chart>Links** for various available Link options

8. Schedule Sorting

In this section you will learn how to sort the Task List by any column.

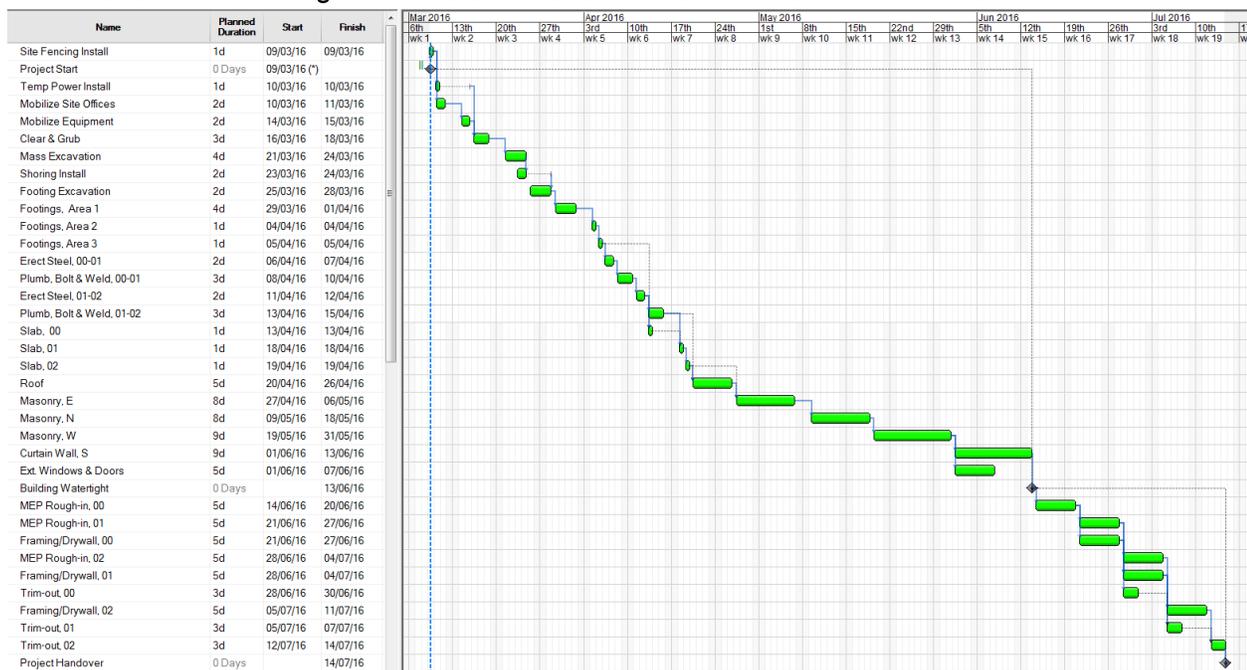
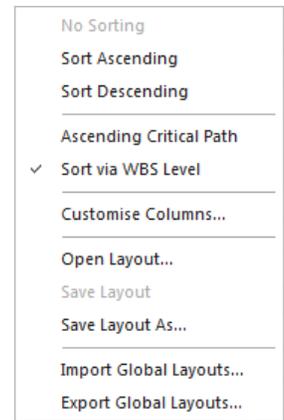
1. Open *SCH Training - Sorting.sp*. The rest of the links have been added for you.

The schedule can be sorted several different ways. Under **Task>Gantt Mode, WBS** has been chosen for the primary sort. If activity codes had been created and assigned to each activity the schedule could be sorted by the activity codes. (This will be covered in [section 12](#))

Another sort or a secondary sort can be chosen by right clicking on a specific Column title in the Task List and choosing one of the schedule sort options for that column – for example, ascending and descending by activity ID, by Start or by Finish. Specific sorts can also be selected such as Ascending critical path or Sort via WBS level.

For example, to see the tasks sorted by start date:

2. Change **Gantt Mode** to **List** in the **Task** tab
3. In the Task List, right click in the **Start** column to access the context menu.
4. Select **Sort Ascending**. The tasks are now sorted in order of start date like a waterfall.



5. Right click in the **Start** column and choose **No Sorting**
6. Change **Task>Gantt Mode** back to **WBS**

NOTE: In the column header context menu, Layouts refer to the how the task columns are organized for that specific project. Each time you add and/or reorganize the columns you can save it as a layout so it can be used another time. Global Layouts refer to Synchro task column layouts accessible for all projects on your computer.

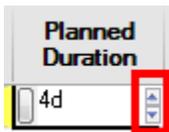
9. Task Modification

In this section, you will learn how to edit task durations and start and finish times.

9.1. Changing Duration

If the duration of a task needs to be revised, highlight the duration cell and type in the new value or use the up/down arrows to revise the value. The duration can also be revised by going to **Task Properties > General** and revising the value in the **Duration** cell.

1. Select the task **Footings, Area 1** and click in the **Planned Duration** cell
2. Either type **2d** (2 days) or double click in the duration cell, highlight the number **4** and use the down arrow until the duration reads 2d



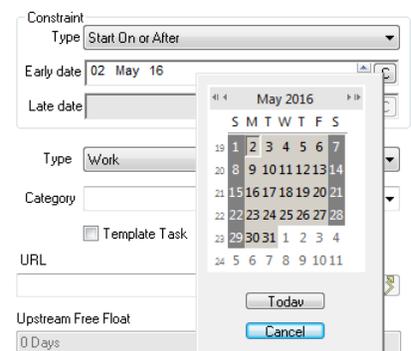
3. Press **F9** on the keyboard to reschedule the task.

9.2. Changing Start Times

The Start date drives the task. This should typically be controlled by the links but there may be instances that you want to push the start date of a task to another date for resource management. Once your date has been pushed an additional lag or constraints can be put in so the task will calculate to the new planned date.

Imagine for example, that the curtain wall subcontractor is not available until 02/05/16 because they are finishing another job. Using the schedule logic, the first task which requires the curtain wall subcontractor (**Curtain Wall, S**) is scheduled to start 27/04/16. Changing the task start date manually in the Start column of the task list will have no effect as it will snap back to the 27th according to the schedule logic when rescheduled. Artificial lag could be introduced, to force the task to start on 01/05/16, but if the preceding tasks become delayed, this artificial lag may cause the start date of the **Curtain Wall, S** task to start later than necessary. To change the start date of the **Curtain Wall, S** task we will add a **Start On or After** constraint.

1. Select the task - **Curtain Wall, S** under **Envelope** then open **Task Properties>General**
2. Change the **Constraint Type** to **Start On or After**
3. The **Early Date** (to start on or after) is automatically set to the Planned Start. To change the date, select the "C" to open the calendar, then select **2 May 16**.
4. Press F9 to reschedule.
5. A marker has been placed in the Gantt Chart to indicate that this task is constrained. Additionally an asterisk (*) has been added to the the Start column to indicate the constraint



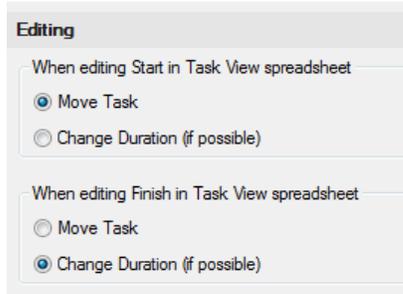
Name	Planned Duration	Start	Finish
Curtain Wall, S	9d	02/05/16 (*)	12/05/16

May 2016			
24th	1st	8th	15th
wk 8	wk 9	wk 10	wk 11

9.3. Changing Finish Times

As previously mentioned the Start time drives the task. If you try to move the Finish time, the task will move to a new starting point and the duration will remain intact, since the default setting in Synchro when editing the Finish date is “**Move Task**”. There may be times that a Task will start as scheduled but must complete on a particular date due to jobsite constraints. To move the Finish time and alter the duration a setting needs to be changed under **Options**

1. Select **Options>Gantt Chart>Editing**
2. Under **When editing Finish in Task View Spreadsheet** enable **Change Duration**



Editing

When editing Start in Task View spreadsheet

Move Task

Change Duration (if possible)

When editing Finish in Task View spreadsheet

Move Task

Change Duration (if possible)

3. Select the Task - *Trim-out, 00*
4. In the Task List, change the **Finish** date to 20 Jun 16
5. Press **F9** on the keyboard to reschedule

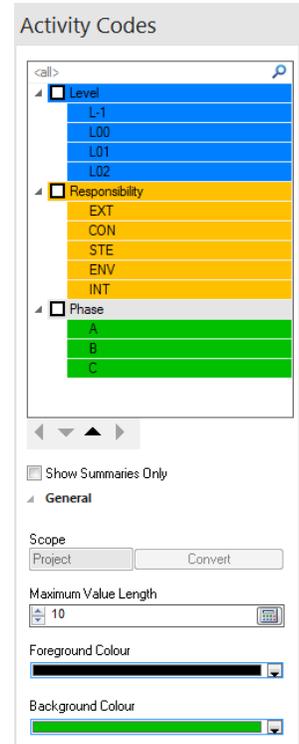
10. Activity Codes

In this section, you will learn how to create Activity Codes, assign them to tasks, and sort the schedule by Activity Codes.

Activity codes are used to organize tasks by grouping, sorting, and/or filtering. Each task can have an unlimited number of activity codes assigned to it. This allows greater flexibility for organizing, sorting, and filtering.

10.1. Creating Activity Codes

1. Open the saved SP file *SCH Training - Activity Codes.sp*
2. Select **Navigator** > **Activity Codes**. Two Activity Codes have already been added. We will add a third code.
3. Right click in top window and select **Add Activity Code** from the dialog box
4. Rename "New Activity Code" to **Phase**. Highlight the code
5. Open the **General** tab under **Activity Codes** and change the background colour to green
6. Select the **Phase** code, right click and select **Add Code Value** from the dialog box
7. Name the new **Phase** code value "A"
8. Repeat this step 2 times until you have **Phase** code values **A, B, & C**



10.2. Assigning Activity Codes

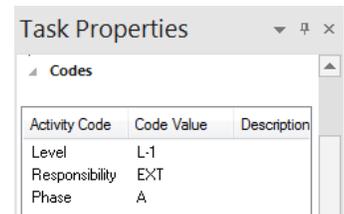
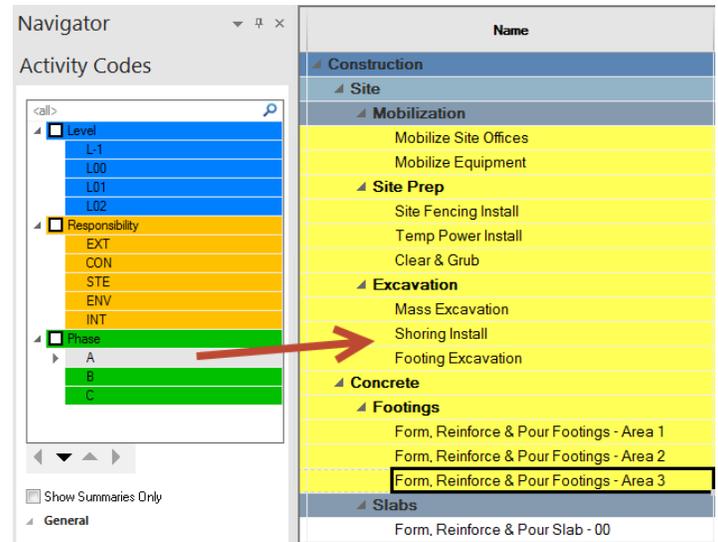
Activity codes can be assigned by simply selecting the task or tasks to be assigned to that code value, then clicking and dragging the code value to the tasks.

Assign the **Phase** code values:

1. Phase **A** is assigned to all sub tasks under **Site** and **Footings**
 - a. Select all the tasks under the **Site** and under **Footings** as shown on right
 - b. Left click on code value **A** under **Phase** as shown on right, hold and drag onto the selected activities
2. Assign Phase **B** in the same manner to all sub tasks under **Slabs, Steel, and Envelope**
3. Assign Phase **C** in the same manner to all sub tasks under **Interiors**

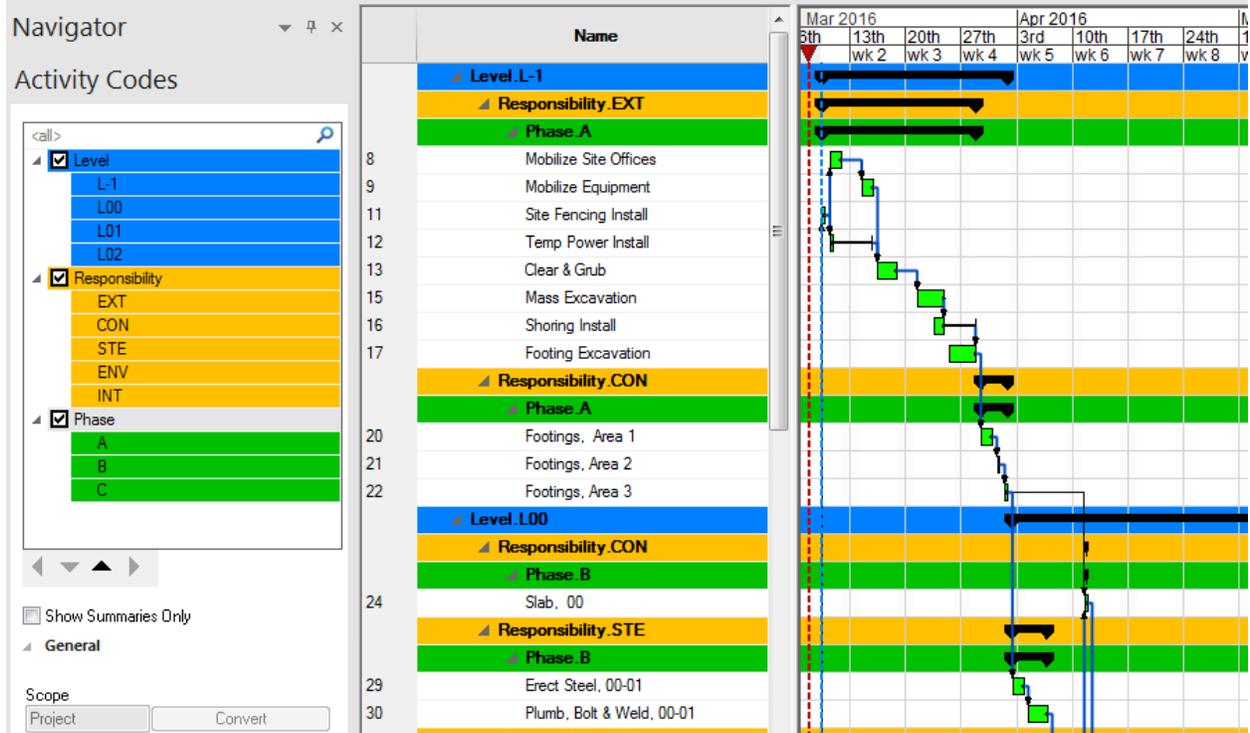
NOTE: Activity Codes will only be assigned to bottom level tasks, never to summaries (even if selected)

4. To check the codes assigned to a task, select a task, for example **Shoring Install**. Then open **Task Properties**>**Codes**. The Code and associated code value will be shown in the dialog box as shown



10.3. Sorting by Activity Codes

1. To view the Gantt Chart as Activity Codes from the **Task Tab**, select **Gantt Mode> Activity Code**.
2. Then under **Navigator> Activity Codes**, enable the check box next to the codes you want to organize by. For this training, enable all 3 Codes
3. The Gantt chart should be organized as shown



The sort priority for the Gantt Chart can be defined by prioritizing of the codes and code values. To prioritize, select the code or code value and use the arrows towards the bottom of the **Navigator> Activity Codes** window to rearrange.

- Select Phase and use the up arrow to move it to the top of the list. Select Level and use the down arrow to move it to the bottom of the list so the priority is **Phase**, followed by **Responsibility**, then **Level**. The task sorting in the Gantt Chart will update accordingly:

The screenshot displays the Synchro PRO interface. On the left, the 'Navigator' window shows 'Activity Codes' with a search bar and a list of codes: Phase (A, B, C), Responsibility (EXT, CON, STE, ENV, INT), and Level (L-1, L00, L01, L02). A red circle highlights the up and down arrow navigation buttons. Below the list are checkboxes for 'Show Summaries Only' and 'General', and a 'Scope' section with 'Project' and 'Convert' buttons.

The central pane shows a list of tasks with their names and activity codes. The tasks are grouped by Phase (A and B), Responsibility (EXT and CON), and Level (L-1, L00, L01, L02). The task list includes: Mobilize Site Offices, Mobilize Equipment, Site Fencing Install, Temp Power Install, Clear & Grub, Mass Excavation, Shoring Install, Footing Excavation, Footings, Area 1, Footings, Area 2, and Footings, Area 3.

On the right, a Gantt chart shows the project schedule from March 6th to April 17th, 2016. The chart is color-coded by activity code: green for Phase, yellow for Responsibility, and blue for Level. A red vertical line indicates the current date.

11. Resources

In this section you will learn how to create resources and assign them to tasks.

There are 4 types of Resources available in Synchro – Equipment, Human, Location, and Material – which can be assigned to individual tasks to manage resource utilization and cost. Resources belong to Companies; therefore the company should exist in Synchro before a resource is created.

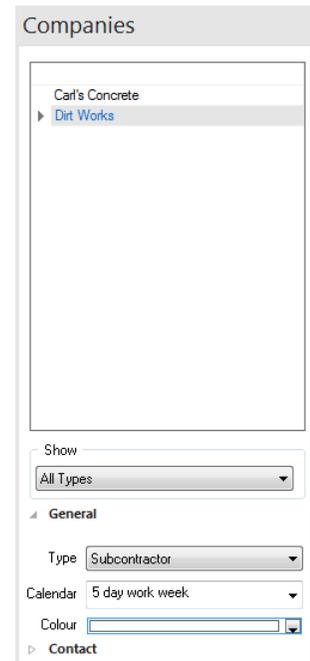
11.1. Companies

Companies are responsible for providing resources for the project tasks. Companies can be added by opening the **Companies** tab in the **Navigator** Window.

1. Right click in the **Companies** list panel and select **Add** from the context menu.
2. A new company named **New Company** will be added. Rename **New Company** to **Dirt Works**
3. Highlight the company **Dirt Works**. Open up **Companies > General** Tab and change the **Type** to **Subcontractor**. It is possible to specify a working calendar for each Resource; for this Company, leave the **Calendar** as **5 day work week**.

NOTE: Contact information for the Company can be added in the **Contact** tab below

4. Add a second **Company** called **Carl's Concrete** and set the **Type** to Subcontractor



11.2. Creating Resources

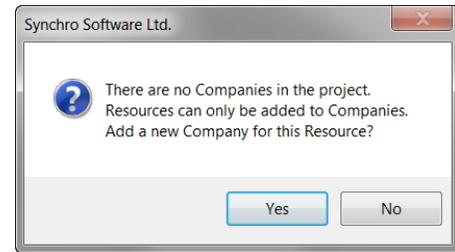
1. In the **Navigator** > **Companies** list panel highlight the company **Dirt Works**.
2. Select the **Resources** tab on the bottom of the **Navigator** to open the Resources window
3. With **Dirt Works** highlighted, right click in the **Resource window** to open the context menu. Select **Add Equipment**
4. A **"New Equipment Resource"** will appear in the name cell. Rename this to **Backhoe**.
5. In **Navigator**>**Companies**, select **Carl's Concrete**
6. In the **Resources** Window, right click to **Add Human**
7. A **"New Human Resource"** will appear in the name cell. Rename this to **Concrete Crew**

NOTE: If you've accidentally added a Resource with the wrong Company or need to edit the company later, you can always change the Company by selecting from the drop-down list in the **Supplier** column of the **Resources** window (scroll to the right to see other columns or undock the Resources window and resize it to see all columns)

8. Once the new resources have been added the Resources window should look as follows:

Resources				
	Name	Type	Supplier	Calendar
	<all>	<all>	<all>	<all>
	▲ Equipment Resources			
1	Backhoe	Equipment	Dirt Works	5 day work w...
	▲ Human Resources			
3	Concrete Crew	Human	Carl's Concrete	5 day work w...

NOTE: If you try to **Add** a new Resource of any type before creating at least one Company, the message shown to the right will appear. Selecting **Yes** will add a **New Company** to the Company list panel along with a New Resource in the Resource window. Both of these can be renamed



11.3. Sub-Resources

There are times when a resource needs to be broken down into sub-resources. For example, the concrete crew is comprised of carpenters, labourers, iron workers, and finishers. To track the work each discipline performs on a task the **Concrete Crew** resource must be broken down into sub resources

1. Select **Concrete Crew** in the **Resource Screen**
2. Right Click to open the context menu and select **Add Human**
3. A **New Human Resource** will be added below **Concrete Crew** and it will be indented. Rename this human resource to **Carpenter**
4. Again, highlight **Concrete Crew** in the **Resource Screen**
5. Right Click to open the context menu and select **Add Human**
6. A second **New Human Resource** will be added below **Concrete Crew** and it will be indented. Rename this human resource to **Labourer**
7. Repeat this process to add **Iron Worker** and **Finisher** under the **Concrete Crew**. Once all the sub-resources have been added the **Resource Screen** should look as follows

Name	Type	Supplier	Calendar
<all>	<all>	<all>	<all>
▲ Equipment Resources			
Backhoe	Equipment	Dirt Works	5 day work w...
▲ Human Resources			
▲ Concrete Crew	Human	Carl's Concrete	5 day work w...
Carpenter	Human	Carl's Concrete	5 day work w...
Finisher	Human	Carl's Concrete	5 day work w...
Finisher	Human	Carl's Concrete	5 day work w...
Iron Worker	Human	Carl's Concrete	5 day work w...

11.4. Assigning Resources to Tasks

The easiest way to assign a resource to a task is to have both the **Task List** open as well as the **Resources** window. This allows you to drag and drop resources to a task or drag and drop tasks to a resource. For this tutorial it will be easier to have the tasks sorted by Activity Code.

1. In the **Task List** under **Phase A**, highlight the tasks - **Mass Excavation**; **Footing Excavation**; and **Shoring Install**
2. Highlight **Backhoe** in the **Resources** window and drag and drop it onto the three highlighted tasks to assign it
3. In **Navigator** > **Activity Codes**, uncheck **Phase** and **Level** so that **Responsibility** is the only Activity Code being used to sort the Gantt Chart.

- Select all 6 tasks under the Code **Responsibility.CON** in the Task List

The screenshot displays the Synchro PRO interface. On the left, the 'Navigator' window shows a tree view under 'Activity Codes' with 'Phase' expanded and 'Responsibility' checked. Below it, 'Level' is expanded showing L-1, L00, L01, and L02. The central 'Task List' window shows a list of tasks from 8 to 29. Tasks 20 through 26, which are under the 'Responsibility.CON' code, are highlighted in yellow. The right window is a Gantt chart showing a project schedule for April 2016, with weeks 4, 5, and 6 visible. A network of task bars and arrows is shown, with the 'Responsibility.CON' tasks highlighted in yellow.

- In the **Resources** window, highlight **Concrete Crew** and drag and drop onto the selected tasks to assign.
- Left click to select just one of the **Responsibility.CON** tasks
- Open **Task Properties>Resources** on the right of the screen to verify that the Concrete Crew and all its sub-resources have been assigned to the task.

NOTE: The sub-resources can also be assigned individually by selecting them at the bottom of the Resources tree

The screenshot shows the 'Task Properties' window with the 'Resources' tab selected. The 'Resources' tree is expanded to show 'Human Resources'. Under 'Human Resources', 'Concrete Crew' is selected, and its sub-resources are listed: Carpenter, Finisher, Iron Worker, and Laborer.

12. Task Costs

In this section, you will learn how to assign costs to resources and directly to tasks, and how to view the project costs and Earned Value graph.

Costs can be assigned to each task. This is either done by assigning cost to the **Resource**, thus a task's cost is computed based on resource utilization, or by assigning a **Direct** cost to a task.

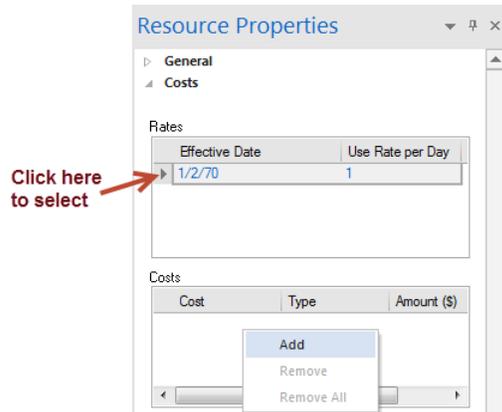
First check the correct currency is selected. Select **Options > General > Currency**. Select the desired currency and formats.

NOTE: The currency settings affect the display only. Switching between currencies simply updates the currency symbol (\$, £, €, etc) beside the cost amount – it does NOT convert the value.

12.1. Resource Costs

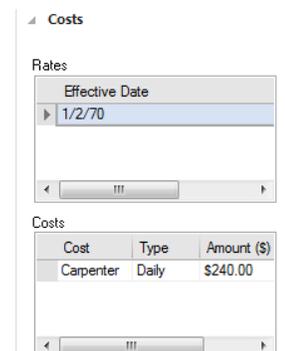
To assign a cost via the **Resource**, use **Resource Properties>Costs** window to define the resource utilization over a period of time, as well as the type of cost.

1. Open *SCH Training - Costs.sp*
2. Select **Task>Gantt Mode>WBS**
3. Open the **Resources** window
4. Highlight **Carpenter** on the **Resource** screen
5. Open **Resource Properties>Costs**
6. Under the **Rates** window, select the Effective Date row so it is highlighted



NOTE: If the cost changes depending on the date (e.g. peak rates during summer months) an additional Effective Date could be added and a different cost defined

7. Right click in the **Costs** window and select **Add**
8. A **New cost** will appear that can be defined for the Carpenter Resource
9. Modify the **New Cost** to **Carpenter**; change the **Type** to **Daily**; and put in **\$240** under the **Amount**
10. For practice, using the same method as above assign the following cost to the **Finisher** as noted follows: **Type** = Daily ; and **Amount** = \$280.
The Costs for the other Concrete Crew resources have already been assigned.



- Select task **Slab, 00**, and open **Task Properties>Cost Totals**. You will see the costs from all the assigned resources including the **Type** (Daily, Hourly, Fixed), **Amount** (e.g. Daily rate), **Units total** (e.g. # of days) and the **Amount total** (=Amount x Units total). The **Total** task cost is listed below – if there are **Direct** costs (discussed next in section 14.2) or **Risk** costs, these will be summed with the **Resource** costs to make the **Total**.

Cost	From	Type	Amount (\$)	Units total	Amount total...
Carpenter	Human	Daily	\$240.00	1.00	\$240.00
Iron Worker	Human	Daily	\$320.00	1.00	\$320.00
Finisher	Human	Daily	\$280.00	1.00	\$280.00
Labourer	Human	Daily	\$200.00	1.00	\$200.00

Budgeted Totals	
Resource	
Human	\$1,040.00
Equipment	\$0.00
Location	\$0.00
Material	\$0.00
Risk	
Mitigated	\$0.00
Unmitigated	\$0.00
Other	
Direct	\$0.00
Total	\$1,040.00

12.2. Direct Costs

Budgeted Costs or Direct costs are costs directly attributable to the execution of a Task. Direct costs are task costs not associated with a resource. Direct costs are either **Fixed** (incurred once) or **Variable** (a value that will be multiplied by time units to give a total cost). A task may have more than one assigned direct cost. Direct Costs can be used in order to cost load a schedule without resource loading (or in addition to resource costs). Assigning a Direct Cost to a task is accomplished by adding the cost under **Task Properties > Budgeted Costs**

- Open the **Task Properties > Budgeted Costs** and **Task Properties > Cost Totals** tabs.
- Highlight the task **Clear & Grub** under **Site Prep**. Assume for the purposes of this training that this task is going to be subcontracted out for a direct daily unit price.
- Under **Budgeted Costs**, right click in the cost window
- Select **Add** and a **“New Cost”** item will appear
- Rename the **“New Cost”** to **Clear & Grub**
- Modify the **Type** to **Daily** under the drop down menu
- Change the amount from **\$0** to **\$2000**
- Under **Task Properties>Cost Totals** you will see that the **Cost** summary window, the **Budgeted Totals** window - **Direct** and **Total** reflect \$6000. This was calculated based on the task’s daily direct cost of \$2000 and the 3 day task duration. The Cost Total fields have been populated as shown below.

Task Properties		
Budgeted Costs		
Cost	Type	Amount (\$)
Clear & Grub	Daily	\$2,000.00

Cost Totals					
Cost	From	Type	Amount (\$)	Units total	Amount total...
Clear & Grub	Direct	Daily	\$2,000.00	3.00	\$6,000.00

Budgeted Totals	
Resource	
Human	\$0.00
Equipment	\$0.00
Location	\$0.00
Material	\$0.00
Risk	
Mitigated	\$0.00
Unmitigated	\$0.00
Other	
Direct	\$6,000.00
Total	\$6,000.00

A direct cost can also be assigned as a fixed cost. The **Fixed** cost is the total lump sum cost for that task regardless of task duration.

- 9. Highlight the task **Temp Power Install**. Assume for the purposes of this training that this task is going to be subcontracted out for a fixed lump sum price.
- 10. Under **Budgeted Costs**, right click in the cost window
- 11. Select **Add** and a **“New Cost”** item will appear
- 12. Rename the **“New Cost”** to **Temp Power Install**
- 13. Modify the **Type** to **Fixed** under the drop down menu
- 14. Change the amount from **\$0** to **\$1000**

▲ Budgeted Costs

Cost	Type	Amount (\$)
Temp Power Install	Fixed	\$1,000.00

- 15. Under **Task Properties>Cost Totals** you will see that the **Cost** summary window, the **Budgeted Totals** window **Direct** and **Total** reflect \$1000. The Cost Total fields have been populated as shown below

▲ Cost Totals

Cost	From	Type	Amount (\$)	Units total	Amount total...
Temp Power ...	Direct	Fixed	\$1,000.00	1.00	\$1,000.00

Budgeted Totals

Resource	
Human	\$0.00
Equipment	\$0.00
Location	\$0.00
Material	\$0.00

Risk	
Mitigated	\$0.00
Unmitigated	\$0.00

Other	
Direct	\$1,000.00

Total	
	\$1,000.00

12.3. Viewing the Project Budgeted Costs

Cost can be viewed at the task, summary task, or project level

- 1. The rest of the task and resource costs have been assigned for you. In the Task List select the **Construction** summary task to see the total cost of all the tasks
- 2. All the different costs are reflected under **Task Properties>Cost Totals** in the **Cost** summary panel. You will need to scroll down to see all the assigned costs.

The **Budgeted Totals** panel reflects the total **Resource** cost, total **Direct** cost and the **Total** cost as shown below

Cost	From	Type	Amount (\$)	Units total	Amount total (\$)
MEP Crew	Human	Daily	\$1,100.00	3.00	\$3,300.00
Trim-Out	Direct	Fixed	\$1,000.00	1.00	\$1,000.00
Drywall Crew	Human	Daily	\$500.00	5.00	\$2,500.00
Equipment/Dry	Direct	Fixed	\$1,000.00	1.00	\$1,000.00

Budgeted Totals

Resource

- Human: \$112,580.00
- Equipment: \$0.00
- Location: \$0.00
- Material: \$0.00

Risk

- Mitigated: \$0.00
- Unmitigated: \$0.00

Other

- Direct: \$100,000.00

Total: \$212,580.00

- 3. To review the Total Project Budgets open **Navigator>Project>Costs**. You will see there are Budget Totals for both the **Resources Human - Costs** and the **Task Direct - Costs**

Navigator

Project

- Details
- Costs

Budgeted Totals

Resources

- Human: \$112,580.00
- Equipment: \$0.00
- Location: \$0.00
- Material: \$0.00

Risks

- Mitigated: \$0.00
- Unmitigated: \$0.00

Tasks

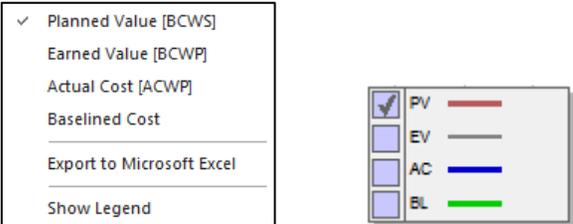
- Direct: \$100,000.00

Total: \$212,580.00

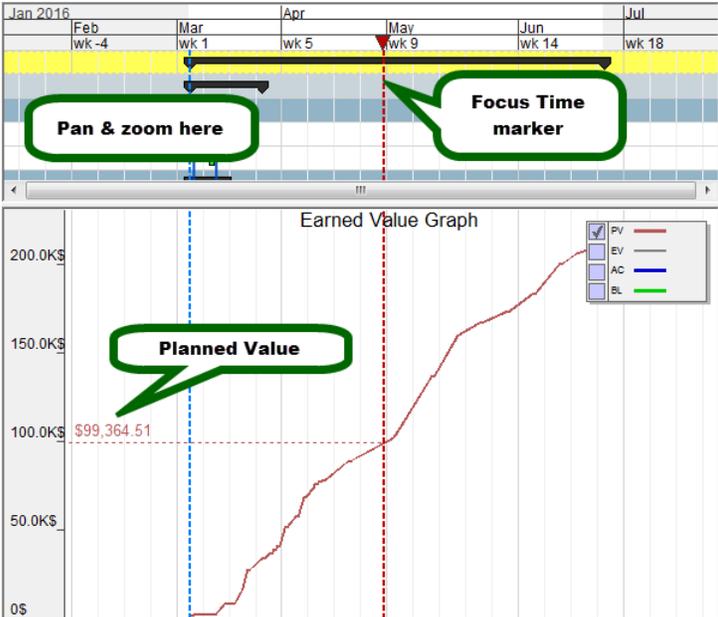
12.4. EVA Graph

Earned Value Analysis (EVA) allows you to compare the Planned Costs of the project against the value of the work completed. Cost comparison will be discussed further in section 15.3. The EVA graph can also be used to view how the budgeted costs are distributed over the lifetime of the project.

- 1. From the **Windows** ribbon, open the **EVA Graph** window. The EVA Graph window will open below the Gantt Chart
- 2. Right click in the EVA Graph window to access the context menu. Deselect **Earned Value, Actual Cost,** and **Baselined Cost** so that **Planned Value** is the only option selected. These graph lines can also be turned on and off via the check boxes in the Legend



- 3. The budgeted costs or Planned Value (PV) for the selected task(s) and subtasks (if any) will display in the EVA graph. Select the **Construction** summary task to see the Planned Value line for the entire project.
NOTE: Zoom and pan for the EVA graph is controlled in the Gantt Chart
- 4. Drag the red focus time marker through the project timeline to see the Planned Value at any point in time



- 5. Select **EVA Graph** in the **Windows** ribbon to hide the EVA Graph window

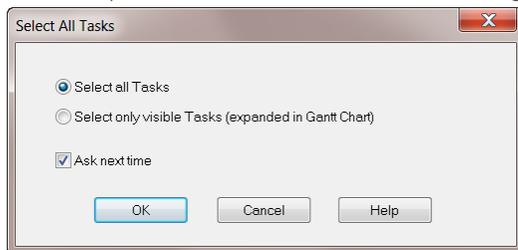
13. Baselines

In this section, you will learn how to save a baseline and compare a baseline to the current schedule

A baseline is a snapshot in time that can be created to analyse “what-if” scenarios or compare planned against actual in Synchro. Baselines can be made up of all tasks or just a few tasks. It depends on what needs to be compared.

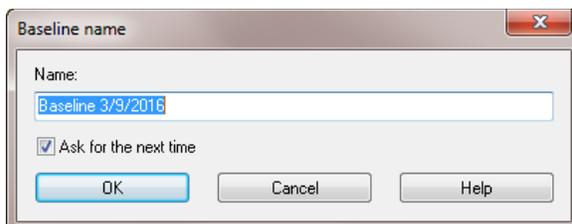
13.1. Create a Baseline

1. Open the saved SP file *SCH Training - Baselines.sp* Some changes have been made to the schedule for a what-if comparison.
2. Make sure the Gantt View is set to WBS mode (**Task>Gantt Mode> WBS**)
3. Select the **Navigator>**  **Baselines and Scenarios** button and select *All* under **Show**
4. Right click in the Task List and then click **Select All** (or type **Ctrl + A**)
5. You will be presented with a **Select All Tasks** dialog window - Choose **Select all Tasks** then click **OK**

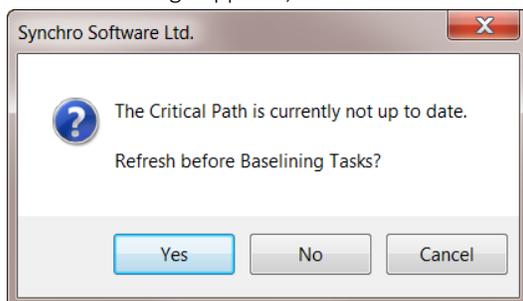


NOTE: If any WBS summaries are collapsed in the Gantt Chart, any of their children tasks will not be included in the Baseline when the “Select only visible Tasks” option is chosen

6. Right click again in the task window and select **Baseline Selected Tasks**
7. The **Baseline name** window will be shown. The name automatically includes the Data Date. You can choose to leave the name as it is, or rename to something more descriptive. For this training, rename to *Revised Schedule* and select **OK**.

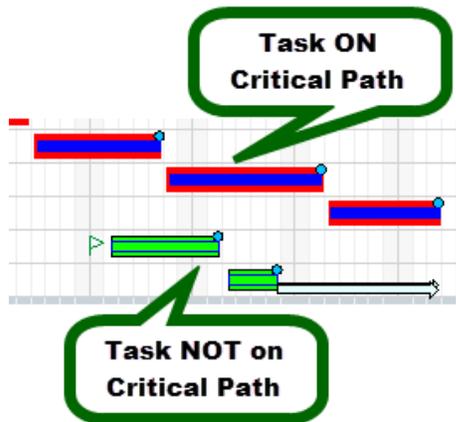


8. When this message appears, select **Yes** to recalculate the critical path.

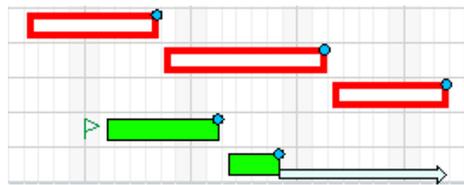


9. The new baseline will be listed in the **Navigator** > **Baselines and Scenarios** window. In the current schedule, the critical path tasks are white outlined in red, whereas tasks not on the critical path are green as shown below. The Baseline is directly over the current schedule, with critical tasks in solid blue, and non-critical tasks outlined in blue but hollow.

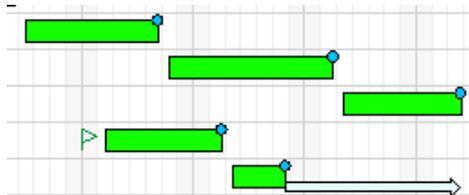
NOTE: The Baseline bar colour can be changed by opening **General** in the **Baselines Tab** and selecting a new colour. The Critical task colour is controlled in **Options**>**Gantt Chart**>**Colours**>**Critical Path**



10. To turn off the **Baseline** display in the Gantt Chart go to **Navigator** > **Baselines and Scenarios** and deselect **Revised Schedule**. Below it is easier to differentiate between the display critical and non-critical tasks in the current schedule.

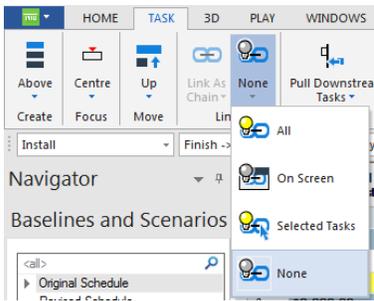


11. To turn off the Critical Path display, toggle off **Compute Critical Path** in the **Home** ribbon. This command can be used to calculate and display the critical path at any time.

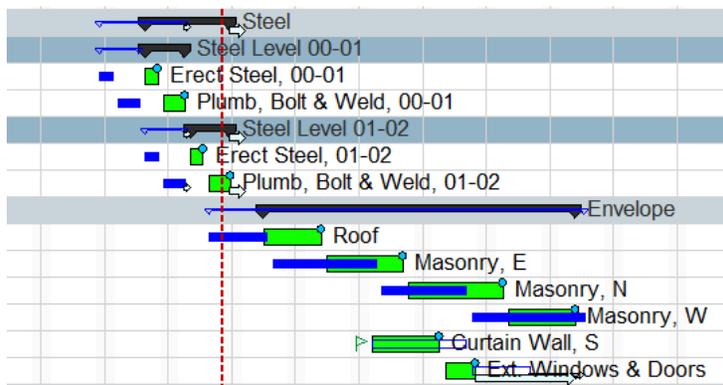


13.2. Baseline Comparison

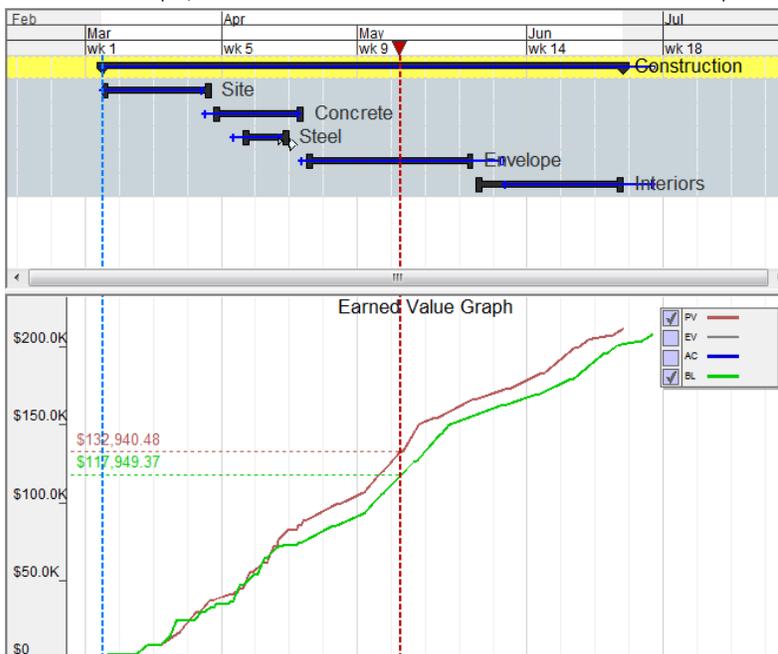
1. A baseline of the original schedule was also saved in the file. In **Navigator** > **Baselines and Scenarios** select the **Original Schedule**
2. In **Task**>**Links** choose **None** to hide all links to see the baseline more clearly



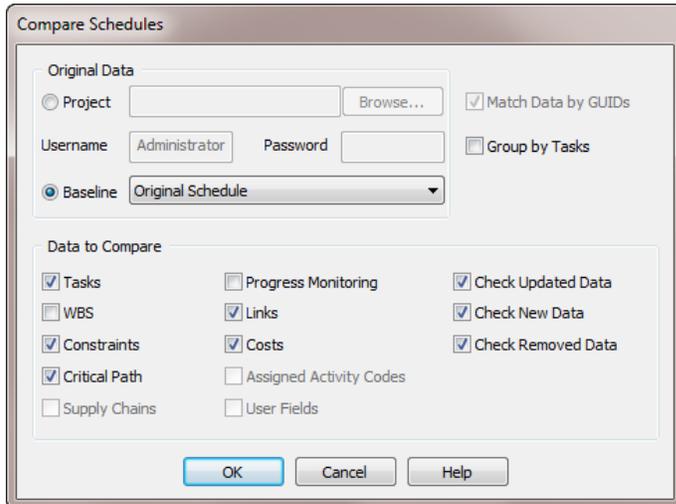
You will then see a difference between the original plan and the revised



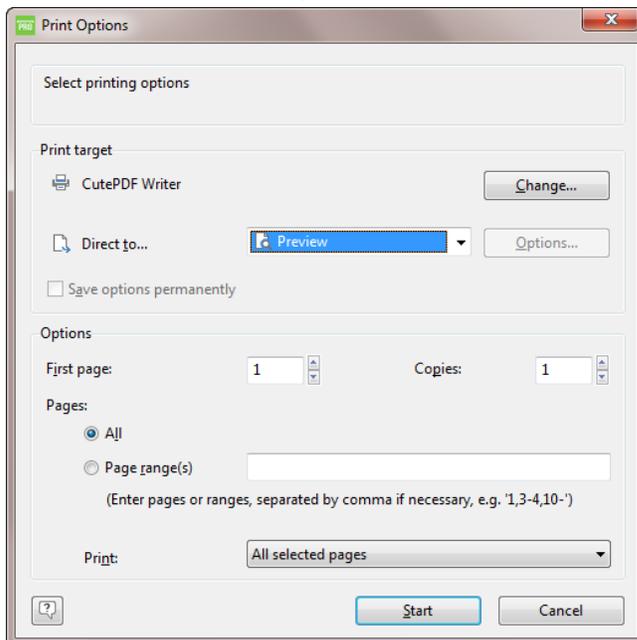
3. Open **Customise Columns**. Add the **Baseline Start** column and the **Baseline Finish** column to compare the initial early dates to the current planned early dates
4. You can also see how the baseline and current planned costs compare in the EVA graph. Select **Windows**>**EVA Graph** and select the **Construction** summary task in the Task List
5. In the EVA Graph, enable both the **PV** and **BL** curves to see the comparison of project costs over time



6. Select **Windows>EVA Graph** to hide the EVA window
7. To create a comparison report between the revised and the baseline schedule, select **Home>Compare Schedules**
8. Under **Original Data**, choose which schedule to compare to the current by selecting **Baseline** and choose **Original Schedule** from the drop-down list of baselines.
9. Under **Data to Compare**, you have the option of choosing which data comparisons should be included in the report. Deselect **WBS** and **Progress Monitoring**, for example, to exclude those from the comparison and select **OK**



10. Select **Yes** to update the critical path.
11. The **Print Options** window opens. Using the **Direct To** drop-down list, you can choose to create the report in a number of formats including Excel, PDF, and Word. For now, leave it set to **Preview** and select **Start**



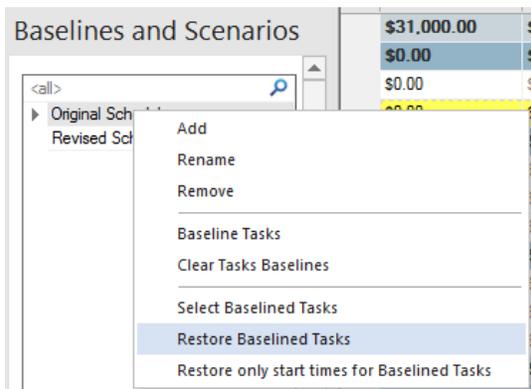
12. The report will look like this:

Synchro Schedule Differences Report			
Executed by: Administrator			
Date: 9/30/2015			
Project: C:\Users\l\OneDrive\Documents\Projects\2015\20150930\20150930.rpt			
Data date: 3/9/2016			
Original project: Original Schedule			
Original data date: 3/9/2016			
ID	Name	New value	Old value
Budgeted Direct Cost			
ST00190	Mass Excavation	\$12,000.00	\$8,000.00
ST00210	Footing Excavation	\$6,000.00	\$4,000.00
ST00340	Slab, 00	\$2,500.00	\$0.00
ST00360	Slab, 01	\$2,000.00	\$0.00
ST00390	Slab, 02	\$2,000.00	\$0.00
Budgeted Total Cost			
ST00190	Mass Excavation	\$15,900.00	\$10,600.00
ST00210	Footing Excavation	\$7,950.00	\$5,300.00
ST00340	Slab, 00	\$3,540.00	\$1,040.00
ST00360	Slab, 01	\$3,040.00	\$1,040.00
ST00390	Slab, 02	\$3,040.00	\$1,040.00
ST00460	Masonry, E	\$12,000.00	\$13,000.00
ST00470	Masonry, N	\$12,000.00	\$13,000.00
ST00480	Masonry, W	\$12,000.00	\$15,000.00
ST00490	Curtain Wall, S	\$17,000.00	\$21,500.00
ST00500	Ext. Windows & Doors	\$14,000.00	\$15,500.00
Downstream Free Float			
ST00340	Slab, 00	1d	2d
ST00430	Plumb, Bolt & Weld, 01-02	1d, 1h	1h
Downstream Total Float			
ST00055	Site Fencing Install	1d	0 Days
ST00057	Temp Power Install	1d	0 Days
ST00058	Clear & Grub	1d	0 Days
ST00170	Mobilize Site Offices	1d	0 Days
ST00180	Mobilize Equipment	1d	0 Days
ST00190	Mass Excavation	1d	0 Days
ST00200	Shoring Install	1d	0 Days
ST00210	Footing Excavation	1d	0 Days
ST00280	Footings, Area 1	1d	0 Days
ST00290	Footings, Area 2	1d	0 Days
ST00300	Footings, Area 3	1d	0 Days

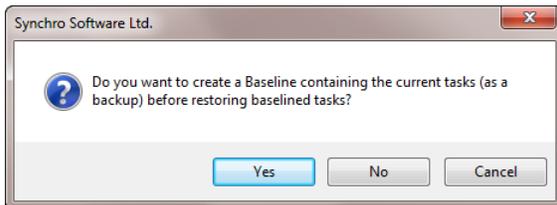
- Page 1/9 -

13.3. Restore a Baseline

1. To restore the original dates, select the *Original Schedule* baseline in **Navigator** > **Baselines and Scenarios**, right click and select **Restore Baselined Tasks**



2. The following dialog will appear. For this training, select **No** to continue without creating a Baseline of the current schedule.



NOTE: The **Restore Baselined Tasks** command will restore any tasks that were deleted since the baseline was created, delete any tasks created after the baseline was saved, and restore the start dates of all tasks as stored in the baseline. Resource assignments are not stored with baselines – the current resource assignments will remain for tasks that are in the current as well as baseline schedule.

The **Restore only start times for Baselined Tasks** command will update the current schedule with the start dates of the baselined tasks stored in the selected Baseline, but does not affect tasks that were deleted or created since the baseline was saved.

3. To turn off the Baseline, select the **Navigator** > **Baselines and Scenarios**, then click in the white space to un-highlight the selected Baseline

14. Schedule Updating & Monitoring

In this section, you will learn how to update the status and progress of a task and record actual costs.

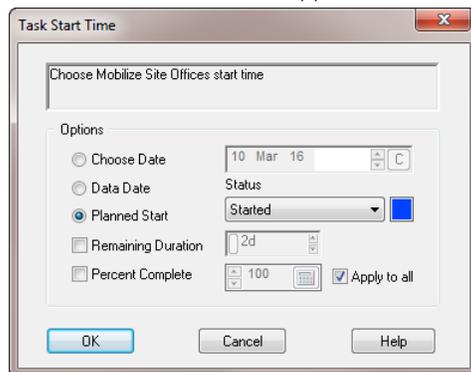
The schedule progress can be recorded and monitored in Synchro. For this training, we'll use 15 April 2012 as the progress date, or Data Date.

14.1. Updating Tasks

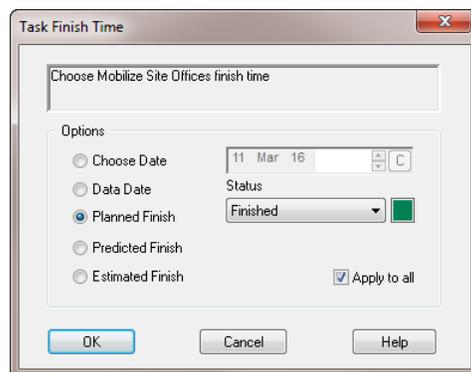
1. In **Navigator>Project>Details**, ensure the **Data Date** is set to **Manual** and change it to **30 April 2016**
2. Select the task **Mobilize Site Offices**, hold down the **Shift** key and select the task **Plumb, Bolt & Weld, 01-02** so that all the tasks in between are highlighted
3. Assume that the selected tasks started and finished on schedule. Right click on one of the selected tasks and choose **Progress>Finish Tasks** from the context menu.

NOTE: Summary tasks take their progress from their children tasks and cannot be statused directly, so it does not matter if they are selected or not when updating tasks.

4. The **Task Start Time** window appears. Select **Planned Start**, enable **Apply to all** and press **OK**



5. The **Task Finish Time** window will appear



NOTE:

- The **Predicted Finish** is the date that the Task was predicted to finish based on the actual start date + duration of the Task.
- The **Estimated Finish** is the date that the Task is estimated to be finished based on the start date + duration +/- progress reports).
- **Predicted** and **Estimated** finish will be equal if no progress reports (negative or positive) have been defined.

6. Select **Planned Finish** and enable **Apply to All**
7. All selected tasks will be given the status of **Finished**
8. Assume a rain delay caused the **Roof** task to start later than planned. Select the **Roof** task under **Envelope**
9. In **Task Properties>Monitoring**, change the **Status** from **Planned** to **Finished**.
10. The **Task Start Time** window appears for the task **Roof**. Select **Choose Date** then click the "C" button to open the calendar and choose **21 April 16** as the Actual Start.
11. The **Task Finish Time** window will appear. Select **Predicted Finish**. This will use the **Actual Start** date you just chose and the **Planned Duration** to calculate the **Actual Finish** date

- The result should look as follows:



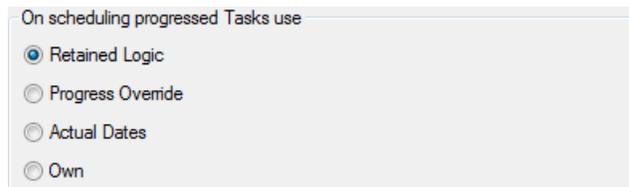
The dark green rectangle with black outline indicates the actual date and the thin green line marks the planned duration dates for comparison.

- Select the task *Masonry – E*, and change the **Status** to **Started** in **Task Properties>Monitoring**.
- The **Task Start Time** window will appear. Select **Choose Date**, set the start to **28 Apr 2015** and press **OK**
- The Task bar changes colour to blue to reflect the new Started status. The light green line indicates the Planned duration of the Task. The dark green line at the bottom of the task bar indicates the portion completed up to the Data Date.

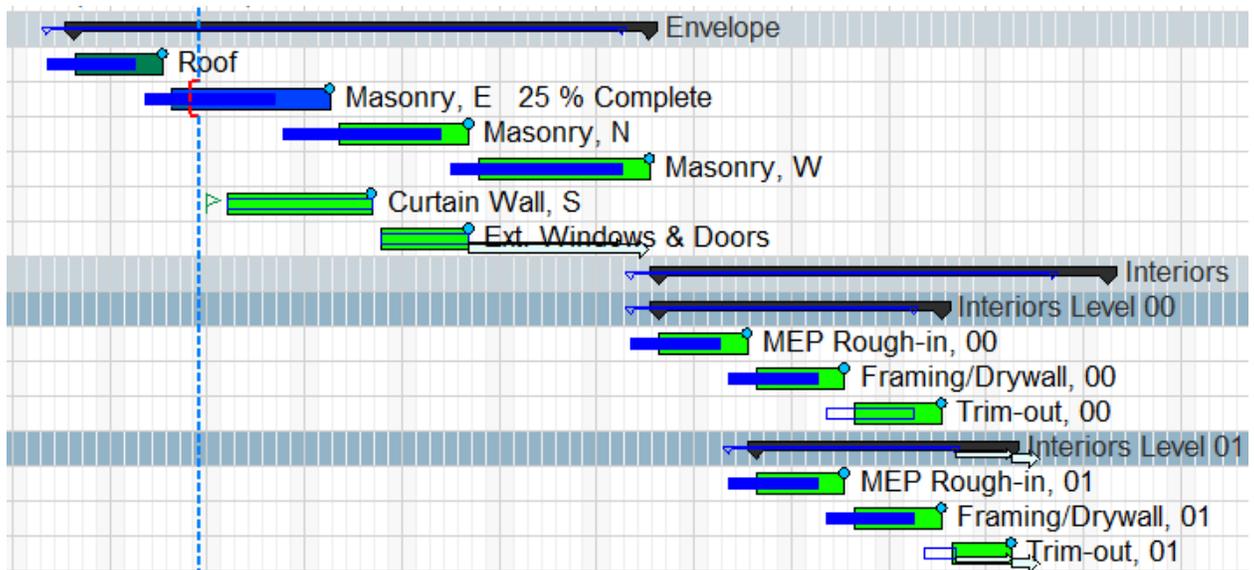


NOTE: The **% Complete** can alternatively be displayed as a **Duration Complete**, **Remaining %** or **Remaining Duration** by changing the settings under **Options > Gantt Chart > Progress**

- In **Options>Gantt Chart>Rescheduling>Parameters**, ensure that **On scheduling progressed Tasks use** is set to **Retained Logic**



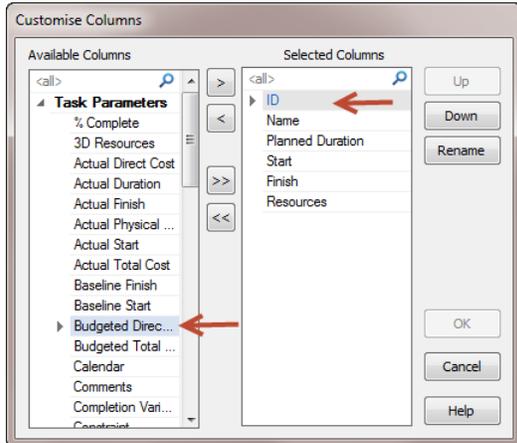
- Press **F9** on the keyboard to reschedule the remaining Planned tasks
- In **Navigator> Baselines and Scenarios**, select **Original Schedule** to see the updated schedule compares to the baseline in the Gantt Chart



14.2. Actual Costs

When tasks are marked as Finished, the Actual Costs from Resources are updated automatically. Direct Task Costs will need to be entered manually.

1. Open the saved file *SCH Training -Actual Costs.sp*
2. Right click in the Task List header and choose **Customise Columns**
3. From **Available Columns**, select **Budgeted Direct Cost**, and from **Selected Columns**, select **ID**. Use the single arrow button to move **Budgeted Direct Cost** to the **Selected Columns** – it will be added directly below **ID**.



4. Use this same method to add **Actual Direct Cost**, **Budgeted Total Cost**, and **Actual Total Cost** in that order. The result is as follows:

Budgeted Direct Cost	Actual Direct Cost	Budgeted Total Cost	Actual Total Cost	Name
\$37,000.00	\$8,000.00	\$89,000.00	\$25,000.00	Envelope
\$5,000.00	\$5,000.00	\$11,000.00	\$11,000.00	Roof

5. Select task *Curtain Wall, S*
6. Open **Task Properties>Cost Totals**. You will see that there are both Resource and Direct Costs assigned to the task. There are no Actual Costs yet since the task is still in the Planned Status.
7. In **Task Properties>Monitoring**, change the task **Status** to **Finished**. When prompted, select **Planned Start** and **Planned Finish**, then press **OK**.
8. In **Task Properties>Cost Totals**, you will see that the **Actual Costs** have been updated for the Resource cost only
9. To update the direct task cost: in the Task List, left click in the **Actual Direct Cost** cell for the *Curtain Wall, S* task and type 8500. Commas and currency symbols will be added automatically. The **Actual Total Cost** cell will be updated accordingly

Budgeted Direct Cost	Actual Direct Cost	Budgeted Total Cost	Actual Total Cost	Name
\$8,000.00	\$8,500.00	\$21,500.00	\$22,000.00	Curtain Wall, S

Actual Direct Cost for all the other **Finished** tasks has already been input this way.

10. Select the Task *Masonry, N* under *Envelope*. This task is in progress. In **Task Properties>Cost Totals** and the **Actual Total Cost** cell in the Task List you can see that the Actual Resource cost has been updated based on the % Complete.

Cost Totals

Cost	From	Type	Amount (\$)	Units total
Curtain Wall Crew	Human	Daily	\$1,500.00	9.00
Curtain Wall	Direct	Fixed	\$8,000.00	1.00

Budgeted Totals

Resource	Amount
Human	\$13,500.00
Equipment	\$0.00
Location	\$0.00
Material	\$0.00

Risk

Mitigated	\$0.00
Unmitigated	\$0.00

Other

Direct	\$8,000.00
Total	\$21,500.00

Actual Totals

Resource	Amount
Human	\$0.00
Equipment	\$0.00
Location	\$0.00
Material	\$0.00

Other

Reports	\$0.00
Total	\$0.00

11. To input the Actual Direct Cost so far, in **Task Properties>Monitoring**, right click in the reports window (as shown to the right) and select **Add Actual Expense**. An **Expense Report** will be added to the list panel with the Data Date as the **Report Date**.
12. With the **Expense Report** selected and highlighted, right click in the **Costs** panel below and select **Add**.
13. Rename the **New Cost** to **Masonry Materials** and enter \$3,000 for the **Amount**.

NOTE: Additional itemized costs can be added to a single Expense Report, and additional Expense Reports can be added with differing Report Dates allowing the user to keep a detailed log of task expenses.

Reason	Date	Type
Expense Report	5/13/2016	Actual Expense

Report Date: 13 May 16

Comments:

Value: Delay Advance
 Percent: 0 %
 Duration: 0 Days

Cost	Type	Amount (\$)
Masonry Materials	Fixed	\$3,000.00

Monitoring

Status: Started

Actual Start: 10 May 16

Estimated Finish: 19 May 16

Progress: Automatic

% Complete: 37.50

Remaining Duration: 5d

Physical Volume:
 Actual: 0
 Remaining: 0

Reason	Date	Type
Expense Report	5/13/2016	Actual Expense

Right click here

- Delay
- Advance
- Suspend Progress
- Resume Progress
- Add Actual Expense**
- Remove
- Remove All

Report Date:

Comments:

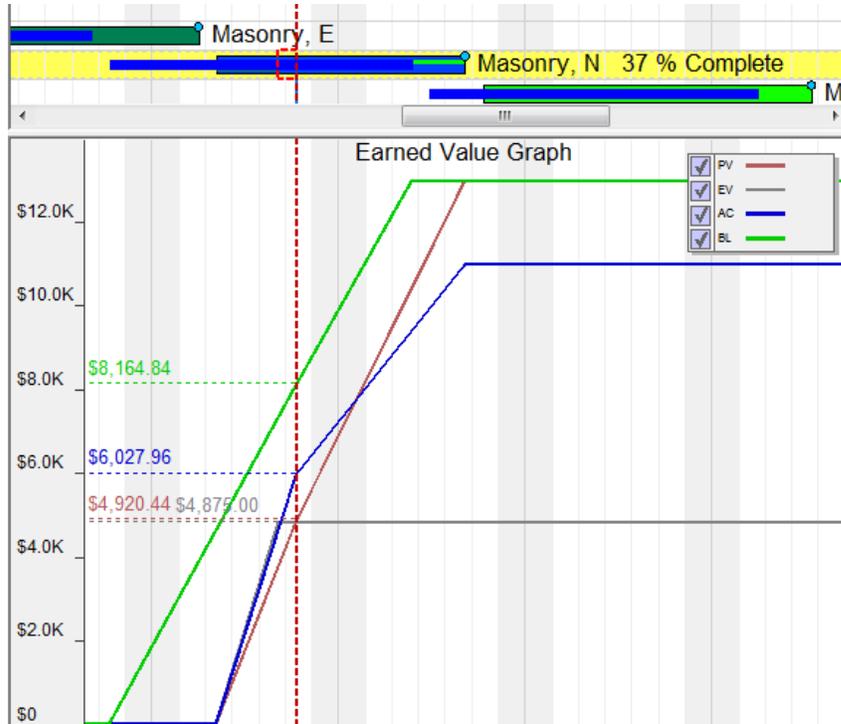
14.3. Earned Value Analysis

Earned Value Analysis allows you to compare the Planned Costs of the project against the value of the work completed. It allows you to quickly assess whether the project is ahead or behind schedule and whether it is above or below budget.

1. Select the **Windows** ribbon and toggle on the **EVA Graph**
2. In **Navigator** > **Baselines and Scenarios**, select **Original Schedule**
3. Select task - **Masonry, N** and view the Earned Value Graph below the Gantt Chart

NOTE: The EVA Graph manipulation is governed by pan and zoom in the Gantt Chart.

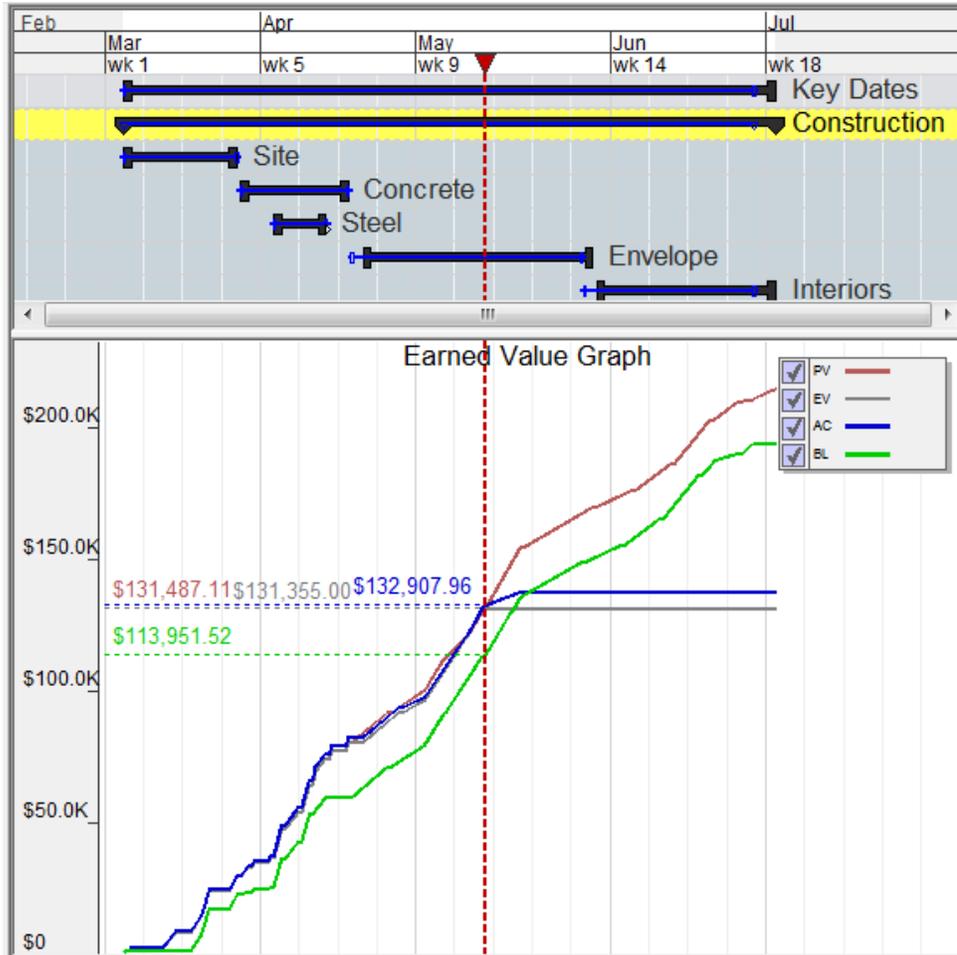
4. Move the red **Focus Time** marker to the **Data Date** to display the values for each curve on that day



- **Planned Value (PV) or Budgeted Cost of Work Scheduled (BCWS)** in red quantifies the budgeted value of the planned work to date on the selected task or group of tasks. The total Planned Value of the task at the end of the task is also referred to as the **Budget at Completion (BAC)**. The intersection of the **Focus Time** line with the red **PV** line reflects the **Planned Value** at that point in time for a selected task or group of tasks. This cost is shown in red on the left of the **EVA Graph**. Moving the **Focus Time** gives a cost forecast reading at that specific moment in time for the selected task or group of tasks.
- **Earned Value (EV) or Budgeted Cost of Work Performed (BCWP)** in grey quantifies the budgeted value of the work performed to date on the selected task or group of tasks. The intersection of the **Data Date** line and the grey **EV** line reflects the **Earned Value** at that point in time for the selected task or group of tasks.
- **Actual Cost (AC) or Actual Cost of Work Performed (ACWP)** in blue quantifies the actual cost incurred for the work performed to date on the selected task or group of tasks
- **Baselined Cost (BL)** in green quantifies the Planned Value saved with the selected Baseline on the selected task or group of tasks

NOTE: You can show/hide Planned Value (**PV**), Earned Value (**EV**), Actual Cost (**AC**) and/or Baselined Cost (**BL**) using the tick boxes in the Legend

5. Select the WBS Summary task - **Construction** so you can see the result in the EVA Graph of all tasks

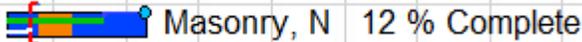


- If the **Planned Value** is greater than the **Earned Value** as of the Data Date, the project is behind schedule; if **PV** is less than **EV**, the project is ahead of schedule. This is known as Schedule Variance
- If the **Earned Value** is greater than the **Actual Cost** as of the Data Date, the project is under budget; if **EV** is less than **AC**, the project is over budget. This is known as Cost Variance

14.4. Monitoring

Should a task fall behind schedule, the progress can be updated and its impact on the project plan can be reviewed.

1. Select task - *Masonry, N*
2. Open up **Task Properties>Monitoring**
3. Change the **Remaining Duration** value to 7d. The **% Complete** is updated.
4. Press **F9** on the keyboard to reschedule the downstream tasks.
5. In the Gantt Chart, the blue task bar extends beyond its Planned Duration represented by the green line



6. A **Progress Report** of Type **Delay** is created

Reason	Date	Type	Percentage	Duration
Progress Report	5/13/2016	Delay	25%	2d

7. The variance shown in the Progress Report is also reflected under the **Analysis Panel** in **Task Properties>Monitoring**

Analysis

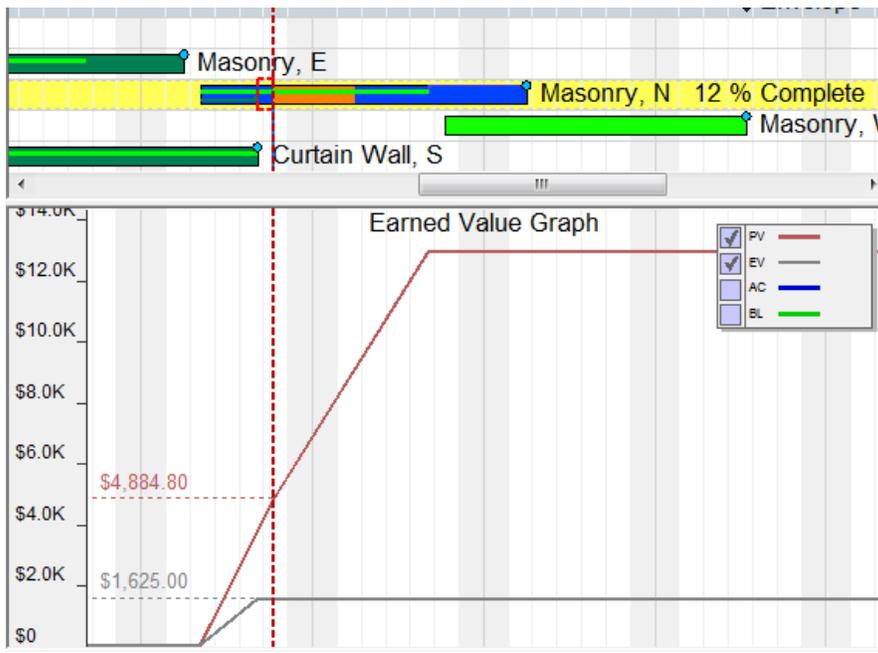
% Due

% Current

% Variance

Hours Variance

8. The **EVA Graph** now displays the delay. If a task is on time the red **PV** line and the grey **EV** line would be at the same point on the **Data Date**. In this case they are not. Since the **EV** is less than the **PV**, it is understood that the task is behind schedule.



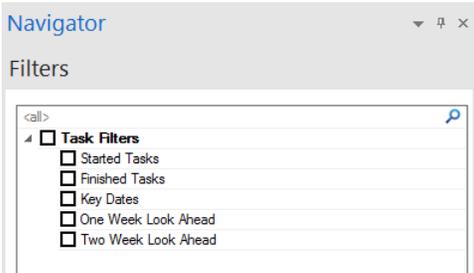
15. Filters

In this section, you will learn about the many types of task filters in Synchro and how to apply them.

It is possible to hide elements of the project plan using pre-set filters or by creating custom filters.

15.1. Applying Pre-set Task Filters

1. Select the **Navigator** > **Filters Tab** and you will see there are five pre-set filter options. You may use any of these pre-set filters as they are or you can modify the filter criteria under the **General** and other tabs



2. Select the **Finished Tasks** filter
3. Once the filter is selected the **General** the **Status** Tabs become available. Open both the **General** tab and the **Status** tab and you will see the filter options shown below

Leave the settings as they are and look at the Gantt chart. You will see only the activities that have already been finished.

NOTE: All of the visible tasks are marked with an (A) in the Finish column to indicate an Actual date

	Name	Planned Duration	Start	Finish
5	Construction	86d	3/9/2016	7/6/2016
6	Site	15d	3/9/2016	3/29/2016
7	Mobilization	4d	3/10/2016	3/15/2016 (A)
8	Mobilize Site Offices	2d	3/10/2016 (A)	3/11/2016 (A)
9	Mobilize Equipment	2d	3/14/2016 (A)	3/15/2016 (A)
10	Site Prep	8d	3/9/2016	3/18/2016
11	Site Fencing Install	1d	3/9/2016 (A)	3/9/2016 (A)
12	Temp Power Install	1d	3/10/2016 (A)	3/10/2016 (A)
13	Clear & Grub	3d	3/16/2016 (A)	3/18/2016 (A)
14	Excavation	7d	3/21/2016	3/29/2016
15	Mass Excavation	4d	3/21/2016 (A)	3/24/2016 (A)
16	Shoring Install	2d	3/23/2016 (A)	3/24/2016 (A)
17	Footing Excavation	2d	3/28/2016 (A)	3/29/2016 (A)
18	Concrete	14d	3/30/2016	4/18/2016
19	Footings	4d	3/30/2016	4/4/2016
20	Footings, Area 1	2d	3/30/2016 (A)	3/31/2016 (A)
21	Footings, Area 2	1d	4/1/2016 (A)	4/1/2016 (A)
22	Footings, Area 3	1d	4/4/2016 (A)	4/4/2016 (A)
23	Slabs	5d	4/12/2016	4/18/2016
24	Slab, 00	1d	4/12/2016 (A)	4/12/2016 (A)
25	Slab, 01	1d	4/15/2016 (A)	4/15/2016 (A)
26	Slab, 02	1d	4/18/2016 (A)	4/18/2016 (A)
27	Steel	10d	4/5/2016	4/14/2016
28	Steel Level 00-01	5d	4/5/2016	4/9/2016
29	Erect Steel, 00-01	2d	4/5/2016 (A)	4/6/2016 (A)
30	Plumb, Bolt & Weld, 00-01	3d	4/7/2016 (A)	4/9/2016 (A)
31	Steel Level 01-02	5d	4/10/2016	4/14/2016
32	Erect Steel, 01-02	2d	4/10/2016 (A)	4/11/2016 (A)
33	Plumb, Bolt & Weld, 01-02	3d	4/12/2016 (A)	4/14/2016 (A)
34	Envelope	34d	4/21/2016	6/3/2016
35	Roof	5d	4/21/2016 (A)	4/27/2016 (A)
36	Masonry, E	8d	4/28/2016 (A)	5/9/2016 (A)
39	Curtain Wall, S	9d	5/2/2016 (A)	5/12/2016 (A)

15.2. Creating & Applying New Task Filters

1. Select the **Navigator** > **Filters Tab**
2. Deselect the current filter
3. Right click within the filters list panel and select **Add Task Filter**. Rename it **Gantt Filter**
4. Open the **General** tab below to view all filter options

General

Company

Filter Tasks by...

Name/ID
 Date range
 Look ahead
 Status
 Type
 Resources
 Risk
 Company
 Schedule
 Baselines
 Calendars
 Activity Codes
 User Fields

Exclude Tasks if they fail...

Any Filter
 All Filters

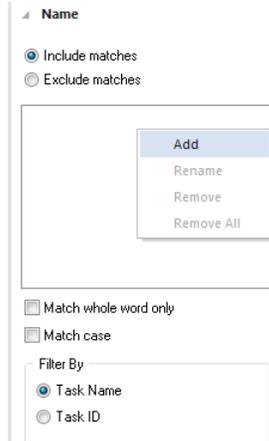
- When a **Filter Tasks By...** option is selected, specific tabs are shown beneath the **General** tab for that selection. You need to open these tabs to set specific criteria for your filter.
- If you choose more than one **Filter Tasks By ...** selection, all the tabs related to the selections will be available.
- When multiple filter selections are chosen you must also select **Any** or **All** under **Exclude Tasks if they fail...**
- The **Any Filter** selection filters tasks that meet all of the selected filters (OR logic) and the **All Filters** selection filters tasks that meet one or more of the selected filters (AND logic).

For training we will select one **Filter Task by...** selection at a time

15.3. Filtering Tasks by Name/ID

This filter allows you to filter tasks by character strings contained in the task Name or ID.

1. Activate **Name/ID** (the Gantt Chart will clear)
2. Open **Name** tab that is now shown below the **General** tab
3. Right click in white window and select **Add**



NOTE: **Task Name** is selected by default under **Filter By**. You can also choose to filter by **Task ID**

4. **New Filter String** will appear- left click on this name and rename as **Install**
You will only see the tasks which contain the word "Install" and their WBS summaries

Name	Duration	Start	Finish
Construction	83d	3/9/2016	7/1/2016
Site	14d	3/9/2016	3/28/2016
Site Prep	8d	3/9/2016	3/18/2016
Site Fencing Install	1d	3/9/2016 (A)	3/9/2016 (A)
Temp Power Install	1d	3/10/2016 (A)	3/10/2016 (A)
Excavation	6d	3/21/2016	3/28/2016
Shoring Install	2d	3/23/2016 (A)	3/24/2016 (A)

5. In the **General** panel, deactivate **Name/ID** selection (all the tasks will appear in the Gantt Chart)

15.4. Filtering Tasks by Date Range

Filtering tasks by a date range allows you to focus on tasks that will take place or have taken place during a certain time period.

1. With **Gantt Filter** selected in **Navigator** > **Filters** with, Activate **Date Range** in the **General** tab (the Gantt Chart will clear)
2. Open the **Date Range** tab below
3. Change dates to suit your filter needs – for training use the date range shown

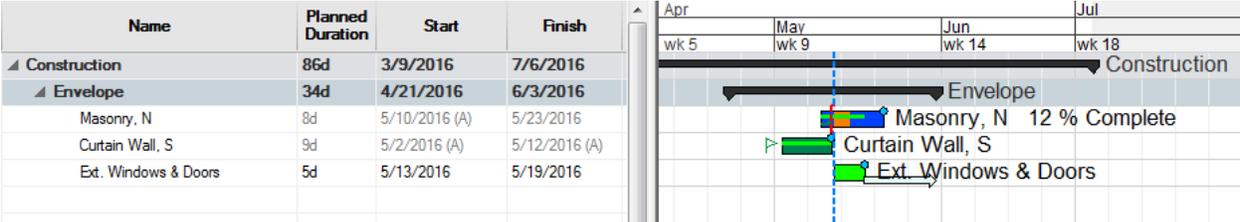
▲ **Date Range**

From

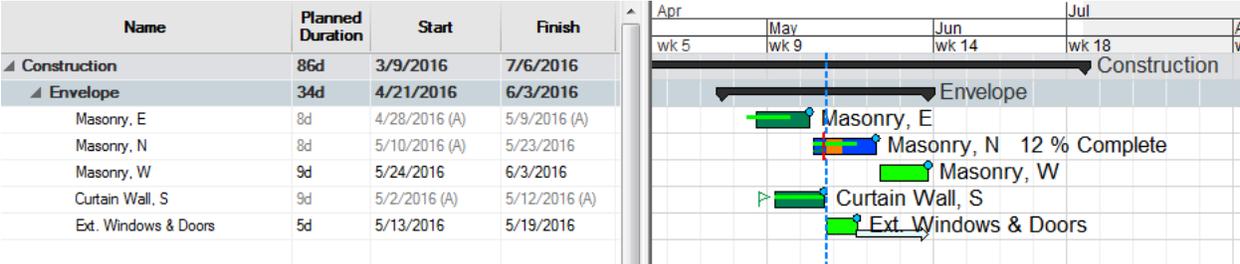
To

Include Overlapping Tasks

4. You will see only the tasks that are planned to start *and* finish *within* those dates



5. Check the box to **Include Overlapping Tasks**. This option will include in the filter tasks that overlap either the **From** or **To** dates. In this case, the **Masonry, E** task finishes within the Date Range, but starts before the **From** date.



6. Deactivate **Date Range** selection (all the tasks will appear in the Gantt Chart)

15.5. Look Ahead Filters

Look Ahead filters allow you to look at tasks that need to be worked on in the next several weeks or months depending on the time frame chosen in the filter selection. They update dynamically with the Data Date or Focus Time.

1. Activate **Look Ahead** in the General tab (the Gantt Chart selection will change)
2. Open the **Look Ahead** tab below
3. With **Current Time (Data Date)** selected change **Look Ahead Duration** to **28d** –

▲ **Look Ahead**

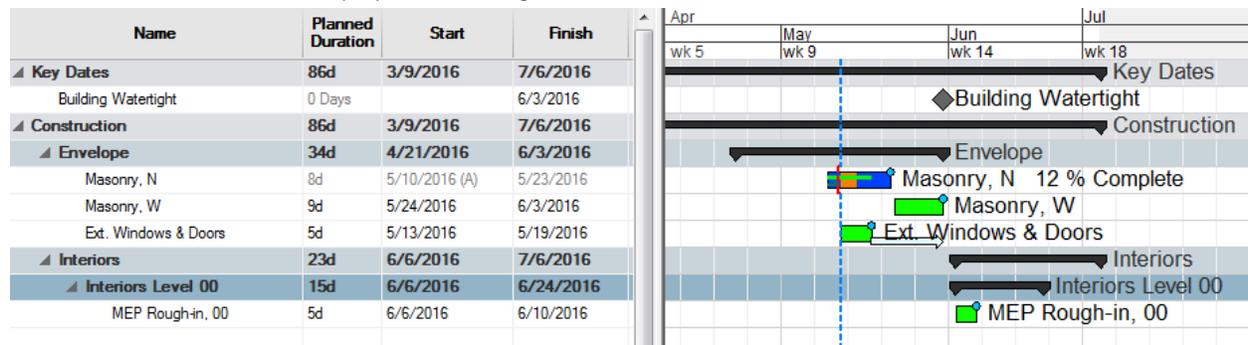
Look Ahead Duration

28d

Current Time (Data Date)
 Focused Time

Include Overlapping Tasks

4. The Gantt Chart should display the following tasks:



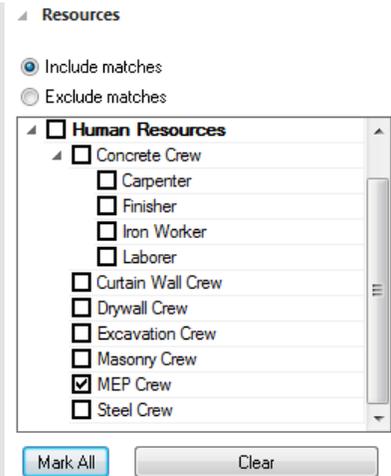
5. Change the **Look Ahead Duration** to **1d** (1 day) and enable **Focused Time** instead of **Current Time (Data Date)**
6. Open the **Play ribbon**. Move the focus time to the start of the project by selecting **Move to Start**. In the Gantt Chart you will only see the tasks that are active within 1 day of where the Focus Time is located. This is based on the **Look Ahead Duration** specified.
7. Press **Play** or move the red Focused Time bar through the schedule to see how the filter updates.
8. Deactivate **Look Ahead**

15.6. Filtering Tasks by Resources

The **Resources** filtering selection allows you to choose one or multiple resources to filter tasks that can be viewed in the **Gantt** window.

The **Concrete Crew** will be filtered for this example

- 1. Activate **Resources** (the Gantt Chart will clear)
- 2. Open **Resources** tab below
- 3. Ensure **Include matches** is selected
- 4. Select the **MEP Crew** resource as shown to the right
You will see just the tasks associated with the **MEP Crew** resource as shown below



Name	Planned Duration	Start	Finish
▲ Construction	86d	3/9/2016	7/6/2016
▲ Interiors	23d	6/6/2016	7/6/2016
▲ Interiors Level 00	15d	6/6/2016	6/24/2016
MEP Rough-in, 00	5d	6/6/2016	6/10/2016
Trim-out, 00	5d	6/20/2016	6/24/2016
▲ Interiors Level 01	13d	6/13/2016	6/29/2016
MEP Rough-in, 01	5d	6/13/2016	6/17/2016
Trim-out, 01	3d	6/27/2016	6/29/2016
▲ Interiors Level 02	13d	6/20/2016	7/6/2016
MEP Rough-in, 02	5d	6/20/2016	6/24/2016
Trim-out, 02	3d	7/4/2016	7/6/2016

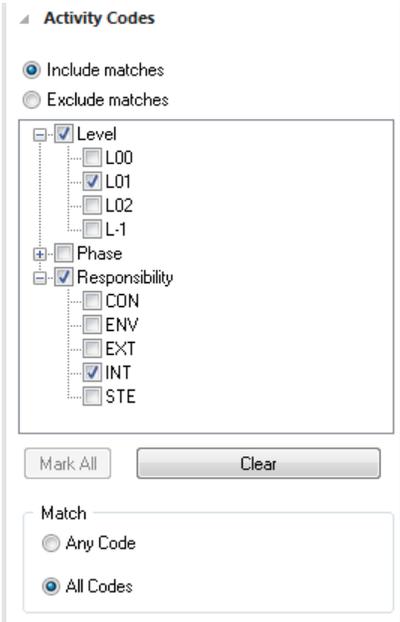
- 5. Deactivate **Resources** in Navigator> Filters>General

15.7. Filtering Tasks by Activity Codes

The Activity Code filter allows you to filter tasks by one or more project Activity Code(s) assigned to the tasks. You do not need to be in **Activity Code Gantt Mode** to use this filter – it also works in **WBS** or **List** mode.

1. With the **Gantt Filter** selected, activate **Filter Tasks by... Activity Code** in the **General** tab
2. Open **Activity Codes** Tab below in **Filters**
3. Select **Include matches**
4. Enable **Level L01** and **Responsibility INT**
5. Select **Match – All Codes** to display tasks that are coded **L01 AND INT**

Note: Choose **Match - Any Code** to display tasks that are coded **L01 OR INT**



The Gantt Chart result will be as shown below

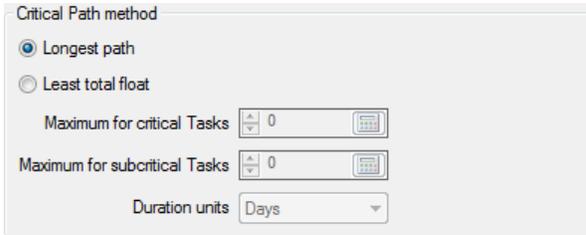


6. Deactivate **Resources** in **Navigator**> **Filters**>**General**

15.8. Critical Path Filter

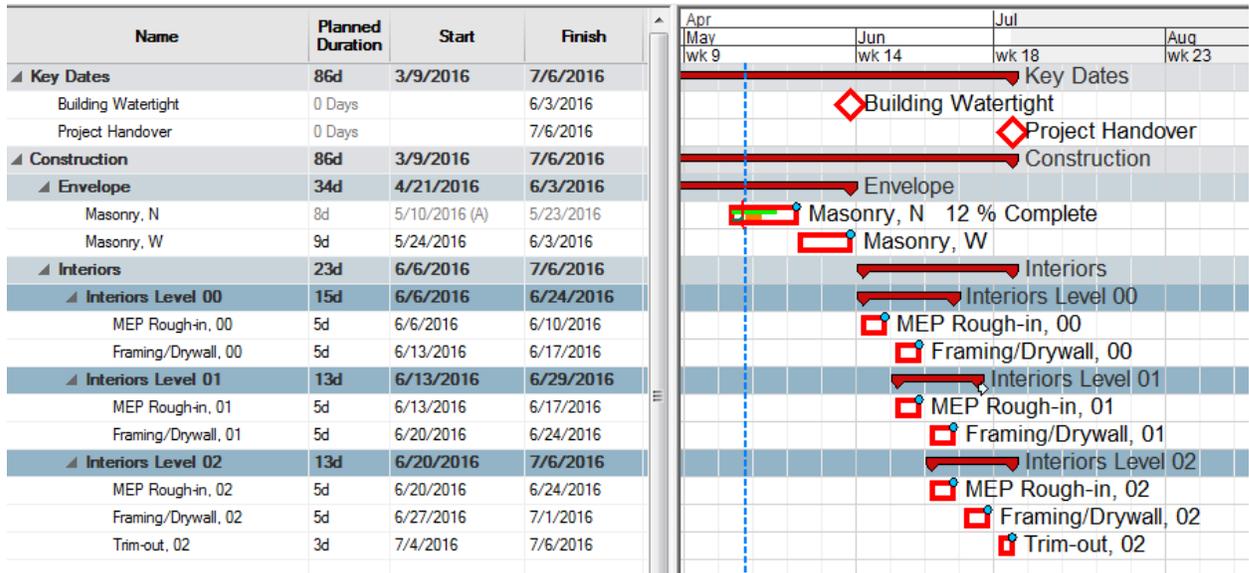
The Critical Path Filter can be used to display only tasks that are on the project Critical Path.

1. With the **Gantt Filter** selected, activate **Filter Tasks by... Schedule** in the **General** tab
2. Open the **Schedule** tab below in **Filters**. This filter contains many options for filtering tasks based on scheduling criteria. For this example, we will leave **Critical** selected.
3. Open the **Options** dialog and select **Gantt Chart>Rescheduling>Critical Path**.
4. Here you can define how to calculate the Critical Path. Ensure that **Longest Path** is selected for this training and select **OK** to close the Options dialog



NOTE: You can alternatively select **Least Total Float** and enter values for the maximum float for a task to be classified as critical and subcritical.

5. To ensure that the critical path calculation is up to date, select **Home> Compute Critical Path**. Rescheduling the project will also recalculate the critical path.
6. Only tasks on the critical path will be displayed in the Gantt Chart



NOTE: The Critical Path display colours are controlled by **Options>Gantt Chart>Colours>Critical Path**



7. Deactivate the **Gantt Filter** so all activities are visible in the Gantt Chart

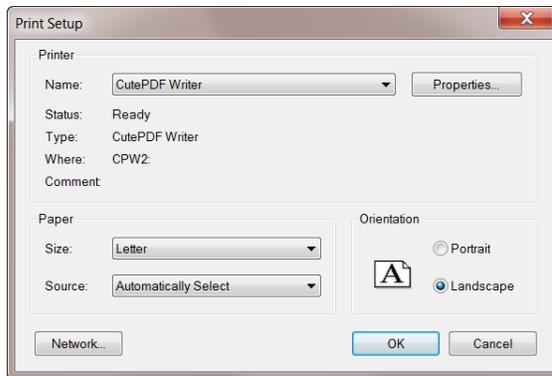
16. Printing

In this section, you will learn how to print the Gantt Chart and the EVA graph

16.1. Printing the Gantt Chart

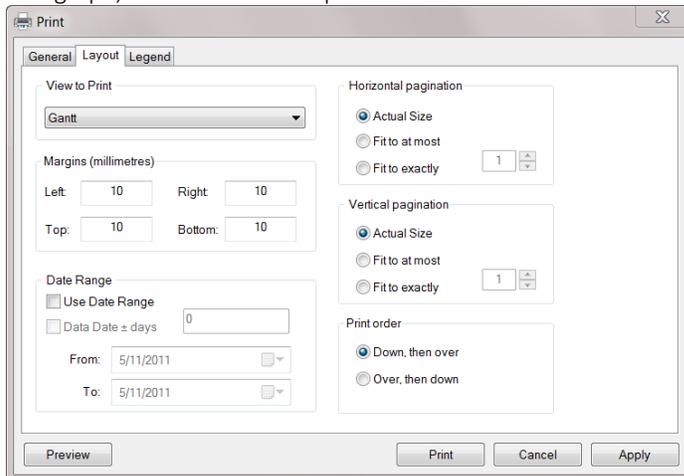
Before printing the Gantt Chart, the Task List should be customised to include the data columns you wish to print.

1. Using *Customise Columns* add and remove the necessary columns so the only columns visible are **ID, Name, Duration, Start, and Finish**.
2. Select **File > Print Set Up** and set the options as required (Landscape)



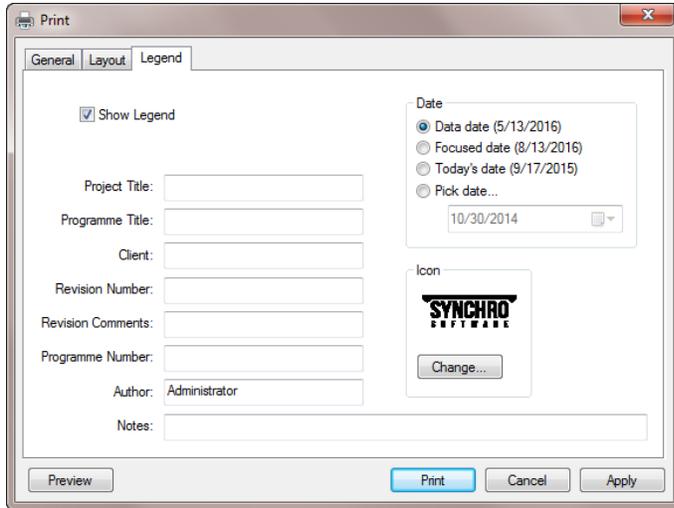
3. Select the required printer from the list (use PDF for training), edit the properties accordingly, and click **OK**
4. Select **File > Print**
5. Verify the printer selection and edit the preferences accordingly
6. Select the **Layout Tab**

Here you can choose what to print in the **View to Print** drop down. Note that there are four default selections – Gantt, Resource Usage, Resources, and Task Usage. If other windows are open on screen such as the 3D view or EVA graph, etc. – then these specific views will become available to print.



7. Click **Apply** when finished

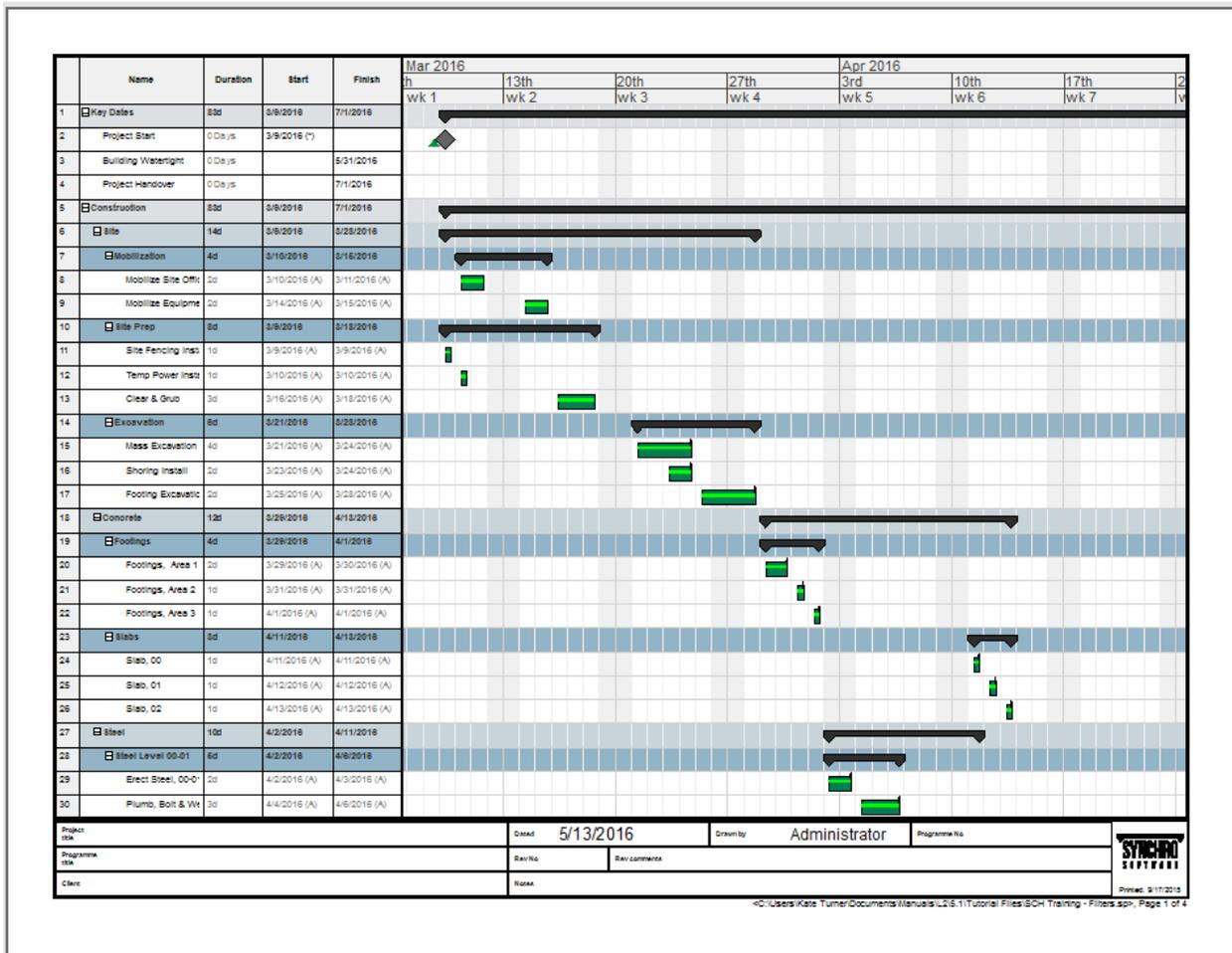
8. Select the **Legend Tab**



The Legend Tab provides options to:

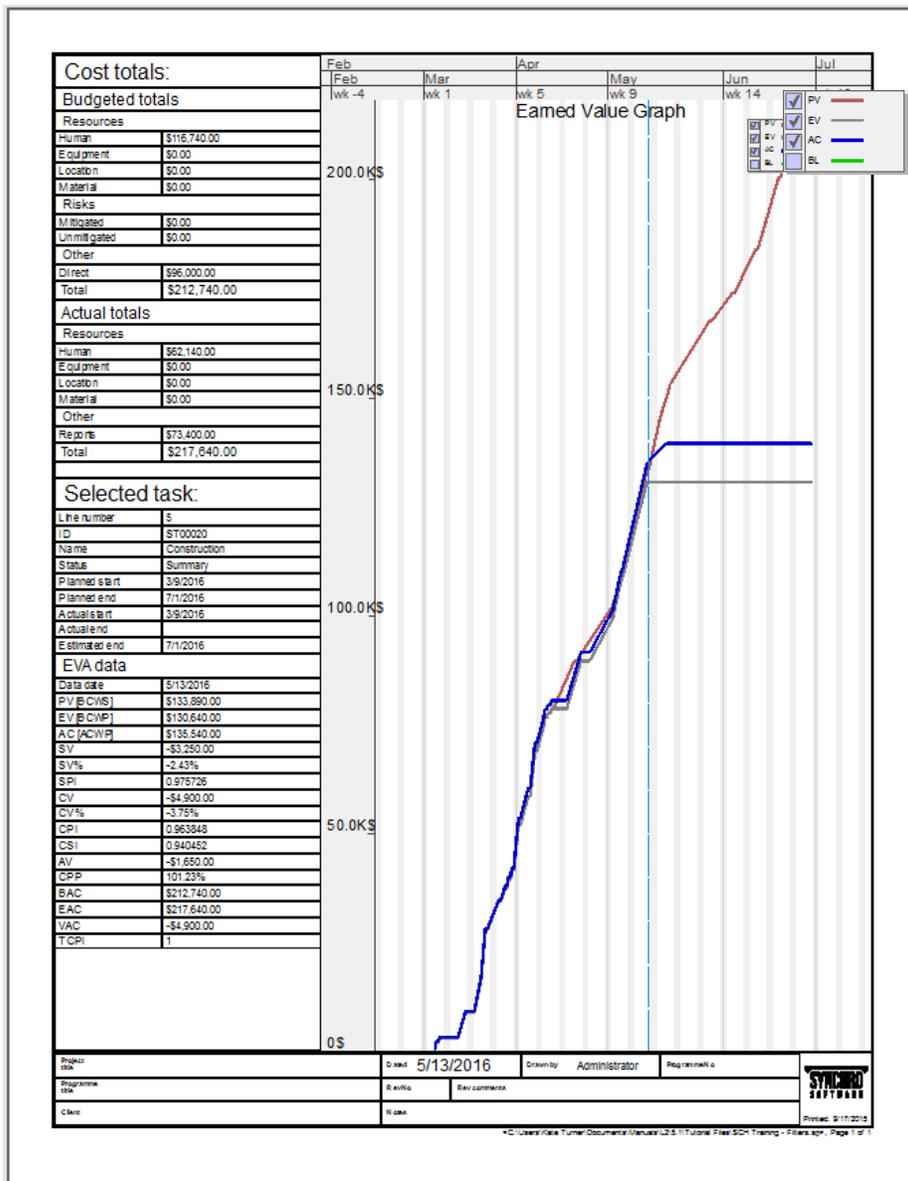
- i. Place a legend at the bottom of the page by selecting **Show Legend**
- ii. Select the date to be shown
- iii. Select a logo to print
- iv. Click Apply when finished

9. Select **Print** or **Preview**. The PDF will look similar to shown



16.2. Printing EVA Results

1. Open the **Windows** ribbon and enable the **EVA Graph**
2. Select the **Construction** summary task and zoom/scroll so you can see the EVA graph for the entire project
3. Select **File > Print Set Up**. Select **Portrait** and set the options as needed
4. Select **File > Print**
5. Select the **Layout Tab**. Change the **View to Print** to **EVA Graph**. Since the **EVA Graph** window is enabled this selection is now available.
6. Modify any other settings as needed and click **Apply** when finished
7. Select **Print** or **Preview**. The EVA PDF will look similar to shown

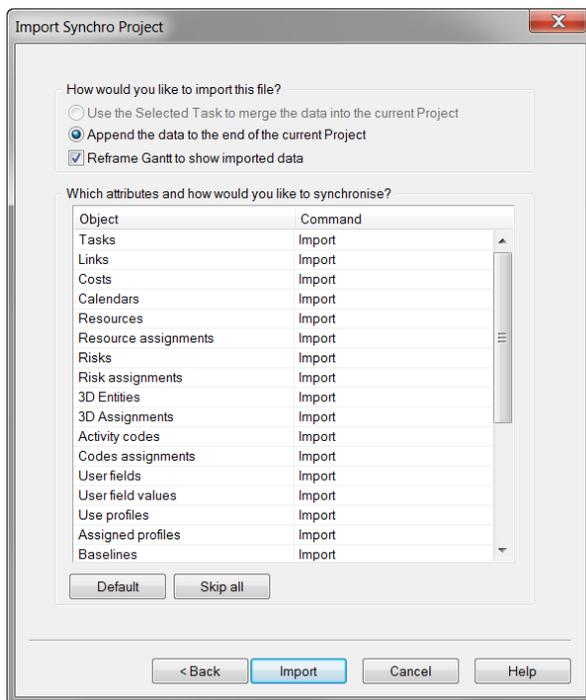


17. Appendix A: Using a Template

You may want to save any calendars, filters, etc. that have been created so they do not have to be recreated each time a new file is started. This is done by saving an .sp file to use as a template. In a blank file, set up needed calendars, filters, activity codes, user fields, task statuses, resource statuses, etc. and save the file.

When you wish to use the template, there are two options:

- Open the template when beginning a new project; save it with new file name; and then enter the new project information.
- Import the template into another Synchro project. This method can be used to import all or a sub-set of the template attributes (calendars, filters, and activity codes, for example) into a project in progress. This method also has the benefit that if your company updates the template (e.g. adds new Activity Codes or adds a new holiday to a calendar), you can synchronise the changes into your project at any point. This method is explained below:
 - 1) If both the template and the current Synchro file contain a calendar named “**Project Calendar**,” rename the **Project Calendar** in the new Synchro file prior to importing a template. If you do not, a duplicate Project Calendar will be created when the template calendar information is imported into the new Synchro file.
 - 2) To import the template, select **File > Import > Synchro Project**
 - 3) **Browse** and select the template SP. Click **Open**, and then click **Next**. You will be presented with the **Import Synchro Project** Window



- 4) Select **Skip All**
- 5) Then change the **Command** next to the Objects- **Calendars, Filters**, etc. to **Import** for any object you want to include from the template file.



- 6) Select **Import** (you will see a report of what is importing) then select **Finish**
- 7) If the template is updated after it was imported, and you wish to bring those changes into your current file: select the template SP in **Navigator > External Data**, right click and choose **Synchronise From**
- 8) See [Appendix D](#) for more information about using **Synchronise From**. You can **Skip** any attributes not contained in the template, or that you do not wish to update from the template

18. Appendix B: Task Constraints

Task Constraints are limiting dates that control a task's start or finish. Use of constraints should be limited. It is best to use them only for contractual milestones.

Constraint Type	Description
No Constraint	The Task is calculated based on the task links or it can be set to start at any date/time you choose
Cannot Reschedule	The Task cannot have its start or finish date changed
Start as Soon as Possible	The Task will start on its Early Start Date. If no links exist, the Task will be set to start at the current data date. If a link does exist then the Task start date will be driven by its dependencies
Start as Late as Possible	The Task will start on its Late Start Date based on its dependencies
Start On	The Task will start on the date specified unless the Task's dependencies drive the Task to start on a later date then specified. If that occurs negative float will be reflected on the Task
Start On or After	The Task will start on the date specified unless the Task's dependencies drive the Task to start on a later date then specified
Start On or Before	The task will start on the date determined by the Task's dependencies. If the Task starts after the date specified, negative float will be reflected on the Task
Start Between	The task will start between the dates specified unless both of the specified dates are prior to the Early Start Date as determined by the Task's dependencies or both dates are after the Late Start Date as determined by the Task's dependencies
Finish On	The Task will finish on the date specified unless the Task's dependencies drive the Task to finish on a later date then specified. If that occurs negative float will be reflected on the Task
Finish On or After	The Task will finish on the date specified unless the Task's dependencies drive the Task to finish on a later date then specified
Finish On or Before	The task will finish on the date determined by the Task's dependencies. If the Task finishes after the date specified, negative float will be reflected on the Task
Finish Between	The task will finish between the dates specified unless both of the specified dates are prior to the Early Finish Date as determined by the Task's dependencies or both dates are after the Late Finish Date as determined by the Task's dependencies
Mandatory Start	No matter the dependencies the Task will start on the specified start date. No negative float will be shown even if the specified start date is after the calculated Late Start Date. This constraint should never be used unless mandated by the contract. If mandated by the contract a duplicate should be put into the schedule without the Mandatory Start Constraint to properly reflect the float on the Task
Mandatory Finish	No matter the dependencies the Task will finish on the specified finish date. No negative float will be shown even if the specified finish date is after the calculated Late Finish Date. This constraint should never be used unless mandated by the contract. If mandated by the contract a duplicate should be put into the schedule without the Mandatory Finish Constraint to properly reflect the float on the Task
Work Between	The Task should start on or after the specified Early Start Date and finish on or before the specified Late Finish Date. Tasks Dependencies have a greater priority than the specified Early and Late Finish Dates
Work Out	The Task should start on or before the specified Early Start Date and finish on or after the specified Late Finish Date. Tasks Dependencies have a greater priority than the specified Start and Finish Dates!

19. Appendix C: Importing Schedules/Plans

This section will demonstrate how to import a schedule/plan from another source

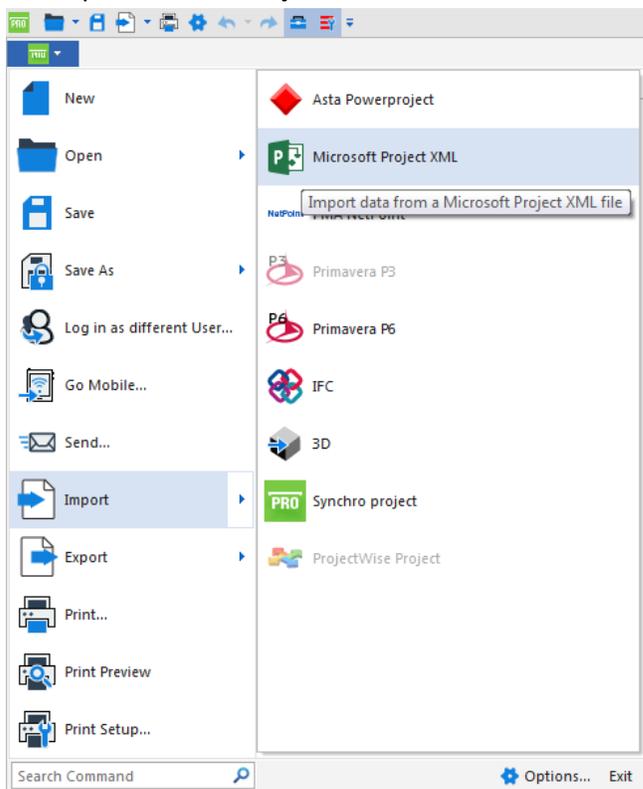
You can import a range of different schedule/plan files into Synchro PRO. The types of plan/schedule files that can be imported:

- Synchro PRO and Synchro Scheduler (.SP file extension) [To learn how to import an SP file, see [Appendix A](#)]
- Asta Powerproject
- Microsoft Project XML
- PMA NetPoint
- Primavera P3
- Primavera P6
- IFC

NOTE: Asta Powerproject, Primavera P3, and Primavera P6 require additional set-up before schedules can be imported. Please contact support@synchro ltd.com for more information.

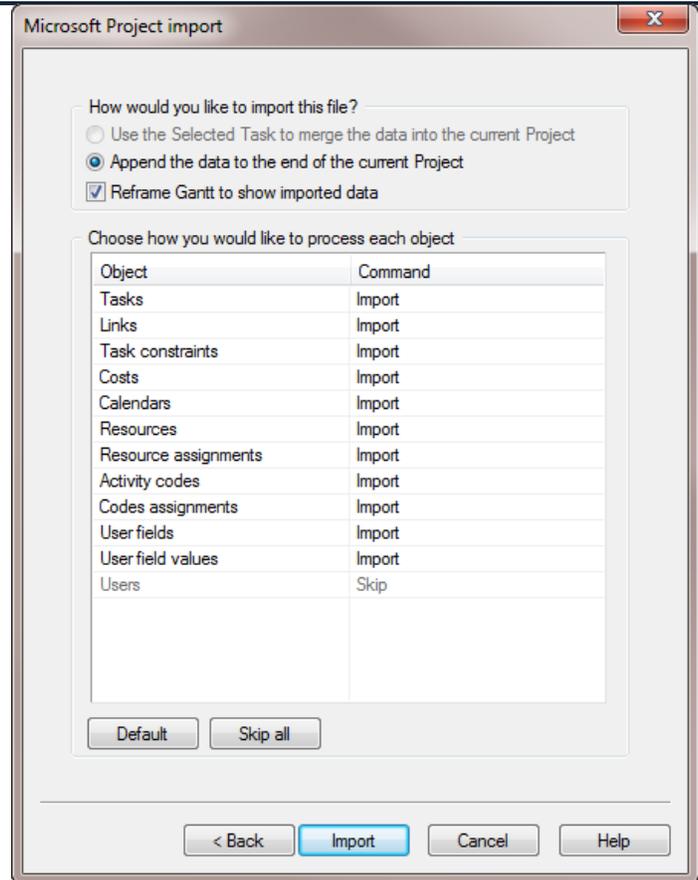
19.1. Importing a schedule from Microsoft Project XML

1. To import a schedule, select **File>Import** then select the source program. For Microsoft Project, select **File>Import>Microsoft Project XML** as shown below



2. Select **Browse** to locate and select the Microsoft Project XML file, then select **Open**
3. Select **Next>**

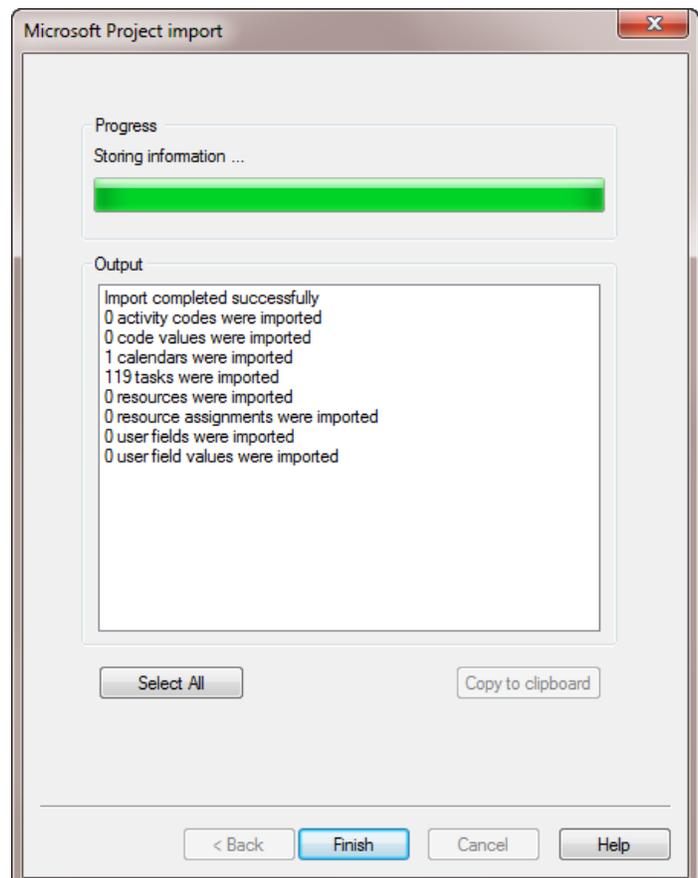
4. This screen allows the user to choose how to treat different attributes of the file on import. The **Command** for each **Object** can be individually set to **Import** or **Skip**.



5. Select **Import**. A **Progress** bar will display while importing and the **Output** panel will display what was imported and any relevant notifications.

NOTE: This data can be copied and pasted into a text editor for future reference by using the **Select All** and **Copy to clipboard** buttons

6. Select **Finish**



19.2. Importing a schedule from Primavera P6

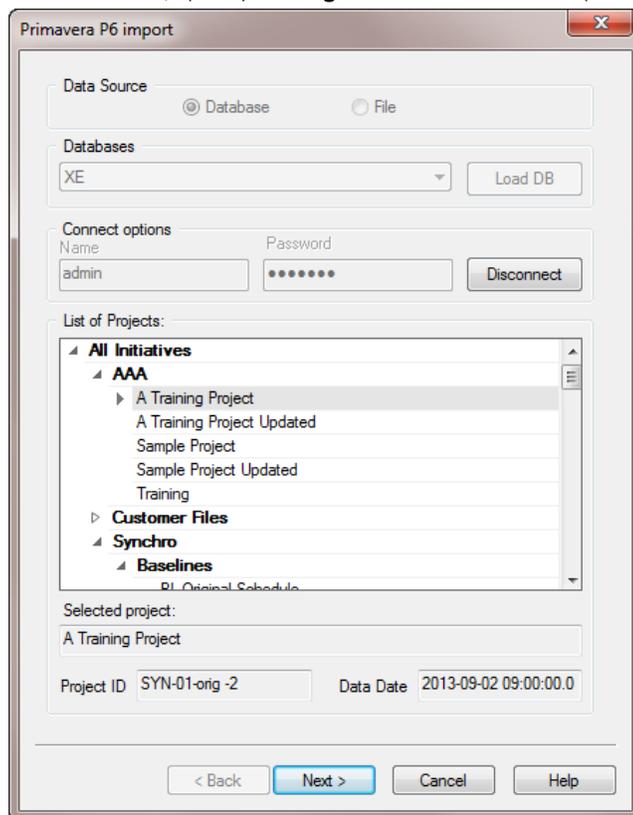
Importing from Primavera P6 can be accomplished in 2 ways:

1. Import directly from the P6 database via an API connection. The Synchro user must have the API installed locally and be able to access P6 either locally or via a remote connection. The user must have proper permissions to import P6 data. If the schedule is updated in P6, simply use the External Data>Synchronise FROM command to bring those changes into Synchro. If the schedule is updated in Synchro, simply use the External Data>Synchronise TO command to send those change to P6.
2. Import a P6 XML file. The P6 XML file can exported from any P6 database by anyone with access to P6. Synchro and P6 do not have to be installed on the same computer. No API installation is necessary. If the schedule is updated in P6, the P6 user should export a new XML, then the Synchro user should use the External Data>Synchronise FROM command to bring those changes into Synchro. If the schedule is updated in Synchro, a new XML should be exported - there is no Synchronise TO capability - the XML must be imported fresh to P6 and a new project created.

The two methods are described below:

19.2.1. Import from P6 Database via API

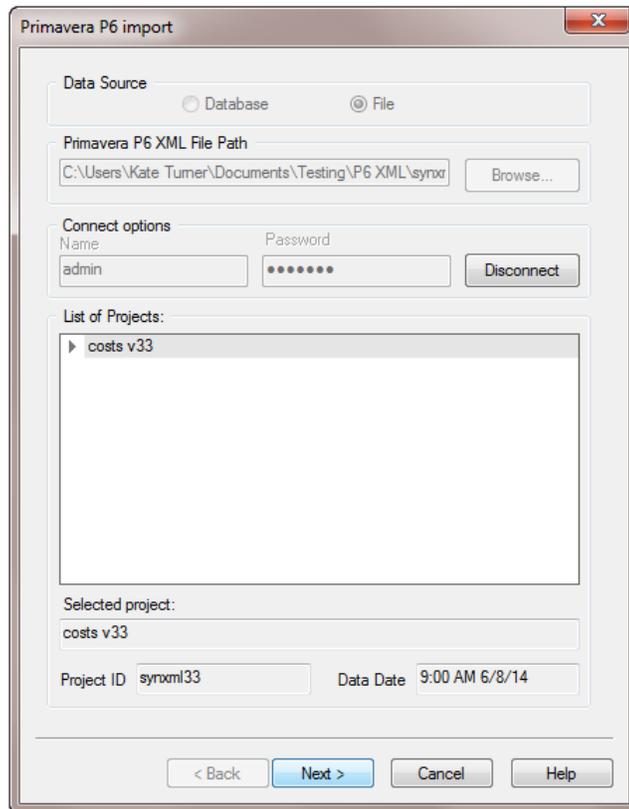
1. In the **Navigator->**  **External Data** list panel, right-click and select Import->Primavera from the context menu, or alternatively select **File->Import->Primavera P6**
2. Select **Database** for the **Data Source**
3. Select **Load DB**, specify the **Login Name** and **Password** (as required), and then select **Connect**



4. Select a project from hierarchical list, and then select **Next>**
5. Continue with Step 4 in section [20.1](#)

19.2.2. Import a P6 XML file

1. In the **Navigator**-> **External Data** list panel, right-click and select **Import->Primavera P6** from the context menu, or alternatively select **File->Import->Primavera P6**
2. Select **File** for the **Data Source**
3. Select **Browse** to locate the saved P6 XML
4. Select **Connect**. The project name, ID, and Data Date will be listed below



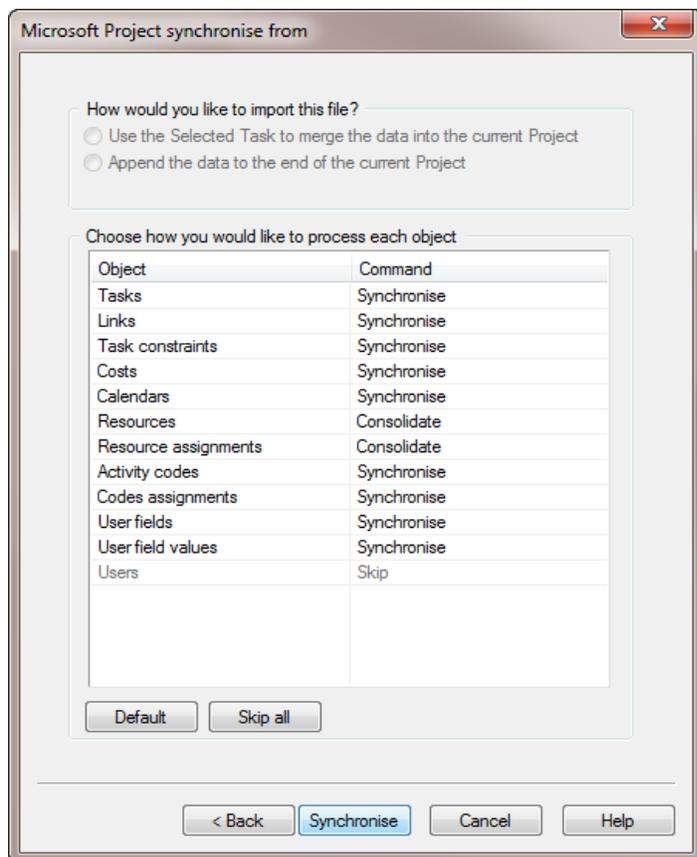
5. Select **Next>**
6. Continue with Step 4 in section [20.1](#)

20. Appendix D: Synchronisation

One of the benefits of Synchro is the ability to quickly and easily bring in updates from an external scheduling program and see those changes reflected in the 4D model. If changes or progress updates have been made to the original source schedule; e.g. in P6 or Microsoft Project, the updates can be brought into Synchro using the Synchronise From command in Navigator> External Data.

- To begin synchronisation, select the **Navigator> External Data** tab.

NOTE: All files imported or exported will be listed here. If you've imported multiple schedules, make sure you select the correct one.
- Right click on the filename and select **Synchronise From**
- Browse** to saved update or connect to the database (depending on the scheduling program), then **Next**
- When synchronising a schedule, you will be asked to choose **Synchronise, Consolidate, Integrate,** or **Skip** for each of the different schedule attributes.



NOTE: Schedule attributes are located in the **Object** column (shown left) and include: *Tasks, Links, Task constraints, Costs, Calendars, Resources, Resource Assignments, Codes assignments, User Fields, and User Field values.*

The Synchronisation options (**Synchronise**, **Consolidate**, **Integrate**, or **Skip**) are explained in the chart below.

SYNCHRONISE

If you choose to **Synchronise**, the existing schedule in Synchro will be completely replaced with the updated external schedule.

Outcome: External schedule takes precedence over Synchro schedule when Synchronising according to the following rules:

- Attributes **ADDED** externally → **ADDED** in Synchro
- Attributes **DELETED** externally → **DELETED** in Synchro
- Attributes **MODIFIED** externally → **MODIFIED** in Synchro
- Attributes **MODIFIED** in Synchro → **OVERRIDDEN**
- Attributes **ADDED** in Synchro → **DELETED**

NOTE: The option to **Synchronise** is not available for P6 global objects (such as Calendars, Resources, Risks and Activity Codes) since these cannot be deleted. **Synchronise** is the default choice for Primavera P3.

CONSOLIDATE

If you choose to **Consolidate**, any schedule changes made externally will be made in Synchro, and attributes added in Synchro will be maintained, **NOTHING IS DELETED**.

Outcome: Merges the External and Synchro Schedules when Synchronising. External schedule takes precedence over Synchro schedule for all Attributes originally created in the external schedule.

- Attributes **ADDED** externally → **ADDED** in Synchro
- Attributes **DELETED** externally → **MAINTAINED** in Synchro
- Attributes **MODIFIED** externally → **MODIFIED** in Synchro
- Attributes **MODIFIED** in Synchro → **OVERRIDDEN**
- Attributes **ADDED** in Synchro → **MAINTAINED**

INTEGRATE

If you choose to **Integrate**, any modifications made in Synchro to the selected external schedule will be overridden. However, any additions to the schedule in Synchro will be maintained.

Outcome: External schedule takes precedence over Synchro schedule for all Attributes originally created in the external schedule.

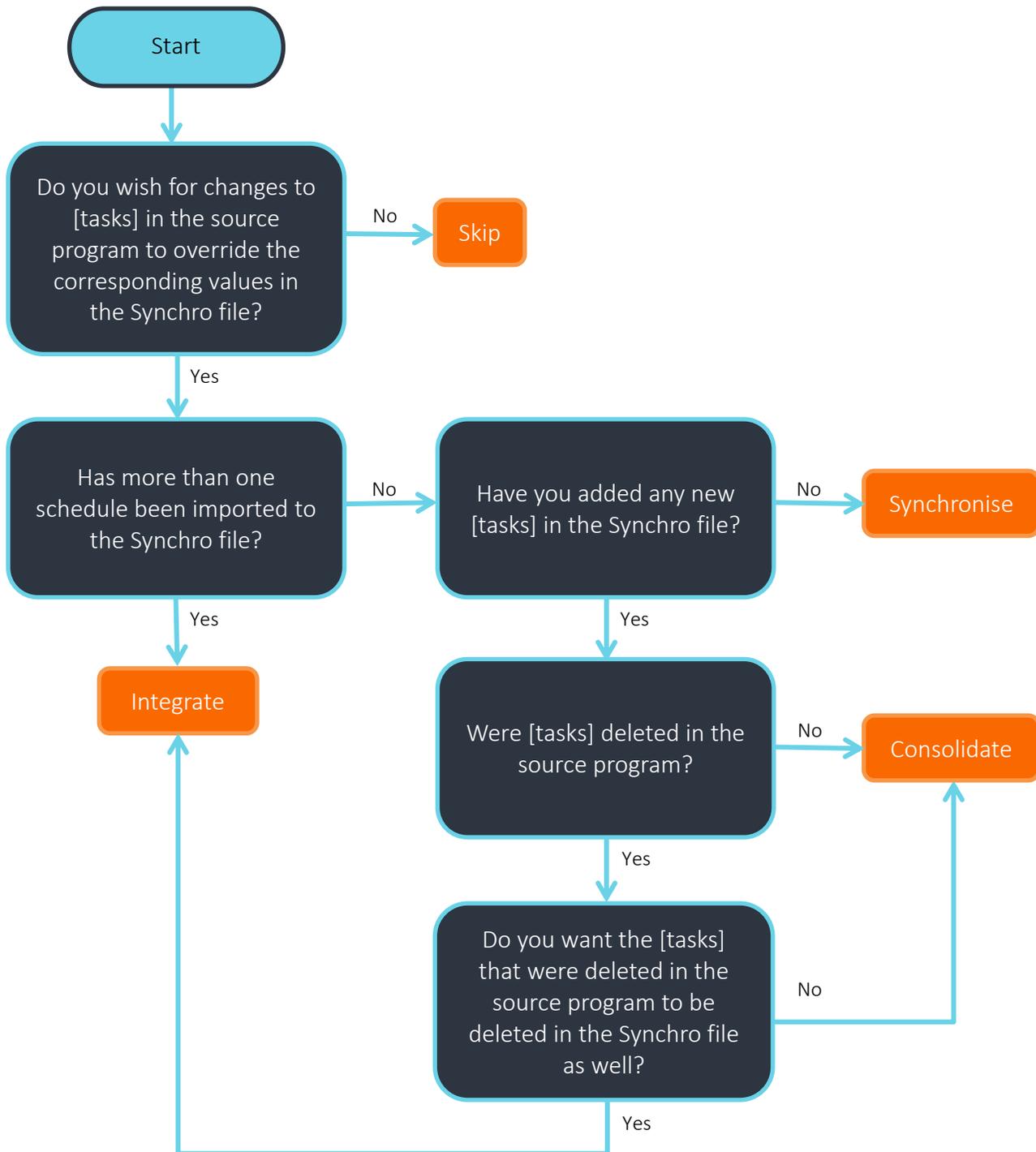
- Attributes **ADDED** externally → **ADDED** in Synchro
- Attributes **DELETED** externally → **DELETED** in Synchro
- Attributes **MODIFIED** externally → **MODIFIED** in Synchro
- Attributes **MODIFIED** in Synchro → **OVERRIDDEN**
- Attributes **ADDED** in Synchro or imported from a different source → **MAINTAINED**

NOTE: **Integrate** only affects selected source schedule being Synchronised. Thus the option to **Integrate** is most commonly used when multiple schedules have been imported into Synchro, so that no project data is lost upon Synchronisation. **Integrate** is the default choice for Resources and Resource Assignments. The option to **Integrate** is unavailable for Microsoft Project XML.

SKIP

If you choose to **Skip**, the associated attribute will not be modified or updated. The attributes in Synchro will be maintained.

Use the following flowchart to determine whether to Skip, Synchronise, Consolidate, or Integrate each attribute. For each attribute (eg. Links, Calendars, etc) substitute the attribute name wherever “[tasks]” appears in the flow chart.



SUMMARY: Any attribute that you have added or modified in Synchro since importing will need to be considered. For example, if you have not created any tasks, calendars etc. in Synchro but have just created Resources and Resource Assignments, those are the only two options that you will be required to Consolidate or Integrate instead of Synchronise to ensure that Synchronisation works correctly and that all assignments are retained

For example, if you have added new tasks and links, created resources from 3D objects, and assigned resources to tasks, you should not use Synchronise for these options or else the changes made in Synchro will be overridden with the changes in the updated schedule

5. Select the **Synchronise** button
6. The **Synchronisation Report** indicates what has been updated. You can save this report for future reference if desired by selecting **Select All** followed by **Copy to Clipboard**
7. Select **Finish** to exit the report

21. Contact Details

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