Introduction

This guide is intended to assist in the step-by-step application of concepts taught in the Kepner-Tregoe *Project Management* workshop through the use of Microsoft Project Software. The steps should be first explained and demonstrated by the KT Program Leader; this guide can then be used as an aid during application work. This is not designed to be a training course in Microsoft® Project; rather it should be considered a list of "quick tips". Refer to MS Project Help (F1 or ) or consider an online tutorial (www.lynda.com) for a basic understanding of MS Project. There are many forums that can also help you become more comfortable using this software, such as the Microsoft Project User Group (www.mpug.com) and Project's Facebook page (www.facebook.com/msftproject). Use the example in the reference section of the KT Project Management *Notes & Reference* to practice the tips provided below.

Step 1 – Project Statement

MS Project automatically uses the name of your project file as the summary task. To record the Project Statement as the Project Summary Task (Figure 1):

- Go to the Format tab (Show/Hide section).
- Select the Project Summary Task box.
- When you do this, the file name appears in the Task Name column.
- Double click on the file name to bring up the Summary Task Information dialog box.
- Key in the Project Statement in the Name field.
- You will notice that the Project Summary Task is numbered '0'.
- You will also notice that the Start and Finish dates cannot be changed. Go to the Project tab. Select the Project Information button. This will bring up a dialog box where you can add the start date if you know it (the default will be the date on which you created the project file). Do not key in a Finish date at this time.

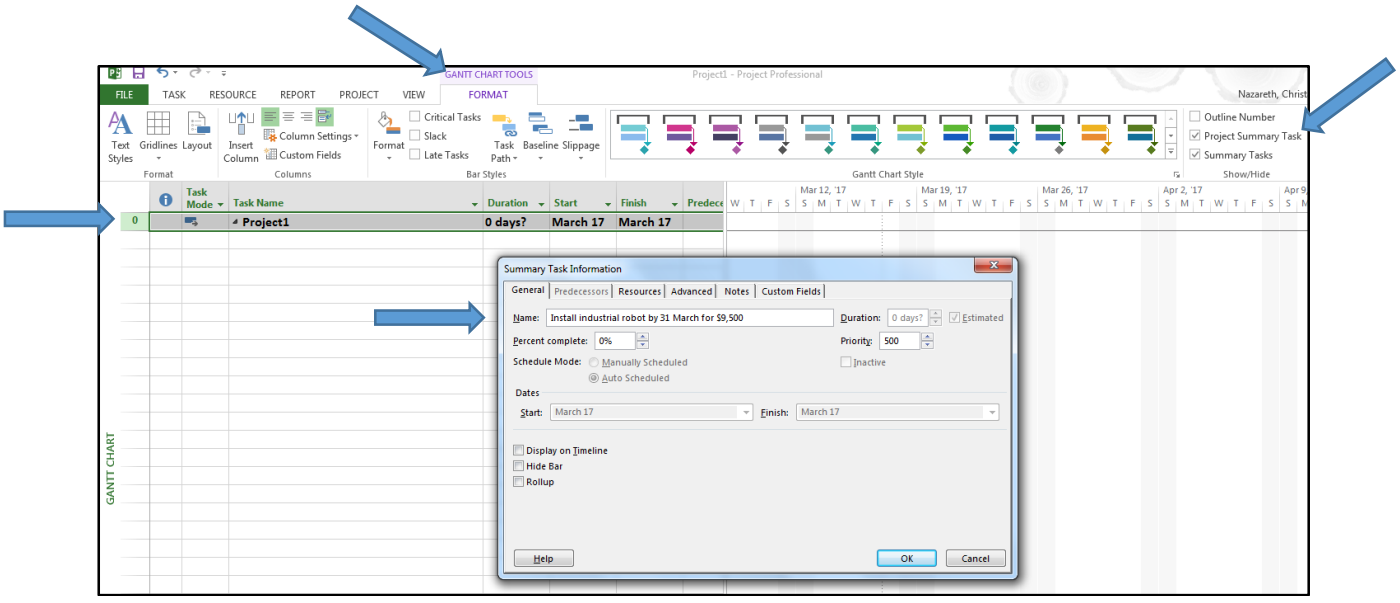


Figure 1

Step 2 – Project Objectives

There is no facility to record objectives directly into an MS Project file. You may record objectives in one of the following ways (Figure 2A):

- Double click on the Project Summary Task to bring up the Summary Task Information dialog box.
- Click on the Notes tab and start recording objectives.
- Use the Format Font button (A) to change the size and look of the text.
- When you click OK, the notes symbol will appear next to the Task indicating there's data in the Notes tab.  To make additions/deletions, etc. to the notes, double click on this symbol to open the dialog box to the Notes tab.
- To print the notes (Figure 2B), click the File tab, and then click Print and Page Setup. In the Page Setup dialog box, click the View tab and then select Print notes. Note: the notes will be printed on the last page and they will be identified by the ID number and not the WBS number.

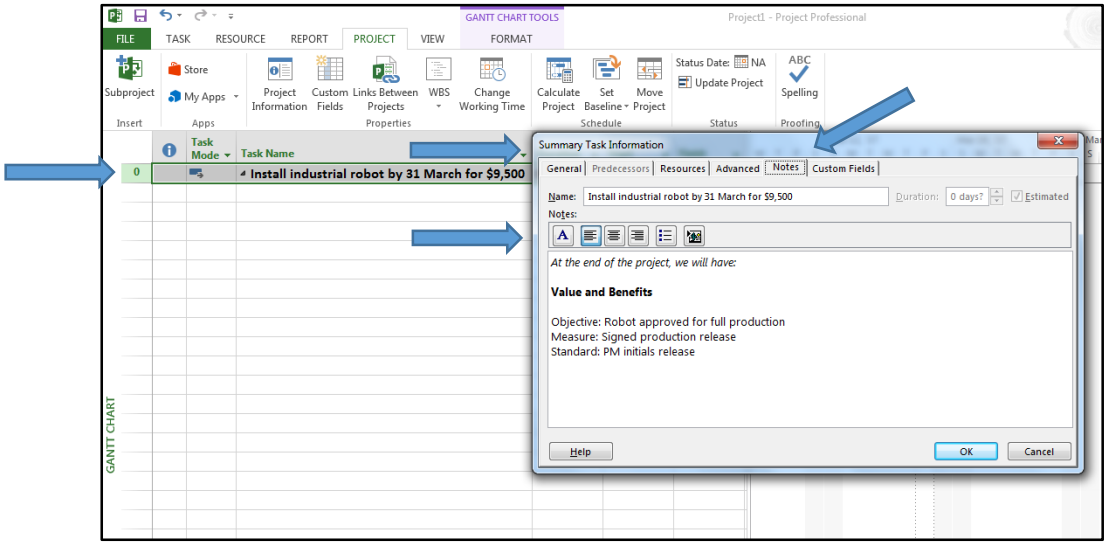


Figure 2A

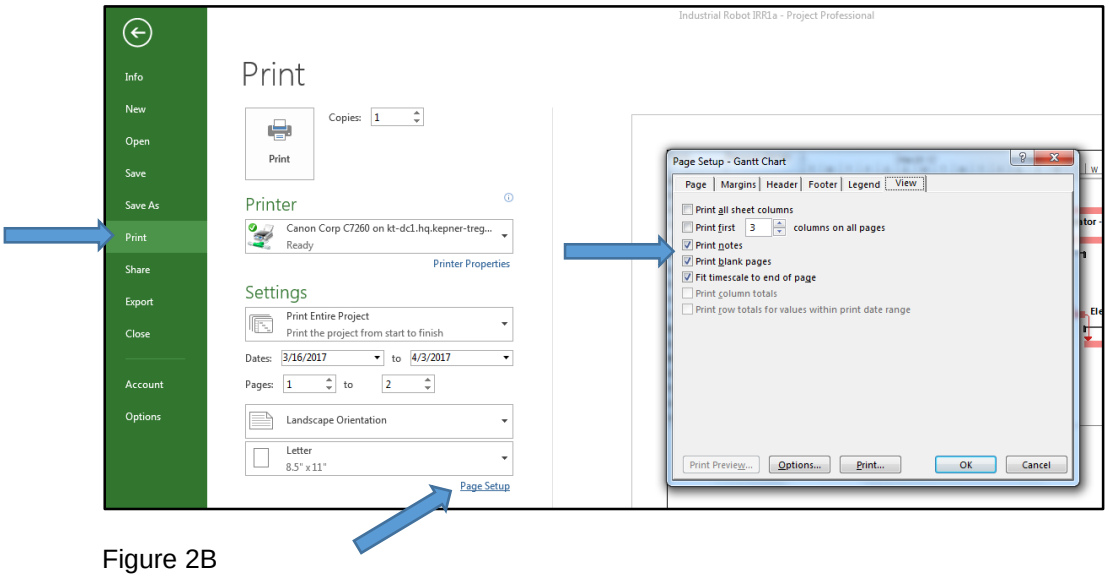


Figure 2B

OR (Figure 3)

- Click on the Insert Object button and select Create New or Create from File.
- If you select Create New, you can access an Excel or Word file, key in your data and save the file. The saved file will appear on the Notes page as an icon (if you checked the Display As Icon box).
- If you select Create from File, click browse for the file where you created your objectives, select the file, and then click insert. It should show up as an icon in the Notes tab.

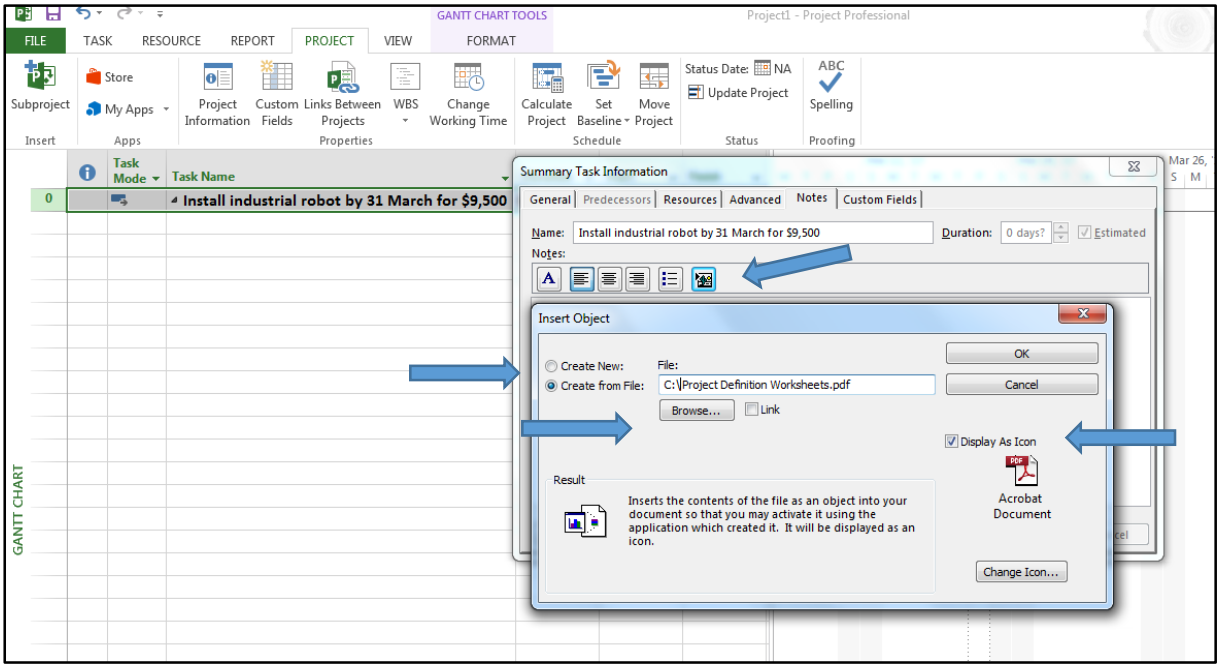
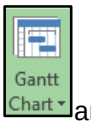


Figure 3

Step 3 – Work Breakdown Structure

The Work Breakdown Structure (WBS) is the backbone of all future work for your project, so it is very worthwhile spending the time getting this right. To build the WBS (Figure 4A):

- On the Task tab (View section), click on the Gantt Chart button 

and then click Gantt Chart on the drop-down menu.
- Under the Project Summary Task, key in data in the Task Name cells (you can move down the list by using the down-arrow or by pressing Enter). **Tip:** Resist the temptation to fill in all the other columns especially the start and finish dates.
- Type in the task names (record them in the past tense – a subliminal message for when you go to tick off how complete they are).
- Include tasks like Project Managed, Project Kickoff Meeting Held, in your list of tasks.
- To insert a new task between two existing tasks, click on the lower of the two tasks and then press the Insert key. Type in the new task's name in the Task Name cell.
- Outdent or indent the tasks in your list to create summary tasks (deliverables or sub-deliverables) or work packages. To do this, click on the task and then on the Task tab (Schedule

section), click either the button with the left pointing or right pointing arrow (when you hover on the button, a dialog box appears telling you what the arrow does). This is one way of indenting/outdenting. Another way is to select the task and then hover until you see the two-sided arrow. Then drag the text to the right to indent or left to outdent.

- You can create an indented task list in Excel, Word, or Outlook and import the list into Project by copying and pasting into the first blank Task Name cell where you want to paste the tasks. Project will automatically arrange the tasks into summary tasks and subtasks.
- To add WBS codes to the task list, select all the tasks in the Task Name column. Then right click and select Insert Column. Type WBS in the [Type Column Name] or select WBS from the dropdown menu. **OR** if you do not want to insert a WBS column, on the Format tab's Show/Hide section, click Outline Number and the numbers will appear next to the tasks (Figure 4B).

- To hide or show tasks, on the Format tab (Show/Hide section), turn on or off the relevant checkboxes. Or, on the View tab (Data section), click on the Outline button and then from the dropdown list, select the lowest level you want to view.

- To insert additional tasks in your task list, first click on the task where you want the new task inserted (new task will be inserted above). Then on the Task tab (Insert section), click on either the Task, Summary, or Milestone buttons.

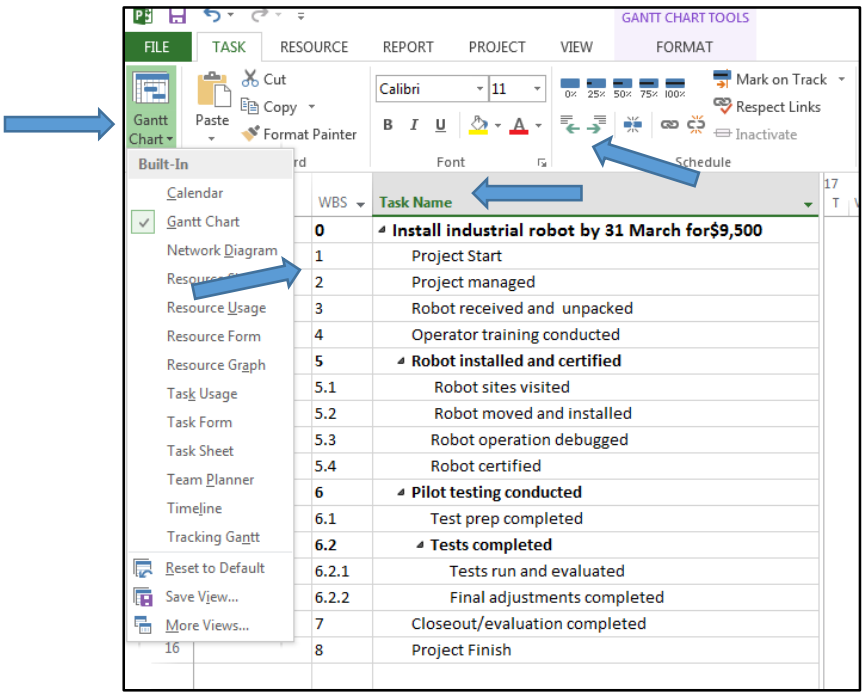


Figure 4A

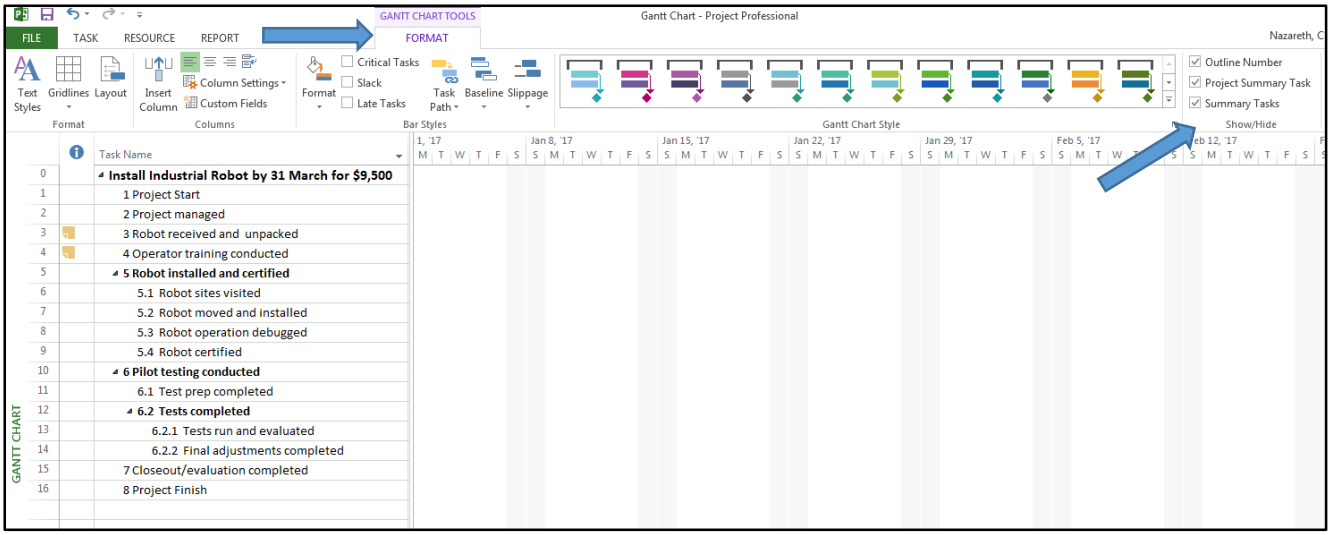


Figure 4B

Note: The hierarchy of the WBS in MS Project is displayed in outline format. If you want to see the task list in tree format, you will need to use Visio or WBS Chart Pro (www.criticaltools.com).

- To create a recurring task, such as a status meeting, first click on the task where you want the recurring tasks inserted (the recurring tasks will be inserted above). Then on the Task tab (Insert section), click Task and select Recurring Task. In the dialog box, key in the name of the task. The Duration will automatically set the value to 1 day (1d). You can change this to hours to represent how long the meeting will be, e.g., 2h for a two-hour meeting. Then set the recurrence pattern (weekly, monthly, etc.) and the range of the recurrence (start, end after, and end by). Project will automatically set the start date to the project's start date. Then click OK. (Figure 5)

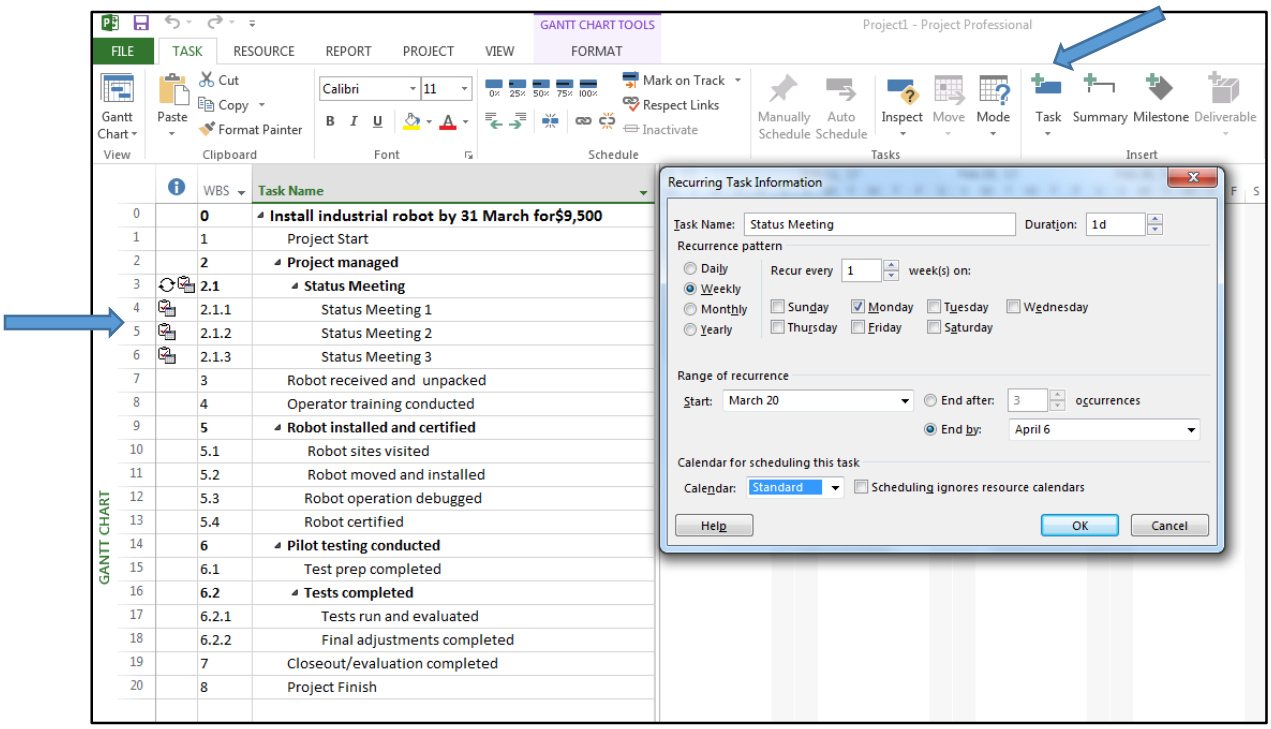


Figure 5

- You can insert a sub-project (or several) into a WBS to create a master project. First create a project file for each sub-project. In the master project, on the View tab, click Gantt Chart. Then on the Project tab, click the Subproject button. Insert the files you want. Keep the Link to project box checked so that changes to one file are reflected automatically in the other file. (Figure 6)

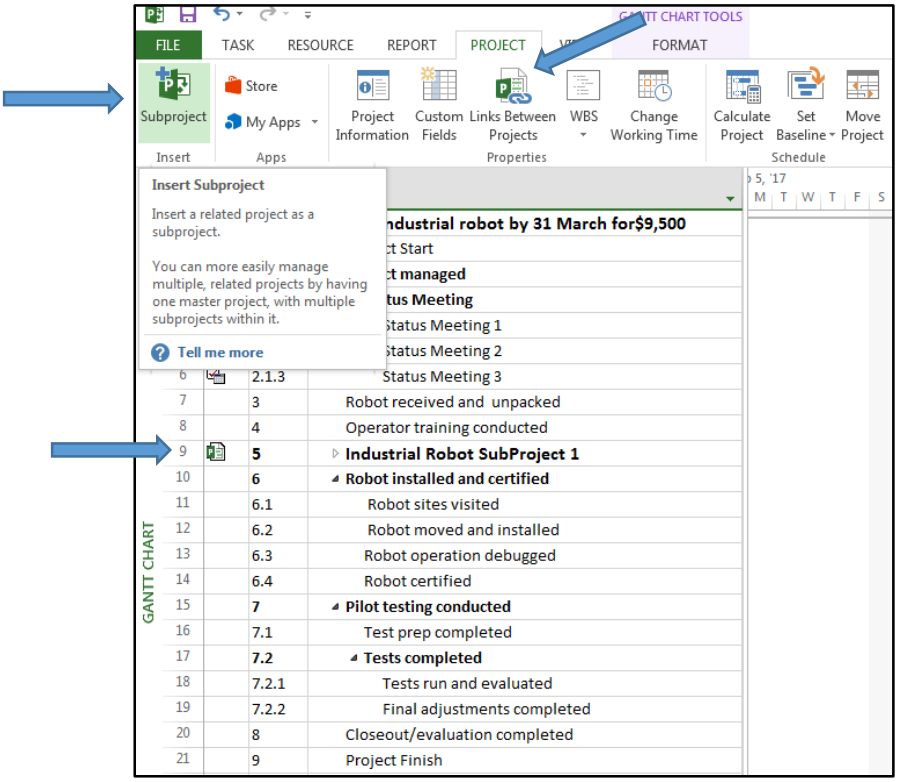


Figure 6

Step 4 – Identify Resource Requirements

In Identify Resource Requirements you are doing three steps: Identifying ***what type*** of resource is required, identifying ***how much*** of that resource is required, and identifying ***how much*** the resource will cost. First record all resources that you plan to use in the Resource Sheet before assigning them to specific tasks. This creates the "resource pool". You can either brainstorm all your resources first, or return to the resource sheet each time you wish to enter a new task. The reason for this is it provides a common area and prompt to record resource type, costs, calendars, etc. It also promotes the correct methodology if common resource pools are ever to be used.

To create a resource pool (Figure 7):

- In the View tab, click on Resource Sheet. This will bring up a table. You can enter data in the table as described below, OR in the Resource Information dialog box, which you can access by double-clicking on a blank Resource Name cell in the Resource Sheet, OR by double-clicking on the "I" cell adjacent to the resource name, OR right-clicking on the resource name and selecting "information".
- The first column in the table is titled Resource Names. Type the name of the resource, if you know it, or the skill set. If you key in the name of a person, develop a naming convention, such as Doe J (last name, first initial). Do not use commas and periods to separate names and initials. Press enter to save the resource and move to the next resource. Key in all the resources, then populate the other columns.

- In the Type column, choose Work, Material, or Cost to identify the type of resource. In MS Project:
  - Work = person (crane operator, programmer) or equipment (crane, server);
  - Material = supplies that are consumed (envelopes and postage stamps);
  - Cost = expenses that are not associated with work or materials (travel expenses, licensing fees, permits).

Work is the default task type in MS Project.

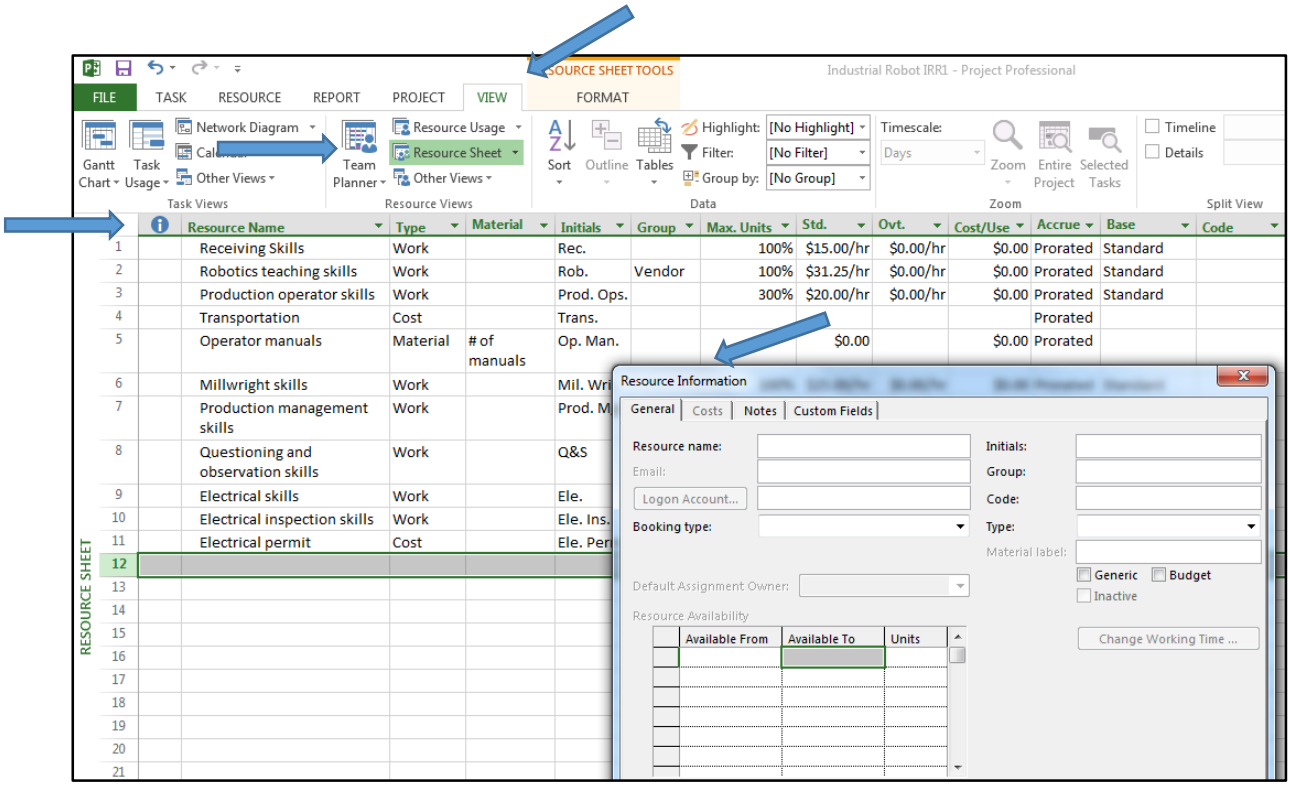
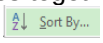


Figure 7

If you use a variety of task types and you want want to keep all the resource types together (all Work resources sequentially listed, for example), click on Sort, choose Sort By…, 

using the drop down. In the Sort dialog box, (Figure 8) change Sort by ID to Type using the drop-down, and click the Descending radio button to keep the work resources at the top of the list. Select Name in the Then by field using the drop-down, and click the Ascending radio button so the names are in alphabetical order. Next check the Permanently renumber resources box and click Sort. (NOTE: After the resources have been sorted, go back and click on the Sort By box and uncheck the Permanently renumber resources box. If you leave the Permanently renumber box checked, the next time you do a sort the resources you have just renumbered will be permanently renumbered again, which may not be what you want.)

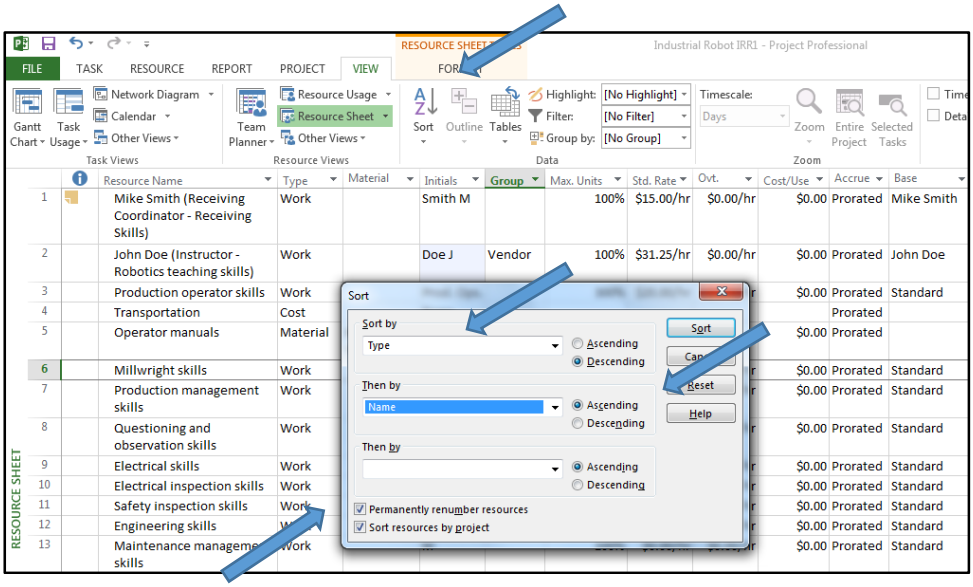


Figure 8

(Note: you can enter a cost for either Work resource or Material resource in the Resource Sheet, but not for a Cost resource. Cost for a Cost resource is entered when you assign the resource to a task. To do this go to the Resource tab, click on the task to which you want to assign the resource, click Assign Resources, select Resource Name in the Assign Resources dialog box and click Assign. This will allow you to enter the cost of the resource in the cost column [Figure 9]).

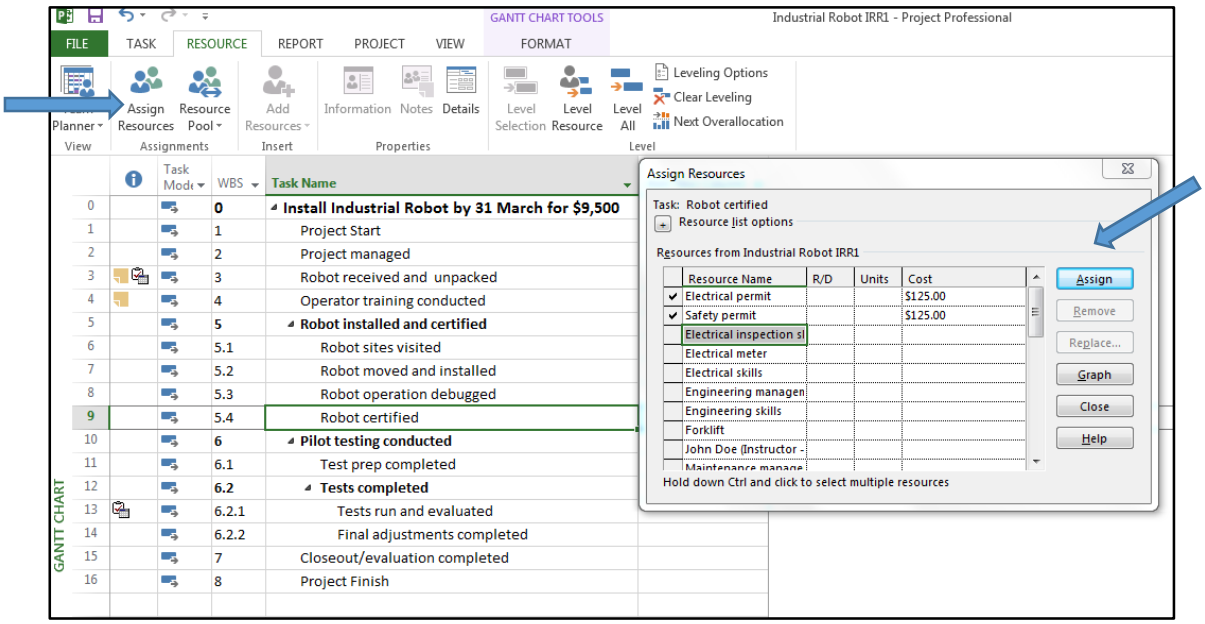
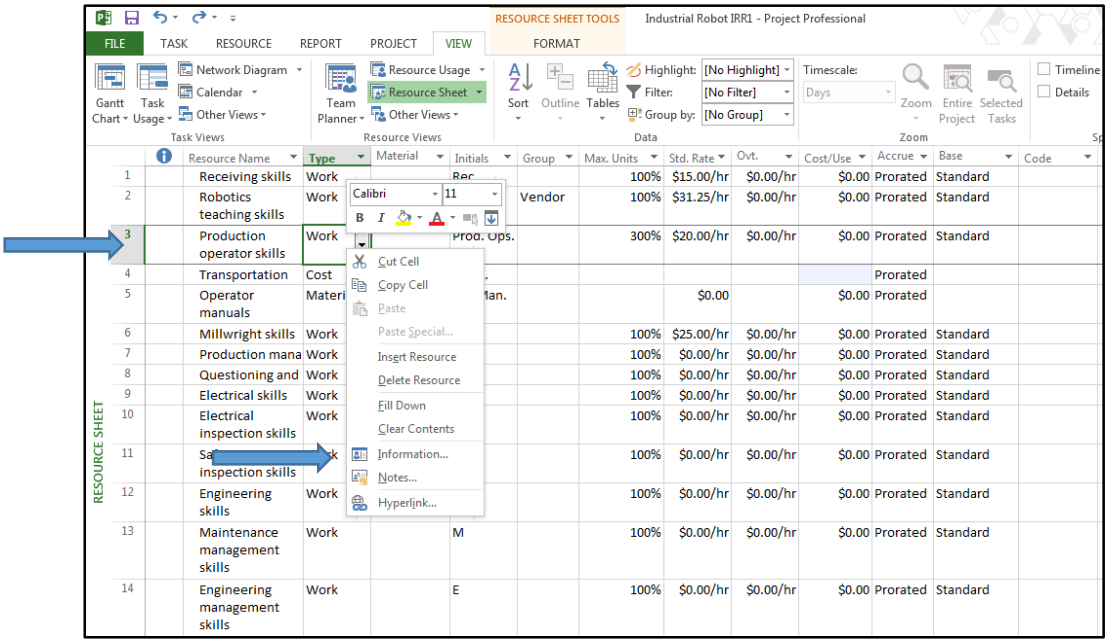


Figure 9

- In the Materials Label column, type the unit of measurement for each material (gallon of fluid, ream of paper, etc.).
- The Initials column populates automatically with the first letter of the first word in the resource name column. You can change this to the person's first and last initial or an abbreviated job description. Do not use commas or brackets with the initials.
- The Group column can be used to categorize resources, such as vendor, subcontractor, or department. You can enter this information here, or in the Resource Information dialog box.

- The Max. Units column refers to resource availability. (This column together with the Base Calendar column is used by project to calculate resource availability.) The default is set at 100% which means that the resource is dedicated 100% of their available time to this project. Percentages greater than 100% indicate availability of more than one resource. Therefore, 500% would tell you that 5 units of that resource are available.
- In the Std. Rate column, enter the standard rate that will be charged for the resource. The standard rate is the typical pay rate for the resource, the cost per time period for a piece of equipment, or the cost per unit for materials. For a Work resource, the default is rate per hour ($/h). If you will pay a flat rate per month or other unit of time, the unit of time can be changed from per hour to per month ($/m), per day ($/d), etc.
- In the Ovt. Rate column, enter the overtime cost for the Work resource if applicable. Overtime rates apply to any hours worked beyond a standard working day as defined in the calendar.
- The Cost/Use column refers to a cost associated with each use that is independent of other costs. For example, if there is a flat fee of $25 each time a technician shows up to make repairs, then include $25 in the Cost per Use column and that will be added in addition to any hourly costs associated with the resource.
- In the Accrue At column, you will find three settings in the drop-down: Start, Prorated, and End. Select Start if the cost occurs as soon as the task begins and End if the cost occurs when the task ends. Select Prorated if the cost will be spread over the duration of the task. Prorated is the default.
- The Base Calendar column has three settings in the drop-down: 24 hours, Night Shift, and Standard. Standard is the default. To change the calendar for a **resource**, you can use the drop-down in the Resource Pool sheet. You can also right click on the resource cell and select Information from the drop-down to bring up the Resource Information dialog box (Figures 10-13). Then select Change Working Time.
    - In the Change Working Time dialog box, select Exceptions to alter the work schedule for a training class, a corporate meeting, or a special holiday, for example. Key in the name of the exception and select the start and finish date. Then click Details to change the working times.
    - Select Work Weeks if the resource is going to be away for a period of time, such as a two-week vacation or medical leave. In the Work Weeks tab, click the first blank Name cell and type in a description of the absence, such as Summer Vacation. Then add in start and finish dates.
- The last column, Code, is another way to categorize resources. For example, if a task is to be allocated to a cost center, use that cost center's code to track expenses.



	Resource Name	Type	Material	Initials	Group	Max. Units	Std. Rate	Ovt.	Cost/Use	Accrue	Base	Code
1	Receiving skills	Work		Rec		100%	$15.00/hr	$0.00/hr	$0.00	Prorated	Standard	
2	Robotics teaching skills	Work			Vendor	100%	$31.25/hr	$0.00/hr	$0.00	Prorated	Standard	
3	Production operator skills	Work		Prod. Ops.		300%	$20.00/hr	$0.00/hr	$0.00	Prorated	Standard	
4	Transportation	Cost								Prorated		
5	Operator manuals	Materi					$0.00		$0.00	Prorated		
6	Millwright skills	Work				100%	$25.00/hr	$0.00/hr	$0.00	Prorated	Standard	
7	Production mana	Work				100%	$0.00/hr	$0.00/hr	$0.00	Prorated	Standard	
8	Questioning and	Work				100%	$0.00/hr	$0.00/hr	$0.00	Prorated	Standard	
9	Electrical skills	Work				100%	$0.00/hr	$0.00/hr	$0.00	Prorated	Standard	
10	Electrical inspection skills	Work				100%	$0.00/hr	$0.00/hr	$0.00	Prorated	Standard	
11	inspection skills					100%	$0.00/hr	$0.00/hr	$0.00	Prorated	Standard	
12	Engineering skills	Work				100%	$0.00/hr	$0.00/hr	$0.00	Prorated	Standard	
13	Maintenance management skills	Work		M		100%	$0.00/hr	$0.00/hr	$0.00	Prorated	Standard	
14	Engineering management skills	Work		E		100%	$0.00/hr	$0.00/hr	$0.00	Prorated	Standard	

Figure 10

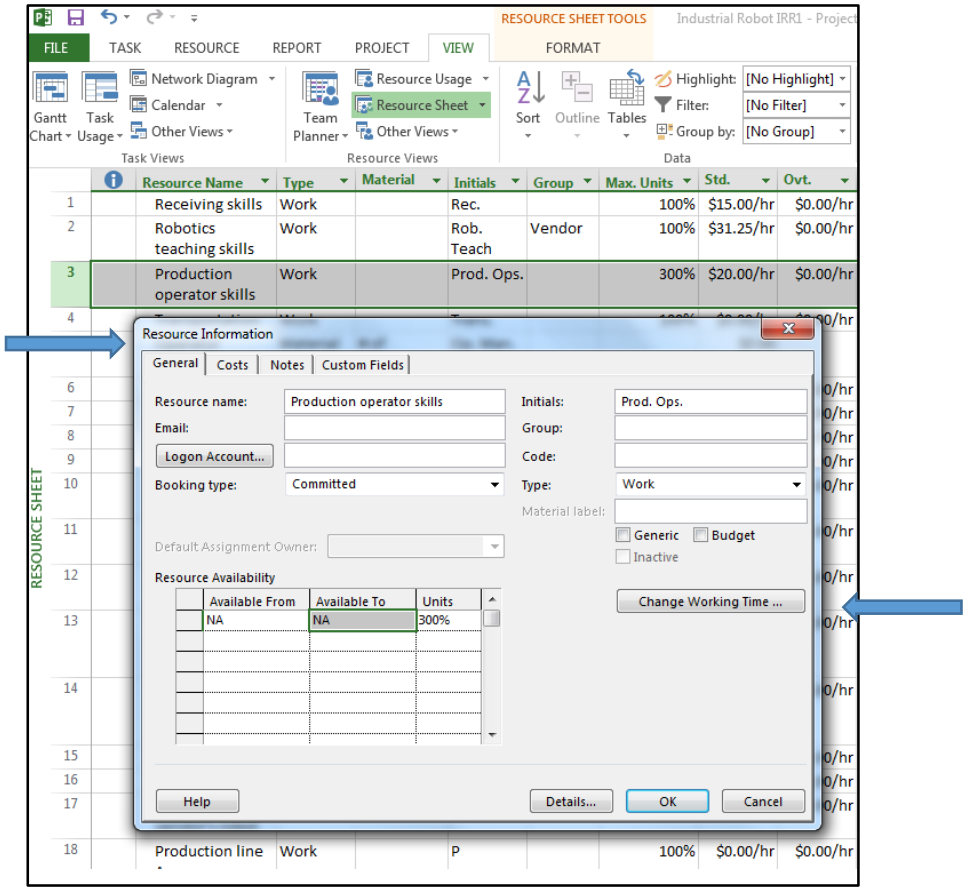


Figure 11

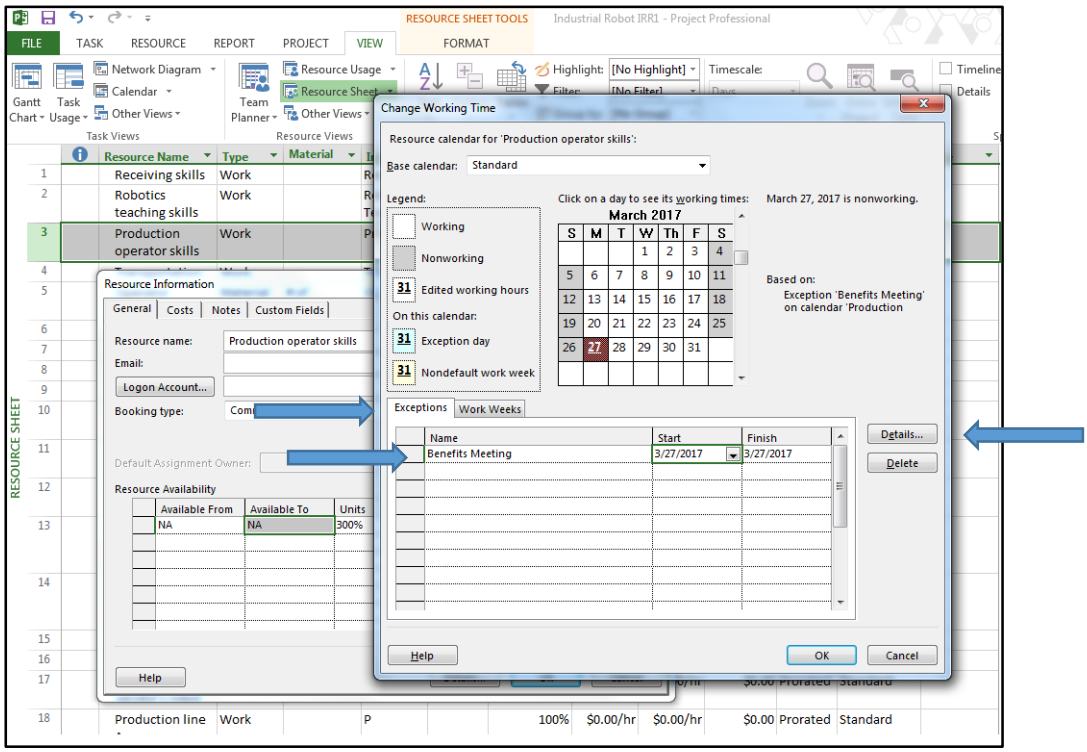


Figure 12

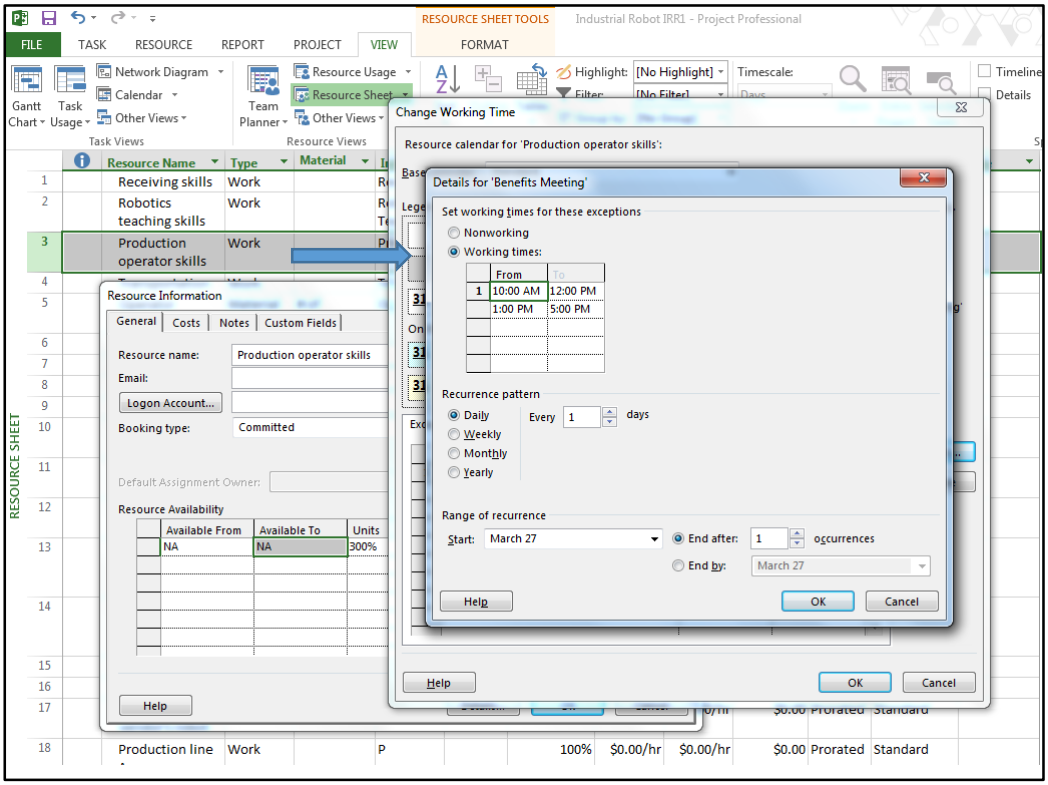


Figure 13

To create a common resource pool for use with multiple projects, you will first need to create a standalone resource pool. Choose File, New, Blank Project. In the View tab's Resource Views section, click Resource Sheet. Fill in information about shared resources (names, standard rates or cost, maximum availability; rest of the information is optional). Then save the file. You can copy resources from this file and paste them into the resource pool in your project. OR, to connect a project to a common resource pool, open the resource pool file and the project file that needs access to the resource pool. In the Resource tab's Assignments section, choose Resource Pool, Share Resources. The Share Resources dialog box opens. Select the "Use resources (requires at least one open resource pool)" option and then, if necessary, in the "From:" drop-down list, choose the resource pool file. For "On conflict with calendar or resource information," select an option to tell Project how to resolve the discrepancy. Click OK.

Understanding Task Types and the Work Equation

Before you assign resources to each task, it is helpful to understand the different ways MS Project can use information about resource availability and task duration to estimate effort and costs. MS Project considers three parameters relative to each task in order to properly allocate time and cost:

Work = effort or time on task or person hours
Duration = elapsed time or length of task from start to finish
Units = percentage of the resource's time dedicated to the task (100% = full-time)

MS Project uses what is called the "Work Equation" to manage information about these parameters. The work equation is:

Work (time-on-task effort in hours)	**=**	**Duration** (total time to complete the task in hours)	**x**	**Units** (% availability of a resource)

MS Project uses this equation with one of these parameters fixed and the other two variable. When you change one of the variables, the other variable is automatically updated to keep the equation "in balance". MS Project uses an algebraic formula:

Duration = work ÷ units (e.g., 60 hours = 30 hours ÷ 50%)
Work = duration x units (e.g., 3 days = 5 days x 60%)
Units = work ÷ duration (e.g., .50% = 80 hours ÷ 160)

When one of the parameters is maintained as a constant, or "fixed":

Task Type	Rule	Effect
Fixed Units	This is the default setting. Units will not be altered automatically by MS Project when you manually change either duration or work.	If you change the Duration, then Work will be adjusted. If you change the Work, then the Duration will be adjusted. If you change the Units, then Duration will be adjusted.
Fixed Work	Used when the Work is to remain constant. For example, you may have quoted a set amount of work to be completed for a client irrespective of the duration.	If you change the Duration, the Units will be adjusted. If you change the Units, then the Duration will be adjusted. If you change the Work, then Duration will be adjusted.
Fixed Duration	This should be used if the Duration of the task needs to remain constant. For example, no matter how many resources you assign, the time to complete the task does not change.	If you change the Units, then Work will be adjusted. If you change the Work, then Units will be adjusted. If you change Duration, then Work will be adjusted.

Note: Task types apply only to tasks that are automatically scheduled. (Manually scheduled tasks have user defined start, finish, and durations for each task. Project will not change these but will warn you of potential conflicts. Project will assign start, finish, and durations to automatically scheduled tasks based on dependencies, constraints, and calendars. To change how tasks are scheduled, go to File, Options, Schedule, Scheduling options for this project. Check the Task Mode column in the Gantt Chart View to see whether a task is manually scheduled  or auto scheduled  . Tip: You can use the drop-down in the Task Mode column to switch from one to the other, but be careful as project will make decisions for you on successor tasks that you may not want. The default is manually scheduled.)

Understanding Effort-Driven Estimating

Effort-driven means the duration of a task is dependent on the resources assigned to it. The more resources added to the task, the shorter the duration. For example, if it takes one person four weeks to complete a task, assigning that task to four people should ensure the task's completion in one week. If the duration of a task is independent of the number of resources assigned to it, then the task is not effort-driven. Adding more resources to such a task will not make the duration shorter. For example, adding four drivers to drive one bus to a destination four hours away will not reduce the drive to one hour.

Each one of these task types can be specified as Effort Driven. When a task is effort-driven, MS Project ensures that the total effort associated with the task (the total amount of work required to complete the task) remains the same, even after a change in resource assignments. If you change resources after the initial work has been entered, the total amount of work will be redistributed over the remaining resources. To accommodate the change in resources, either the amount of work being done by individual resources will change, or the duration will change.

The effort-driven setting is usually turned off. To turn it on, go to File, Options, Schedule, then check "New tasks are effort-driven." If you are going to use effort-driven, make sure to watch work, duration, and resource loading carefully when you make changes. (Do some tests to see how it works. Right click a task, then click Task Information, Advanced tab, and uncheck the effort-driven box.) Note: the Fixed Work task type is always effort-driven and cannot be changed. Summary tasks cannot be set to effort-driven. Manually scheduled tasks cannot be set to effort-driven. Some tasks, such as meetings and presentations, should not be effort-driven (for example, the number of people involved should not have an impact on the duration of the meeting).

Use the Help feature within MS Project to find *How Project Helps Schedule Tasks: Behind the Scenes* for a thorough understanding of these topics.

You can record how much of a specific resource is required for each task and the associated cost in two ways:

Method One (Figure 14)

- In the View tab, click on Gantt Chart, then go to the View tab and check the Details box to split the screen.
- Click on the task for which you want to identify resources.
- Click on the Resource Name field (in the lower half of the split screen) and use the drop-down to bring up the list of resources from your resource pool. After you have selected your resource, enter units (availability for *this* task) and work (hours to be spent on *this* task). Assign all of the resources needed for this task, then move to the next task.

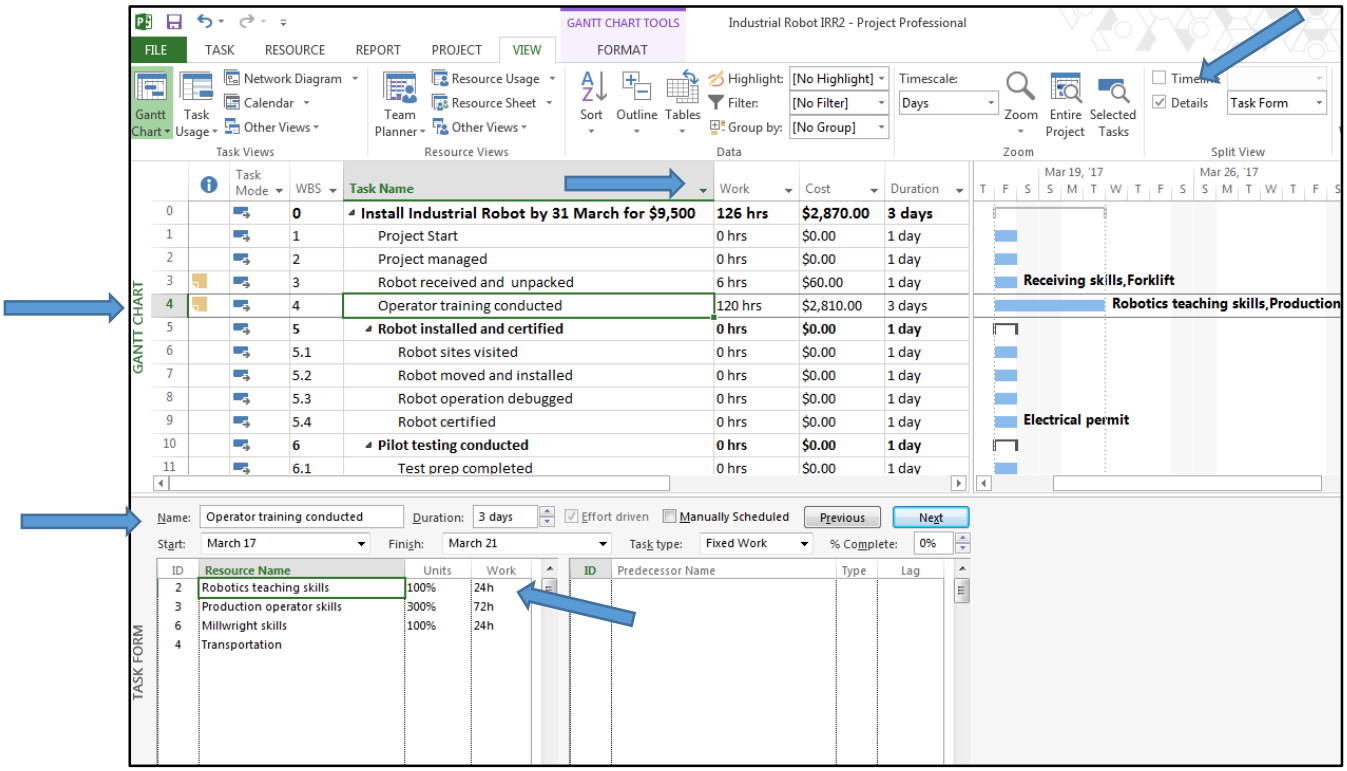


Figure 14

Method Two (Figure 15)

After you have clicked on the task for which you want to identify resources, go to the Resources tab and in the Assignments section, click on Assign Resources. This will bring up the Assign Resources dialog box. Check the resources you want assigned to the task, then click Assign.

- Insert a column called Work and a column called Cost next to the Duration column (select the Duration column, right click and then select Insert Column, select Work from the drop-down. Repeat for Cost). This will allow you to see the total work and costs associated with this task.

- Repeat assigning work and resources for all work packages.
- As you do this, you should see the figures in the Work column and Cost column on the Gantt chart update.
- You will also note the Duration column automatically updates – leave this for the moment as you can modify it later if necessary. MS Project is using the work equation to fill this in, but you have not completed all the information that is necessary for it to be accurate just yet.
- If you have tasks where you are uncertain of the work they will involve, treat those as fixed duration (e.g., waiting for a part to arrive) – leave them blank; you will return to them in Step 6 when tasks are sequenced.

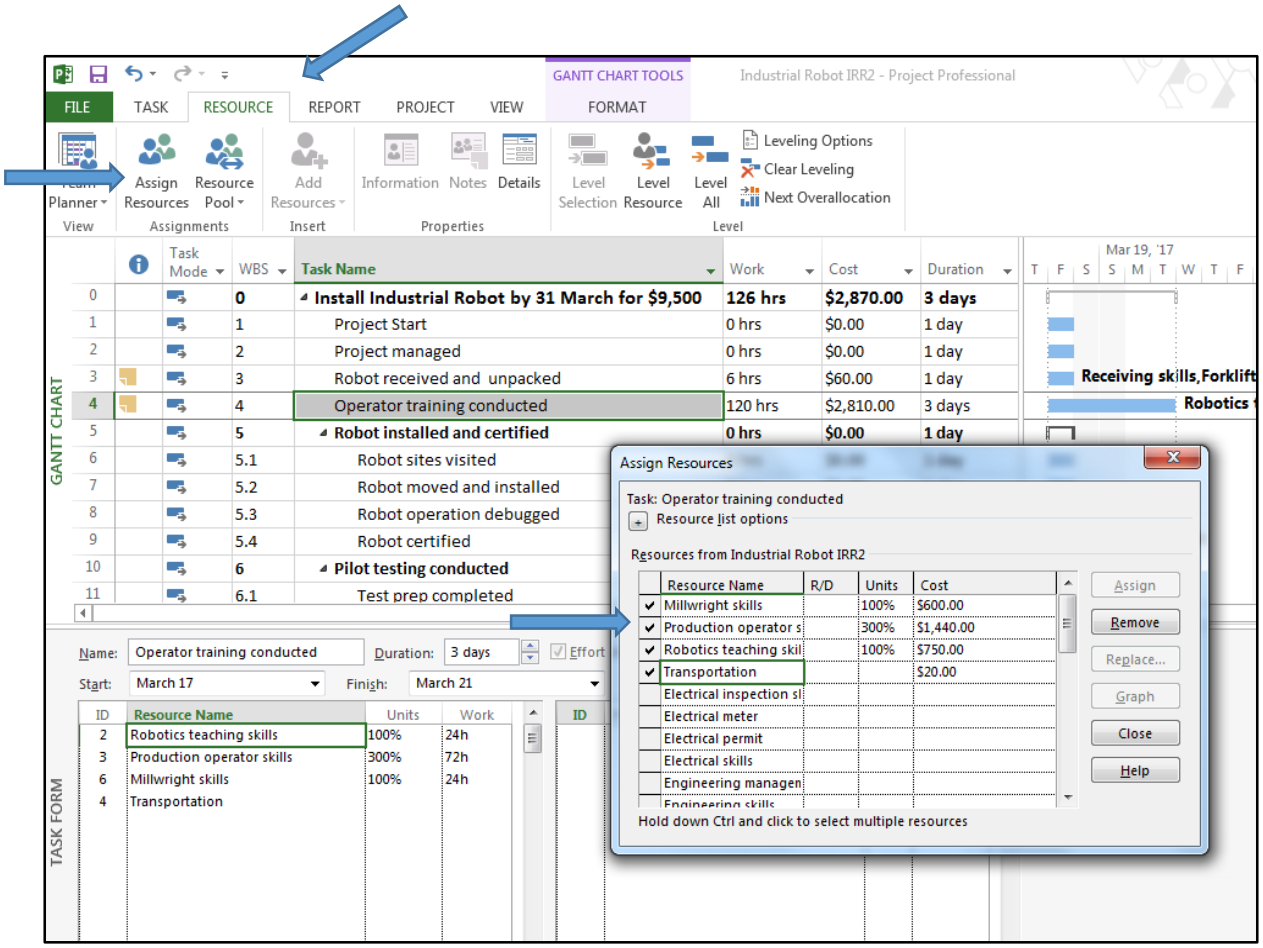


Figure 15

Once you have assigned resources to all of the tasks in the project, you will be able to see an initial estimate of the total cost of the project in the Cost column (if you created one). Other ways to check the total cost of the project include:

- In the main toolbar select Project, Project Information, Statistics.
- Reports are also available detailing exact resources and costs being used for each work package. In the Report tab, View Reports section, click on Resources 

or Costs 

and select the appropriate options.

Note: As you define and plan your project, you will find that numbers sometimes change but you cannot figure out why. One way to quickly spot where the changes occurred is to create text fields adjacent to the calculated fields. It will also help you determine the accuracy of the changes. For example, next to the Work column, add a new column. Select Text1 from the drop-down (or the next available Text number). When Text1 shows up as the column heading, double click on that heading and enter a new heading, say Work Data. Then copy/paste all the Work information into this new column.

Step 5 – Responsibility Assignment Matrix

In Step 4 you identified resource skills required for each work package. Now that you have agreement from Resource Owners, you can assign actual names against the skills you listed in the resource sheet. The best practice is to add the name of the person with primary responsibility to the skill. For example, Mike Smith (Receiving Coordinator – Receiving Skills) (Figure 16). If that is too much information you can, key in the appropriate information in the Initials column (default is the first initial).

Specific information about what each resource is required to do can be stored in the notes section of the Resource Information.

- Go to View, Resource Sheet and double click on the resource in Resource Name field.
- In the Resource Information dialog box, select the Notes tab.
- Record the specific responsibilities (see Figure 16 for Mike Smith's performance information).
- Repeat this until all responsibility assignments have been identified and expectations have been documented for the project.

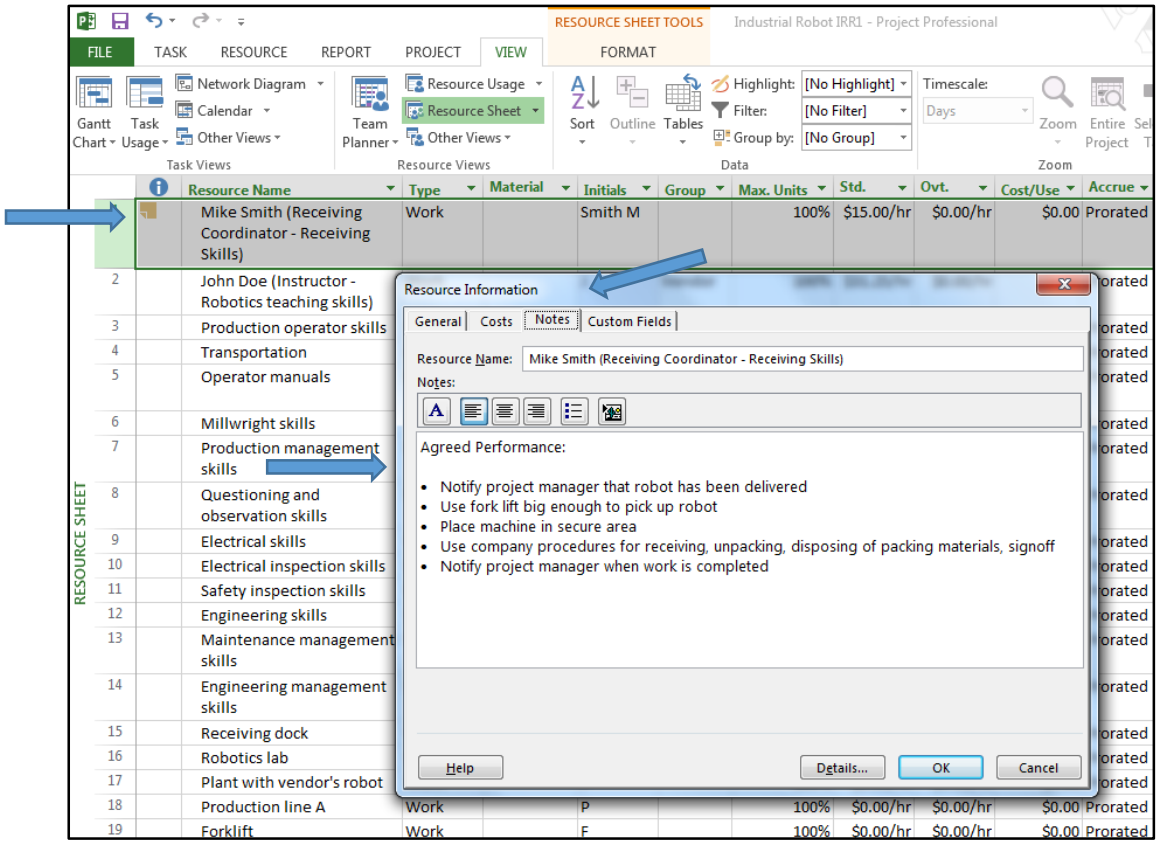


Figure 16

Note: If you decide to use resource names and eliminate the knowledge/skills set from the Resource Name column, then make sure you save the skills needed for the task should you require to make resource changes further along in your project. Do this either in Notes or set up a column called Knowledge/Skills and move the skills required there. Since Knowledge/Skills is not available in the Add New Column drop-down, select Text2 from the drop-down (or the next available Text number). When Text2 shows up as the column heading, double click on that heading and enter the new heading, Knowledge/Skills. Then copy/paste all the skill sets into this new column.

Step 6 – Sequence Deliverables

To sequence tasks (Figure 17):

- In the Gantt Chart View, enter the Task Number predecessors for each task in the Predecessors column. Note: Task Numbers are the numbers that Project assigns for each line in the WBS, not the WBS numbers.
- You should not enter predecessors against major deliverables and sub-deliverables, as this might throw of task sequencing.
- You may find it helpful to insert a Successors column, which will show what other tasks will be influenced by the task you are working on. To insert the column, select the Predecessor column, right click, select Insert Column, then select Successors from the drop-down.
- Make sure that your predecessors are true predecessors – do you really have to wait until that task is entirely completed before the next one starts? The default task relationship in MS Project is Finish-to-Start. Consider using the other precedence relationships (e.g., Finish-to-Finish or Start-to-Start) if necessary. You can change precedence relationships for each work package by double clicking on the work package to bring up the Task Information dialog box. Then go to the Predecessors tab and from the Task drop-down select the precedence relationship that is most appropriate.

Duration should now be entered for all tasks, or revised if they were calculated automatically when you identified resources for each work package. This is your estimate of how many work days there are between the start and end of a work package – also known as elapsed time. (Note: don't worry about calendar days yet – that is coming up in the Schedule Deliverables step.)

- Enter duration directly into the Duration column on the Gantt chart. Note: If you created Auto Scheduled tasks without filling in their durations, Project will set the durations to "1 day?" To remove the question mark (?), click File, Options; then in the Project Options dialog box, click Schedule. Next scroll down to the Scheduling Options for this Project Area and turn off New Scheduled Tasks Have Estimated Durations check box. If you do not turn off the check box, the question mark will vanish when you key in durations.
- If there are tasks that need to be fixed duration (remember that fixed units is the default) – modify the task type to Fixed Duration and enter the duration. (Double click on the Task Name. Go to the Advanced tab in the Task Information dialog box, and change the Task Type in the drop-down. You will not be able to make this change to tasks that you scheduled manually.)
- Note: For tasks like meetings or presentations, make the task a fixed duration task or keep the task as non-effort driven so that the duration does not change if you make a change to resources.

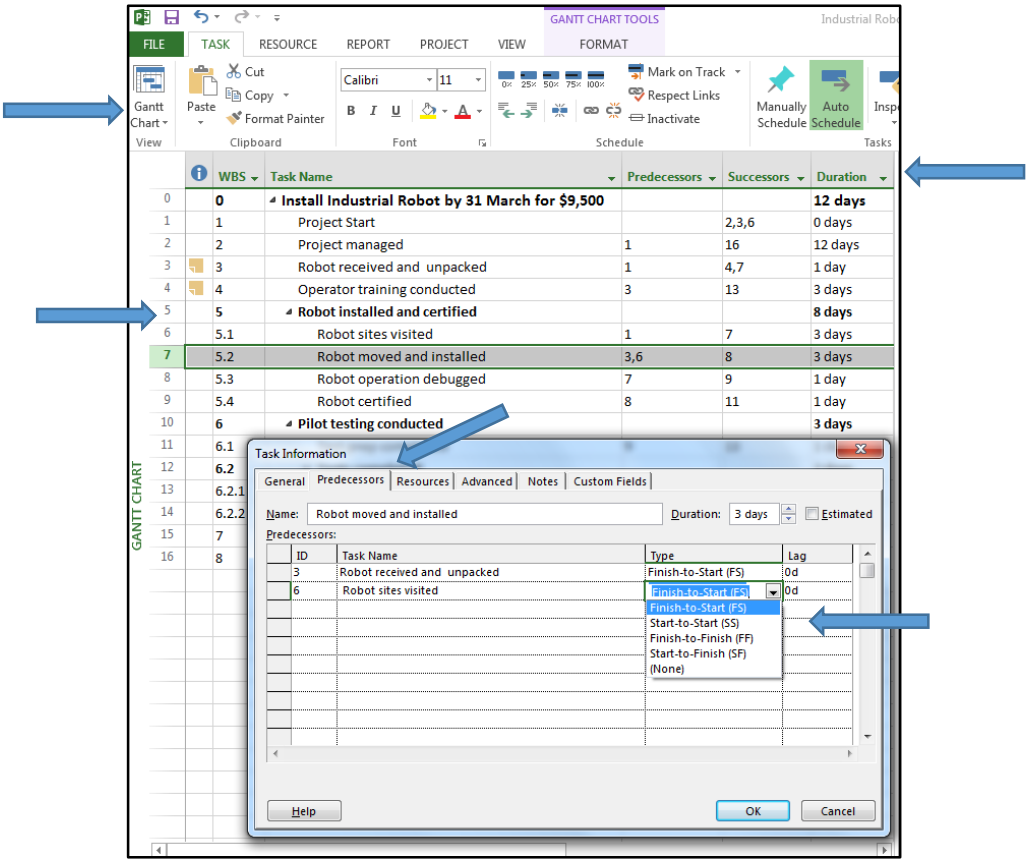


Figure 17

The Network Diagram can now be checked to ensure all precedence relationships are correct (Figure 18):

- Go to the View tab and then select Network Diagram.
- The work packages are standard rectangles, while the parallelograms are sub-deliverables and major deliverables. To change these shapes, go to the Format tab, then click Box Styles.
- To format the layout, go to the Format tab, then click Layout. Here you will be able to make adjustments automatically or manually, so that the Network Diagram is easier to view or print. For example, you can uncheck “Show summary tasks” and “Show page breaks” for a less cluttered view.
- Remember what you are auditing your network diagram for – all work packages have an arrow in and out, all work packages are there, and there are no loops.
- Check how big the Network Diagram is with the print preview function before you print it! You may need to adjust the scale or find a large format printer for very large plans.

The Critical Path will show up as red on your network diagram. It is the longest path through your network diagram that includes completion of all the tasks in the project (or the path with no slack).

- Check that the critical path(s) make sense.
- If the total duration is not acceptable you may choose to review some of the links (or the type of link) to change or reduce the critical path.

If your critical path is non-existent, check that all work packages are linked (have at least one predecessor and successor) and that all work packages do not have slack (as a results of constraints or leveling delays).

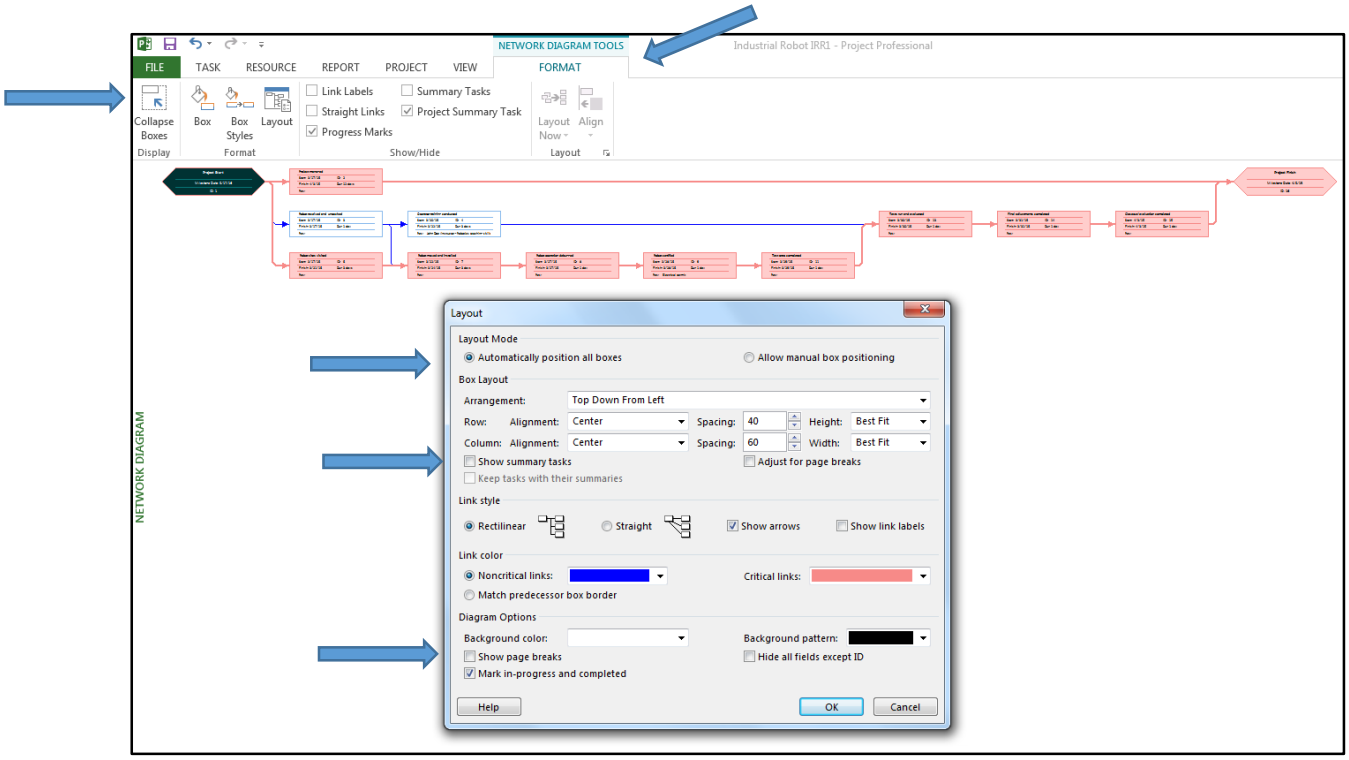


Figure 18

If you want to see supporting Critical Path data, such as the Early Start and Finish, Late Start and Finish, and Free and Total Slack, you can do so by using the Add New Column drop-down and then selecting the appropriate column (Figure 19).

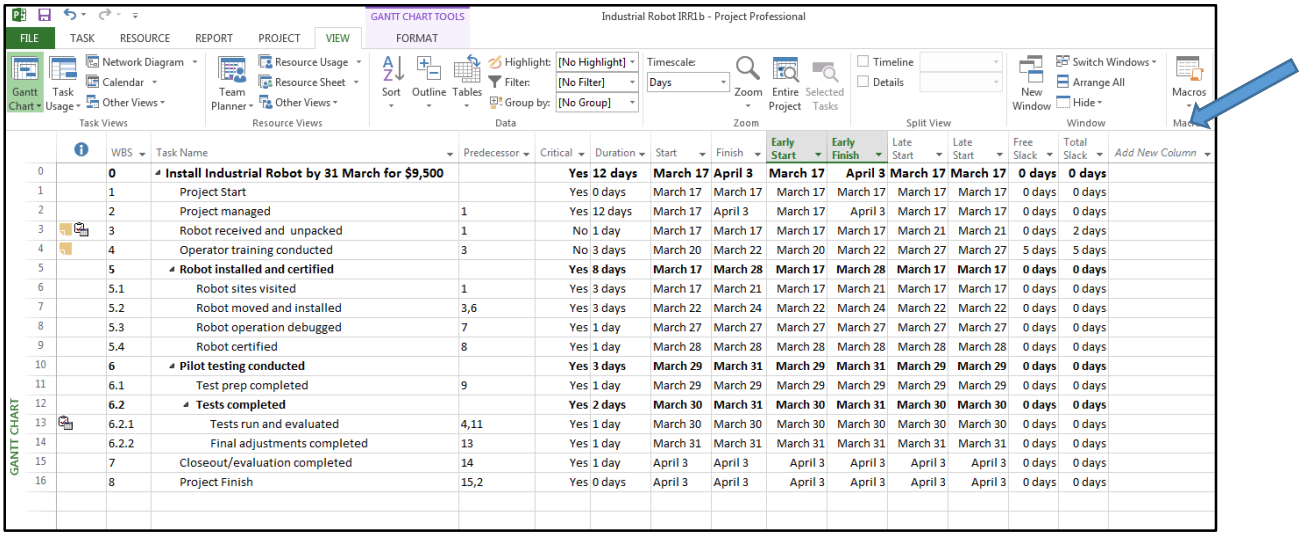


Figure 19

Step 7 – Schedule Deliverables

At this point in KT Project Management you will begin to confirm when in calendar time the work packages will start and finish. However, Project will have already done this for you once you provided a start date for the project, sequence, duration, and calendars. (Note: if you plan to make lots of changes to the dates or the overall schedule, it may be prudent for you to make a copy of your plan before you do that.) If you need more information on project schedules than is provided here, please refer to *How Project Schedules Tasks: Behind the Scenes* in Project's Help feature.

To check the project schedule:

- Confirm that start and finish dates for all work packages are acceptable.
- IMPORTANT: Do not change dates in the Start and Finish columns as that could create constraints and potentially prevent your carefully linked tasks from honoring their links! This could result in changes to the critical path and you will not be using the program to assist with your scheduling.
- If you decide to go ahead and make changes in the Start and Finish columns, every time you change a date, the Planning Wizard dialog box will open up to ask for guidance on handling links.
- If changes have to be made to working time after responsibilities are assigned, adjust the calendars now. (On the Project tab, click Change Working Time  , then make changes to the Standard Project Calendar or the Resource Calendars). Changes made to the standard project calendar will not carry over to the resource calendars. You will need to do that separately.
- If you create custom resource calendars at this time, remember to add them to the Base column in the Resource Sheet view. Use the Base drop-down and select the appropriate resource calendar (Figure 20).

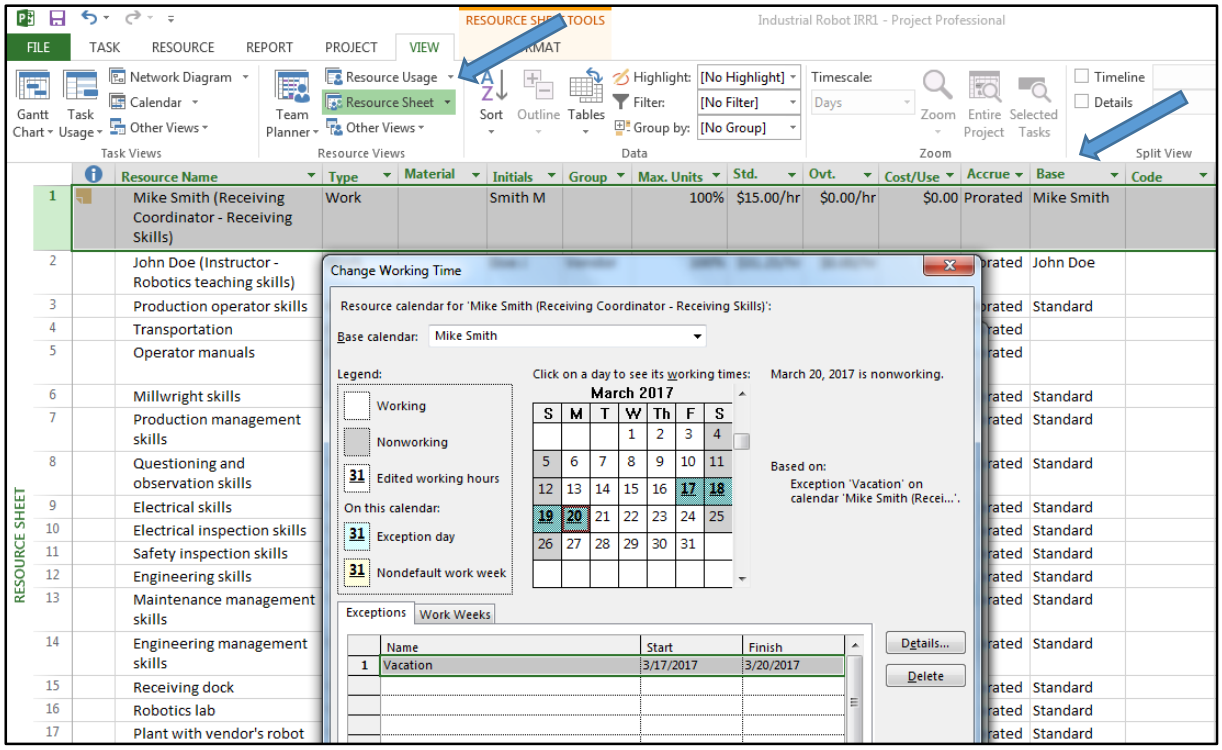
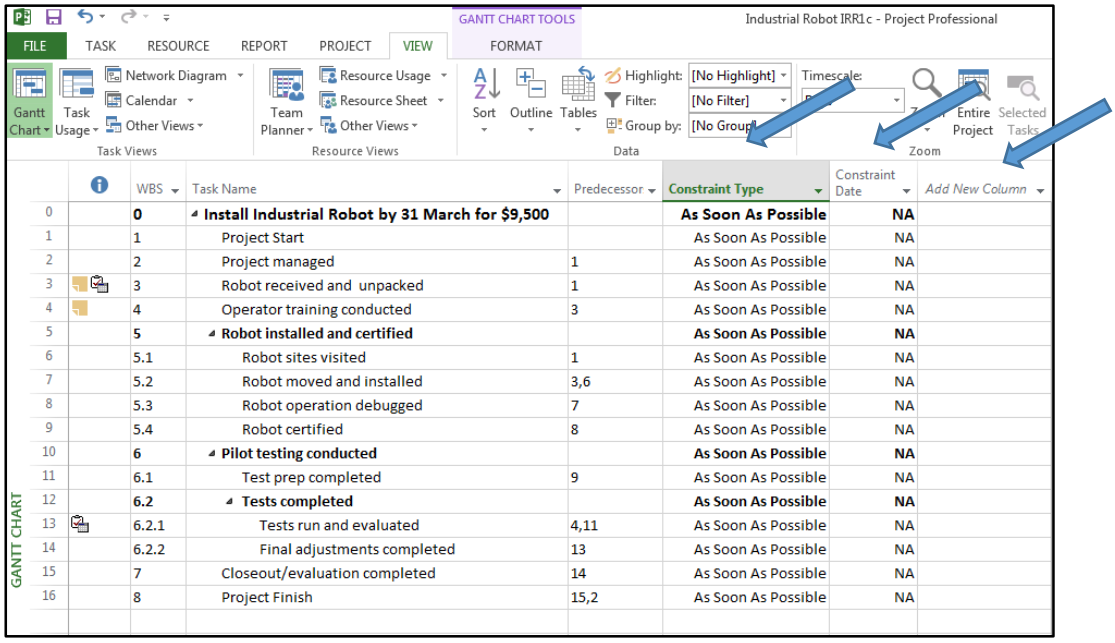


Figure 20

- Check scheduling constraints for work packages. MS Project automatically sets the constraint type of As Soon As Possible. To change to one of the other constraint types (As Late As Possible, Start No Earlier Than, Finish No Earlier Than, etc.) double click on the work package, then in the Task Information dialog box, click on the Advanced tab and select the appropriate

task constraint. If you select a constraint other than As Soon As Possible or As Late As Possible, you must also enter a Constraint Date. IMPORTANT: Changing constraints may induce artificial scheduling constraints, so only use other constraints if you understand and can track how they impact the schedule moving forward.

- Scheduling constraints can be identified by checking the Indicator column and looking for a calendar symbol.
- If you absolutely must start a task on a certain date – you may insert a Must Start On Constraint but be warned – it may prevent the task links from operating as they should – and hence give a false critical path (MS Project will warn you of this as well).
- To see all the constraint types and dates, select those columns from the Add New Column drop-down. (Figure 21)



	Indicator	WBS	Task Name	Predecessor	Constraint Type	Constraint Date	Add New Column
0		0	**Install Industrial Robot by 31 March for $9,500**		**As Soon As Possible**	**NA**	
1		1	Project Start		As Soon As Possible	NA	
2		2	Project managed	1	As Soon As Possible	NA	
3		3	Robot received and unpacked	1	As Soon As Possible	NA	
4		4	Operator training conducted	3	As Soon As Possible	NA	
5		5	**Robot installed and certified**		**As Soon As Possible**	**NA**	
6		5.1	Robot sites visited	1	As Soon As Possible	NA	
7		5.2	Robot moved and installed	3,6	As Soon As Possible	NA	
8		5.3	Robot operation debugged	7	As Soon As Possible	NA	
9		5.4	Robot certified	8	As Soon As Possible	NA	
10		6	**Pilot testing conducted**		**As Soon As Possible**	**NA**	
11		6.1	Test prep completed	9	As Soon As Possible	NA	
12		6.2	**Tests completed**		**As Soon As Possible**	**NA**	
13		6.2.1	Tests run and evaluated	4,11	As Soon As Possible	NA	
14		6.2.2	Final adjustments completed	13	As Soon As Possible	NA	
15		7	Closeout/evaluation completed	14	As Soon As Possible	NA	
16		8	Project Finish	15,2	As Soon As Possible	NA	

Figure 21

- A preferred method to highlight critical dates is to insert a Deadline in the Task Information dialog box. This will be indicated as a green down-arrow on the task bar in the Gantt. If the deadline is to the right of this arrow, the task is late and a missed-deadline icon appears in the Indicators column. (Figure 22)

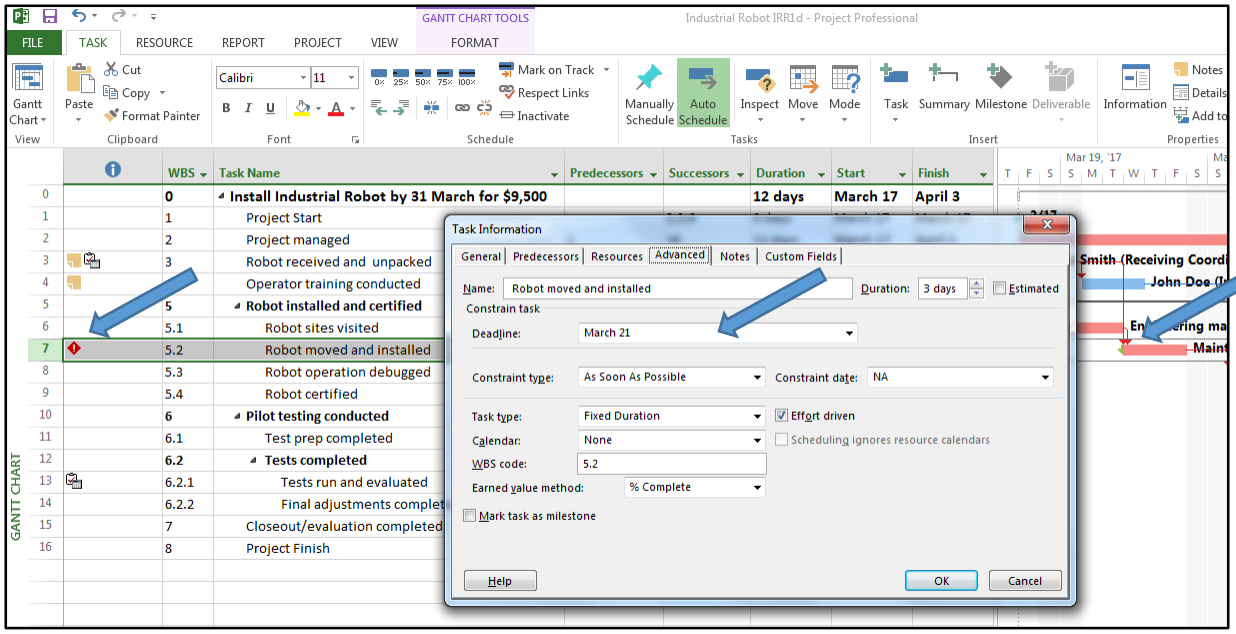


Figure 22

- To delay the start date of a task, use the Levelling Delay Column (see Step 8, Figure 32). This will insert a delay, but maintain all the links between tasks, and if necessary push out the critical path.

You can also customize the appearance of your Gantt chart (Figure 23):

- With the Gantt chart view active, click the Gantt Chart Tools Format tab to activate the ribbon. Then use the features listed on the ribbon to make changes to the color of the critical path (check the Critical Tasks box first), the height and color of the bars, etc. If you wish to customize the Gantt Chart using the Gantt Chart Wizard 

, you will need to add the Wizard to the Project ribbon. For information on how to do this, refer to *Use a Wizard to Create a Gantt Chart* in Project's Help feature.

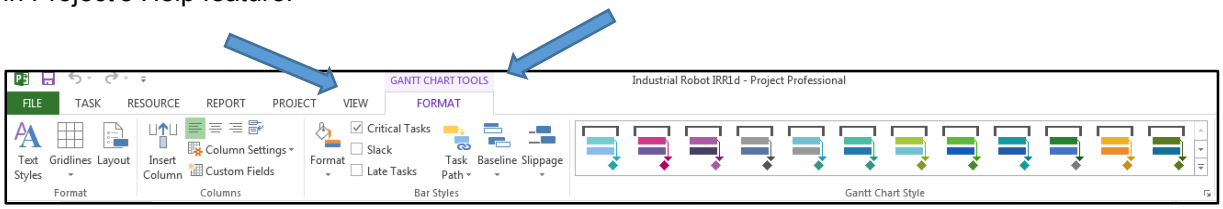


Figure 23

- If the critical path is incomplete after you have changed constraint types and dates, check the following:
  - First, is the Critical Tasks check box turned on? (Gantt Chart view applied, click on Gantt Chart Tools/Format tab and select Critical Tasks checkbox.)
  - Check the Total Slack column (see Figure 19). Any task with a total slack of more than zero will not be on the critical path.
  - Are there tasks with negative slack? Are all work packages connected? Are precedence correct and complete? Check if deadlines have been assigned to those tasks. If the deadline occurs earlier than the task's calculated finish date, the result is negative slack because Project calculates slack using the deadline and not the finish date.
  - Is the latest finishing work package connected to something? Working backwards check for gaps in your work packages.

- A quick way to check which tasks are critical so you can quickly hone in on problem areas is to use the Filter feature. On the View tab, select Critical in the Filter drop-down box. (Figure 24)

- If you wish to see multiple critical paths (for example, if you are working on a plan with multiple sub-projects), click File, Options. When the dialog box opens, click Advanced and scroll to the bottom, then click the Calculate Multiple Critical Paths checkbox.

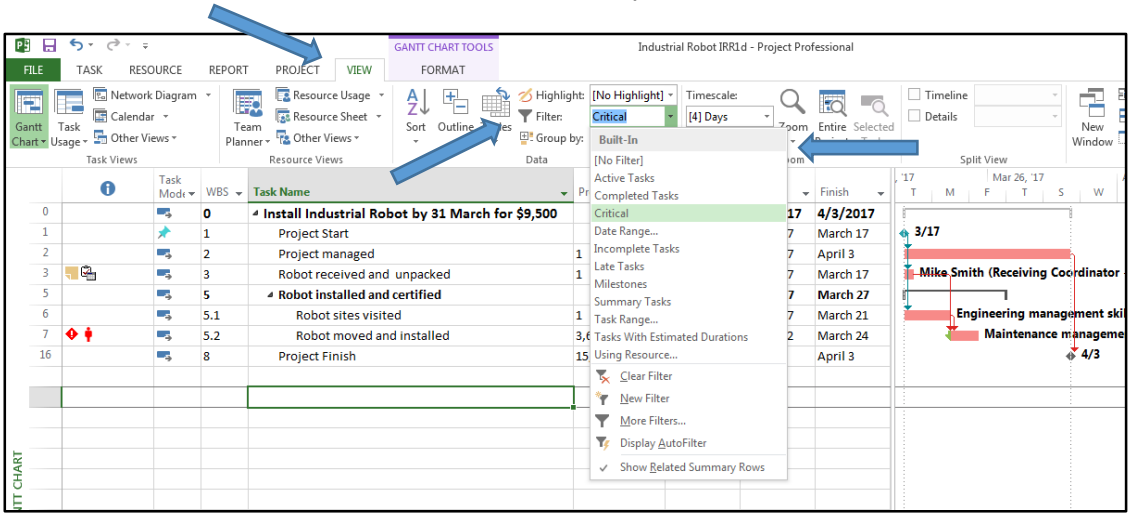


Figure 24

- If you wish to see multiple critical paths (for example, if your plan has multiple sub-projects), click File, Options. When the dialog box opens, click Advanced and scroll to the bottom, then click the Calculate Multiple Critical Paths checkbox (Figure 25).

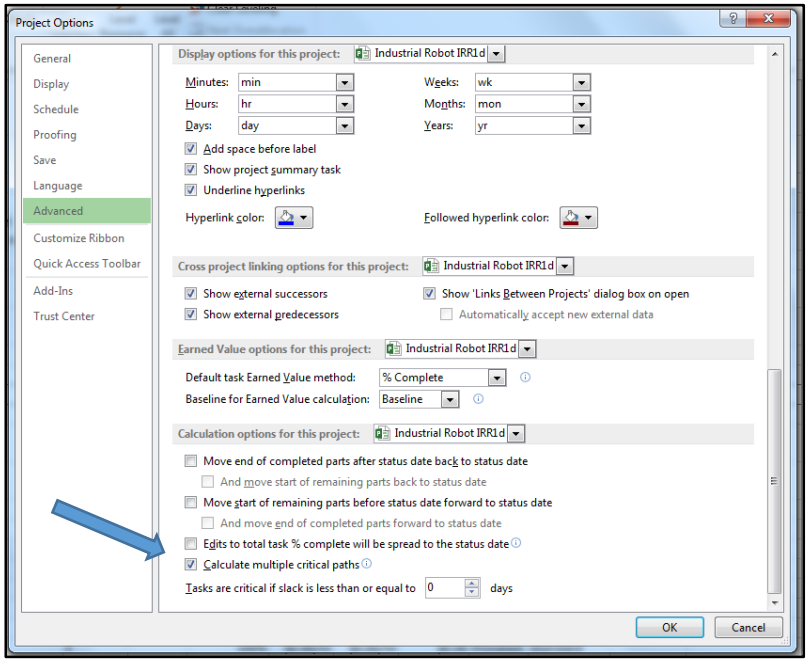


Figure 25

If you haven't already done so, you may also wish to add some Milestones. Milestones are significant points in your project implementation that you will use to measure progress. They may be based simply on time, but more often will occur at the end of a significant parcel of work (e.g., all ordered parts have arrived).

- Milestones have zero duration and zero work (though there may be a milestone meeting associated with them which will have both duration and work).
- Use the Task Information dialog box (Advanced Tab) to mark a task as a milestone.
- Milestones are displayed on the Gantt as a black diamond. (Figure 26)
- You can filter for milestones just as you did for critical tasks. (On the View tab, select Milestones in the Filter drop-down box.)

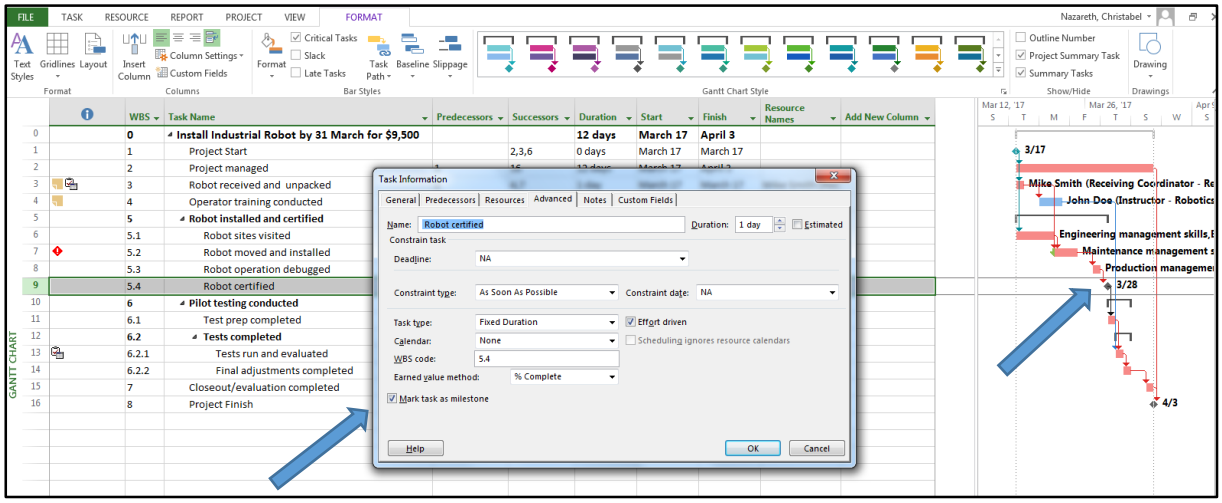


Figure 26

If you have detected scheduling problems after you have completed your Gantt Chart, you can resolve the problems using the Task Inspector. Scheduling problems are more likely to appear when tasks have been manually scheduled, as Project does not automatically update those tasks. The cell with the error will have a red wavy line. Right-click on the cell to fix the problem. Your choices will be Respect Links, Fix in Task Inspector, or Ignore Problems for This Task. If you click Fix in Task Inspector, that pane will open up on the left. It will offer you a range of options. Select the option that suits you the best, including changing the task to Auto Schedule and Respect Links (Figure 27).

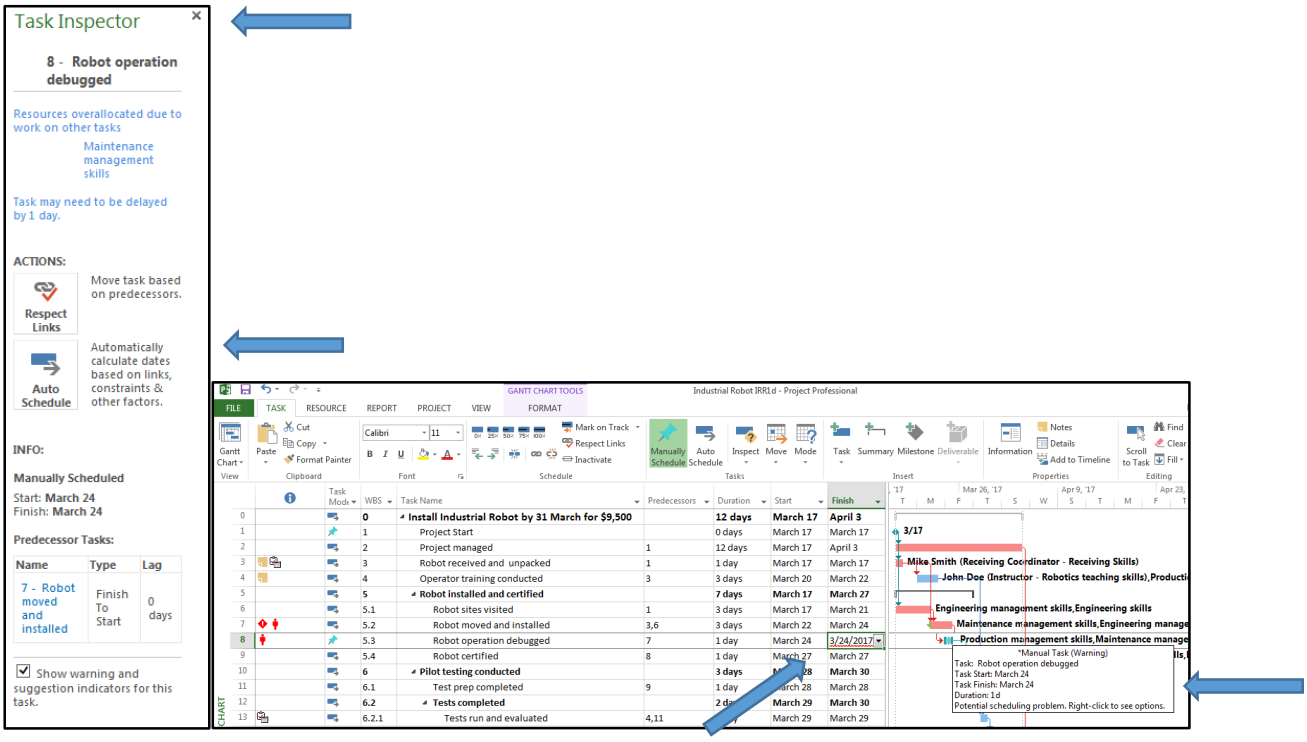


Figure 27

Step 8 – Schedule Resources

This final scheduling step is all about confirming that resources are available and not overloaded now that assignments have been completed. Again – task start and finish dates should not be manipulated to complete this step to avoid scheduling constraints being automatically introduced by MS Project. Rather, consider some of the ways to address overloaded resources discussed below.

Sometimes more work gets assigned to resources than they can accommodate in their schedule.

- You may add an extra identical resource to share the load – the best way to do this is change the maximum availability of the resource in question.
- Alternatively, you may choose to add a new resource and assign some of the work overload to that resource. Take care to watch what happens to Duration and Work on any tasks where you redistribute work. It may be necessary to clear Work and Duration fields back to zero and then re-enter those amounts after the new/additional resources have been added to get the balance of work across resources correct.
- Or you may change the days the resource is available to do work – but make sure you change the right calendar for that resource. You may need to change the calendar assigned to the task to enable the duration to calculate the correct start and end date.

To check resource loading (how much work is assigned to a resource at any given time):

- The Gantt Chart view will show you which tasks have one or more overloaded resource by displaying an icon of an individual in red  . To see which specific resources are overloaded, select View, then Resource Sheet. The name of any overloaded resource will show up in red with this icon  beside them. A quick way to view all overallocated resources is to select View, Filter, Overallocated Resources.

- To see when resources are overloaded, select View, Other Views, Resource Graph from the drop-down (Figure 28A). Select Details and from the drop-down select Resource Usage to split the screen. This will show who is overallocated for what tasks, when they are overallocated, and by how much (Figure 28B). Use Page Down or scroll to move from one over-allocated resource to the next, if needed.

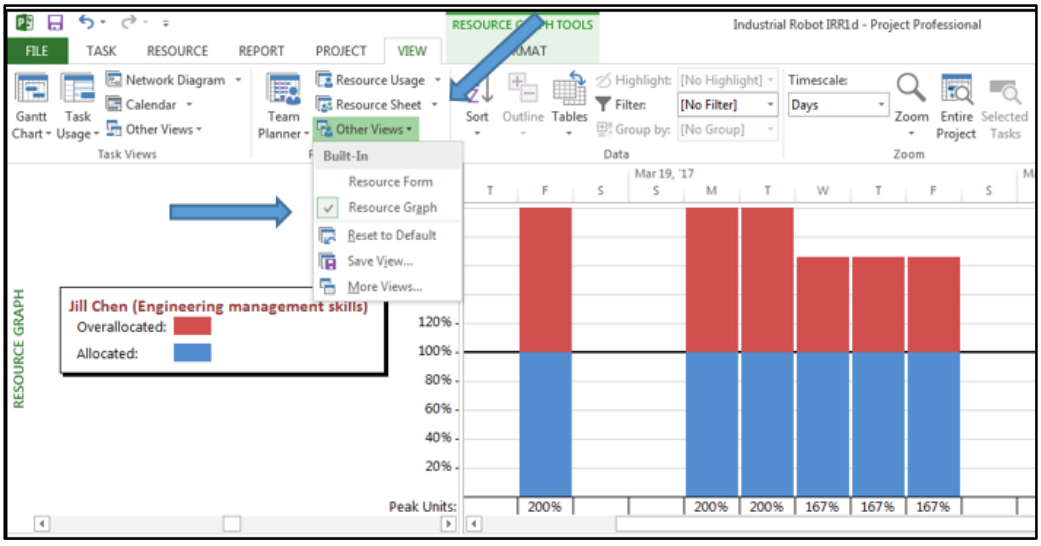


Figure 28A

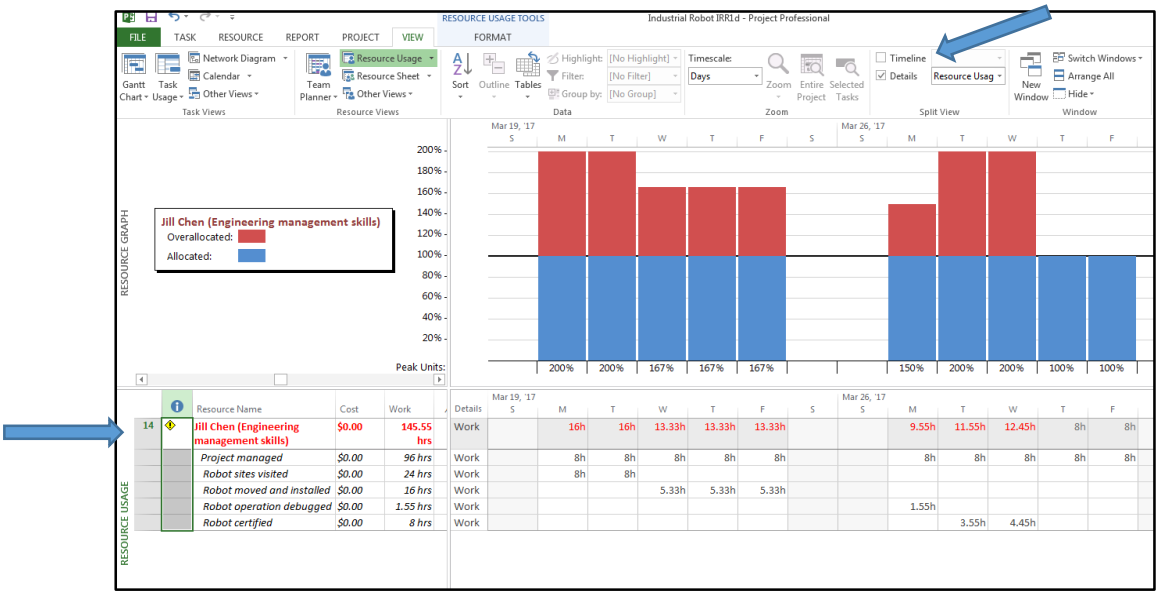


Figure 28B

If a resource is working on more than one task on the critical path at the same time, you can reduce their workload by assigning some of the work required to complete the tasks to another resource with similar skills. To redistribute the work by replacing resources (Figure 29):

- In the Gantt Chart view, select the task you want to modify.
- Click Assign Resources in the Resource tab to bring up the dialog box.
- Click the assigned resource's Units cell and reduce the percentage (e.g., from 100% to 50%).
- Click the Units cell for the resource you want to add to the task and assign the remainder of the percentage (e.g., the other 50%). Then click Assign.

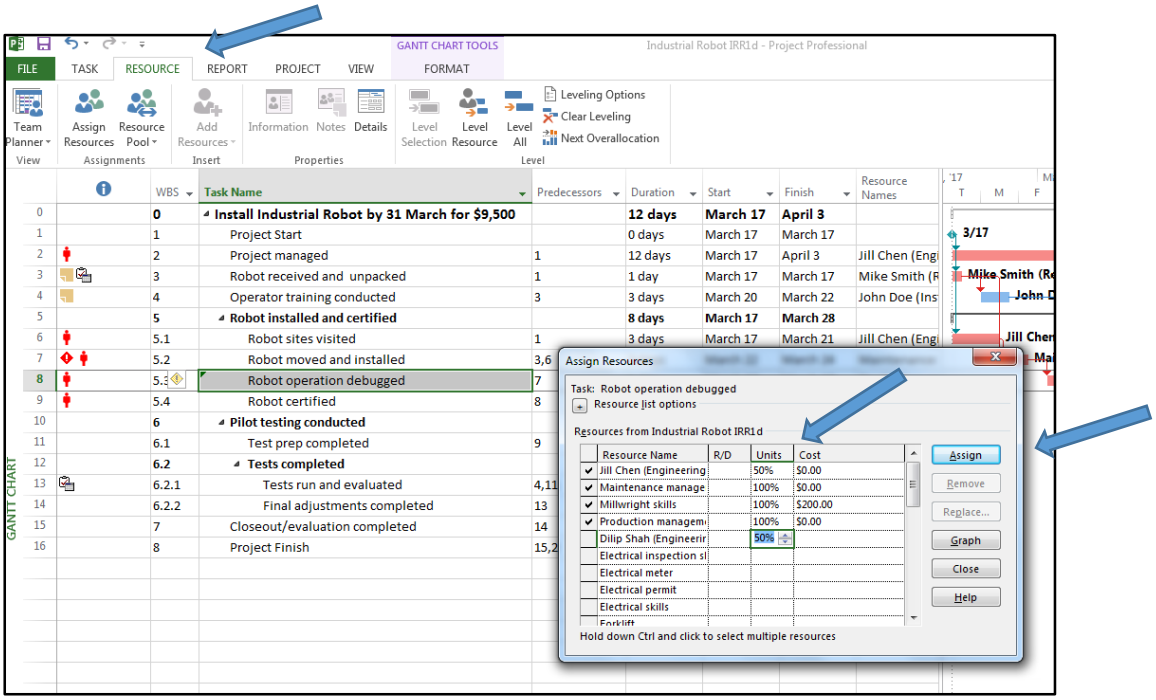


Figure 29

To replace one resource with another (for example, replace an inexperienced resource with a faster, more experienced one) (Figure 30):

- With the Assign Resources dialog box open, select the task you want to modify in the Gantt Chart view.
- In the Resources Name list, select the assigned resource you want to replace.
- Click Replace to open the Replace Resource dialog box.
- Select the replacement resource and then click OK. (Before you do this, consider how expensive the replacement will be and the impact to overall project cost. Also consider whether that resource has other assignments to be sure you are not creating a new problem in your effort to solve an existing one.)

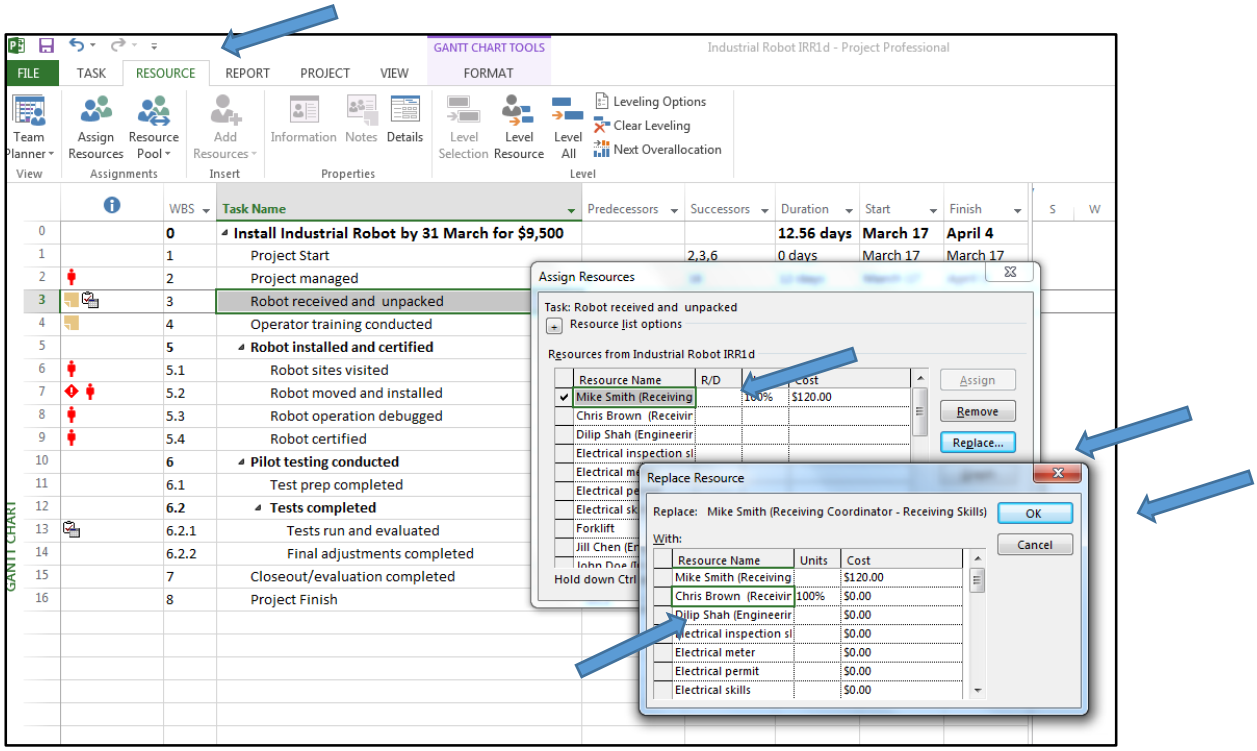


Figure 30

To address overallocations by levelling resources:

- Click on the lower half of the Gantt Chart icon on the Task tab. Then click More Views to bring up the dialog box. Select Leveling Gantt and click Apply (Figure 31).

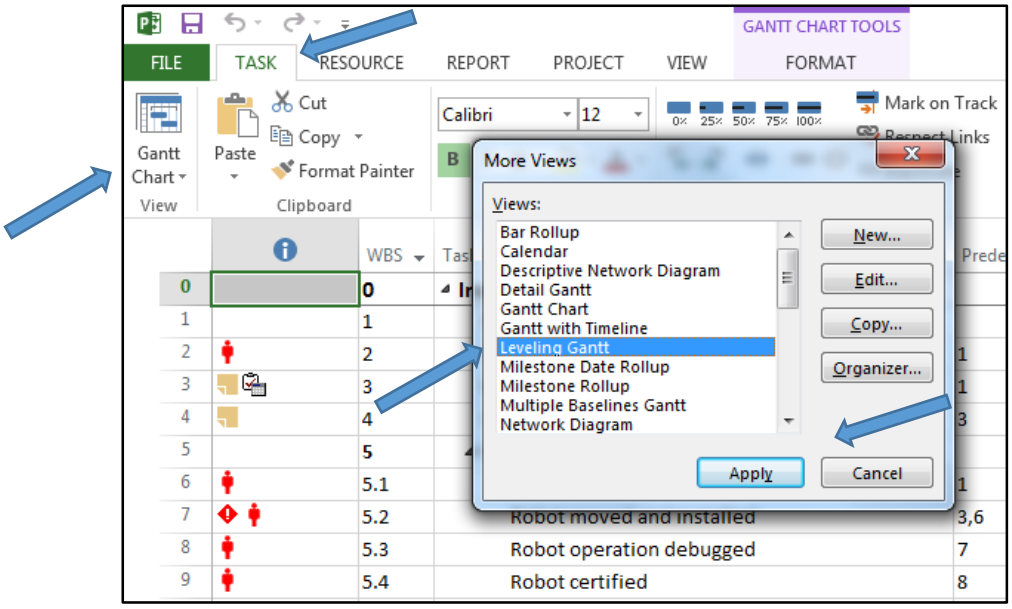


Figure 31

- Next, click the Resource tab. On the far right, click on the Leveling Options to bring up the dialog box. Here you will have to make choices to help MS Project level resources (Figure 32).
- First, select Automatic or Manual. The default is Manual and it's the best choice as MS Project will level only when you manually make a change.
- Then select the time frame. Week by Week or Month by Month (for long projects) is preferable as overallocations sometimes will go away because resources were able to complete assignments faster than anticipated and doing so in a structured way is more efficient and gives you more control.
- Keep the default setting of Clear Leveling Values Before Leveling so MS Project can get rid of any delays added before it recalculates based on leveling changes.
- Next select whether you want to Level the entire project or a date range. At the start of the project, Level the entire project makes sense. During the project, choose the Date Range option so that tasks in progress are not affected.
- Keep the Leveling Order set to standard, unless you have assigned priorities to tasks. If so, then select Priority Standard, so available resource time gets assigned to high priority tasks first.
- For the remaining checkboxes, the defaults are Leveling Can Adjust Individual Assignments on a Task, Leveling Can create Splits in Remaining Work, and Level Manually Scheduled Tasks. Leveling Within Slack will likely not resolve overallocation issues. Turn on this option if you don't want the project to finish later as a result of leveling. If you plan to level individual assignments by adding more resources, turn off Leveling Can Adjust Individual Assignments. If you turn on the Level Proposed Resources, then all resources committed and proposed are leveled to show what the schedule would look like if you got all requested resources. As a general rule, do not turn off Splits in Remaining Work and Level Manually Scheduled Tasks. Note: when the split remaining work is turned off, assignments are delayed until a resource can complete the work of an assigned task without stopping, which can extend the completion time of other tasks that resource is assigned to.
- After you have selected your options, click OK. These are the option MS Project will use every time you level until you change them again.

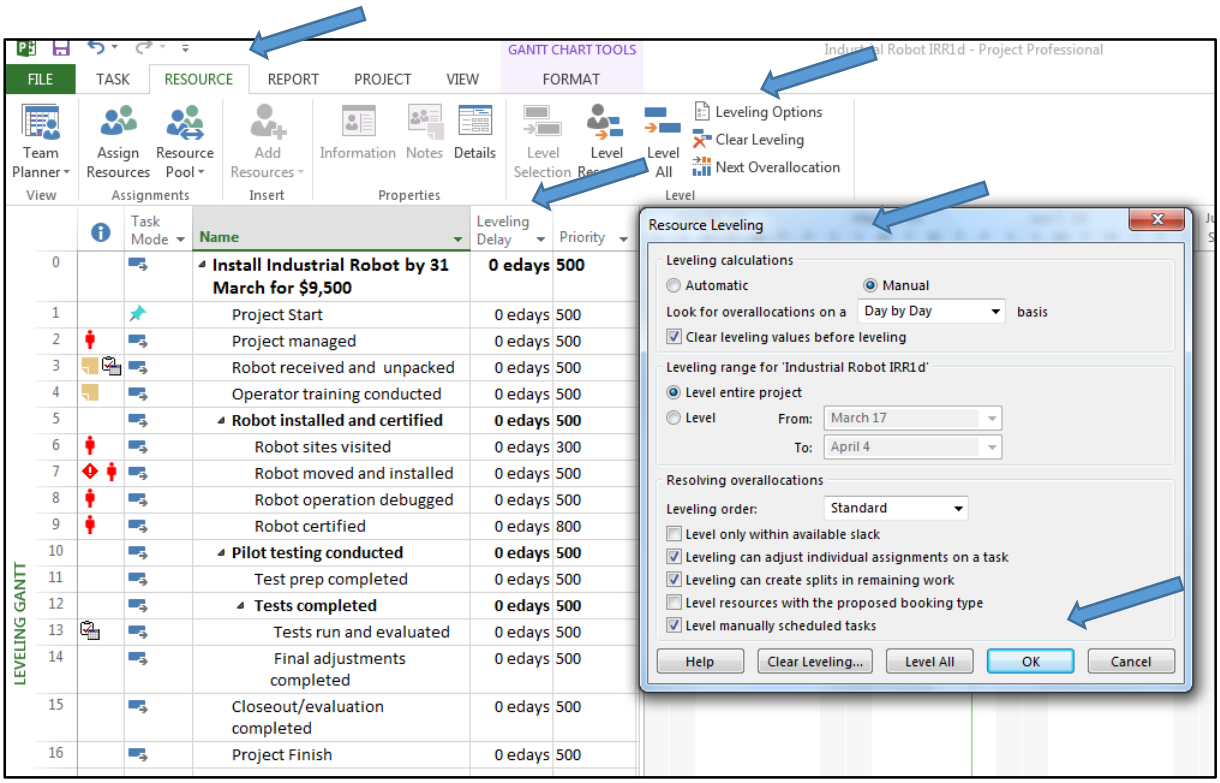


Figure 32

- Sometimes leveling will not remove overallocations. Typically this is because you may have the following constraints set for a task: Must Start On or Must Finish On; the tasks have a priority of 1000 (more on this to come); the tasks are in-progress and the Split Remaining Work box is turned off; or the Leveling Can Adjust box is turned off. One way to hone in on why leveling is not working is to add the Can Level column to the Resource Sheet view. (On the View tab, select Resource Sheet, right-click to insert a column, and then select Can Level from the column drop-down [Figure 33].) This lets you quickly see if tasks are unable to be leveled, and then you can look for one or more of the reasons listed above.

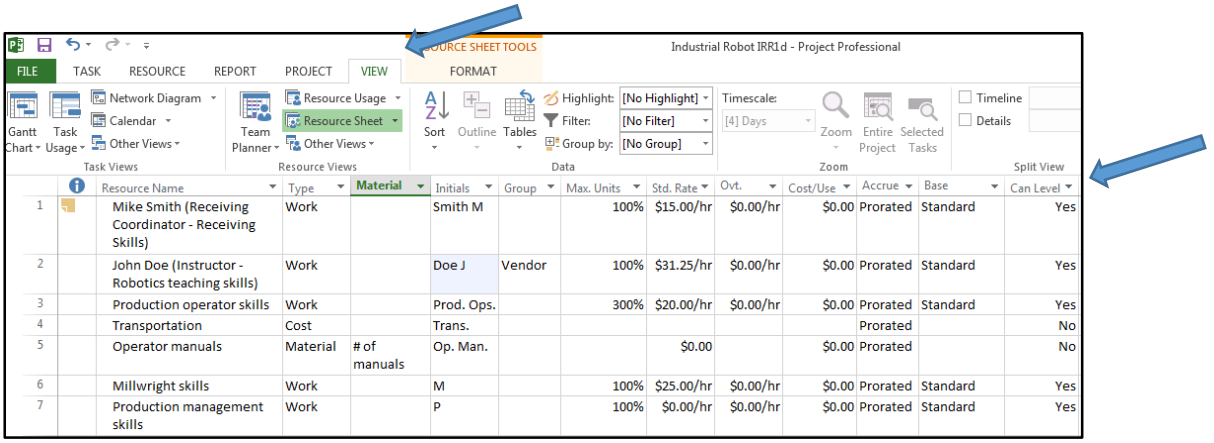
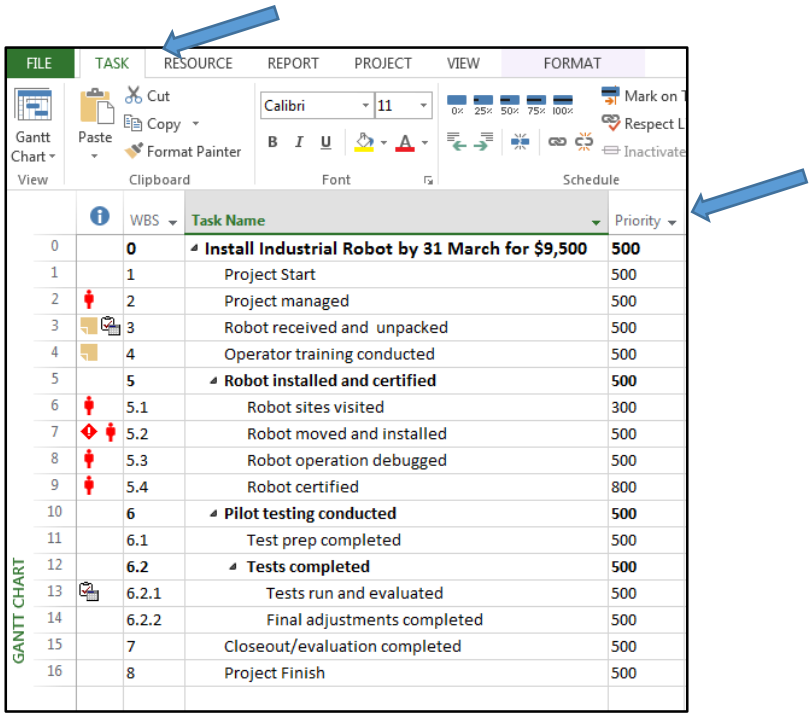


Figure 33

- Task priority helps MS Project determine whether/how to calculate certain parameters. Taks priority can range from 1-1000. Project automatically assigns new tasks a value of 500. You can assign a priority other than 500 if you do not want MS Project's resource leveling feature to affect the schedule of certain tasks. A good rule of thumb is to set the following values: 1000 for high priority; 800 for above average; 500 for most tasks; 300 for below average; 0 for low priority.

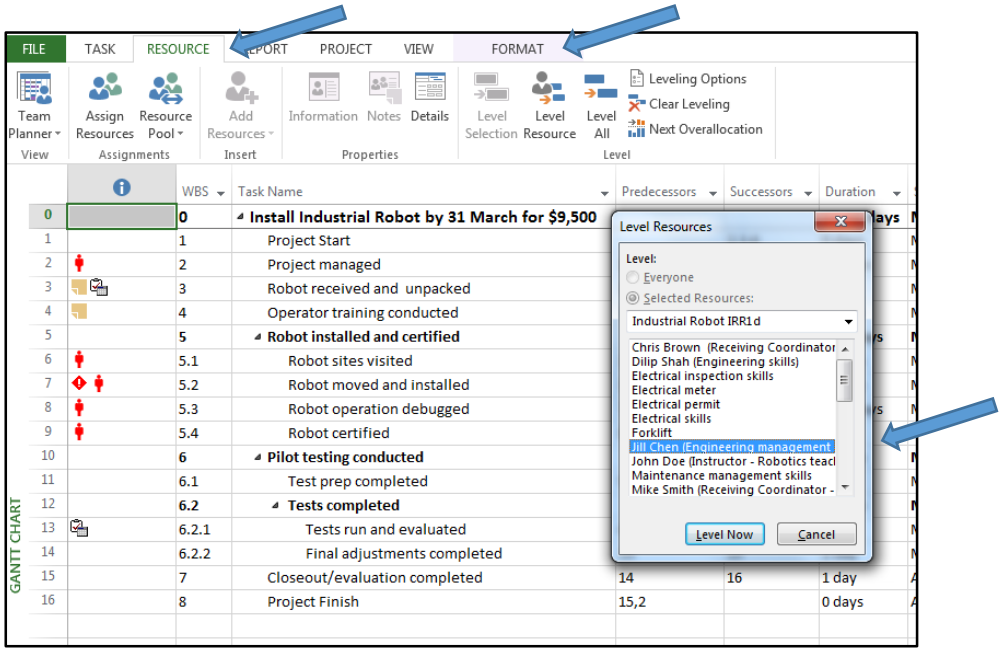
To change task priority for a single task: click on the task to bring up the Task Information dialog box, and in the General tab change the number in the Priority box from 500 to the priority you want to assign to the task. To change the priority for many tasks quickly, in the Gantt Chart view, add a Priority column [right-click the table heading, choose Insert Column, Priority] and then key in or copy and paste in the task priority (Figure 34).



		WBS	Task Name	Priority
0		0	**Install Industrial Robot by 31 March for $9,500**	**500**
1		1	Project Start	500
2		2	Project managed	500
3		3	Robot received and unpacked	500
4		4	Operator training conducted	500
5		5	**Robot installed and certified**	**500**
6		5.1	Robot sites visited	300
7		5.2	Robot moved and installed	500
8		5.3	Robot operation debugged	500
9		5.4	Robot certified	800
10		6	**Pilot testing conducted**	**500**
11		6.1	Test prep completed	500
12		6.2	**Tests completed**	**500**
13		6.2.1	Tests run and evaluated	500
14		6.2.2	Final adjustments completed	500
15		7	Closeout/evaluation completed	500
16		8	Project Finish	500

Figure 34

- A quick way to level a single resource is to use the Level Resource button. In the Resource view, click on Level Resource to bring up the dialog box. Select the resource you want to level and click Level Now (Figure 35). Remember, it will level the resource using the Leveling options in place at that time, so check those first to see what will be applied when you click Level Now.



		WBS	Task Name	Predecessors	Successors	Duration
0		0	**Install Industrial Robot by 31 March for $9,500**			**days**
1		1	Project Start			
2		2	Project managed			
3		3	Robot received and unpacked			
4		4	Operator training conducted			
5		5	**Robot installed and certified**			
6		5.1	Robot sites visited			
7		5.2	Robot moved and installed			
8		5.3	Robot operation debugged			
9		5.4	Robot certified			
10		6	**Pilot testing conducted**			
11		6.1	Test prep completed			
12		6.2	**Tests completed**			
13		6.2.1	Tests run and evaluated			
14		6.2.2	Final adjustments completed			
15		7	Closeout/evaluation completed	14	16	1 day
16		8	Project Finish	15,2		0 days

Figure 35

To manage overallocation by delaying assignments, use the Leveling Delay column:

- In the View tab's Resource Views section, click Other View, then More Views to bring up the dialog box. Double-click Resource Allocation. This will split the screen to give you the Resource Usage view on the top and the Leveling Gantt view on the bottom.
- When you select an assignment in the top page, the task to which the assignment belongs appears in the bottom page.
- Type in the number of days you want to delay the task in the Leveling Delay cell. The "e" in the Leveling Delay column stands for elapsed time. A thin line to the left of the task bar shows the leveling delay (Figure 36).

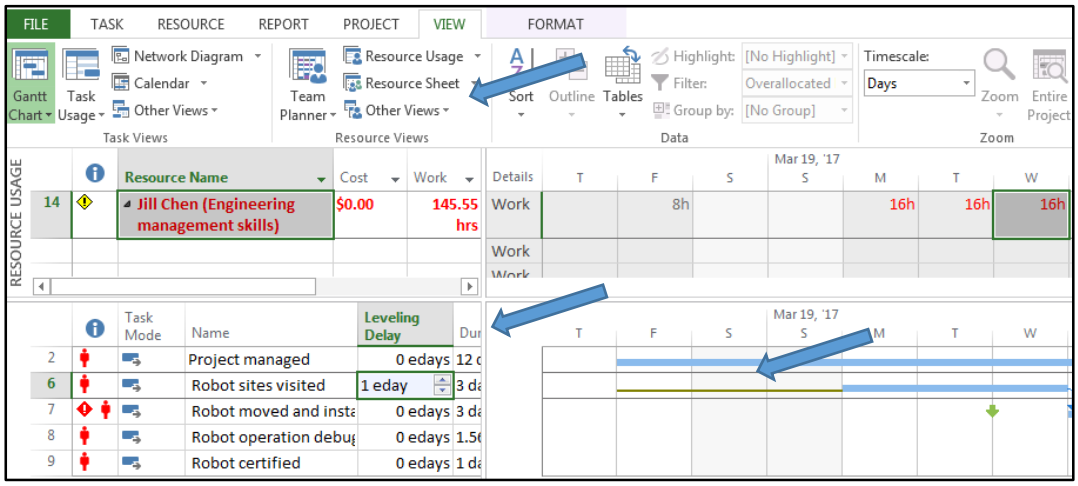


Figure 36

Step 9 – Protect the Plan

MS Project does not provide functionality to record plan protection directly into a project plan. However, the Gantt and Network Diagram tools should be used to identify appropriate areas for focusing Potential Problem Analysis or Potential Opportunity Analysis. Some of the reports may also be useful to identify tasks with significant cost or time requirements, which are also areas where you may benefit from protecting your plan.

- Once the Potential Problem/Opportunity Analyses have been completed, the worksheets can be attached to the plan (double click on the task to bring up the Task Information dialog box; then select the Notes tab and click on the Insert Object button, similar to the steps for inserting the Project Objectives file). Make sure you attach the PPA/POA to the task note that it relates to. OR you can copy/paste the PPA/POA from another document into the Notes section of the Task Information dialog box (Figure 37).
- Also remember to make any changes to the plan that you have identified as part of your PPA/POA since these often require resources and work.
- A quick check of the Resource Sheet should also be done to make sure that your changes haven't overloaded resources.
- Also check to make sure that additional costs associated with changes to the plan are checked against budgets.

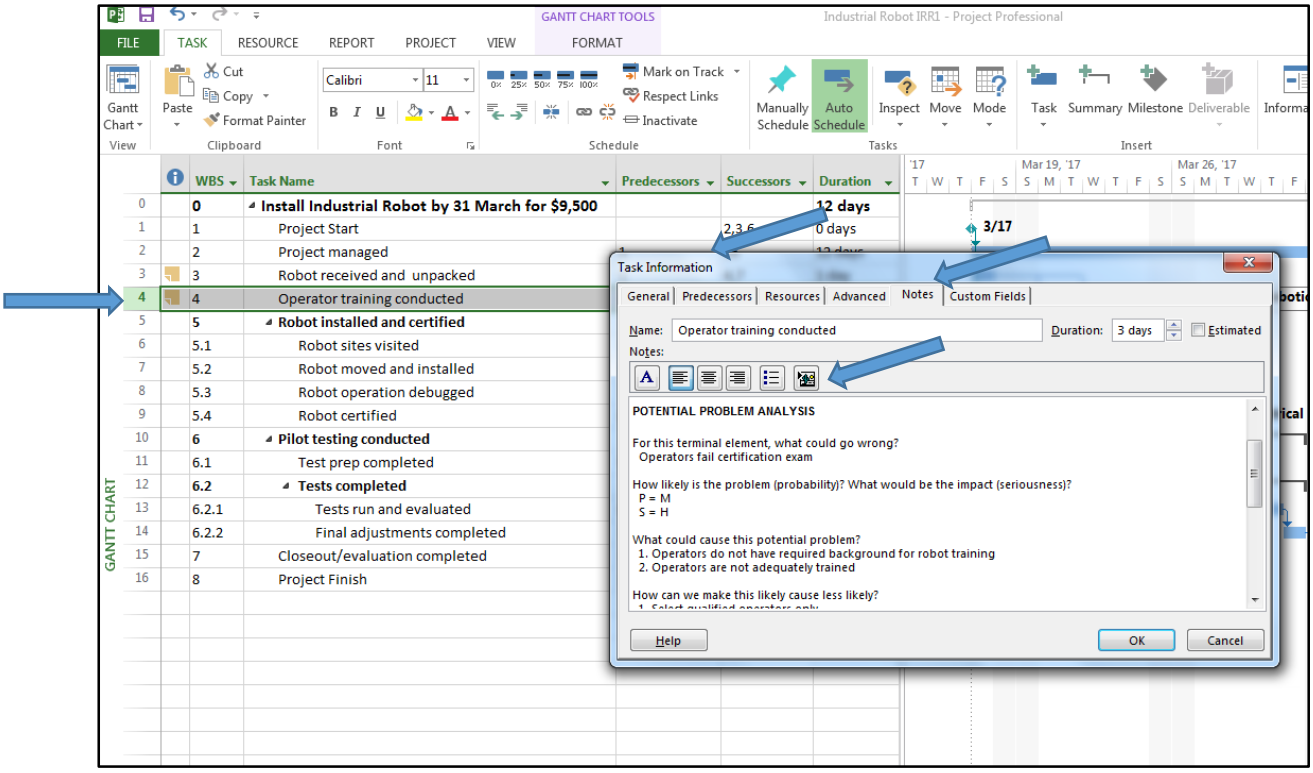


Figure 37

Step 10 – Start to Implement

Once planning has been completed and the plan is approved by stakeholders and before you begin implementation activities, it is important to freeze the project plan so that actual progress can be compared against the original plan. This is done by setting a baseline. A baseline saves your scheduled values as “the plan” (dates, durations, work, cost) and then allows you to track “actual” start and finish dates, cost, etc., against “the plan” to help you monitor for variances. To Set a Baseline (Figure 38):

- In the Project tab, click Set Baseline. Select Set Baseline from the drop-down to bring up the Set Baseline dialog box.
- Select Set Baseline, select Entire Project to set the baseline for the entire project and then click OK.
- After you have set the baseline, click Set Baseline and select Set Baseline again to make sure your baseline set. You should now see Baseline (last saved on [date]).

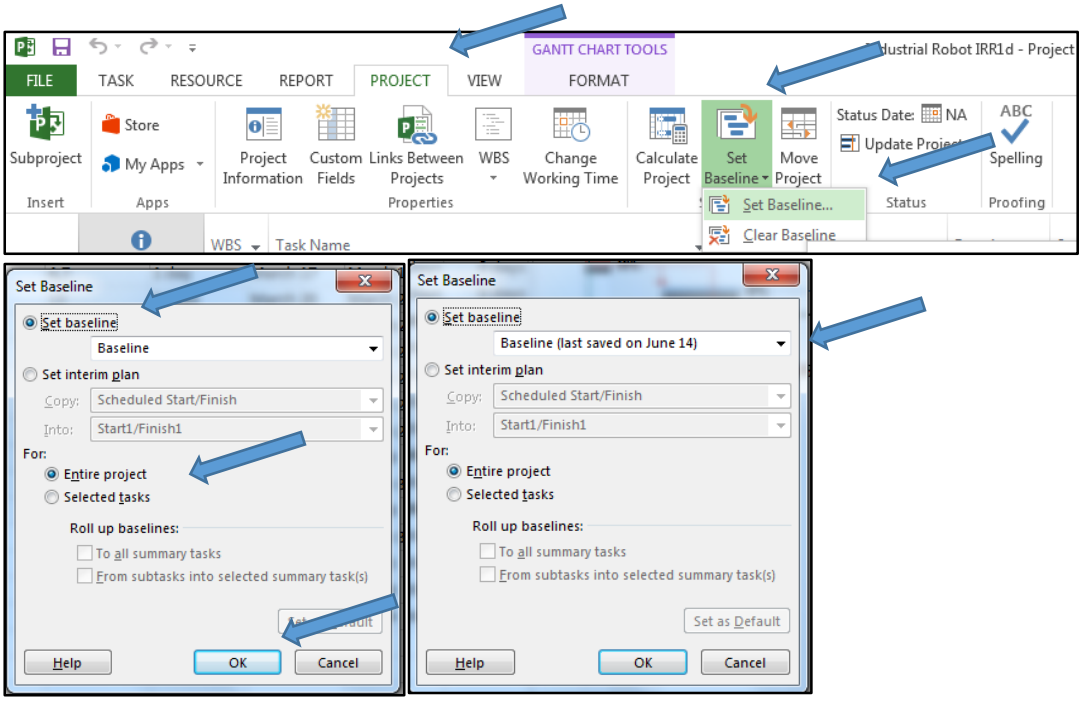


Figure 38

When you set a baseline for your plan, grey bars are added to the Gantt. However, you can see this only in the Tracking Gantt View (Figure 39).

- On the View tab, click Gantt Chart.
- Select Tracking Gantt.

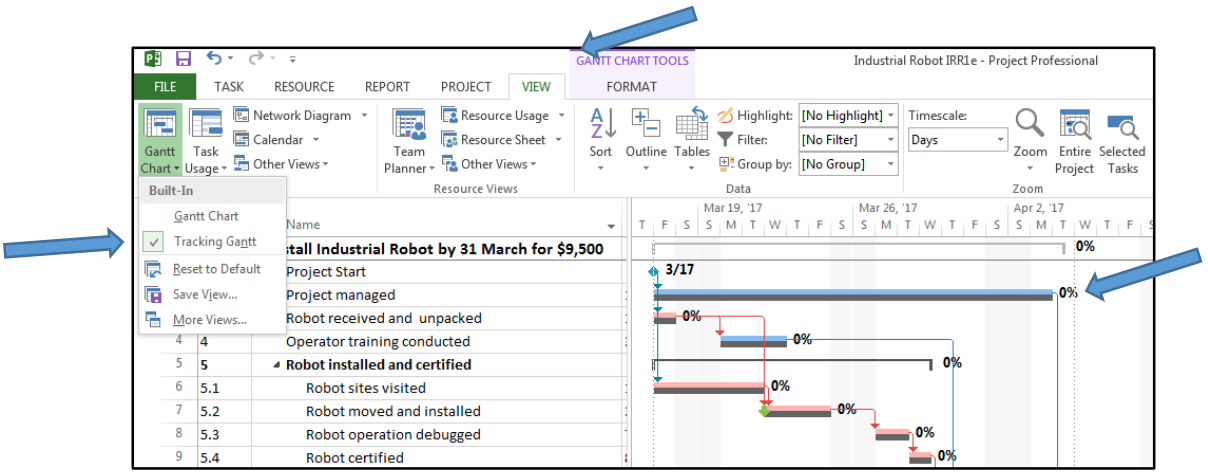


Figure 39

To see more detail on your baselined plan, on the View tab click Tables and select Variance from the drop-down. You will be able to see the (actual) Start and Finish and Baseline Start and Finish. At this point, the dates should all match because you have not started the work and there will be no variances since the project has not started. You can add a Cost Variance and Work Variance column to this view by clicking on Add New Column down arrow and selecting what you want to track from the drop-down (Figure 40).

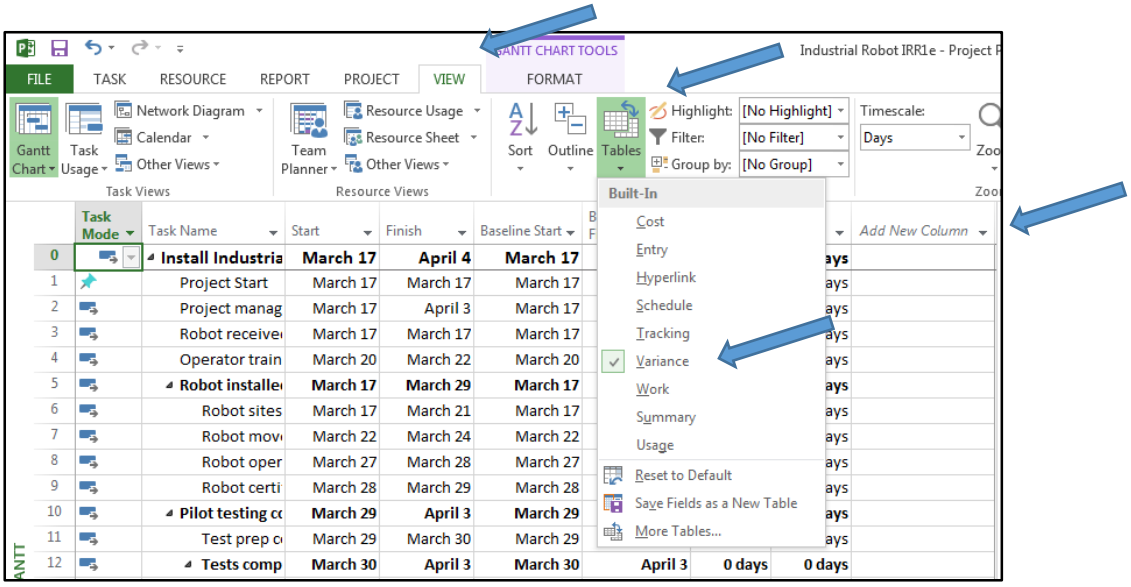


Figure 40

You can set more than one baseline (up to 10) if needed. For example, if your plan was put on-hold for a while and then activities resumed or because the scope changed significantly, you may wish to establish a new baseline while retaining the original for comparison purposes. To set additional baselines (Figure 41):

- In the Project tab, click Set Baseline. Select Set Baseline from the drop-down to bring up the Set Baseline dialog box.
- Click on the down arrow in the box where you saved your last baseline. This will bring up a list of baselines.
- Select Baseline 1 (or the appropriate number) and click OK. Then make sure Baseline 1 has been set (click/select Set Baseline again). The new baseline date will show next to Baseline 1.

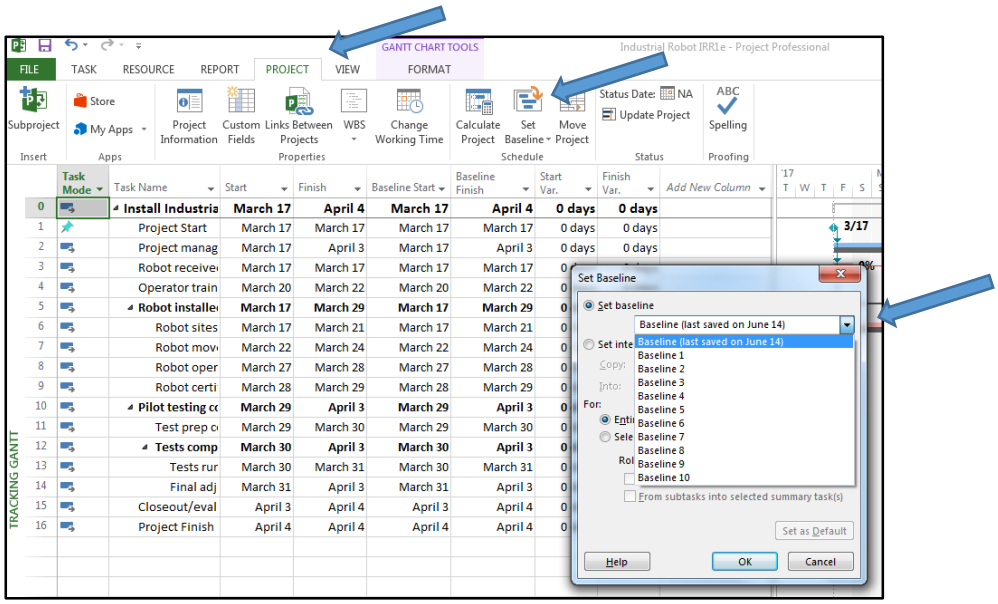


Figure 41

If you have to make some changes to the plan after you have baselined it and before there are variances, reset by clicking Set Baseline and selecting Set Baseline. Project will ask you whether you want to overwrite the data, click the Yes button.

To clear the baseline, click Set Baseline, and then select Clear Baseline from the drop-down.

The plan can be baselined either before, during, or after the kickoff meeting in Start to Implement. Kickoff meeting agendas and communication matrices can either be incorporated by copying/pasting text from the respective documents into the Notes section of the appropriate tasks or they can be inserted as whole documents (double click on the task to bring up the Task Information dialog box; then select the Notes tab and click on the Insert Object button, similar to inserting the Project Objectives file in Step 2, Figure 3).

If you have not already done so, now is the time to agree on when you will update the project's status. Determine when you will hold status update meetings and schedule them into the project plan. (See Step 3, Figure 5 on how to set a recurring task.)

Also agree on whether each team member or the person with primary responsibility will help in keeping the project plan up to date. To do this (Figure 42):

- Create a table containing the elements you want to track, such as Actual Start, Actual Finish, Actual Duration, Remaining Duration, % Complete, Physical % Complete, Actual Cost, Actual Work, Remaining Work, % Work Complete. (In the View tab, add columns and from the column drop down select the elements you want to track.)
- In the View tab, go to Gantt Chart, and on the drop-down select Save View.
- Select Save As a New View and Name the view (StatusUpdate, for example). Then click OK.

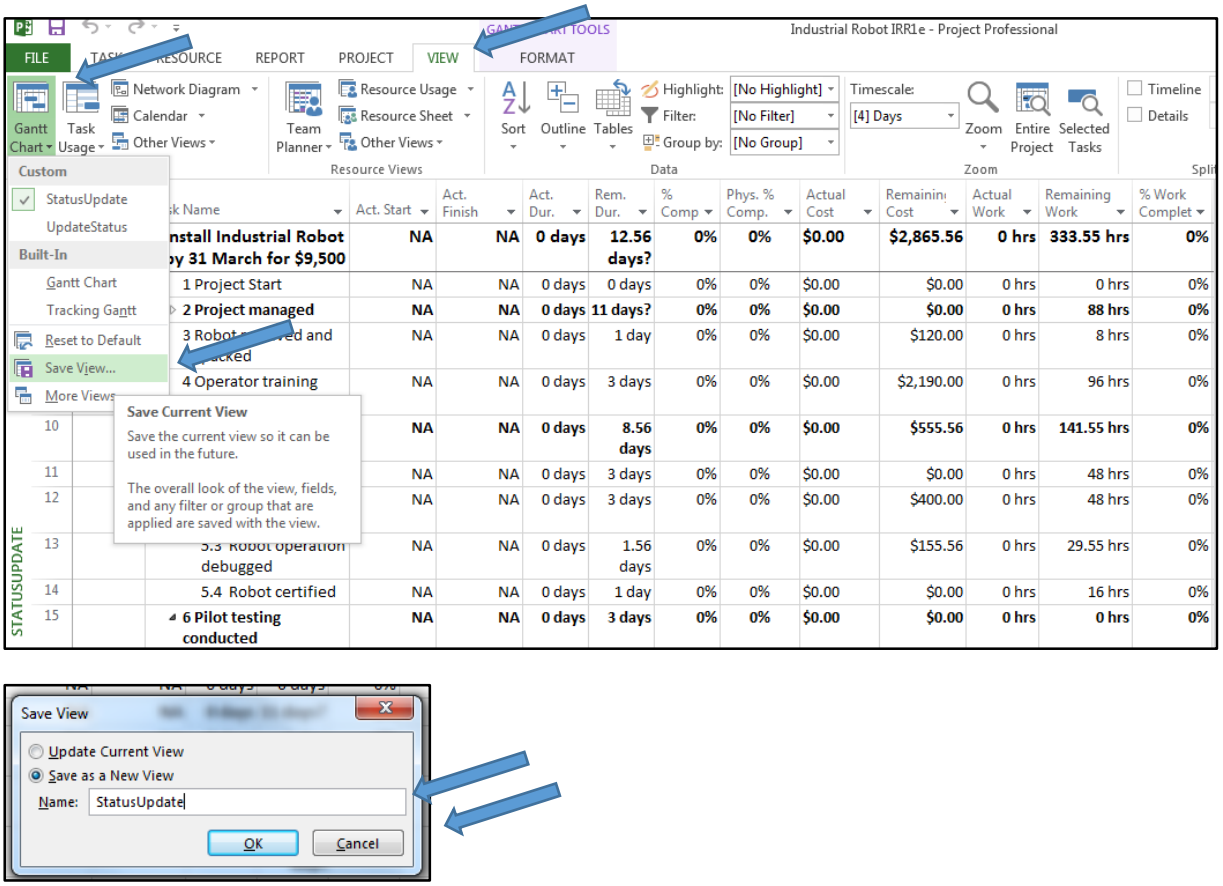


Figure 42

If you decide to have people provide update information to one person, who then updates the plan, it can be helpful to have a standard Excel form. To create a Status Update form in Excel (Figure 43):

- Display the StatusUpdate view. (In the View tab, go to Gantt Chart view, and from the drop-down choose the view's name in the Custom heading.
- Then in the View tab, go to Filter in the Data section. Click the Filter down arrow and then choose More Filters. In the More Filters dialog box, select Should Start/Finish By, and then click Apply.
- Enter the start date in the first Should Start/Finish By dialog box. Then click OK.
- Enter the finish date in the second Should Start/Finish By dialog box. Then click OK.
- Your plan should show tasks in that date range you entered in the Should Start/Finish By boxes.
- Copy the table (tasks and all elements you want updated) and paste into a blank Excel spreadsheet. Save the file to include the date range in the file name.
- Then email it to team members with instructions on how to complete it.

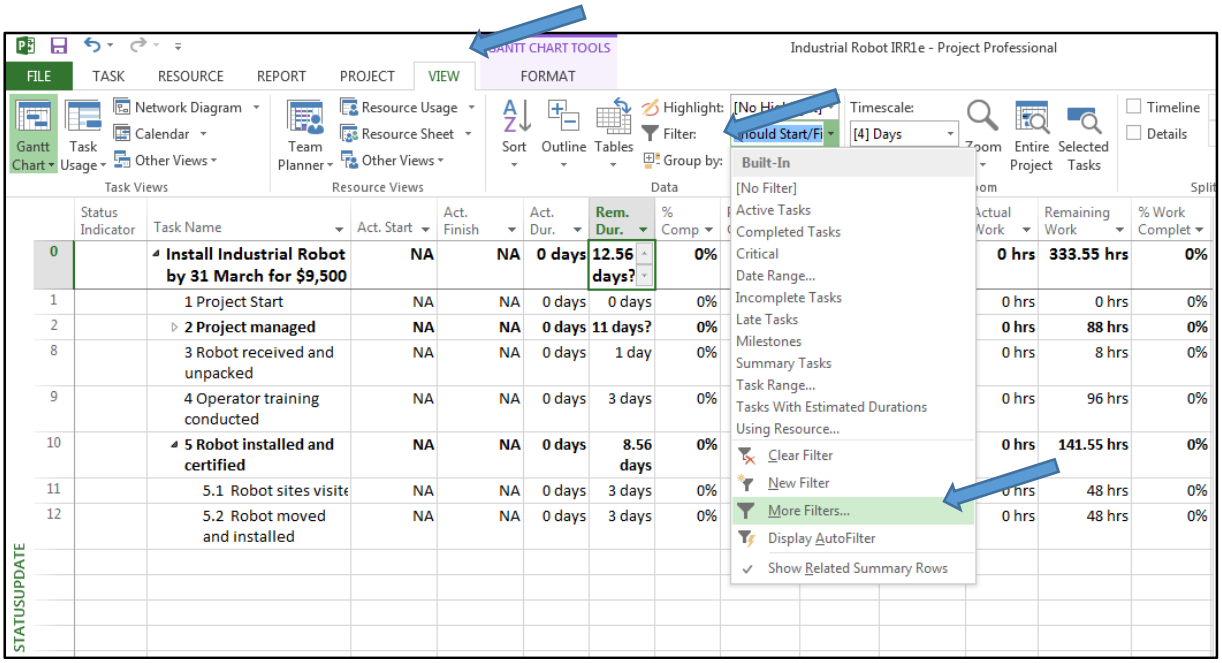
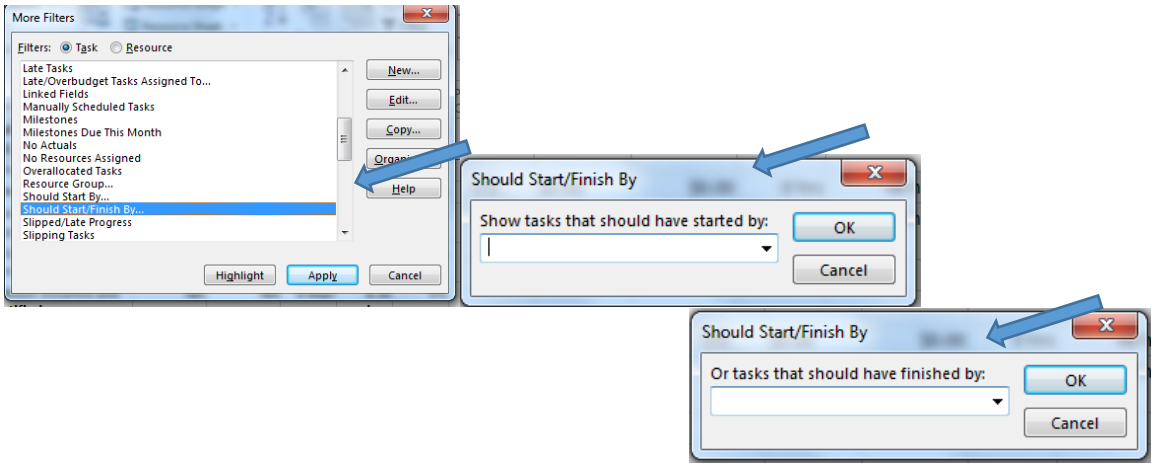


Figure 43



Step 11 – Monitor Project

Once work on the project is underway, you should be receiving regular status updates from project resources. It is now time to start tracking how the project is progressing compared to the baseline.

To track the schedule:

- Go to the File tab and click Options. Then select Schedule and scroll down to Calculation Options for This Project. Make sure the first checkbox, Updating Tasks Status Updates Resource Status, is turned on (Figure 44). This tells project to take the progress values you enter and roll them down to the individual resource assignments. Turn this on because updating tasks is faster than updating individual assignments.

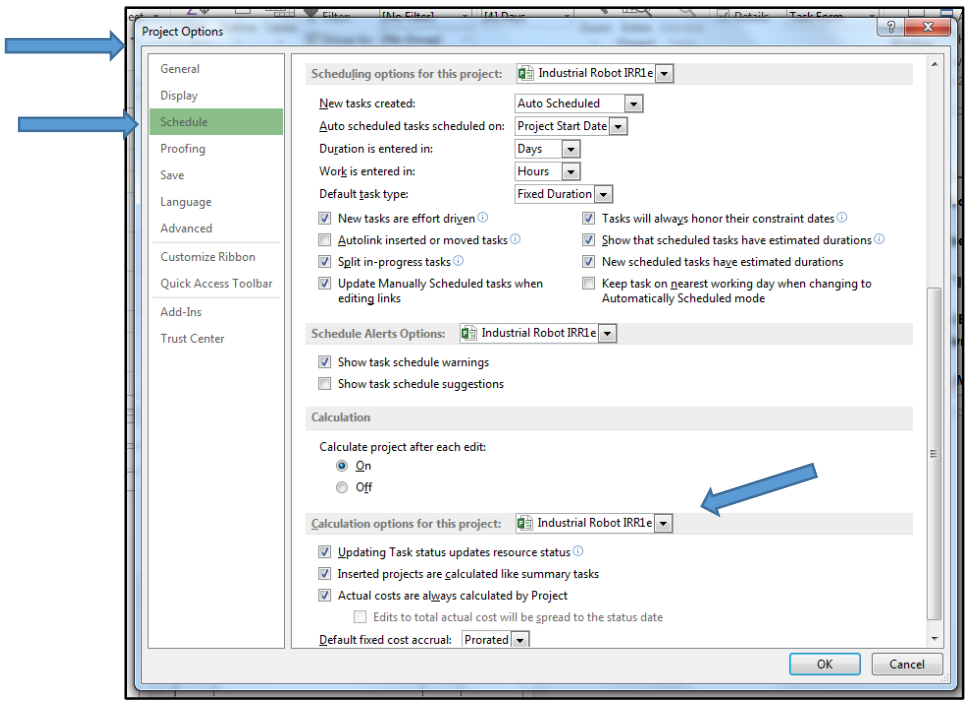


Figure 44

- Then click on Advanced and scroll down to Calculation Options for This Project. Then turn on these four check boxes (Figure 45):
    - Move End of Completed Parts after Status Date Back to the Status Date
    - And Move Start of Remaining Parts Back to Status Date
    - Move Start of Remaining Parts before the Status Date Forward to Status Date
    - Move End of Completed Parts Forward to Status Date

Doing so allows Project to record completed work for **in-progress** tasks in the past (when originally planned for completion after the status update) or reschedule incomplete work for in the future (when originally planned for completion before the status update). Note: Any task scheduled to start before the status date that has not started at all will have to be rescheduled to start in the future.

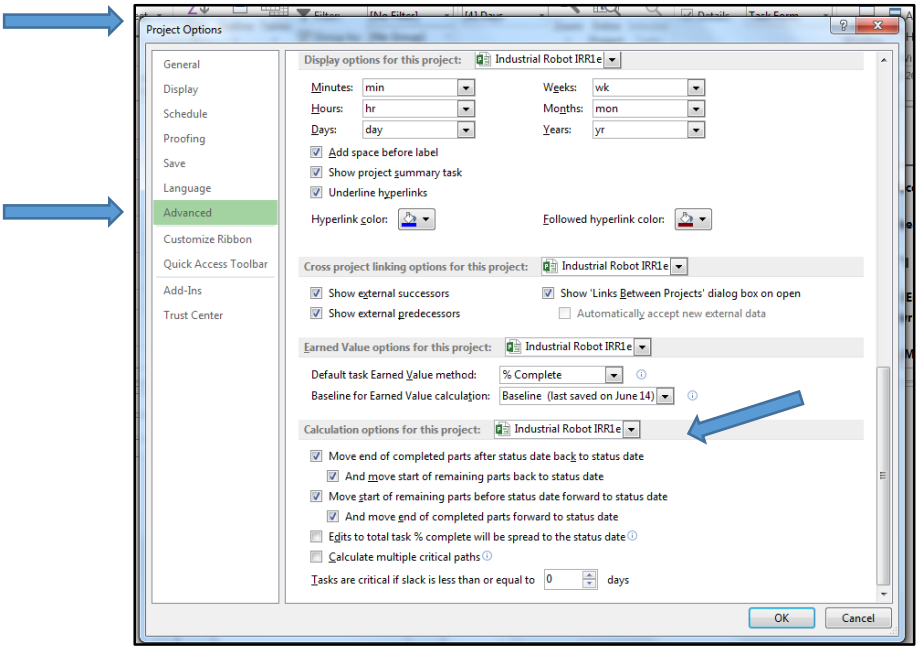
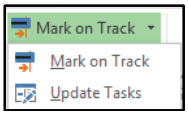
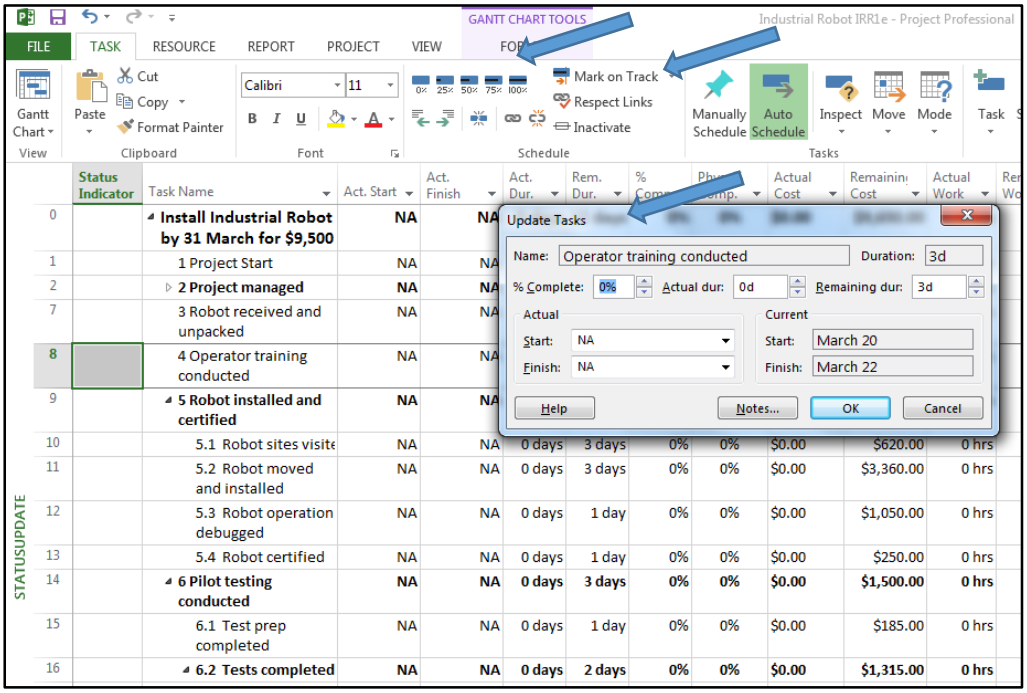


Figure 45

- Enter a status date. Go to Project tab and then click the Status Date Button. Choose the status date and click OK.
- If a task is on track and occurs just as planned, select the task and then go to the Task tab. In the Schedule section, click Mark on Track and select Mark on Track. % Complete is 100%.



- If a task is complete, but it took longer than planned, go to the Task tab. In the Schedule section, click Mark on Track and select Update Tasks. In the Update Tasks dialog box, revise the information as appropriate, such as Actual Start/Actual Finish, Actual Duration/Remaining Duration, etc. Do this similarly if your task is behind or ahead of schedule (Figure 46).
- Note: the next time you have to update the plan and you already have several completed tasks, apply a filter to just show you the incomplete tasks. Go to the View tab, click the Filter down arrow and choose Incomplete Tasks from the drop-down. This will make updating the project easier.
- A fast but not very accurate way to update the plan, is to click on the task you want to update and then click on the % Complete bars in the Schedule section.



	Status Indicator	Task Name	Act. Start	Act. Finish	Act. Dur.	Rem. Dur.	% Comp.	Actual Cost	Remaining Cost	Actual Work
0		**Install Industrial Robot by 31 March for $9,500**	**NA**	**NA**						
1		1 Project Start	NA	NA						
2		**2 Project managed**	**NA**	**NA**						
7		3 Robot received and unpacked	NA	NA						
8		4 Operator training conducted	NA	NA						
9		**5 Robot installed and certified**	**NA**	**NA**						
10		5.1 Robot sites visite	NA	NA	0 days	3 days	0%	$0.00	$620.00	0 hrs
11		5.2 Robot moved and installed	NA	NA	0 days	3 days	0%	$0.00	$3,360.00	0 hrs
12		5.3 Robot operation debugged	NA	NA	0 days	1 day	0%	$0.00	$1,050.00	0 hrs
13		5.4 Robot certified	NA	NA	0 days	1 day	0%	$0.00	$250.00	0 hrs
14		**6 Pilot testing conducted**	**NA**	**NA**	**0 days**	**3 days**	**0%**	**$0.00**	**$1,500.00**	**0 hrs**
15		6.1 Test prep completed	NA	NA	0 days	1 day	0%	$0.00	$185.00	0 hrs
16		**6.2 Tests completed**	**NA**	**NA**	**0 days**	**2 days**	**0%**	**$0.00**	**$1,315.00**	**0 hrs**

Figure 46

To track costs:

- Click on the task that you want to update. Then go to the View tab and check Details to bring up the Task Form.
- Right click on the Task Form and select cost from the drop-down to bring up the cost table.
- When you update % Complete, Work and Materials resources will update automatically, but not the Cost resource. In Figure 47, Transportation is an example of a Cost resource and that has to be updated manually by entering the Actual amount.

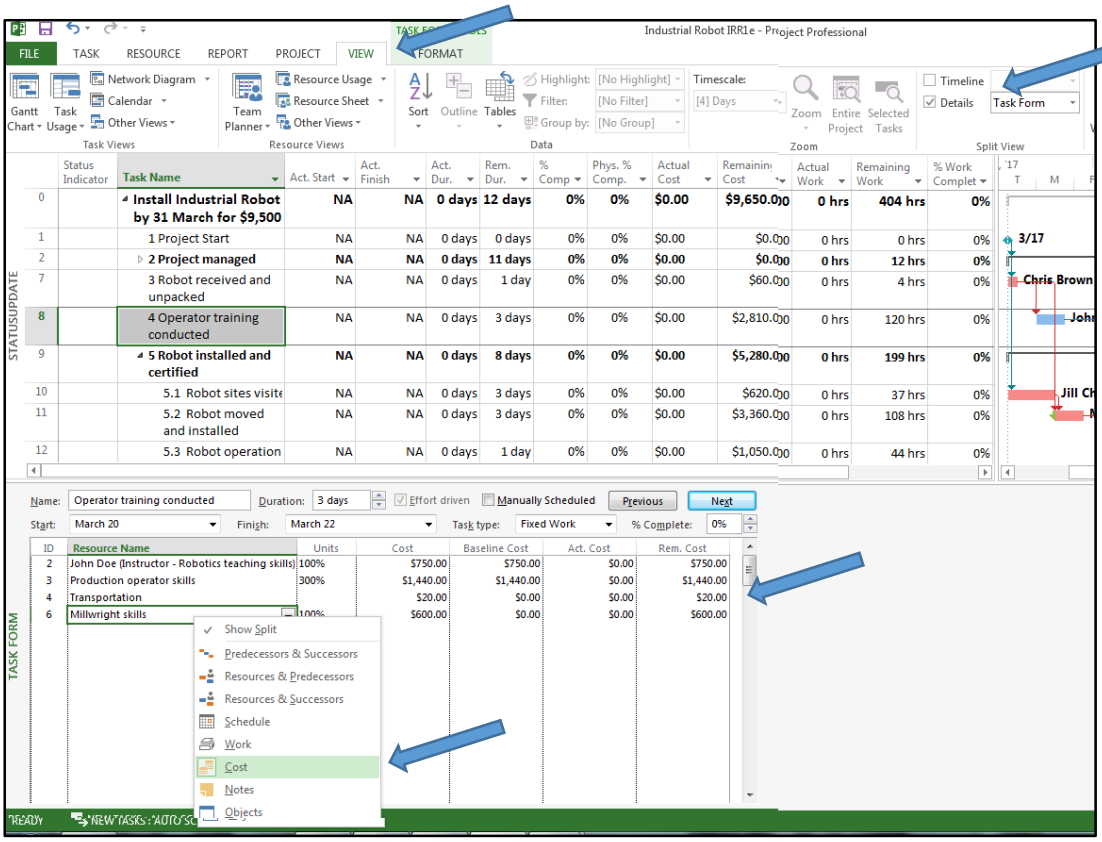


Figure 47

To track overall progress:

- Review the status of the project regularly to spot areas where trouble might occur. The overall Project Summary task (task ID 0) will give you a high-level view of how your project is doing. If you want to know the cost status of the entire project, select the Project Summary task, go to the View tab, click the Tables button and select Cost to see the current total scheduled cost for the project, the baseline cost, and the cost variance. A cost variance that is negative (shown in parentheses) indicates that the project is scheduled to come in under budget.

- Similarly, to see how the entire project is doing with regard to schedule, click the Tables button and select Variance. A positive schedule shows that your project is going to be completed later than planned.

- To see which specific tasks are over budget, in the View tab, click on the Filter down arrow, choose More Filters (Figure 48) from the dropdown and then click Cost Overbudget. To see which tasks have more work than planned, select Work Overbudget.

- Filters are very helpful in looking for tasks that are headed for trouble. You can use the Slipping Tasks filter to find tasks that will have finish dates later than their baseline dates. The Slipped/Late Progress filter checks for tasks that are slipping and whose completed work is less than planned. The Slipping Assignments filter checks for resources who are behind on several assignments, indicating that the resource might need help, or that too many tasks are scheduled for the same time, or that the resource is inexperienced or has the wrong skillset. To access any of these filters, follow the steps outlined above for Cost or Work Overbudget.

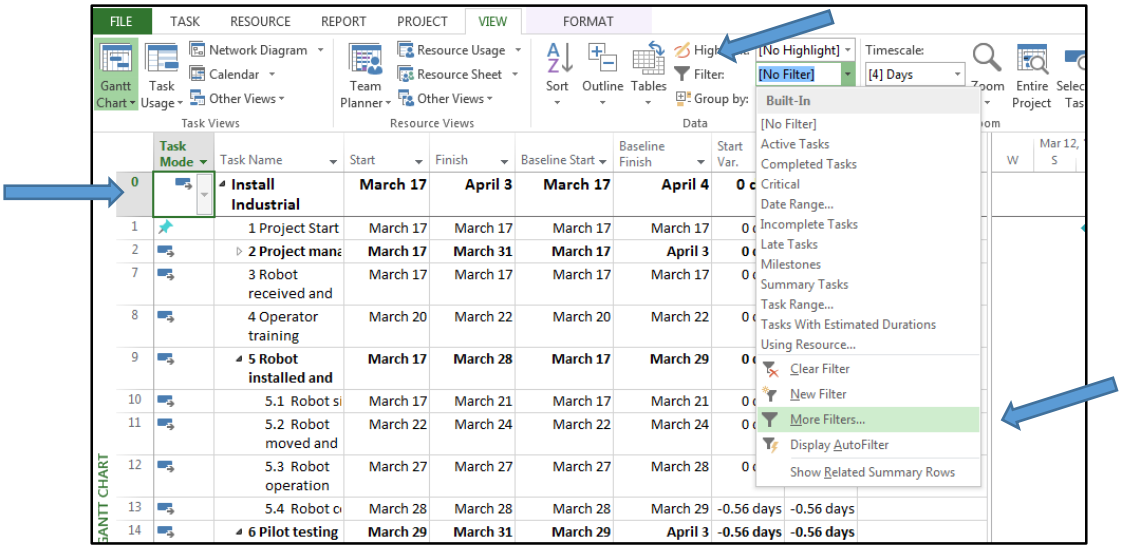


Figure 48

Another way to get a quick snapshot of your project is to look at Project statistics. Go to the Project tab, click Project Information. In the dialog box, click Statistics (Figure 49).

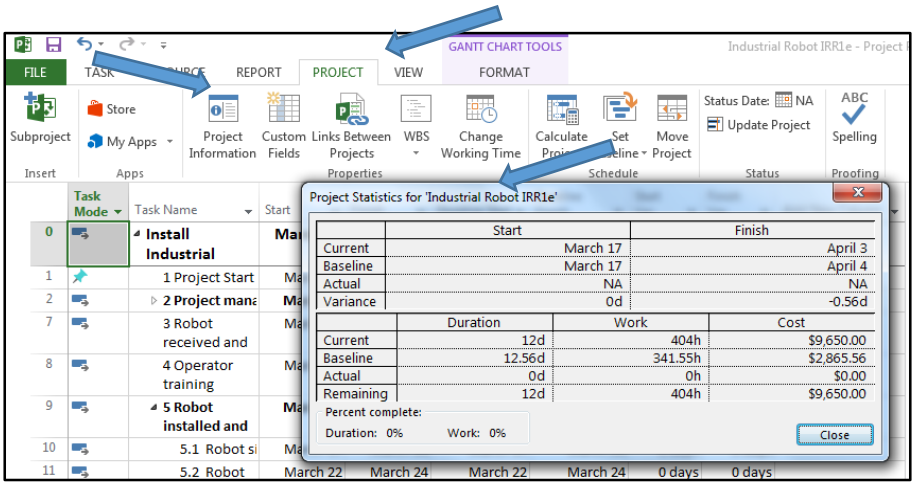


Figure 49

You can also get an overview of your project using the Dashboard feature. Go to the Report tab, click on Dashboards and then select Project Overview (Figure 50).

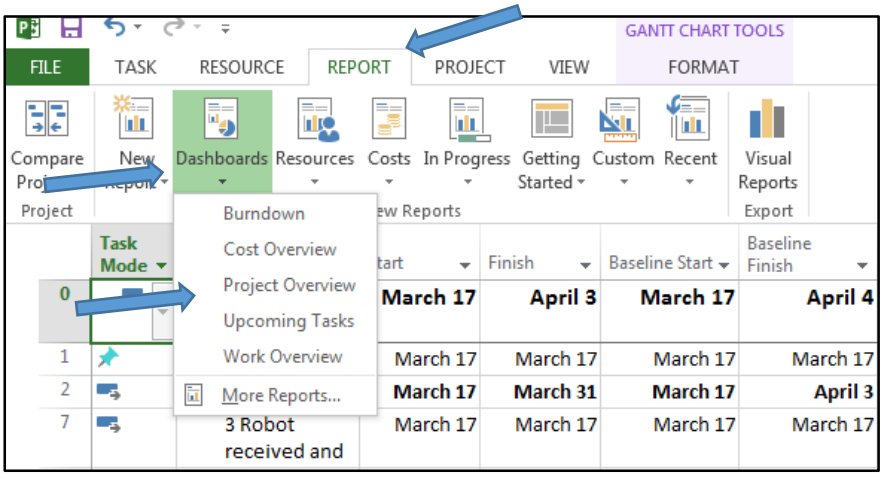


Figure 50

To see overall cost and schedule performance for the project at a glance and find out how much value your project has earned:

- Make sure you have saved a baseline. (On the Project tab, click Set Baseline, then choose Set Baseline.)
- You will also need to set a status date. (On the Project tab, click Status Date, then choose a date.)
- Go to the Report tab, click Costs and then choose Earned Value Report.
- The report will show you how well your project is doing. BCWS (Budgeted Cost of Work Schedule) represents the baseline for the work that is scheduled. If ACWP (Actual Cost of Work Performed) is higher than BCWP (Budgeted Cost of Work Performed or earned value), the project is over budget. If BCWS or the planned value is higher than the earned value (BCWP), then the project is behind schedule.
- If you want a detailed report, go to the Gantt Chart. On the View tab, click Tables, choose More Tables, click Earned Value, and then click Apply. You should now be able to see Planned Value, Earned Value, Actual Cost, and variances for Cost and Schedule, Estimate at Completion, Variance at Completion, etc., for each task (Figure 51).

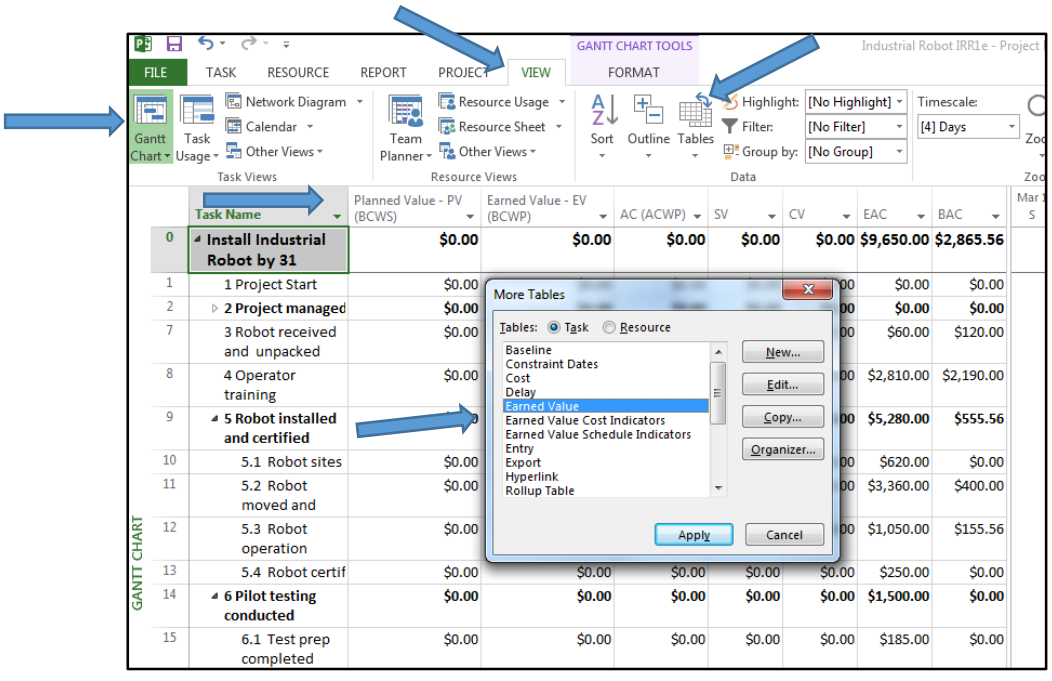


Figure 51

- To let MS Project know how you want it to calculate Earned Value, go to File, Options, Advanced. Scroll to the bottom to Earned Value Option for This Project. The default is set to % Complete (that is the percent of the duration that is complete). Change the setting to Physical % Complete for more control over what values are valid. For example, you can select 0% for a task that has not started, 50% for a task that is underway, and 100% for a task that is complete.
- In the Gantt Chart View, click Tables and select Tracking. In the Tracking Table there is a column for Physical % Complete. You can add values there (Figure 52).

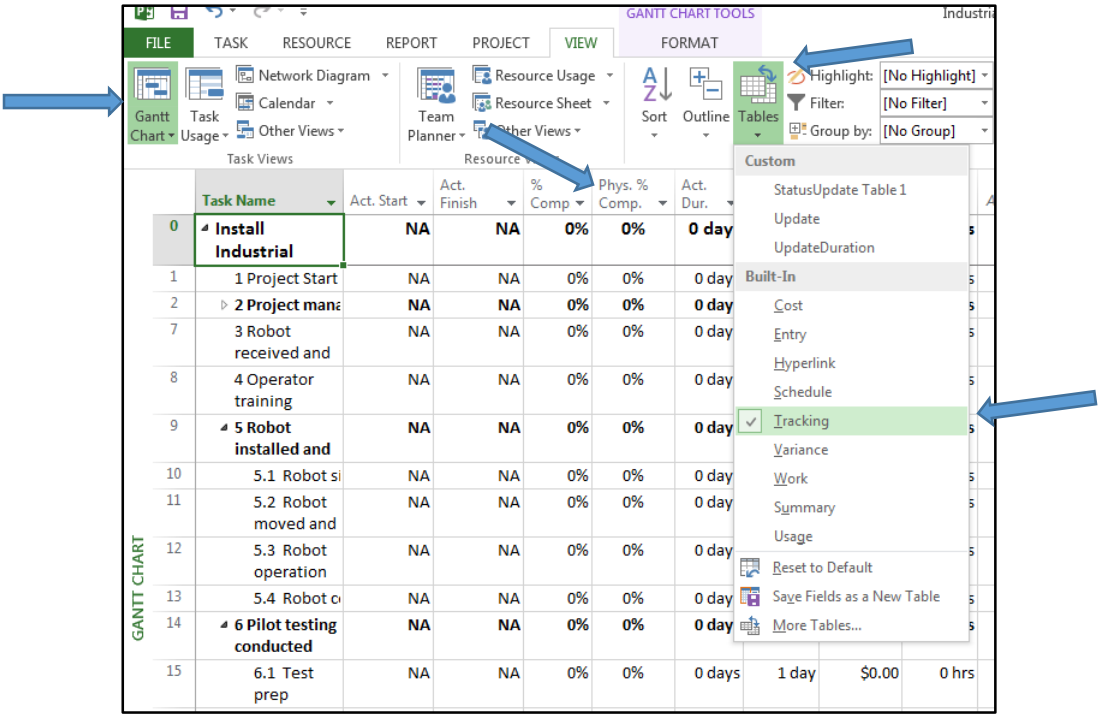


Figure 52

Step 12 – Modify Project

If modifications are required to the project plan, a separate modification or change control sheet should be used to ensure that changes are approved and recorded. This can be attached to the notes section of the relevant task or to the project summary task. If new tasks need to be entered into the WBS, the same steps with relation to identifying resources (work), assigning resources, sequencing and scheduling should be followed. Remember to check for over-allocations in resources.

If there is work that needs to be rescheduled because the project was put on-hold, for example:

- Go to the Project View tab, and click Update Project.
- In the Update Project dialog box, select Reschedule Uncompleted Work to Start After.
- Enter the date when you want to resume work (it will default to today's date).
- Select Selected Tasks or Entire Project depending on what you want. If you select Entire Project, all incomplete work will be rescheduled (Figure 53).
- Click Okay. This will automatically split the task/s in question so that remaining work is completed after the nominated date.
- Check any manually scheduled tasks to see if you need to revise those dates manually.
- Don't forget to go back and check for overloaded resources!
- Also remember to baseline the plan (generally, it is a good idea to save a separate baseline after significant changes).

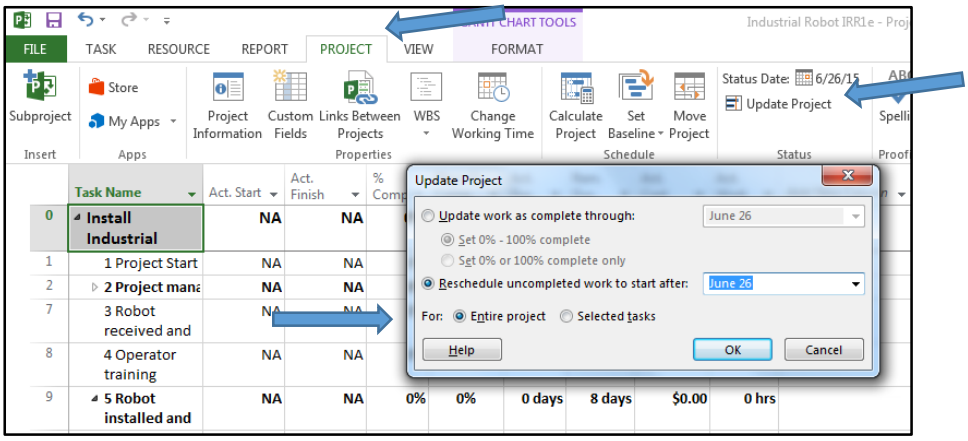


Figure 53

Step 13 – Closeout & Evaluate

If you have used MS Project accurately and regularly up to this point, it will reward you with a great deal of information to assist in your Closeout and Evaluate step. MS Project can supply information on both "What we planned to do" and "What we actually did" – the first two steps in Evaluate.

- This will be in the form of various reports, such as project overview, burn down, cost overview, work overview, task status, milestone report, earned value, cash flow, cost overruns, resource cost summary, etc.
- It is well worthwhile spending some time scanning through the program to find exactly which reports and views will be most useful to you.
- Remember to reference change control documents and re-baselined plans for information to include in the closeout report.
- Attachments of closeout/evaluate minutes, performance summaries, and lessons learned can be added to the notes section of the Closeout and Evaluation task.

One last thing to remember, after you have closed out the project, the product of that project will likely be maintained by some other department or group of people. They may need access to some of the information generated over the course of your project. Other project groups could learn from your project or adapt some of the work done in your project to speed up their project work. Take some time to clean up your documents and archive them in a place where they are easily accessible to those who might need them in the future. Follow your organization's policies with regard to the archiving and distribution of documents, particularly those of a sensitive or confidential nature.

