Getting to know MS Project

Academic year 2020/21

Prepare a management plan to supply a Swing Bridge for a Metro Stay Cabled Bridge in Istanbul, Turkey

(Youtube tutorial for greeting insight about how to use MS Project:
For deep insight follow: **https://youtu.be/KmNoWjF-I6Y)**
For a crash course follow **: https://youtu.be/lWmP0kReXkQ**

Project Background:

•The Golden Horn Metro Bridge (Turkish: Haliç Metro Köprüsü) is a cable-stayed bridge along the M2 line of the Istanbul Metro, spanning the Golden Horn in Istanbul, Turkey.

•On the Unkapanı side, a 120-metre-long swing bridge, essentially a cantilever structure, is to allow passage for large ships. It has 50-metre and 70-metre-long spans, which rest on a central pier.

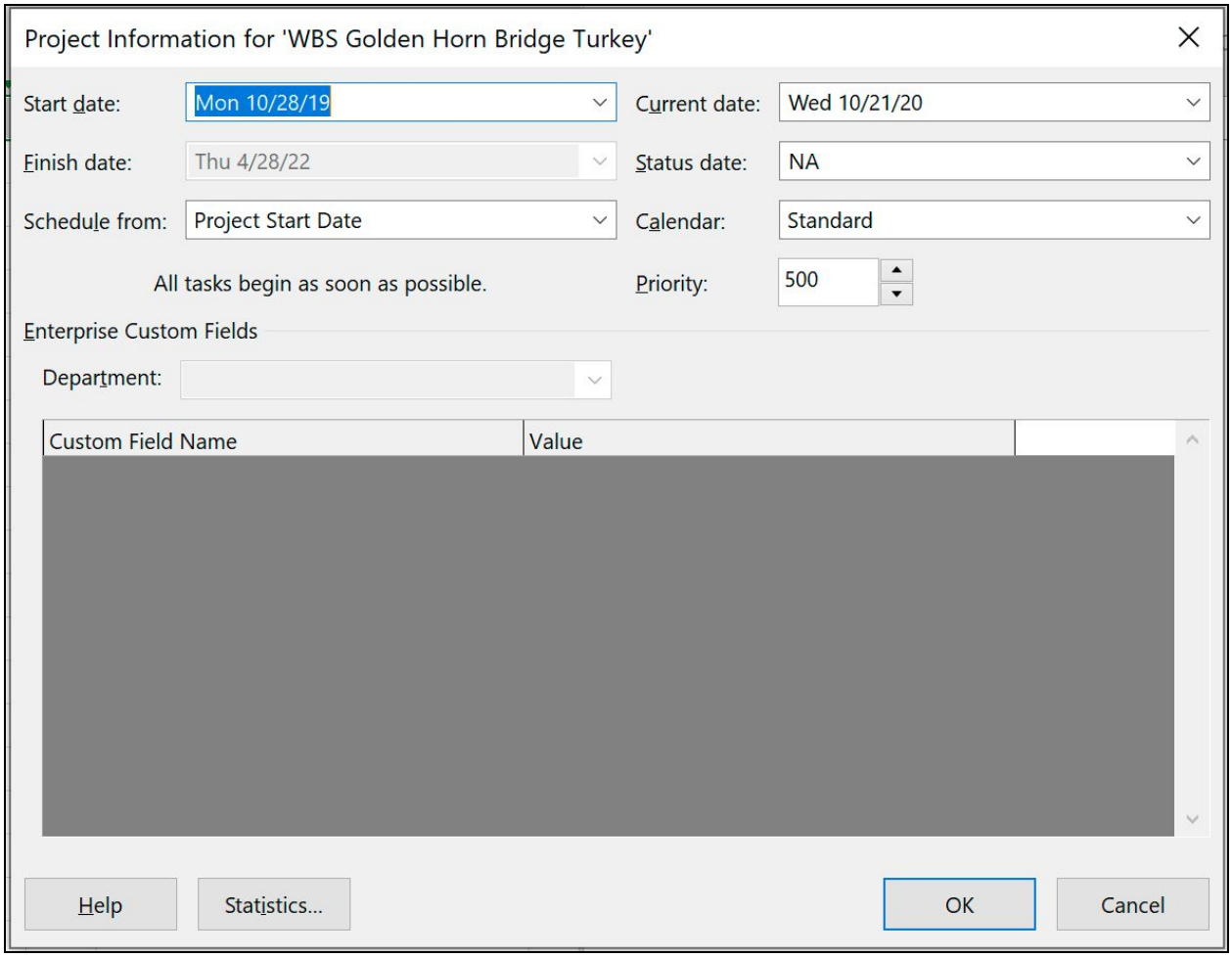
The swing bridge project is about a part of bridge that is being constructed in Istanbul Turkey and the municipality of istanbul gives a tender call to get some proposal about the construction of the bridge. There are numerous companies competing and the company providing the best time and profitability values will win the contrat to work.

Setting Default Values

Click on Project on the menu bar, and then go to Project Information. Set the project start date to Mon 8/26/19, 9.00h. Don't enter the finish Date. click Ol
Set current date
The computer's internal clock initially determines the date listed in the Current Date text box.
To access the Current Date, click again on Project, then Project Information.
The current date box appears. Changing this date box has several implications:

- The date determines the location of the dashed (current) date line on the Gantt chart timeline.
- The Current Date appears in the header of the Project Summary standard report. You can also display the Current Date in headers or footers on other reports.
- You can use the Current Date to track the progress of the project, specifically to record the progress of all tasks scheduled to be in progress or finished as of the date in the Current Date text box.

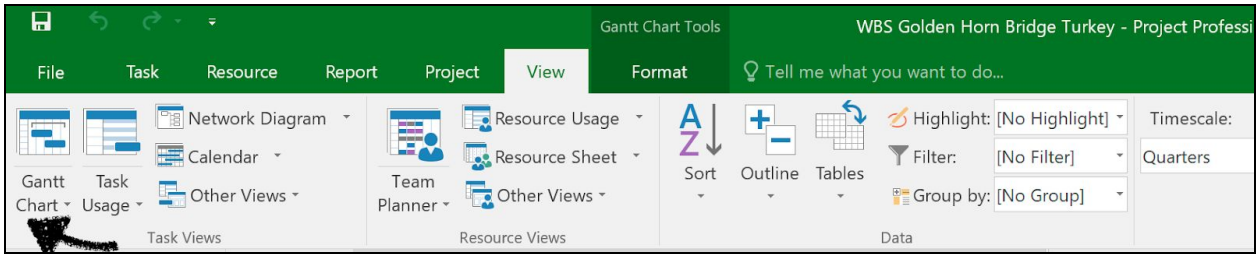
You will, initially, leave the Current Date as defined by the computer clock, please check that it is correct.
Use the standard calendar with no changes.



Click OK, to close the Project Information box.

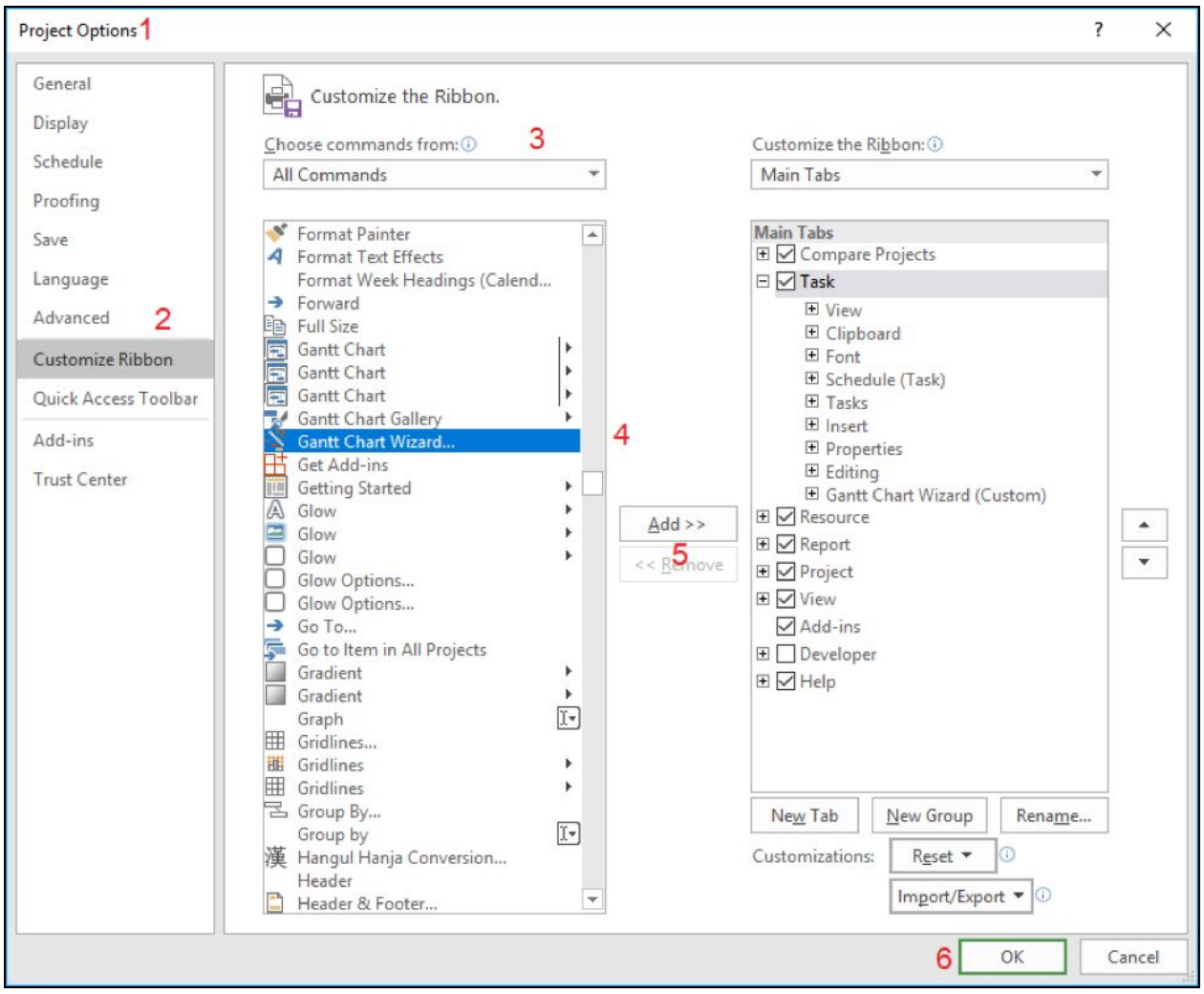
Set the Gantt chart bar display

There are two scenarios, let start with the simpler one, if you open your MS project you may have a ribbon with all the preset and you don't need to customise the top ribbon to get the the Gantt chart wizard and other tools like clipboard fonts etc

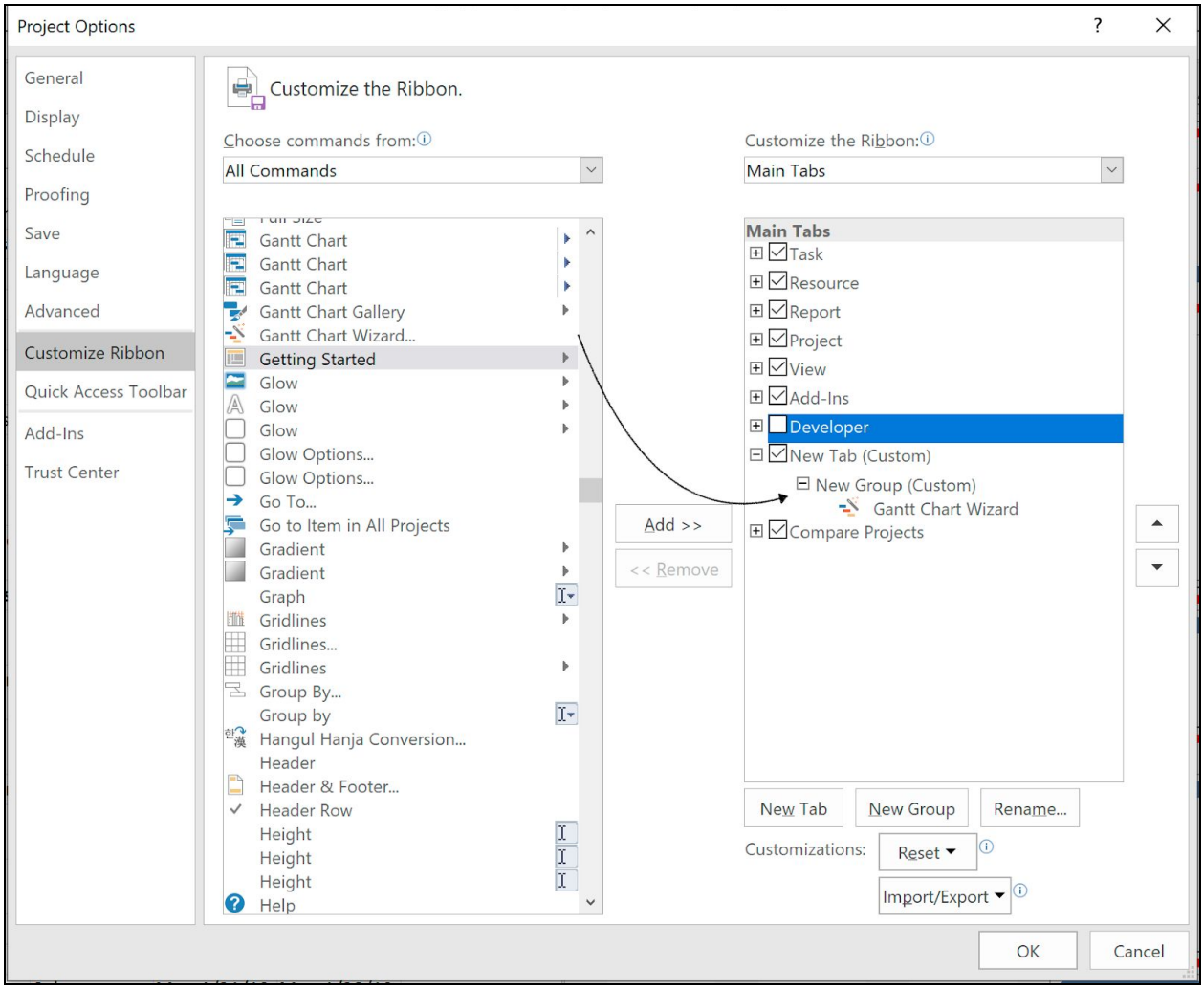


The second method is to to file click option and then click customise Ribbon and from then select All commands as in default mode it shows all the popular commands, after

this scroll down and click the option of gantt chart wizard and to add it you have to create a custom group in the taks taks and rename it to chart wizard or simply create a new new tab and add Gantt chart wizard to it.

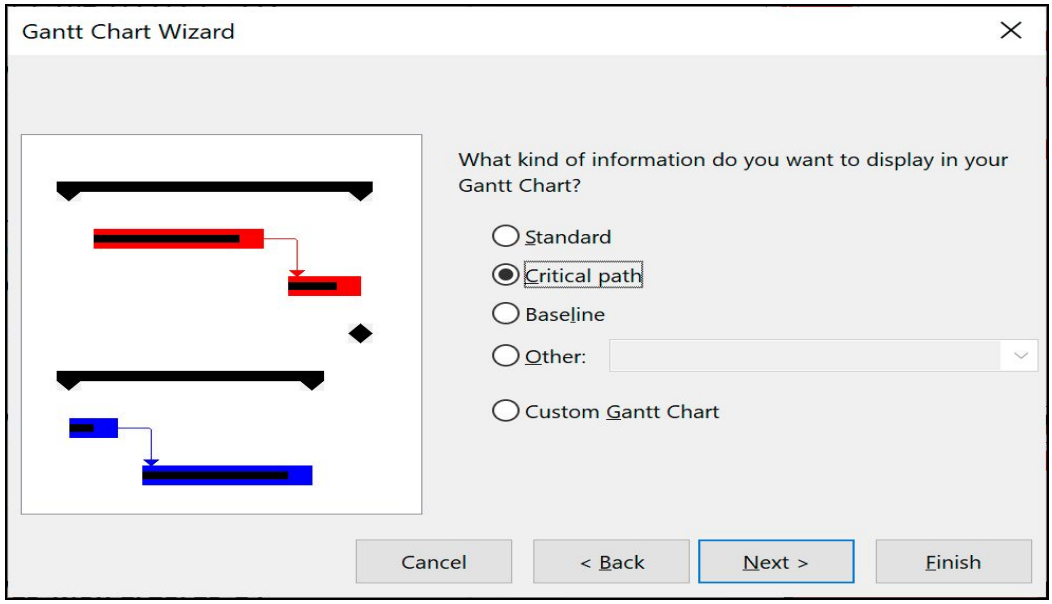


Or

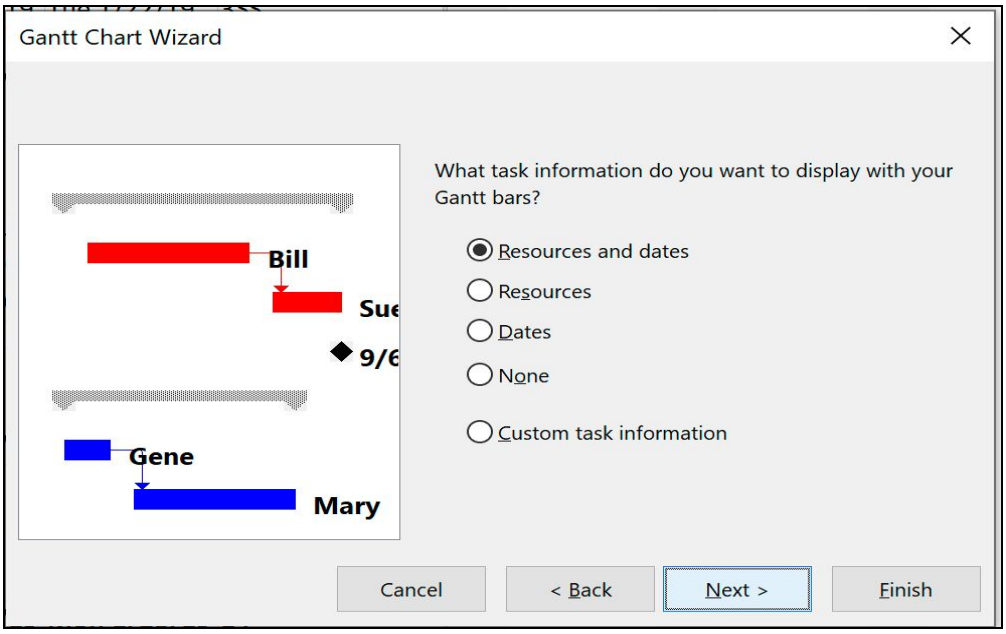


Once the Gantt chart wizard is added to the ribbon click and initial the wizard and follow these steps

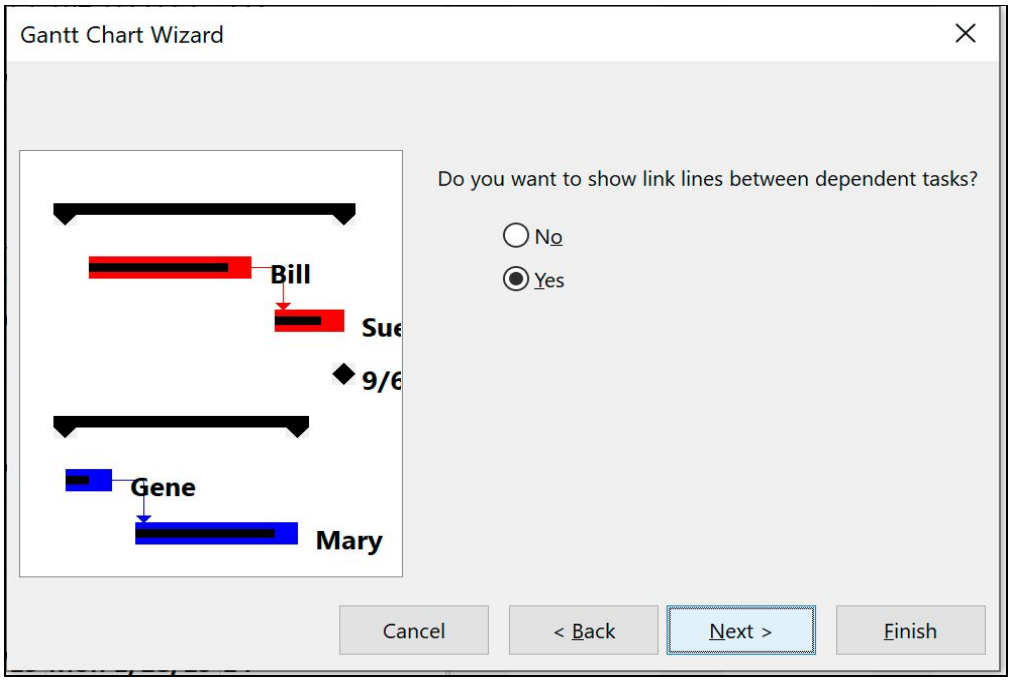
1.



2.

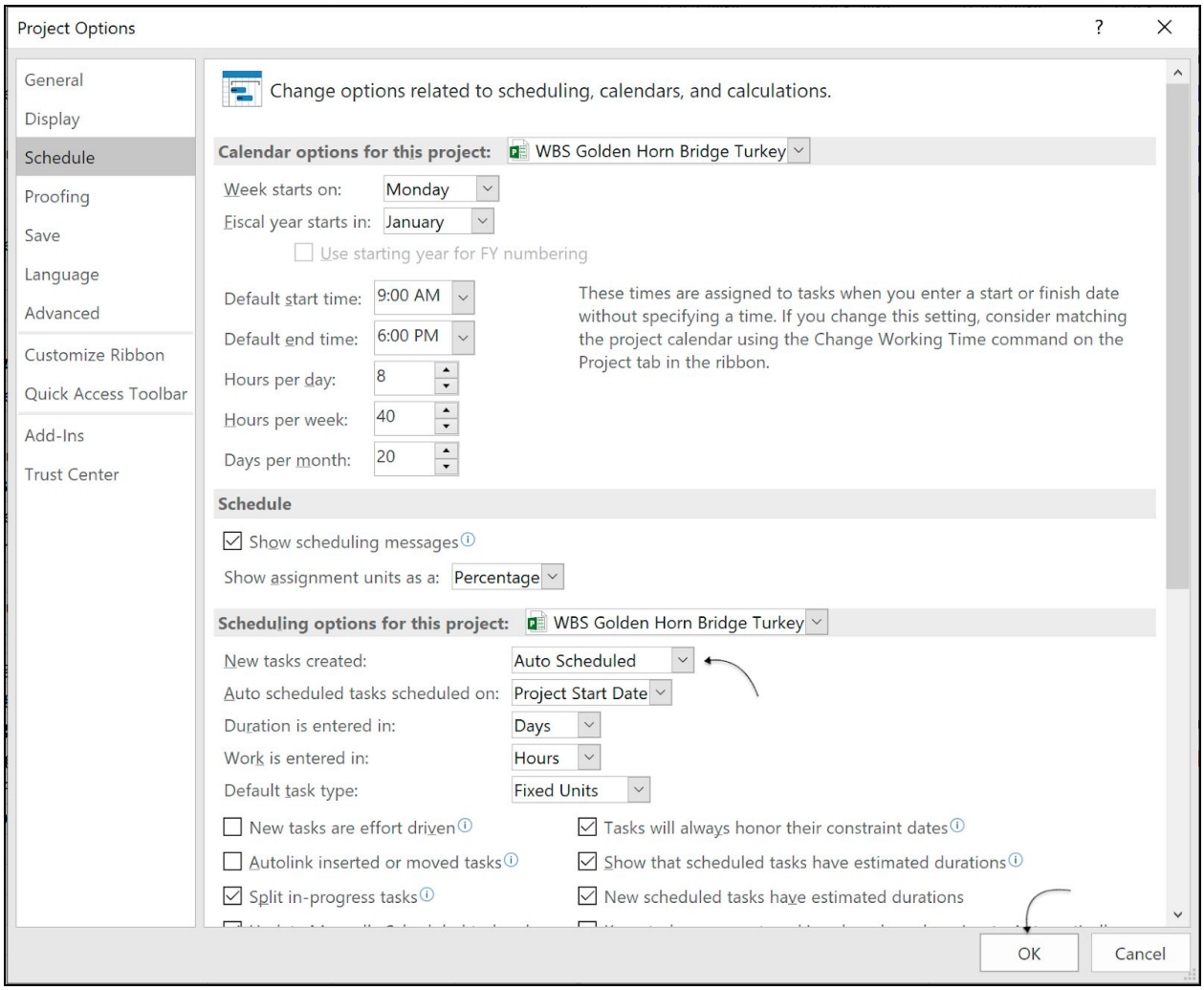

Gantt Chart Wizard
Bill
Sue
9/6
Gene
Mary
What task information do you want to display with your Gantt bars?
Resources and dates
Resources
Dates
None
Custom task information
Cancel
< Back
Next >
Finish

3.


Gantt Chart Wizard
Bill
Sue
9/6
Gene
Mary
Do you want to show link lines between dependent tasks?
No
Yes
Cancel
< Back
Next >
Finish

The last step is the format, and then exit your Gantt chart wizard is ready to use.
The functionality of this is when tasks are added to the Gantt chart the bars will be colored red if they are on the critical path, and when duration and links are added to the project you will be able to readily identify on the screen what tasks are on the critical path. When the project gets underway, you will be using a different Gantt chart display to highlight any variances between planned and actual activity on the tasks.

Set Auto Scheduling mode

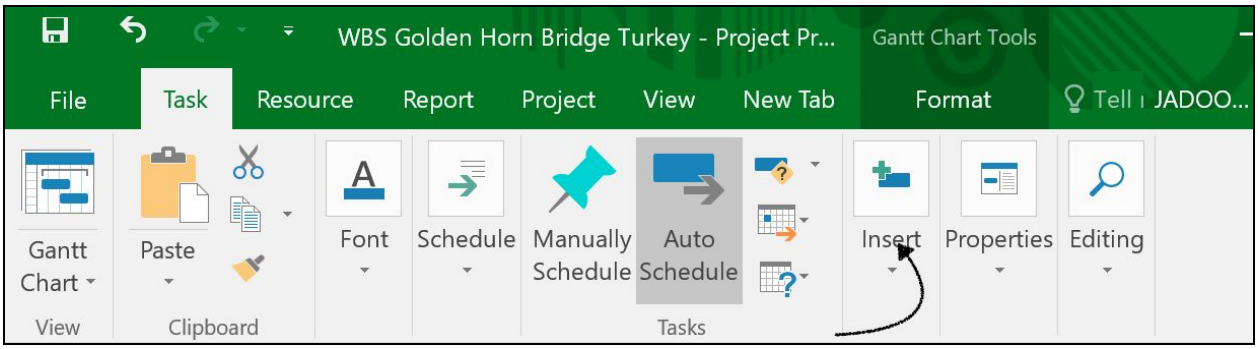


Set the Tasks

Enter Tasks

The first step in creating your schedule is to enter task heading and tasks. With the Gantt chart on the screen, begin by typing a list of tasks or events that are needed to be done to move the project forward, preferably in the approximate order they will happen. Tasks entered are assigned the default duration of one day. It is easy to delete and insert tasks and to relate tasks so that each task will be scheduled appropriately.

- In the first field, in the task name column type **Swing Bridge Project**
- Press Enter
- In the field 4, **enter Design**
- Continue entering these task heading, one in each task name field:
- **Purchase of every engineering part**
- **Manufacturing**
- **Transportation**
- **Swing Bridge Pre-Assembly On-site**
- **Off-shore swing Bridge installation**
- **Final commissioning and Testing: Swing Bridge**
- **Off-shore Piles Design and Construction**



Select the Design Task, then either use the insert key on the keyboard (windows only) or choose New Task from the insert menu. This enters a blank line above the current task. Repeat until there are four cells between the "**Design**" and "**Purchase of every engineering part**" . in the three blanks cells enter

- Cylinder and locking devices-Detailed Engineering

    - Machinery Room-Detailed Engineering
    - Swing Bridge Deck-Detailed Engineering
    - C2-Design Completed

Repeat the same procedure for the following tasks
In the task Purchase of every engineering part the sub tasks are further divided into categories, however the procedure remains the same.
Under **Purchase of every engineering part**

- **Cylinder and Locking Devices**
    - Request for Proposals
    - Time Notice
    - Bid analysis
    - Order placement

- Machinery Room
    - Request for Proposals
    - Time Notice
    - Bid Analysis
    - Order Placement
- Steel Material
    - Request For Proposals
    - Time Notice
    - Bid Analysis
    - Order Placement

This task is finished as it consists of a cylinder and locking device, Machinery room, Steel Material. We will repeat the procedure for Manufacturing

- **Manufacturing**
    - Lift and Turn Cylinder
    - Locking Devices
    - Machinery Room (Pumps, Tanks, Control Cabin..)
    - Steel Material

- **Transportation**
    - Lift and Turn Cylinder
    - Locking Devices
    - Machinery Room
    - Steel Material

- **Swing Bridge Pre-Assembly ON-SITE**
    - Lift and Turn Cylinder
    - Locking Devices
    - Machinery Room (Pumps, Tanks, Control cabin..)

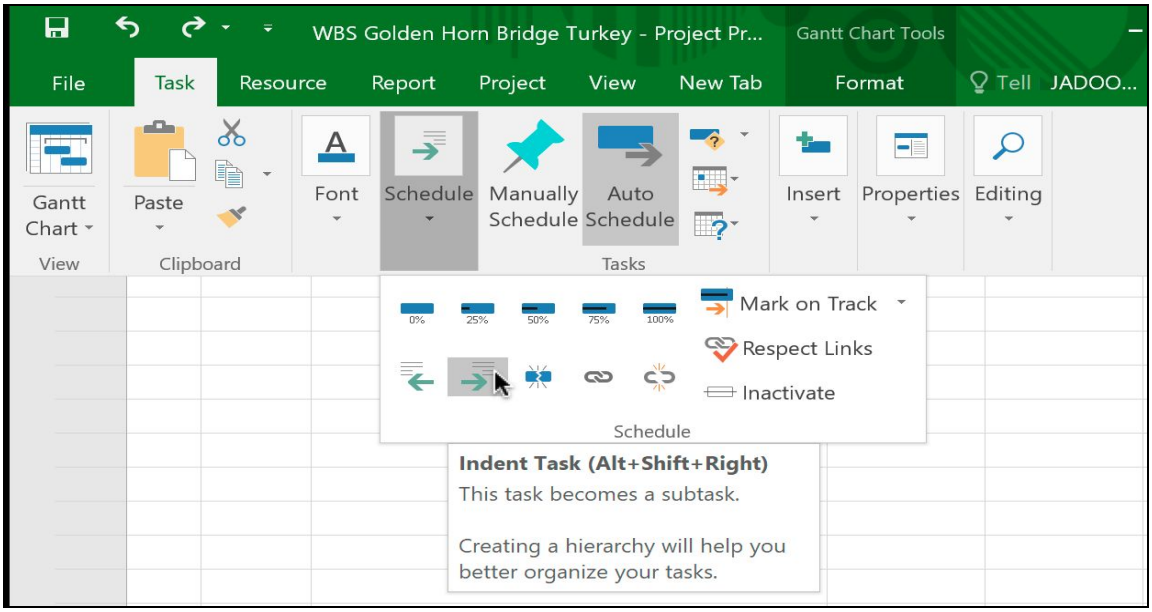
- **OFF-SHORE Swing Bridge Installation**
    - Lift and Turn Cylinder
    - Swing Bridge deck Installation
    - Locking Devices
    - Machinery Room (Pumps, tanks, control cabin..)

- **Final Commissioning & Testing : Swing Bridge**
    - Final Commissioning & Testing : Swing Bridge
    - M2-Owner's Taking Over

- **Off-Shore Piles Design and Construction**
    - Offshore Piles Design
    - Swing Bridge: Off-Shore Piles
    - O1-Swing Bridge off-shore piles complete

Designating Tasks and Sub-Tasks

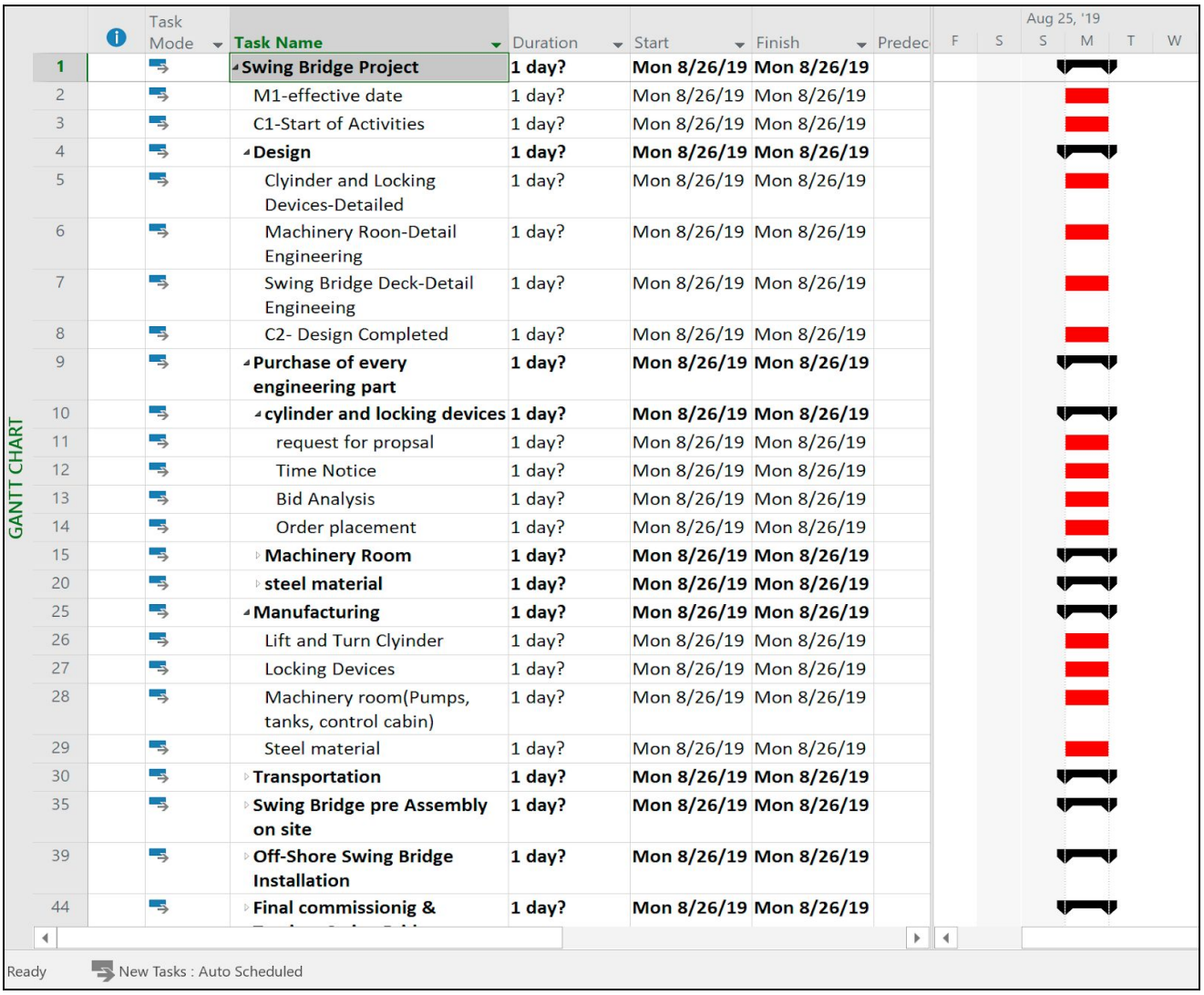
To show the structure of the project, that is the hierarchical nature of tasks heading and subtasks, subtasks are indented to the right of the tasks heading. To do so, select the subtasks and click the indent button (right-pointing arrow on the formatting toolbar) or choose the outline from the project menu and then choose indent.



Select tasks from 5- 8 and indent them, Note that the task summary "Design" has become bold, its Gantt Bar has changed shape and colors and the length of the bar is now the longest duration of the subtask. Continue indenting the subtask associated with the following:

- Purchase of every engineering part
- Manufacturing
- Transportation
- Swing bridge Pre assembly ON-Site
- Off-shore swing Bridge installation
- Final Commissioning & Testing: Swing Bridge Deck
- Off-shore piles Design and construction

Now it is necessary to make all tasks part of the project. To do so, indent all Task summaries so that they become Sub Tasks of Swing Bridge Project. To check on the structure, it is helpful to show all of the subtasks by clicking on the arrow symbol of each task summary. On completion, your chart should look similar to that below.



Durations and Milestones
Set Durations

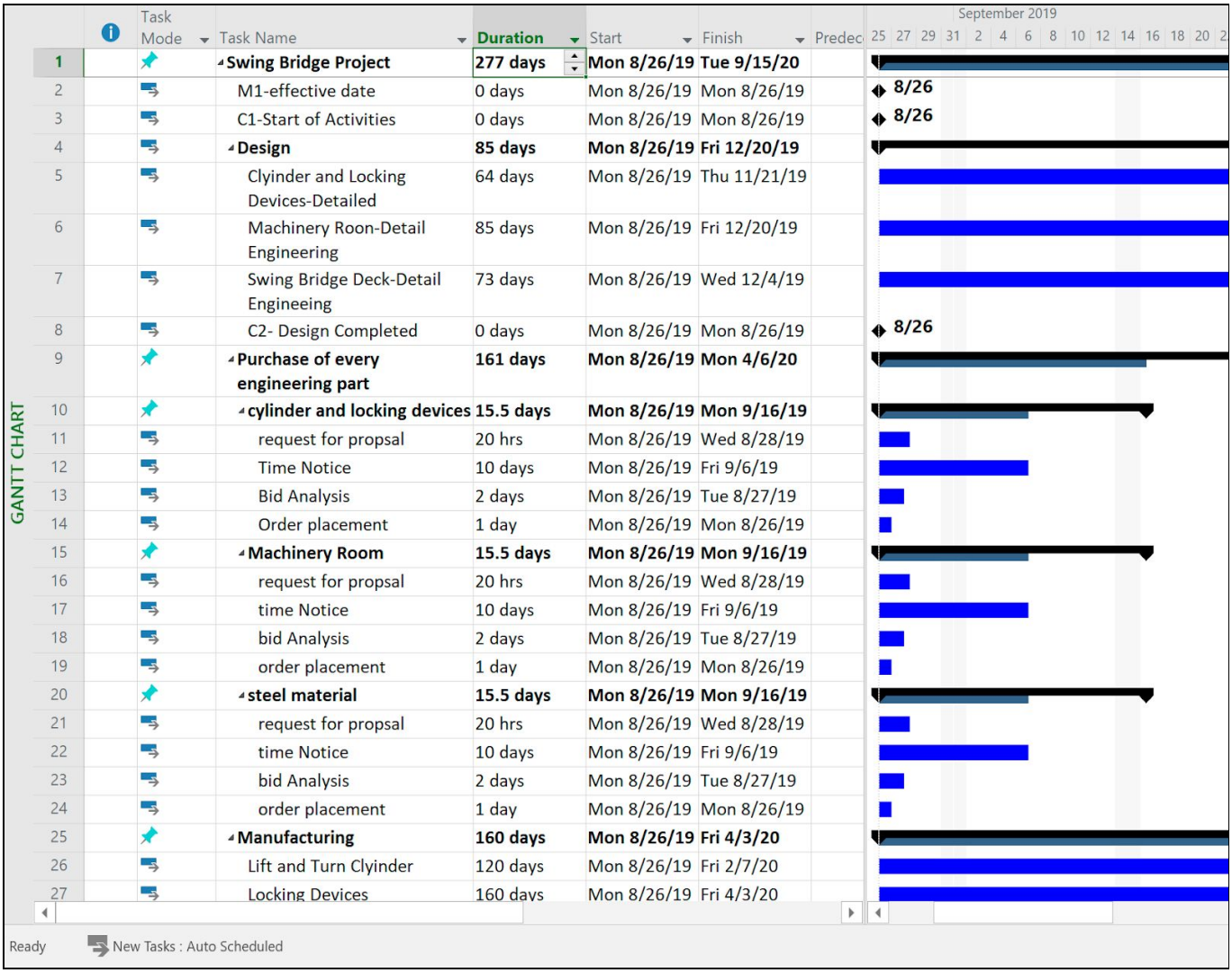
The durations shown in the Gantt chart below are to be added in the Duration Column.

1. Select the duration field in the first task.
2. Type a number for the duration length followed by the duration unit abbreviation.
3. Press the enter button or the tick mark.
4. Repeat steps 1 through 3 to enter durations for all the tasks in your project.

Set Milestones
You are to add milestones, which are the dates project deliverables are due. To enter the first milestones:

1. Insert a blank task line
2. Type " Deliverable to the Project Manager" or your desired description/ Name

Having completed all duration and milestones, your Gantt chart should look similar to the chart below.



Create a resource List

You need to create a resource list. While assigning resources, this will save you time. The software assigns the amount of work specified for a task to a resource. Scheduling depends on the resource's work schedule, or resource calendar, and other tasks assignments. For example, if you assign a one day task to a resource and the resource works full-time, then the resource will be scheduled to work on a task for the equivalent of a full day, starting with the earliest available unscheduled time that meets the constraints of the task. Once a resource is assigned to a task, the resource name appears next to the taskbar on the Gantt Chart.

In this project, you will assume that your project has engineers that include Turkish and Italian, you also have logistics service providers that you need to manage, a team of Italian and Turkish workers. The number of people working are represented by units in percentage. Also, suppliers will be used in some tasks, as it is set as a material type. In MS Project Material resources are the items that are required to complete your project that are measured in units rather than work hours, such as cases of roofing shingles or gallons of paint.

To Create a Resource List:

1. From the view menu, Choose resource Sheet.
2. In the resource name column, enter the title of the staff member
3. In the Max. Units columns, enter the number of the resource unit available for this resource (default is 100% per each one unit.) For example, to use 3 italian engineers we will set 300 %
4. For each staff, enter the standard € rates as shown below.

Your resource sheet should look like this:

RESOURCE SHEET

	Resource Name	Type	Material	Initials	Group	Max.	Std. Rate	Ovt. Rate	Cost/Use	Accrue	Base
1	Supplier	Material		S			€0.00		€0.00	Prorated	
2	Purchasing agent	Work		P		200%	€80.00/hr	€0.00/hr	€0.00	Prorated	Standard
3	Turkish Mechanical Engineer	Work		T		400%	€42.50/hr	€0.00/hr	€0.00	Prorated	Standard
4	Logistics service Provider	Material		L			€0.00		€0.00	Prorated	
5	Turkish Project Engineer	Work		T		100%	€60.00/hr	€0.00/hr	€0.00	Prorated	Standard
6	Team of Turkish Workers(5 workers each)	Work		T		800%	€150.00/hr	€0.00/hr	€0.00	Prorated	Standard
7	Owner	Work		O		100%	€0.00/hr	€0.00/hr	€0.00	Prorated	Standard
8	Team of Italian Workers (5 workers each)	Work		T		100%	€400.00/hr	€0.00/hr	€0.00	Prorated	Standard
9	Italian Mechanical Engineer	Work		I		400%	€85.00/hr	€0.00/hr	€0.00	Prorated	Standard
10	Italian Project Engineer	Work		I		100%	€120.00/hr	€0.00/hr	€0.00	Prorated	Standard

Now return to the Gantt Chart by Choosing the Gantt chart from the view menu.

Links on the Swing Bridge Project

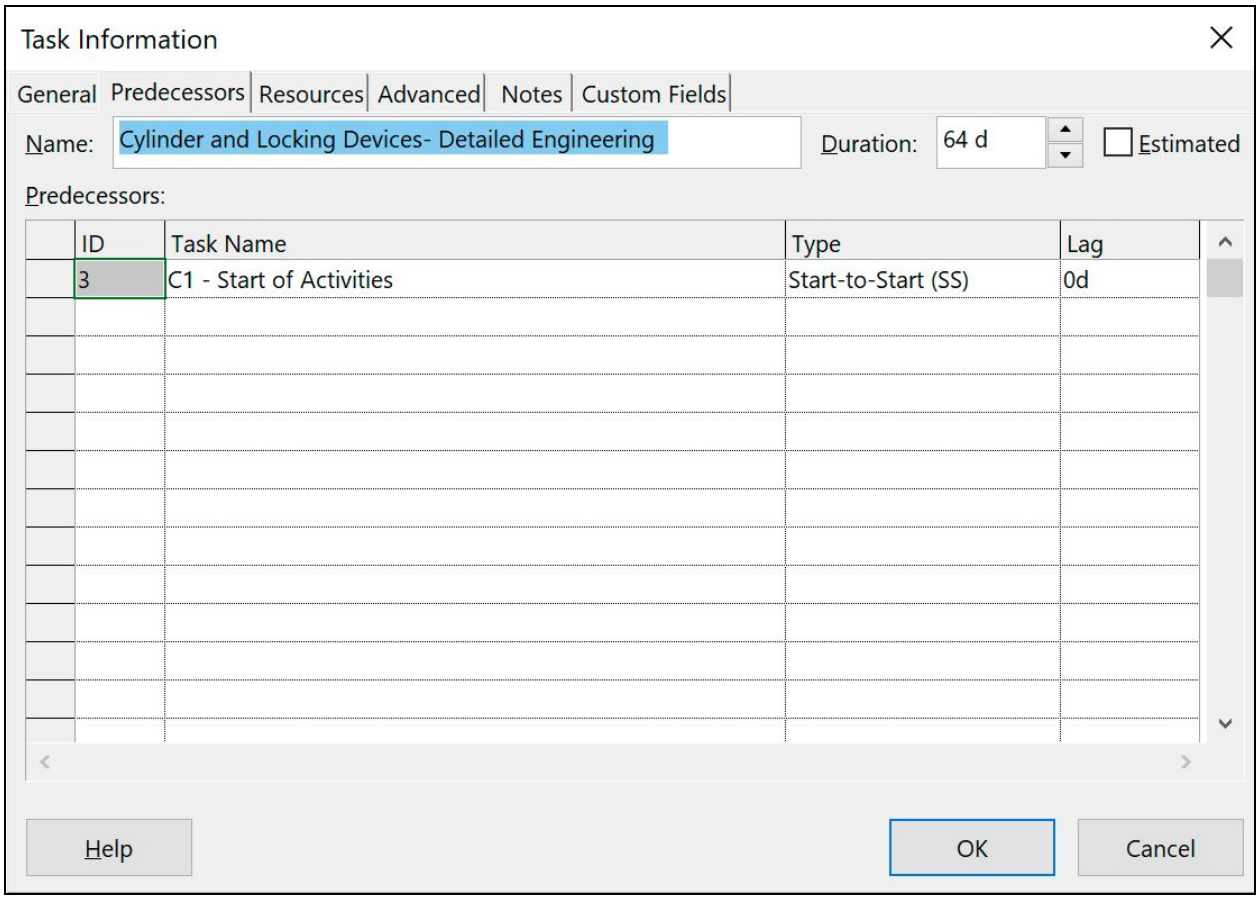
We will put links on the start of the design phase , we will put start-to-start relationship and will put 3SS on task 5

We will repeat the same procedure with the reming task

- Task 5 must precede task 6
- Task 6 must precede task 7
- For task 8, set the predecessor as 7FF, Finish-to-Finish
- Task 5 must precede task 11
- Task 11 must precede task 12
- Task 12 must precede task 13
- Task 13 must precede task 14
- Task 6 must precede task 16
- Task 16 must precede task 17
- Task 17 must precede task 18
- Task 18 must precede task 19
- For task 21 we use 22SF (Start to Finish) as predecessor
- Task 22 must precede task 23
- Task 8, 23 must precede 24
- Task 26-29 all inclusive must have predecessor of task 9
- Task 26 is precede task 31
- Task 27 must precede task 32
- Task 28 must precede task 33
- Task 29 must precede task 34
- Task 31 must precede task 36
- Task 32 must precede task task 37
- Task 33, 36 must precede task 38
- Task 47, 38 must precede task 40
- Task 40 must precede task 41, 42

- Task 41 must precede task 43
- Task 17 must precede task 44
- Task 43, 42 must precede task 45
- Task 45 must precede task 46
- Task 4 must precede task 48
- Task 48 must precede task 49
- Task 49 must precede task 50

Here is an example of how to set the predecessor, and change other attributes, simple way to access task info is by double clicking on the task and another way is by right clicking on task (for Windows) and tap 2 finger for (Mac Os)



After setting all the predecessor your project should look like this

GANTT CHART

	Task Mode	Task Name	Work	Duration	Start	Finish	Predecessors
1		**Swing Bridge Project**	**25,202.67 h**	**699 d**	**Mon 8/26/19**	**Thu 4/28/22**	
2		M1 - Effective Date	0 h	0 d	Mon 8/26/19	Mon 8/26/19	
3		C1 - Start of Activities	0 h	0 d	Mon 10/7/19	Mon 10/7/19	
4		**Design**	**7,992 h**	**222 d**	**Mon 10/7/19**	**Tue 8/11/20**	
5		Cylinder and Locking Devices- Detailed Engi	2,304 h	64 d	Mon 10/7/19	Thu 1/2/20	3SS
6		Machinery Room - Detailed Engineering	3,060 h	85 d	Fri 1/3/20	Thu 4/30/20	5
7		Swing Bridge Deck - Detailed Engineering	2,628 h	73 d	Fri 5/1/20	Tue 8/11/20	6
8		C2 - Design completed	0 h	0 d	Tue 8/11/20	Tue 8/11/20	7FF
9		**Purchase of every engineering part**	**360 h**	**161 d**	**Fri 1/3/20**	**Fri 8/14/20**	
10		**Cylinder and Locking Devices**	**120 h**	**15.5 d**	**Fri 1/3/20**	**Fri 1/24/20**	
11		Request for proposals	40 h	20 h	Fri 1/3/20	Tue 1/7/20	5
12		Time notice	0 h	10 d	Tue 1/7/20	Tue 1/21/20	11
13		Bid analysis	64 h	2 d	Tue 1/21/20	Thu 1/23/20	12
14		Order placement	16 h	1 d	Thu 1/23/20	Fri 1/24/20	13
15		**Machinery Room**	**120 h**	**15.5 d**	**Fri 5/1/20**	**Fri 5/22/20**	
16		Request for proposals	40 h	20 h	Fri 5/1/20	Tue 5/5/20	6
17		Time notice	0 h	10 d	Tue 5/5/20	Tue 5/19/20	16
18		Bid analysis	64 h	2 d	Tue 5/19/20	Thu 5/21/20	17
19		Order placement	16 h	1 d	Thu 5/21/20	Fri 5/22/20	18
20		**Steel Material**	**120 h**	**15.5 d**	**Fri 7/24/20**	**Fri 8/14/20**	
21		Request for proposals	40 h	20 h	Fri 7/24/20	Wed 7/29/20	22SF
22		Time notice	0 h	10 d	Wed 7/29/20	Tue 8/11/20	
23		Bid analysis	64 h	2 d	Wed 8/12/20	Thu 8/13/20	22
24		Order placement	16 h	1 d	Fri 8/14/20	Fri 8/14/20	8,23
25		**Manifacturing**	**0 h**	**160 d**	**Mon 8/17/20**	**Fri 3/26/21**	
26		Lift and Turn Cylinder	0 h	120 d	Mon 8/17/20	Fri 1/29/21	9
27		Locking Devices	0 h	160 d	Mon 8/17/20	Fri 3/26/21	9
28		Machinery Room (pumps, tanks, control cal	0 h	160 d	Mon 8/17/20	Fri 3/26/21	9
29		Steel Material	0 h	120 d	Mon 8/17/20	Fri 1/29/21	9
30		**Transportation**	**0 h**	**45 d**	**Mon 2/1/21**	**Fri 4/2/21**	
31		Lift and Turn Cylinder	0 h	25 d	Mon 2/1/21	Fri 3/5/21	26
32		Locking Devices	0 h	5 d	Mon 3/29/21	Fri 4/2/21	27
33		Machinery Room	0 h	5 d	Mon 3/29/21	Fri 4/2/21	28
34		Steel Material	0 h	5 d	Mon 2/1/21	Fri 2/5/21	29

Allocating Resources

(Link for tutorial on Youtube: https://youtu.be/PjXUtWl22EQ)

Make a backup copy of your files BEFORE you start assigning resources and rescheduling tasks to fix over-scheduling problems you currently have. As you may have to revert to the saved backup copy.

It is important to grasp the concept of task allocation as this procedure, if misunderstood, can lead to much confusion and incorrect results. Microsoft Projects does not know if a task needs 1 employee or 10 employees to undertake the task. At this stage, we are going to decide how many staff it is going to take to perform a task.

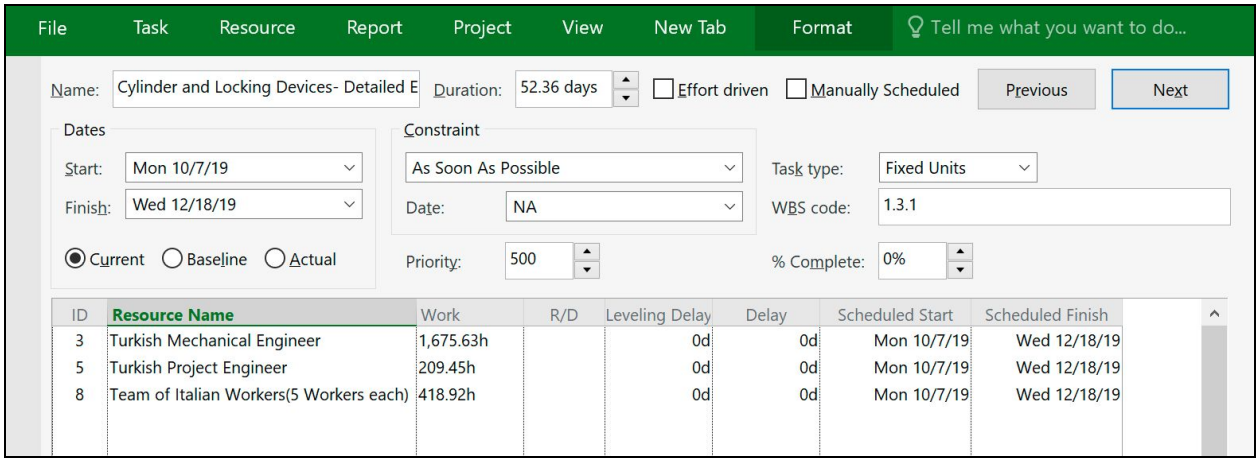
Entering resources for each task

Notes about resource allocations

> Check the tasks with 1 resource (person) allocated. You will find that the durations are the same.
>
> However, for the tasks with 2 (or more) resources (people) allocated, the durations should have halved or changed. In fact, it is better to see what the s/w has done when you allocated the resources. For the purpose of this exercise, the task durations have been expressed in working hours to completion, meaning that multiple resources can work together shortening the overall task duration. Keep in mind that this may not be always the case.

To assign resources to a specific task, click on the resource tab, and click assign resources or double click the task and then open the resources tab.

Another significant point is, as stated earlier, the duration given is intended as work hours. If multiple resources are added at the same time, MS project does not know that it needs to shorten the overall task duration to keep the working hours constant. You will need to check that every time you add multiple resources at the same time, the total hours stays constant. The amount of work assigned to each resource can be seen in the task from the view



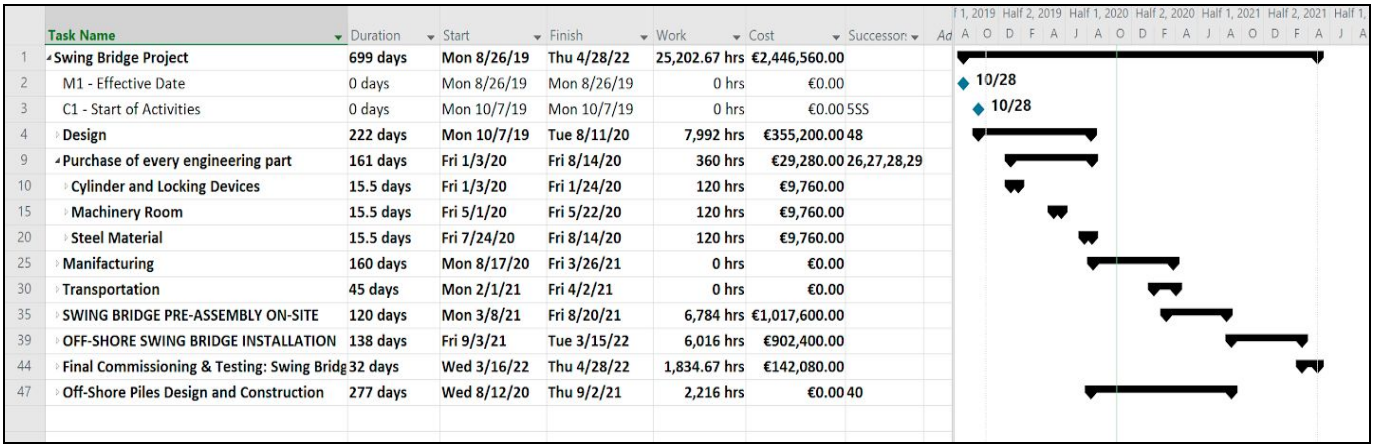
If your task has more than one resource, then you click next to find info about it and change accordingly if you have to.

Now the final allocation of the resource is following.

	Task Mode	Task Name	Duration	Predecessors	Resource Names
1		**Swing Bridge Project**	**699 d**		
2		M1 - Effective Date	0 d		
3		C1 - Start of Activities	0 d		
4		**Design**	**222 d**		
5		Cylinder and Locking Devices- Detailed Engineering	64 d	3SS	Turkish Mechanical Engineer[400%],Turkish Project Engineer[50%]
6		Machinery Room - Detailed Engineering	85 d	5	Turkish Mechanical Engineer[400%],Turkish Project Engineer[50%]
7		Swing Bridge Deck - Detailed Engineering	73 d	6	Turkish Mechanical Engineer[400%],Turkish Project Engineer[50%]
8		C2 - Design completed	0 d	7FF	
9		**Purchase of every engineering part**	**161 d**		
10		**Cylinder and Locking Devices**	**15.5 d**		
11		Request for proposals	20 h	5	purchasing agent[200%]
12		Time notice	10 d	11	
13		Bid analysis	2 d	12	purchasing agent[200%],Italian Mechinal Engineer[200%]
14		Order placement	1 d	13	purchasing agent[200%]
15		**Machinery Room**	**15.5 d**		
16		Request for proposals	20 h	6	purchasing agent[200%]
17		Time notice	10 d	16	
18		Bid analysis	2 d	17	purchasing agent[200%],Italian Mechinal Engineer[200%]
19		Order placement	1 d	18	purchasing agent[200%]
20		**Steel Material**	**15.5 d**		
21		Request for proposals	20 h	22SF	purchasing agent[200%]
22		Time notice	10 d		
23		Bid analysis	2 d	22	purchasing agent[200%],Italian Mechinal Engineer[200%]
24		Order placement	1 d	8,23	purchasing agent[200%]
25		**Manifacturing**	**160 d**		
26		Lift and Turn Cylinder	120 d	9	supplier[1]
27		Locking Devices	160 d	9	supplier[1]
28		Machinery Room (pumps, tanks, control cabin ...)	160 d	9	supplier[1]
29		Steel Material	120 d	9	supplier[1]
30		**Transportation**	**45 d**		
31		Lift and Turn Cylinder	25 d	26	Logistics Service Provider[1]
32		Locking Devices	5 d	27	Logistics Service Provider[1]
33		Machinery Room	5 d	28	Logistics Service Provider[1]
34		Steel Material	5 d	29	Logistics Service Provider[1]
35		**SWING BRIDGE PRE-ASSEMBLY ON-SITE**	**120 d**		
36		Lift and Turn Cylinder	60 d	31	Team of Turkish Workers (5 Workers each)[400%]
37		Locking Devices	92 d	32	Team of Turkish Workers (5 Workers each)[400%]
38		Machinery Room (pumps, tanks, control cabin ...)	60 d	33,36	Team of Turkish Workers (5 Workers each)[400%]
39		**OFF-SHORE SWING BRIDGE INSTALLATION**	**138 d**		
40		Lift and Turn Cylinder	25 d	47,38	Team of Turkish Workers (5 Workers each)[400%]
41		Swing Bridge deck installation	88 d	40	Team of Turkish Workers (5 Workers each)[400%]
42		Locking devices	50 d	40	Team of Turkish Workers (5 Workers each)[400%]
43		Machinery Room (pumps, tanks, control cabin ...)	25 d	41	Team of Turkish Workers (5 Workers each)[400%]
44		**Final Commissioning & Testing: Swing Bridge**	**32 d**	**17**	
45		Final Commissioning & Testing: Swing Bridge	32 d	43,42	Team of Turkish Workers (5 Workers each)[800%],Turkish Mechanical Engineer[4(
46		M2 - Owner's Taking Over	0 d	45	
47		**Off-Shore Piles Design and Construction**	**277 d**		
48		Off-Shore Piles Design	90 d	4	owner
49		SWING BRIDGE: OFF-SHORE PILES	187 d	48	owner
50		O1 - Swing Bridge Off-Shore Piles Completed	0 d	49	

Now the total duration of the project should be 699 days and the budget should be 2,446,560.00€

The final project will look like the figure below,



	Task Name	Duration	Start	Finish	Work	Cost	Successor
1	Swing Bridge Project	699 days	Mon 8/26/19	Thu 4/28/22	25,202.67 hrs	€2,446,560.00	
2	M1 - Effective Date	0 days	Mon 8/26/19	Mon 8/26/19	0 hrs	€0.00	
3	C1 - Start of Activities	0 days	Mon 10/7/19	Mon 10/7/19	0 hrs	€0.00	5SS
4	Design	222 days	Mon 10/7/19	Tue 8/11/20	7,992 hrs	€355,200.00	48
9	Purchase of every engineering part	161 days	Fri 1/3/20	Fri 8/14/20	360 hrs	€29,280.00	26,27,28,29
10	Cylinder and Locking Devices	15.5 days	Fri 1/3/20	Fri 1/24/20	120 hrs	€9,760.00	
15	Machinery Room	15.5 days	Fri 5/1/20	Fri 5/22/20	120 hrs	€9,760.00	
20	Steel Material	15.5 days	Fri 7/24/20	Fri 8/14/20	120 hrs	€9,760.00	
25	Manifacturing	160 days	Mon 8/17/20	Fri 3/26/21	0 hrs	€0.00	
30	Transportation	45 days	Mon 2/1/21	Fri 4/2/21	0 hrs	€0.00	
35	SWING BRIDGE PRE-ASSEMBLY ON-SITE	120 days	Mon 3/8/21	Fri 8/20/21	6,784 hrs	€1,017,600.00	
39	OFF-SHORE SWING BRIDGE INSTALLATION	138 days	Fri 9/3/21	Tue 3/15/22	6,016 hrs	€902,400.00	
44	Final Commissioning & Testing: Swing Bridg	32 days	Wed 3/16/22	Thu 4/28/22	1,834.67 hrs	€142,080.00	
47	Off-Shore Piles Design and Construction	277 days	Wed 8/12/20	Thu 9/2/21	2,216 hrs	€0.00	40

Crashing Project

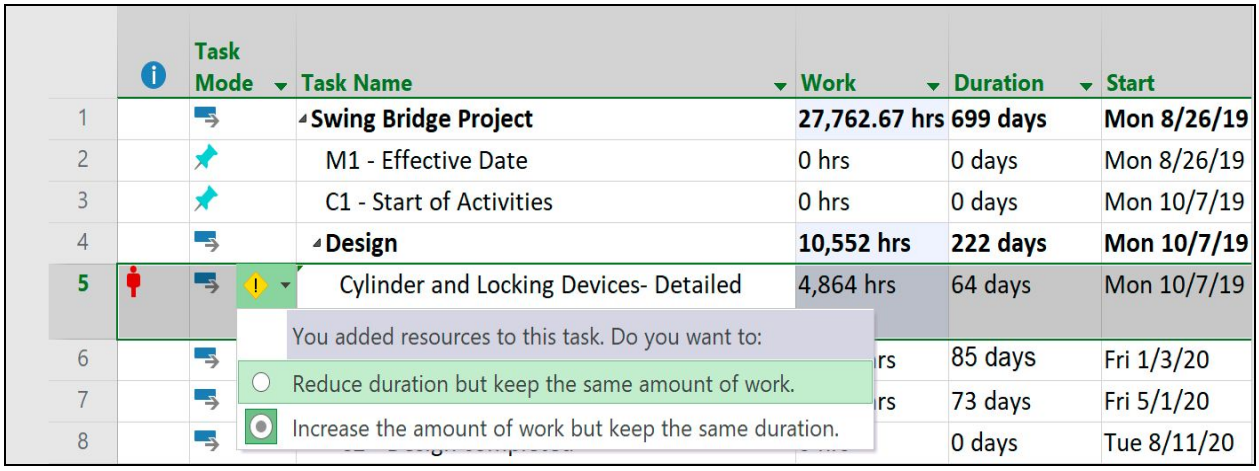
Notes on Crashing Project

we may need to crash the project based on our need, i.e. we can look at the SI or CI and can observe whether we need to add more resources, if we want to keep the original duration aligned with our Planned duration, we can allocate more resources, this in turn will increase the cost, contrary we can keep the same resources and it will increase the duration of the project. In most scenarios, we will choose the most profitable option

Senario

To understand the process, we will crash the task Design by adding more resources to it, this will increase the cost and will decrease the overall duration of this activity. The red warning will appear on the side indicating that the resource is over-utilized, we have different ways to fix that, and we can use a task inspector to fix this issue.

By adding a team of Italian mechanical engineers, we have reduced the duration from 699 to 690 days but the cost has increased to €2,595,505.45



	Task Mode	Task Name	Work	Duration	Start
1		Swing Bridge Project	27,762.67 hrs	699 days	Mon 8/26/19
2		M1 - Effective Date	0 hrs	0 days	Mon 8/26/19
3		C1 - Start of Activities	0 hrs	0 days	Mon 10/7/19
4		Design	10,552 hrs	222 days	Mon 10/7/19
5		Cylinder and Locking Devices- Detailed	4,864 hrs	64 days	Mon 10/7/19
6			rs	85 days	Fri 1/3/20
7			rs	73 days	Fri 5/1/20
8				0 days	Tue 8/11/20