

## CHAPTER 2

# PROJECT MANAGEMENT

InFocus

WPL\_J401

While this session cannot replace more formal project management theory you do need to be introduced to some aspects of the theoretical side of project management, especially as it applies to Microsoft Project.

Project management is the process of planning, organising and managing tasks and resources to accomplish a defined objective, usually within the constraints of time, resources and cost.

Each project is unique, and although two projects may appear the same, it is highly unlikely that they will be managed the same way.

A **project** is a sequence of tasks that leads to a specific objective or accomplishment. A project is different from everyday routine events in that it usually originates when something **non-standard** must be achieved. For example, moving office, building a factory, implementing a new computer system, are all examples of non-routine events that could be defined as projects.

A project usually is made up of one or more non-routine **tasks** that lead to a specific objective, has a start and finish date or time and is accomplished with a limited or measurable set of **resources**.

**In this session you will:**

- gain an understanding of the two key elements of a project
- gain an understanding of the importance of planning a project
- gain an understanding of project management tools
- gain an understanding of the strengths and weaknesses of **Microsoft Project**.

# TASKS AND RESOURCES

A project comprises a sequence of **tasks** that culminate in the completion of the project. These tasks may be dependent, in that some can only be started when their predecessors have been

finished. Other tasks may be independent in that they can be completed simultaneously or without needing to wait until another task has been completed.

## Tasks

The following diagram shows **tasks** listed in a typical project in Microsoft Project.

Task	Task Name	Duration	Start	Finish	Predecessors
1	Planning	43 days	Mon 11/05/15	Wed 8/07/15	
2	Create architectural pl	3 wks	Mon 11/05/15	Fri 29/05/15	
3	Submit plans for appr	1 mon	Mon 1/06/15	Fri 26/06/15	2
4	Order materials	8 days	Mon 29/06/15	Wed 8/07/15	3
5	Planning Completed	0 days	Wed 8/07/15	Wed 8/07/15	4,2,3
6	Site Works	27 days	Thu 9/07/15	Fri 14/08/15	
7	Erect fencing	3 days	Thu 9/07/15	Mon 13/07/15	5
8	Erect site buildings	4 days	Tue 14/07/15	Fri 17/07/15	7
9	Clear and level site	3 wks	Mon 20/07/15	Fri 7/08/15	8
10	Prepare drainage infra	1 wk	Mon 10/08/15	Fri 14/08/15	9
11	Prepare cabling infras	1 wk	Mon 10/08/15	Fri 14/08/15	9
12	Site Works Completed	0 days	Fri 14/08/15	Fri 14/08/15	7,8,9,10,11
13	Building Construction	132 days	Mon 17/08/15	Wed 2/03/16	
14	Pour foundations	4 days	Mon 17/08/15	Thu 20/08/15	12
15	Erect steelwork	3 mons	Tue 25/08/15	Mon 16/11/15	14FS+100 eh
16	Erect wall	2 mons	Tue 17/11/15	Tue 26/01/16	15

When building a house, for example, you may need to seek council approval, prepare the site works, lay the slab, erect the walls, and so on. These are the tasks required to construct the house. The time taken to complete each task is called its **duration**. The project is completed when all of the tasks have been accomplished.

## Resources

Tasks can only be accomplished by providing **resources**. Resources can take the form of people, money, equipment, facilities or supplies. The following diagram shows **resources** listed in a typical project in Microsoft Project.

Resource Name	Type	Material	Initials	Group	Max.	Std. Rate	Ovt. Rate
1 Architect	Work		Arc	Consultant	100%	\$160.00/hr	\$160.00/hr
2 Draftsperson	Work		Dft	Staff	100%	\$48,000.00/yr	\$7,000.00/yr
3 Building Clerk	Work		BC	Staff	100%	\$42,000.00/yr	\$63,000.00/yr
4 Supervisor	Work		Sup	Staff	100%	\$45,000.00/yr	\$67,500.00/yr
5 Rigger	Work		Rig	Wages	500%	\$18.95/hr	\$28.43/hr
6 Boilermaker	Work		BM	Wages	600%	\$20.66/hr	\$30.99/hr
7 Welder	Work		Weld	Wages	500%	\$20.25/hr	\$30.38/hr
8 Carpenter	Work		Car	Wages	600%	\$21.50/hr	\$32.25/hr
9 Painter	Work		Ptr	Wages	500%	\$12.90/hr	\$19.35/hr
10 Labourer	Work		Lab	Wages	1,000%	\$15.50/hr	\$23.25/hr
11 Driver	Work		Drv	Wages	200%	\$17.56/hr	\$26.34/hr
12 No Barrier Fencing	Work		NBF	Contractor	100%	\$0.00/hr	\$0.00/hr
13 Rock Solid Concrete	Work		RSC	Contractor	100%	\$0.00/hr	\$0.00/hr
14 Listen Ear Audio	Work		LEA	Contractor	100%	\$116.80/hr	\$116.80/hr
15 In Focus Video	Work		IFV	Contractor	100%	\$178.00/hr	\$178.00/hr
16 Pure Grass Turf	Work		PGT	Contractor	100%	\$195.00/hr	\$195.00/hr

The duration of tasks may be affected by the number or resources that can be directed towards it. For example, it may take one painter three days to paint your house. Three painters however, may take only one day. This type of task is known as **resource driven**, because the number of resources influences the duration of the task.

Other tasks are fixed in duration. For example, when building a house on a concrete slab you may need to wait five days for the concrete to cure before erecting the frame. No matter how many resources you provide, you will still need to wait the five days.

Your project therefore, is made up of **tasks** and **resources**.

# THE IMPORTANCE OF PLANNING

Since a project is non-routine it can only be managed effectively with a **plan**. Planning is the most important step in project management as it formalises what you will do, how it will be done,

and how long it will take. It is used to predict the outcome. When the plan has been produced you will have a **schedule** with which to work. It should detail tasks, timeframes and resources.

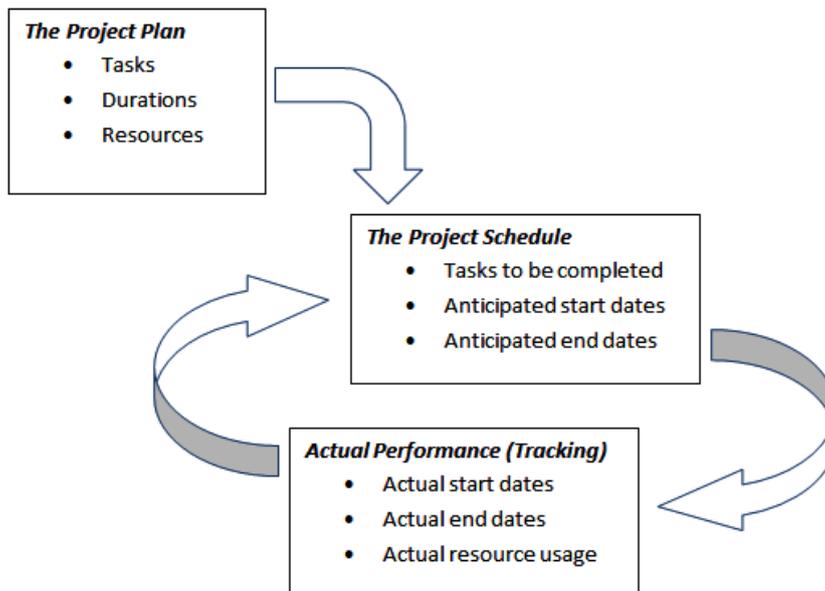
## The Project Plan

Planning involves specifying:

- what you will do – the **tasks** needed to complete the project
- when you will do it – the **duration** required for the tasks
- how you will do it – the **resources** required to undertake the tasks.

The plan can be used as a **baseline** to measure actual performance. When the actual performance is compared to the baseline the variance can be examined to determine the extent and nature of corrective action required to ensure that targets are met. As a consequence, the schedule will change to reflect changing circumstances.

While the plan remains fixed as a yardstick, the schedule is constantly updated using actual data. Your project needs to be rescheduled regularly to reflect actual circumstances.



## Steps In Project Management

The steps of project management therefore involve the:

1. formulation of a plan
2. creation of a schedule based on the plan
3. monitoring of actual circumstance and comparison against the plan
4. revision of the schedule based on actual circumstance.

# PROJECT MANAGEMENT TOOLS

Two specific tools have been developed over the years to assist you in project management. These are the **Gantt** chart and the **Network** chart. Most project management software

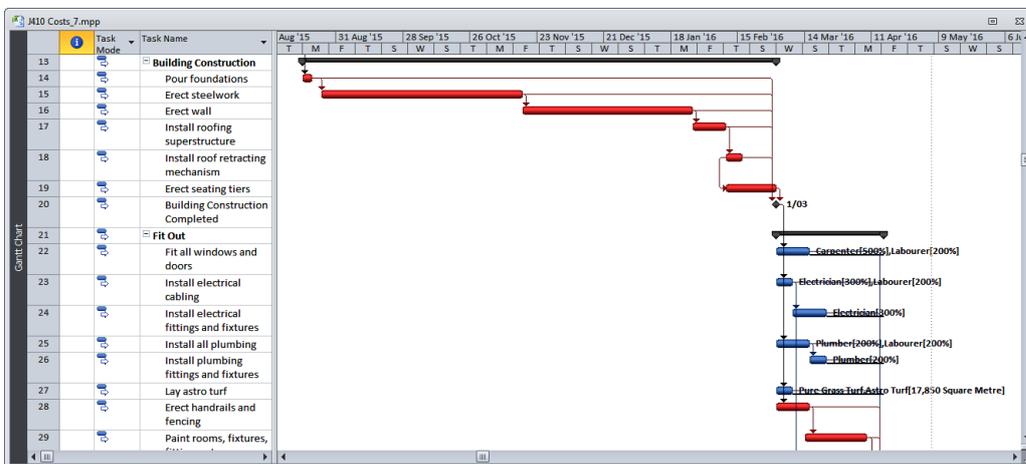
packages use a technique known as **critical path method** (CPM) to help you track your project. The critical path is displayed in Microsoft Project using a **Gantt** chart.

## Gantt Chart and Critical Path

**CPM** was originally developed by DuPont and Remington Rand in the 1950s to improve scheduling of projects. **CPM** requires you to define all of the tasks in a project that are critical to the project being completed on time. **CPM** then passes through these tasks to calculate scheduled start and finish dates for each task, and therefore also for the project as a whole.

In **CPM** two calculations are made to the schedule. **CPM** first works forward through each task calculating respective start and end dates. **CPM** then passes backwards through the tasks from the latest finish dates. This allows it to calculate earliest and latest start and finish times. The time between these dates is **slack** which is the amount of time a task can be delayed without delaying the overall project. The **critical path** is that sequence of tasks which represents the longest total time required to complete the project.

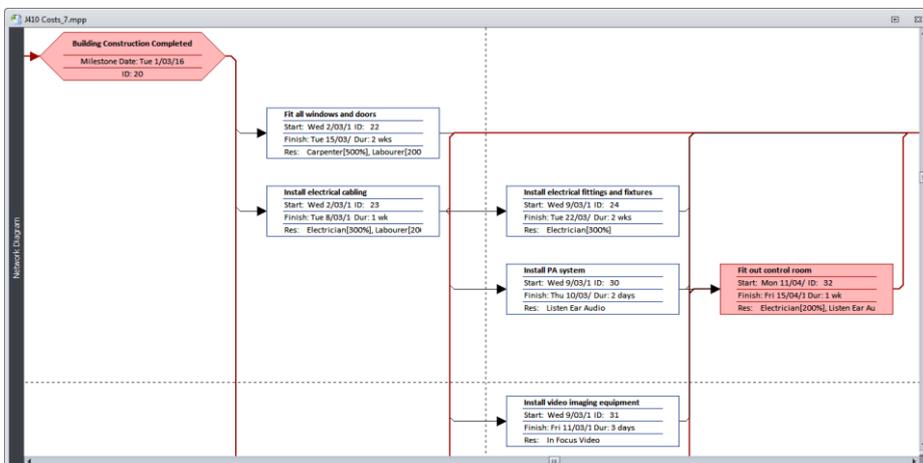
The following diagram shows a **Gantt Chart** for **CPM** in Microsoft Project.



The Gantt chart uses horizontal bars to represent task duration across a period referred to as the *timescale*. Any tasks that are on the critical path appear with red horizontal bars, whilst those tasks that have slack time appear in blue.

## Network Diagram

A **Network Diagram** chart is used in Microsoft Project to display the task relationships graphically. Each task is shown as a part of a network of nodes. Their relationships are drawn using connecting lines and arrows. The following diagram shows an example of a **Network Chart** in Microsoft Project.



# USING A COMPUTER FOR PROJECT MANAGEMENT

The most time consuming aspect of project management is calculating the schedule. The schedule is based on the duration and dependencies of the tasks and the amount of

resources at hand. If the second task in the project slips behind, subsequent tasks need to be rescheduled. This tedious job of calculating the critical path is best done by the computer.

## Computerised Project Information

The advantages of using a computer:

- the schedule is created and revised quickly and accurately allowing you to make faster decisions to get the project back on track
- the total resource costs can be summed and calculated instantly
- printed output can be created uniformly, quickly and regularly
- project information can be presented on screen or in reports in a variety of ways
- you have access to what-if testing to try various scenarios to overcome potential problems.

To use a computer system you will need to input:

- the tasks required to complete the project
- the task sequences and their interdependence
- the resources required
- special information such as working hours and fixed costs.

As your project begins you will need to enter:

- actual start and completion dates
- actual costs.

As the actual data is entered a computer can be used to:

- provide information showing variance to plan
- check and reschedule resources if necessary
- check budget expenditure
- look at alternatives to decide how to keep the schedule on track.

## The Pros and Cons of Microsoft Project

Microsoft Project is extremely useful for project management for many reasons. It enables you to plan your project objectives, enter individual tasks and milestones, assign resources and track your progress, to name a few. However, there are several aspects of Microsoft Project that you need to consider carefully.

### The Pros

Microsoft Project is a powerful tool for project management because you can:

- ✓ easily create plans and schedules and compare the two
- ✓ track progress and record actual information
- ✓ easily allocate resources
- ✓ work with different calendar timeframes for resources (this is useful for projects where labour works in various timeframes - e.g. shiftwork)
- ✓ link data between other applications
- ✓ easily change presentations and views of your data
- ✓ filter out unwanted data and create custom views
- ✓ sort the data in various ways
- ✓ automate tedious and/or repetitive steps with macros.

### The Cons

You need to consider carefully the following characteristics when using Microsoft Project:

- ✗ Microsoft Project does not easily lend itself to working with routine operations – it is a project tool (remember a project is made up of non-routine tasks, and has a defined start and end date)
- ✗ Microsoft Project is more complex in operation than a spreadsheet or word processing package and therefore requires more initial learning
- ✗ The schedule needs to be monitored constantly as subtle changes to a task or resource can have a rippling effect through your scheduled dates.

