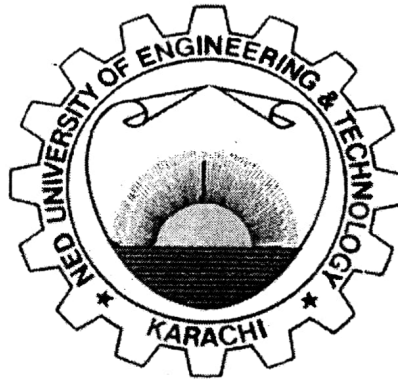


Practical Workbook

CH-407: Industrial Organization & Management

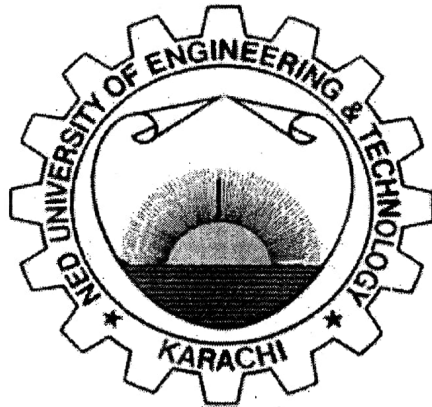


Name _____
Roll No _____
Batch _____

Department of Metallurgical Engineering
NED University of Engineering and Technology

Practical Workbook

CH-407: Industrial Organization & Management



This is to certify that this practical book contains 28 pages.

Prepared by: _____
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Approved by: _____
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Chairman MYD

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NED University of Engineering and Technology

CERTIFICATE

It is certified that Mr. / Ms _____ Student of
class _____ Batch _____ Bearing Roll No.
_____ has completed his/her course work in the
subject of _____ as prescribed and approved by
Department of Metallurgical Engineering.

His/her performance is reflected by index/contents of his/her practical workbook.

Overall performance of the student is

Excellent

Very Good

Good

Satisfactory

Not Satisfactory

Course Teacher

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Practical No. 1

Object: Introduction & Overview of MS Project

Microsoft Project is really a computer database that uses two main **tables** of data to keep track of your project. **Project** uses one table to store information about the **tasks** of your project and the other for **resource** information. By using the many views available in **Project**, you can display your project data from these tables in many ways.

Tasks

This table is comprised of over 240 columns (or fields) which contain all sorts of information about the tasks such as scheduled start, scheduled finish, name, duration, cost, and the like. Some of these fields require you to enter data, while others are calculated and filled by Microsoft Project for you.

ID	Name	Duration	Start	Finish	Fixed	Cost	etc...
8	Erect fencing	2 days	1/2/2013	3/2/2013	No	\$500	

Resources

This table contains over 200 fields (or columns).

ID	Name	Initials	Group	Max Units	Standard Rate	Overtime Rate	etc...
3	Builder	FG	Contractor	4	\$55.00/h	\$75.00/h	

The two tables are joined together by assigning *resources* to *tasks*.

Views

To help you see, or *view*, your data, *Microsoft Project* adopts techniques used in spread sheets, databases, and graphics packages.

For example, you can see your task or resource table in *sheets* on the screen. Sheets are like spread sheet programs where data is presented in rows and columns. In fact, many of the operations used in spreadsheets, such as widening columns, deleting data, selecting cells, and the like, are also found in *Microsoft Project*.

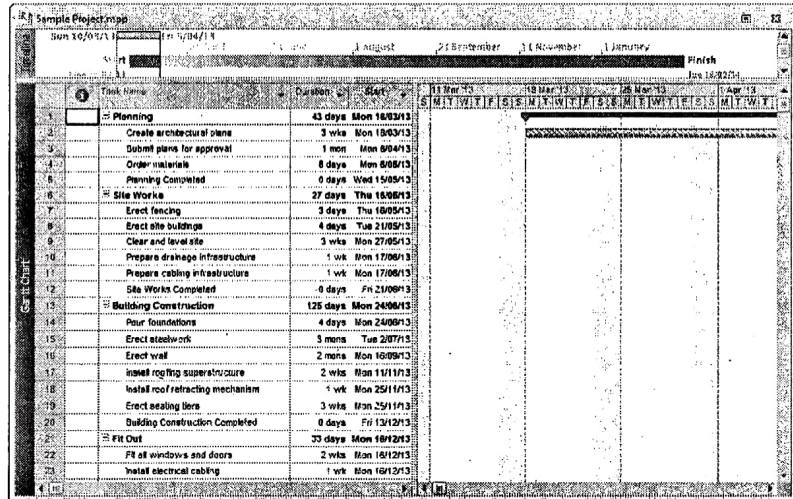
You can also see, or view, your data in *forms*. These forms are like a form view that you receive for data entry screens in database programs. Forms allow you to add or edit data and you can usually cycle through the cards as you would in a normal database.

If you wish to see your data graphically you can view it as a *Gantt Chart* or *Network Diagram*. In addition, you have a variety of other graphs for displaying resources.

ID	Resource Name	Work	R/D	Leveling Delay	Delay	Scheduled Start	Scheduled Finish
4	Supervisor	225h		0d	0d	Wed 21/08/13	Tue 12/11/13
5	Rigger	2,700h		0d	0d	Wed 21/08/13	Tue 12/11/13
6	Boilermaker	2,700h		0d	0d	Wed 21/08/13	Tue 12/11/13
7	Welder	2,250h		0d	0d	Wed 21/08/13	Tue 12/11/13
10	Labourer	2,700h		0d	0d	Wed 21/08/13	Tue 12/11/13
11	Driver	900h		0d	0d	Wed 21/08/13	Tue 12/11/13
18	High Job Crane	450h		0d	0d	Wed 21/08/13	Tue 12/11/13
21	Utility	450h		0d	0d	Wed 21/08/13	Tue 12/11/13

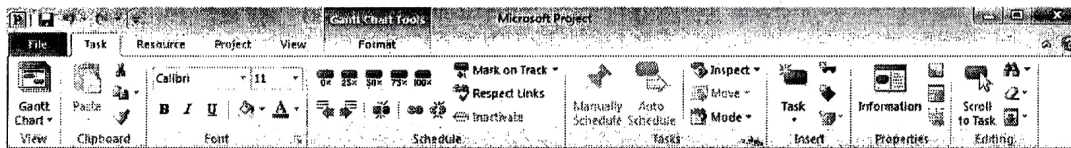
The Work Area

The *work area* occupies the largest part of the screen and contains the data associated with your project. The key point to remember is that a project is made up of *tasks* and *resources* and the work area allows you to view your task and resource data in a number of different ways. The work area may show your data in a *sheet* view, or maybe a *chart* view like a Gantt chart or maybe even both!



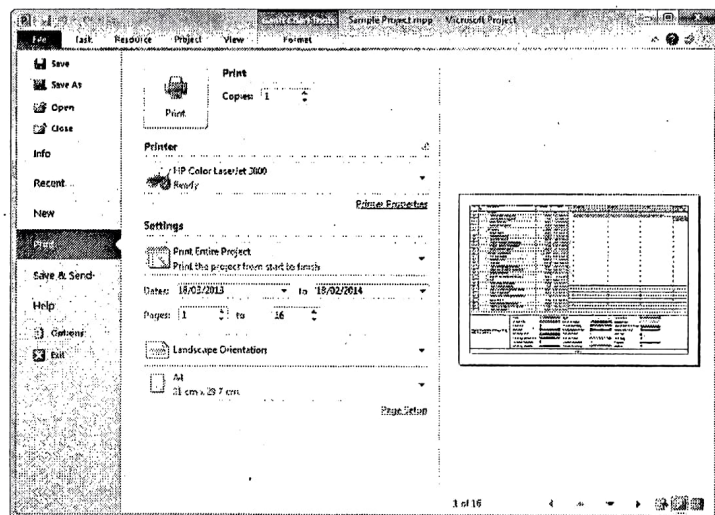
The Ribbon

When you need to do something with the data in the work area, such as format it, colour it, analyse it, move it, copy it, change the view of it and much more, you'll find all of the relevant commands on the *Ribbon*. The *Ribbon* has commands organised thematically using a series of *tabs* across the top. Commands on each tab are further organised into *groups* of like-commands. It's not too hard to get the hang of where a command can be found. Remember, a project is simply a view of task and resource data – hey, have a look at the *Ribbon* and you'll find a *Tasks* and a *Resources* tab! So whatever you need to do with tasks can be found on the *Tasks* tab, and anything you want to do with resources can be found on the *Resources* tab.

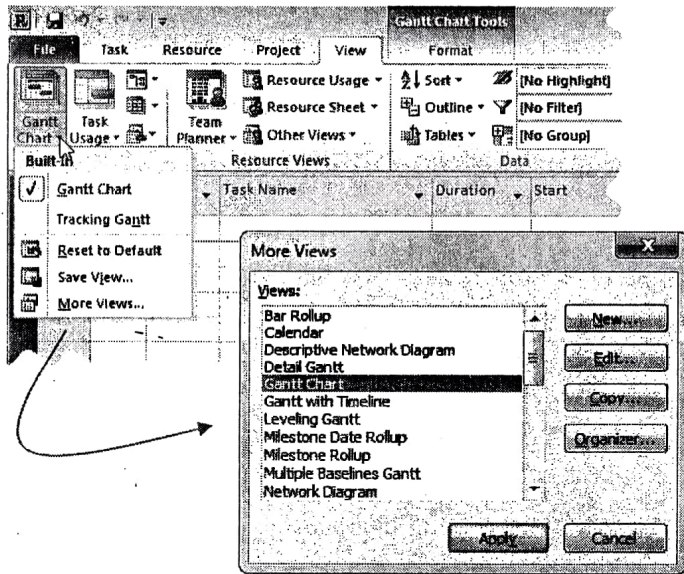


Backstage

When you want to do something with the data in your work area, such as save it so that you can access it again later, print it, share it with a colleague, send it to your boss, protect it from prying eyes, or whatever, you will need to access the *Microsoft Office Backstage* area of Microsoft Project. The *Backstage* is accessed using the *File* tab on the *Ribbon*. Rather than offering you commands on a *Ribbon*, *Backstage* occupies the entire screen and has a series of options down the left side. Here the *Print* option is active, and that is why you can see a preview of the work area and a series of print-related options on the right side of the *Backstage*.



Views grouping here!



When you click on the arrow for one of the *View* commands you'll receive a menu of further views available to you. All of the menus feature the *More Views* command which displays the *More Views* dialog box which lists all of the standard views available to you in Microsoft Project.

Built-In Project Views

Microsoft Project contains 27 different built-in views for you. Seven of these views are available from the **Task Views** and **Resource Views** groupings on the **View** tab, while the full 27 are available from the **More Views** dialog box. Here's a list of the 27 views – the ones marked with a (T) or (R) are accessible directly from the **View** tab of the **Ribbon**.

Bar Rollup	Multiple Baselines Gantt	Task Details Form
Calendar (T)	Network Diagram (T)	Task Entry
Descriptive Network Diagram	Relationship Diagram	Task Form
Detail Gantt	Resource Allocation	Task Name Form
Gantt Chart (T)	Resource Form	Task Sheet
Gantt with Timeline	Resource Graph	Task Usage (T)
Leveling Gantt	Resource Name Form	Team Planner (R)
Milestone Date Rollup	Resource Sheet (R)	Timeline
Milestone Rollup	Resource Usage (R)	Tracking Gantt

WORKING WITH VIEWS

A *view* is the way we look at the project and the data it contains. In order to work with your project successfully, you will need to learn how to operate and manipulate the many different views. The main way to change the view of your project is through the commands on the *View* tab or through the *Quick Views* buttons at the bottom right of the screen.

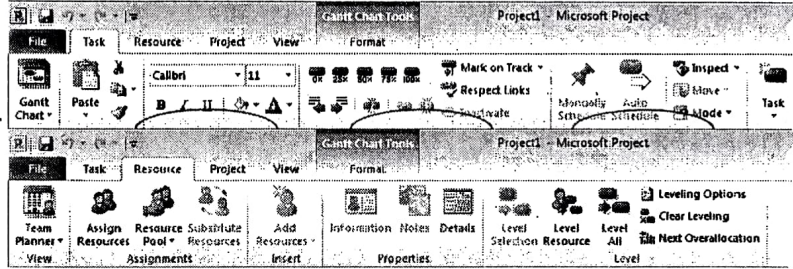
USING THE RIBBON

The **Ribbon** is the command centre for Microsoft Project. It provides a series of **commands** organized into **groups** and placed on relevant **tabs**. Tabs are activated by clicking on their name to display the command groups. **Commands** are activated by clicking on a button, tool or gallery option. Everything you could possibly want to do in Project will be found somewhere on this **Ribbon**

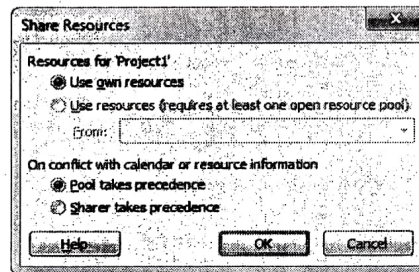
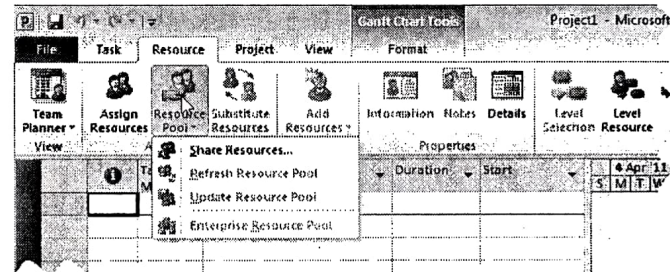
Try This Yourself:

Before starting this exercise ensure that Project has started...

- 1 Examine the various groups on the **Task** tab
The group names appear at the bottom of the Ribbon...
- 2 Click on the **Resource** tab
The commands on this tab are used to work with resources. Many will not be available because there are no resources in the blank project on the screen. You can never be too sure what you'll get when you click on a command...
- 3 Click on **Resource Pool** in the **Assignments** group to display a menu
- 4 Click on **Share Resources** to display the **Share Resources** dialog box
- 5 Click on **[Cancel]** to pop the box away
- 6 Click on the other tabs and spend some time examining the groups and commands they contain
- 7 Click on the **Task** tab



2



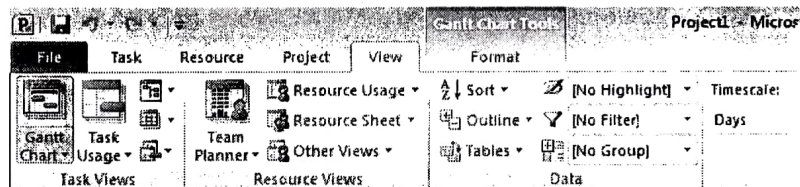
THE PROJECT WORK AREA

The main part of the Microsoft Project screen is made up of the **work area** where your project data is displayed. Remember, Project is really just two tables of data – **tasks** and **resources**. The work area shows you different aspects and sometimes combined **views** of this data. For example, you can view your tasks and the resources assigned to them.

The View Tab

The **View** tab on the **Ribbon** provides you with access to the views for your project's data.

Notice, there is a **Task Views** grouping and a **Resource**



Task Tables

There are 17 pre-defined tables for *tasks* as follows:

Baseline	Earned Value	Export	Summary
Constraint Dates	Earned Value Cost Indicators	Hyperlink	Tracking
Cost	Earned Value Schedule Indicators	Rollup Table	Usage
Delay	Entry	Schedule	Variance Work

Resource Tables

There are 10 pre-defined tables for *resources* as follows:

Cost	Entry – Material Resources	Hyperlink	Usage
Earned Value	Entry – Work Resources	Summary	Work
Entry	Export		

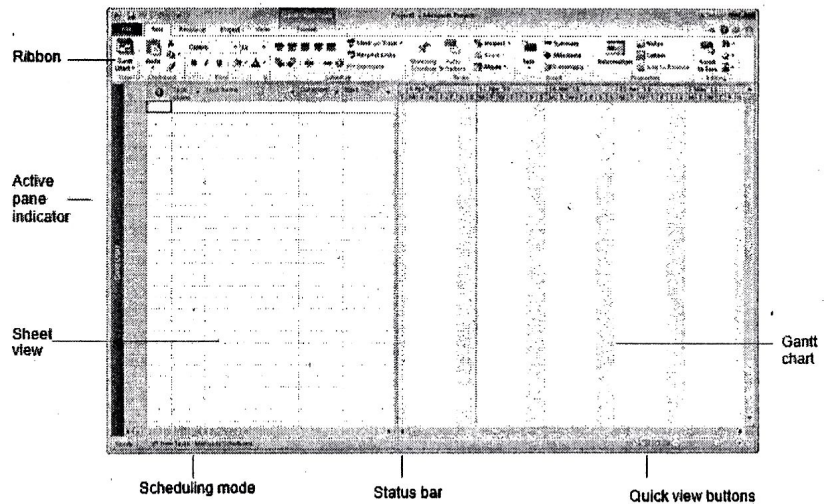
Exercise:

Consider a company and develop project process in detail with predecessors and put it in Ms-Project table.

	Task Name	Duration	Start	Finish	Predecessors	Resource Names
1	Planning	43 days	Mon 6/05/13	Wed 3/07/13		
2	Create architectural plans	3 wks	Mon 6/05/13	Fri 24/05/13		Architect,Draftsperson[200%],Building Clerk[25%]
3	Submit plans for approval	1 mon	Mon 27/05/13	Fri 21/06/13	2	Architect[67%]
4	Order materials	8 days	Mon 24/06/13	Wed 3/07/13	3	Draftsperson,Building Clerk
5	Planning Completed	0 days	Wed 3/07/13	Wed 3/07/13	2,3,4	
6	Site Works	28 days	Thu 4/07/13	Mon 12/08/13		
7	Erect fencing	3 days	Thu 4/07/13	Tue 9/07/13	5	No Barrier Fencing
8	Erect site buildings	4 days	Wed 10/07/13	Mon 15/07/13	7	Supervisor,Carpenter[400%],Labourer[800%]
9	Clear and level site	3 wks	Tue 16/07/13	Mon 5/08/13	8	Supervisor,Driver[200%],Grader[200%]

THE MICROSOFT PROJECT SCREEN

The Microsoft Project screen will vary depending upon the *view*, *table*, and *filter* that is currently active. However, you will need to become familiar with the basic components of the screen as shown below. Understanding the layout of the screen, and its components and terminology will help you in using Microsoft Project.



Ribbon

The *Ribbon* displays the commands required to use Microsoft Project. It is made up of tabs (*File*, *Task*, *Resource*, etc) which each contain *groups* of commands organised into logical order.

Active pane indicator

The *active pane indicator* is a vertical bar with a dark colouring that runs down the left side of a screen (or a *view*). The one above contains the words *Gantt Chart* so that you know you have a *Gantt Chart* as the *active view*. You can actually have two different views open by *splitting* the screen – only one view, however, can be active because things like the commands on the *Ribbon* are controlled by what you are viewing. The indicator shows which view is currently *active*.

Sheet view

Your project's tasks and resources can be seen as a *table*, much like a spreadsheet. In Microsoft Project this is referred to as a *sheet view*.

Scheduling mode

Your project can be scheduled manually (the default) or automatically. This (very important) indicator tells you which mode is currently applicable.

Status bar

Watch this space – it tells you what Microsoft Project is currently up to.

Quick view buttons

There are many ways to change the view of the screen. These four buttons provide quick access to the four most common views saving you the hassle of locating the commands to do this on the *Ribbon*.

Gantt chart

The *Gantt Chart* is the world's most favourite view of a project. It shows your project's tasks as a series of timelines. It is the default view of Microsoft Project when it is first started and, in reality, will most likely be the one you use most.

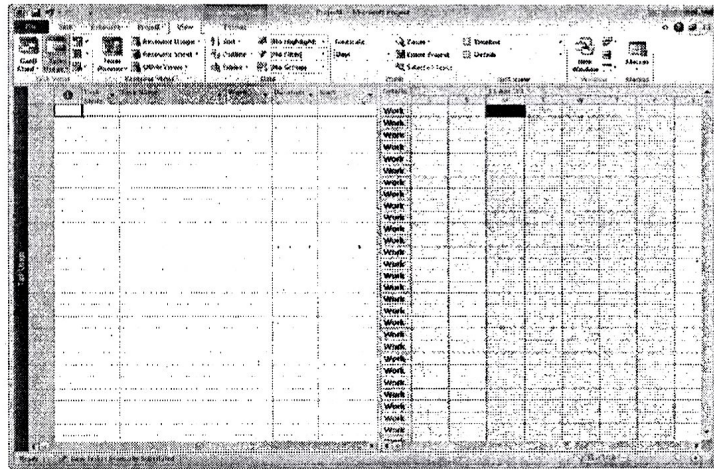
HOW MICROSOFT PROJECT WORKS

For a novice user the *Microsoft Project* screen can seem intimidating. However, you'll soon see that it is made up of only three key areas. The data you type is placed in the *work area*. The data here can be manipulated and changed using commands on the *Ribbon*. The data is saved in a project file which is controlled through commands on the *Backstage*.

Try This Yourself:

Before starting this exercise ensure that Microsoft Project has started...

- 1 Click on the **View** tab and spend a few moments studying the options in the **Task Views** and **Resource Views** groupings
- 2 Click on **Task Usage** in **Task Views** to see the work allocations on the screen
- 3 Click on **Calendar** in **Task Views** to see the screen laid out as a calendar
- 4 Click on **Other Views** in **Task Views** to display a menu and click on **TaskForm**
- 5 Click on **Resource Sheet** in **Resource Views** to see a spreadsheet-like view of the resources
- 6 Click on **Gantt Chart** in **Task Views** to return to the **Gantt Chart** view



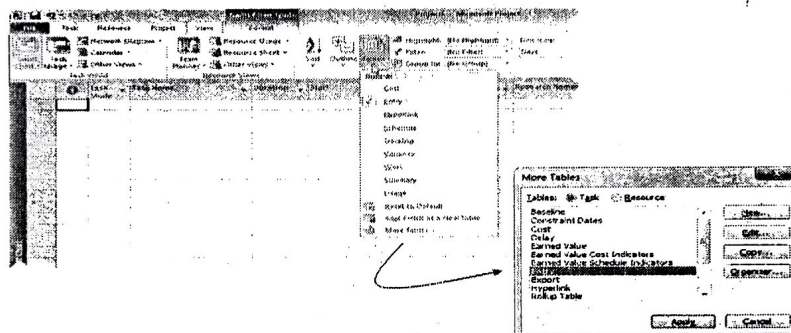
There is an obvious lack of data presented on this screen! Don't worry too much at this stage about what the view is all about. All we are doing at this stage is examining the View commands to see how they work and what they offer.

UNDERSTANDING SHEET VIEWS

Sheet views of data are common to database and spreadsheet applications. Microsoft Project also uses **sheet views** where data is presented in rows and columns. In Project there are literally dozens of columns (called **fields**) for tasks and similarly for resources. To make it easier to work with these columns, oops fields, they have been organized into **tables**.

About Tables

Since there are literally dozens of fields for both Tasks and Resources, Microsoft Project organizes these in specialized groupings into **tables**. For example, fields for tasks associated with costs are organized into a **Cost** table, fields that are commonly used for data entry are organized into an **Entry** table, and so on.



Practical No. 3

Object: Resource selection, allocation & optimization

Once a project schedule is created, it will usually have to be altered to avoid over allocating a particular resource (for instance, a subcontractor), which will cause the schedule to be held up. Assignments are the last step of data to enter into the project schedule and they reflect who works on a task. Knowing how to allocate resources will help keep you in control of your project from start to finish. By assigning resources to tasks, you can make sure that you have enough resources to accomplish the tasks in your project. You assign people and equipment in the same way. You assign resources to tasks to clarify responsibility for getting those tasks done. Assigning resources also helps you determine how long it will take for a task to get done, and, if you track costs, how much the task will cost.

You should assign resources to tasks when your goal is to:

- Track the amount of work done by the people and equipment assigned to the tasks.
- Ensure high accountability and understanding of the project — responsibilities are clear, which decreases the risk of tasks being overlooked.
- Have greater flexibility in planning when and how long tasks take to complete.
- Monitor resources with too little or too much work assigned.
- Keep track of resource costs.

Step by step on how to assign resources to tasks:

1. Assign resource using Resource Names column in the Gantt Chart view.

If Resource Name column is not present in your table, right click on grid columns and click on insert column then select "Resource Names".

1. You can import Team Members using the Assign Team Members dialog (menu Team - Assign - Team Member) or by adding them from Gantt Chart.

Task Name	Resource Names	Duration
task 1	<input checked="" type="checkbox"/>	1 day?
task 2	<input type="checkbox"/> new resource 1 <input type="checkbox"/> new resource 2 <input type="checkbox"/> new resource 3 <input type="checkbox"/> New User <input type="checkbox"/> User Name <input type="button" value="Add Team Member"/>	

2. When you open the Resource Names drop-down menu, you will get a list of all resources in your project and the Team Members (marked with an icon). Note that all the Team Members are visible in this list (imported or not). Selecting any Team Member in this list will import it to the current project (only once). If you want to add a new Team Member, click Add Team Member button and the following dialog will be opened.

Add Individual Team Member

The person you are adding needs to have a valid e-mail address.

Email Address*
john@email.com

Name*
John

Available Editor Subscriptions: 0

Select Role
Read Only

Editor can perform edits to your projects and it needs a valid license.
Read Only can only read, and does not need a license.

After clicking on the Add Team Member button, John will be added as a Team Member

2. Assign Resource using Task Information dialog

Open Task Information dialog and in Resource tab write or select the resource/resources you want to add. Set the resource units or the number of items.

Practical No. 4

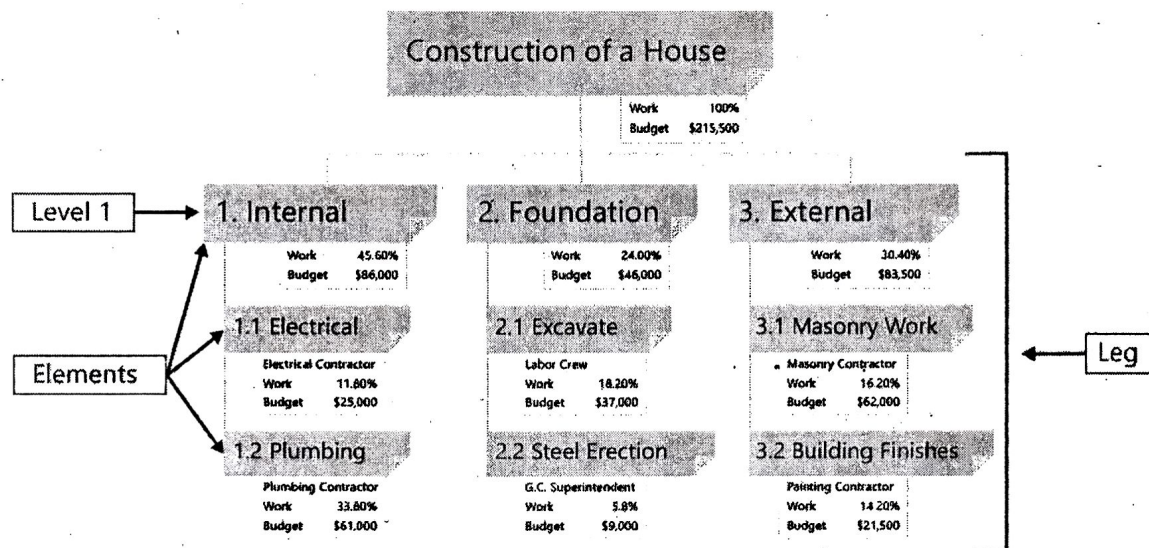
Object: Understanding of Work Breakdown structure and how we develop it in MS Project?

A **Work Breakdown Structure (WBS)** is a deliverable-oriented hierarchical decomposition of the work to be executed by the project team to accomplish the project objectives and create the required deliverables. A WBS is the cornerstone of effective project planning, execution, controlling, monitoring, and reporting. All the work contained within the WBS is to be identified, estimated, scheduled, and budgeted.

Work Breakdown Structure Diagram

The Work Breakdown Structure (WBS) is developed to establish a common understanding of project scope. It is a hierarchical description of the work that must be done to complete the deliverables of a project. Each descending level in the WBS represents an increasingly detailed description of the project deliverables.

The first two levels of the WBS (the root node and Level 2) define a set of planned outcomes that collectively and exclusively represent 100% of the project scope. At each subsequent level, the children of a parent node collectively and exclusively represent 100% of the scope of their parent node. Here is a Work Breakdown Structure example:



Quality of a Work Breakdown Structures

A well-designed WBS describes planned outcomes instead of planned actions. Outcomes are the desired ends of the project, such as a product, result, or service, and can be predicted accurately. Actions, on the other hand, may be difficult to predict accurately. A well-designed WBS makes it easy to assign elements of the WBS to any project activity. A good WBS should exhibit the following characteristics:

- **Definable**—can be described and easily understood by project participants.
- **Manageable**—a meaningful unit of work where specific responsibility and authority can be assigned to a responsible individual.
- **Estimateable**—duration can be estimated in time required to complete, and cost can be estimated in resources required to complete.
- **Independent**—minimum interface with or dependence on other ongoing elements (i.e., assignable to a single control account, and clearly distinguishable from other work packages).
- **Integratable**—integrates with other project work elements and with higher level cost estimates and schedules to include the entire project.
- **Measurable**—can be used to measure progress; has start and completion dates and measurable interim milestones.
- **Adaptable**—sufficiently flexible so the addition/elimination of work scope can be readily accommodated in the WBS framework.

Resource Name	Type	Material Label	Initials	Group	Max Units	Std. Rate	Ovs. Rate	Cost/Use	Accrue At	Base Calendar	Code
1 G.C. General Management	Work		G		100%	\$60.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
2 G.C. Project Management	Work		G		100%	\$70.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
3 Steel Erection Contractor Management	Work		S		100%	\$60.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
4 Roofing Contractor Management	Work		R		100%	\$70.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
5 Elevator Contractor Management	Work		E		100%	\$60.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
6 Plumbing Contractor Management	Work		P		100%	\$60.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
7 Electric Contractor Management	Work		E		100%	\$70.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
8 HVAC Contractor Management	Work		H		100%	\$60.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
9 Electric Contractor	Work		E		100%	\$60.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
10 Plumbing Contractor	Work		P		100%	\$60.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
11 G.C. Survey Crew	Work		G		100%	\$50.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
12 Site Grading Contractor	Work		S		100%	\$60.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
13 G.C. Rough Carpenter Crew	Work		G		100%	\$50.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
14 G.C. Concrete Crew	Work		E		100%	\$50.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
15 G.C. Labor Crew	Work		G		100%	\$50.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
16 Elevator Contractor	Work		E		100%	\$60.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
17 G.C. Finish Carpenter Crew	Work		G		100%	\$50.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
18 HVAC Contractor	Work		H		100%	\$60.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
19 Drywall Contractor	Work		D		100%	\$60.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
20 Painting Contractor	Work		P		100%	\$70.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
21 Carpet Contractor	Work		C		100%	\$60.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
22 Landscape Contractor	Work		L		100%	\$60.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
23 Tile Contractor	Work		T		100%	\$60.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
24 G.C. Superintendent	Work		G		100%	\$60.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
25 G.C. Scheduler	Work		G		100%	\$60.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
26 G.C. Procurement	Work		G		100%	\$60.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
27 Steel Erection Contractor	Work		S		100%	\$60.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
28 Paving Contractor	Work		P		100%	\$60.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
29 G.C. Accounting	Work		G		100%	\$60.00/hr	\$0.00/hr	\$0.00	Prorated	Standard	
30 Concrete	Material	ton	C					\$30.00	Prorated		
31 Painting Material	Material	liter	P					\$15.00	Prorated		

Define resource type using **Type** column - select **Material** type.

Then, go to Gantt Chart view, locate in **Resource Names** column the desired material resource.

Note: If you have a single task with a lot of people assigned, making changes in the **Resource Names** column may not work.

For tasks where you need a lot of resources assigned, it's best to make your assignments, and make changes to those assignments, in the **Task Information** dialog box. On the **Resources** tab, you can assign a longer list of resources to the task.

Resource Name	Assignment Owner	Units	Cost
Electric Contractor Management		100%	\$140.00
Elevator Contractor Management		100%	\$120.00
G.C. General Management		100%	\$160.00
G.C. Project Management		100%	\$140.00
HVAC Contractor Management		100%	\$120.00
Plumbing Contractor Management		100%	\$120.00
Roofing Contractor Management		100%	\$140.00
Steel Erection Contractor Management		100%	\$120.00

With regard to resource assignment, there are two types of scheduling generally met in project management:

1. Fixed deadline and unlimited resources - it is the case when adhering to a strict deadline is mandatory, and the project manager must do whatever it takes to meet the deadline;
2. Limited resources - when the resources are limited but the deadline is flexible; in this situation the PM is not allowed to hire new persons; overallocation is allowed, corresponding to resources working more than 8 hours a day (extra-working hours), and this degenerates in a more flexible deadline.

Project Plan 365 implements the two scheduling policies above regarding resource assignment and, also, a third one.

In the first scenario described above, the PM estimates the maximum duration for each task such that the whole project will meet the deadline. Then, it assigns all the resources necessary to accomplish the activity in the given period. If you are in this situation while planning, then Project Plan 365 must use the "Fixed Duration" policy.

In the second scenario, instead estimating the duration of the task, you should estimate the total amount of work required to accomplish the task (that is the number of hours required by a single person to do the task). After setting the work field, you assign the resources you have and the duration of the task will be computed based on the assignment. In this situation, Project Plan 365 must use "Fixed Units" policy.

The current section describes resource assignment under "Fixed Units".

You can assign one resource, a part-time resource, multiple resources, or multiple units of the same resource to a task. Project Plan 365 displays the percentage of time a resource is assigned to a task, and the number of multiple resources assigned to the task, next to the resource name by the task bar on the Gantt Chart. You can remove a resource from a task at any time. If you want to remove a resource from a task, simply delete the resource name values from the Resource Names cell corresponding to that task. Use the Undo option if you want to restore the assignment.

When assigning a resource of type work, this may work full time at a given task, or part time. You indicate the percent of the work day dedicated by the resource to the task in units: 1 unit (or 100%) is equivalent to full time. Project Plan 365 allows resource assignments with 0% units and resource assignments that exceed 100% units. A resource assignment with 50% units corresponds to 4 hrs/day, while a resource assignment with 200% units corresponds to 16 hrs/day. If two resources are allocated to the same task, the total number of Resource Units assigned to that task is 250% or simply 2.5.

The first time you add resources to a task, you will notice that a value for the work field is computed for that task. The formula used to compute work is: **task work = task duration x assignment units**. If you edit again the assignment (i.e. the Resources names field), you will see that duration gets modified while the value of work is kept constant. If you modify the total amount of work required for the task and edit the work field, the duration is recomputed. Changes in duration draw updates on work. This is the scheduling behavior at resource assignment under the "Fixed Units" policy.

Exercise:

Develop Resource sheet by adding material and human resource and allocate these resources to your project with costing.

Task Information

General | Predecessors | Resources | Advanced | Notes | Custom Fields

Name: Submit bond and insurance documents Duration: 2 days

Resources:

Resource Name	Assignment Owner	Units	Cost
G.C. Project Management		100%	\$1,120.00
G.C. General Management		25%	\$320.00
Carpet Contractor			
Concrete			
Drywall Contractor			
Electric Contractor			
Electric Contractor Management			
Elevator Contractor			
Elevator Contractor Management			
G.C Accounting			
G.C Procurement			
G.C Scheduler			
G.C. Concrete Crew			
G.C. Finish Carpenter Crew			
G.C. General Management			
G.C. Labor Crew			
G.C. Project Management			
G.C. Rough Carpenter Crew			
G.C. Superintendent			
G.C. Survey Crew			

OK Close

3. Assign Resource using Assign resources dialog.

Select the desired task in the grid then go to menu **Team - Assign - Resource**. In **Assign Resource** dialog, select the desired resource and click on **Assign** button. Set the resource units or the number of items.

Assign resources

Task: Submit bond and insurance documents

Resource Name	Units	Cost
<input checked="" type="checkbox"/> G.C. General Management	25%	\$0.00
<input checked="" type="checkbox"/> G.C. Project Management	100%	\$0.00
<input type="checkbox"/> G.C. Procurement		
<input type="checkbox"/> G.C. Scheduler		
<input type="checkbox"/> G.C. Accounting		
<input type="checkbox"/> G.C. Superintendent		
<input type="checkbox"/> G.C. Survey Crew		

Assign Remove OK Close

4. Assign resource type Material.

First add resources like equipment and materials using **Resource Sheet** view.

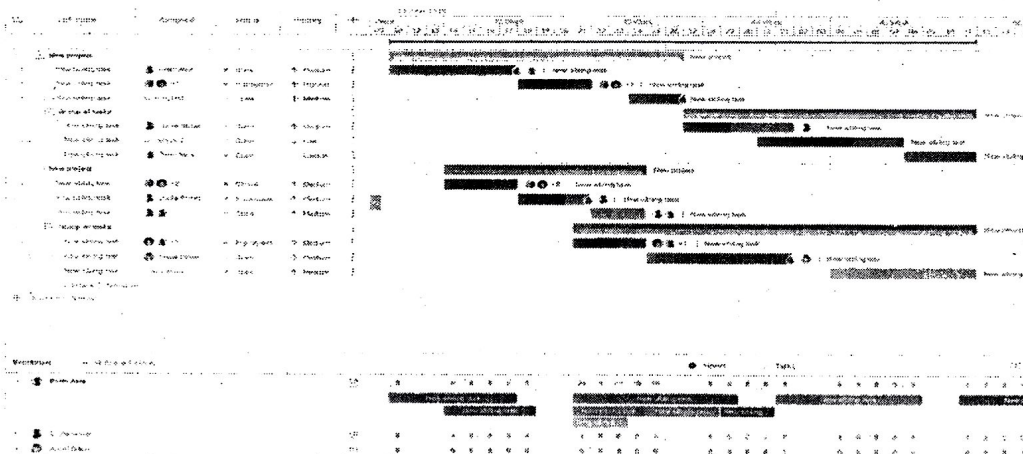
Gantt Chart View

The default view in MS Project is the Gantt Chart view. In it, users can see task information as both text and bar graphics because the window is split into two sections. On the left side columns (containing Microsoft Project fields) are shown. You can use these columns to modify task names, durations, start and finish dates, and other information. Other fields may include Task Number, Indicators, Predecessors, Resource Names, planned and actual costs. The right side of this view shows the Gantt chart. This chart is made up of bars that graphically display task durations and start and finish dates on a timescale. This sequence of bars shows the order in which tasks are scheduled to occur. Gantt Chart view is useful when:

- Entering tasks and task durations.
- Establishing sequential relationships between your tasks.
- This view allows you to see how changing task duration affects the start and finish dates of other tasks and the project finish date.
- Designating resources to a task. 1-5
- You want to watch how much of each task is complete and follow the progress of your project by comparing actual start and finish dates with the planned dates.

Gantt Chart views can be customized to meet your needs. Your changes to the view are saved with the project file. Some things you can change in the Gantt Chart view, are:

- The number of columns and the information that is displayed. For example, you can display, hide, or change the appearance of nonworking time.
- The formatting of fonts. For example, you can apply bold to an important finish date or increase the size of column titles.
- How units of time are shown.
- The formatting of the Gantt bars. You can use this option to emphasize specific conditions in the schedule. For example, you could change the color of a critical task.
- How gridlines are displayed. You can use this option to enhance the readability or clarity of the Gantt Chart. For example, you can specify different line patterns and colors for column, row, and title gridlines.
- Draw your own labels or figures to the Gantt Chart.
- Whether or not subtasks are displayed.



Exercise:

Assign Days to all the process and develop Gantt Chart in MS-Project




Practical No. 2

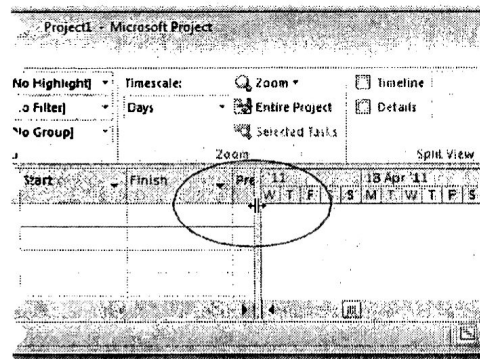
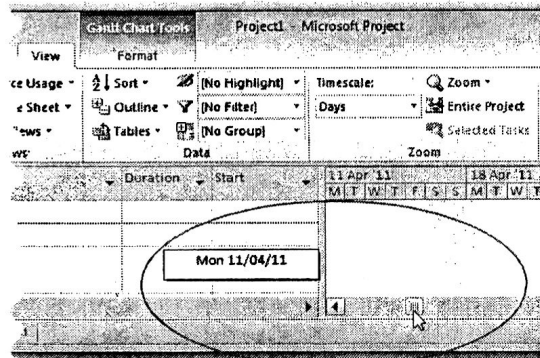
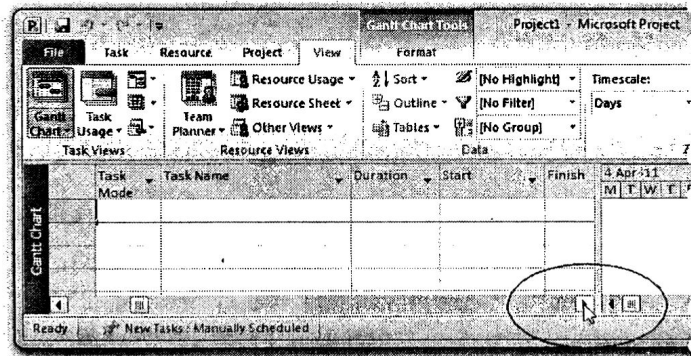
Object: Introduction & Development of Gantt Chart

The *Gantt Chart* view is used to display tasks and durations as bars plotted on a time scale. It provides an overview of the project, plus the capacity to enter or edit task information. It is the default view in Microsoft Project and the most common view. It also contains a few useful features for displaying your data.

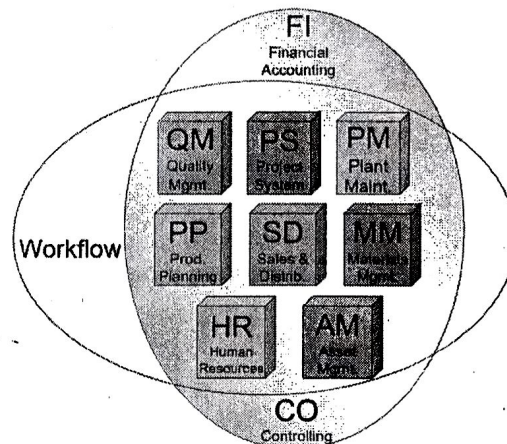
Try This Yourself:

Before starting this exercise ensure that Microsoft Project has started...

- 1 Click on the right arrow  of the horizontal scroll bar in the left pane to scroll the sheet view and see different columns
- 2 Click on the left arrow  until the first field is back in view
- 3 Click on the right arrow  of the horizontal scroll bar in the right pane and notice how the timeline scrolls
- 4 Click and hold the mouse pointer on the grey button on the right scroll bar to reveal the date that the timeline is currently viewing
- 5 Hold down the left mouse button on the line that divides the table on the left from the timescale on the right and drag it to the right to see more of the sheet view
- 6 Double-click on the vertical line to precisely align it to the nearest field



Different Modules of SAP ERP



SAP MM (Material Management) Module:

Features of SAP MM The features of a SAP MM system are as follows:

- SAP MM is one of the modules of SAP that deals with material management and inventory management.
- Material Management as a process ensures no shortage of materials or any gaps in the supply chain process of the organization. SAP MM speeds up the procurement and material management activities, making the business run smoothly with complete time and cost efficiency.
- It deals with managing the materials (products and/or services) and resources of an organization with the aim of accelerating productivity and reducing costs. At the same time, SAP MM is quite versatile to accommodate changes that are frequent in any business environment.
- It deals with the Procurement Process, Master Data (Material & Vendor Master), Account Determination & Valuation of Material, Inventory Management, Invoice Verification, Material Requirement Planning, etc.
 - Master Data
 - Purchasing
 - Inventory

Master Data

- Materials master data creation
- It consists of Description, allocation of code, Unit to measure, Category, Unit weight and Gross weight
- Storage area reference
- Re-ordering level

Purchasing

- Creation of purchase requisition
- Conversion of purchase requisition in to purchase order
- Quotation review, comparison & finalization.
- Purchase order creation, release and edit

Pricing

- Creation procedure to arrive at landed price
- Price calculation and conditions i.e. discount, tax, rounding off, plus / minus tolerance

Inventory

- Overview of inventory management
- Rule for Goods receipt
- Location of inventory
- Issue of goods
- Transfer posting of goods
- Physical verification of inventory
- Special stock and special procurement

Guidelines for Developing Work Breakdown Structure

The development of Work Breakdown Structure involves subdividing the major project activities or sub-activities into smaller, more manageable activities until the activities are defined in sufficient detail to support the management and development of project works. The items at the lowest level of a branch are known as work packages. Here are some tips in developing a Work Breakdown Structure that can express works effectively:

- Always express Work Breakdown Structure activities at the lowest levels of granularity in verb form.
- Review the Work Breakdown Structure. Make sure all deliverables have been fully covered by the works defined in the Work Breakdown Structure.
- Ensure that testing and training have been considered.
- Ensure that non-IT work packages are also included such as, documentation and review activities are included in the structure.
- Ensure that other supporting activities such as, product/service launch and implementation activities are planned.
- Ensure that delivery approval cycles are considered.

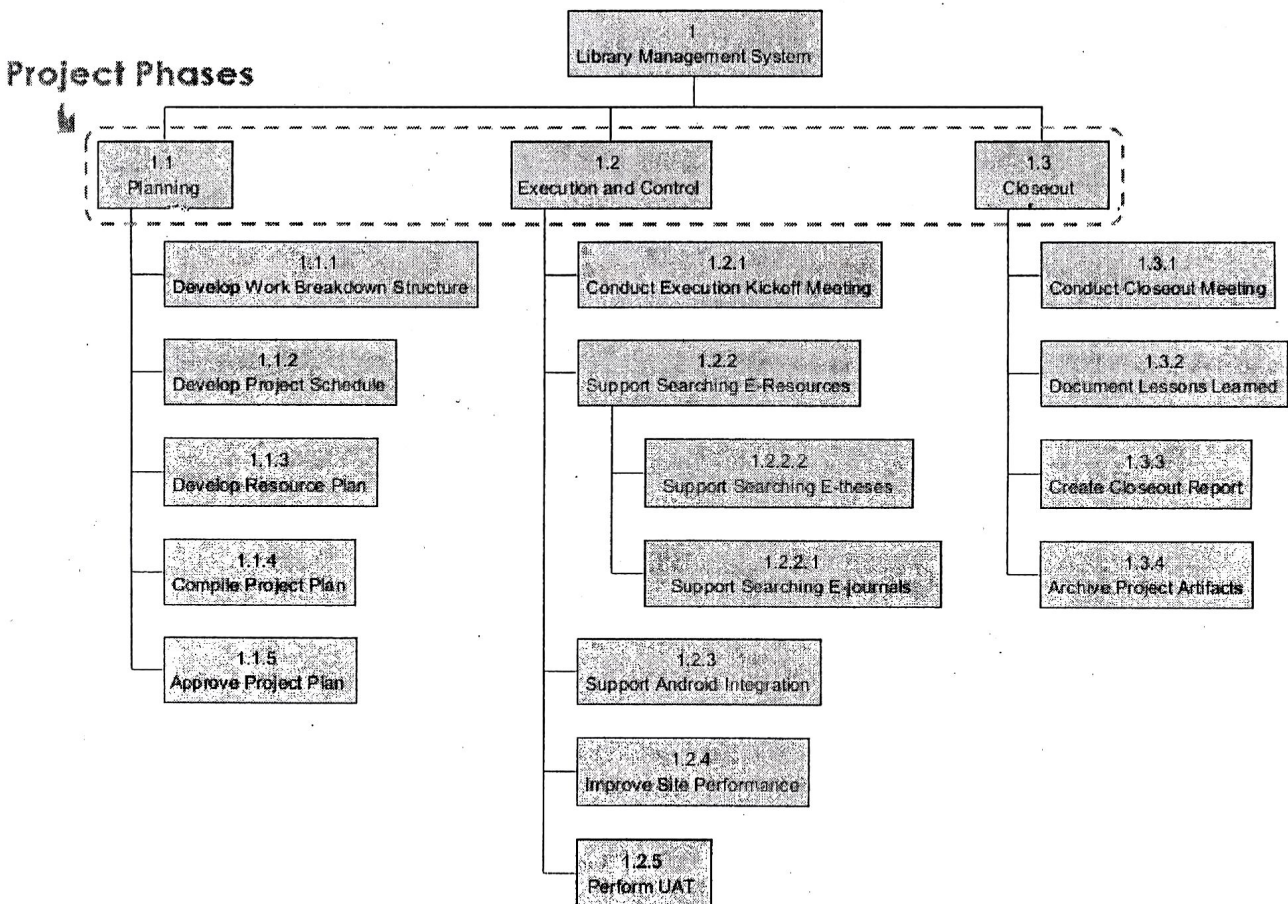
Include project management deliverables on the project as well (e.g., production of Project Plan). Include any deliverables that must be met or delivered by the customer or any external parties. Check the Work Breakdown Structure against the project approach specified in Project Charter for any activities that needs to be included in the Work Breakdown Structure.

Different Forms of Work Breakdown Structure

There are three typical ways in structuring works with a Work Breakdown Structure (WBS). They include phase-based structures, deliverable-based structures and responsibility-based structures.

Phase-based structures

Define and structure project activities based on the project phases.



PILLAR 2—JISHU HOZEN (AUTONOMOUS MAINTENANCE)

This pillar is geared towards developing operators to be able to take care of small maintenance tasks, thus freeing up the skilled maintenance people to spend time on more value-added activity and technical repairs. The operators are responsible for upkeep of their equipment to prevent it from deteriorating.

1. Steps in JISHU HOZEN

Train the employees: Educate the employees about TPM, its advantages, JH advantages and steps in JH. Educate the employees about abnormalities in equipment.

2. Initial cleanup of machines

Supervisor and technician should discuss and set a date for implementing step 1.

- Arrange all items needed for cleaning.
- On the arranged date, employees should clean the equipment completely with the help of maintenance department.
- Dust, stains, oils, and grease must be removed.
- Following are the things that must be taken care while cleaning. They are oil leakage, loose wires, unfastened nuts and bolts and worn-out parts.
- After cleaning up problems are categorized and suitably tagged. White tags are place where operators can solve problems. Pink tag is placed where the aid of maintenance department is needed.
- Contents of tag are transferred to a register.
- Make note of area, which were inaccessible.
- Finally close the open parts of the machine and run the machine.

PILLAR 3—KAIZEN ‘Kai’ means change, and ‘Zen’ means good (for the better). Basically Kaizen is for small improvements, but carried out on a continual basis and involve all people in the organization. Kaizen is opposite to big spectacular innovations. Kaizen requires no or little investment. The principle behind is that “a very large number of small improvements are more effective in an organizational environment than a few improvements of large value.” This pillar is aimed at reducing losses in the workplace that affect our efficiencies. By using a detailed and thorough procedure we eliminate losses in a systematic method using various Kaizen tools. These activities are not limited to production areas and can be implemented in administrative areas as well. Kaizen Policy

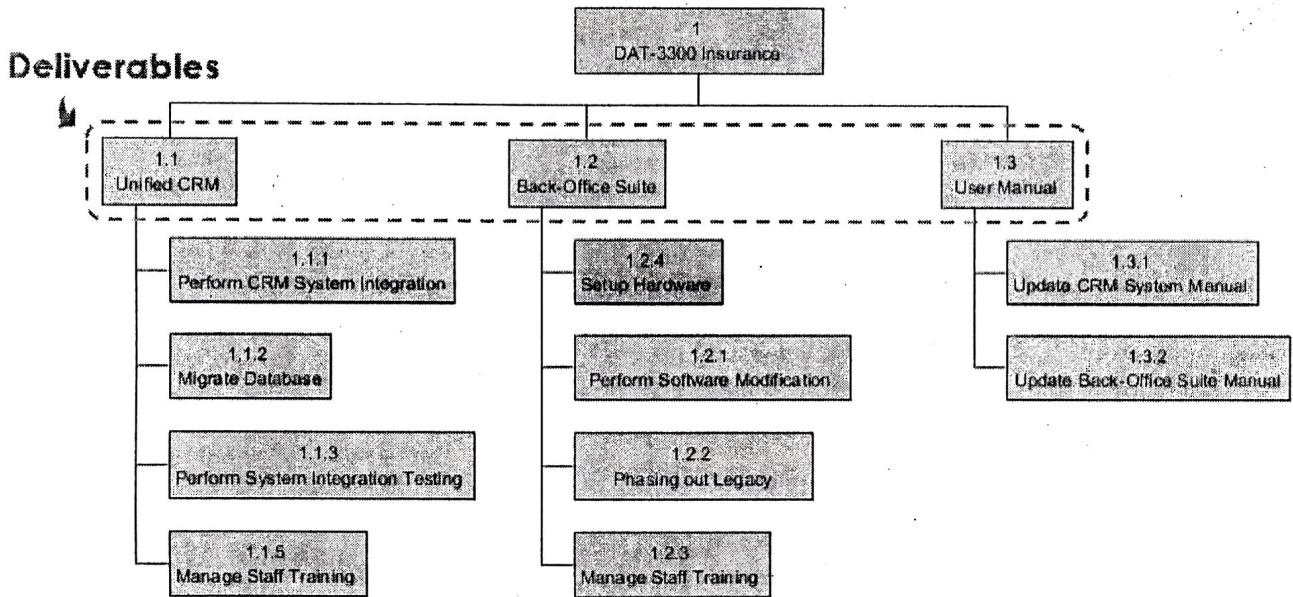
- Practice concepts of zero losses in every sphere of activity.
- Relentless pursuit to achieve cost reduction targets in all resources.
- Relentless pursuit to improve overall plant equipment effectiveness.
- Extensive use of PM analysis as a tool for eliminating losses.
- Focus of easy handling of operators

16 Major Losses in a Organization

<i>Loss</i>	<i>Category</i>
1. Failure losses—Breakdown loss	Losses that impede equipment efficiency
2. Setup/adjustment losses	
3. Cutting blade loss	
4. Start up loss	
5. Minor stoppage/Idling loss	
6. Speed loss—operating at low speeds	
7. Defect/rework loss	
8. Scheduled downtime loss	
9. Management loss	
10. Operating motion loss	
11. Line organization loss	Losses that impede human work efficiency
12. Logistic loss	
13. Measurement and adjustment loss	Losses that impede effective use of production resources
14. Energy loss	
15. Die, jig and tool breakage loss	
16. Yield loss	

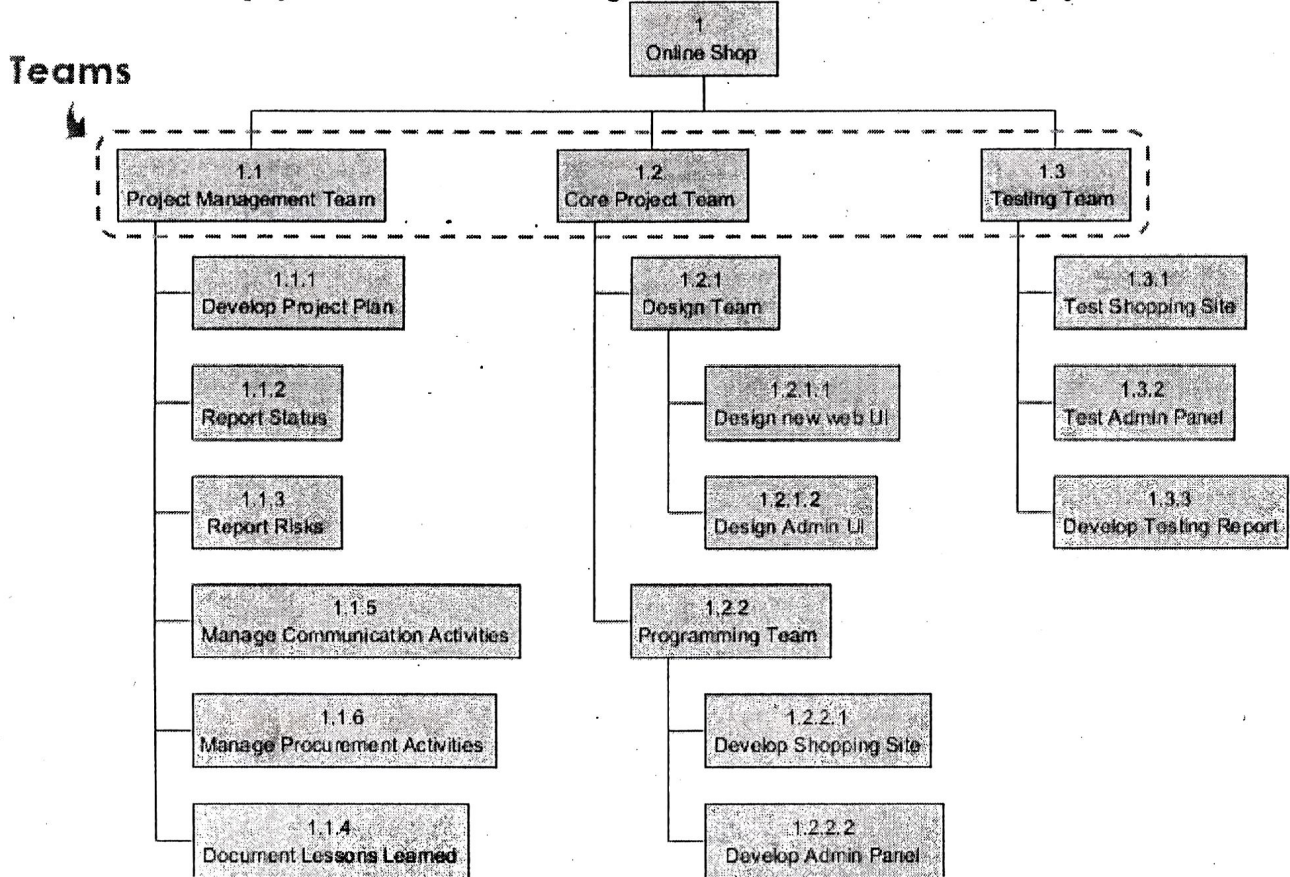
Deliverable-based structures

Define and structure project activities based on the deliverables agreed to deliver.



Responsibility-based structure

Define and structure project activities based on the organization units that will work on the project.



Exercise:

Develop WBS for the designed project and include all main and sub levels likewise project bases WBS.

Practical No. 6

Object: TOTAL QUALITY MANAGEMENT & ITS PILLARS

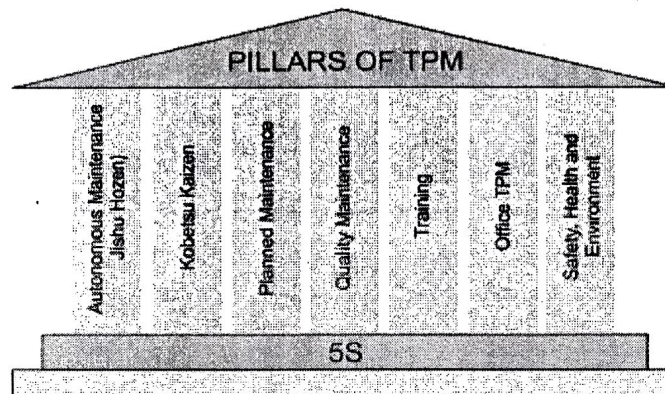
The TPM program closely resembles the popular Total Quality Management (TQM) program. Many of the tools such as, employee empowerment, benchmarking, documentation, etc. used in TQM are used to implement and optimize TPM. Following are the similarities between the two:

- Total commitment to the program by upper-level management is required in both programmes,
- Employees must be empowered to initiate corrective action.
- A long-range outlook must be accepted as TPM may take a year or more to implement and is an on-going process. Changes in employee mind-set toward their job responsibilities must take place as well.

The differences between TQM and TPM are summarized below

Category	TQM	TPM
Object	Quality (Output and effects)	Equipment (Input and cause)
Mains of attaining goal	Systematize the management. It is software oriented	Employees participation and it is hardware oriented
Target	Quality for PPM	Elimination of losses and wastes.

8.7.2 Pillars of TPM



PILLAR 1-5S:

TPM starts with 5S. Problems cannot be clearly seen when the workplace is unorganized. Cleaning and organizing the workplace helps the team to uncover problems. Making problems visible is the first step of improvement.

Japanese term	English translation	Equivalent 'S' term
Seiri	Organization	Sort
Seiton	Tidiness	Systematise
Seiso	Cleaning	Sweep
Seiketsu	Standardisation	Standardise
Shitsuke	Discipline	Self-discipline

Practical No. 5

Object: Maintenance Management & Its Types

Introduction

Past and current maintenance practices in both the private and Government sectors would imply that maintenance is the actions associated with equipment repair after it is broken. The dictionary defines maintenance as “the work of keeping something in proper condition, upkeep.” This would imply that maintenance should be actions taken to prevent a device or component from failing or to repair normal equipment degradation experienced with the operation of the device to keep it in proper working order.

OBJECTIVES OF MAINTENANCE

Equipment's are an important resource which is constantly used for adding value to products. So, it must be kept at the best operating condition. Otherwise, there will be excessive downtime and interruption of production if it is used in a mass production line. Poor working of equipment's will lead to quality related problems. Hence, it is an absolute necessity to maintain the equipments in good operating conditions with economical cost. Hence, we need an integrated approach to minimize the cost of maintenance.

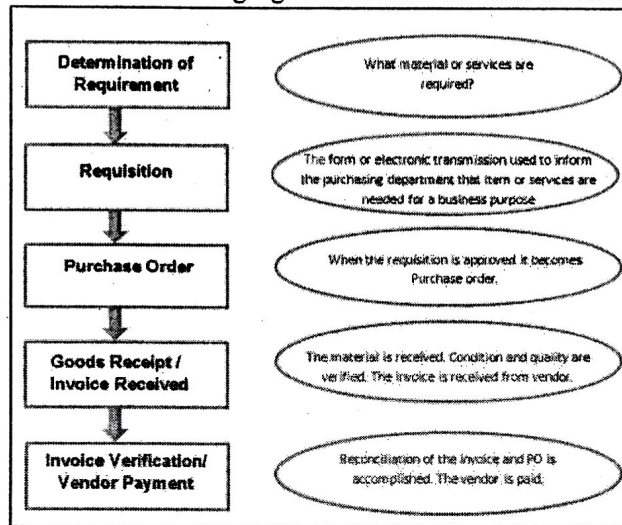
TYPES OF MAINTENANCE

The design life of most equipment requires periodic maintenance. Belts need adjustment, alignment needs to be maintained, proper lubrication on rotating equipment is required, and so on. In some cases, certain components need replacement, e.g., a wheel bearing on a motor vehicle, to ensure the main piece of

1. Breakdown Maintenance
2. Preventive Maintenance
3. Predictive Maintenance

	Breakdown	Preventive	Predictive
PROS	<ul style="list-style-type: none"> • Involves low-cost investment for maintenance. • Less staff is required 	<ul style="list-style-type: none"> • Cost effective in many capital-intensive processes. • Flexibility allows for the adjustment of maintenance periodicity. • Increased component life cycle. • Energy savings. • Reduced equipment or process failure. • Estimated 12% to 18% cost savings over reactive maintenance program. 	<ul style="list-style-type: none"> • Increased component operational life/availability. • Allows for pre-emptive corrective actions. • Decrease in equipment or process downtime. • Decrease in costs for parts and labour. • Better product quality. • Improved worker and environmental safety. • Improved worker moral. • Energy savings. • Estimated 8% to 12% cost savings over preventive maintenance program
CONS	<ul style="list-style-type: none"> • Increased cost due to unplanned downtime of equipment. • Increased labor cost, especially if overtime is needed. • Cost involved with repair or replacement of equipment. • Possible secondary equipment or process damage from equipment failure. • Inefficient use of staff resources. 	<ul style="list-style-type: none"> • Catastrophic failures still likely to occur. • Labour intensive. • Includes performance of unneeded maintenance. • Potential for incidental damage to components in conducting unneeded maintenance. 	<ul style="list-style-type: none"> • Increased investment in diagnostic equipment. • Increased investment in staff training. • Savings potential not readily seen by management

Basic Procurement Activities The following figure illustrates the flow of basic procurement activities:



A brief introduction of the procurement activities is given below:

Procurement Activities	Description
Determination of requirement	It is the logical subdivision where it is determined what material or services are required, and which supplier can fulfill the requirements.
Creating purchase requisition	It is the phase in which the purchasing department is informed about the requirement of items or services. A requisition is an internal document.
Creating purchase order	It is the phase when an order is created from requisition and it is approved and assigned to a supplier.
Goods receipt/ Invoice received	It is the phase in which the material is received by the company and its condition and quality are being inspected. In this phase, an invoice is received from the vendor (seller).
Invoice verification/Vendor Payment	It is the phase in which the vendor (seller) is paid from the company and reconciliation of the invoice and PO is accomplished.

Exercise:

Develop a flow chart of SAP ERP for material issuance from Store to specific location with direct cost charge on cost center.

THANK YOU

Practical No. 7

Object: Introduction to SAP ERP & its Modules.

What are Enterprise Resource Planning (ERP) Systems?

- SAP mean System Applications and Products
- Incredibly large, extensive software packages used to manage a Company's business processes.
- Standard software packages that must be configured to meet the needs of a company

Database programs with the following functions:

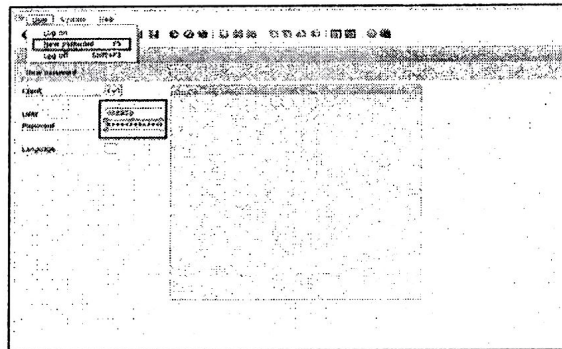
- Input
- Storage/Retrieval
- Manipulation
- Output

WHY ERP /SAP

- Well integrated SAP has been implemented 9 out of 10 fortune 500 companies
- It brings discipline in the Company
- Has various authorization level, Complete tract record of entries, correction, and movements.
- Drilldown facility for mapping the complete transaction
- Brings overall efficiency in the organization
- Best for growth of business
- Brings various controlling mechanism
- Export / import of data to external source

LOGIN SCREEN

Log on to the SAP ERP server. The SAP login screen will prompt you for the User ID and the Password. Provide a valid user ID and password and press enter. The user id and password are provided by the system administrator. The login screen appears as follows:

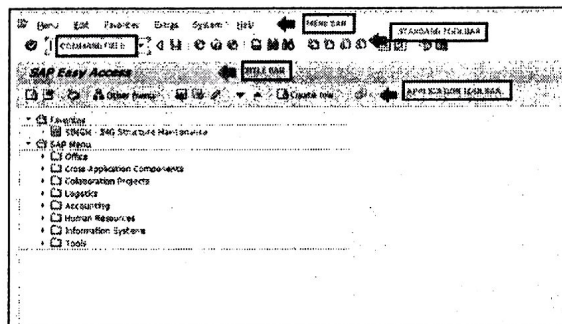


TOOLBAR IN SAP

Given right is a brief description of the available toolbars:

- Menu Bar - Menu bar is the topline of the dialog window in the SAP system.
- Standard Toolbar – This toolbar includes standard functions such as save, top of page, end of page, page up, page down, print, etc.
- Title Bar - Title bar displays the name of the application/business process you are currently in.
- Application Toolbar – Application-specific menu options are available on this toolbar.
- Command Field - To start a business application without navigating through menu transactions, some logical codes are assigned to the business processes. Transaction codes are entered in the command field to start an application directly.

The following screenshot shows the toolbars available on the SAP screen.



PILLAR 4—PLANNED MAINTENANCE

It is aimed to have trouble free machines and equipment producing defect free products for total customer satisfaction. This breaks maintenance down into 4 'families' or groups, which was defined earlier.

- Preventive maintenance
- Breakdown maintenance

PILLAR 5—QUALITY MAINTENANCE

It is aimed towards customer delight through highest quality through defect free manufacturing. Focus is on eliminating non-conformances in a systematic manner, much like Focused Improvement. We gain understanding of what parts of the equipment affect product quality and begin to eliminate current quality concerns, then move to potential quality concerns. Transition is from reactive to proactive-(Quality Control to Quality Assurance). QM activities is to set equipment conditions that preclude quality defects, based on the basic concept of maintaining perfect equipment to maintain perfect quality of products. The conditions are checked and measure in time series to very that measure values are within standard values to prevent defects. The transition of measured values is watched to predict possibilities of defects occurring and to take counter measures beforehand. Policy

- Defect free conditions and control of equipment's.
- QM activities to support quality assurance.
- Focus of prevention of defects at source.
- Focus on poka-yoke (fool proof system).
- In-line detection and segregation of defects.
- Effective implementation of operator quality assurance.

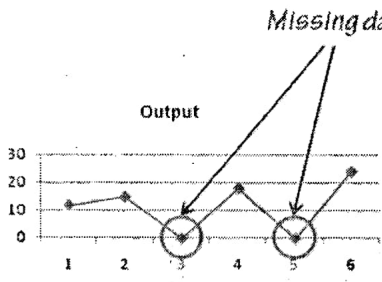
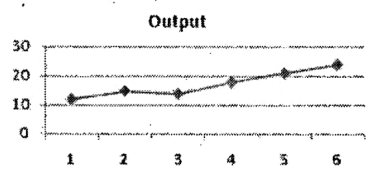
Exercise:

Assume any machine or equipment and create kaizen report on the idea that small, ongoing positive changes can reap significant improvements. For reference, please review below table.

KAIZEN ACTION SHEET

Date: 02/05/00

Item #: 35

Manager Or Supervisor <i>Peter P.</i>		Area or process name <i>Assembly Line 1</i>	Person doing this sheet <i>John H.</i>
Problem description: <i>It is time consuming to update the chart because the pencil is never there. We lose time looking for the pencil or we sometimes do not update the chart because we do not have the time</i>		Actions to be taken: <i>Hang a pencil next to the chart (attached to the PVD)</i>	Expected results/benefit: <i>No more wasted time. looking for pencil and always updated charts</i>
Before improvement (draw picture):  <p>The graph shows 'Output' on the y-axis (0 to 30) and days on the x-axis (1 to 6). Data points are approximately: (1, 10), (2, 15), (3, 0), (4, 18), (5, 0), (6, 22). The points at day 3 and 5 are circled, and arrows labeled 'Missing data' point to them.</p>		After improvement (draw picture):  <p>The graph shows 'Output' on the y-axis (0 to 30) and days on the x-axis (1 to 6). Data points are approximately: (1, 10), (2, 15), (3, 12), (4, 18), (5, 20), (6, 22). All points are connected by a line.</p>	
Outputs measured / to be measured to determine impact of changes: <i>Frequency of missing data</i>			

Concept of Reliability:

Reliability is the probability of survival under a given operating environment. For example, the time between consecutive failures of a refrigerator where continuous working is required is a measure of its reliability. If this time is more, the product is said to have high reliability. In a textile mill, generally the light is maintained at a minimum specified level. To achieve this, let us assume that there are 100 bulbs in use and the guaranteed life time of these bulbs is 5000 hours. If we collect statistics about the number of bulbs survived till 5000 hours, we can compute the reliability of the bulbs. In this case,

$$\text{Reliability} = \text{Failure rate} = \frac{\text{Number of bulbs survived till the specified time limit}}{\text{Number of bulbs used}}$$

If the number of bulbs survived till 5000 hours is 80, then we can say that the reliability is 0.8 (i.e., 80/100) The reliability of railway signaling system, aircraft, and power plant are some of the interesting examples for demonstrating the reliability concept. In these cases, a failure will lead to heavy penalty. The individual component's reliability affects the reliability of the product. Hence, enough attention must be given at the design, stage such that the product's reliability is maximized. The cost of maintenance is also to be considered along with the reliability while improving it. The general failure pattern of any product is given in Fig. 8.1. This is called bath-tub curve. In Fig. 8.1, there will be large number of failures in the early period. This is mainly due to nonalignment while shipping the product, or misfit while manufacturing (assembling), or very high initial friction between moving parts, etc

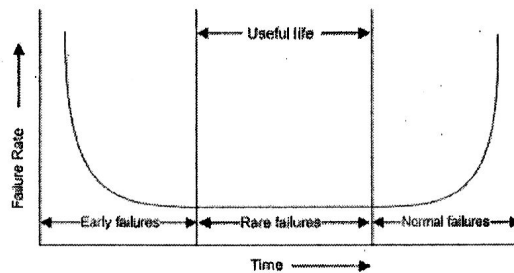


Fig. 8.1 Product failure rate

Product failure rate Reliability Improvement The reliability of a system/product depends on many factors. So, we should concentrate at the grassroot level to improve product's reliability. Some of the ways of improving systems reliability are listed below:

- Improved design of components
- Simplification of product structure
- Usage of better production equipment
- Better quality standards
- Better testing standards
- Enough standby units
- Usage of preventive maintenance, if necessary, at appropriate time.

Maintenance Sheet

Equipment Maintenance Log						
Equipment Name		Manufacturer				
Serial Number		Manufacturer P/N				
Plant location		Manufacturer's contact details:				
Date manufactured		Date in service				
Maintenance Activity						
Date	Maintenance description	Maintenance performed by:	Validated by:	Date of validation	Cost activity	Remarks

Exercise:
Develop Maintenance log sheet for gear box maintenance for shaft failure.