Principles of Management
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Lecture – 17
Forecasting and Premising - IV

So, in this 4th lecture of Forecasting and Premising we have discussed about the forecasting techniques, we discussed about the environmental scanning, global scanning. And then we discussed about the quantitative and qualitative techniques of forecasting and further we discussed about benchmarking in details.

So, in benchmarking, what we discussed? We have discussed about what is benchmarking, benchmarking purpose and learning best practices and benchmarking process like identify what best benchmark practices to be adopted, the benchmark team does the benchmarking exercise and identifies the benchmark partners, where the benchmarking can be done.

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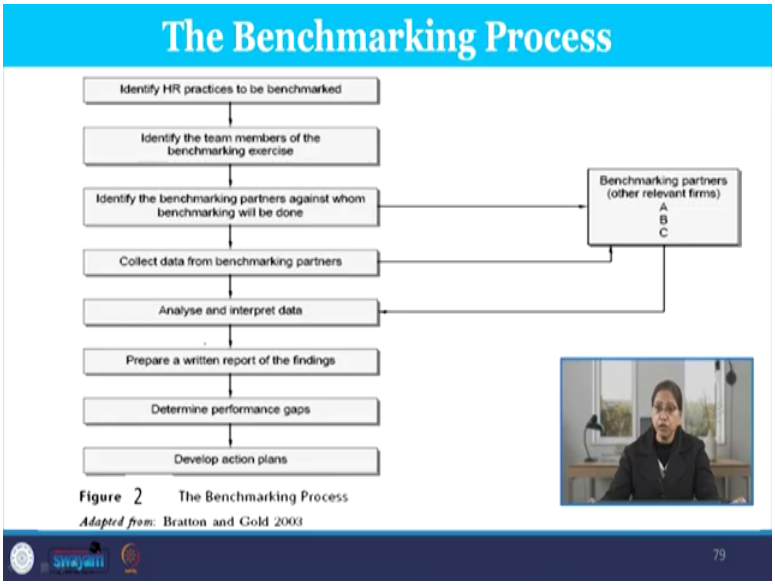

And they collect the data from the benchmark partners, analyze and interpret that data, prepare a written report, analyze the gap between their present practices and the benchmark practices and then make the action plan for decision making.

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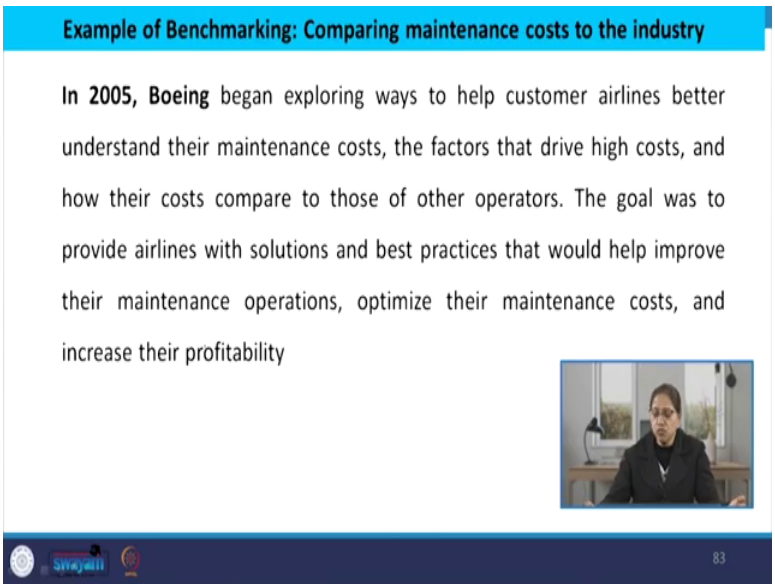

So, taking a cue from the benchmarking that we have studied in more details. I will cite an example of benchmarking comparing the maintenance cost which is used in the Boeing comparing maintenance cost in the industry. So, in 2005 Boeing began exploring ways to help customer airlines better understand their maintenance cost.

The factor that drive high cost and how their costs is compared to the other operators. The goal was to provide airlines with solutions and best practices that would help improve their performance, their maintenance operation optimize, their maintenance cost and increase the profitability.

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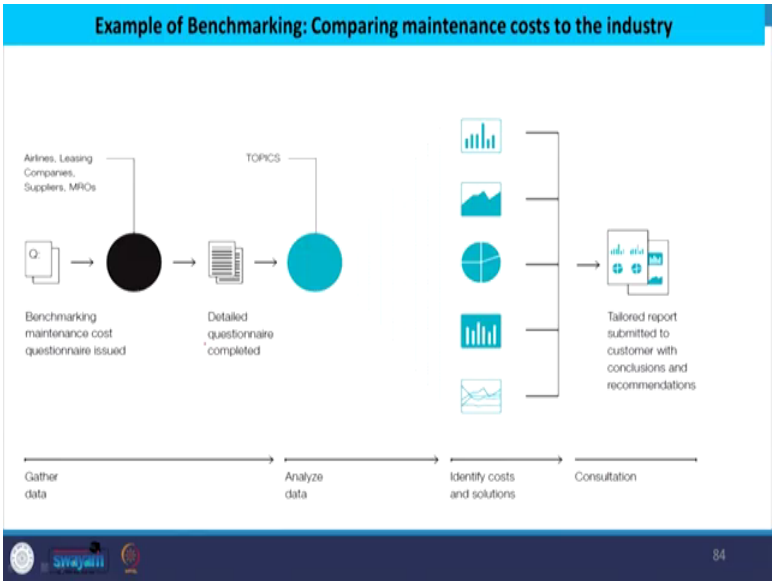

So, what airline did is gather data about benchmarking, maintenance cost there is a questionnaire, which used airlines and the leasing companies suppliers, they have they have taken the data through a survey based questionnaire method and the detailed survey questionnaire is compiled on various topics.

And then the data was analyzed to identify the cost and the solution. And then the consultant was submitted this data. So, tailored data is submitted to the customer with conclusion and recommendation.

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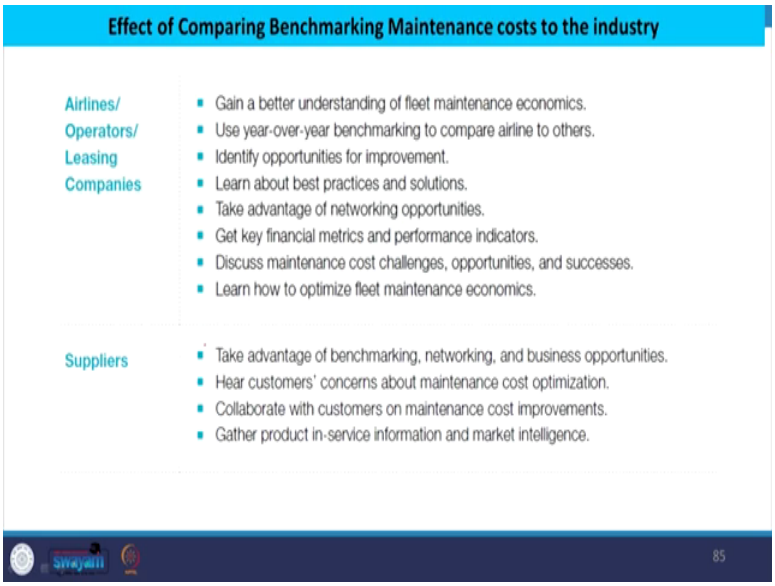

So, this will help in gaining a better understanding of fleet maintenance economics use year over year benchmarking to compare airlines with others identify the opportunities for improvement. As airlines operators and leasing companies they have learned about the best practices and the solutions they take advantage of networking opportunities, key financial metrics and performance indicators and they discuss maintenance cost challenges, opportunities and successes.

Learn how to optimize their fleet maintenance economics. The suppliers; they take advantage of benchmarking, networking and business opportunities. Then they hear customers concerns about maintenance cost optimization, they collaborate with customers or maintenance cost improvement. And they gather product in service information and market intelligence.

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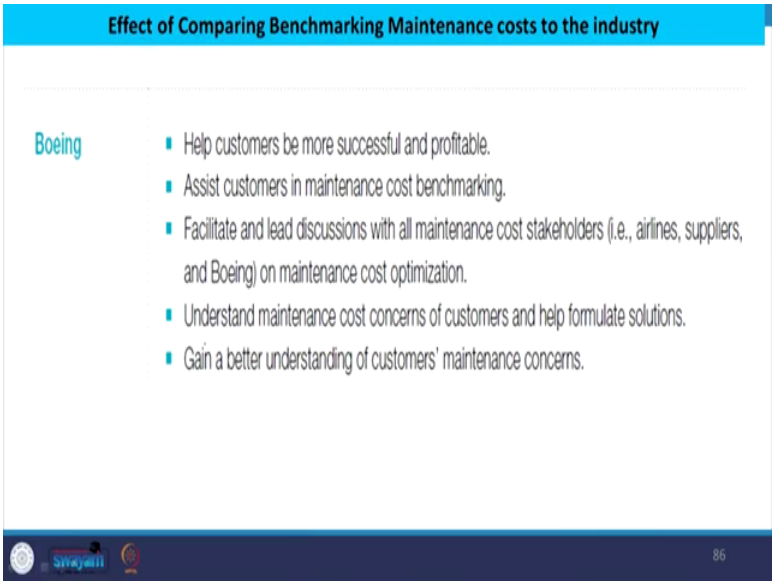

And as a result the Boeing helps customers to be more successful and profitable, assist customers in maintenance of cost benchmarking, facilitate and lead discussions on with a maintenance with all maintenance cost stakeholders like airlines, suppliers and Boeing on maintenance cost optimization.

Understand the maintenance cost concerns of customers and also help formulate solutions. So, this overall helps in gaining a better understanding of customer maintenance concerns. Next moving on so, what we have understood is benchmarking practice is also important for decision making.

It is also a method which helps managers to take decisions effectively to improve their best practices to improve their processes products year on year keep on improving them learning from the best methods available in the market. Now moving on to the next technique is technique for allocating resource.

After the goals or the end results have been established next step of planning is to determine how these goals need to be executed or accomplished that is the focus on the means or the process. Before managers can organize and lead in order to implement goals they must have some resources they must have resources to execute the project.

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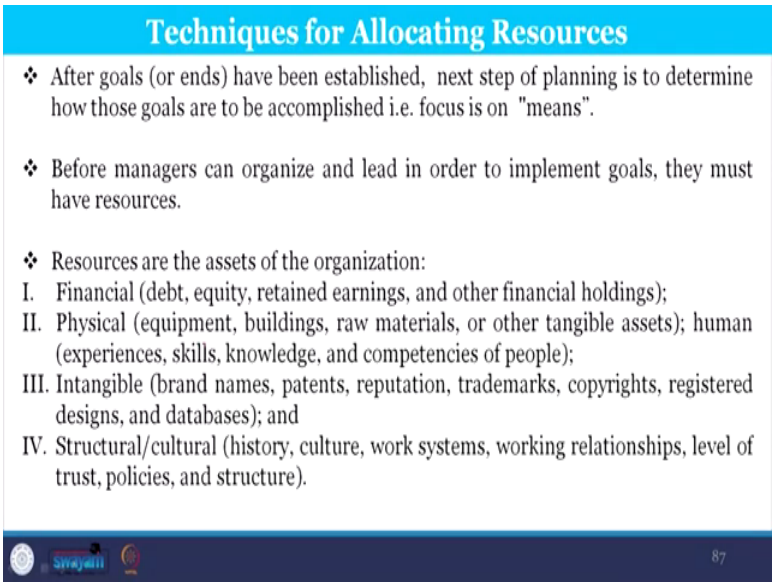

Resources are the assets of organizations like financial debt, equity, retaining retained earnings and other financial holdings physical equipment's buildings raw material or other tangible assets.

Human experience, skills, knowledge and competencies of people then intangible assets like brand names, patents, reputation, trademark, copyrights, registered designs and databases and structural or cultural capital or cultural assets like history, culture, work system, working relationship, level of trust, policies and structure.

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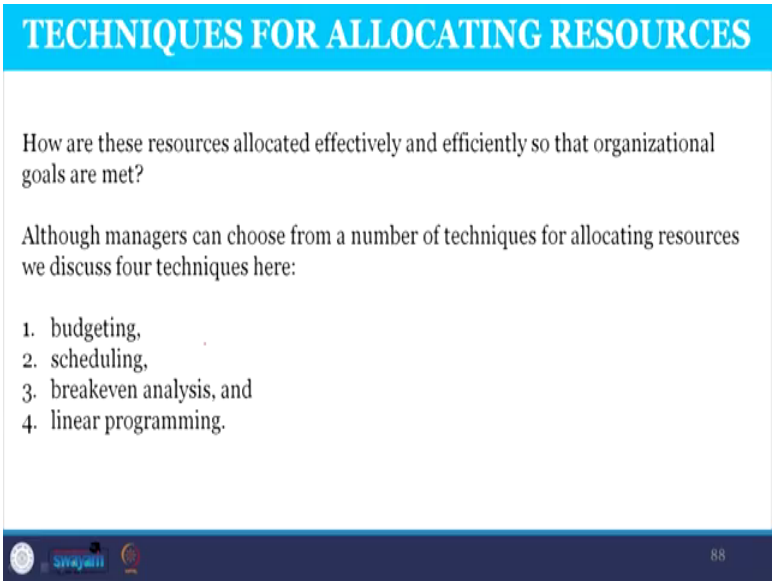

So, how are these resources allocated effectively and efficiently so that organizations goals are met? Although managers can choose from a number of techniques for allocating resources. We will discuss four techniques that is one is budgeting, another one is scheduling, breakeven analysis and linear programming.

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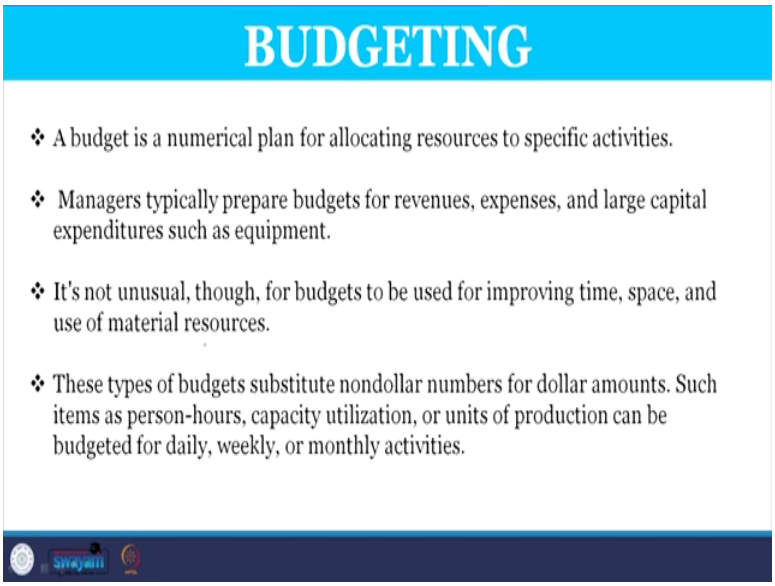

What is budgeting? A budget is a numerical plan for allocation of resources of specific for a specific activity. Managers typically prepare budgets for revenue expenses and

large capital expenditures such as, equipment's. It is not usual though for budgets to be used for improving time space and use of material resource.

This type of budgets substitute non dollar numbers or dollar amounts. Such items as person hours, capacity utilization or units of productions can be budgeted for daily, weekly or monthly activities. So, what are the different types of budgets? Variable budget takes into account the costs that vary with volume.

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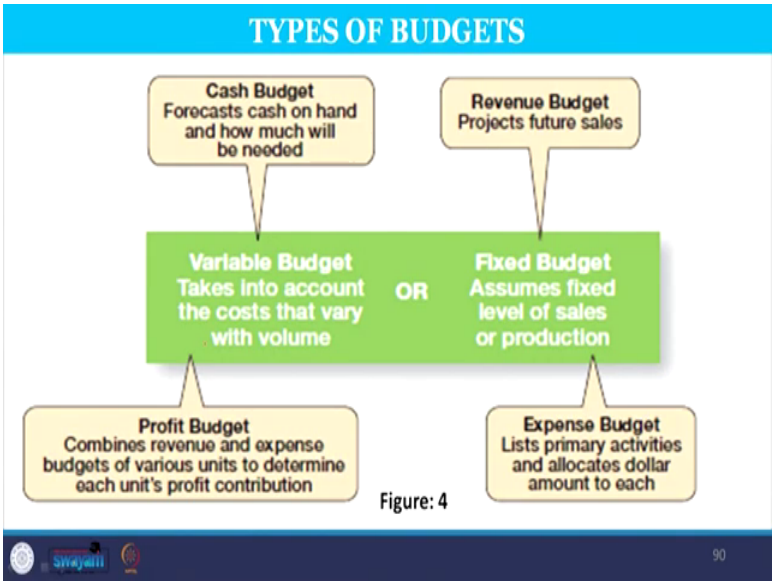

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The second one is fixed budget that is assumes fixed level of sales or production. So, variable budget; cash budget and profit budget, cash budget forecast, cash on hand and how much will be needed. Profit budget combines revenue and expense budgets of various units to determine each units profit contribution.

And revenue budget projects future sales. And expense budget lists primary activities and allocates dollar amount to each. So, what we have learnt? There are cash budgets, revenue budgets, expense budget and profit budget.

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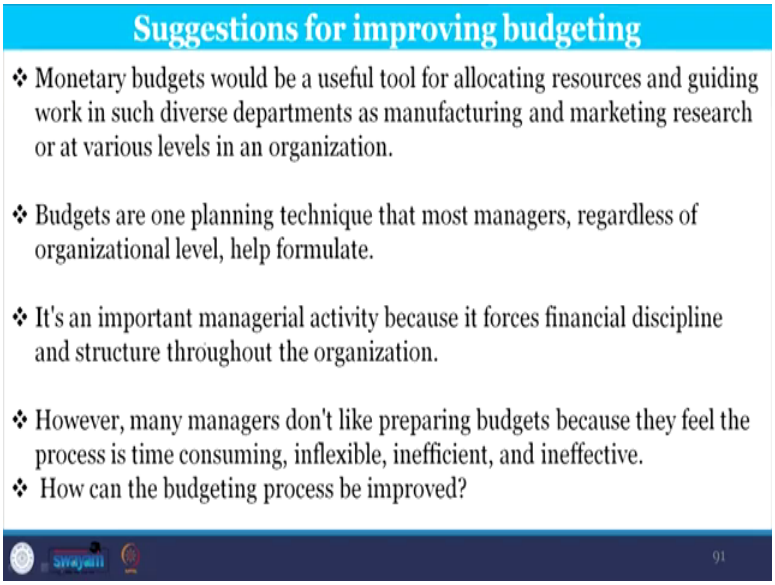

And suggestions for improving budgeting: monetary budgets would be useful tool for allocating resource and guiding work in each in such diverse departments as manufacturing, marketing research or at various levels in the organization. Budgets are one planning technique that most managers regardless of organizational level they help formulate.

It is important managerial activity because it forces financial disciplines and structure throughout the organization. However, many managers do not like preparing budgets because they feel that this process is very time consuming, inflexible, inefficient and ineffective. How can the budgeting process be improved? Scheduling: Next, we will discuss if you observed a group of supervisors or department managers for a few days.

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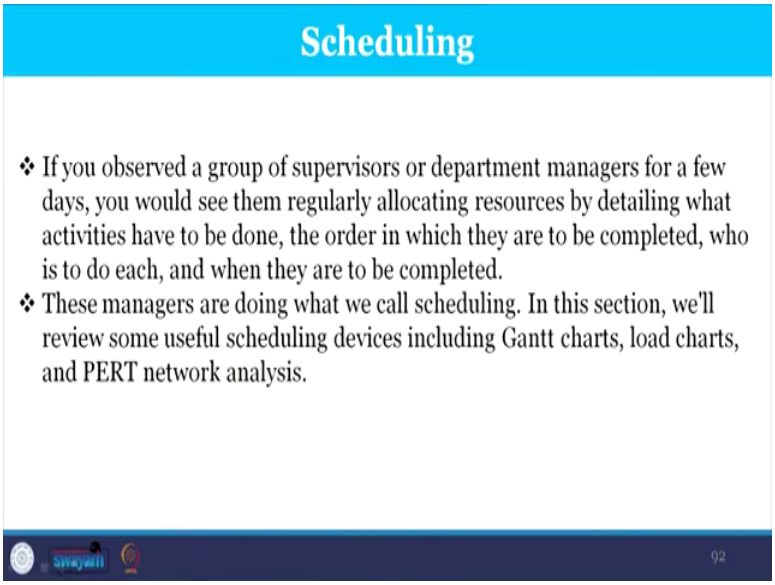

You would see them regularly allocating resources by detailing, what activities have to be done, the order in which they are to be completed, who is to do each and when are they to be completed. So, these managers are doing what we call is scheduling, in this section. We will review some useful scheduling devices including Gantt chart, load chart, PERT (program evaluation review technique) or network analysis.

And it is scheduling is when a group of supervisors or managers regularly allocate resources by detailing, what activities have to be done, in what order, in which they have to be completed, who is to do each activity and when they are to be completed.

In this section we will review some of the useful scheduling techniques like Gantt chart, load chart and PERT network. What is Gantt chart? Which how it is useful? Gantt chart was developed during the early 1900s by Henry Gantt and associate in the scientific management expert the Frederick Taylor.

The idea behind Gantt chart is very simple. It essentially is a bar graph with time on the horizontal axis and activities are plotted on the y axis vertical axis activities which are to be scheduled. The bar shows output both planned and actual over a period of time.

The Gantt chart visually shows, when the task is supposed to be done and compares that with the actual progress on each. It is simple, but important device that lets managers detail easily what has yet to be done to complete a job or project.

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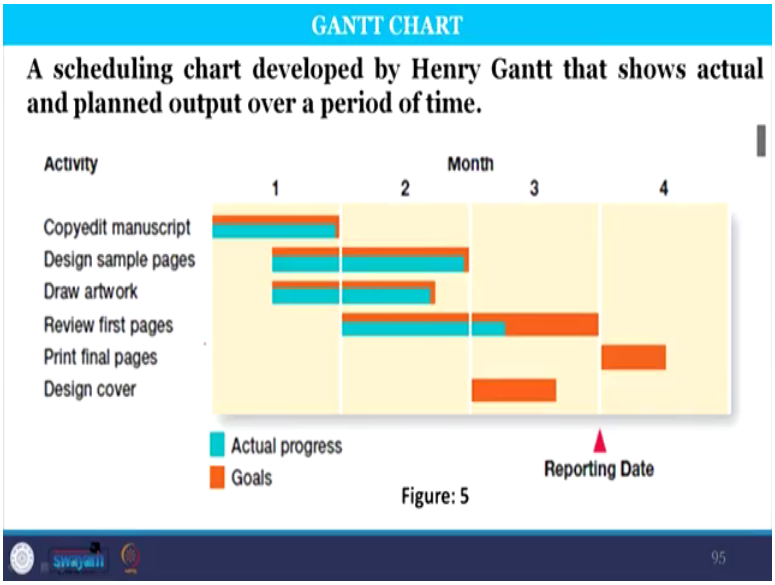

And to assess whether the activity is ahead or behind schedule a typical Gantt chart appears like a scheduling chart developed by Henry Gantt that shows actual and planned output over a period of time. So, activity is plotted on the vertical axis and horizontal activity, a horizontal axis the date is plotted or time is plotted.

And you can know when for example, if we have a Gantt chart we can know say some activities like copy edit manuscript, design sample pages, draw artwork, review first page, print final page, design cover.

So, if we are supposed to plot the Gantt chart for activity planning of writing a book or compiling a book, so, how we can, what are the various activities to be noted? As I said if you have to, if you have to compile a book or if you are compiling a book, what are the various activities like designing the cover page, print final pages, review first page, draw.

So, mostly the activities involved are drawing the artwork or writing then design sample pages copy edit to the manuscript. So, mostly as in writing a report or writing a book planning, then executing the message and compiling the message or proofreading these are the important steps.

So, these activities can be plotted in the horizontal in the vertical axis and the date can be plotted like by when you are going to finish compilation of the book, when the book is to

be completely written or compiled. So, this an actual progress of the work can be plotted against the goals or the end results.

And we can know whether in which activity there is an activity running behind schedule. So, Gantt chart gives us gives an overview of how many activities are planned and whether the activity is moving in the timeline or there is a gap in the time which is already set or the for achievement of goal.

Next we will be discussing about load chart. A load chart is a modified Gantt chart. It is just like a Gantt chart, but it is just a modified version. Instead of listing activities on the vertical axis load chart lists departments or specific resources on the vertical axis.

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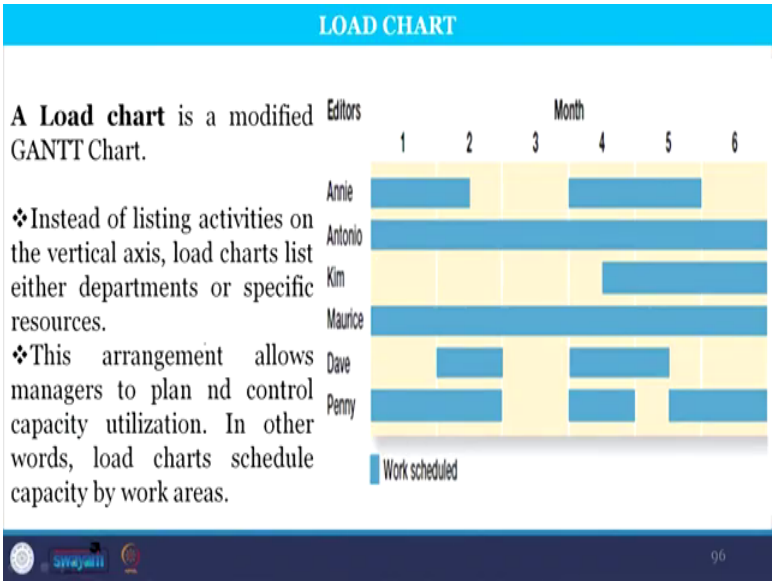

And this arrangement allows managers to plan and control capacity utilization.

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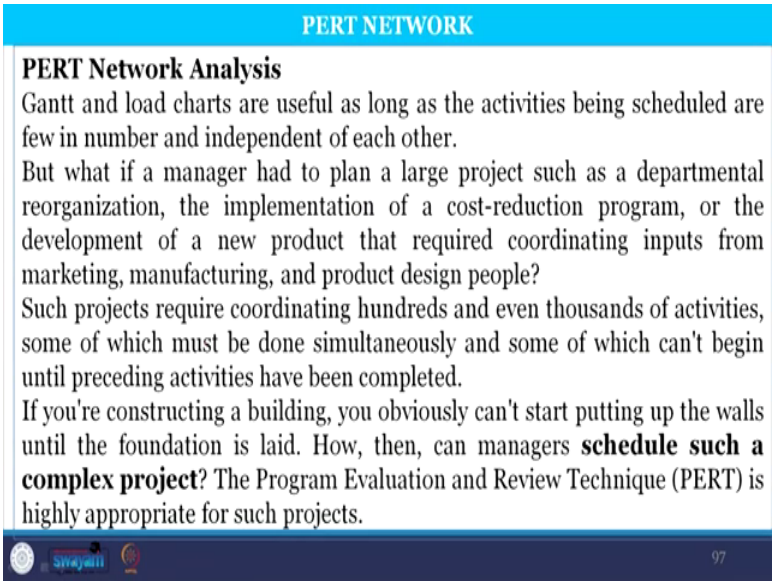

In other words load chart schedule capacity by work areas. Then further moving on to the next technique we will be discussing about PERT that is Program Evaluation and Review Technique network analysis technique. So, Gantt and load chart basically are useful as long as activities being scheduled are few in number and independent of each other, activities are independent of each other.

But not necessarily every project will have activities which are independent of each other. There would be several projects where the simultaneous activities or of the project are also going on and they are also dependent on each other they are not independent.

So, when a manager has to plan for large projects such as a departmental reorganization, the implementation of a cost reduction program or the development of a new product, that required coordinating inputs from marketing, manufacturing and product design people as well as also several other departments.

So, such projects require coordinating hundreds and even thousands of activities together. So, some of which must be done simultaneously and some of which cannot begin can until preceding activities are yet to be completed. So, if you are constructing a building you obviously, cannot start putting up the walls with the foundation without laying the foundation.

So, how then can manager schedule such a complex project? The program evaluation review technique is highly appropriate for executing such projects. PERT network is a flowchart like diagram that depicts the sequence of activities needed to complete a project and the time or cost associated with each activity.

With a PERT network a manager must think through what has to be done, determine which event depends on another event and identify potential trouble spots. PERT also makes it easy to compare the effects alternative actions might have on scheduling and cost. Thus PERT allows managers to monitor a project's progress, identify possible bottlenecks and also helps in shifting resources as necessary to keep the project on schedule.

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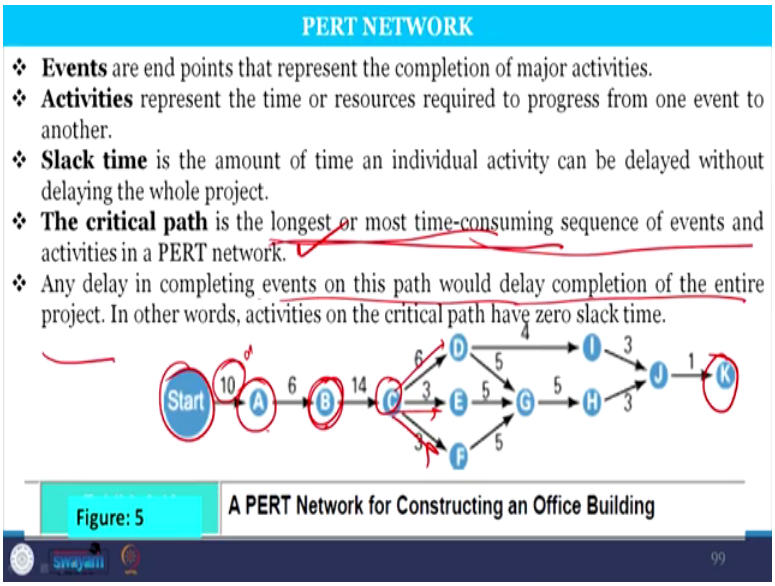

Figure: 5 A PERT Network for Constructing an Office Building

And PERT network what are the various critical points, I would discuss. Important activities are events, activities like time, the critical path. What is an event in a PERT chart? Events are the endpoints that represents the completion of major activity and the language of PERT there are some important points that I will be slowly discussing.

Activities represent the timeline or resource required to progress from one event to another event. Then there is another point called slack time is the time amount, is the amount of time an individual activity can be delayed without delaying the whole project.

The next point is critical path is the longest or most time consuming sequence of events and activities in a PERT network. So, any delay in completing events on this path would delay completion of the entire project. In other words, activities on critical path has 0 slack time. A PERT network for constructing an office building is exhibited in this diagram.

So, there is a start event. Event is written like there is a start event and there is an end event. So, when the event starts it goes to the next event that is A to B and to C and so on. Then again there are 2 events, 3 events which are starting and each of them have a different timeframe and what we will discuss in this?

So, what is the critical path? Critical path is the longest or the most time consuming path. If we calculate, it took 10 days to reach to point A. Then 6 days for completion of the project from A to B or the path from A to B.

So, calculating the longest path we can know what is the critical path; that is the longest path or the most time consuming sequence of events and activities in a PERT network. And any delay in completion of events on this path would completely delay the completion of the entire time of the project.

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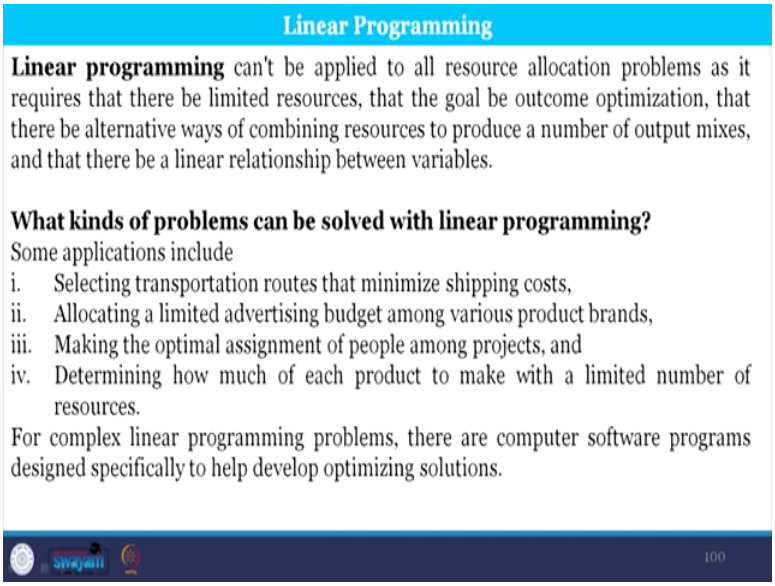

So, with this a PERT chart, I will move on to the next point which is linear programming. Linear programming and, what is its application? What type of problems

can be encountered to solve the linear programming problems? We will be discussing in more details.

What is linear programming? It cannot be applied to all resource allocation problems as it requires that there be there that there be limited resources, that the goal be outcome optimization, that there be alternative ways of combining resources to produce a number of outputs mixes and there will be a linear relationship between variables. What kind of problems can be solved with linear programming?

Some applications are selecting transportation routes that minimize the shipping cost and allocating a limited advertising budget among various product, brands, making optimal assignment of people among projects and determining how much of each product to make with a limited number of resources. So, for complex linear programming problems, there are computer software programs, designed specifically to help develop optimizing solutions.

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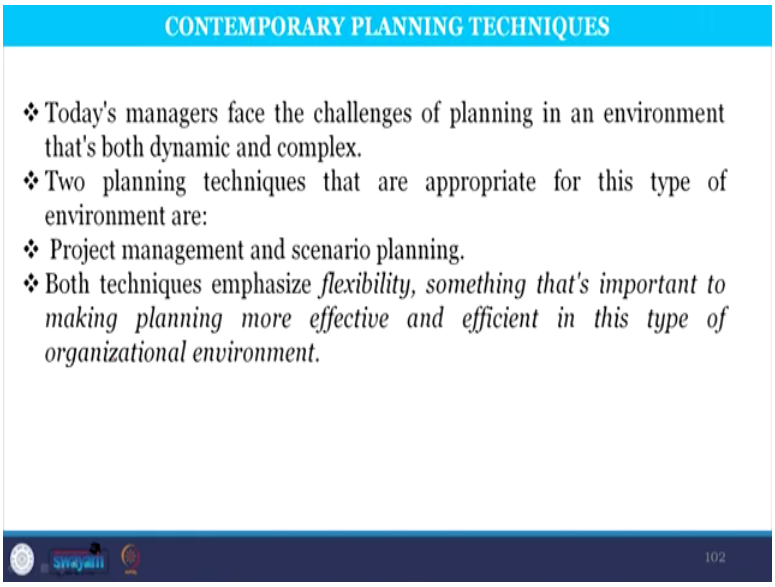

A graphical solution to linear programming problem and then I will move on to the discussion on contemporary planning techniques. We have discussed in the section application of benchmarking. Then a case of Boeing, Boeings cost minimization, Boeings maintenance cost optimization method. Then we discussed about the linear programming PERT, we discussed about scheduling, Gantt, load chart then PERT network analysis.

We also discussed about, what is budgeting and resource allocation at large. Then moving on to the next point contemporary planning techniques, what are the techniques? What are the planning techniques which are applicable in the present business conditions or in the contemporary business?

Today's managers they face the challenge of planning in an environment that is dynamic and complex. Yes of course, the present business environment is facing uncertainty a huge amount of uncertainty because of some unknown factors. And so planning cannot be as exactly as or planning will not result in exactly what we have planned. So, there are some uncertainties which need to be taken care of.

And two planning techniques that are appropriate for this type of environment are project management and scenario planning. Both these techniques emphasize on flexibility, something that is important to making planning more effective and efficient in this type of environment, dynamic business environment.

So, moving further to scenario planning; scenario planning is creating stories of positive future scenario that are considered to be vital for the future of the organization. Although scenario planning is useful in anticipating events, it is difficult to forecast random events.

So, for instance an earthquake in Taiwan in 1999 that destroyed a large portion of the countries chip manufacturing facilities was a wild card for global computer makers. Other random events that surfaced in the last decade would be rapid spread of AIDS, sudden popularity of the internet and there is certainly will be random events that materialize in the 21st century as difficult as it may be for managers to anticipate and deal with random events.

They are not totally vulnerable to consequences. Lastly I would like to say also the pandemic the has also given a kind of has created a crisis in the business environment and many large to small manufacturers have suffered manufacturing service firms, educational institutes, hospitality industry have suffered tremendously because of the crisis posed by the pandemic COVID-19 pandemic.

So, scenario planning of course, helps to work as a contemporary technique to effectively work in a uncertain business environment in a highly dynamic and dynamic business environment. Suggestions for scenario planning, identify potential unexpected events, it

is very important to identify the unexpected events or intelligently assessing the environment.

Determine if any as I told you that because of the technology platform or because of the educational technology available, the COVID-19 situation could be effectively managed by the educational institutes. There are various software's like Moodle then WebEx and Google Meet and Microsoft teams, which have effectively given provided a solution for dealing with the problems associated with COVID-19.

And when the problem was largely because the normal situation demands that there has to be a large number of people cannot be available in one place at a time. So, and also other problems are to maintain social distance.

So, how to execute your business in a situation where there are some associated problems? So, as discussed educational institutes have effectively used the services of the online platforms of learning through which they are effectively taking lectures or classes.

So, providing solutions to uncertain situations is possible because of the scenario planning which has led to identification of unexpected events, intelligently assessing the business environment and probably identifying opportunities or identifying the gray area in the market.

So, determine if any of these events would have early indicators and set up an information gathering system to identify early indicators have appropriate response plans in place if these unexpected events occur. So, this example of having various online platforms or learning or various software's for conducting or executing lectures which has been planned maybe some 5 to 4 to 5 say maybe around 2 to 3 years in advance and has really provided a solution for effectively handling a situation of crisis.

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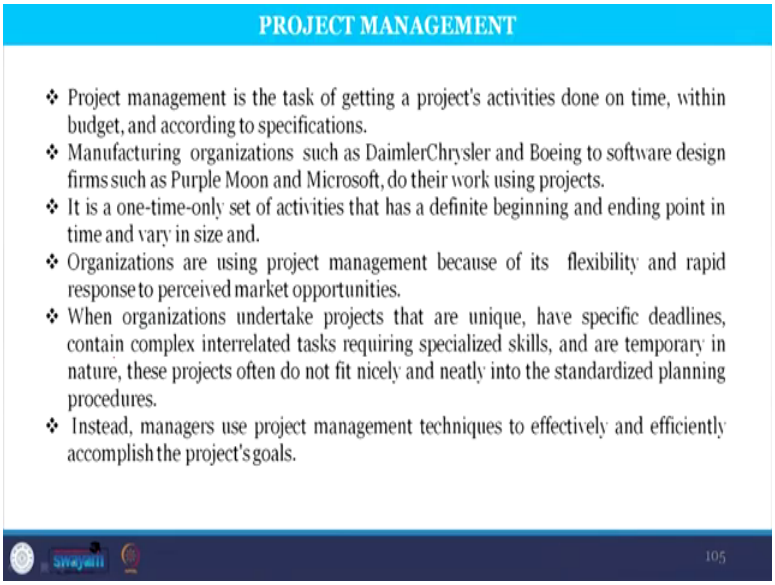

So, next moving on to the next technique of project management, what is project management, I will be discussing what is project planning process.

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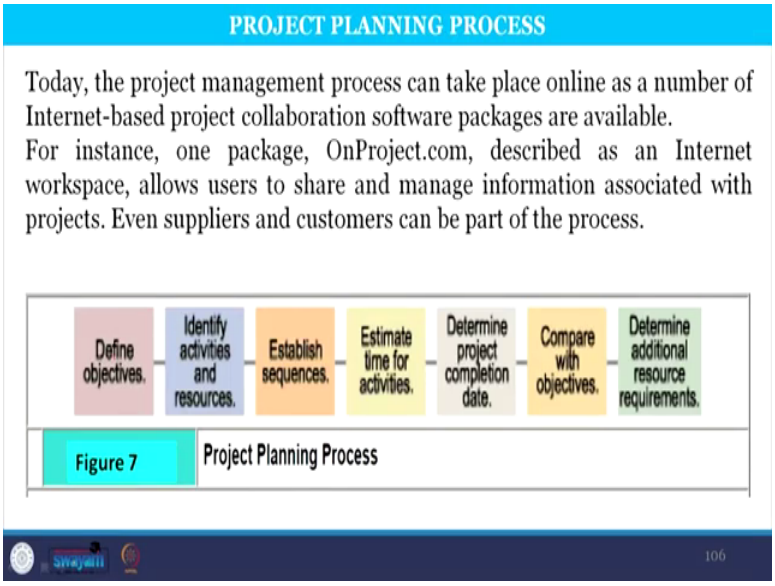

So, first I would like to start this discussion with the project planning management is the task of getting a project activity done on time within a budget allocated and according to the specifications of the project. Manufacturing organizations such as Daimler Chrysler and Boeing to software design forms such as Purple Moon and Microsoft do their work using project planning methods.

It is a onetime only set of activities, that has a definite beginning and ending point in time and vary in size. And organizations are using this project management because of its flexibility and rapid response to perceived market opportunities. When organizations undertake a projects that are unique have specific deadlines contain complex interrelated task required specialized skills and are temporary in nature these projects often do not fit nicely and neatly into standardized planning procedures.

Instead managers use project management techniques to effectively and efficiently accomplish the project goals. Now, moving on to the project planning process today the project management process can take place online. As a number of internet based project collaboration software packages are available.

For instance one project dot com described as an internet workspace allows users to share and manage information associated with the project, even suppliers and customers can be part of the process.

So, the project planning process starts with the definition of objectives, identify activities and resources then establish sequence of events, estimate time for activities, estimate the determined the project completion date, compare with the objectives and determining additional resource requirements.

So, concludingly what we have discussed so far in this lecture? We have discussed about the various techniques like techniques for resource allocation. We discussed about the budgeting, scheduling breakeven analysis, linear planning programming.

And we discussed about the types of budget then we discussed about Gantt chart, load chart, PERT and linear programming technique and contemporary planning technique of contemporary planning methods of scenario planning and project management. So, with this I would like to conclude this session here.

Thank you so much.