Project Management
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Module No # 1
Lecture No # 01
Introduction to Project Management

Project management as a course is very vast so I will just very briefly first go through the books. The reason I want you to first through the books is that it will give you idea about what type of Concepts I am going to follow. I will try to bring different types of problem solving and also in between I will refer to few of the problems sets which the students can solve and get a good understanding of project management.

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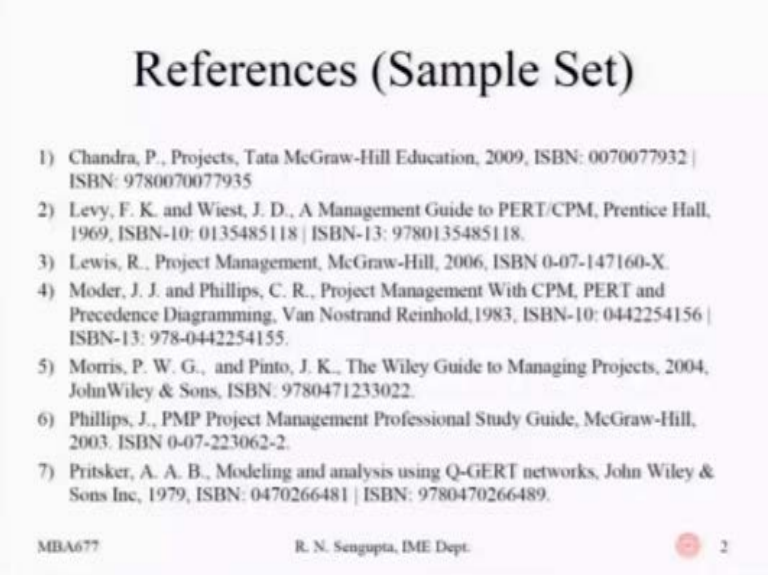

The reference list which I am going to follow which is basically a collection and collation of different types of notes which are prepared not very in depth, in any field but it basically covers in a general format. The main book which is very specific to the Indian audience is the first one which is by Prasanna Chandra published by Tata McGrow Hill is basically known as projects. It covers all the topics related to project management, PERT (program evaluation review technique), CPM (critical path method).

A very good book but old book in the market is the second one which is Levy and Wiest basically is called the management guide to PERT and CPM. So it is little bit advanced book but condenses all the topics which is generally are covered in project management and it does not obviously cover few of the topics (main focus of this book is PERT and CPM). Basically it is about how you find out the time taking to finish a project if you crash a project, what is overall cost involved after crashing and what is the marginal rate of the cost of the projects.

The third, fifth and the sixth book are in general in nature, if you see this the slides which is the third one is the lewis, the fifth is the Morris and six one is the Philip.

I want to talk to you about Moder and Philip which is a little bit old book as like in line with Levy and Wiast but it has got a very in-depth analysis from the mathematical point of view, the concept of project management and obviously it consist the concept of how precedence diagrams which will come consider later on that. How they are considered in details, how operation research optimization framework is used to analyze different type of problems, are covers in depth with respect to Levy and Wiast, another thing is that it has few problems which are solved some coding in the concept of slam, 'Slam' is basically a simulation package (obviously we would not use it here but I just want to mention that) it has some and codes in the slam concept in book which is the Moder Philip one.

And last but not the least if you see the book which is the seventh in number but Pritzkar Alan Pritzkar it is basically covered a whole different topic of Q-GERT where precedence diagram all these concepts are there but cyclicity comes into the picture such that for any very big project you are able to analyze those projects from the point of view of Q-GERT and try to solve them accordingly.

So obviously our flow would be mainly from the basic topics then go into the concept of precedence diagram in a more details and obviously before that we will cover PERT, CPM and then go into the Q-GERT but main focus would be the former part. What will try to cover (obviously these slide that does not have that, so I will try to be very brief considering that you have already seen the same syllabus), It will basically consider what we mean by projects? How

projects can basically be analyzed? And what are the basic general characteristics in the project then we will come to the concept of Gantt Charts. How the Bar charts are basically analyzed in order to understand the successor and predecessor of the other jobs (so which jobs comes before which jobs comes what are the relationship) between the jobs and in activities, then we will consider the concept of activity on node and activity on arc concepts (activity means the task which you are going to do). So obviously there are different type of notions how you depict them pictorially so it can be there from the concept of arc or from the concepts of nodes. Then we consider different two main types of network concepts which are used to analyze projects (which is PERT and CPM).

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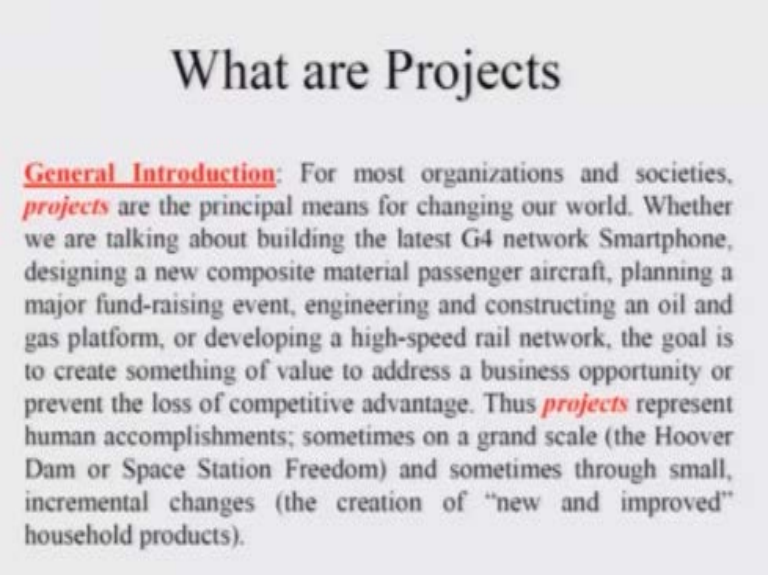

What are main difference of the PERT and CPM? I will consider that later on. Apart from deterministic time framework, how you consider the probabilistic time framework, the concept of most pessimistic time, most optimistic time, the average median time. Why median is taken and not mean, then we will consider different type of distributions in the area of networks or project

management, how it is relevant, how you try to find out the average time taken to finish a project, what is the slack, what are the dummy activities. So we will consider all these things in details, then we will consider what is the critical path or critical time taken to finish a project and how it has an effect on overall resource constraints because we will consider (till now, then the Fag end of the course that) all the concept of basically trying to analyze a project, considering that there is no resource constraints (that means either man, material or amount of money are not the important factor, what is important is the time).

Now the moment you basically overflow your time, these consequence of more resources is being used, more manpower is being used, more money being used comes into the picture. And if you want to basically crash a job (crash means basically shorten the time duration of the job considering that it needs to be done much beforehand), so how it will affects our overall resource constraints will be considered.

We will only solve these problems on a simplistic notion using the diagrams only and will not go into the actual solution of the problem from the optimization point of view. Even though I will try to give you some flavor of how the optimization problems are basically formulated in order to solve this type of problems and then in the fag end of the course I will try to cover come concept or basic algorithms, ideas and rules of sequencing and scheduling (which many not have any direct relationship with the project management but it will give you some idea), How concept of sequencing and scheduling are utilized when you have different types of jobs and different types of a machines (machine means the entities which basically process the job) that can be a machine, that can be a tailor machine, that can be an outlet in the bank where you are giving a check and getting the money.

So how they should basically be managed and look into the factor that how the overall time or overall efficiency of the overall system can be increased. To finish this course (apart from the problem solutions which we will do) I will consider one or two very simple cases which are relevant from the point of view of project management (mainly from the point of view of PERT CPM) and if time permits I will consider one or two cases in the area of Q-GERT but that will depend on how we proceed.

Coming to the general introduction, what do you mean by projects? So for most organization and societies you have some work to finish. Now work need not be repetitive, it can be overall once concept of work which has to be framed in such a way that the overall timing of the works are critical (I am using the word for the first time (not the critical path method), the word critical I am using, will be utilized later on also) such that you want to finish the work considering some project completion or framework of time and resource utilization is there in order to meet some deadlines of some work, (it can be either building up) say for example finishing the modeling of the car, can be building of the bridge, can be either the building up of the road etc.

Now to give a brief background the concept of PERT, CPM and precedence diagram concepts basically came into the force or came into the ideas of how we can utilize that during the US space program of Apollo where the amount of work need to be done for one in one project that means there was only one project which has to be done and hence the concept of PERT and CPM came. So if you basically read into the books you will understand that the history of that how PERT, CPM and project management came.

So we will be talking about building the latest G4 network for the smartphone, designing a new composite material passenger aircraft or car are project (in the sense like we will consider that how that the projects which you are going to implement which have some deadlines, can be implemented.) We need to basically implement and try to utilize the concept of project management in order to finish that work within time considering the resources which are there.

It can be also related to a planning a major fund raising event like, say for example some political campaign is going on, some eradication of leprosy drive is going on or you want to basically float a product in the market and there is a deadline that the marketing campaign should be over by that time, so these can also be termed as a project.

Project can be either engineering or construction of an oil field (so you have a base which has to be the drilled and oil has to be tapped such that within a certain time oil has to be pumped out and then sold in the market), so obviously that can also be considered as a project with different type

of constraints and different type of outputs which are of main consideration for the project manager or the person or the set of the persons who are trying to analyze that project.

It can be also related to developing a high speed train so what are the requirements which are to be done what is the time schedule so based on that you basically design a project for that. The goal is basically to create in all these things which I mentioned it can be is to create of something of value to address a business opportunity it can either from the social point course perspective it can be from the business perspective and main end result is that it has to get some benefit.

When it can be social as I mentioned it can be from the financial point view also. So thus project represent human accomplishment sometimes on a grand scale I say for example if you consider the Hoover Dam project. So obviously that was also a project if you consider the project which ISRO is for the Mangalyaan for the moon project whatever it is those are also project which can be termed that where the concept of project management has been utilized in a big way.

So consider that you want to build you they were some huge amount of tasks needed to be done in order to build the Bhakra Nangal Dam obviously that was also a project on a big scale. And sometimes the project need not be very big they can be small but they can be complicated in the sense that they can be loops inter loops and feedback loops as that the concept of PERT and CPM which I had mentioned in the beginning do not consider the concept of looping being there.

So that means these feedback loops are not there which will be considered in the later part of the course when we consider the concept of Q-GERT. So we with an introduction we consider all those later on also. So different between production and projects so production is basically a condition continuation production of say for example a similar type of cars which is being produced or similar type of machine tool which is being produced or similar type of cloth which is being produced in the garment factory.

So obviously that has some difference wind from the concept of our project so in what are those I will just read it from the slides and I explain it.

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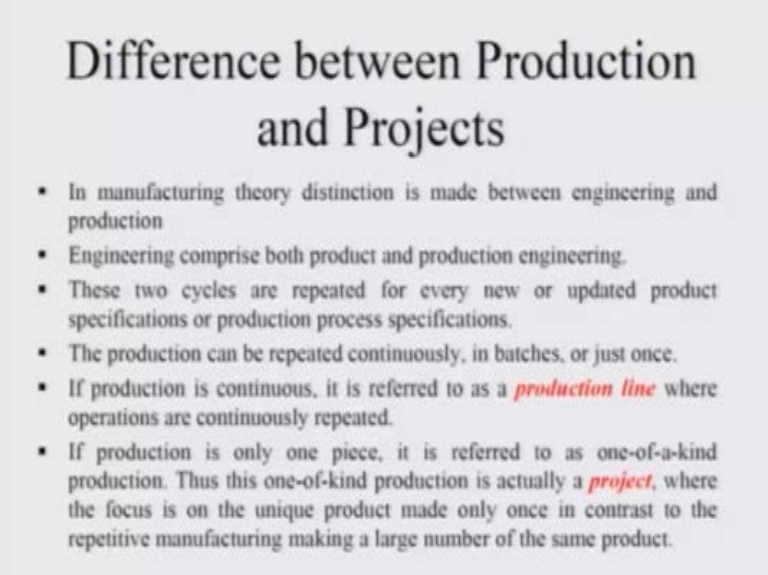

As we proceed in manufacturing theory is distinction is made between the engineering and the production. So you have different type of engineering concept which I used and then they are basically being interpedently in the production concept. Engineering comprised both product and production engineering so product can be basically trying to design the product and trying to find out what are the essential features reengineering and so on and henceforth are considered it when you are basically doing the product design as such in the under the ambit of engineering.

So these two cycles of basically product and production engineering I repeated for every new and updated product and basically depending on the specific issues which are there in the market you basically try to update that. Say for example the fuel tank design as to be done again for one of the Bajaj Motorcycles. So it has to be done in such a way that it takes care of that or say for example when you are trying to stitch a shirt and by being done by or a jeans being manufactured by Arvind Mills.

Obviously there are some design parameters which have we take into consider depending on the market trainer and what the people want so obviously that would be taken into consideration and the new design features would be done. So obviously that goes into concept of production and product design rather than being a one and one only project which is on standalone basis and which has to be done on a single framework only one time.

The production can be repeated continuously they can mean batches or they can be just one. So this concept of once when you do that a big project which would not be repeated again they will try to basically bring the concept of project management. In production if it is continuous it is referred to that the production line whereas in operations are continuous are repeated would not be considered the concept of project management.

So you have only one flow obviously feedback would be there as I mentioned but this one flow is on a standalone basis considering that it will be only done once. So hence the concept of project management would be coming to the picture. If production is only one piece it is referred to as one of a kind production thus the one of a kind production is actually only once when you do that I have mentioned a few seconds back is basically a project.

Where the focus is on the unique product design which has been made and unique production concept which will be used in order to implement that can be I am using the word ah but design and production from the production part of view but it can be say for example project can be implementation for marking strategy implementation.

Say for example of trying to basically come up with a new drug which is one of its kind only and how it would be marketed or say for example you want to find out the efficiency of a drug in the market and then basically plan your strategy accordingly how things can be done. So that is only one time hence it will be basically termed as a project on a project management scale.

So where in the project the focus is on the unique product made only one contrast to the repeated manufacturing concept which is used for the same product time and again in the engineering concept.

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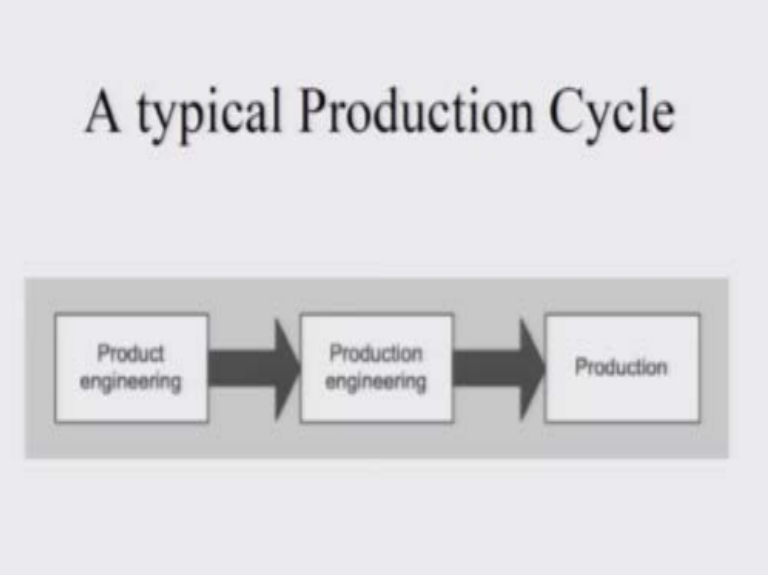

So what we see in this slide is basically a typical production cycle you have a product engineering so all the engineering. So all the engineering has been used the production concept will be used production concept this that means you are using a drill machine it can be using a lathe machine, CNC machine but they are being used in such a manner in a way that the job repeatedly would be done time and again for the products.

Which are coming such that they would basically feed into the system line of production which are sold in the market consumed or whatever it is? So after the production engineering the production starts and once the production starts the reputation on the same set of procedures which had already been fine-tuned would be repeated time and again.

So hence any variations which are which have already been considered in the concept of production engineering and the product engineering beforehand are already there such that there is no such concept of trying to change the overall production process as you go in producing the material or the product.

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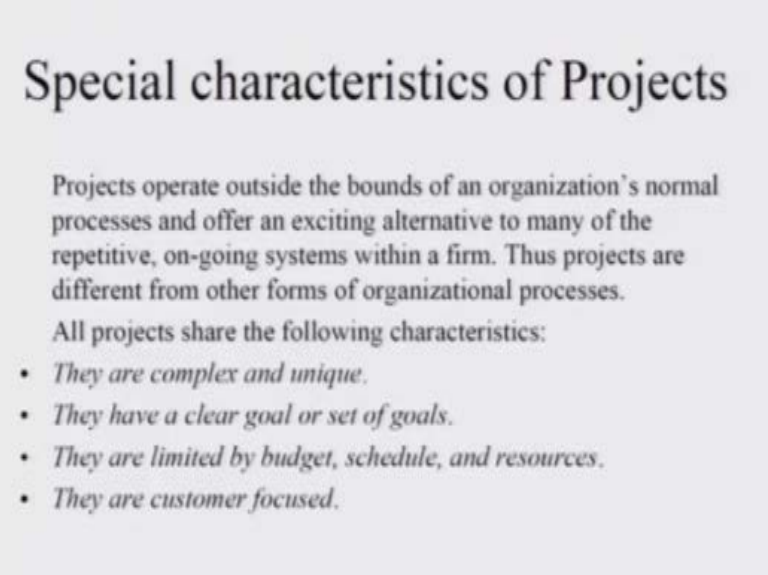

Projects operate outside the bounds of these and outside the bounce of the organization normal scheme of things. So they are as I mentioned they are only one effort at a time have to be done only once but obviously there are different type of constraints which limits its efficacy says that you want to basically plan it in such a way that you get the maximum benefit.

Benefit means that means time is a constraint issues is a constraint all these have to be considered in the best possible way. So they offer an exciting alternative that is project management to many of the repetitive ongoing systems which a firm. Thus projects are different from other forms of organization processes and projects share the following characteristics which many not be intrinsic part of each and every part generally they have the characteristics of any project have these.

They are complex and they are unique means one at a time so once you finish the project that could not be repeated in future. Complex in means that there different type of sequences of products which have of a sequence of events have to be undertaken so the overall completion of the project is accomplished. They have a very clear set of goals and clear set of a small set accomplishment say for example I am trying to build a stadium so obviously it will be stated that I want to use the stadium for a certain football tournament which is going to come up in 2018.

So obviously it would mean that my deadline of trying to finish up that project is fixed say for example January thirty first two thousand eighteen based on that I try to find out that when should

the inauguration should be done and as I try to find out and go back I try to find out one at a time when the foundation would be laid when the overall field should be set up how should the stadium we set up such that that chairs the audio system the security system as required should be setup.

So that they are unique in in nature such that one at a time they are completed you basically are able to complete the whole project. So obviously there would be precedence diagram say for example without finishing the overall ground work or laying the foundation of overall stadium I cannot complete the whole work. So obviously it means those some jobs or some of the activities are needed to be done in such a way there is a certain sequence of events which need to be accomplished in order to basically finish the overall project.

They are limited by time, schedule and resources and budget so obviously we will consider this point of budget schedule and resources later on but our main focus will be basically to consider the concept of time as the main constraint. So our main constraint is that we will consider the time as money and try to finish off any of the projects with in schedule time.

Such as that any change in the sequence of the events or say for example trying to squeeze or crush of certain activity you are trying to basically utilize your sigma resources are done in such a way that your main concern which is the time depending upon the which you want to finish the project is taken into consideration with the primary goal. But it may so happen that in many of the projects apart from the time resources or the budgets are also important.

So in that case how you basically consider the concept of budgets and the concept of basically resources and they need to be brought into the picture after the time constants are taken into consideration would also be considered but obviously in many of the cases always not in the initial part that will be considered a simple very multi objective programming. Where the resources along with the times are considered? In such a way that the weightages are given on the concept of time, on the concept of resources in a budget.

Such that you are able to basically find a compromise such that it fulfills the criteria of the overall project in all things which are important for you. So it need not be only time is important it need

not be only resources are important if both of them are important you make a balance between them and try to basically finish your work accordingly.

Projects are very customer focus like customer in the example which I just mentioned few minutes back is basically the stadium is to build why because of football tournament would be held and if the football tournament is held your main focus are the customers is basically the spectators who are going to come and watch it may be the society. Or say for example you want build a hospital and your main focus would be to meet the demand of the healthcare which the general public in the particular region has.

Or say for example you want to basically come up with a new drug consider in the area of malaria or say for example in the area of HIV or say for example in tuberculosis you want to plan it in such a way that your main goal which is basically to meet the requirement of the customers which is the social structure such or people who are suffering from such diseases are taken care accordingly.

It can be say for example if you want to have float project related to basically trying to come into the market is certain bike it may be that your main goal is basically to come up with the unique motorcycle or bicycle such that it basically gives the competition to your customers because your main motive definitely can be to run your business in order to make profit.

So how you will basically try to optimize the project in such a way that it basically as a maximum benefit on your overall cash flows on overall of your profit motivation and definitely be a or criteria based on which the project could be taken. So in general to put use in very qualitative framework without going to the concept of quantitative so obviously we will consider a quantitative concept later on.

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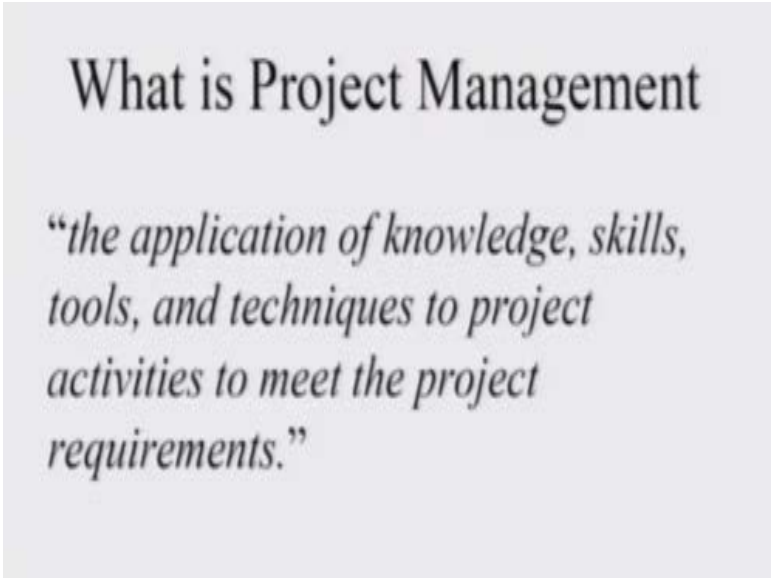

So project management is basically the application of knowledge, skills, tools and techniques to project activities to meet a certain project requirement or criteria. So what are the requirements? What are the criteria? We will consider that but in general we will first try to basically analyze what is the project? And what are the general concept based on which the project is build up and slowly consider what are the criteria based in which a project is evaluated?

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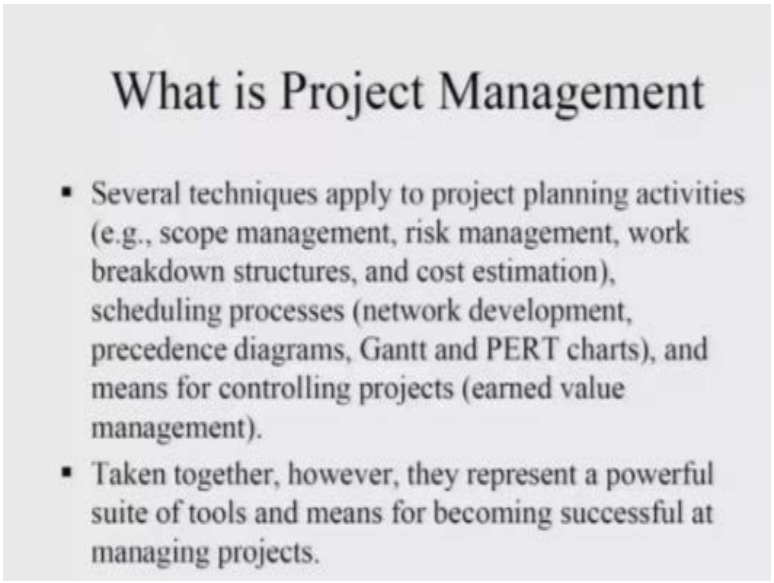

So several technique apply to project planning activities say for example the concept of scope management is their concept of risk management is there, risk I want to pause here. It does not mean the concept of risk from the point of view of financial risk only it can be from the point of view of what is the social impact of the project does it have a risk?

What is the overall impact of the environment? So does it have a risk or say for example what is effect of the risk from the point of view of its implication on the company which is basically trying to come up with the project. If it is say for example in my last example which I gave about trying to come up with the (()) (27:18) with the new bike or a motorcycle it may have a huge implication on the overall bottom line of the company.

So if the company is really banking on that product so obviously your main thing is basically profit motive. So any risk prospective for the company would be the financial implication it may face in case the project does not take off what does not pay that returns which the company wants? So we will also consider later on the detailed work breakdown structure how the works or the how the activities are broken down in components such that if gives you a good idea that what are the building blocks for the overall projects?

So rather than concentrating on each and every activity at one go it may be better we consider different blocks of activities such that concentrating on the blocks would give us a much better macro view of how the project is done? Rather than going into the macro details at one go immediately. Projects would definitely consider later on as I mentioned that time is important that is true but cost perspective that how you can reduce the cost would also come into the picture.

We will also consider the scheduling processes how the actual drilling processes the activities are done and we will consider them in such a way that all the concept of precedence diagram all the concept of relationship between the activities all the concept of which job should come before which job should be coming later on how they can be taken up simultaneously or they can take in our different points of time considering there is a time difference between two different activities or jobs would also be considered the reason.

Why I mentioned the concept that how the time difference between two activities and the jobs should be considered or are to the considered is that we later see that the concept that general concept of how to fine of the slacks? Or how to find out the overall time duration of jobs are there?

We will have to basically have a look at different concept of how the precedence diagrams would be done.

So we will also consider the Gantt, the PERT charts and how the controlling projects are done and obviously we will consider that how the on value of the project can be utilized that. How do you finish can be find out the expected value of the project and try to compare different project if the overall scheme of the project is basically the goal is same. So if you want to compare that project one is better than project two of vice-versa we will take that.

Taken together however there so all these concept taken together presents a powerful suit or a set of tools based on which we will basically consider project management as such that over and above the quantitative techniques we will consider that quality field of that also. So with this I will end the first lecture and then as we start with the second lecture we will see that how we are going to expand this concept in the later classes thank you