Software Project Management
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Lecture - 39
Project Monitoring and Control

Good afternoon. Now, let us take up a new chapter that is Project Monitoring and Control. So far we have seen how to prepare schedules, prepare resource schedules, how to prepare cost schedules etcetera, how we can represent, how we can display the schedules, may be in the form of a work plan or work schedule. Now, let us see how to monitor and control the progress of a project.

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We will see little bit about introduction of the project monitoring and control, then we will see a cycle known as project control cycle for controlling the project for controlling the progress of the project, then how can see the project reporting structures what will the structure, then how to assess the progress of a project.

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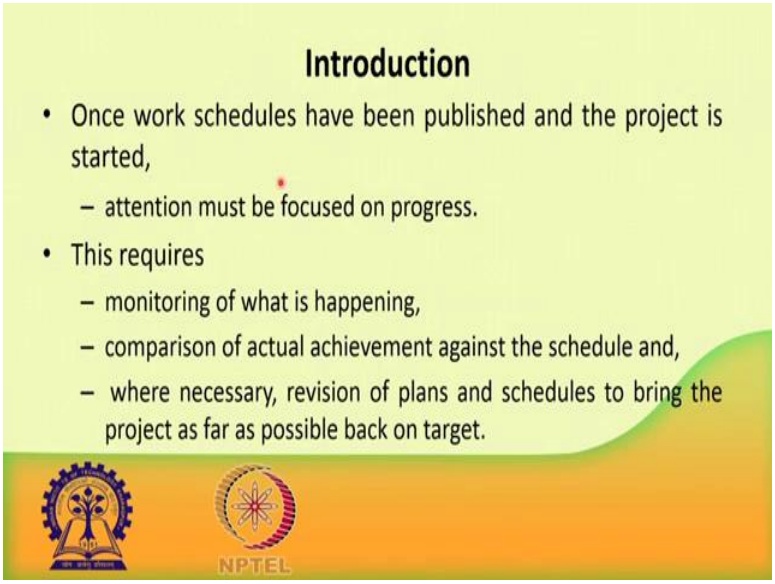

Once the work schedules have been published and the project is started, then the project manager must pay attention or must focus on the progress. I have already told you how we can publicize the outcome of this resource scheduling, may be through the help of work schedules, we can publicize the outcome of this what resource scheduling. So, once work schedules have been published, published and the project has been started, so attention must be on attention must be given on the progress of the project.

So, how to what to focus on the progress of the project? So, this requires monitoring of what is happening in the project, comparison of actual achievement against the schedule one, and wherever necessary, we have to revise the plans and the schedules to bring the project as far as the as far as possible back on target. If in schedule something is what proposed and we are running were we are running away from the schedule, then we have to revise the earlier plans so as to bring the project target so as to what so as to bring the project to the target date.

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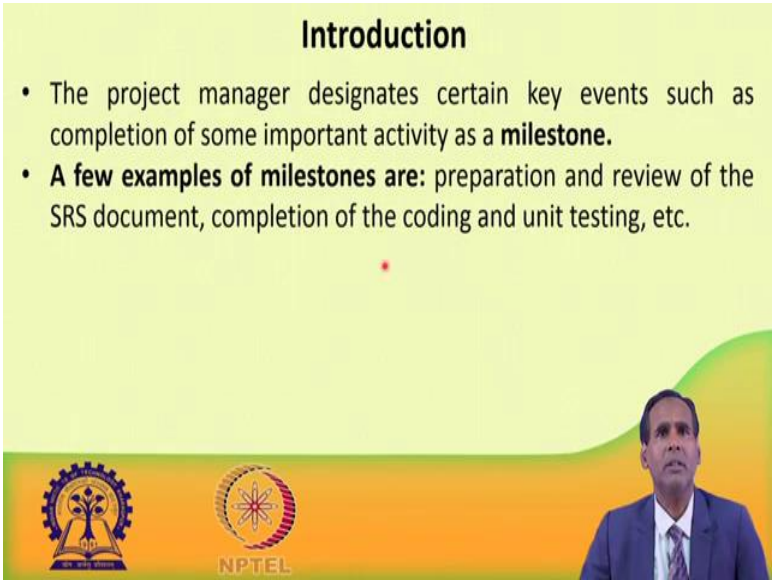

So, once the project is undertaken, and the project manager has to start monitoring the project, the during this or for the project monitoring the project manager designates some key events such as completion of some important activity might be a completion of the requirement analysis, completion of the design, completion of the coding, etcetera. So, these activities may be set as a milestone ok.

So, for this monitoring purpose, the project manager designates certain key events such as completion of some important activity as milestones. The important activity could be completion of requirement analysis, completion of design, completion of coding, completion of testing etcetera, there may be what treated as the milestones.

A few examples of milestones are preparation of review of the SRS document, completion of design, completion of coding, completion of unit testing, completion of system testing etcetera. So, these are few examples of milestones. So, then the project manager can measure the progress looking at the milestone, whether what was proposed in the schedule for the milestone and what is the actual situation right now, whether we have completed this review of this SRS document or not, whether we have completed the coding by this date, by the target date or not, accordingly you can what monitor the progress of the project.

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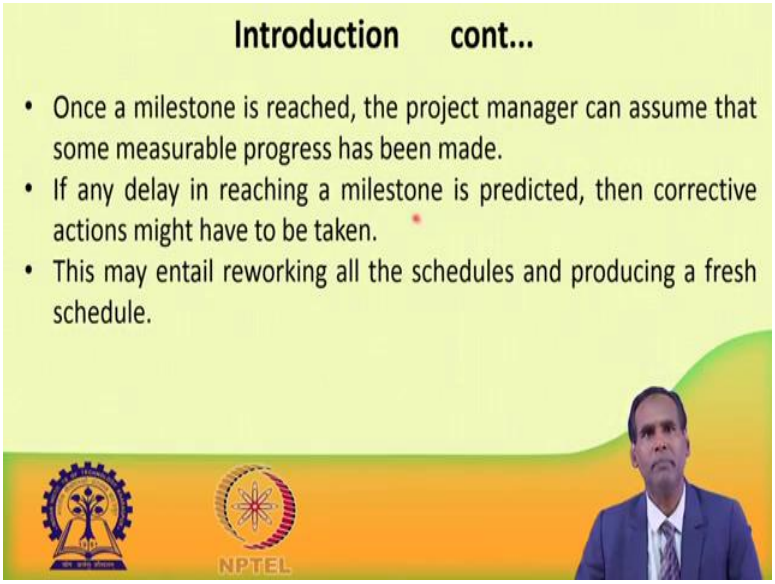

So, once a milestone is reached, the project manager can assume that yes some measurable progress has been made. If any delay is there in reaching a milestone or it is predicted that there will be some delay in reaching a milestone, then the corrective action has to be taken by the project manager. So, this may entail what, so if you are expecting that there will be some delay in reaching the milestone, then the project manager has to take some remedial action.

This may entail reworking all these schedules, so whatever schedules we have repaired earlier; you have you may have to revise them, you have to rework them, because some delay is expected and we have to producing a fresh schedule.

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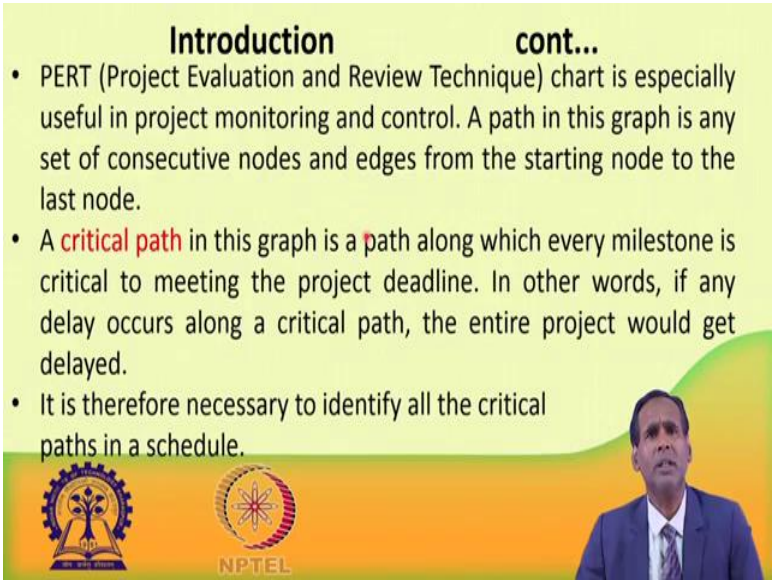

So, there are some tools there are some techniques helpful for monitoring the progress for controlling and the project. So, one such technique is PERT, PERT you have known earlier stands for Project Evaluation and Review Technique; so this strategy especially, very much useful in project monitoring and control. In PERT actually there are several paths and a path you know it is defined a path in a graph is defined as any set of consecutive nodes and edges from the starting node to the last node, this definition we have already seen in graph theory ok; also a path in this graph that means, in this PERT chart is any set of consecutive nodes and edges from the starting node to the last node.

And among all the paths there can be some path, so we call them as critical path and how define the critical path, a critical path is a path along which every milestone is very much critical to meeting the project deadline. In other words, we can define that if any delay occurs along a critical path, then what will happen the entire project would get delayed. Therefore it is very much necessary to identify all the critical paths in a schedule.

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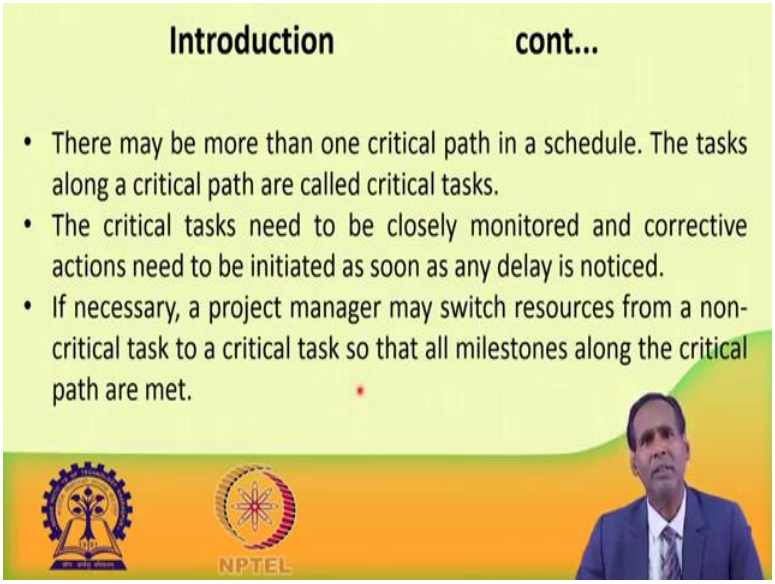

See there can be more than one critical path in a schedule. The tasks along the critical paths, so we call them as critical tasks. The critical task need to be very closely monitored, they has to be controlled, they have to be very closely monitored, because what if there will be any delay, then the critical task will meet will miss that deadlines and hence the overall project duration completion time will be delayed.

So, the critical tasks need to be closely monitored and corrective actions need to be initiated as soon as any delay is notice. So, whenever the project manager expects predicts that some delay will occur or already some delay has delay has been occurred, then he has to initiate some corrective actions in order to what bring the project into the main track into the what scheduled track or the schedule duration. So, if necessary a project manager may switch resources from a non-critical task to critical task so that all milestones along the critical path are met.

So, if a critical task it is getting delayed. So, as a what precautionary action what you can do, the project manager can divert some of this staff which are allocated to the non-critical task to the critical task, because the non-critical task you know it they have some what free times, they have some slack times or float times. So, even if there will be little bit delayed that can consume therefore, what free times or the slack times and it will not affect the overall project completion date.

So, if you find that the critical task they are getting delayed, then as a project manager you may switch some of the resources, you may divert some of the resources, some of the manpower from the non-critical task to the critical task so that all milestones along the critical path they will be met.

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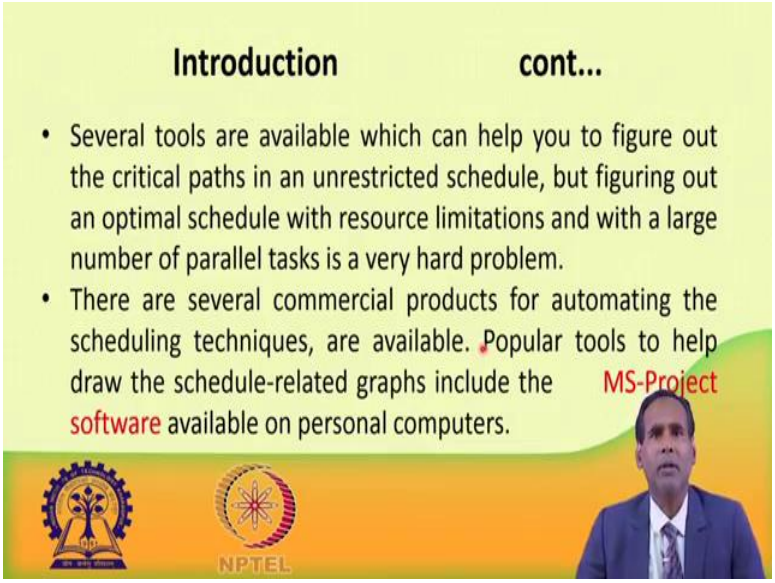

So, several tools are available for project monitoring, etcetera; so we will see some of the tool here now. Several tools are available which can help you figure out the critical paths in an unrestricted schedule, but figuring out an optimal schedule with resource limitations and with a large number of parallel task is very very hard problem.

There are several commercial products or tools for automating the scheduling sequences. For example, the popular tools to help draw the schedule-related graphs include the MS-Project software available on personal computer So, in if you are having you the personal computer is there, then there is a what software there is a you can say software MS-Project software that is available on almost all of the personal computers and this tool you can use to draw the schedule-related graphs such as CPM, PERT etcetera.

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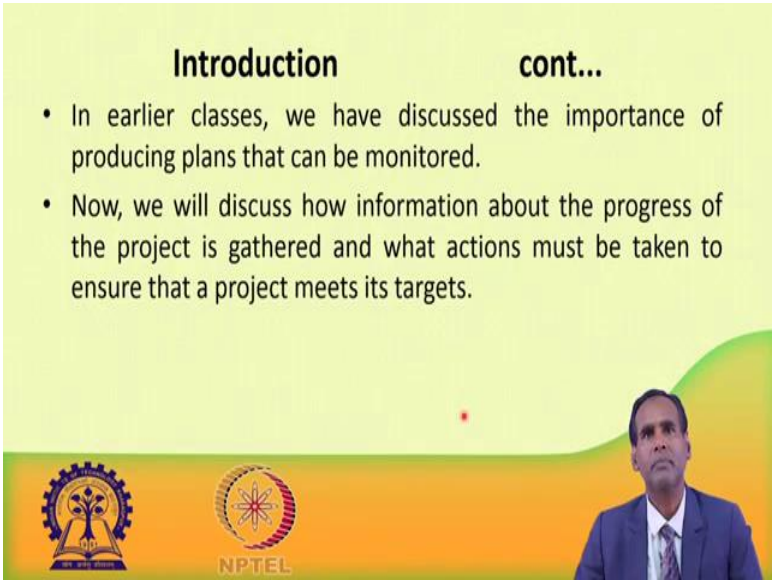

So, in previous classes we have discussed the importance of producing the plans, different plans how to produce we have seen earlier how ok. So, in the previous classes we have discussed the importance of producing plans, which can be monitored. Now, we will discuss how the information about the progress of the project is gathered.

So, how far the progress we have already made the plan, but how far the project is progressed, is it according to the what schedule mentioned in the plan or not; if not, then what action we have to take so that is why, right now let us discuss. How the information about the project of the about the progress of the project how it can be gathered and what actions the project manager must take to ensure that the project meets its targets. If he expects some delay will is to occur, then how he should take some precautionary measures, so that the delays can be avoided and the project can meet the target dates that is the subject matter of today's class.

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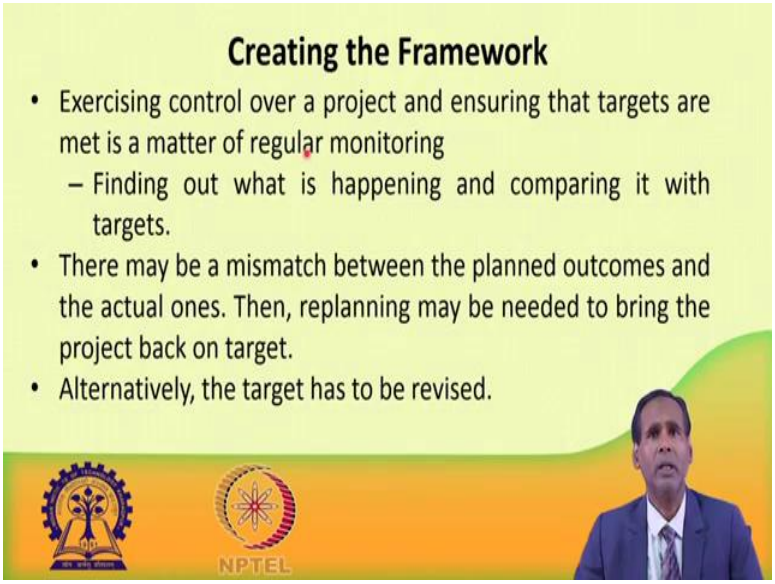

Let us see about the how to create the framework. Exercising control over a project and ensuring that targets, they are met is a matter of regular monitoring. So, a regular monitoring means finding out what is happening now and comparing it to what the target. So, what is currently happening and what should be they are at this time as per mentioned in the schedule as per the target, so compare that. Finding out what is happening and comparing with what the targets as mentioned in the schedules.

There may be a mismatch between the planned outcome and the actual ones. Then if there is a they are not matching, then what will happen we have to do replanning. Then replanning may be needed to bring the project back on target, so that some remedial actions has to be taken they have to be taken in order to bring the project, what to its a original target. So, if it is not possible replanning is not possible, then the target that is they have to be revised.

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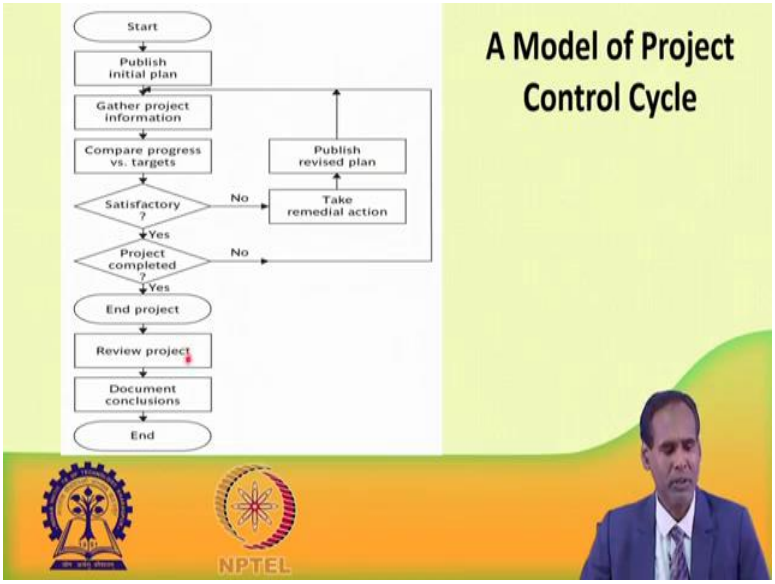

So, let us see a particular model a specific model of project control cycle. So, how to what control the progress of a project. So, first what we are doing, first we are what we are doing publish the initial plan we had we had made the initial plan as a project manager you have made the initial plan, then you publish it. Then you gather the project information regarding the progress, so gathered the project information regarding the progress of the project, then what you do compare the progress versus the targets.

So, in the initial plan the targets you have mentioned, then you have collected the current progress information compare them. Is it satisfactory that means, are you moving according to the plans is the progress, is the progress or is the progress is happening is the progress happening according to the initial plan or the scheduled plan, is the progress satisfactory, if yes, then terminate the project end the project.

If it is not sorry, yes if it is what satisfactory, then we will see whether the project is completed or not; if the progress is not satisfactory, we have to take a remedial action, then we have to revise the initial plan, then we have to publicize the revised plan and then again we have to gather the current information, the current progress information or we have to gather the project information regarding the progress or the at present progress, current progress.

And again we have to compare, again we have to see that whether it is satisfactory or not; again if it not this loop will continue and when will be satisfied that yes the progress

is according to the plan made in the schedule, then we will check whether the project is completed or some portions are left. If the project is completed we have to declare that yes project is ended, project is completed; if it is project is not completed, then again we have to go back, again we have to gather the information of the project regarding the current progress and again the loop will fall, again the loop to loop will be followed.

And after the project is ended what we have to do, we have to review the project, then we have document the conclusions, we have to draw the inference, document the conclusions, this we must note down, because if in your future we will get similar types of projects. The lessons what we have learnt earlier that will help us in executing similar types of projects in future and then we will end. So, this is how a model of the project control cycle looks, in this way you can control the progress of a project.

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So, this whatever I have explained that I have written here, you can see yourself that the project control cycle it shows ah how, once the initial project plan has been published, then project control is a continual project please see, project control it is not a one time job, it is a continual process of monitoring progress against what; against the initial against a plan and wherever necessary we have to revise the plan to take account of the definitions. It also illustrates the important steps that must be taken after completion of the project, see after completion of the project we have to review the project, then we have to document the conclusions, etcetera.

So this also so, so this framework also illustrates the importance steps that must be taken after completion of the project, so that the experience the lessons that we have gained in any one project can feed into the planning stages of the similar future projects, thus it allows us to learn from the past mistakes.

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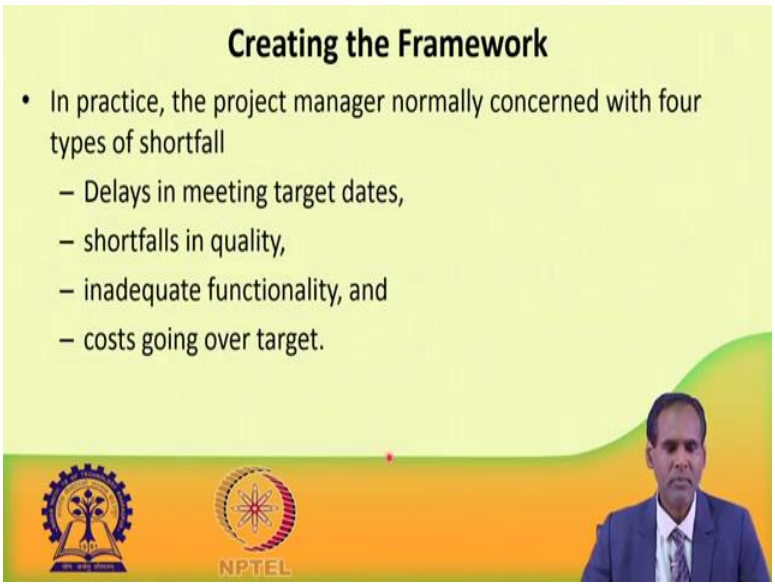

So, in practice the project manager normally concerned with a four types of shortfalls what are they, number one, delays in meeting target dates, why there is a delay in meeting the target dates that we must as a project manager you must see. Then shortfalls in quality, whether the quality as we have expected as we have what anticipated, whether that quality is maintained or there is a shortfall in that.

Similarly, inadequate functionality whether the functionality that of the final product is sufficient or as far ours what plan or it is inadequate. And finally, cost going over the project, what cost we have plan, what cost we have mentioned in the cost schedule, whether it is within that or it is over the target. So, these are the what four types of shortfalls that project manager normally concern do it during development of a project.

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Now, let us see the responsibilities whose responsibility is what, the overall responsibility for ensuring satisfactory progress on a project is the role of the project steering committee, sometimes it is known as project management board; the this is the overall responsibility that is given to the steering committee of the project management board.

The day-to-day responsibility normally it is given to the project manager, it rests it relies with the project manager and you know for every project there is a project manager. Other normal aspects of the projects, they can be delegated to the team leaders.

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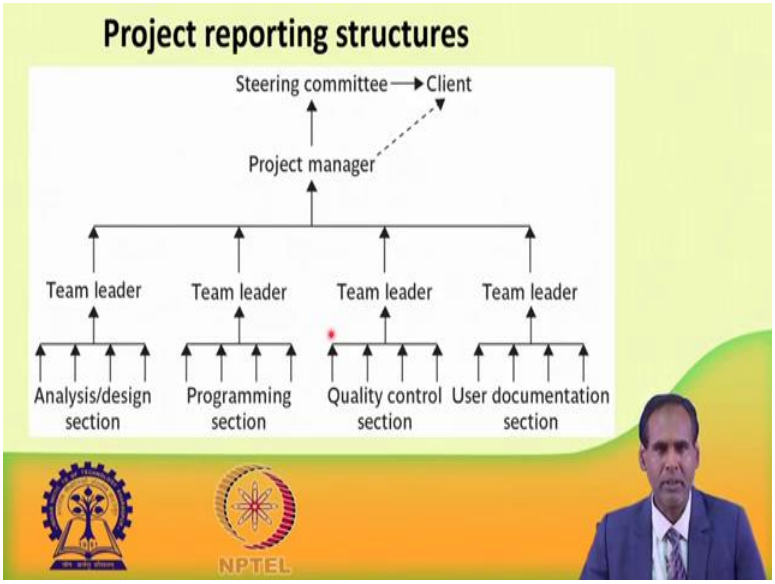

And this is how the reporting structure this looks likes. So, steering committee looks after the overall aspects of the project, overall progress of the project. Then under the steering committee, the project manager works and under the project manager there are several team leaders are there, and or not the one team leader several what other what personals are working.

Like one under one team leader, the analysis and design section their employees are there. Another team leader the programming section I mean, the programmers coders are there. Another team leader the quality control section is there, testers are there. Another team leader the user documentation employees they are there.

So, these what bottom level employees they report to the team leaders, then the team leaders they prepared this summary and they report to the project manager, project manager adds his comments, etcetera and modified this one revises the what reports given by the team leader and sends the reports to the steering committee; and steering committee forwards to the these reports forward to the clients, sometimes the project manager also can directly communicate to the client regarding the progress or the reports documents, you can directly communicate to the clients.

So, this is how the reporting structure look like. The end developers or the end personnel the end or the bottom level personnel in the structure, they will report to the team leaders

and the team leaders will report to the project manager, project manager will report to the steering committee.

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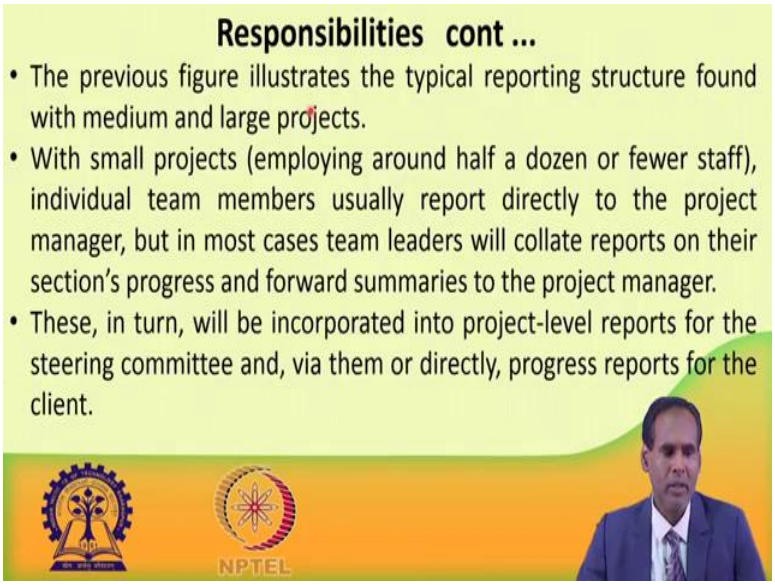

So, I have already told you that this previous figure, it illustrates the typical reporting structure, which is found with a minimum with medium and large scale projects, but for small projects we are less than half a dozen or fewer staff are there. The individual team members, they usually report directly to the what project manager, but in most cases the team leaders will collate the reports on their sections progress and then they will forward the summaries to the project manager.

Then these, in turn, I mean these reports are given by the project manager they will be incorporated into the project-level reports for the steering committee and, via them or even if in some cases directly, the progress reports for the client it will be sent. So, these progress report for the clients may be directly sent from this project manager to the clients or via this steering committee.

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So, reporting could be oral or written, see let see the different kinds of reporting. We have already shown you the reporting hierarchy, this is the reporting structure. Then how do the what staff members they report, the reporting can be oral or written, it can be formal or informal or it can be regular or adhoc. So, informal the communication is also necessary and important, but whenever any such informal reporting of a project progress, it is followed, it must be complemented by some formal reporting procedures.

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See these are the categories of reporting, like this is the oral formal regular type of reporting type and one example is weekly or monthly progress meeting, and this is the comment like while reports may be oral, formal written minutes this would also be kept.

Then oral formal adhoc type of reporting, example is end to end-of-stage review meetings. And written formal regular, example is job sheets, progress reports, etcetera. Then another type is written formal adhoc, examples are exception reports, change reports, etcetera. Oral informal adhoc, example is like discussion in canteen, social interaction, etcetera, these are some of the content. So, these are the different categories of for reporting.

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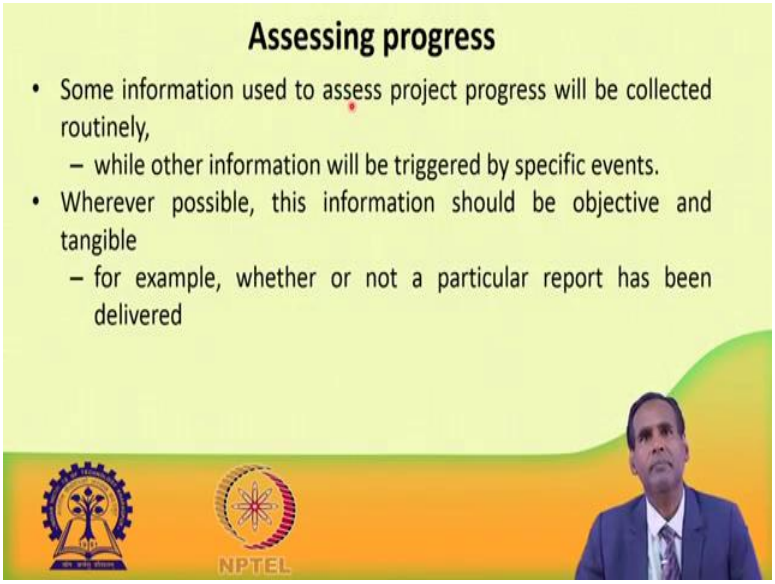

Now, let us see how to assess the progress of a project; how as a project manager, how we can assess the progress of a project. Some information are used to assess project progress or the progress of the project that should be collected routinely, while some other information will be triggered by specific events. So, in order to assess the progress of the project, some information used to assess the project progress will be collected routinely, maybe weekly or monthly also.

While some other information and they will be triggered by specific events, maybe when the requirement specification document SRS document is over, say may be you have to collect some information. When the design is over, you may collect some other

information like this, whenever some specific event is triggered, then you will collect some information.

So, now wherever possible this information should be very much objective and tangible. For example, whether or not a particular report has been delivered or not, so this kind of information, please try to make them objective and the tangible as far as possible.

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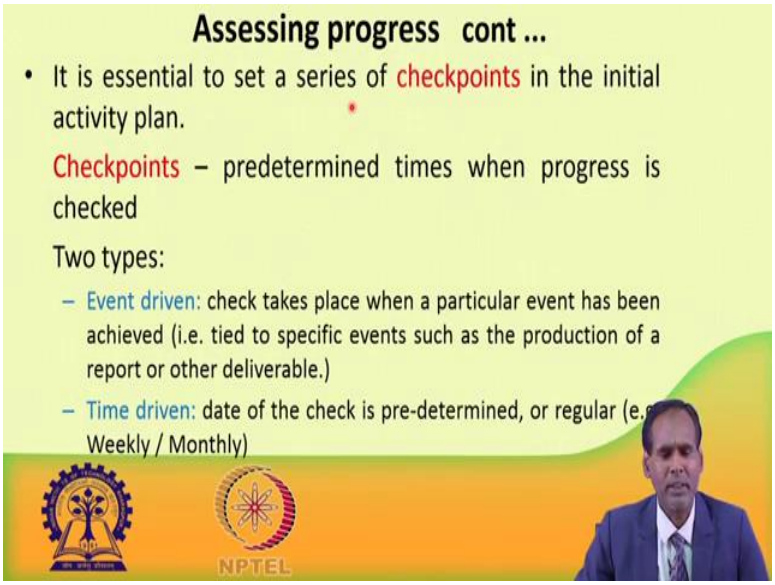

So, it is essential to set a series of checkpoints in the initial activity plan. So, in order to assess the progress of a project, it is very much essential to set a series of checkpoints in the initial activity plan. What you mean by checkpoint, checkpoints means these are some predetermined times when progress is checked. So, you have to determine some ok, you have to pick some predetermined times, when the progress is checked.

So, the checkpoints can be up for two types, event driven and a time driven. In event driven the check takes place when a particular event has been achieved. So, what could the example of a particular event, might be what the production of some report or other deliverable or what the coding is complete or testing is complete like that some event is completed, then you check whether you have achieved whatever it is mentioned in this schedule or not.

So, another checkpoint is time driven. So, here date of the check is pre-determined. So, on what date you will make the checking that is pre-determined that means, it is regular

might be weekly basis or monthly basis; you will check the progress, you will you will check the progress so that is why this is regular, this is known as time driven checkpoints.

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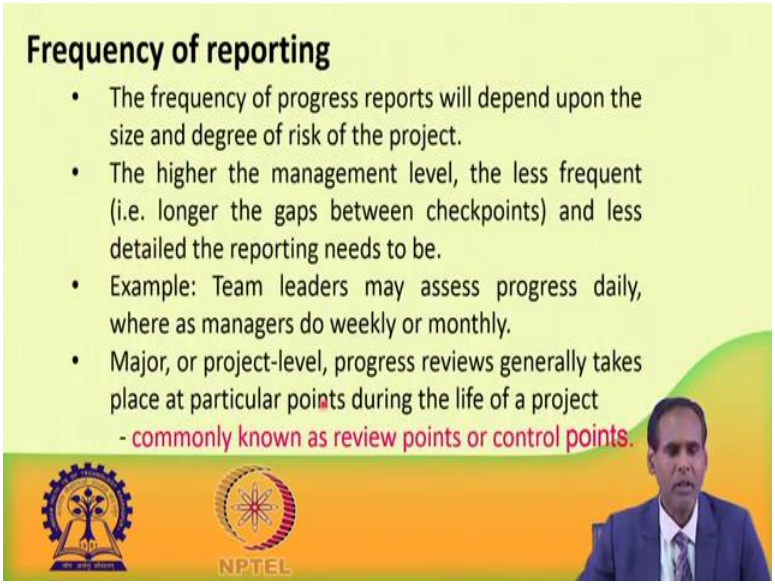

Now, let see what is the frequency of reporting, how frequently you should do the reporting. The frequency of progress reports will depend upon the size and degree of risk of the project. So, the how frequently as a project manager you should check the reports, you should prepare the reports like this.

So, the frequency of progress reports will depend on several factors such as what is the size of the project, what is the degree of risk of the project; if this is a what real time system, if this is a safety critical system, where risk is more, so then the frequency will be very what it is very frequent might be every day you have to monitor this thing. If it is a very large size project, might be again very frequently you have to check the progress. So, the as per the rule the higher the management level, the less frequent is this what reporting.

For example, longer the gaps between the checkpoint, so if higher is the management, less is the frequent reporting or longer the gaps between the checkpoints and less detailed the reporting needs to be, because the high level management they are not interested in the detailed what report, they will see the summary of the report etcetera.

But lower the management more frequent in the reporting and more detailed should be the ah reporting documents. For example, you see the team leaders may assess progress daily. So, we have already seen what the hierarchy somewhere else here.

So, at the bottom level like team leader they will require the reports more frequently might be on every day whereas, project manager may require the report may be on every week or so. So, steering committee maybe they will require the reports on every month. So, higher is the management lesser is the frequency and lesser is also the detailed reports.

Ok, this I have already told you that higher is the management level, the less frequent is the reporting as well as less detailed the reporting needs to be. In other words we can say, longer if the gap between those between the checkpoints. Example I have already told you, the team leaders may assess the progress of the projected daily whereas, the managers do that in every weekly and the steering committee may do that in every month.

Major, or project-level, progress reviews generally takes place at a particular points during the life of a project, maybe you can say that every a month ok. Major, or project-level, progress reviews generally takes place at a particular point, maybe particular point during the life of a project might be in every month, so the these points ok. So, as I have already told you the project-level progress reviews, it generally takes place they generally ok.

So, project project-level progress reviews generally takes place, when at some particular points during the life of a project maybe in one month or so, so these particular points are commonly in known as review points or control points. So, this is how the frequency of a reporting it occurs, as I have already told you. It will be what if it is a bottom level management, the frequency of reporting is more, the detailed reports will be more, but if it is a as we are moving towards the upper level of the management, high level of the management; then the frequency of the reporting will be less as well as the detailed reports, they will require a less detailed report.

So, this is about how frequently you should do the reporting in a what project organization.

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So, finally we have discussed the importance and the need of project monitoring and control in project development. We have also explained the project control cycle, so not only that after the project is completed; what we should do like project review and documents, etcetera from where we can gain some lessons, some experience which will help us in handling similar types of projects in future.

We have also presented the project reporting structures and we have also seen the frequency of the reporting, we have also explained how to assess the progress of a project. So, this we have seen in this today's class.

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We have taken from these references.

Thank you very much.