Project Planning & Control

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Lecture - 54

Course Conclusion

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Hello everyone, welcome to this concluding lecture of this class. In this session, what I thought is we would first summarise the highlights of the course. So, we have covered several areas in project planning, and control. I thought I would go through those so that we could review some of the topics we have done. I will then move on to covering some of the emergent trends and tools in project planning. I thought this would be useful especially for those of you, who all are looking for project topics, and you know want to kind of explore some new areas, certainly we have seen there are challenges in the way CPM, PDM, and these resource planning and all of these tools are used, but let us also get flavor of what are the currently emerging tools in research and in industry.

And then, we have special guest Prof. Raghavan, who will give us his perspective on planning, he is a very experienced industry professional, and we will have a brief talk by him on what he feels are the industry perspectives on planning and scheduling issues. Finally, I think most of you will be keen to discuss what the pattern of the exam will be and I will briefly cover, what is the mark allocation for the topics. So, you will help you

in preparing for the exam, and finally the acknowledgements in running the program.

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So, looking at the course highlights, you know, the topics we covered, if we go back to week one, you will recall we introduced what project management was, we talked about the art and science of project management, and these concepts are still very important, because now when we are at the end of the course, when you look back, we really learned a lot of detailed issues, we tried to make project management or project planning and control more of a science, but you had to kind of reflect and see how much of subjectivity was still there. Are we able to make it pure science or are there still art issues in there.

So, this is something you can reflect back now, and this topic is very important, because a lot of what we learn in project management, we have to understand the balance. We look at the objectives of a project, we discussed that with reference to these objectives, we are primarily looking at time and cost issues in this course, but certainly the other objectives such as safety, quality, the environment are also very, very important; need to be managed effectively for project success. We, then looked at some of the broad issues facing the Indian construction industry, the impact it has on national growth, we talked about broadly about project stakeholders, the phases of the project and it is important for you all to understand this, to put the context of where planning is, in the project. And then finally, we talked about scheduling levels in this course, and then in this session and then responsibilities of scheduling engineer, and now that you have covered several of the tasks a scheduling engineer does, I hope you have more detail ideas on what are these

levels and how the effect.

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When we went on to week 2, we actually started on some of the basic tools. We primarily looked at time management, we looked at how time can be managed with various types of tools. We've covered some simple tools, and then we primarily looked at the Gantt chart or the bar chart which is widely used in industry. But before we actually started identifying activities for the Gantt chart, we said that we have to work, we have to develop work breakdown structure or WBS, and we have actually had gone through kind of what should be the aspects of a WBS, how do we identify areas, activities, options. And now we will again when you come to this to the end of the course, you will realise that when you can kind of a get feel that if you do not identify the activities correctly, all the analysis is meaningless; For planning requirements and for control requirements.

So, starting with WBS is very important and getting proper activity breakdown is critical. We looked at, certainly we looked at more details into the bar chart, and I think most of you should be very familiar with drawing a bar chart or interpreting a bar chart, we looked at historically how bar chart was used to represent much more information than that is available today. But with the current tools, you know even the software or even CPM, we still go back to the bar chart to communicate information effectively. So, this was what we are covered in week 2.

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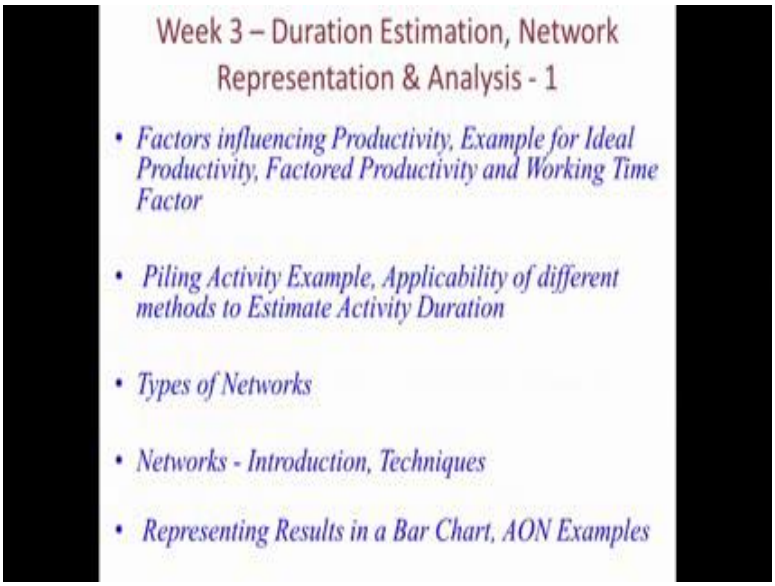

When we went to week 3, we started with the activity duration estimation, we went into fair amount of detail on how we estimate duration, either from: given the resources, how do we estimate what is required or we based on a given duration, we estimate how resources and how much productivity is required to achieve the duration. We then went into basics of network, we introduced how a network represents a project, we primarily use the activity on node approach, and then we did basic network techniques, and how we actually get results of the network which can be represented in a bar chart.

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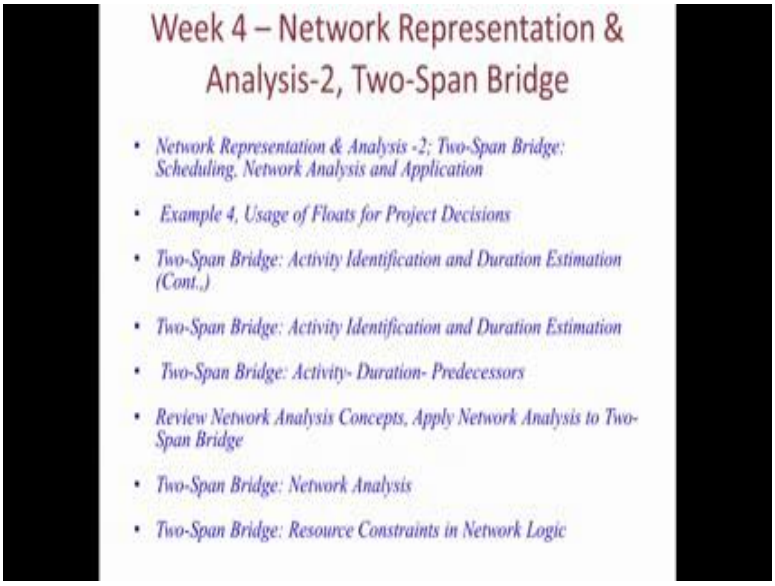

When we went into week 4, we then actually went more in depth into network representation and analysis, we in addition to the early start, early finish, late start, late

finish, you know, we talked about the floats, the various types of floats, and how floats are used for decision-making. We gave simple examples you know which is should be familiar with what we called ABCD examples, and they are basically to illustrate the concept and you know, get your basic procedure right.

And then, we scaled it to a really a small project, but what we called the 2 span bridge problem, and we apply all of this concept to the 2 span bridge problem. And judging by all the discussions that were posted on the forum on the 2 span bridge, it looks like people you know, took this up well, identified you are able to kind of relate to the concepts, and several good questions were asked, and we hope we provided answers to these which you know resolved the issues. But like we said during the lecture, that total span bridge, we only illustrated one way it could be done with certainly, with a lot of assumptions. When you get to the field and you have to implement, there will be alternate methods, alternate ways, and it network will represent generally what is happening, but did not represent in detail, what is happening in the 2 span bridge.

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When we went to week 5, we introduced the concept of time cost trade off or we call crashing, again we introduced the simple project ABCD project, and when there are steps of crashing, we went to from the basic concept we used the tabulation approach to be able to systematically do crashing, and then we also considered factors such as bonus and penalty and basically the duration when the total cost is minimum, all these concepts were covered, and I think most of you have done problems on this well, and we got some feedback on some other issues which were which were I think hopefully clarified.

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Week 6, we moved on to resource scheduling. So, this is an important area, we covered several aspects of resource scheduling. We started with very, very basic elements as how load resource, how to allocate a resource, we looked at the over-allocation problem, we look at cumulative resource graphs, you know specific weekly or specific duration resource graphs. We then talked about the over-allocation issue and how over-allocation can be resolved, basically using floats. So, these are important concepts. We then went on to resource profiling, specifically, resource levelling, and in this, we talked about levelling both from an intuitive perspective, and then we introduce the concept of the minimum moment and the improvement factor in order to be able to assist if a resource histogram was at a proper position of levelling or not. And we looked at, we made this assumption that rectangular profile is what we want, and we looked at generating this improvement factor which gave us whether there was any improvement when we shifted resources.

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Now, we went on to week 7 then and here we introduced the precedence diagram method, which is, which we, which is available in lot of the software and people do tend to use it, we then looked at how the precedence diagramming method can really, unless it is represented properly, there can be issues with it. So, we looked at network calculations with it as well as problems and issues that are, that come when we use a PDM. And we looked at, you know, some of the critical issues such as negative lags, and you know, how we should avoid negative lags, we looked at precedence diagramming method with just, you know, sometimes just single start-start and finish-finish and discuss the problems with that. We went on to discuss, you know, continuous duration type PDM or non-continuous duration and the issues with each type. We then went on to also discussed different types of floats which were with the PDM, this we talked about finish float, start float, relationship float; these are all again, you know they are not widely discussed in practice, but they were very critical if you choose to use to PDM and all the features of PDM to represent project, you have to know these things in detail.

In the same week, we also start at the concept of project monitoring which is very important. We reviewed, you know the BIS standard, and how it, the process it had for project monitoring. We then actually went to the micro level and, you know, using some examples showed, how the percentage complete is what is basically required to do effective project monitoring, and how we calculate percentage complete with different methods and how each method can actually give us various answers. So, this is certainly any issue which is a practical issue, because if the planning team or the execution team

does not use that appropriate method, you will not be able to get a proper reflection of what is happening the progress lets happening on the field.

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And then in this week we started with earned value analysis. So, we extended the project monitoring and control issue to a higher level. Now we moved from the micro plan and micro plan to more the management level where earned value analysis is used. We looked at how percentage complete of the project can be computed, you know you not just percentage complete of an activity, but of the whole project and how earned value analysis approach is useful for that. We then talked about cost and schedule performance indicators, these tend to be extremely important and today they are the way, they are the means by which a project manager would actually, kind of make a quick assessment of what the status of the project is. We also looked at how these earned value indicators are not only applicable at the project level but also the work package level, we kind of looked at how forecasts can be developed based on these earned value indicators and some of the examples illustrated how these concepts can be applied.

We then went on to the topic of uncertainty in project schedules, this again is very large area, you know, risk and uncertainty are huge area and project management which is evolving and as tools become more sophisticated, we are really able to quantify, and more scientifically managed risks in projects - construction projects, but we basically covered the PERT technique which is you know historic historically the first, the strong technique which was applied from probabilistic perspective, we look at the background and the assumptions of PERT, we found that there were several assumptions which are

limited use of PERT, but still it was a very powerful technique which allows the planning team to be able to assist, and give probabilistic estimates for the project duration.

Now we went through also a step by the procedure for PERT, which you know kind of takes you through and we took you to an example which illustrated how we calculated various parameters from PERT. And with that you have actually come to all the topics we have kind of highlighted through this course, and you know we really looked at several of the discussion points raised by several of you, and there were very good points and like I said earlier I have hope we have addressed these satisfactorily. You know, if there are any points do raise it, because I think the interaction on the forum has been extremely good.