Project Planning & Control
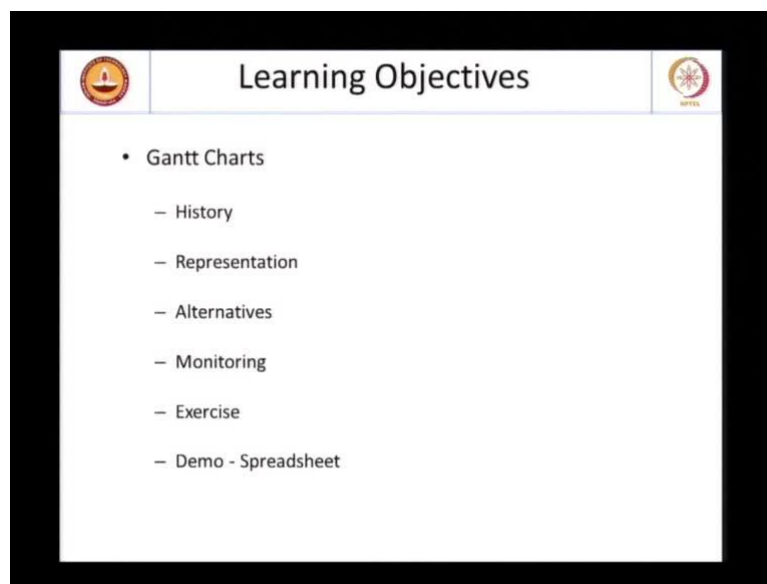
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Lecture – 10

Lesson – 04

Gantt / Bar Chart – History, Representation

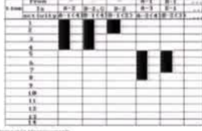**Progress Monitoring, Uses, Steps to draw a Bar chart**

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In this lecture, we are going to start covering some more details on the tools such as Gantt charts and we will look at the learning objectives here. I will cover a little bit on the history of the Gantt chart, how you represented alternative representations, how we can use the Gantt chart for monitoring and we will do a little bit of an exercise, and then, I will demo a spreadsheet which we can use to be able to do simple Gantt charts.

Now, when you go into the history although it's called a Gantt chart, it was actually there is the evidence that this form of a chart was originally used by a Polish engineer and he was actually in steel in the steel works, and he used what you see here, it is called a Adamiecki harmony graph. So, it is almost like a musical score, which, the difference here is you can see the bars are coming down vertically as opposed to what Gantt designed later on. So, it was only around 1910 that Henry Gantt actually came out with this, with what we used today is called the Gantt or the Bar chart.

And; obviously, the what came out of Eastern Europe was not an English, so the English-speaking world did not take up to it and what Gantt came up was in English, and so we associate this chart with the Gantt chart and interestingly you will find that Gantt was associated with Frederick Taylor. So, he had worked for some time with Frederick Taylor, went into this principle of scientific management and so, at that stage it was kind of an era when factories and production places were looking at scientific ways of doing management, and Gantt was one of these people who came up with, what we know as the Gantt chart.

Now, incidentally, it was very popular for production purposes and world war 1. It was used for planning the Hoover Dam, interstate highways in the US, it got really popular, because of its simplicity. Now, there is also evidence that Germans used a similar chart. So, what you see here on the right is a chart that is used for bridge construction in Germany. So, while the world knows it as the Gantt chart, there is evidence that never this is common sense based approach, which was used by quite a few engineering managers in the past.

And I recommend you read the reference given below, it gives you history of the Gantt chart, It refers into more detail on what is covered on this slide and it also gives you access to the original books by Gantt on how he developed the chart and we know, what it is purposed were, and these are now out of copyright. So, it is public domain, and you can actually see how some of the management thinkers, at that stage who were trying to optimize production.

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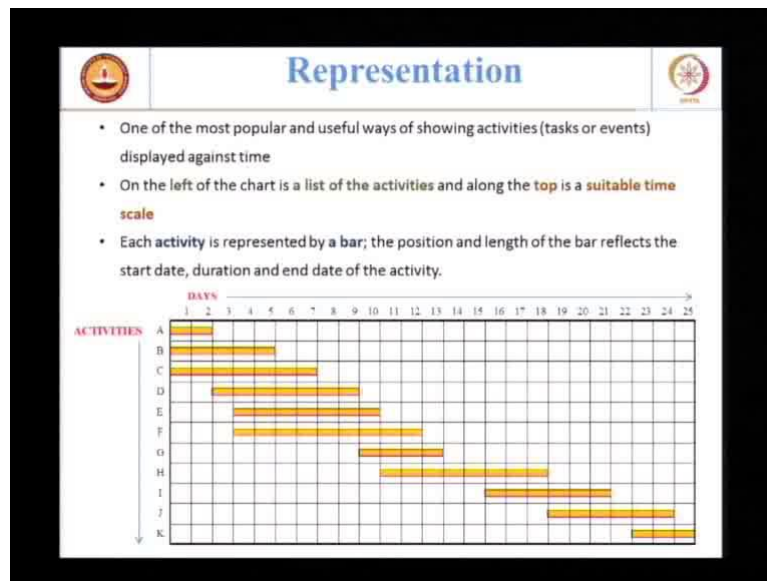
Now, when we actually get the representation like Gantt chart, you are familiar with this and some form or the other, it does not need a lot of explanation. But, just look at the simplicity we had activities, which are listed here on the left of the chart there is a activity and on the top which is time. Now, you remember last class what was our objective? What was the objective of the earlier lecture?

Student: Work breakdown structure.

Work breakdown structure. What does the work breakdown structure do?

Student: Basically it recognizes, you recognize all the activities that involved in the work.

So, by using the work breakdown structure, we want to be able to identify the activities, and once we identify these activities, we can actually put it suppose we able to listed down here. So, we assume that some kind of activity identification exercise has taken place before the bar chart is made to list the activities. On the time axis here we have days, and we have not actually covered the topic of how do we estimate the duration of activity. So, that will come in the next lecture, but this is also important.

So, we just need, we need two inputs. What are the inputs we need to draw a bar chart? Activities and time, start time and duration. So, we have the activities which we got from work breakdown structure or some other means; we need to know when the activity is going to start, and we need to know the duration of the activity. So, with that you can actually draw this, you can easily see that. Now; obviously, just drawing the bars on a graph is one thing, but making it meaningful in the context of the project you are trying to do is really the key question here.

And as we get into the exercises later you will find that, when you have to draw when you have to put the bar into where are you going actually to place the bar; that is going to be some of the key questions.
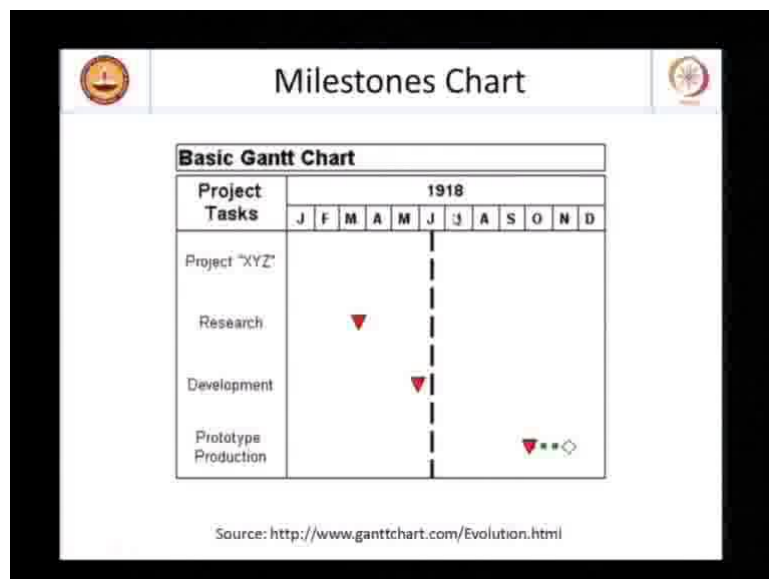
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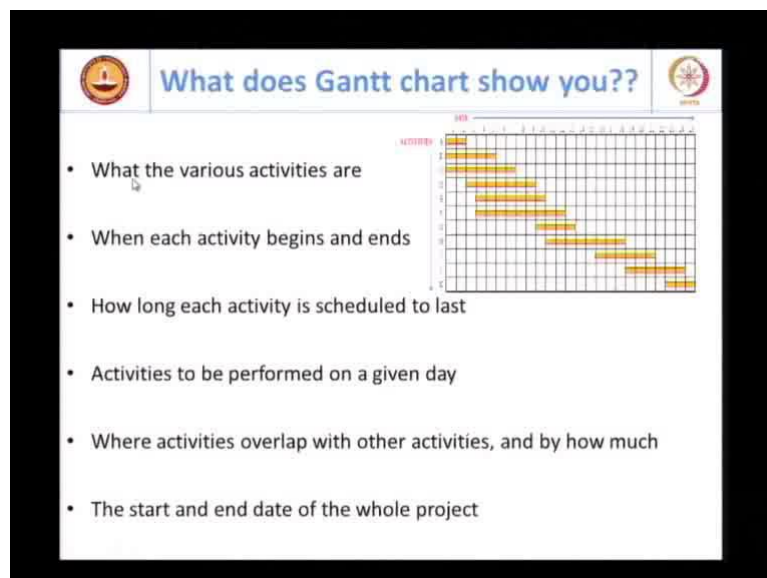
Now, if we look at what are the aspects that the bar chart shows you, you can see one is certainly what are the various activities are when an activity begins and ends, you know how long each activity scheduled to last, so this we have discussed before. So, I can get more information I can go on a particular day, say like day 12 and see, what are the activities that have to be performed on that day.

So, now, I am not going from an activity side I am going on a day side and finding what should be the activities that are performed. I can find what activity overlaps with what and the last part I can find when you know what is the duration of the project. So, this project takes 25 days, what is the actual duration of the whole project. So, this is all basic planning information, and you can see that most of these are; obviously, related to time. Any

questions?

Now, there are different forms of a bar chart, so this is a sample of a milestone chart, so here you find there are no bars actually, but you have the same concept. You have time on the x-axis, you have activities, and you are just taking, you are just placing points on when an activity should be completed or how much can an activity, can be what is the most you can extend an activity.

So, this is kind of a milestone chart, which is very popular. Typically when we go back to the levels of scheduling, if we take the highest level of scheduling, it is more of a milestone chart.
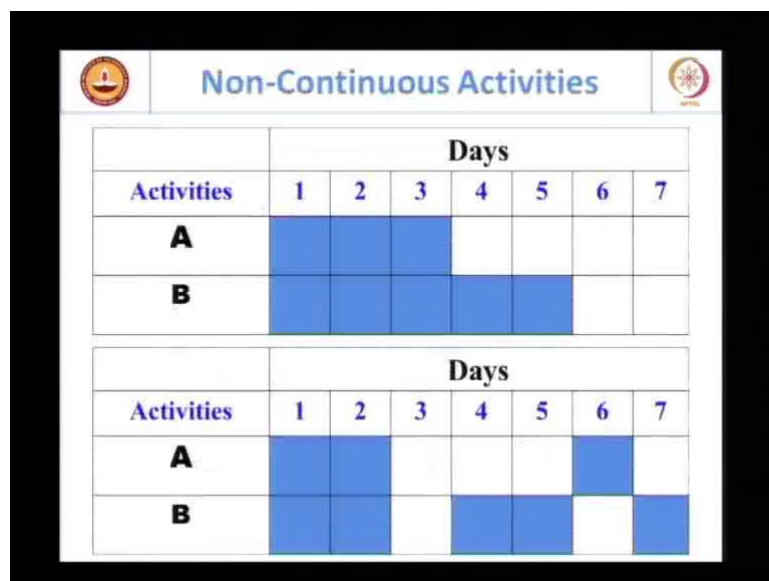
Now, another form of the bar chart, it need not be continuous, you can see here that we have continuous A and B. Now, I have in the second graph here the second bar chart here, what is represented. Discontinuously happens. So, what is constant in both?

Student: Duration, total time.

The total, would you call that duration.

**Student:** The total timing was, the total working time is same.

The total working time is the same, so in A's three days and you can see that here 1, 2, three days. So, the effort put for this activity A is the same, the effort put for activity here is, for B is five days and here we have split it up.

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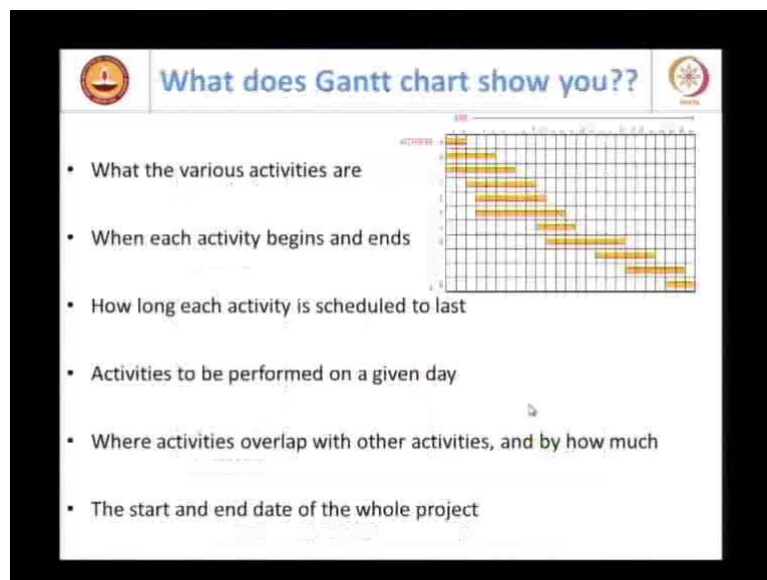
So, there is no reason a bar chart has to be continuous as I have shown here. We can also split up the effort in a duration for the activity because that is what often happens. So, you know for examples A could be done by a person who is not available on day 3, 4 and 5, which means you need flexibility to represent it in a non-continuous form. So, do keep this also in mind, that you will be able to bar chart does not need to have a continuous representation.

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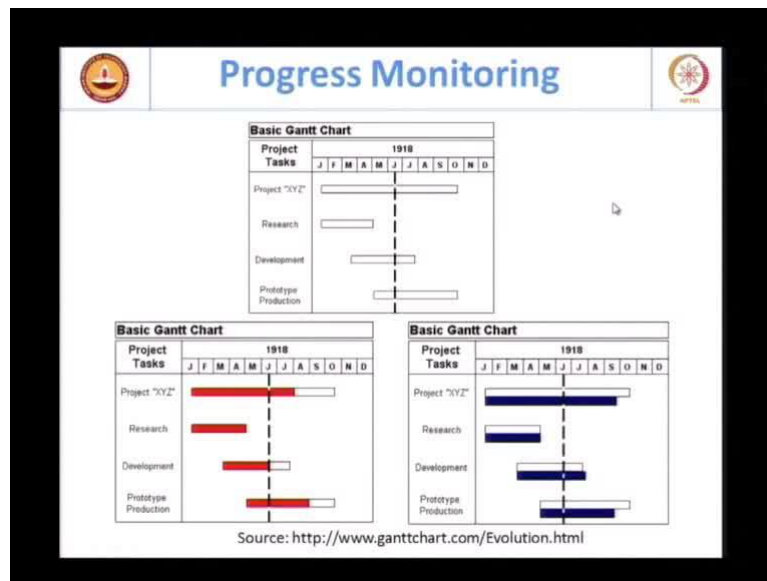
Now, another unique aspect, what you very convenient aspect of a bar chart is the fact that you can use it the progress monitor. So, here you can see that you have the regular bar chart, which is continuous, and this is a plan and ask progress is made you can start shading the bar and show you know where am I?. So, here I mean I might be on the particular time period and how much your progress has been made, so this is either you can shade in the bar, or you can show a parallel path provide and see how much of it is continue.

Now, in some of these cases, it becomes tricky to say what do we mean by progress. So, this we will we will take up this question later has to how do we define progress in what you mean by progress we will take this up to some extent in this class, but certainly a lot more when we take up project monitoring module of this course.
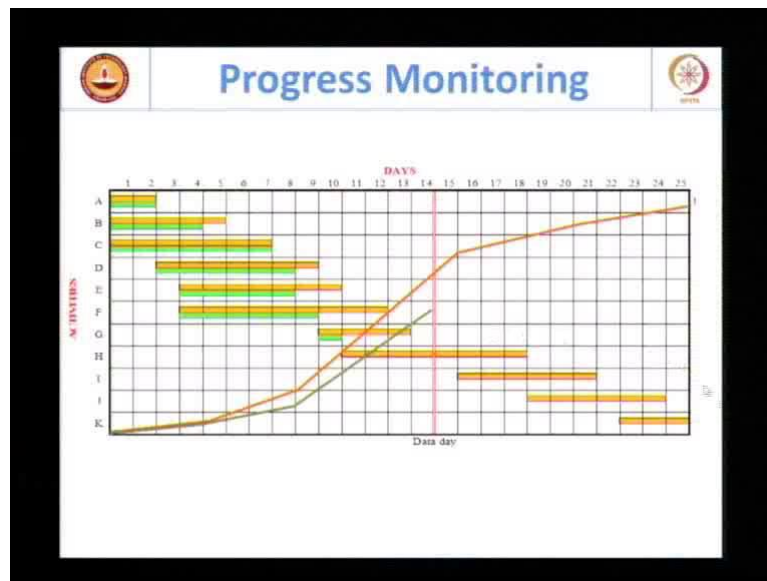
So, here is another way in which monitoring is done there a you have you have bar chart here you have the progress chart the green shows the progress made now what we have here is the line showing the day on which way the current day and what we showed in red here it could be something like cost how is the cost of the project varying with respect to time. So, we have a plot a graph like this to show you how this happen we will plot a graph like this and what is shown what do you think the green line here?.

Student: ((Refer Time: 10:29))

Yes, the red is the plan or the estimated cost. So, it is the cash flow for the estimate, and the green is what is… Once a project is started progressing what is the actual cost?

Student: Green, above the red, because mostly you have the…

You can have the green above the red, but it also depends on I mean just let's just take this question if the green is below the red what could what are the two things it would mean?.

Student: may be overestimated

yes it is overestimated, and I am doing the below cost or

Student: going behind schedule

yes that is the other part that is going behind schedule I am not complete I am not completed enough of my project progress I do not spend the money it could be in that it could be either

Student: B is unfinished activities

yes. So, right now B should have been finished it is not finished. So, we are actually behind schedule

Student: it could also be below the estimated

it could it could have been below, but right now when you look at the schedule there are many activities which are should have been finished, which are not finished

Student: also may be the progress also wasn't good for the cost the expense is very high let us say there might be a lot of overheads.

So, right now the question is can you make the conclusion why this below you cannot make a conclusion it could be either that and but when looking at the progress bars what do you think?

Student: it could do mostly that in the work assignment company

Work assignment company. So, you have not spent money because work for that money has not been completed, so yes, yes spent less. So, now, when you know once you get work. So, when you go to the end of the project what is likely let us say the project is fully completed the green will be over there. So, these are the scenarios that are possible and When we get into the monitoring will get into the much more details of this.

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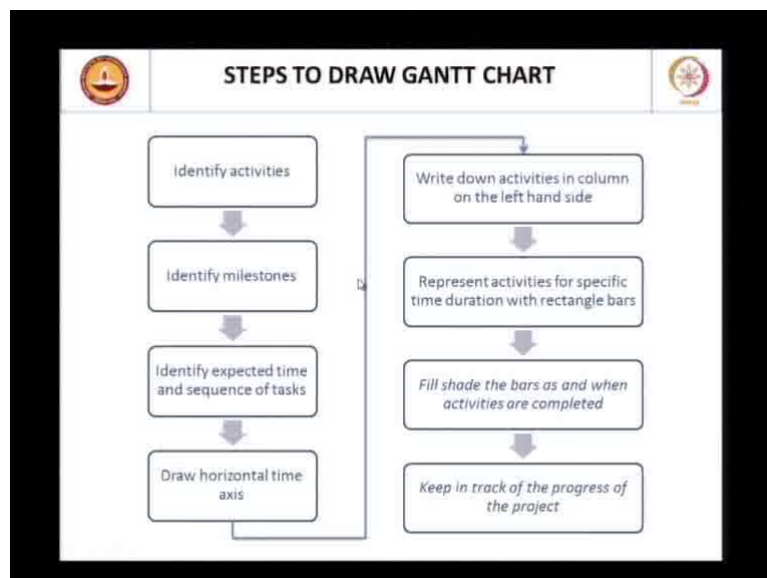
And, so when we start just to summarize when we when we want to draw a Gantt chart, these are the steps one who take', identify activities, you will identify milestones identify expected time and sequence of tasks, draw the horizontal time axis you will write the activities and

represent the activities for specific time duration with bars or with milestones are whatever is required. Now, when we come into the last two, the last two are, where you are filling the bars based on an as they are completed and keep track of the progress.