Project Planning & Control

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Lecture – 08

Lesson – 02

Basics of Work Breakdown Structure (WBS)

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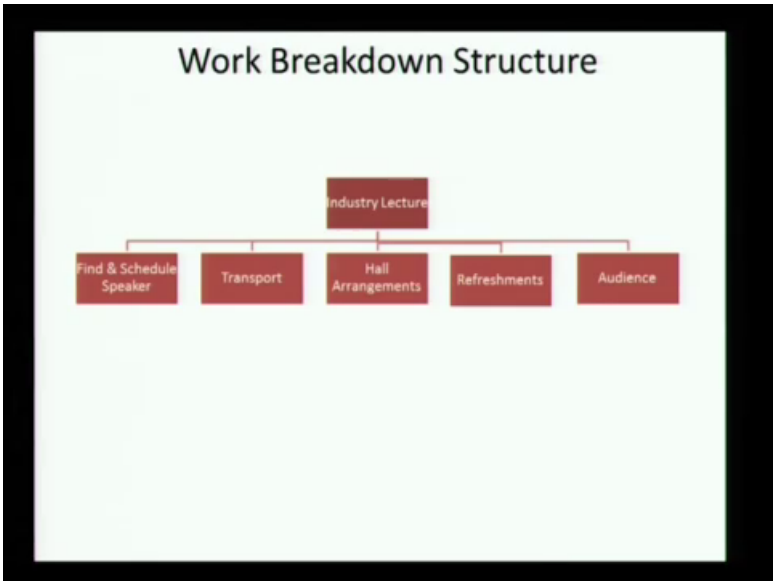

So, now, here I gave a very simple initial breakdown structure, which is similar to what we had you know we have find scheduled speaker, transport, hall arrangements, refreshments. I can start breaking this down, and I will finally, get it into all of the activities, which you have to do to achieve this.

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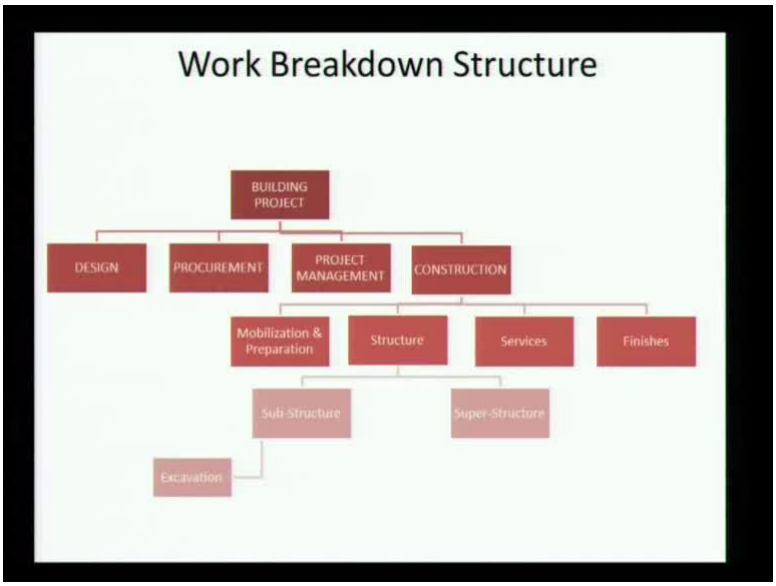

Now, a similar structure can be taken for a building project. So, here I have taken a building, and I have broken it into, what… In the first part, it is the phases of the building project. Remember, we looked at different phases of our project, design; we looked our pre-design phase also, but here I have taken initial part and broken into phases. We have a design, your procurement, your project management, construction. I have taken construction and then broken it, again broken it, divided it, I have taken the structure and again started dividing it, so this is the work breakdown structure.

Now, we can do this intuitively which sometimes lands as in trouble, because different people see things from different perspectives, there is also different rules to do a work breakdown structure. So, what we will do is, we will see some of it, we will not go into too much detail as into the standards in the work breakdown structure, but our objective here is to get adequate work breakdown structure information to be able to start developing it. We will actually come back to more details on work breakdown structure in a later lecture. Are there any questions on what you see here?

Student: Project management should not be the construction be under project management?

See project management is, it actually in composes all of it is design, procurement, and construction. So, these are tasks which have to be done as a part of a project management, and they are separate. So, what you are suggesting is there are put, but construction is, which means actually the whole thing can come under project management. Design, procurement and construction can come under project management; that was it could be also I mean I will

not say it does not make sense, it make sense.

But, in the way it did here, the main thing is project managements gets to identify as a critical task, which has to be done and there is no sequence, or there is no hierarchy here. It is just these tasks are, these are the phases through which it is going, there is a hierarchy of components, but not necessarily of roles as a form. Other questions?

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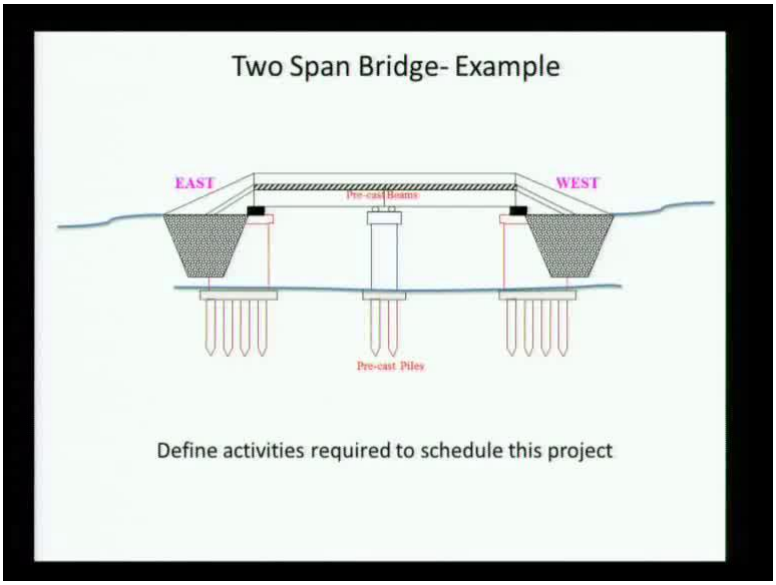

Now, I have given a simple example here, you can see this bridge, what I would like you to do is take a look at this drawing for a few minutes and then, can you kind of think what are the, how would you develop a work breakdown structure for this, what are the activities you would want to represent and let us try to identify what are the proper approaches to break this project into it is activities. Remember, we are trying to find activities. Any questions?

Student: You have to look at the sequence of the activities.

You have to look at the sequence of the activities, sequence actually comes a little later, if you go back you remember, where we said identifying the activities, estimating the duration and then, sequence. If you jump into a sequence that is okay, if that is a way you visualize that; that is, fine. But, when you look at this, let me explain what you see, basically you have a two-span bridge, you have pre-cast piles, and then, there is pile cap. There is an apartment; there is a pier, there are pre-cast beams, and then, there is the approach, which is built on the east side and the west side and the road is already there. So, this is the basic elements of it.

So, if we now you are thinking, of course, you need some civil engineering domain knowledge to think of the activities. What are the… What would be the activities you could

think?

Student: Surveying

Surveying, yes. So, let us take it more for the construction from the construction side. You seeing the bridge, yes let us start from pile driving. So, that is I am taking that as a scope of what this is, before you drive the piles, what you do?

Student: soil testing.

The soil is tested, you know you need piles, you come up with specs, you actually mobilize on site, you are all ready now, you have been given the construction go ahead. So, we go back all the design is done here, the procurement you know most we are not worrying about the procurement here, we are assuming the cement will be available when you want, steel will be available when you want, you know formwork is available, equipment is available, all that we are assume. We are coming only to the construction part of the whole bridge.

So, what is the first, so let start bottom up that is one way to go, I what do you excavate. So, let me say these are not, these are let me say these are driven piles. So, I am not necessarily excavating to the piles; here I am going to drive the piles in and they are precast piles. So, they have to be driven. So, what do and I assume now I can also give you an assumption that piles are precast on site.

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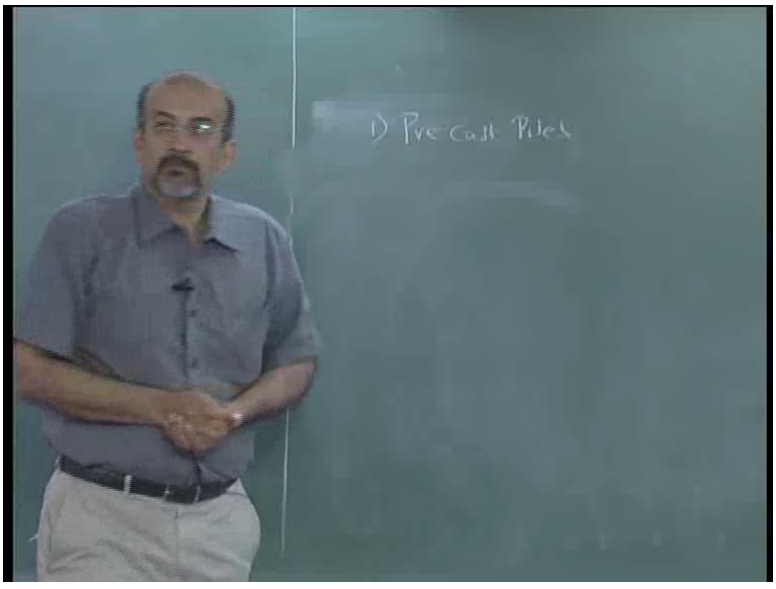

So, the first activity would be to precast piles now; that gives your clue it could be pre-cast lines of pre-cast beams you can see beams are also pre-cast what could be.

Student: Set up the facility for the pre-cast task.

So, I fine, fine, so that is the mobilization task, look at the structure. So, now, our piles are pre-cast, and my beams are pre-cast. What are my other options? So, let us go into the methodology I pre-cast the piles, now what do I do the piles, I would drive the piles. Yes, I drive the piles. So, after I drive it, I do create consult the pile cap. So, there is some sequence coming in, but I will have to think of the pile cap. After the pile cap I will have to think of the abutments and the piers after that the beams, and then, there is a deck slab and road over it, so if you kind of look at the bridge…

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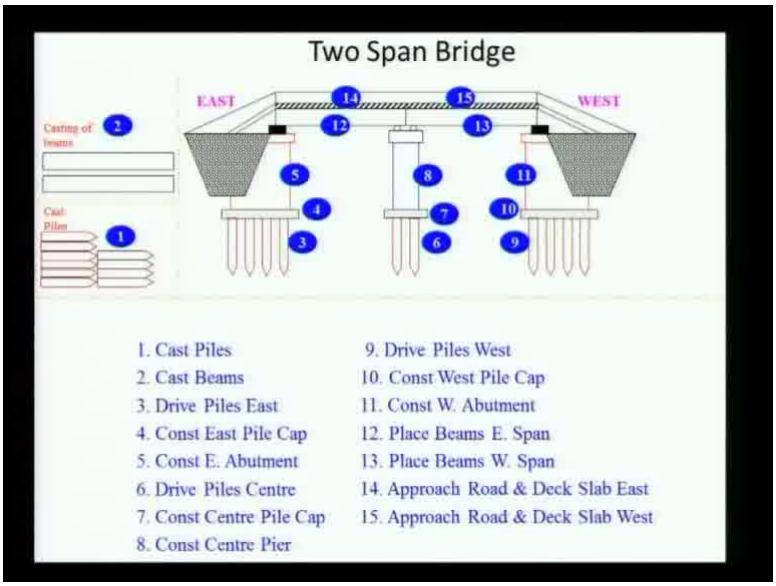

So, you have cast piles casting beams then, what you think it is driving the piles the pile cap, abutment east that middle pile, pile cap, the pier, the west piles, pile cap, abutment, place my beam here, place the next beam, deck and then, the. So, this is the sequence now based on the sequence I did I mean of course, in the scheduling and whatever we do the sequence base an important part.

But, lot of times will might not be able to see the sequence immediately you should have to be able to identify the components and we able to break down the project into component breakdown, which will then make sure that once we have all the components listed in the work breakdown structure once we do all of it in the whole bridge should be done.

So, if you actually go into this you can see all of the activities which we talked about are here take a look is there something you would think of it differently look something you would changes I am not even talking sequence I am not talking of sequence 1 to 15 does not imply a

sequence it just identifies activities I should complete delivering my project sequence will come later. The way this is organized is there anything we would say I do not this could be a little different especially with 14 and 15. What do you think about 14 and 15?

Student: The beam is constructed, we could actually do it for a single step.

So, here and actually know again what thinking of the sequence I am thinking of the organization no I am again sequence I am thinking the organization is my is the person who does my road is the same person does the deck slab or is my road construction different from my deck slab construction. So, in a road requires a different kind of a way of a doing this deck slab and I might say that this is not I want to break this up I want to have road separate, approach road east, approach road west, deck slab east and deck slab west as a separate units of responsible separate components that have to be done it I am just giving it as a possible break up.

Most of the others fit logically into where they are logically into where they are you cannot actually you can break it up, but they logically fit into what there this is just put as I just put it up as a suggestion. Now, is there any other level of detail you can think on this for example, we have cast piles some of you mention one of you mention that you know now setting up the casting yard setting up the formwork, setting up you know setting up the batching plant all of that could be a representative it depends on whether you think it is required are you know when I say something like that whether it comes from the activity imply. Each of the concreting activity will require some kind of formwork, should I say you know mobilize forms is that, or you know ((Refer time: 10:49)) strip form, cure all of these are there.

But, here is at the much more abstract level we will see one of the challenges of our work breakdown structure is to identify the level of abstraction you want for an activity how detail should I go how abstract should it be and we will take that up as we go, but please keep that in mind. Any questions on this?.

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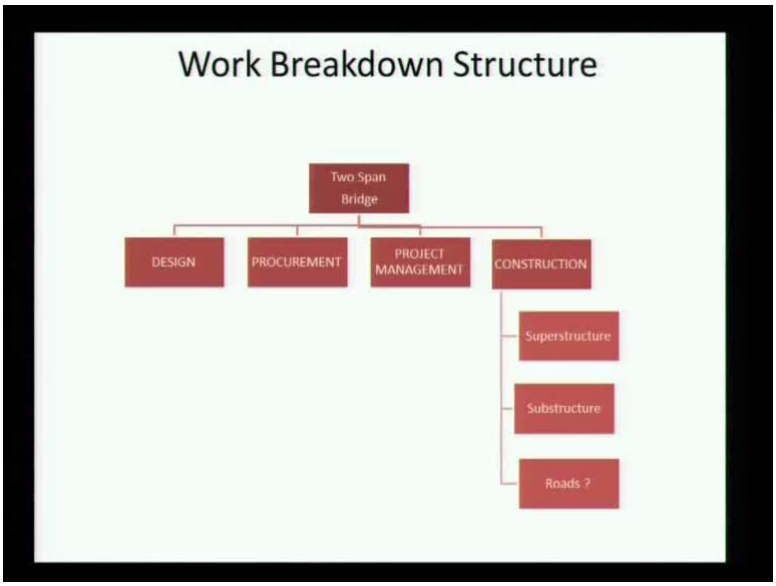

So, here I have given, we have taken construction you know I can start breaking it down I can take superstructures, substructure, roads, procurement again. So, this is I am taken I am actually going bottom up I took the activities it is a… I can start I can organize it into this WBS. So, we will be doing this at a later stage when we start also entering this into doing for analysis with this.

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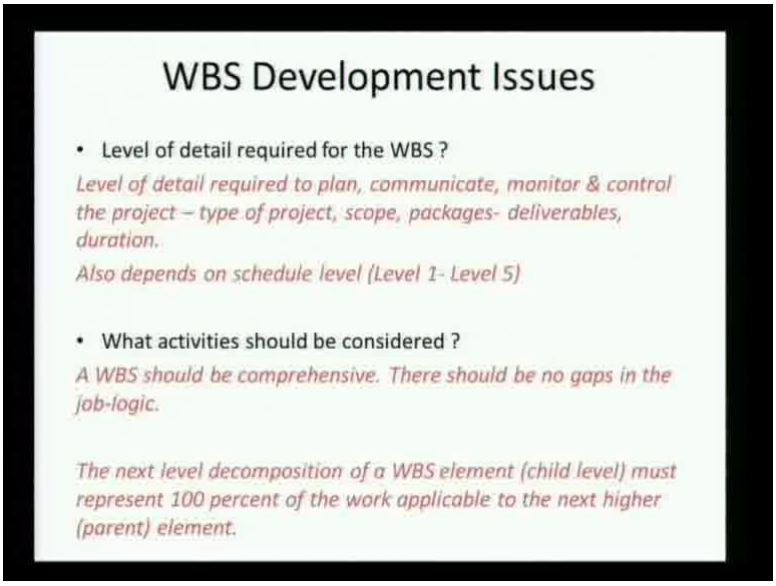

Student: Based on individual perception.

You know, so you should is based on, so the here we come into this mix of art and science. So, we are basically saying that identification of activity is right now is seem more of an art

than science no there is certainly a lot of art in identifying an activity, but the science with comes to what is the purpose of the project. What is the purpose of the identifying activities? But, you are right the way you interpret the bridge under the way we actually you know to start at structuring it there is there can be the difference is opinion.

But, let me ask you the question you are seen the bridge in this form, how would you reorganize this?.

Student: ((Refer Time: 12:45)) approach.

That is acceptable; that is to me that is a reasonable suggestion, and I purposely combined it. So, that we can see that is a that is something that comes the other parts 1 to 13 how else would you break it can be it can go further detail no doubt about it

Student: we can rearrange actually like though pile caps first drive all the pile caps. And then, start sequences

That is sequence we are not discussing, how would you logically, what is the logical structure you would have which is different another structure could be I can say concreting is something are as we said earlier I only say substructure work superstructure work just leave it at that is too abstract this is one level of detail further and; however,. So, if you look what on what basis is this broken down what is the component bring down.

So, we have taken the various component of the bridge and try to break it down as much by component. So, once we put all these components together, we have the bridge and generally construction that is a kind of way one of the most common base one of the probably the easiest way break down because components of physical. But, a lot of time say something like service a project management of service you cannot break it down by component.

But, in construction yes you can allow break it down by component, but you have to realize that the breaking down by component is still only one view does not give we might require other views in of project. For example, we might want a view from different subcontractor I might have do I mean do I might have the same subcontractor like all of concreting could be one subcontractor which means a piling and the deck slab does not mean does not need different people for I want to I want concreting view to the project not the component view to the project.

So, these are things that can at change views and this important to understand it is multiple views exist and might be when we look at it from the level we are today that component is

easiest to look at as you get into more complex situation with multiple teams is looking at different aspects you will find that there are views, which you cannot even see which others needed it in that perspective we able to management the project. Coming back to this issue of detail remember we talked about schedule levels, level 1 level 2 level 3 level 4 level 5.

So, the detail you do also made depends on the level of the schedule which your are working and sometimes when you are in the in the beginning in the higher level you there is no meaning in going into too much detail. Other questions or points?. So, here we raise this question is this common question what is the level of detail require. So, it says the level of detail require basically it is a plan communicate monitor control the project given the type of project scope package deliverables and duration.

So, for example, and other very important thing is a level of detail is duration I am I am in an in a shut down better of in project where to let us say you have a power plant, and you have the boiler shut down for you to do maintenance. So, in this case, the boiler can be shut down only for a few days, and it is critical that the boiler come back up and the power plants starts generating again what is the what is the detail you will go to from a duration perspective it will be an hourly it even a half hourly duration your activity has to be at that level of detail as suppose to level of project it is going to take 4, 5 years to complete it can be weeks, months, because that is a level and control it.

So, the control depends on also the time scale and what is you are deliverable from the project the second question is you know what activity should we consider like we have said WBS should be comprehensive, there should be no gaps in the job, job logic does not necessarily mean sequence; it means at once have completed all the elements of WBS my job should be fully completed. All activities from my job should be accounted for so when you talked about project management being a part this is something that you use to be missed people would not put project management in the WBS.

Because, it was not a what you call it was not a component of a something like that no drawings were not coming out the project management even though the plan that is not a component, but there is a lot of money spend on project management there are resources on project management. So, we should make sure that all paths of jobs are taken care of when we do is WBS and when we decompose WBS at each level, hundred percent of the work apply to the next higher level is.

So, these are some other basic rules, but still, we will find that when you start trying to break

up the project into its activities into its elements and organize it in the form of work breakdown structure, it is not that easy for everyone to see the same perspective as we just experienced.

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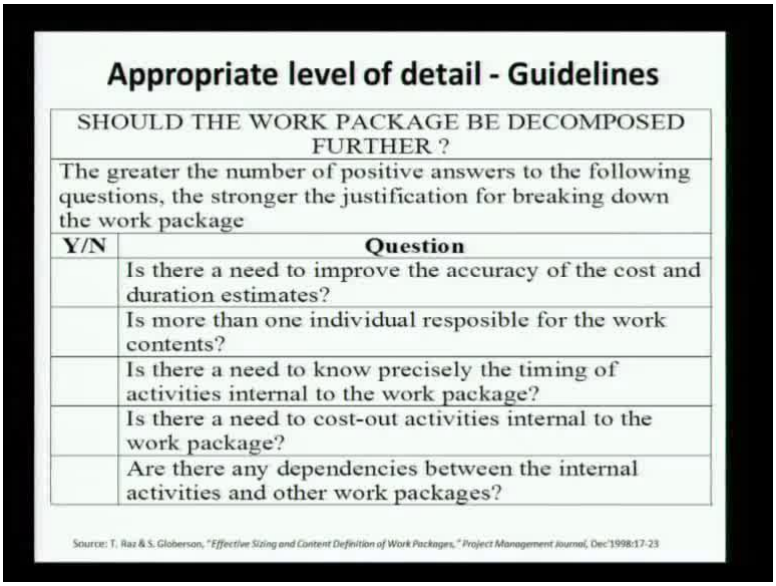

Now, I just put this to show you this is the question this is asked very commonly what is a level of details and you know there are guideline such as this, which gives you checklist you say you know you have to answer if you take a look at this list should the work package we decompose further this says the greater the number of positive answer should have followed in question is stronger the justification for breaking down from work package.

See the rule is not it is not a very black and white rule it is a gray rule it says greater stronger justification and that is the nature of the job. So, you can see the there are there are a list of questions here.

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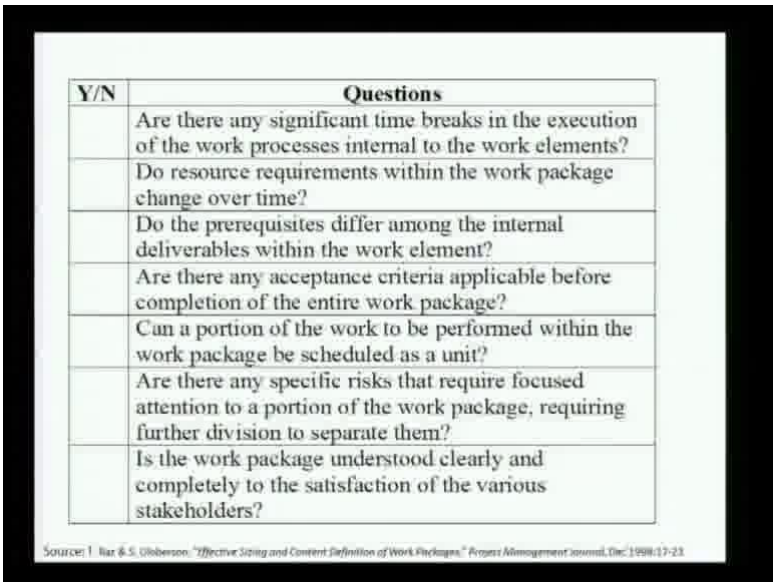

And that does not end there quite a few questions, and once you can answer these question then you probably have a justification or in an answer should I go into more detail on it and this is a question faced by a professionals. So, without a lot of experience with a lot of a of a of planning knowledge everything when you come in that is still a question as to how the detail should I go in a work breakdown package. This, the reference to this is given below I would encourage you to read it if you more curious about learning about a what how what level of detail to break down.

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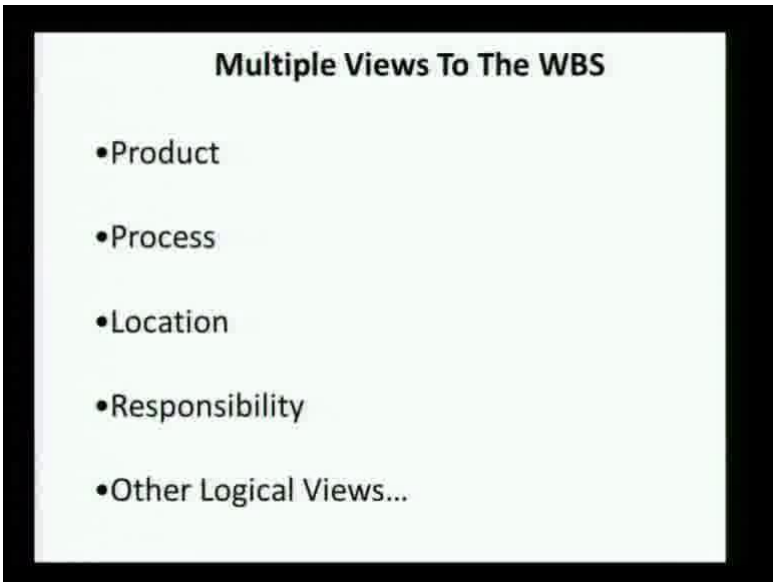

So, we need to step back and if you take a work breakdown structure you have multiple views you have the product view the process view you can break it down by location you can break it down by responsibility there are many other logical views, and the challenge is that all in a when you take a project and all its stakeholders one or the other view is always applicable design.

So, somewhat we say here is you can you get actually you get a multidimensional work breakdown structure. In some cases, you have to actually take all of these views develop an n-dimensional work breakdown structure, which can be sorted the way you want based on the view you want. Today, with computer programs and you know software, that is possible we will see a bit of that later in the course.