Introduction to Lean Construction
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Module – 1, Lecture 41
Process mapping – Illustration: Reinforcement shifting

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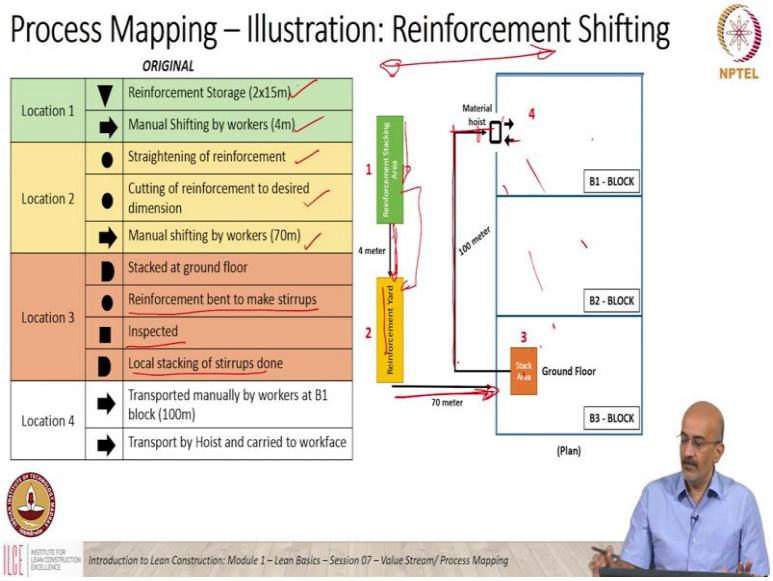

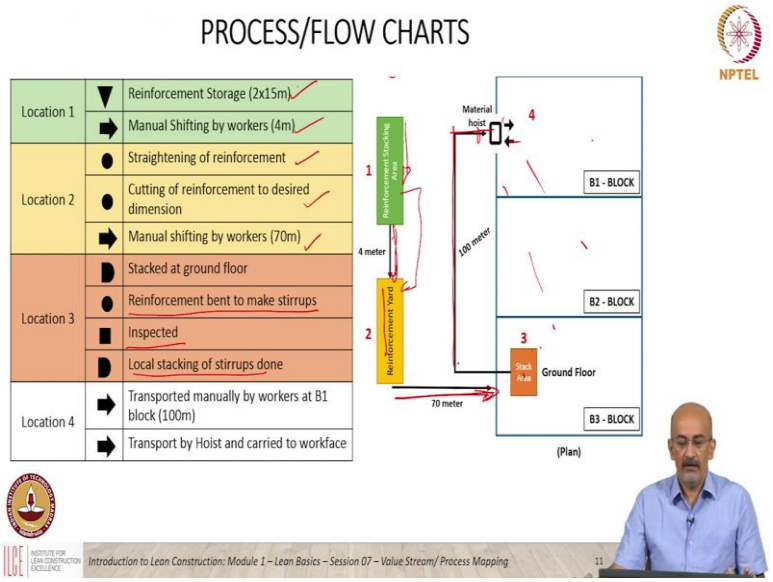

So, here is an example, on the right here we have a diagram on how reinforcement is actually processed for a building construction. We have for example a reinforcement stacking area here from which reinforcement is shifted to the yard and here then we move to another stack area and here we move it to the high.

So, this is the flow of what is happening. The process map here lists the details. So, for example, in location one, we have reinforcement and storage, then we have manual shifting

where workers which is here. We have straightening of reinforcement occurring here cutting of reinforcement, a desired dimension occurring in stage 2. And then it is manually shifted to the next location and here is stacked on the ground floor, so there is a stack area here. And in this area itself, it is bent to make stirrups. So, here stirrups are made, and then the stirrups are inspected.

And then again, it is locally stacked the stirrups are against stacked. So, there are two delay occurs there and then transported manually to this area, a hoist happens to be here and transported vertically to the hoist and then move to whichever place it needs to be moved to for fixing the reinforcement or the stirrups as required. Are there any questions in this map as you see it, in this translation of what is actually happening, here is a more of a plan view of what is happening, it is transformed into a process?

Now, when taking a look at this and looking at the various processes, we then look at it from the basic details of what is happening at each stage. So, you can see the bending, the stacking, and all of these other parts of it. The question now happens, how can we improve this process? So, if I go back here and ask the question, how would you improve this process? What are the wastes you see right away? Any suggestions of the waste you see right away?

Student: Location 1 and 2 can be merged together.

Professor: Yeah, so one option is actually to merge location 1 and 2 together that is one option. Anything else? Or I can merge location 2 and 3 together? Why am I cutting and bending, here and then I am sorry, what am I doing? I am straightening here and then I am doing I mean kind of bending it here and then moving it over here and then moving it all the way to another place.

So, for example from 1, I can do the straightening and cutting here and then I do the bending here and then move it here, why cannot I do the straightening cutting and bending in one place. So, possibility, is there anything with the layout?

Student: lesser number of movements I think the better it is definitely. So, we need to see the both the direction and the route, movement, and then correct.

Professor: So, again, there is a lot of cross movement that take place with the movement is going this way once and then the other way ones. So, there are many ways in which we can look at this to see how it could be improved.

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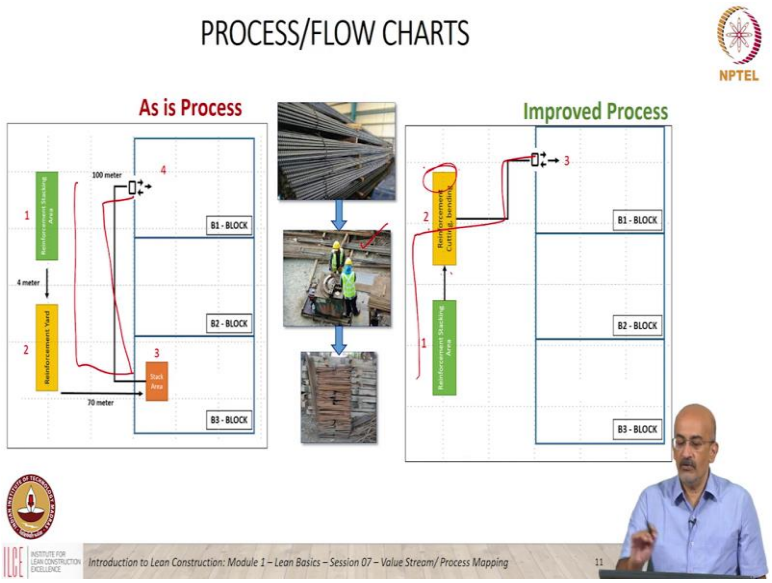

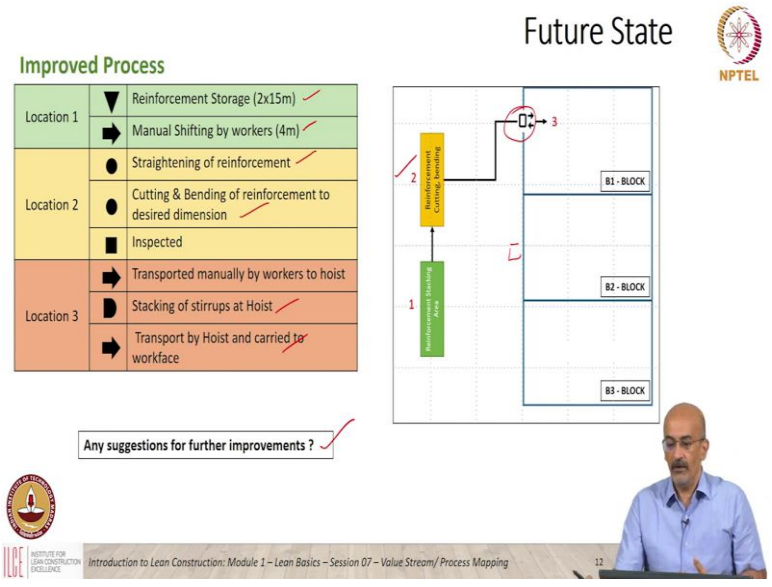

So, here is a suggestion that is been made for how it is improved that is we have first changing the way, the stacking areas done in the cutting and bending is done. So, one is we are moving stack the stacking area here. So, the flow is all in one direction rather than flowing this way, this way, this way and back. So, the flow is all in one direction and two there is some amount of automation brought in the bending.

So, if you notice in the earlier case, it was more manual. So, this was probably why it had to be bench was separately. Here in terms of straightening cutting and bending would be one bench where we could probably straighten shifted, cut it shift it, bend it, so that all of this takes place in one operation or in one location and so, if we try to put these ideas into a process.

We basically move it this way reinforcement and storage, manual shifting, we have straightening of reinforcement cutting and bending of reinforcement to desired dimensions in the second place is inspected here, transported manually by workers to hoist, stack to the hoist and then carried. So, this is just a proposal, they can be other any other suggestions for further improvement? Is there anything else that could be done?

Student: Stirrups can be made up of say offsite.

Professor: It can be made off site, in which case, I mean, there will be a totally different process. One might ask the question why is the highest here? Why cannot have a have the hoist that might be a larger question, hoist in the middle of the block, so that transportation time is it is more central to the whole building, in which case the arrangement here might be different.

They can might be the hoist came up here because those are the first block to be built. And then that continues to be, there might be a lot of wise we can ask and might be some of these wise my deal more improvements. So, this is just an example of how we can use a process map to be able to show how we are the current state and the future state of processes? The ideas that can be put on should be made into a process map and show.

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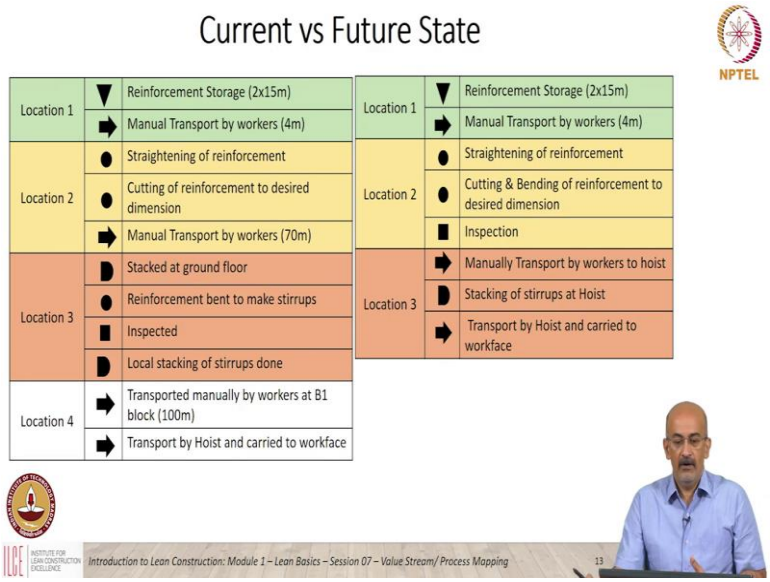

So, here we have what was the current state versus the future state side by side?

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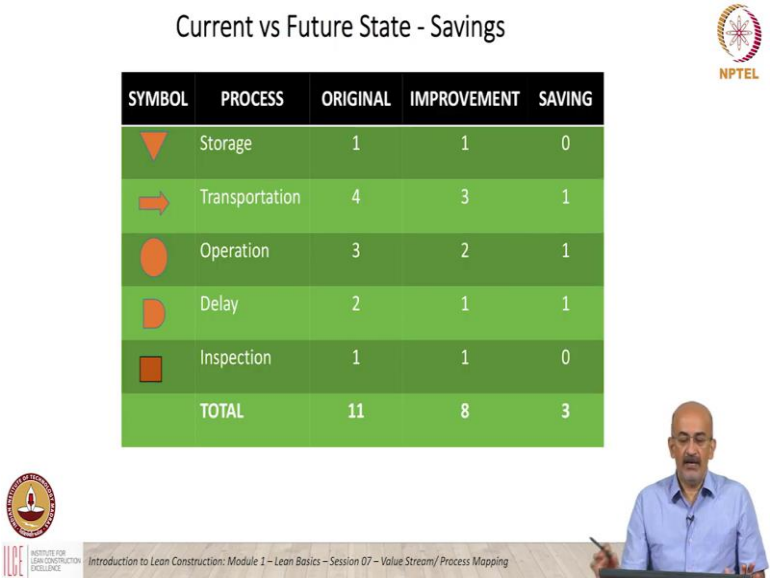

Now, we can now a little bit of quantification of savings can be done. We can see in storage there were we there was no savings, transportation, there was one step saving, operations there was one saving, in delay there was one inspection. There is actually this is always a one-step saving totally there is a 3 step saving to the whole process of the savings that would done.

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