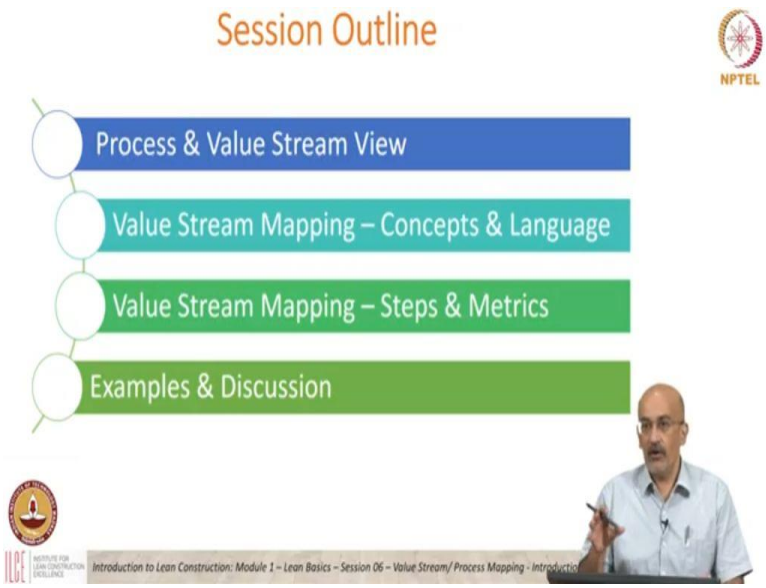
Introduction to Lean Construction
Professor Koshy Varghese
Department of Civil Engineering
Indian Institute of Technology, Madras
Module 1
Lecture 34
Value Stream, Value Stream Mapping (VSM), System vs Process, Reference

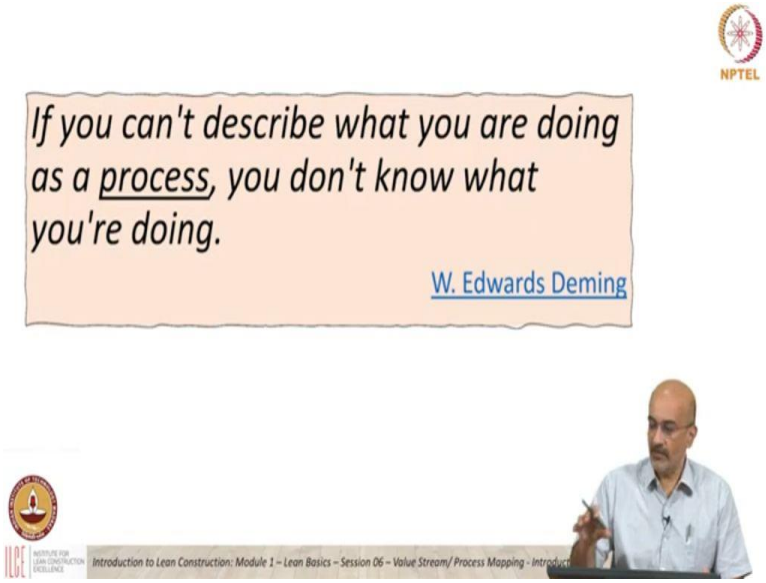
Good day everyone. In this session, we are going to start on this topic of value stream mapping. So as you are aware, VSM or Value Stream Mapping is one of the core Lean tools; and where it evolved from the Toyota production system. And it has continued to be used as one of the core tools in most Lean implementations.

(Refer Slide Time: 00:45)



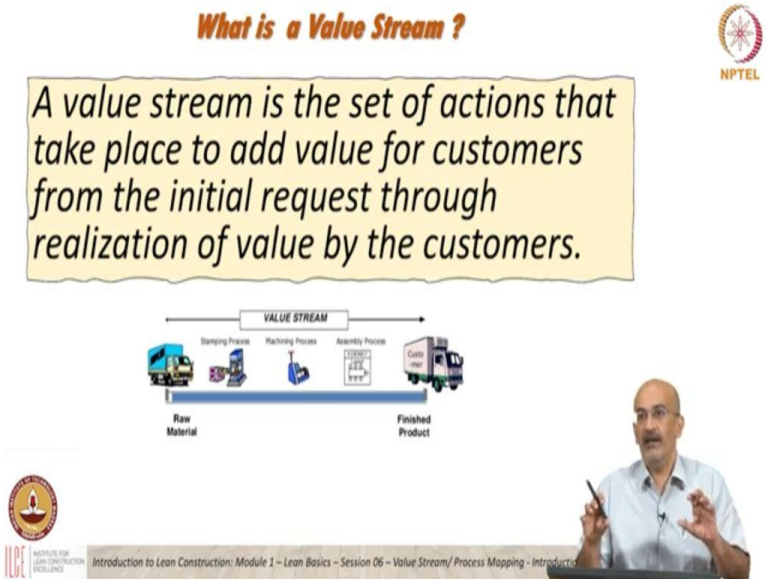
So, from the outline of the session, we will look at process and a value stream view. So, this is important to understand how we look at what we do from a process perspective. Then, we will go into the concepts of value stream mapping and the language as we call it. And then we take a few examples to show what the steps and metrics used in value stream mapping are. And then end with a discussion on how we would implement VSM.

(Refer Slide Time: 01:14)



So, this is a quote by one of the stalwarts in this area of called Deming. And as you can read, it is what he says is, if you can not describe what you are doing as a process, you do not know what you are doing. So, basically what Deming says is every kind of operation we do our sets of operations, we should try to make it a process. And only when we see it as a process can we bring about improvements. And as we know that this is one of the basics of Lean that we are looking at making the things we do processizing it; and then bringing in efficiencies into the process.

(Refer Slide Time: 01:50)



So, if we look at them what is value stream? So, it is very important for us to understand when we look at the process, that there is a value stream in the process. So, if we just go with the definition, a value stream is a set of actions that take place to add value for customer, from initial request to realization of value by the customer. So anything we do, there is a process; and then each step of the process, there is value added possibly. And as the process flows, that is there is value being added; and that is the value stream.

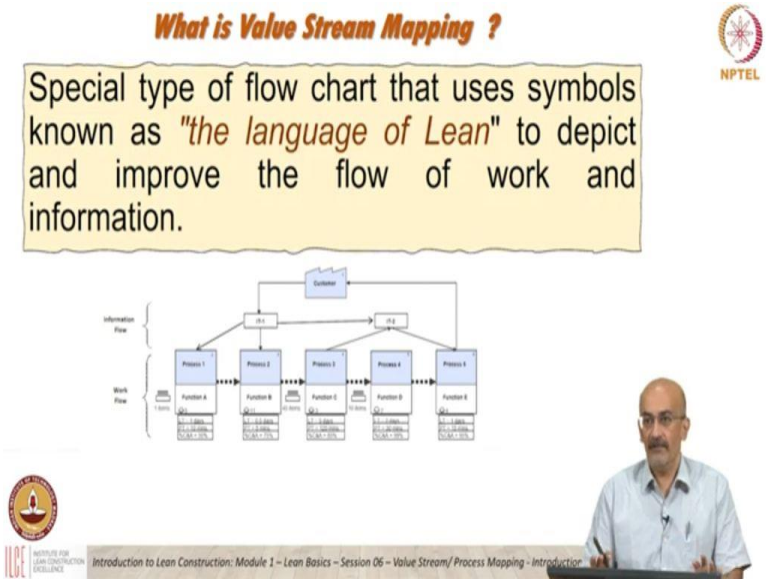
So, here you have an example of a raw material coming in; there is a stamping process, a machining process assembly and each stage. For example, does stamping add value?

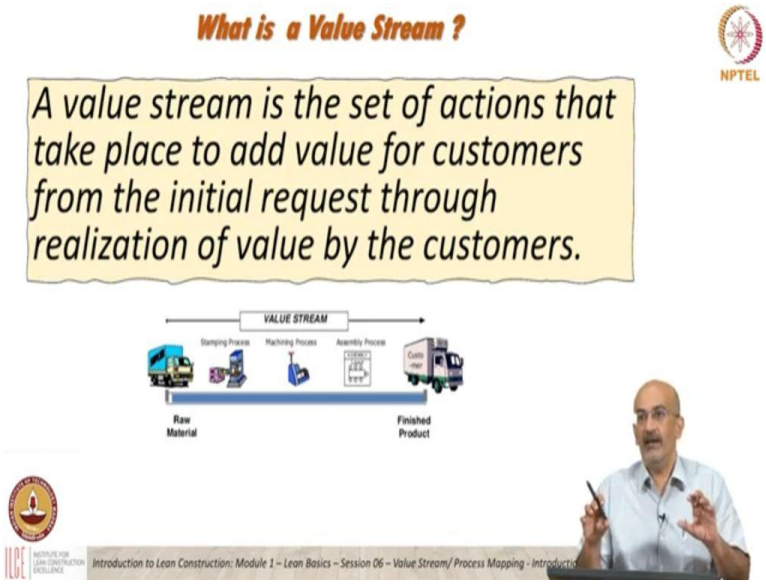
Student: Yes.

Professor: Yes, there is value, because the customer wants some value added to it; and stamping is one of the requirements of the process, so some part of machining adds value, assembly adds value. The customer finally gets the end product, the way the customer wants it. But, in each step of the way, there is some value added; and the whole process when we look at it, and where value has been added is the value stream. So, it is important not only to understand the value stream as a tool, but also to understand what a value is, and what value stream is as a concept; because the tool is there to support the basic concept.

So, the tool can be modified, the tool can be adapted, the tools some of the metrics we decide today can be adapted, and evolved and even change. But, these core concepts remain the same.

(Refer Slide Time: 03:29)



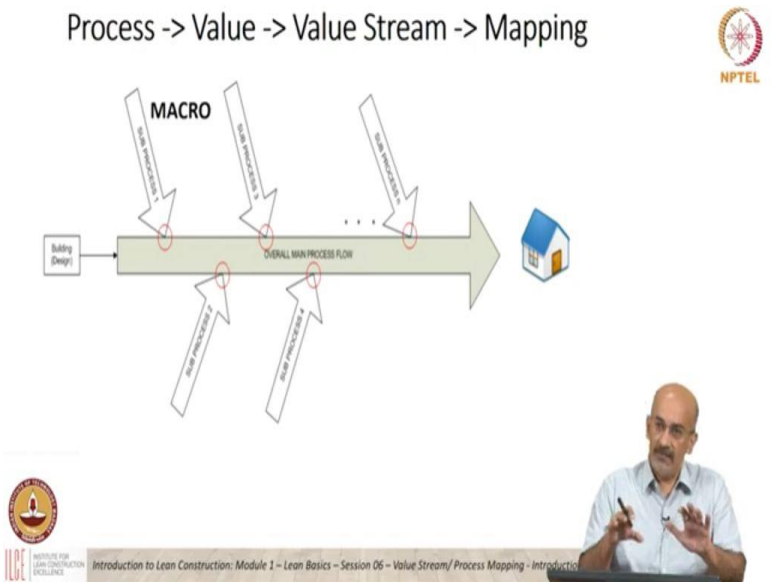


So, when we go into value stream mapping. So, now we discussed what was kind of a process we looked at, what the value stream was with respect to the process. Now, when we look at what is value stream mapping, it is basically a special type of flowchart that uses symbols known as the language of Lean, to depict and improve the flow of work and information. So, we looked at what a value stream is. So, all our value stream map is does is instead of putting it into what you call the real world process like this, we can show icons et-cetera. It translates it into some kind of a language.

So, the parameters which we use from a Lean perspective can be depicted; symbols can be depicted here. And when we show this chart, people understand what the whole processes; and when we use a standardized language that means communication becomes easier. I do not need to show icons and customized diagrams like this; I can show a value stream map and people will understand what is happening. So, there is a lot to be said when something is visual. I mean as we know that when we see a map, we are able to make out many more things; then we just we just look around and see where we are.

So, we can give a lot of examples where a big picture view of what we are doing makes us think, and understand where we are rather than just looking at things from a numerical perspective or text perspective.

(Refer Slide Time: 05:02)



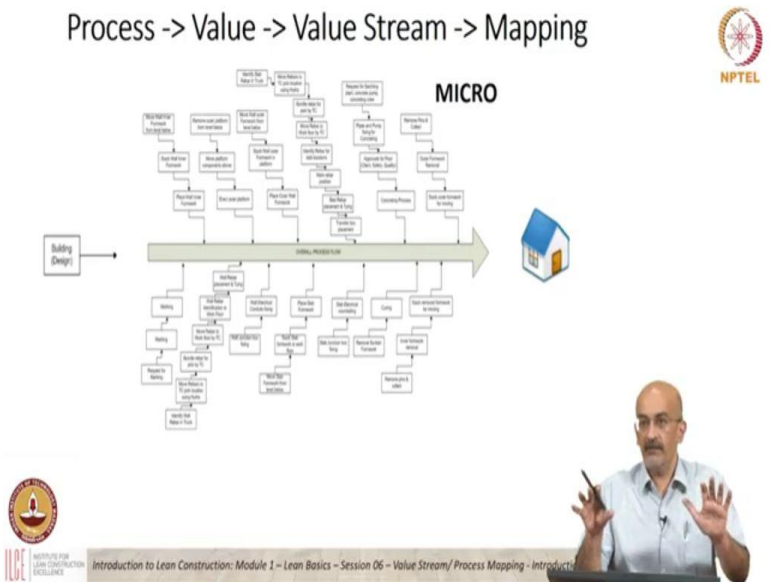
So, when we take this in the context of construction. So, a lot when we look and when I know it is always easy to say there is a process in manufacturing; there is an assembly line, there is value added; all of these are kind of easy to relate to in the manufacturing coming. But, when we take the construction domain, so we can see; I mean this is an example we used earlier, you have a building design. Now, the design has to kind of transform itself into the physical property. So, there is a I mean, we know that there is a process flow. We know that it is not as well structured as a manufacturing process flow; but there is still a process that needs to be done to convert the building design to the physical product.

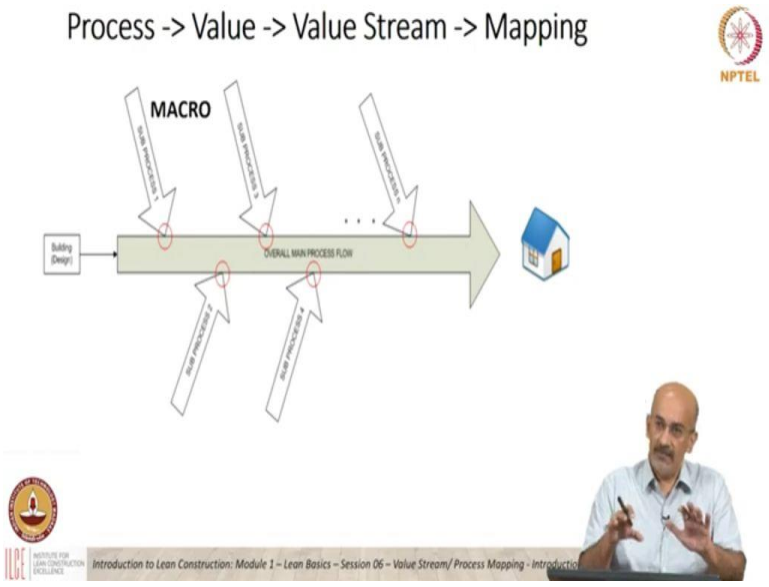
We can look at the macro view of the process. For example, what could some of these arrows indicate? What do you think?

Student: the activities like WBS

Professor: It could be it could be foundation structure finishes, it could be you know these are the larger processes that are constituting in terms of the big arrows.

(Refer Slide Time: 06:06)





I could go into the micro level. So, for example, this is at a very detailed level. This talks about wall, this talks about form work, this talks about reinforcement this talks. So, all of these micro

level processes basically contribute to the construction and the fact that design can be transformed into a constructed physical component. So, even in construction we have processes and is there value added in each of these phases?

Student: Yes.

Professor: There is value added in each of these phases. So, there is a value stream and if I can map the value stream, then I can study the process from a macro perspective, or from a micro perspective. And what is the objective of looking at it from a macro/micro perspective?

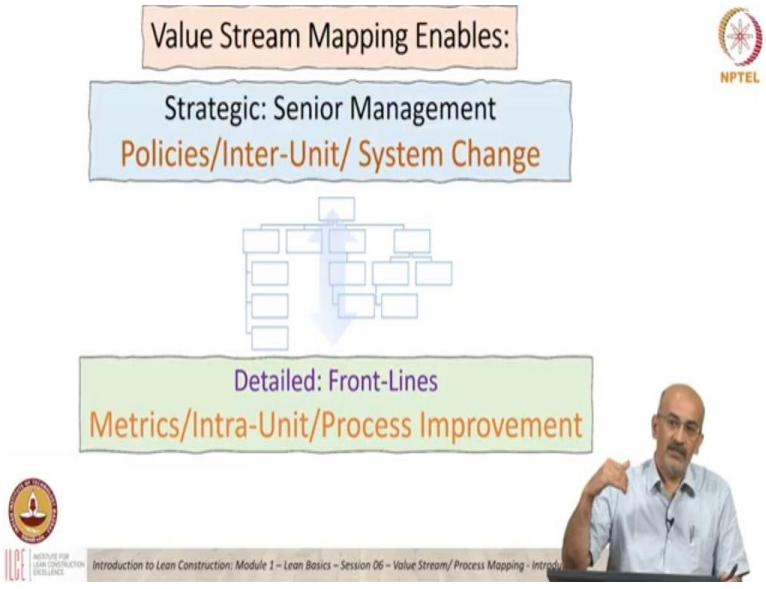
Student: Depends on how detailed you want.

Professor: I mean, if I look what is so, what is the objective of mapping out this?

Student: Even you should know exactly where the value is getting increased.

Professor: Right, and what do I will then? I want to try to improve the process. So, whether I want to do this improvement at a macro level, or I want to do this improvement at a micro level, it depends on me. Micro level will take a lot of detail will take a lot of effort to do this mapping. But, at a macro level, I might be able to do some level of mapping, some level of benefit; but it will scales are different. So, what you see here is not a value stream mapping; it just shows that there is a process associated with construction, and there is value added in each stage.

(Refer Slide Time: 07:42)



So, if we look at value stream mapping, just as we discussed in the macro and the micro perspective. There is in the macro perspective, we look, we need it can be strategic. We need senior management inputs, we need it impacts policies, inter unit kind of coordination and a system level change. The same concepts applied into a detail or at the frontline level; we look at more detail metrics, we look at intra-unit, we look at processes. So, the concept of a value stream the way I have seen it applied. In general when we talk about value stream mapping, it is more at a strategic and at the strategic level.

But, we have seen the tools applied also at the detail and the frontline level and P to P. So, we will kind of look at both of these aspects in this presentation. And from where we have seen applications in construction or in many of our projects today, which you think is easier to do?

Student: Macro level is easy.

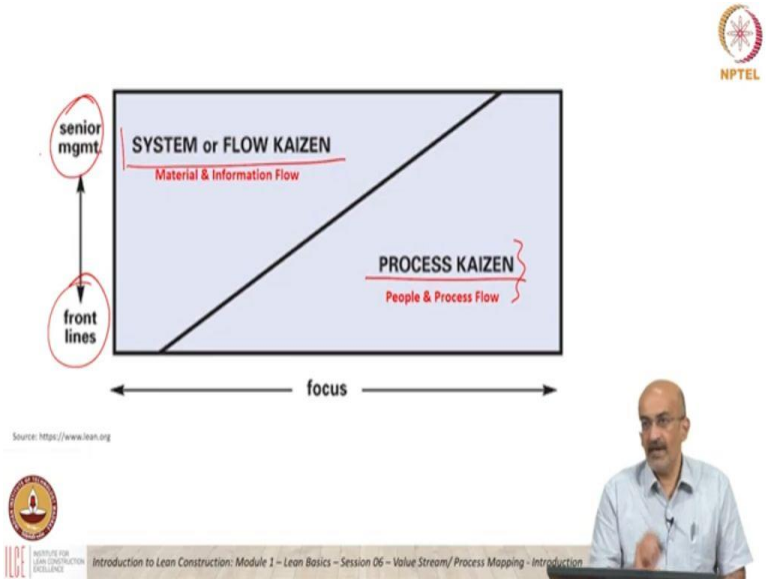
Professor: Macro level requires top management and buy-in requires inter-departmental coordination tends to be more challenging. The micro level is within the department, within its own people, within its own thing; so it is easier to map and easier to bring about change.

Student: So, it is more time consuming, macro.

Professor: It is more time consuming. But then sometimes it is not the time consuming part of the effort; that is a problem, it is a coordination of people. If you remember we have people, process, technology. Sometimes the people part is buying enough getting people to work with doing the macro level is more of an issue, rather than the effort that goes into micro. So, several of the implementations when we have gone to teams and said do a VSM. They found it kind of, I mean, kind of more. I mean, it is it is easier to kind of start with the micro.

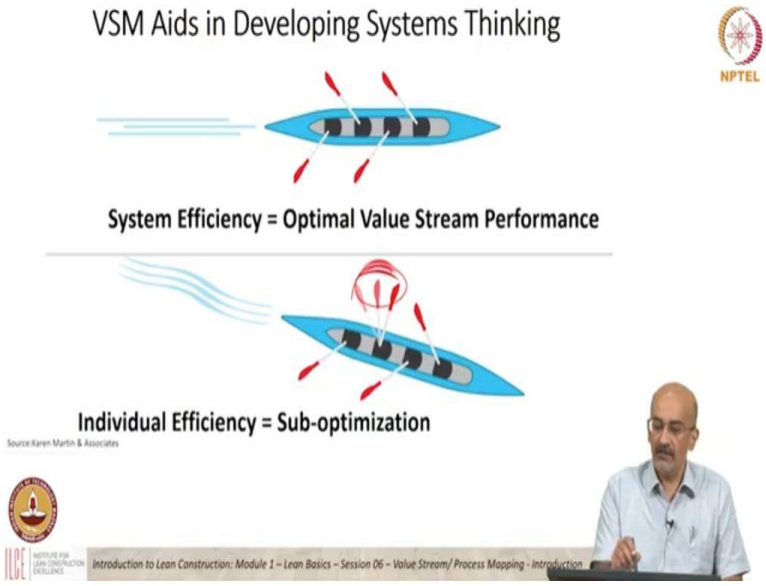
And this is also suggested you can start at the micro level get used to how the tool works and then start moving to the macro. But, it all depends on how much of management buy-in you have; how much top management support you have, and how effectively the team works together.

(Refer Slide Time: 09:53)



So, this is another view of the same concept. So, this is from one of the original developers of, or the people who made VSM popular. And this talks about, you can see what we have is the focus. Here is the focus on the process or on the system. So, here we have let me take this, so here we have process focus; here we have process focus, and here we have system focus. So, if I am going to focus on my process, then I need more frontline involvement. If I am going to focus on system, I need more senior management. Basically, an extension of the same concept we just discussed. Are there any questions?

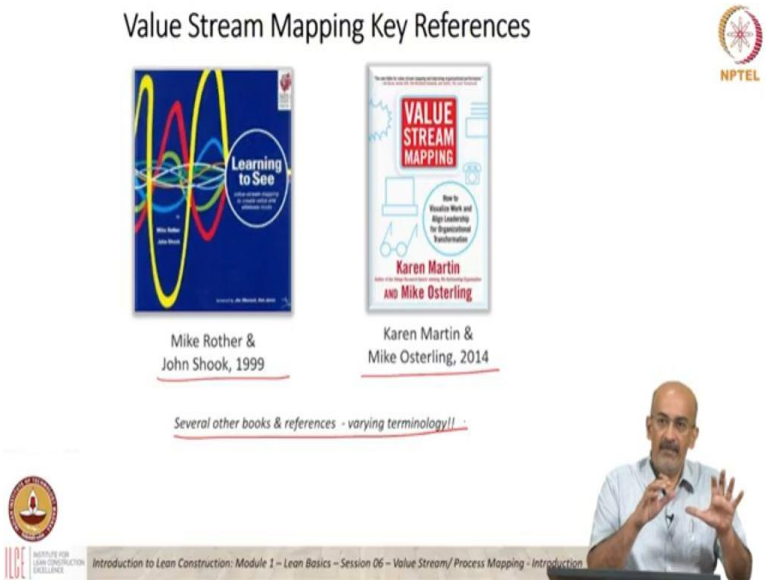
(Refer Slide Time: 10:54)



Now, again just continuing, because this is important; because there are two levels of VSM usage; or two levels in which flow and value can be viewed. So, if we look at it at an individual level, you can see this is a boat where you have one boatswain is optimized and doing fast. It does not help because everybody needs to do this in a coordinated way. So, optimizing a single process will not help the overall objectives. So, when you look at the value stream, yes, I can look at this process alone; and say how can I make it better.

Yes, there is a certain amount of benefit to it. If that person for example, that boatswain happens to be the weakest person, improving him might improve the system. But, only focusing on that boatswain and making a very big improvement or optimizing will not help the system, because the system works in coordination with it.

(Refer Slide Time: 12:02)



Now, these are two key references which I have used for this presentation for VSM; and I find that these are in terms of many of the concepts they are presented. Many the way they are presented from the terminologies are appropriate to the way we have been wanting to do this. So, the first book called Learning to See is a classic. It is the book that actually made Value Stream Mapping popular industry; so, you can see this was around 1999. Then, in 2014, this book has actually adapted from some of these concepts brought in more metrics, more detail into value stream mapping.

And some of this is also what we will I will present in this session. And if you go to the book, actually it gives you a more; I am only presenting some of the key concepts. Now, there are several other books and references in VSM; and there is some more varying terminology. You will see that the terminology we use here is something we have been reasonably comfortable with. But, there is varying terminology, there is the symbology almost remains the same. But, what does one get out of we here for VSM tends to marginally change.

And that is okay, because that is the intent. You are ultimately trying to get improvement in the process. Whether I do it by method a or method b; if the improvement is there and it can be experienced by the organization. That is what important.

(Refer Slide Time: 13:34)