

Toyota Production System
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Module No # 03
Lecture No # 15
Use of Visual Control

Welcome friends, now, this is the end of week 3, we are into the fifteenth section of this course on Toyota production system and we are already discussing various principles or you can say various techniques which we need to keep in mind while making our organization a world class organization. We discussed that Toyota production system is a way of manufacturing one way of manufacturing we discussed is mass manufacturing where we create a lot of inventory.

And when we are creating a lot of inventory, many problems were not identified, because that inventory was giving a cushion and because of that cushion problems were not surfaced. On the other hand, we have this manufacturing system, which is Toyota production system and many of the authors call it also as lean manufacturing system where we are trying to develop minimum inventory.

We consider that if you are having overproduction, that is a kind of waste and it is not only waste in itself, but it is also giving birth to many other problems and those problems will become the source of non-competitiveness for your organization. And therefore, the principles of Toyota production system will not only help you in reducing the waste will not only help you in strengthening the processes, but also help you in removing various sources of non-competitiveness and will help you to strengthen your competitiveness so that you become a world class organization.

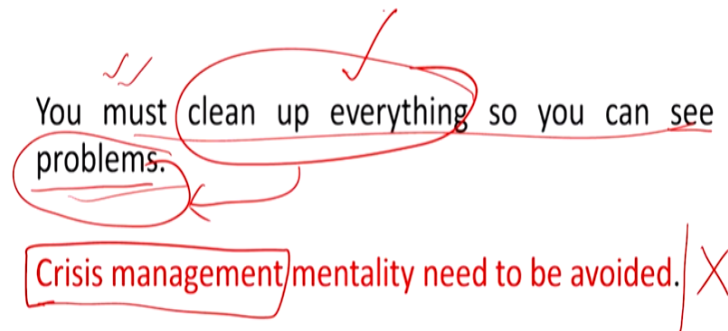
Now, in this particular session, we will discuss that how we can develop various visual control systems for our organization one type of visual control with which we all are very much familiar that is the traffic signals. So, on our highways, on the crossings, we have different types of traffic signals. And once you have different color for those traffic signals, you automatically understand what is the meaning of it and what type of reaction you need to have with respect to those

different colors, if it is red color, yellow color, green color, how you need to respond to those traffic signals.

So, that is a very common type of visual control, we all are very much familiar, now Toyota said that we can have similar kind of visual control systems in our organization also, in the manufacturing locations also, in the service organizations also, in our offices also and once you have these visual control systems at different locations, the productivity of those areas will increase.

So, that is the principle of Toyota Production System, which we are going to discuss in this particular session. Now, the basic idea of this visual control is that we need to have a neat and clean place where we are working.

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So, you can see the problems when things are messy, when there are a lot of stuff around your place of work. So, you will not be able to identify where is the problem? And therefore, the idea of visual control is that if you have a completely neat and clean system and wherever there is a smallest problem, it will immediately be highlighted. So, if you have a white shirt and even a small spot is there on that white shirt, it will be immediately highlighted.

But if you are wearing a dirty shirt, so many dots, many black spots you will not be able to identify because you will not be able to surface out to those problems. So, it is very simple to

understand that if we keep our area clean, if we keep our workplace clean, it will help us to see the problems effectively. So, the whole idea of Toyota production system is to improve our process, so that you can produce the right product.

And therefore, it says that clean up everything and this clean up everything will help you in seeing the problem. So, when you are able to create a clean environment, a clean workplace, it will help you in getting the problems immediately even the smallest problem tiniest problem will be noticed and unfortunately, when we talk of this idea, one more thing come to my mind.

And that is most of the time, if you see our managers in a manufacturing organization, if you go to a bank, if you go to a restaurant, if you go to airline office, every time you go there, you will find that most of the people are busy in the crisis management. So, we are all the time in the crisis management situation why because we are not keeping our workplace up to the mark. And the idea of visual control is that if we can avoid this crisis management situation, then only you can work on long term philosophies.

Otherwise, our entire energy our all resources are wasted in handling the crisis. So, crisis management mentality need to be avoided and we need to create a clean environment. So that you can find out you can identify you can locate the problem as soon as it occurs. Now, for this purpose, a very popular concept that is mentioned in Toyota principles.

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The Principle Clean It Up, Make It Visual

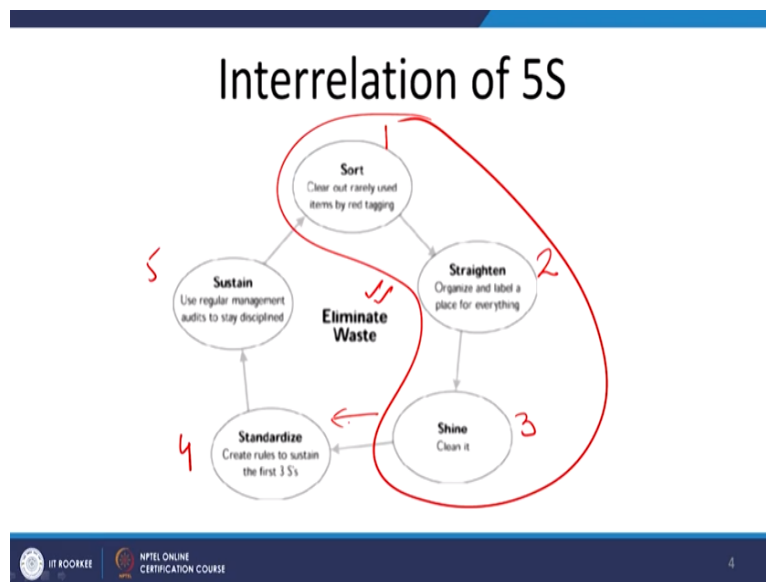
5S

seiri (Sort) ,
seiton (Straighten) ,
seiso (Shine) ,
seiketsu (standardize) , and
shitsuke (Sustain)

And Japanese people follow these with the name of Japanese language. So, you find these 5S concept many of you must have heard about these 5S, these are seiri, seiton, seiso, seiketsu and shitsuke. These 5S concepts are then being adopted all across the globe and English translation is also available in the form of 5S. So, that is sort, Straighten, Shine, standardize and Sustain. So, you need to follow a 5S philosophy and many authors discuss this 5S concept under the heading of lean manufacturing.

That if you want to achieve a lean organization, you need to follow this 5S philosophy and let us see that what do we mean by these different 5S and how these 5S are interrelated also. So, these are not 5 different things rather these are very much interrelated.

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And this diagram gives you the idea that how do we start with the Sort then we go to Straighten and then Shine then Standardized and then finally Sustain. And if we do all these 5S, you will be able to eliminate the waste which is ultimate objective. Because you are sorting means clear out those things which are not required, you can create different kind of visible controls for that purpose.

Like first we discussed that you have to sort these items and keep only those items, which are required and you can dispose of those items, which are not required in our houses also in our offices also at our workplace also, we keep large number of those items, which are rarely used. So, if you see this diagram, we say that when you are sorting, you are keeping all of those items

with you, which are regularly used and those items, which are rarely used, can be placed with the red tagging, that these are the items which are rarely used.

So you can put a red mark on those and those red mark items can be placed at a distant location, so that they are not the part of your regular work area. So, that is the first important thing you can see practically you go to any Indian organization and you just ask the computer operator to locate a particular file and the computer operator will take a huge amount of time because there is no proper sorting.

So, in our offices also we do not have proper file management system in our home also we regularly see that things are not at the right place. And therefore all the time in the morning hours, particularly when children are going to schools and you are going to your office. So that type of crisis management normally a phenomena of morning hours daily in our houses. So, sorting is very, very important, keeping only the important things close to you and all those things which are not so important.

And you very well know that things which you have not used since let us say past 6 months or 1 year will a thing off used rarely. So, all those type of items should not occupy your immediate space, because space is a very important resource and how to use the resources is an important thing that is the idea of waste minimization. So, sorting is a very important thing and you can do this sorting at your home, at your factory as well as at your offices. So, wherever you are, the principle of sorting is very much useful.

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Seiton (Straighten)

- Orderliness : A place for everything and everything in its place.

Refrigerator }
Tool box } → SMED workplace

The second S is the orderliness and if I say that, in the form of English word, it is a straightening that brings the orderliness to the workplace. Now what it says it need to have a place for everything and everything should be at its place. So, you know that the interior design of a refrigerator, that is a very good, you can say example of the orderliness. So, in that refrigerator, you have a place for keeping the bottles.

You have place for keeping the containers you have place for keeping the vegetables you have place for keeping x you have place for keeping your other spices. So, for every item, there is a proper place in your refrigerator. If you see your toolbox, the interior design of the toolbox is again a very good example of orderliness. So, where to keep the screwdriver where to keep the plast? Where to keep the hammer? Where to keep the other tools? Where to keep the wires?

Where to keep the screws for all those things, there are well defined places. So that whenever you are needing a particular tool, you just open the toolbox and you know that here is the screwdriver, here is a hammer, here is the some other kind of tool. So, your hand will automatically go to that particular place. So, you will not waste time in searching the tools, if your items if your tools, if your raw material is not at the appropriate place.

So, lot of time is wasted insulting in our manufacturing plants, we are talking of quick exchange of dice the concept like a SMED that is single minute exchange of dice that is now becoming popular, because we want flexibility. So, we are continuously reducing the lot sizes of

production. And when we are reducing the lot sizes of production, we want to quick changeover of one product to another product and in that time as an SMED type of concepts are very useful.

So on one side you are having SMED, where you want to change the dye in one minute, but if the dye is not available at the appropriate place, so, in just searching the dye, you will take let us say 10 minutes. So, the whole philosophy of SMED goes into the waste that though you are taking only one minute for changing the dye, but you are taking 10 minutes for searching the dye and that time can be eliminated that time can be reduced for searching, if you have the orderliness.

So, examples like a refrigerator, the toolbox these examples can be extended to your workplace where you know that this particular area is for raw material. And this area is for type A type of raw material, this is for type B raw material, this is for type C raw material. So, if you are following ABC classification of inventory management, accordingly, you can know that where to keep which material and accordingly you will have various material handling devices for those sections.

Accordingly, you will have various devices, various racks for holding those materials. So, material holding devices, everything can be designed, if you have a proper system of finding the item at a particular place, otherwise, it will going to create a lot of wastage of movement, a lot of wastage of identifying searching the items. So, lot of time wasted will take place if orderliness is not there. So, that is the second important S to straighten.

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Seiso (Shine)

- Cleanliness: The cleaning process often acts as a form of inspection that exposes abnormal and pre-failure conditions that could hurt quality or cause machine failure.

The third important S is about the shining. So, what does you see this diagram says that first is the sort. So, what you are keeping that is very important thing and those things which are often less value, which are rarely used, you need to keep them apart. The second thing is you need to organize and label the place for everything that here you are keeping type A item here you are keeping type B item here you are keeping type C item, then the third thing is shine the cleaning.

Now, what does we mean by shine here, that is cleanliness, that once you have created the orderliness in your workplace, the cleanliness process often acts as a form of inspection, when you are doing the cleaning activities. So, inspection takes place because it exposes abnormal and pre-failure conditions that could hurt quality or that can also lead to failure of a machine. For an example, in our houses many a time it happens that some small article maybe eraser, sharpener, pencil, we are not able to locate because of some issue.

Then what we do, we bring a broom and we start cleaning our floor and when we are cleaning the floor, maybe below our bed or below the dining table or under the study table, you will find that article. So the cleanliness will bring the problem to the surface and it exposes that when you are doing the cleaning activities, then it exposes that something abnormal is there and you can be proactive to remove those abnormalities, you can be proactive to fix those possible problems.

And therefore, lot of wastage of time, lot of wastage of creating defect can be avoided, because you are regularly cleaning your areas. So, you are regularly inspecting your area you are as

normal practice is there that whenever you start your vehicle in the morning or you are a machine operator going to factory and in the morning, what is the first job you do?

The first job is the cleaning of the area cleaning of that machine cleaning off your car and when you are cleaning your car, you are also inspecting the vehicle you are also inspecting your machine that what is the coolant level, what is the lubricant level etc. And therefore, with this, you just see whether any abnormality is there or not. And if abnormality is there, you immediately take corrective action.

So, this shining means the cleanliness and cleanliness is just not about the cleaning with the brooms. It is actually the inspection of your work area which can help you in becoming proactive with respect to any future defects or future failures. That another important S is the seiketsu that means a standardization. Now the idea of standardization, we have already discussed in one of our earlier principle of Toyota production system that we need to create more standards for the task.

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The slide features a blue header bar at the top. Below it, the title "Seiketsu (standardize)" is centered in a large, black, sans-serif font. Underneath the title, a bullet point reads "Create rules: Develop systems and procedures to maintain and monitor the first three Ss." The words "Create rules:" are circled in red, and a red arrow points from this circle to the word "Seiketsu" in the title above. A vertical red line descends from the end of the bullet point text to the handwritten red text "SOPs" which is underlined. At the bottom of the slide, there is a dark blue footer bar containing the IIT ROORKEE logo on the left, the text "IIT ROORKEE" and "INTEL ONLINE CERTIFICATION COURSE" in the center, and the number "8" on the right.

The meaning of creating the standard for task is to create rules that is the meaning of standardization, that you have to create more rules for your workplace for the task for the job in hand. And when you are creating more rules, you actually develop systems and procedures you develop SOP's that what are the standard operating procedures to maintain and monitor the first 3 S.

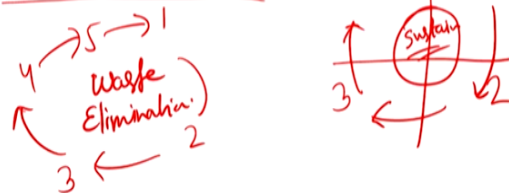
So, we discussed the first 3 S these are Sort, Straighten and Shine. So, for doing these 3 things, you are creating rules, regulations, procedures, checklist and with the help of those checklists, you are ensuring that in our organization, there is a system of sorting, there is a system of orderliness, the regular cleaning is taking place. So, those type of checklists are being developed for maintaining first 3 S.

So, that is the purpose of standardization. So, when you develop these 3S So, you also need to develop systems that people become part of these 3S, because we continuously focusing more on people in Toyota production system. So, how to maintain these 3S for that purpose, we need to create processes and creating that processes is basically the standardization activity. So, that is the fourth important S which will help us to achieve earlier 3S.

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Shitsuke (Sustain)

- Sustain (self-discipline) Maintaining a stabilized workplace is an ongoing process of continuous improvement.



And finally, we come to the fifth S that is sustain keeping the fifth S means you have standardized you have created rules. Now you want to make that part of the organization that become the part of philosophy of the organization. So, that is the meaning of sustain. So, people automatically starts falling it becomes your culture. So, it is more appropriate to say that there are large number of people who say that you have 1234 you have sort, you have straighten and then you are having the cleanliness and then you are having the sustenance.

And that is going to help you achieving the long term advantage that is the long term philosophy the first P if you remember, so, how to develop the philosophy of the organization. So, the first 4S will help you in achieving the sustainability and that is another version of this 5S concept, we had a diagram where we discuss 5S in a cyclical manner. And we say that these 5S help us in eliminating waste.

And there are people who also say that if you follow 4S, then these 4S will help you in getting the sustenance if you have developed the rules, if you have standardized the process of following the 3S then actually the fifth S is the sustenance you are maintaining a stabilized workforce, you are maintaining that stable system in your organization which becomes ongoing process for Kaizen ongoing process for continuous improvement. So, that is what the meaning of fifth S people say.

So, but it is more important to understand that either you have this diagram in your mind or this diagram in your mind, both these are actually saying the same thing that we need to create more visual controls. So that you can have the identification of problems immediately. Immediate identification of problems will help you to actually target the problem as soon as it occurs. And this will avoid large number of waste which are there in the organization.

Now, when we are talking of visual control system, you will find large number of examples around you, where organizations have implemented these 5S philosophy because the meaning of 5S if you do not go to the philosophical level the meaning of 5S people understand is only about creating a neat and clean workplace. So, people invest a huge amount of money in creating a neat and clean workplace, everything is shining everywhere you have created new paint.

So, everything is shining so new almirahs, new racks, new flooring is being done. So, we are more on just the exterior part of 5S. We do not understand the interior aspect or the deeper aspects of 5S. So, for that purpose, it is very important to understand that this visual control system is not of just creating the shining workplaces rather it has a deep rooted meaning.

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Visual Control Systems Are About Improving Value Added Flow

Visual control is any communication device used
in the work environment that tells us at a glance
how work should be done and whether it is
deviating from the standard.

And the deep rooted meaning is about improving the value added flow. This is all about improving the value added flow, it is not just to create a neat and clean and shining workplaces. So, even if you may have old rooms, we are no whitewash is there, but still 5 S and 5 S resulting into improving the value added flow may be there. Now, what is it the visual control is any communication device used in the work environment that tells us at a glance, how work should be done, and whether it is deviating from the standard or not.

So, telling this thing, whether your work is as per the standard or not as per the standard, that is the more important meaning rather than just creating a shining workplace. Shining workplace will automatically give you a high morale, no doubt in that, if you have good illumination, if you have new walls, clean walls, then you will have high morale, no doubt in that. But this whole idea is to create more value addition using the concept of 5 S.

Like, if you will see this particular diagram. So, this is one type of visual control system which is installed in a manufacturing organization.

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Now in this system, you see the last column here, this is regularly giving you the idea of overall improvement efficiency this OEE means Overall Equipment Efficiency. So, the Overall Equipment Efficiency of the plant at the moment is 73% the availability data is 81% the performance rating is 91% and quality rating is 99%. So, this is a type of visual control regularly you are getting this data.

Nowadays, I started like saying with the traffic signals, because in India problems of pollution is also increasing. So, what government has done nowadays, that at important places, particularly in our Metro cities, they have installed visual controls that what is the current PM 2.5 level, what is the current PM 10 level, what is the current humidity level, so that people know that what is the pollution level at the moment.

If you go to some other areas, some bigger cross sections in your city. So, there are a regular data coming about the deaths, because of road accidents. So, all these are nothing but the visual controls. So that you can sensitize people about the various aspects that however performance is moving. For this type of example, like the company has set the target of OE that we want to operate at 80% of OE.

And now, the 73% OE is there and we know that OE is the result of product of availability into performance and quality. So, since quality is 99% performance is 91 and availability is 81%. So, immediately your target will be to improve the availability so that if you improve the availability,

the OE only will also improve. So, this type of visual control, which we also call if you remember in our previous session, we have discussed these are light Andon controls.

So, these are the automatic lighting systems which are installed in the plant and because these machines these readers are doing their calculations on their own, and they will regularly display that what is the performance of the system. In hospitals also we have a lot of such visual controls where for a patient to monitor the condition, we have various displays, where regularly your pulse, your BP, your oxygen intake, your other parameter vital parameters are monitored.

So, as soon as there is some deviation, you will immediately come to know that were to take the corrective action. So that is the usefulness of this idea of visual control. So, you can design depending upon what are the important items of your dashboard. So depending upon the items of dashboard, you can design this visual control display systems like for this organization, OE maybe the important criteria, so they have mentioned OE and availability, performance quality are all required to calculate the OE.

And the other side these are the quality related data where how many good parts? How many rejected parts? What is the rate of output, these things are actually mentioned. So, all these data is translated into the calculation of OE. So they have created a dashboard as per their requirement depending upon what are the critical parameters for your organization, you can create your own dashboard and that will help you to actually monitor the performance of your organization.

So that is all about the visual control system. And with the help of these visual control system, you can actually surface of the problem. So with this, we are closing the session thank you very much.