Manufacturing Strategy
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Module - 8
Lecture - 38
Toyota Production System II

So, welcome friends. In our last session, we were discussing about the practical example of manufacturing system. We discussed the philosophy of Toyota production system, which is one of the most successful example of achieving excellence using operational strategies. We discussed the popular 4 P model of Toyota, where they are giving emphasis on philosophy, process, people and partners and problem solving.

And we discussed that how they are giving more importance on implementation and less on tools and techniques. Because tools and techniques are known to all the organizations. I also know all those tools and techniques. But, implementation of those tools and techniques takes the real courage. That takes the real challenge of your organization. And implementing those tools and techniques in each organization require a particular kind of enabling environment, a completely local understanding.

Local means, the organizational level understanding. That what type of employees are there, their cultural understanding, so that you can customize the implementation process to your local requirement. But Toyota has done, not only this thing in their Japanese plants, but all across. Because we know 1 very interesting thing about Toyota. That Toyota has a plant almost in all major markets.

So, Toyota has a plant in U.S.A., Toyota has a plant in India, Toyota has plants in Japan. So, they have plants everywhere. And local employees, local labours are working in these different plants. So, how to implement the Toyota philosophy, how to implement the Toyota Way of working is not unique to only Japanese plant. But it is implemented in the Indian plants, it is implemented in the American plants, it is implemented in the European plants.

So, to some extent, they have gone for the standardization of their system. And to some extent, they have the local or you can say the customization at the plant level of their

philosophy. So, in this particular session, we will extend the discussion what we had in the previous session. And we will see some specific issues, specific guidelines for the Toyota production system. And let us see what are those specific guidelines now.

Now, one of the very core thing, one of the various fundamental thing about Toyota production system is this One piece flow system. This One piece flow system is, you can say is a kind of JIT system.

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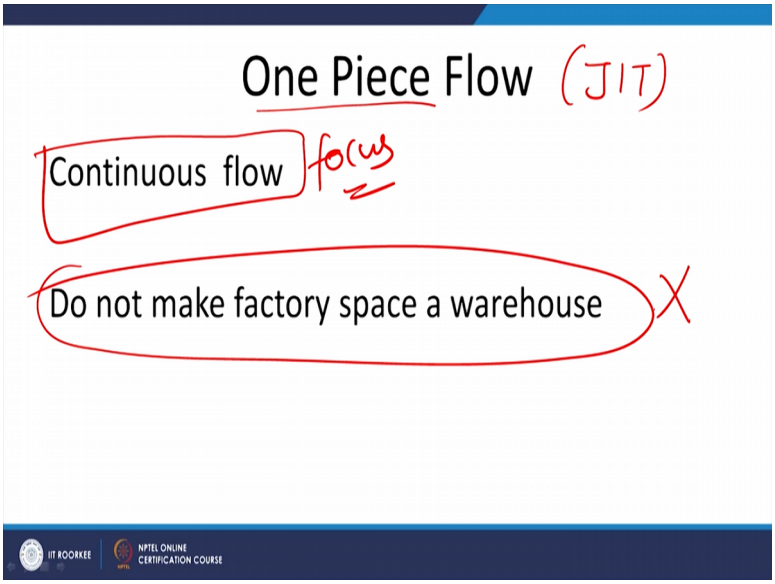

Because, when one of the top leadership of Toyota visited their plant; so, they saw that in front of some of the machines, huge piles of semi-furnished articles are there. And there are some forklift kind of devices. And these forklift devices were taking those semi-finished goods from 1 machine to another machine. And it was looking like a warehouse and less like a factory space.

So, the person was confused that whether I am in a factory or I am in a warehouse. So, this triggered the idea of One piece flow. Now, what was happening in this earlier system of production in the batches, that sometime some machine is producing. And once the batch is complete, the machine is switched off. And the inventory of semi-finished products are in front of that machine.

Now, as a result of that, it was not continuous flow of products. Someday, because order is there, so, products are moving from 1 machine to another machine. The other day, when either because of some maintenance issue, because of mismatch of schedule, because of

variety of other issues, floor was stopped. So, the focus became on achieving this continuous flow. That became the focus.

And we need to avoid becoming our factory spaces like a warehouse. When you have, obviously when you have too much of WIPs, work in process inventory, your factory space may become a warehouse. So, if you follow the concept of One piece flow that 1 piece is flowing from 1 machine to another machine. And this will ensure 2 things. 1 is, it will ensure the continuous flow, that flow of goods is always there.

However small that flow may be, but water is continuously flowing from the river. It is not that, for 3 months of the year, there is no water in the river and for remaining period of the year there is flood in that river. So, you need to maintain that you have some small stream of water flowing round the year. So, that is this continuous flow One piece flow concept of Toyota. And this will also help us in avoiding the becoming of my factory space like a warehouse. So, this is 1 very you can say central point in this system of Toyota production.

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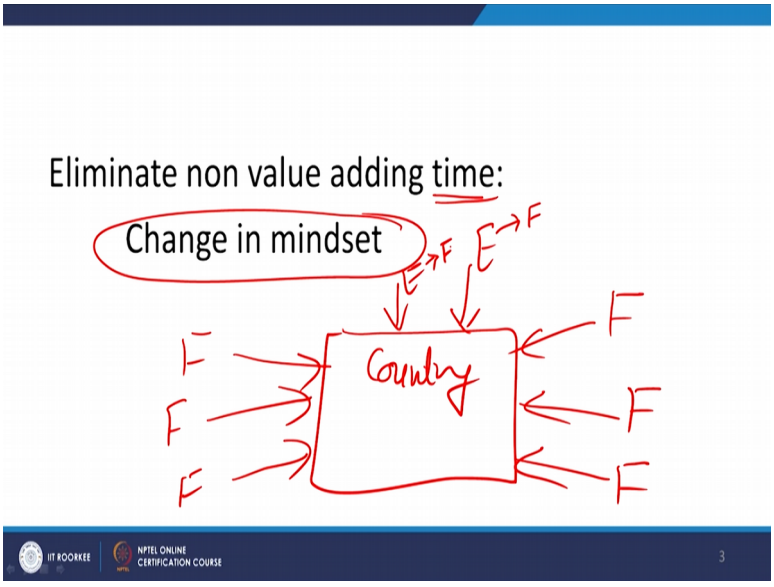

Then, the second important thing is elimination of non-value adding times. Now, as we discussed in the previous session also, this requires lot of change in mindset. It is a game of mindset. Now, how it is a game of mindset? Since childhood, we are trained like that, focus on important things. We need to give priority to important things. Try to do only those things which are important.

Do not focus on trivial issues. Do not focus on unimportant activities. But the Toyota says that we need to focus on those unimportant activities. We need to focus on those trivial issues also. Because these are non-value adding activities. And therefore, these non-value adding activities also consume our resources. And one of the resource is time. These non-value adding activities are consuming resources.

And one of the very simple example of the resource is time. So, we need to see that focus should not be kept only on the value adding activities, we need to keep focus on those non-value adding activities. And therefore, when you keep focus on them, then only you can eliminate, then only you can see that how you are able to strengthen your processes. So, that is the important thing.

Like when you are having; this is your country. And with you, there are many friend countries. These are your friends. So, the focus is on improving ties with these friend countries. But you also need to keep an eye over your enemy countries, that what these countries are doing. So that, you can strengthen yourself to face any potential threat from these enemy countries. Or, it will be good if you convert these enemy countries into your list of friend countries.

That will be the best thing. But at least, you need to keep a focus on them. If you do not focus, they will create some kind of damage to you. Same thing, in the manufacturing arena also, you need to focus, you need to keep some kind of attention on your non-value adding time activities. And once you keep focus on them, then only you can eliminate. So, that requires the change in mindset, because since childhood we are only trained to focus on important things.

But now we need to focus on unimportant things also, to eliminate them. Unless, until you know them, how will you eliminate them? And in our last session, we discussed one of the P of Toyota model. That is problem solving. And in that also, we discussed that we need to have a mechanism where we can bring problems to the surface. And that bringing problems to the surface is actually the change in mindset; how you will able to identify your various areas of scope.

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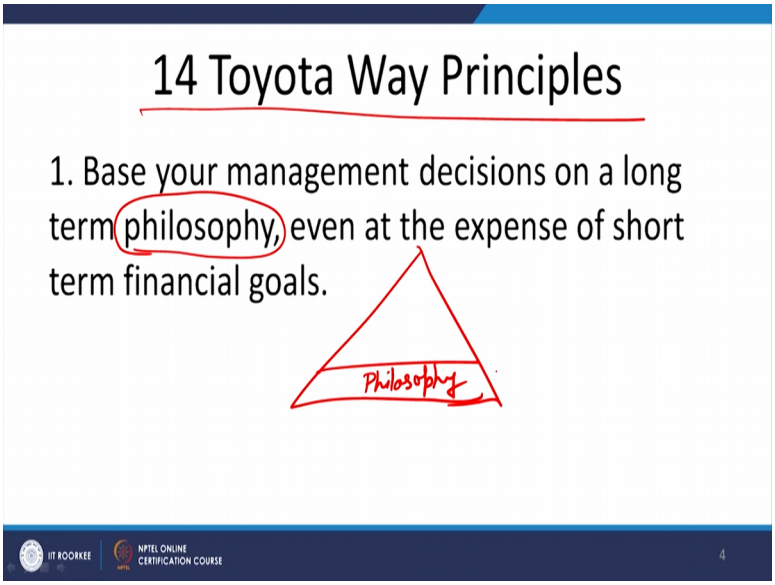

Now, we will discuss very important thing. That is, some of the activities which Toyota did can be described with the help of 14 principles of Toyota Way. So, these are very popular in literature also. And quickly we will discuss all these 14 principles. So, these are known as 14 Toyota Way principle. Now, the first Toyota Way principal is: base your management decisions on a long-term philosophy, even at the expense of short-term financial goals.

So, in our last session also, we emphasized on this particular aspect of philosophy. This philosophy is one of the P of your Toyota model. And at the base of Toyota model; if you remember, in this Toyota model, the basis is of philosophy. Now, in the meaning of philosophy, our thinking should be the long-term thinking. And for achieving the long-term advantages, sometime you need to sacrifice the immediate advantages.

So, that type of mindset; otherwise, we are more busy in thinking of our immediate gains. And if we think only of immediate gains, then probably, we will not be able to achieve long-term sustainability. We had 1 very interesting indicator available to us. That is, in a year, we celebrate a particular day which marks that for this particular year we have consumed all the available natural resources.

And after that particular day, whatever resources we are going to consume, that is in excess of capability of this planet earth. Now, for year 2018, that day is on August first. Now, on August first, we have consumed; from January first to August first, we have consumed all the resources which were available to human being for year 2018. And after August first to

December thirty first, whatever we are consuming, that is in excess of capacity of this planet earth.

So, that is a type of system where we are consuming the resources only for immediate gains. And we are not thinking of long-term impact of our this excessive consumption pattern. And in that list, if you see a country which is very small, Qatar. If you see their pattern of consumption; and the whole world, if it starts following their pattern of consumption. So, the resources for this year got consumed on February 9.

And within 39 days of starting of this year, we would have consumed the resources for the whole year. And now the remaining period would be the excessive burden on this planet earth. So, the point is that, if you are thinking for the long-term advantage, you need to sacrifice your short-term gains. And because most of these organizations, most of the manufacturing organizations think of only for the today's gain.

And therefore, this type of indicators came into existence. And we are able to see that how excessively we are consuming the natural resources. So, that is 1 important thing, that at the philosophical level, you need to have the long-term thinking.

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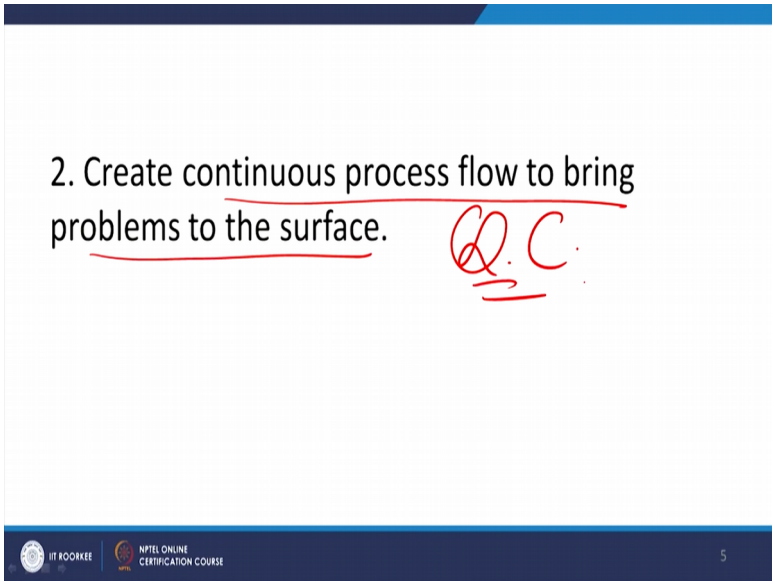

The second important point of the Toyota Way is: create continuous process flow to bring problems to the surface. Again and again we discussed in the last session that problem solving is a very important thing. Now, we need not to think of a particular solution. Rather, if we need to, if we want to have a problem solving approach in my organization, the

important thing is that, I need to create a mechanism through problems can come to the surface. And concepts like QC, quality circle, is 1 such activity through which you can bring problems to the surface.

And once problem comes to surface, then with team work, with different types of mechanism, you can solve it. But if you do not have that mechanism, you will not come to know about the problem. So, you need to have some kind of regular interactions with your employees, with your partners, with your distributors, so that you keep knowing about the problems. And then, you can think of solving them.

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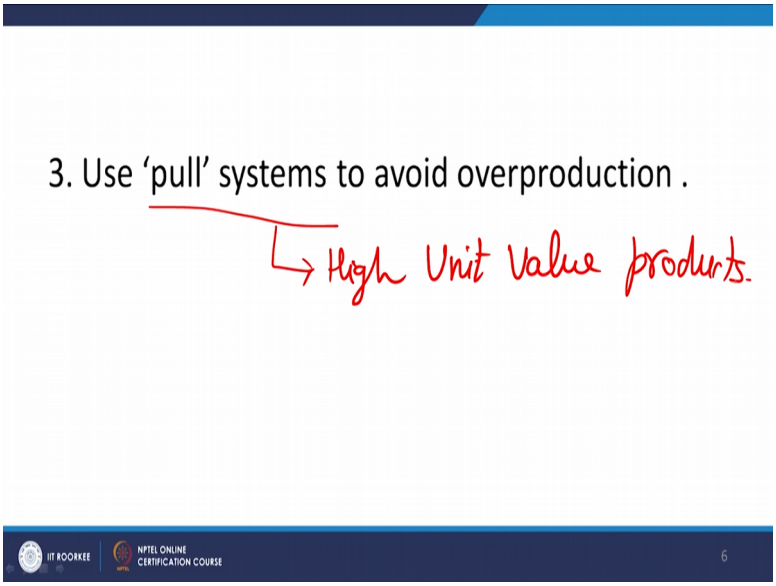

Then, third important principle is the pull system of manufacturing. Now, pull system is a kind of reactive system of manufacturing. And the benefit of this pull system is, you will avoid over production in your organization. Now, in some cases where the unit value of the product is very high, because this Toyota production system is started from Toyota company which is an automobile company.

So, we know the cars are having every high unit value. So therefore, you can offer to have pull system of manufacturing. But if you go to other kind of products where the unit value is not very high, so, you can still follow to some extent a push system of manufacturing. Where you are producing products in anticipation of orders. So, you know that there will be a demand of product. And in anticipation of the demand, you are producing these products.

So, you need to see that pull system is useful for high unit value products. And obviously, our cars are considered to be a high value products. And therefore, we need to see that we produce products only when orders are available. And this will help us in minimizing the waste of overproduction.

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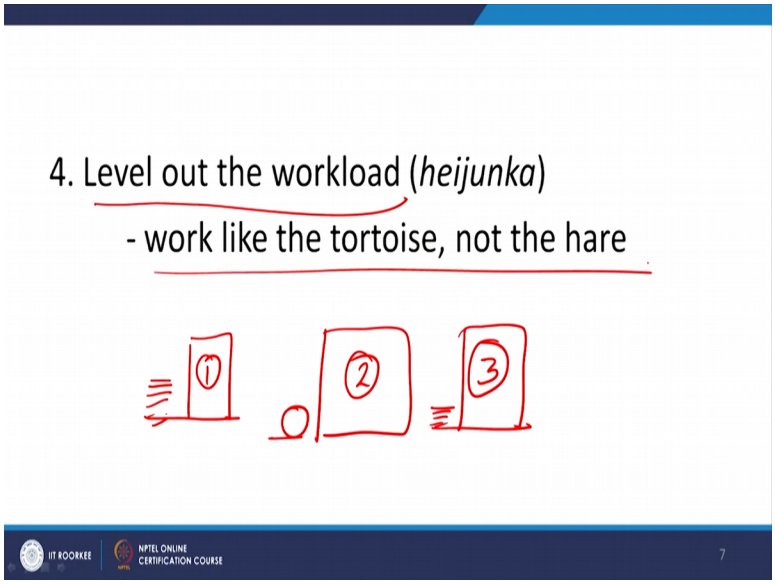

Then, when we are saying that follow the pull system, make orders only when you are having a customer demand. So, your order activities start in response to customer demand. But, the other important thing here to understand, that we need to level out the workload. When I am saying the level of the workload, it means, someday you are having so many orders. On other day, you have 0 orders. Then another day, you have again huge number of orders.

So, your machine, someday is overloaded, on some other day it is 0 loaded. Then some other day it is again overloaded. So, this will create fluctuations in your production system. This will create uncertainty in your production system. And because of this, you will not be able to give a realistic delivery dates to your customers. So, for that purpose, it is important that you work like the tortoise, not like the hare.

And this will have consistency when you are working like a tortoise, not like the hare. So, you have a consistency, you are slowly and slowly doing some activity. So, that is more important that you level the workload. And this will create a positive environment. Because, all the workers know that what is the level at which our company is working. And therefore, these many number of employees, these number of work hours, this type of duty schedule

will be there. But when fluctuations will be there, there will be lot of uncertainty. And everywhere it will create chaos.

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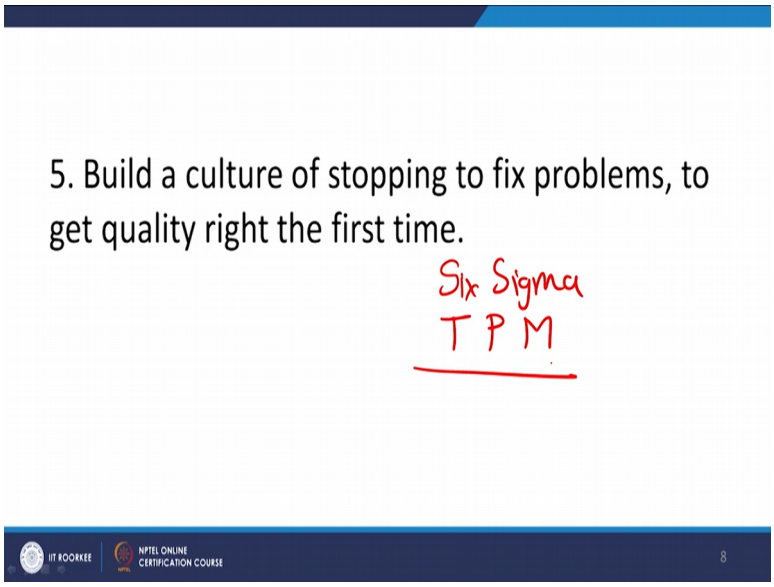

Then, another important principle is: build a culture of stopping to fix problems, to get quality right the first time. Now, we need to see; this particular point is saying that we need to minimize the requirement of inspection. And we need to produce things right at the first time. Poka-Yoke; so, Poka-Yoke where we are doing error proofing, that system, the process is like that, it is producing the product right at the first time.

And there is no need to stop the system to fix the problem. So, strengthening the processes, that is another important thing. And things like Six Sigma, things like total productive maintenance; these 2 tools are very useful for achieving this aspect of building a culture of stopping to fix problems. Then another important thing is, which is against the conventional myth. In our various sessions, we have discussed this particular aspect.

That nowadays, we are moving towards heterogeneity. More and more customization is required. But within that customization, we need to go for some type of standardization also. Now, what this principle says that;

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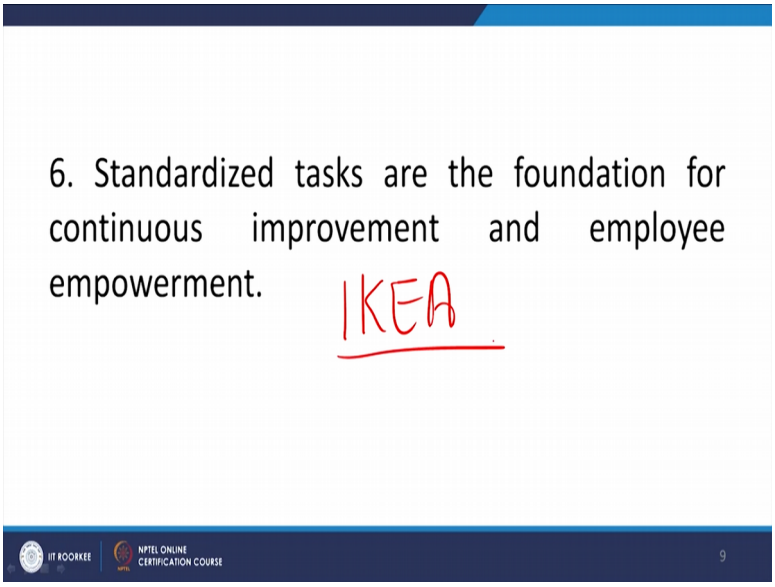

Standardized task are the foundation for continuous improvement and employee empowerment. You are providing variety to your end customer. But you need to see that how that variety can be converted into some kind of standardized task for your employees. Because if you expect your employees to do every time a different type of job. Then the chances of inspection, chances of stopping the processes to fix the problem will increase.

So, you need to see that, my employees keep doing the same kind of job, they do repetitive task, they do the standardized task. But, for the customer, the variety should increase. And a very good example for this is IKEA. That the employees are doing the repetitive jobs. They do the similar kind of job again and again. But the output is received from the customer in a variety of formats.

So, that is how you are employing the principle of partnership, you are employing the principal of respecting and challenging your employees. And with this, you are also able to minimize the requirement of inspection.

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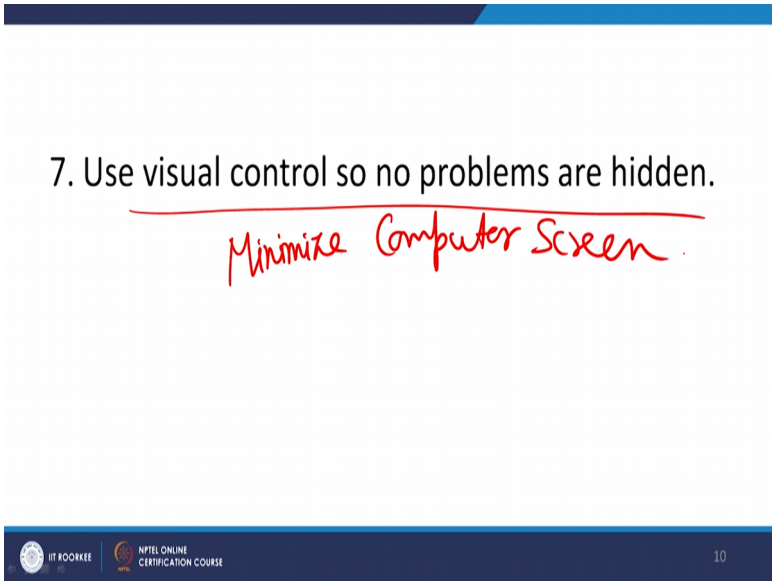

Then, another important thing is: use visual control so no problems are hidden. More and more visual controls, signages should be used. And 1 important thing is, minimize the use of computer screens. Because computer screens may shift the orientation of your employees from the workplace to the computer screen. And when this focus shifts from workplace to computer screen, chances of accidents may increase.

So, you have to careful in designing the visual systems for your organization, so those visual systems can quickly identify the problem. So, if you have some kind of yellow, green, red, blue type of signalling system at your machine. And if your machine producing any kind of defective pieces, immediately the color symbol changes from green to red or green to yellow, that something wrong is going to happen or something wrong has happened.

So that, immediately you will stop your machine and can see or can fix the problem. So, that type of visual control systems are required. And in developing visual control system, some of the organizations do this mistake, that they install large number of LCD screens, computer screens. And when you have more information on the visuals, then what is possible that the shift may move from workplace to that screen.

And that will again create problem. So, using the visual control is important, it is an effective way to go for problem solving, but computer screens should be avoided. Then, another important principle of Toyota system is:

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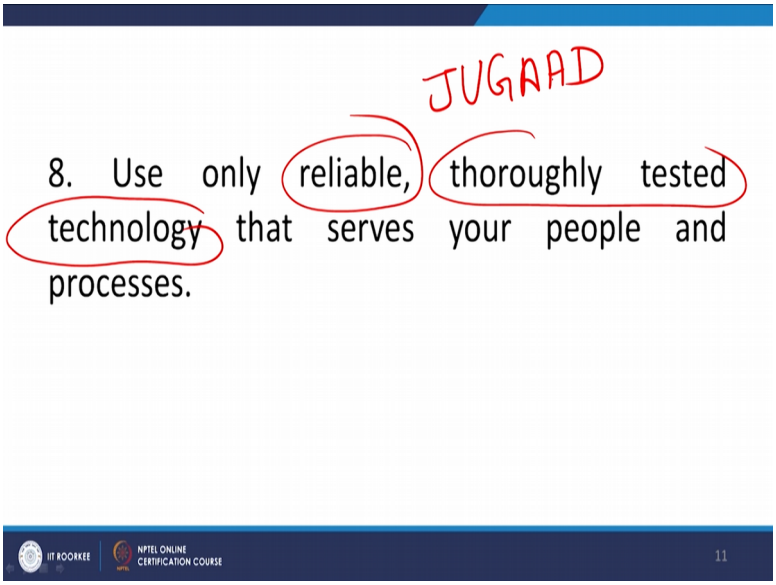

Use only reliable, thoroughly tested technology that serves your people and processes. Very important from the Indian point of view. Why from Indian point of view? Because, we are not very interested about the thoroughly tested technology. We are not very interested about the reliable systems. We are a country known for giving this word to the dictionary of innovation Jugaad.

So, there is a large number of examples you will find in manufacturing setup, where workers, the foremen, the supervisors create their local Jugaad for machining activities. They do not use proper jigs and fixtures. They do not use proper guiding vehicles. They do not use proper tooling arrangements. They do not use proper holders for tool. Rather, they develop their own Jugaad for doing their activities.

And when you have this type of culture of using the Jugaad; I am not against creativity, I am not against finding new solutions; we must. But before implementing those new solutions, those new technologies, we need to have a thorough testing of those things, so that the earlier points, where my systems are robots, I can minimize the inspection. That can also be achieved.

If I am using a technology which is not properly tested, then obviously, there will be a requirement of more inspection or products coming out of that technology. So, that is another important principle.

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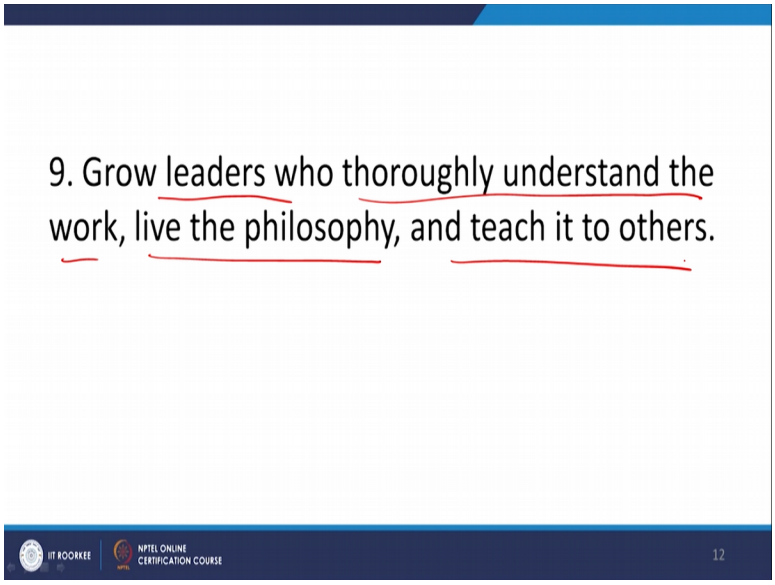

Then, there are few principles which are focusing towards your employees, towards the leadership of the organization. Now, the principal number 9 says that, grow leaders who thoroughly understand the work, live the philosophy and teach it to others. Now, what is that system in your organization through which you are able to develop leadership? And this is also related to succession planning in the organization.

So, if I am the leader of the organization, if I am the CEO of the organization, then how I develop, what is that internal mechanisms through which I develop my second hierarchy, through which I develop my next hierarchy. And in many organizations, if 1 leader is very good, many a times you will find that, whenever that leader leaves the organization, whenever that leader retires from the organization, it goes down like a saint's palace.

Because, there is no proper succession planning. While in very popular book of Good to Great; in that, the author Jim Collins mentioned about, that how these succession planning, how Jim Collins could identify some of the organizations where they had excellent succession planning. And the implementation of Toyota Way is also possible because of the commitment of Toyota family, that from 1 generation to another generation to another generation, they were able to imbibe that philosophy of long-term thinking.

So, that is another important thing that we need to have a mechanism of developing the leadership. Then, another thing is, another principal is:

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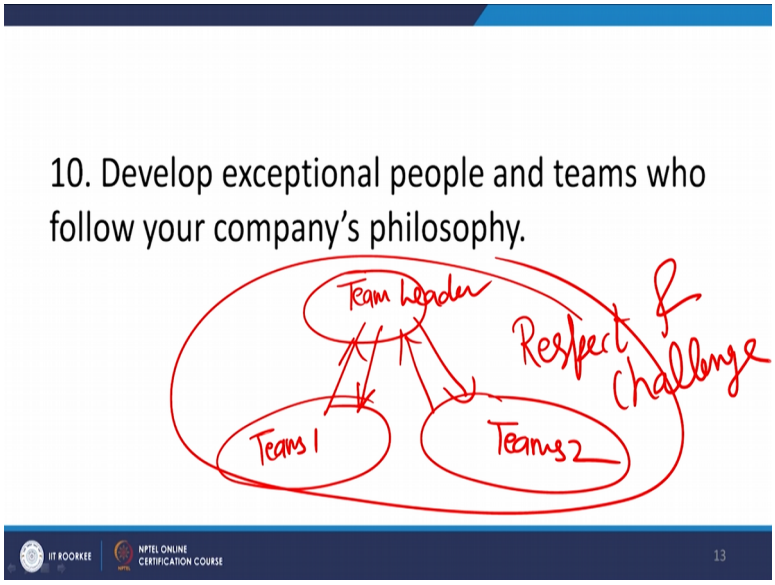

Develop exceptional people and teams who follow your company's philosophy. You may have a very good leader, but you do not have that involved team in your organization. So, it is very important that whatever type of a leader you have, there has to be a complete cohesiveness in the organization. So, this is leader, this is team leader and these are the teams at different locations.

Now, you need to have this type of a connect between the teams and team leader. And as we discussed in the 4 P concept, respect and challenge; you need to give respect to your team members and you need to continuously challenge them, so that they can move regularly upward. If you do not give them new challenges; the role of leader is very important in this particular aspect, that leader must give challenge to its team members.

So, if you go to the classes of human resource management, classes of motivation and leadership, you will find that how successful leaders are able to take exceptional work from their teams. In one of the session also we discussed that how in some of the challenging situations teams have done exceptional work. When they have developed a passenger ship into a fighter ship within 1 week's time. So, those types of examples are there where teams can do exceptional or unthinkable work, which otherwise is not possible.

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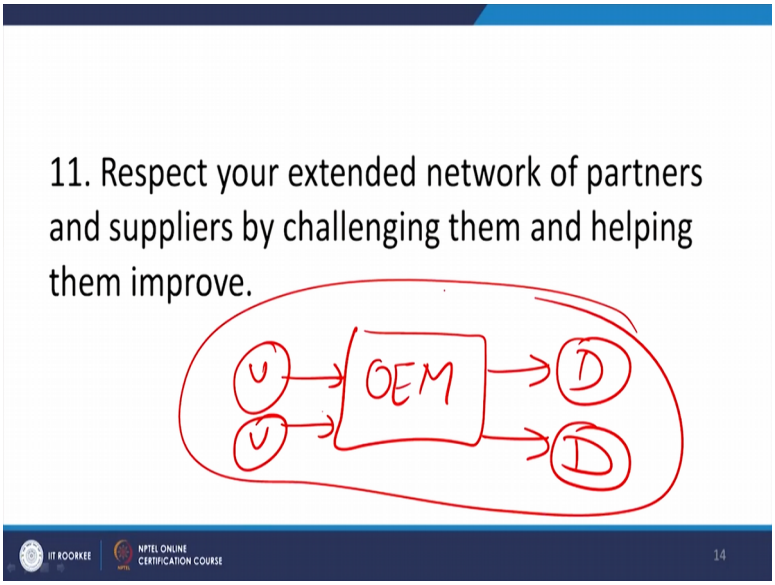

Then, another principal is: respect your extended network of partners and suppliers by challenging them and helping them improve. So now, we know that you are not alone. You are here, original equipment manufacturer like Toyota. And then you have your vendors. Then you have your distributors. And you need to treat them like your partners. They are your extended family.

And when you are able to think like extended families, that vendors and distributors are my extended arms, then probably you will be able to give them good respect. You will be able to challenge their creativity. And by this way, you can able to achieve higher success in the organizations. If those organizations who are not giving; because the size of OEM is much much bigger.

We know Toyota, but we hardly know any vendor of Toyota. So, all of them need a kind of respect which only Toyota can provide. And by this principle, eleventh principle, we think in that direction that how you are creating those extended network by respecting and challenging your partners. Then another principal is,

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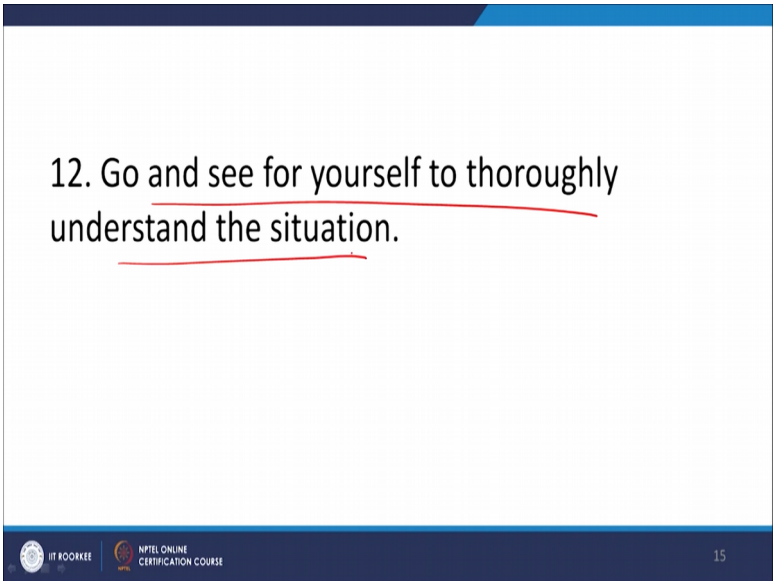

Go and see yourself thoroughly understand the situation. Now, many a times, top leadership is not very much involved in seeing the or in understanding the shop floor problems. They are at different location, top leadership is at different location, factories are at different location. But the principle of Toyota says that, you on your own must go to those sites where problems are there.

And once you understand, you collect your own data, you develop your own understanding about the problem, then only you can have the best solution for that problem. If you are not visiting the sites; and therefore, many a times, whenever situations of floods are there, whenever situations of disasters are there, top leadership of the country visit these areas just to have own understanding of the problem.

So, this point of Toyota says that, do not rely on your team's data. Rather you also part of team; and therefore, you should go, you should visit those places which are the affected areas.

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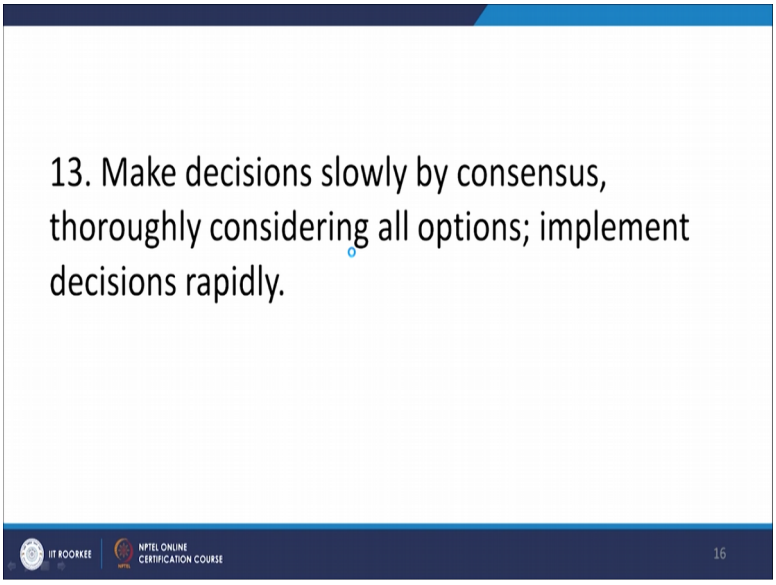

The thirteenth principal is about, make decisions slowly by consensus, thoroughly considering all options; implement decisions rapidly. Now, developing the decisions should a slow process. And once the decision is developed, the implementation of the decision should be done with full force, with as rapid force as possible. When you are developing a decision, at that time, take the view of all your employees, take the view of all your partners.

So, it has to be a slow process where the consensus of everybody is required. But once the decision is being taken, then the implementation should be with full force. So, that is the point number 13, that decision making and decision implementation; making is a slow process, implementation is a fast process. And finally, the last but not the least.

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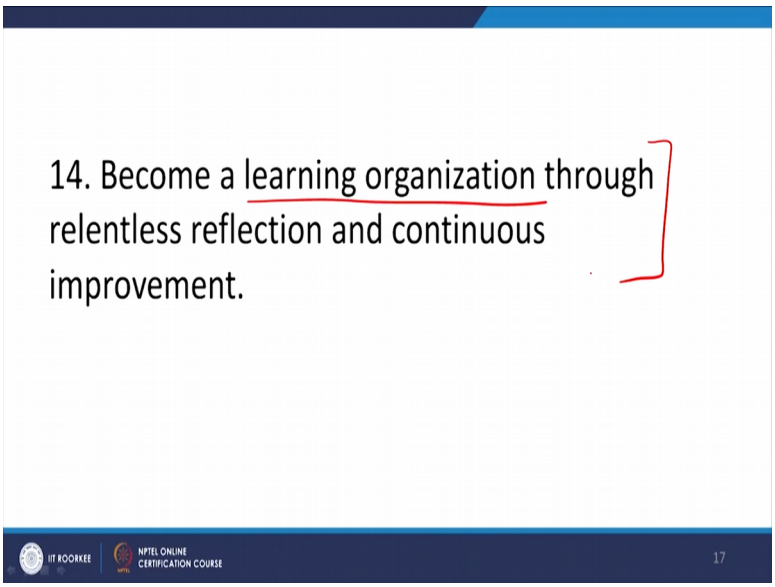

That become a learning organization through relentless reflection and continuous improvement. So, you have to continuously improve through learning, continuously try to adopt new things, try to adopt system of improvement. And therefore, your employee involvement, philosophical understanding and your approach towards problem solving is a very important thing which will help you in becoming a learning organization.

If you go to the theories of motivation, in that also you will realize that initially we are motivated because of some physical aspects. But later on, we want to have growth based on learning. And therefore, for the long-term sustainability, your organization should be known as learning organization, which is ready to adopt new philosophies, where there is least resistance to change.

And this is again a point which is more discussed in the classes of human resource management. So, it is all about Toyota production system, where we are focusing not only tools and techniques, but there is equal emphasis about the implementation. And the implementation can only be ensured through effective use or through giving proper respect and challenge to your employees and partners.

So, with this, you can see that, you can create your own system. That how to give respect to your employees, how to challenge them so that they become your team member, effective team member for achieving the excellence. Thank you very much.