Toyota Production System
Prof. Rajat Agrawal
Department of Management Studies
Indian Institute of Technology, Roorkee

Lecture - 23
Become a Learning Organization: Continuous Improvement

Welcome friends, now we are into the last principle of Toyota production system. We started discussions on this 14th principle in our previous session and we will continue the discussion to this session also because the ultimate objective of Toyota production system is to become a learning organization and for that purpose you have to continuously improve yourself by doing introspection.

So, how to do that introspection so that you can go to the root cause of the problem that we discussed in our previous session. We use the principal of continuously asking the why question and by asking a series of why's you go to the root cause of the problem and then you can solve the root cause and automatically it will improve the organization's working. It will create a better process.

And as we have discussed many a times that the right process will result into the right product, so all those things are automatically going to happen if you understand the philosophy of root cause problem and continuing in the same way in today's discussion, we are going to see that continuous improvement becoming a learning organization by the way of continuous improvement is again one of the important you can say the output of this entire Toyota production system philosophy.

Continuous improvement we all know is a very popular term coming from the Japanese literature and we know its Japanese version also Kaizen. So, in this session, we will be mainly discussing about the Kaizen, how Kaizen is related to Toyota production system and how you can apply that principle of Kaizen for becoming a learning organization.

(Refer Slide Time: 02:44)

Now, with this as we have already discussed many a times that all these are the part of 4th P of Toyota production system. The 4th P that is dealing with the problem solving, so we are trying to solve each and every small problems and we want to go to the route of that problem if the problem is occurring again and again. So, when there is a repeated problem, these are opportunities of learning.

Because when you are focusing on the root of those problems in our last lecture we discussed that how the simple problem that there is some oil at the shop floor and when we asked series of why's that resulted into the change of policy of procurement of the gaskets. So, a simple problem that why a shop floor is not cleaned, why there is excessive oil available at the shop floor.

And that problem give us the reason that we are having a faulty parameter for evaluating the performance of our purchase department that how much saving they are doing that was the idea, that was the performance indicator for the material management department and it resulted into change of that policy so that you have better specification for your all equipments, your supplies, your various spare parts.

And therefore the quality of gasket improved and because improved quality of gasket, there was no leakage of oil and that is how you solved the actual source of the problem, that is the very important thing in the Toyota production system and this will help us in becoming a learning organization. So, that is where we are discussing in our last 3 sessions.

(Refer Slide Time: 04:51)

Principle 14:

Become a Learning Organization Through Relentless Reflection (*Hansei*) and Continuous Improvement (*Kaizen*)

Now, this principle as we mentioned in our previous session that one is about becoming an organization where we do lot of introspection and the second part of this principle deals with continuous improvement that is Kaizen. So, in this particular session, we will be concentrating on this aspect that how to have this approach, what is the tools, techniques available for continuous improvement.

We discussed in our last session about this comparison between the traditional business environment and the contemporary business environment and we saw that there are lot of changes which are happening now that long product life cycles are becoming smaller product life cycles. Earlier there was less competition because very few marketers were there and particularly if you talk in terms of India, so take an example of scooters.

(Refer Slide Time: 05:58)

Traditional Business Environment	Present Business Environment
Long Product Life Cycle	Very Small Product Life Cycles
Less Competition	Cut Throat Competition
Homogeneous Markets	High degree of customization
Quality, Cost, Delivery	Adaptation, innovation, and flexibility

So, only very few providers, one name all of us remember that is Bajaj, only one company was there providing us two wheelers and there was a long waiting period which was ranging into many years, so there was almost no competition for Bajaj and when there is no competition you cannot expect those organizations to become world class organization and nowadays it is a cut-throat competition.

Every day new models are coming; new types of products are coming. So, you have to continuously learn so many new things. Earlier markets were homogenous because competition was not there, so almost with same product you were able to fulfill the demand of your entire market, so the markets were homogenous though there would have been some aspirations of your customers.

But since there was no requirement of any kind of competitive advantage so you were fulfilling the demands of customers by providing limited type of products but now competition is there, so therefore when competition is there, you need to think about competitive advantage and in that category because of competition high degree of customization is also happening in the current environment.

And we also can understand that earlier good quality, low cost, faster deliveries were the important terminologies for the operational managers but nowadays for business the buzz words are adaptation, innovation and flexibility. So, this simple comparison helps us in understanding that how things are moved from the 2, 3 decades back to this particular time of 21st century.

And therefore because these things are happening in the current environment, we need to be a learning organization and as we discussed in our last session in the book of Peter Senge where Peter Senge in 1990 mentioned that what is the meaning of learning organization. It does not mean that you simply adopt implement some of the best practices which are developed elsewhere.

Rather you should be capable of developing, creating, identifying new knowledge, new skills, new capabilities so that is the ultimate meaning of learning organization that I am not simply adopting, I am not simply procuring technologies from different sources, I am contributing technology into the development of the society and therefore if you see the modern

organizations have started emphasizing on a very important term which is you can say the common word to say that whether it is a learning organization or not and that is the IP creation.

The intellectual property creation from the organization has become a key indicator about the learning organization that how much new knowledge you are creating, how much new technology you are creating and whether that technology is usable, whether you can exploit that technology for the benefit of the organization, for the benefit of the society so that has become a very important (()) (09:33) in the contemporary environment.

Those organizations and not only organizations but those countries which are able to create more IP whether it is patents, whether it is copyrights, whether it is trademarks, so those organizations, those nations are more successful, they are having higher rate of progress as compared to other countries where this IP creation is not up to that standard. So, therefore we without any doubt can conclude that IP creation learning organization is the utmost necessity of present world environment.

If we want to succeed, you have to have this kind of organization; otherwise it is impossible to succeed, it is impossible to have competitiveness in your organization. Now, when we are talking of this particular concept, so in light of Toyota production system when we yesterday discussed that why we need to ask repeatedly, so that asking why's repeatedly is basically the part of this practical problem solving process which is being proposed under Toyota system of manufacturing.

(Refer Slide Time: 10:55)

Toyota's Practical Problem Solving Process
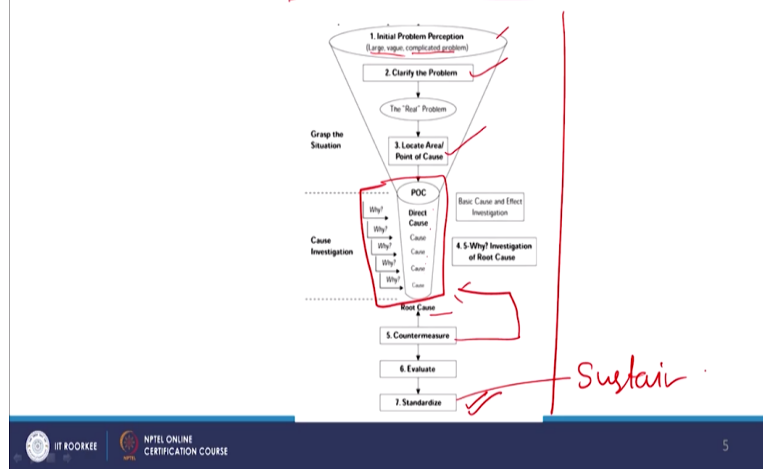
Now, this is a 7-step process and in that 7-step process when you identify point of cause then you start doing this investigation by repeatedly asking why's and if you see that the first step in this process like it is like funneling process where initially you have a very broad, vague understanding of the problem and then slowly and slowly you start making the problem crisp, you make the problem very specific.

So, that is you can say creating more clarity about the problem, so the first step in this problem solving process is that initial problem perception. So, it is mentioned as it is a large, vague, complicated problem where you have some lack of clarity. Now, with discussions within your group with the other stakeholders in the company, you start getting some kind of clarity about the problem that where is the actual problem.

And this helps you in surfacing the actual problem and then you locate area of concern, area of cause and that area of cause will give you the actual starting of this exercise of 5 why's and you start doing this questioning again and again and you go to the root cause of the problem. Now, when you are doing this questioning with respect to why's for each question, you also create a system of countermeasures. If gasket is leaking, so replace the gasket.

Now, that is the countermeasure that because gasket was leaking, so you have replaced the gasket with a new gasket so that that problem is being sort but the question remains unanswered that why gasket was leaking, so you go for the next question that why gasket was leaking, so answer came that because it was of inferior material. So, the countermeasure is make a better specification.

So, now you have done the countermeasure by providing the better specification but again the question comes why the specification was poor, why did not we have better specification in the first go, then the answer comes because the material management department looks for lowest cost as their key indicators are cost saving. So, therefore they went for the lowest cost and that was of poor specification.

So, even though you change the specification, you have this question in mind that can we change this policy of low cost or cost saving for the material management department and therefore the final outcome that now they will not be measured on the basis of cost saving rather their performance will be measured that how long those spares can work and that is how you got a fundamental change in your purchase policy because the gasket or the oil was there at the shop floor.

So, this is that when you are asking various why's, you also need to propose countermeasures in between so that therefore the entire structure will start working properly and when you are proposing the countermeasures, you also need to evaluate whether by changing, whether by providing that new solution things or you are able to address that point of cause or not and once you see that yes this change this solution has provided the intended result, then we go for the standardization.

That now we have created that new standard that now the purchase department will be evaluated on the basis of quality of spares not on the basis of cost saving and when it is finally resulting into the desired output, then this policy change will be actually adopted by the organization and then you have to sustain it. After standardization, I can say that this is not the part of problem solving but we go for the sustaining of that new solution.

So, this is the Toyota's practical problem solving approach and because of their deep involvement into the problem solving as they feel that each problem, each kind of error is an opportunity for new learning. So, therefore they were actually from the top were very keen to find out new problems and keep solving them because it will create new knowledge for the organization.

Now, if I talk in this learning organization concept, the principle of continuous improvement which in Japanese known as Kaizen.

(Refer Slide Time: 16:20)
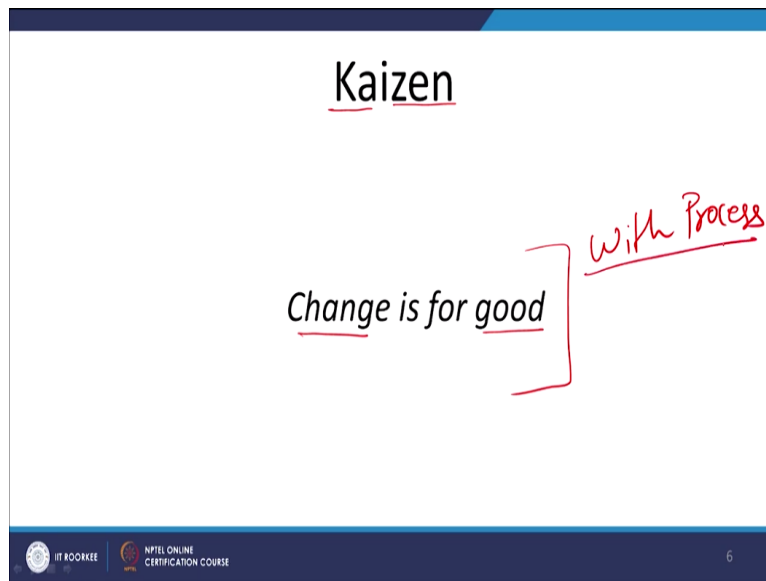
So, Kaizen is made of 2 terms; one is kai and another is zen and kai and zen means that there is change and change for good. So, kai means change and zen means good. So, change is happening for good. That is the basic premise that is the basic philosophy for this concept of Kaizen. So, you need to do a small incremental change which is happening in the right direction.

So, Kaizen believes in small incremental improvements in your system which is going to help in improving the entire process which is going to strengthen the process and since this is mostly related with process. This is mostly related with process and processes are mostly confined within the organization. So, they do not come in the media reports, they do not being highlighted in other kind of journal articles.
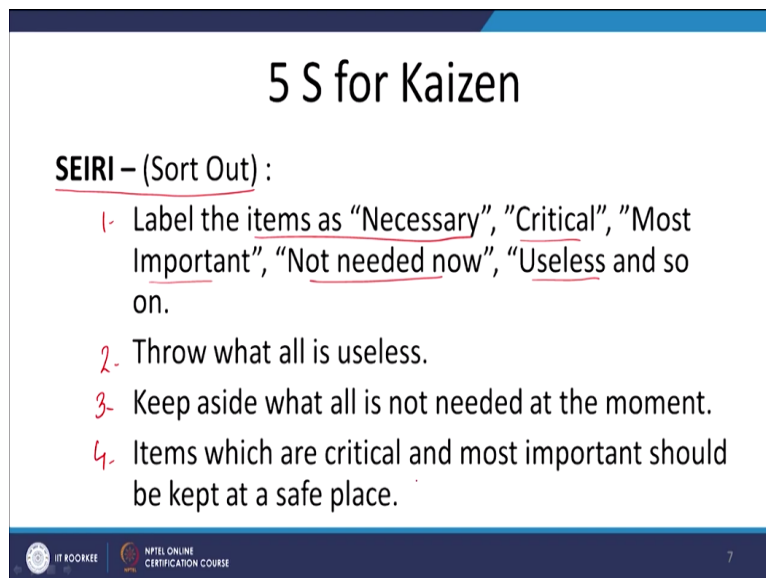
So, we are not very much aware about what type of Kaizen things are happening inside the boundaries of the organization. You know very much about Apple because their improvement, their innovation is happening with respect to products. They come with new product, so whenever product innovation is happening, you are aware of that but whenever it is process innovation happening because process innovation is related to internal environment of the organization.

So, we are not very much aware about the internal environment but if you follow the concept of Toyota production system you will understand that it is the process which is going to produce the product. So, their focus is more on developing good processes and doing the small innovations, small changes which are actually controllable and taking you into the right direction.

Now, to implement Kaizen in your organization, we have a concept known as 5S and 5S we have already discussed in our earlier sessions also but now we will discuss 5S with respect to Kaizen and how 5S will help us in improving our processes and since it is a small incremental innovation therefore the results are visible immediately. That is the most important thing with respect to Kaizen. You need not to wait for long to see what is happening with because of Kaizen.

You can immediately see that you do some Kaizen practice today and tomorrow onwards you can see the result. So, Kaizen therefore is a highly motivating phenomena that if you follow these 5S concepts, it will immediately be giving you the benefit and therefore the short-term motivation, short-term morale boosting activities are possible with the implementation of Kaizen.

(Refer Slide Time: 19:41)

Now, the first S in this list is SEIRI and we all know that the meaning of SEIRI is to sort. So, sorting means you have to make different kind of label and labels can be necessary, critical, most important, not needed now, useless, etc. So, you can create your own way of labels and like hazardous, non-hazardous, etc depending upon the type of materials you have. So, this is

just a suggestion but depending upon organization to organization you may create your own labels.

So, one important point in sorting is creating labels for various items. There should not be any item without label that is the principle. So, what is the content of that label, this is you to decide. The second important thing is throw what all is useless. There may be large number of items which you have not used for last 6 months, 1 year but still these are there occupying our precious space.

So, that what all is not used please throw them out, that is the second important principle you can say second important guideline under the SEIRI. Then, the third is keep aside what all is not needed at the moment that those things which you are using but you are not using immediately, you can keep them at a distant location and then another principal is items which are critical and most important should be kept at a safe place.

So, those items like in case of our household, the cash, jewellery, those things which are very critical and you can say the value wise they are very precious, so sometime emotional values are also attached to them. So, we keep them in the safe custody in the lockers etc. So, that means that those things which are very critical and important things that have to be kept at a safe place.

So, for example if I talk in terms of a hospital, so all implants are very critical things, lifesaving drugs are very critical thing so they need to be stored at a very safe place and the condition, the ambient temperature, humidity, etc what is to be maintained for their safe keeping that also need to be maintained. So, that is the first S under the Kaizen that is SEIRI.
(Refer Slide Time: 22:28)

Now, the second S is to organize that is how you have to organize your entire work place. Now research says that employees waste half of their precious time searching for items and important documents because you have not organized your workplace properly. Therefore, we keep searching again and again our important documents and you are not be working in an organization right now.

So, just see that how have you organized your computer, your laptop because that is also not properly organized. Therefore, every time you keep searching file, whenever you require some old file in your system, some PowerPoint presentation, some Excel workbook, so we go for searching and searching. Same thing in our email boxes, so we do not have any proper system of managing our email box.
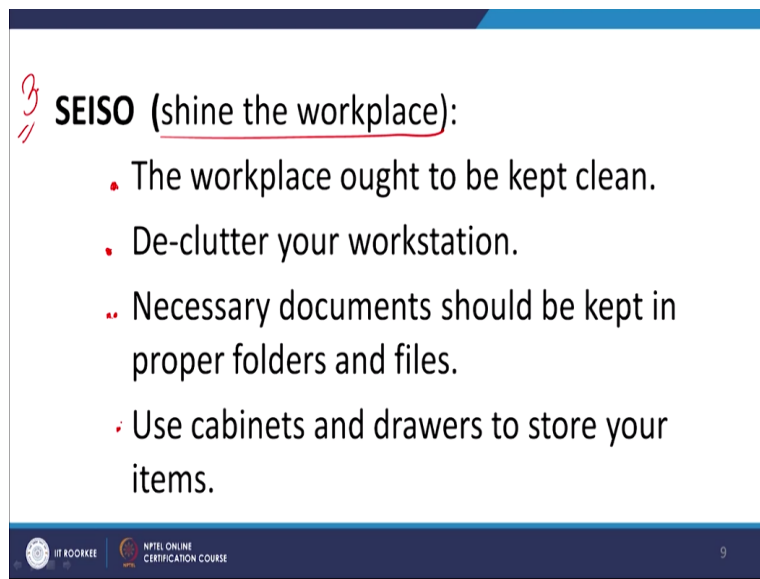
So, we search old e-mails whenever it is required. So, we waste lot of our daily time in the office in searching our computer only. So, that is possible that time of searching that is a kind of waste that can be minimized if we organize everything in proper folders, if we give proper name to the file that how to, if you start the class of computers, so how to give name to a file that is also important art.

So that by just seeing the name of the file that will give you that what it is there in this. If you download a research paper from science direct, it automatically gives a name to that PDF file and that name is in some numerics, some words and you cannot figure out that what is the title of this paper and if you automatically save that PDF file, so every time you have to

search, you have to open all the PDF documents in your system then only you can locate that which paper do you want.

Otherwise, you will again go back to the root source, so therefore proper organization is very important and it can minimize your searching time tremendously and this will help you space and you can use your place properly for keeping new important things otherwise in that kind of unorganized area, your important things will also get lost.

(Refer Slide Time: 25:10)

Then, the third important is SEISO that is related to shining the workplace. So, not only sorting is important than to organize everything is important, you also need to keep your workplace clean, you need to keep your workplace shining but here there is a question also. Many of us those who want to implement Kaizen, they feel that keeping the workplace neat and clean is the ultimate objective of Kaizen.

So, it is just the superficial meaning of Kaizen, it is not the philosophy of Kaizen because this will help us in becoming a learning organization, it is not the objective, it is just the means so many a times we understand that means ends, so these are not the ends of continuous improvement activity. Now, what do we do in the shining the workplace? There are things like the workplace ought to be kept clean, that is very simple.
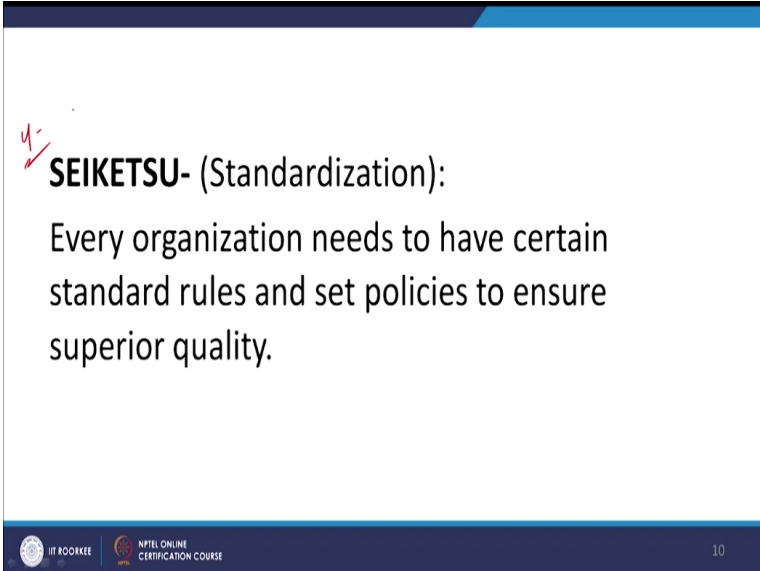
De-clutter your workstation that what is not usable, you please through them out, this we discussed in the sorting also. Then, necessary documents should be kept in proper folders and files, again principle that how can you achieve de-cluttering. Then, use cabinets and drawers

to store your items. You need to keep proper size of cabinets where your documents, your files can be held properly.

So, you can see that in offices, we make furniture depending upon the size of our files, our documents so that they are kept stated and they are visible to us even from the outside, so that you can exactly locate which file to be picked up at the time of need. So, all that is the part of shining that it is just not meaning that there is no dust but that is also important that your workplace if it is shining, it will be more motivating, you will feel sitting there, you will be working for longer duration at that place.

So, that is also there but apart from that you also need to create that kind of orderliness in the workplace that will help you in minimizing the time for searching.

(Refer Slide Time: 27:51)

Then, another S is related to SEIKETSU. SEIKETSU means standardization. Once you have developed a proper organization, once you have identified what type of labels will be there, you have pasted those labels on different articles, then you have kept those items at different locations, those which are regularly used are kept ahead, those rarely used are kept behind and now you have to standardize this practice so that any new engineer who joins your organization understand that system properly.
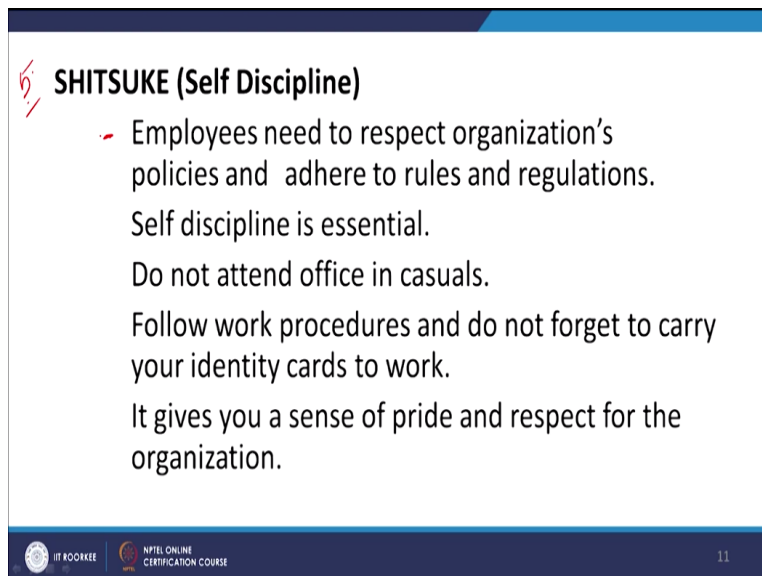
So, once you standardize your practices, your findings, then it will be sustained. So, every organization needs to have certain standard rules and policies to ensure superior quality. When you have this kind of standardization that what are do's, what are do not's for my

organization that will help you in getting a better quality because you will continuously identify and that is again a beauty of this learning organization.

That the list of do's and do not's keep updating, you will get new knowledge with each error and that will be translated into the form of what has to be the standard practice for my organization like we discussed that Toyota problem solving funnel and the last point in that was standardization and that was coming because of some point of concern. So, we did that 5 why analysis and that 5 why analysis resulted into some kind of countermeasures.

And when you evaluate those countermeasures, you finally get a standard version to tackle such kind of situation and that is coming in the form of this SEIKETSU that you have to continuously update the list of do's and do not's rules, regulations, policies so that you continuously achieve superior quality. That is the meaning of standardization. Then, the fifth S is SHITSUKE.

(Refer Slide Time: 30:06)

Now, SHITSUKE means having self-discipline in you. This self-discipline in you is very important then only you can introspect and the meaning of SHITSUKE or how do you achieve SHITSUKE in your organization for that purpose. Employees need to respect organization's policies and adhere to rules and regulations.

So, you need to create that kind of belongingness and the 3rd P of Toyota production system where you are giving respect to your people, your partners via giving respect to your people and partners, you create this kind of respect for organization. So, you give respect to people,

people will give respect to organization, so this is how the mutual bonding will take place. Self-discipline is essential, without self-discipline nothing is possible.

You cannot force discipline from outside and if you are forcing discipline from outside, it will result into some kind of IR issues sometime like it used to happen during the days of scientific management when Taylor was trying to enforce that system of standardization to the workplace. So, discipline has to be from within and that is self-discipline. Then, we discussed in our previous sessions that meetings, involvement of stakeholders are very important thing in Toyota decision making process.

So, therefore as part of self-discipline, we need to understand that if we are going to office, it is not in casual mode, you have to be have fully prepared, you need to do full homework for attending your office, so that is again very important thing. Follow work procedures and do not forget to carry your identity cards to the work because when you are following the culture of self-discipline, when you are following the culture of participation.

So, it is very important that we address each other by name and when we address each other by name, it creates more belongingness. Now, it is also possible that because I am working in a large organization, there are 3000 employees, 4000 employees and I may not be remembering names of each other, therefore if my I-card is there in my uniform, so by seeing my name, you can call me by my first name, hello Mr. Agrawal, how are you and that will automatically create a good bonding, a belongingness in the organization.

And since I will know your name, it will automatically force me to remain in discipline. So, that is another benefit of creating the self-discipline culture in the organization. Then, it gives you a sense of pride and respect for the organization. So, when you follow the procedures, policies, you are able to contribute for the development of the organization. So, you automatically feel happy.

You feel that you are contributing into the success of the organization and that feeling of pride is priceless. Therefore, this concept of self-discipline is emphasized that discipline cannot be enforced rather we need to develop that kind of environment in the organization where our employees follow the system of self-discipline. So, through this idea of Kaizen, we

are trying to develop a system of learning organization and if we see the target of these 5S, so the target is zeros to so many aspects.

(Refer Slide Time: 34:21)

We target zero changeovers leading to product service diversification, so that is large number of; we have seen that it is the time of customization. So, we want to have more and more products coming out of that and therefore we want to minimize the time of changeovers and the ultimate objective is to have zero changeover time. Zero defects that is going to lead us for superior quality.

Already, there is a concept of Six Sigma but we want to go even beyond Six Sigma that how to have zero defects in the organization. So, continuous improvement should have those targets which may be unachievable but at least you should know that these are the objectives, these are the targets where we need to achieve something. Zero waste, so it will lead to lower cost, zero delays leading to on time delivery.

Then, zero injuries which will promote safety and zero breakdowns which will bring better maintenance and all these things will help you in improving your OEE, overall equipment effectiveness because of all these things when you are having 100% productivity, when you have 100% quality and when you have 100% maintenance that will help you in achieving 100% OEE.

So, that is going to be the major you can say ideal situation when we are implementing Kaizen in our organizations. Now, when we are doing this discussion, it is again very

important that what type of metrics we need to follow. Now, if we see the example of Toyota Company, so in the Toyota Company, there was always confusion that what type of metrics to be developed.

(Refer Slide Time: 36:32)

In general Toyota had 3 types of metrics; one is global performance measures and global performance measures are there which tell you how is the company doing globally. So, all your financial analysis etc are the part of this global performance measures and completely it was the benchmarking with other competitors. Then, the second level of performance indicator, the operational performance measures.

That is how is the plant or department doing, so with respect to a particular plant or a particular department that design department, new product development, production department, so how is that particular department is doing and therefore the department specific indicators were developed for measuring the performance of those departments and then third is stretch improvement metrics.

That is how is the business unit or workgroup doing, so there are departments, there are business units, so like Toyota India is one business unit, so how is this business unit doing, so that is with respect to a particular business unit which is Toyota India. Similarly, Toyota Motor Car Company in USA that is one business unit, so depending upon business unit to business unit you can have the performance indicator.

Because each business unit is independent entity for a particular market, so you need to see the performance of that particular and the learnings why are we discussing these things? So the reason of discussions of these metrics is that these metrics cannot be changed overnight, it is again the process of that continuous improvement that you need to identify these metrics will give you idea that which is the point of concern.

And the concept of theory of constraints, the weakest point in all these performance indicators will give you the point of concern and that point of concern will help us in asking many why's and then our learning will start out of that that how to improve that point of concern. Therefore, we discuss this process and result orientation. We discussed already this particular concept of learning organization that how we can map the PDCA cycle over this concept of creating a smooth flow.

And we discussed that creating a smooth flow will help you in surfacing out the problems and when the problem will be surfaced out, you will automatically be able to address, you will be able to fix that particular problem.

(Refer Slide Time: 39:47)
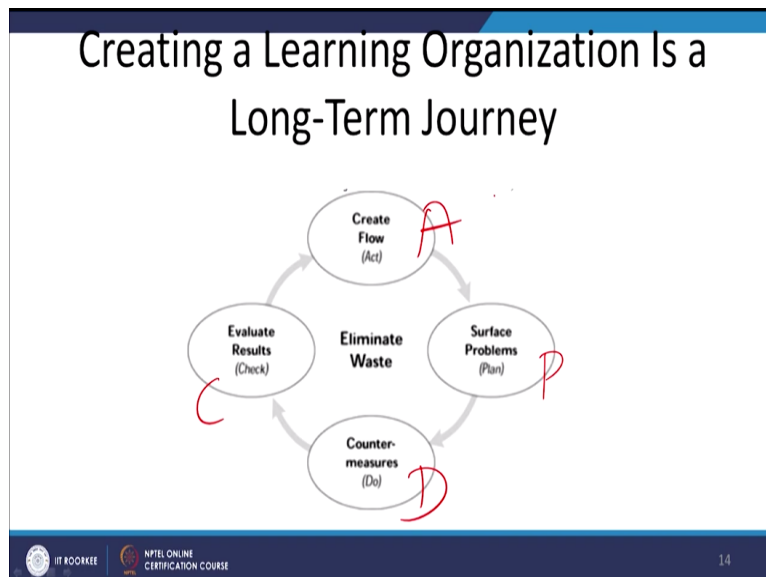
Now, this is in a simple way, the PDCA cycle which is popular deming version of how to achieve total quality management.

(Refer Slide Time: 39:57)
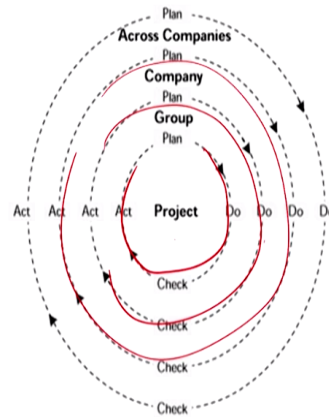
Now, the same PDCA cycle is applicable at each stage of this previous cycle like here we are saying the surface problems and here you see that this PDCA cycles are presented in various concentric circle forms like within a particular project you can follow PDCA then at the company level you can follow PDCA, then across companies you can follow PDCA. So, PDCA is a companywide and which is possible to have into multiple layers that for a particular project this PDCA.

Then, for the group this PDCA, then for the company this PDCA and then across companies you can have PDCA. So, you can follow the approach of developing a smooth flow not only at the project level but across the companies, only thing is you need to understand that what is expected, how to go to the root cause and from where to start the process of this continuous improvement. So, with this we come to end of this session. Thank you very much.