Production and Operation Management
Professor Rajat Agrawal
Department of Management Studies
Indian Institute of Technology, Roorkee
Lecture 47
Some Current Issues in Quality Management

Welcome friends. So, now we are coming to the last session on the quality issues. In quality management we discussed various aspects which include discussions on total quality management. And as part of total quality management, we also discussed in detail about statistical quality control where we discussed that how variations are natural phenomena and in all processes variations are inherent you cannot avoid variations, but there are two types of variations we discussed, variations which are because of some chance which are random in nature and variations which are assignable. And variations which are assignable can be eliminated.

So, whenever from assignable variation are there we need to eliminate them and over a period of time more and more research happened in this area, and then people realized that it is more important that how we continuously improve our processes and therefore research shifted to process capabilities and people said that we need to improve our process capabilities, so that our processes should produce products with minimum variation as more variation means lesser customer satisfaction and in light of that the concepts of six sigma also came into picture.

That by adopting the principles of six sigma, by adopting the principles of six sigma we can minimize the variation and more and more values can be produced around the mean of that particular parameter. So, in our earlier sessions, we discussed these aspects of quality management in detail. Now, in this final session on the quality management we are going to discuss some of the current issues which are more generic in nature or which are going to focus on the future aspects of the quality management direction.

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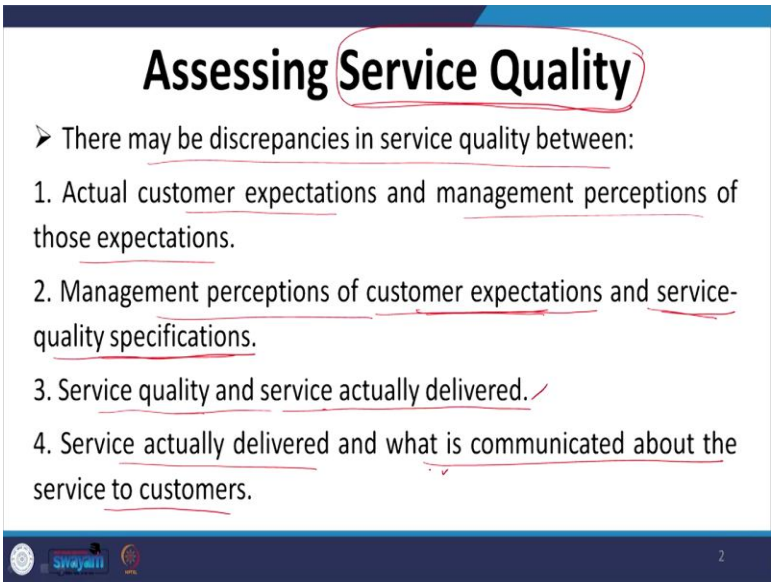

Now, the first important aspect in that discussion is the service quality. The development of quality management is largely attributed to Toyota manufacturing company. Toyota give the concept that what is the meaning of quality and they actually pioneered the implementation of quality management principles, and as a result of that most of the time we discuss quality in context of manufacturing organizations only.

But we all know that the contribution of services are rapidly increasing in the nation's economy. And therefore, it is quite important to understand the role of quality management in service organizations without providing good quality services you cannot compete in that environment. And therefore, now the very important dimension of quality management is to discuss the service quality, that how your organizations which are service organizations are giving the quality products.

In one of the lecture when we discussed various dimensions of quality, where initially we discussed the dimensions of those products which are physical in nature, goods, manufactured goods. Then we also discussed about the quality of service products. So, now in this particular few minutes, we will like to focus on service quality.

Now, what are the important issues with respect to service quality, let us try to understand. Actual customer expectations and management perception may have different type of levels. So, there may be a gap between the management expectations of management perception of the

customer expectation and the actual customer expectation. How? Because some time like in a restaurant you have a very good quality restaurant.

Now, customer is going to a restaurant, normally we understand that customer is going to a restaurant for a good quality food. And management of the restaurant also feels that customer is coming to me for a good quality food. So, that is both are expecting at the same level. But sometime it is possible that customer is going there for the ambience not for the food and when customer is going for the ambience to have a good comfortable environment.

Because that restaurant gives a very scenic beauty of the outside environment. Maybe some river is close to that restaurant. Maybe some mountains are close to that restaurant and customer is going to that restaurant to enjoy that scene not for the quality of food and if management is focusing more on the food quality in that case rather giving better view of the outside environment.

Then there is a mismatch of expectations. So, many a times this type of mismatches are possible. Because now days customers expect lot many benefits from the service organizations. So, many a time the core benefit remains on the side line and augmented benefits become the pioneer or become more focused from the customer's point of view.

So, how the expectations of the customers are changing with respect to use of that particular service that we need to understand. Then another important thing is management perceptions of customer expectations and service quality specification. Now, whatever perception management has with respect to customer expectation and the service quality specification.

So, how you are converting that expectations which you are having about the customer requirement into the service quality specification. Because it is a very relative thing, you have to design services as per the unique requirement of the customer. Each customer may have separate expectations. So, according to individual customer you see service is, we have discussed many characteristic of the services in the past.

But one very important characteristic is that services are highly customized products, services are highly customized products. So, because of that each time you have to understand customer expectation and accordingly you need to give, you need to provide the specification for your service quality.

So, that is also a ongoing process, in case of manufacturing activities you understand the customer expectation. And at least, at least those expectations remain constant for one lot, but here it is quite possible that every time a new customer is coming and you have to change your service quality specification.

In a restaurant again one customer is coming he wants spicy food. The next customer is coming, he wants no spices. Then third customer is coming, he wants a no oil in the food. So, every time the customer expectations are changing and accordingly you have to provide that kind of specification. One customer wants tea with snacks, another customer wants that tea follow the snacks.

So, these are the simple examples with which you can understand that how service quality specifications need to be redesigned all the time whenever a new customer is to be served. Then service quality and service actually delivered. That is also very important thing. Because as a top manager or as a manager I may design the service quality specification.

But the delivery of service is being done by some other executive, maybe the other is staff, for an example you go to gymnasium. So, as I owner or the trainer of that gymnasium, I may design some specification that how I will train a beginner. But actually the training will be implanted by my juniors or those volunteers working in that gymnasium.

Now, whether they are actually able to follow the SOP that is again a very important issue, in manufacturing you can 100 percent ensure that SOP's are properly followed but here because of human involvement sometime SOP's are not exactly followed you go to hotel and whenever you check in into a room you see that the room is properly arranged in a particular fashion.

Now, that is being trained to them by their supervisors. Now, how the person who is actually doing the house keeping activity, follows the instruction of the supervisor that is the meaning of service quality and service actually delivered. Then another important issue is service actually delivered and what is communicated about the service to the customer.

So, the service you are delivering that is from the point number 3 and what you are communicating about the service to the customer. So, there may be a gap between these two things also, that the service actually which you are delivering to the customer and what you are communicating about the service. There may be a gap.

There may be some kind of discrepancy, because as a service provider you always feel that I am delivering excellent quality of services, but there may be some gap because of this customer expectation. Because customer is expecting something else and you have delivered something else. Now, you are communicating something else.

So, at different levels, there are possibilities of discrepancies. So, discrepancies are possible at these four different levels. The actual customer expectation and the management perception, then the perception of the customer expectation and the specification and then the service quality specification and the delivery of those specification.

At the delivery what you have done and what you have communicated to the customer. So, there are lot of scope in the service products about the various discrepancies and you can now understand that if you accumulate all these gaps all these discrepancies this may lead to huge amount of customer dissatisfaction. So, you have to be very very careful about the quality of service. All these gaps are not so prominent as in the manufacturing goods.

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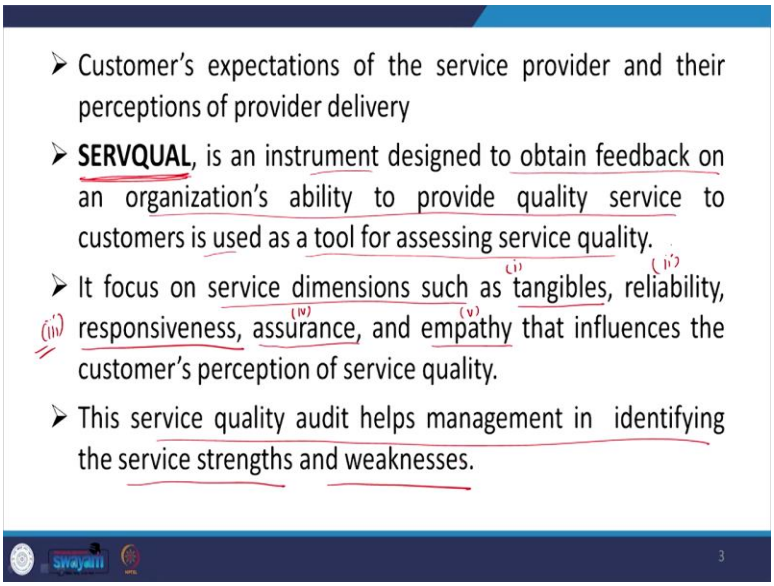

Now, because of these things, we have a separate tool for the measuring the quality of services, which is known as Servqual. Now, in present literature there are multiple type of Servqual, you have E Servqual, you can have health care Servqual but this is one basic instrument through which you can measure the quality of services.

So, it is an instrument designed to obtain feedback on an organization's ability to provide quality services to customers. It is used as a tool for assessing service quality. Now, it focuses on certain dimensions and this is as I am saying a very comprehensive tool for determining the service quality. Though, sector specific tools are also available.

Now, the basic Servqual, it is based on some service dimensions, one is tangibles that what is the role of tangibles in offering a particular service and how much you are satisfied with those tangibles. Maybe like in case of a hotel room. So, tangibles, maybe the bed sheet, tangibles maybe the toiletries which are offered to you. Tangibles maybe the air conditioning, tangibles the television. So, all these are the part of tangibles in case of a hotel room.

The second is reliability. So, whether all those things, all these services, all the you can say aspects of that particular service are properly functioning or not functioning. Whether the TV which you want, whether the TV is working properly or not. If hotel is saying that Wi-Fi connection will be available to you.

So, whether you are getting enough bandwidth in that Wi-Fi connectivity or not. So, that is the part of reliability dimension. The third is responsiveness. So, whether the service is enough responsive or not, that means how quickly service is being delivered to you that is the meaning of responsiveness.

Another is assurance. That means whatever is communicated to you whether it was delivered or not. So, you have some commitment to the customer and whether all those commitments were met or not met that is the meaning of assurance. And then very important aspects in case of services that is empathy.

So, how was the behaviour of staff, their courtesy, etiquettes all these things are the part of empathy dimension. So, these are the important dimensions which are there, which define the service quality, tangibles, reliability, responsiveness, assurance and empathy and obviously now days there are different versions of this particular Servqual.

Then this service quality audit helps management in identifying the service strengths and weaknesses. So, based on the customer response, you can understand that in which particular area you are having good strength and in which particular area you need to improve and that is

why this particular tool which is very simple to apply and very robust also is one of the most widely used tool for measuring the service quality.

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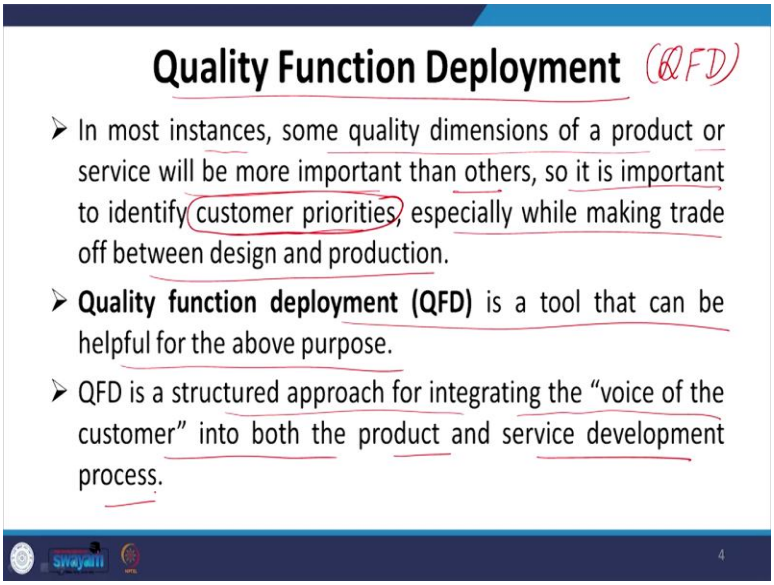

Now, the another important area which we will like to focus in this particular session that is QFD. That is quality function deployment. Now, quality function deployment is a tool which is going to help us in transferring the customer expectations into product specification. Now, what happens in most instances some quality dimensions of a product or service will be more important than others.

So, it is important to identify customer priorities, especially while making trade off between design and production. The meaning is that depending upon market to market in rural market to urban market, from Indian market to American market as you go from place to place different segment to segment it is quite possible that the dimensions of the product will have different priorities.

At some place some other aspects are more important, at some other place some other aspects are more important. If you are making shoes, if you are making shoes, so if you are making shoes for soldier, so safety is more important. But if you are making shoes for CEO of a company in that case status is more important. So, the product is same shoes, but depending upon who is the user, who is the market and therefore the importance of dimension will change.

So, you need to understand what is the customer priority, you need to understand what is the customer priority for a particular segment. Otherwise, if you make a generic shoes, you want to make that kind of generalized shoes, which is equally applicable for a soldier or a CEO. So, neither solder will purchase, nor CEO will purchase.

Because it is not going to fit their purpose. So, it is important that we need to identify right customer priorities and based on right customer priorities we can actually design our specification. So, that we can give more stress to important parameters and less stress to less significant areas.

So, quality function deployment is a tool that can be helpful for the purpose of identifying the right customer priorities and converting them into design aspects of the product. So, QFD is a structured approach for integrating the voice of the customer into both the product and service development process. So, whether you are designing a service or you are designing a product in both these cases this QFD is a very popular tool.

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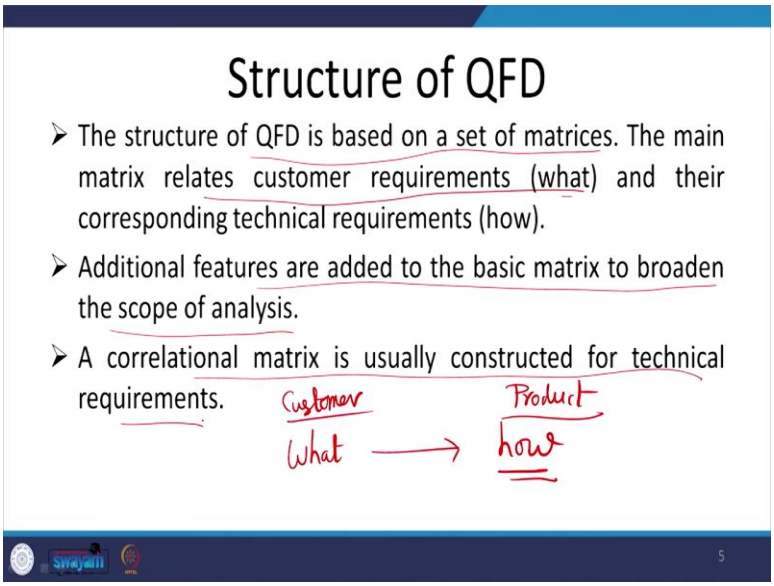

Now, if you see the structure of QFD, so QFD's structure is based on a set of parameters. The mean matrix relates customer requirement that what is required to the customer and their corresponding technical requirements. So, what is required by the customer and how you are going to fulfil that requirement. So, you want to make a relationship between what and how, what comes from the customer side and how is with respect to product.

So, how customers what will be converted into how of product that is the basic purpose of this matrix. We will see the image of one matrix also. Then additional features are added to the basic matrix to broaden the scope of our analysis. Because now days the basic product is simply not enough you require lot of other features also. So, we need to add more features in the basic matrix and then a correlation matrix is usually constructed for technical requirement.

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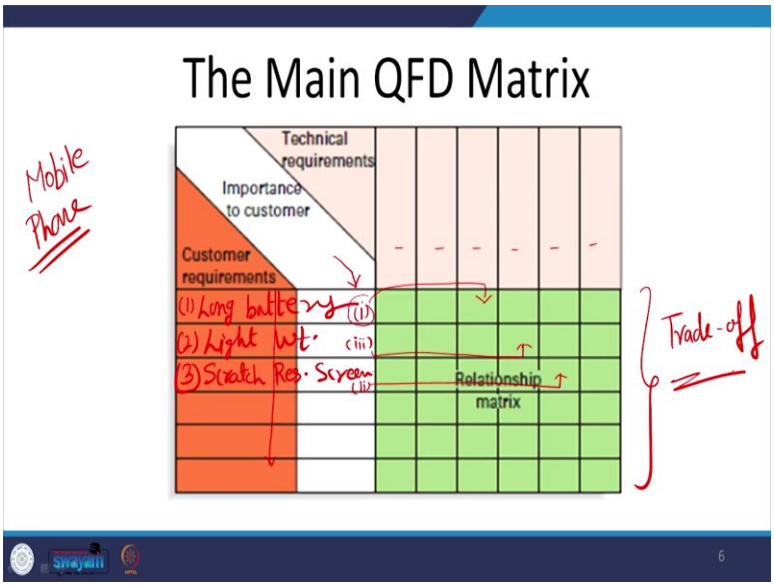

So, now let us see this QFD matrix where you see that we have customer requirements here. Now, customer requirements may be of different types you can have customer requirement. If I am talking of a mobile phone, let us say, so in case of a mobile phone you have customer requirement of long battery, you have a light weight, you have scratch resistant screen and so on. These are the customer requirements, which are there.

Now, second column is the importance to customer. So, you will do survey and then you will say that the most important thing is long battery that is number one, scratch resistant screen is number two, light weight is three. So, accordingly you will have different types of priority for this thing. Then you have on this side technical requirements and then you will connect that for this particular thing which technical requirement is more suitable.

So, with respect to various customer requirements, different type of technical requirements are mentioned in this relationship matrix and then based on all these criteria. So, this will give you a good trade-off. And trade-off between the customer requirement and the production capabilities.

So, how you can combine because customer may aspect, customer may ask you various requirements, which may not me simultaneously fulfilled.

So, how you have to do some kind of trade trade off that you can provide this requirement up to this level and this requirement of to this level. So, all that trade-off is easily possible with the help of this QFD matrix, then you can also broaden, you can do additional feature analysis. You can add more things into this basic relationship matrix.

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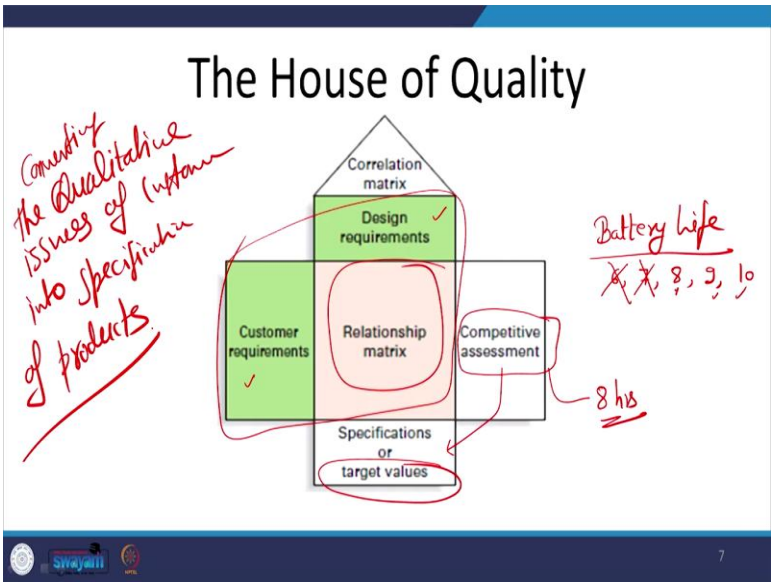

So, this basic relationship matrix comes from that QFD and then you can have various other things also. That customer requirements and design requirements all these things we discussed in our earlier diagram. Now, you do competitive assessment also. What your competitors are doing, what type of parameters your competitors are providing for fulfilling these customer requirements and on the basis of that you will finally take the specification or target value.

If, for an example, the battery life is one important aspect of mobile phone and you thought of 6 hours, 7 hours, 8 hours 9 hours 10 hours of battery lives are available. Whatever technology is available with that you can provide these different levels of battery life. Then you see that your competitors. Your competitors are providing normally 8 hours of battery, when you are doing the competitive assessment.

So, in any case you cannot go with these values. The minimum value which you can select is 8 hours or more than that. So, that type of analysis is going to add more feature into our house of

quality. And with that, we finally select the target values that what should be the target value for my product, my service.

So, this is a very useful analysis which helps us in actually converting the qualitative issues of customer into specification of products. Otherwise, you have no mechanism of converting the customer voice into your product specification. So, this is a very systematic scientific way of converting the customer's requirement, voice of customer into your product specification.

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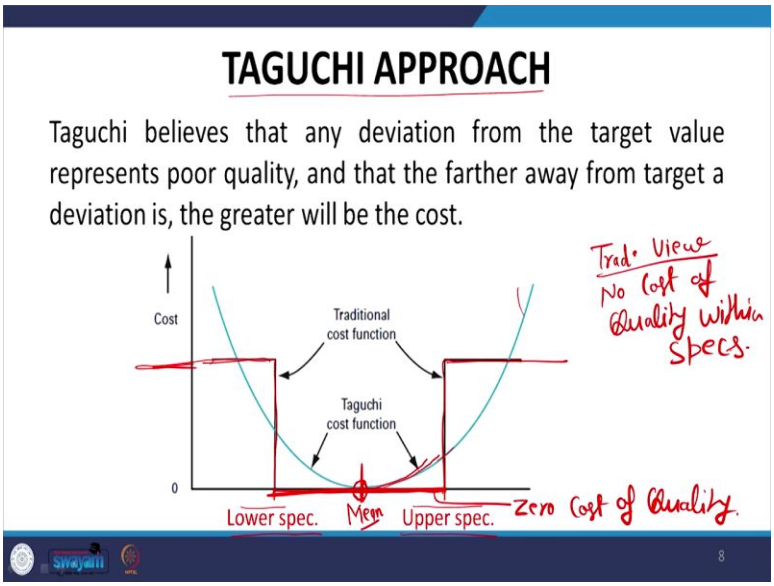

Then another very important thing which we should know as part of this quality management course that we discuss that variations are important part of our processes, you cannot eliminate the variations. And based on this very concept we discuss the development of Tagu, this Six Sigma and all these concepts.

Now, one very important development was given by G Taguchi and G Taguchi suggested that as we move away from the mean value customers become dissatisfied, customers become dissatisfied and because of dissatisfaction of customer, we start incurring the cost of quality. So, that is being given in the form of this Taguchi cost function.

If you see in this diagram, we have these two types of cases. In one case, we have this traditional cost function, which is a step cost function. So, here we have the lower specification and upper specification of the product as long as the traditional view is that as long as I am producing within the specification. Traditional view that no cost of quality within specs.

So, as long as you are producing between lower specification to upper specification, you are not incurring any cost of quality. So, as soon as you come either below lower specification your cost of quality all of a sudden jumps to this particular level or as soon as you cross the upper specification then also you incur the cost of quality to this level. And otherwise the cost of quality is zero, zero cost of quality.

Now, Taguchi came with a different idea Taguchi said no, this is not the correct view. Taguchi said that the cost of quality is zero only at the mean value. This is the mean value. So, only at the mean value cost of quality is zero, as soon as because of variation, you start moving away from the mean value your cost of quality starts increasing.

And therefore, we should try to minimize the variation and this is a kind of parabolic curve which Taguchi suggested for the cost of quality. So, now we have moved from this step function to this parabolic function, where the cost of quality is zero only for a particular point. In the earlier case for entire reason the cost of quality was zero.

But now only for a particular point the cost of quality is zero. So, that is a major change and as a result of that now we need to think how to minimize the variation and produce more and more parts around the mean value. And this actually emphasizes the implementation of six sigma in the organization because that therefore you will keep your cost of quality as low as possible.

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Another important thing which we will like to discuss in this session that is about quality certification. Many of us know for this word. That is ISO certification and out of ISO certifications ISO 9000 is the most popular one. In this ISO certification we have the international organization for standardization. Which gives this certification to various organizations whether they are manufacturing or service organization.

One perception or I will say that one myth we all have that if I am having ISO and you are not having ISO, it means I am producing superior quality product then what you are producing. But it is not the correct version of this ISO system. The meaning is that whatever you are doing, whatever you are doing, you are documenting your entire process.

So, it is believed that when you are documenting your entire process, you will have more opportunities to improve your process. Without documentation the opportunities to improve will reduce and therefore if you can document your entire process, you may be eligible for ISO certifications. Those organizations where processes are not properly documented whether they are doing excellent work, but they will not be able to get ISO certification.

So, this is a very important thing that ISO is simply the certification for your documentation. That whatever you have documented you are following same thing in your organization. There are different types of agencies, which are authorized to give ISO certification like in India, we have companies like BVQI, DNV and our own Bureau of Indian Standard, BIS. These are the organizations which are very popular for giving ISO certificates.

Now, these ISO 9000 certificates are given for variety of activities like you 9001, 9002, 9004 these are the quality management systems, when right form design, production, installation and after sales services. When you are doing all these things you are eligible to get 9001, when you are only producing and installing then you are 9002.

That means you are taking design from either your customer or from some other source, you are not designing on your own. And when you are only involved in installation and after sales services that is 9004. So, depending upon the scope of your organization you are eligible for one type of ISO certification.

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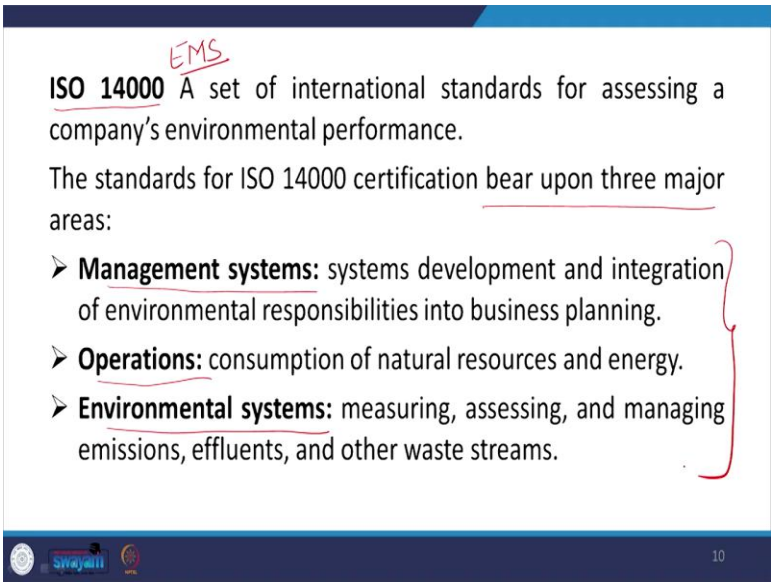

Then another type of ISO certification, which is becoming very popular these days because of environmental issues. That is ISO 14000 series, it actually gives the certification about environmental performance of the organization and therefore like 9000 are known as QMS quality management system. These are known as environmental management system EMS. That what is the environmental management of your organization and these are into three major areas, one is the management system, then the operations and then the environmental system.

And all these three systems are basically related to how your company is committed for reducing the carbon foot print. So, that is the basic idea that whether you are consuming the natural resources. So, if you are consuming the natural resources how you are replenishing them all these things are the part of your ISO 14000 certification.

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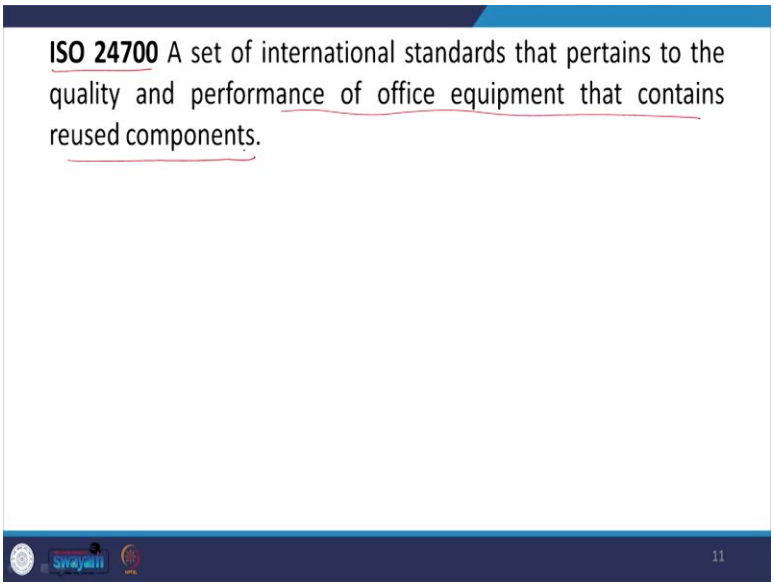

Then another certification which is becoming very recently popular that is related again to some extent sustainability, but it is more with respect to reused components. That how much components you are using in your organization, which are already used and now you are reusing them in your office.

So, to improve or rather you can say to emphasize more on environmental aspects these type of additional certifications are being created these days. Then you have various other series of ISO certifications which are related to food, which are related to safety aspects, which are related to your performance in the Labour productivity areas. So, there are different types of series which are regularly coming. But the main point with respect to ISO certification is that you are documenting everything whatever you are doing you are documenting those things then you are able to get ISO certification.

Now a days, if you are doing business in a globalized world, many companies will do business with you only when you have ISO certification. So, therefore, the need of ISO certifications are continuously increasing because in your supply chain, it is quite possible that either your customer or vendor will have this condition that I will do business only when you are ISO certified.

So, therefore, in India also, we have specialized course that how to do ISO auditing, how to create documents for ISO certifications and all those things and large number of consultants are

finding their career opportunities in ISO certification. So, with this we come to end of our discussions on quality management. And now we will start some new topics in our next class of operations management. Thank you very much.