

Operations Management
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Lecture - 46
Concept of Quality

[FL] Friends welcome to session 46 in our course on operations management. So, we have finished the discussion for 9 weeks and currently we are starting the discussion for the tenth week and in this week our focus will primarily be on the important topics which are important for ascertaining the success of an organization. We will study that how quality plays an important role in measuring the effectiveness of the operations that we are doing.

So, basically all operations, specially on the shop floor are involved in converting a raw material into a tangible product. Now the quality of the product is very very important. So, we have to ensure that whatever we are doing whatever we are producing is of the utmost quality utmost quality means the quality which is acceptable by the customer who buys that product to achieve certain function.

So, the customer in today's scenario is the king and he or she decides that what is the quality of the product and everybody has become quality conscious everybody wants to buy a good quality product. So, our operations have to fine tune have to be fine tuned in such a way that we produce good quality products. So, how the subject is related to this topic that I am trying to emphasize because in the discussion we will see that the process is very very important whenever we talk about the quality.

We have to see that the people involved in the overall conversion process or transformation process of the raw material into the final product are capable enough the people involved, the men involved, the machine involved, the equipment involved, everything every stakeholder who or he or she who is involved or the equipment or machines that are involved in the overall conversion process must be aware of what they are producing, must be aware of the quality standards, must be aware that where they are representing in the overall product development cycle.

Their role must be clear how they can affect the quality must be clear to them, how they can improve the quality must be clear to them. So, we need to understand first that what is quality then we need to apprise, we need to train, we need to tell, we need to guide the people who are involved in the transformation process right from the procurement of the raw material to the dispatch of the product to the customer everybody involved in the organization must be quality conscious and there by only the people can suggest number of changes which can help in order to improve the quality not only of the product, but of the processes of the operations as well.

So, our focus will be to understand the concept of quality and try to highlight it to the people involved in the overall process, now I think all the learners who are doing the course may be management graduates may be engineering graduates may be bachelors of business administration all the learners I think must have a clear cut idea about quality, that what quality is all about and there are hundreds of good presentations available on the internet which you can refer to and try to grasp this concept of quality there are handbooks available there are good books available on quality.

So, you can refer to these books and try to use the concept so that we can improve the quality of operations, the quality of service, the quality of products that we are developing and designing. So, it is a overall concept it is not specifically a formula where you can put in some values and you get your answer it is something which is in our lives of we can lead a quality life or we can lead a disturbed or a disturbed or maybe unhappy life also.

So, we can have a quality of life the quality word is associated with our life, also quality word is associated with the products that we use, quality word is associated with the processes that we see, quality word is associated with the way the governments govern the people, quality word is associated with the automobiles how they are manufactured, how they perform qualities, associated with the mobile phones that we use. So, quality is all around us so it is not something which is only in the books which is only in the presentations.

Which is only over the internet quality is all around us therefore, we need to understand this basic concept of quality that how quality is perceived as a customer for example, I go and buy a shirt I would definitely like to buy a very good quality shirt it should look

good on me the people who see me in that shirt must appreciate that you are looking smart in this shirt. So, as a customer I perceived quality of the shirt I may look for different colours the bright colours the colours that are suited with my skin colour. So, I will see that what type of shirt, what type of quote should be there for the shirt, what should be the colour of the shirt that matches with my personality. So, that is the quality concept from my point of view.

Now suppose there is a company which is manufacturing readymade shirts. So, they are not only focusing on me as a customer, but their focusing on general customers. So, they will see that what type of shirts they must prepare so that the customer buys the company the shirts manufactured by that company. So, their focus may be entirely different from my focus, my focus is colour, my focus is cost, my focus is fitting, my focus is maybe comfort that I get by wearing that kind of a cloth or the shirt. So, my expectations as a customer of a shirt are entirely different from the objectives of the organization which is preparing or manufacturing that shirt.

So, they may be like to that they may like to see that 40 size must be exactly 40 - 42 must be exactly 42 the stitching may not come out the stitching may be of good quality. The thread that is being used for stitching the shirt must be of the best quality, then it show can be a wrinkle it can be can be made of a wrinkle free cloth it should be comfortable to wear. So, some of the objectives that the company is focusing on are similar to what I also want as a customer and that is where the input of the customer these days is defining the way the companies are operating.

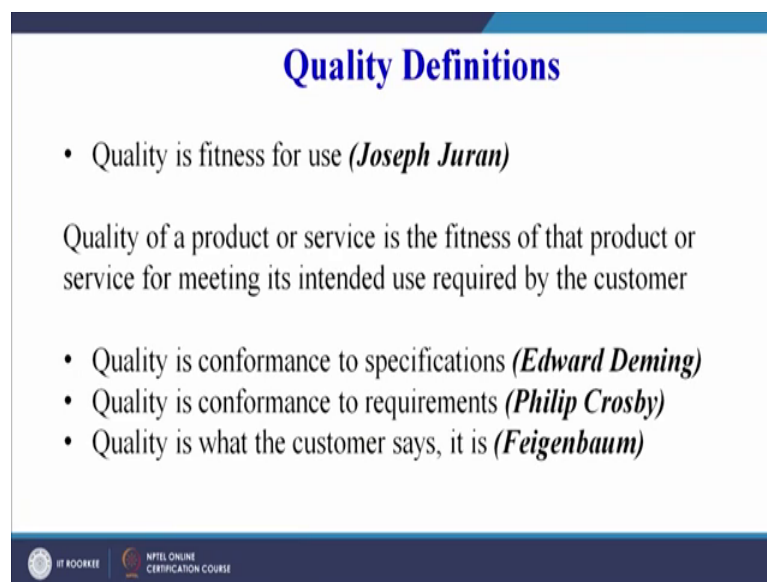
So, the feedback of the customer has become very very important in defining the quality of the processes as well as the quality of the products because of the competitive business environment of the business scenario earlier, whatever companies used to produce they used to push it down your throat because there was no competition, but today because of the competition each company has to take into account the customer feedback what the customers actually want how much price they are ready to pay. So, the customer input has become a very important part of managing our operations in such a way that we are able to satisfy the demand of the customer.

Therefore, the quality has also attained a very important role because the customers always would look for quality product. So, how qualities defined, how qualities

perceived as a customer, how quality is defined as a manufacturer, that is the basic concept that we are planning to discuss today in our course. Although quality is such a word which can be discussed in a complete course for an undergraduate or a postgraduate course, but still we will try to address the basic idea about what quality is. So, that if there is a question that how do you see a quality of a product you must be able to answer it convincingly, scientifically, logically and with conviction.

So, that is the purpose of this maybe 20 - 25 minutes of discussion related to the word quality. So, we will try to understand the concept of quality with the help of this brief presentation now as per Joseph Juran qualities fitness for use.

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Quality Definitions

- Quality is fitness for use (*Joseph Juran*)

Quality of a product or service is the fitness of that product or service for meeting its intended use required by the customer

- Quality is conformance to specifications (*Edward Deming*)
- Quality is conformance to requirements (*Philip Crosby*)
- Quality is what the customer says, it is (*Feigenbaum*)

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So, we can see fitness for use means that it can be from the customer's perspective that the function for which I have bought the product it is fit for that particular function or fit for that particular use. Now the quality of a product or service is the fitness of that product or service for meeting its intended use as required by the customer which I have already explained, as a customer I have bought a product for a specific function and if the product is performing its intended function in the best possible manner reliably I will say that the product is of good quality.

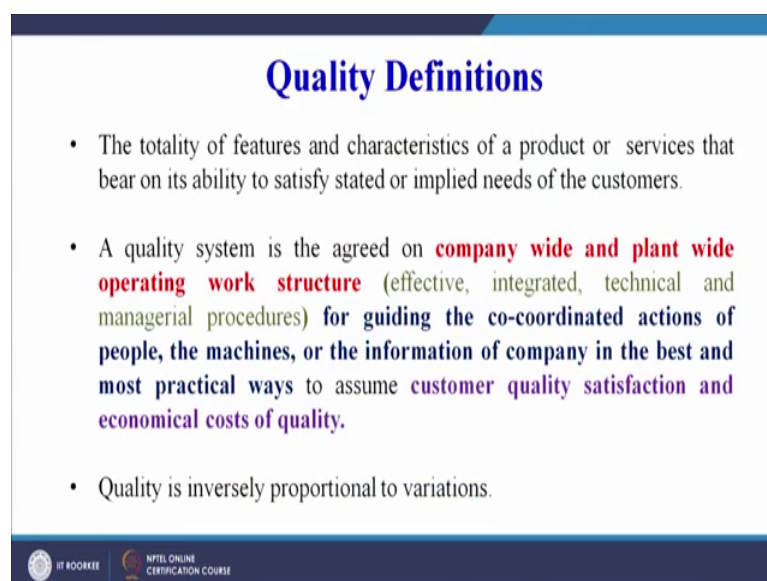
So, the quality is fitness of or fitness for use other quality groups have also defined quality. So, we can see Edward Deming has defined quality as conformance to specifications which is the quality perception or quality concept from the manufacturers

point of view because the manufacturer has to produce the product as per specifications if you remember the example that I have taken in the beginning of today's session the example of a shirt.

So, as a manufacturer I will see or I will ensure that if the size is forty it must be made as forty there should be minimum of variation in that size although I will focus on no variation in size, ideally the focus will be no variation in the size. So, that is conformance to specifications then as per Philip Crosby qualities conformance to requirements as per if you can bond qualities what the customer says it is. So, there is a customer focus also on quality now whatever the customer says that this is what I perceive as quality that is actually what quality is all about.



So, different authors different quality gurus have defined quality in different perspectives, but majorly the focus has been on the to stake holders. Now for any product there are two stakeholders there is one per one company or a person or organization that is offering a particular product there is audience or a customer base which is using that product. Now quality has to be defined in context of these two important stakeholders the offering as well as the receiving. So, we will see that how quality is defined from the manufacturer's point of view and how quality is defined from the customer's point of view or from the user's point of view.

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Quality Definitions

- The totality of features and characteristics of a product or services that bear on its ability to satisfy stated or implied needs of the customers.
- A quality system is the agreed on **company wide and plant wide operating work structure** (effective, integrated, technical and managerial procedures) for guiding the co-coordinated actions of people, the machines, or the information of company in the best and most practical ways to assume customer quality satisfaction and economical costs of quality.
- Quality is inversely proportional to variations.

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The other definitions for quality the second one being slightly longer, but we will try I have highlighted the important points. So, that we are able to understand it point by point. So, what is quality the totality of features and characteristics of a product or services that bear on it is ability to satisfy stated or implied needs of the customers.

So, we can see that for a product there are certain features there are certain characteristics or for services also there will be certain characteristics of the services for example, you go to a bank how your serviced there, how people are interacting with you or the bank staff is interacting with you, how much time you spend in the bank for a particular activity for example, you want to make a draft what are the steps involved how many times you have to go to the window.

So, these are the parameters or features or characteristics of the service being offered by the bank now you would like to have the best experience when you are visiting a bank. So, the bank needs to look at the customer expectation as well as the customer maybe perception of quality that how the customer will feel happy if he enters into our bank. So, that is the features and characteristics of a product or service and how those features and characteristics are able to satisfy the direct needs of the customer as well as the indirect needs of the customer or the implied needs of the customer.

For example, if I work into a bank I would like to be serviced at the earliest possible time. So, that the waiting time is minimum that is my direct need whatever I want to be done for example, I want to withdraw the cash from the cash counter must be done at the earliest possible. So, that is my direct need, but indirect need may be 35 go I must feel comfortable. So, the environment must be comfortable it must not be 2 muggy or may be 2 maybe with so much of moisture or maybe it is hot and humid inside the bank that is my implied need.

It is a secondary need I have to go and withdraw the money even if that environment persists I will have to get my direct needs serviced, but my indirect need also has to be taken care by the bank. So, but we can conclude here is that the product has got certain features and characteristics, these features and characteristics must be show designed that they are able to satisfy the direct the implied needs of the customer my example may not be that correct from the tangible product point of view, but I have tried to explain it from the services point of view that what can be the features and characteristics of a service

provider which can make the customer happy both in terms of the direct needs as well as in terms of the implied needs.

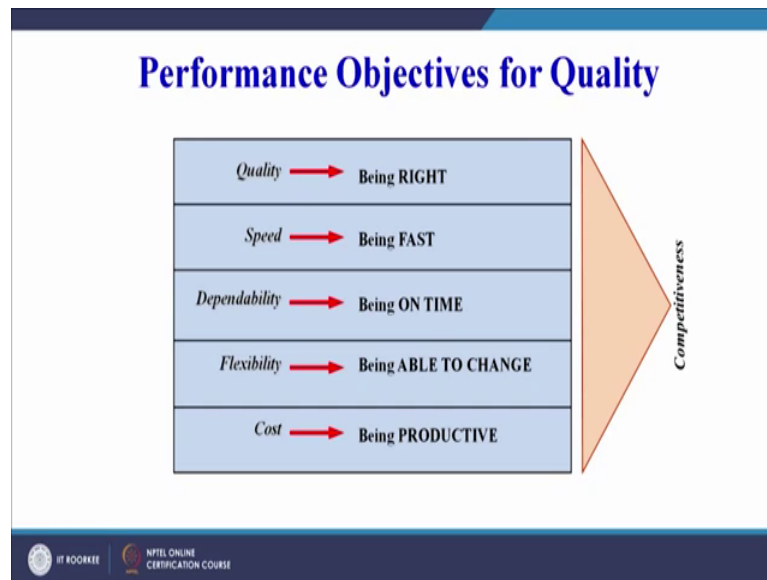
Now, coming on to the second definition we can see a quality system is the agreed on. So, agreed on means that everybody in the organization agrees to that. So, the quality system is the agreed on companywide and plant wide operating work structure. So, it is a totality means everybody in the organization companywide and plant wide operating work structure. Now, what is the work structure, work structure is effective integrated technical and managerial procedures. So, we have to document all these things effectively the effective integrated technical and managerial procedures.

So, these are the procedures that everybody agrees upon and these are companywide not only for a specific department or a business unit and why these procedures are in place for guiding the coordinated actions of people the machines or the information of company in the best and most practical ways. So, the again coming back from where we started there has to be a companywide effective documented integrated technical and managerial procedures that guide not only the people, but also the machines and the information within the company in the best and most practical ways to assume customer quality satisfaction and economic costs of quality or economical cost of quality.

So, the quality system is designed in such a way it is in the form of the effective and integrated technical and managerial procedures which guide everybody within the organization towards working for the customer satisfaction as well as achieving the economical cost of quality. Then quality is inversely proportional to a variation that is a third definition. So, if we can see inversely proportional or for low of all of us have studied mathematics still class 10.

So, qualities inversely proportional to variations mean that if the variations in the product performance are large we will see variations more quality is less. So, if the variations are less we will say the quality is more.

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Now, performance objectives for quality we can see that quality is being right, speed being fast, dependability being on time, flexibility being able to change, cost being productive so, all this will lead to competitiveness. So, we can see that quality we can also define that we have to be right the very first time then we can say that our procedures our processes are of good quality.

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Now, dimensions of service quality we can see quality word has got so, many different connotations maybe if we can see that if we buy a particular product and we see that it

can be used for one year 2 year or 3 year, but still we are using it after 10 years also. So, the quality has a different dimension somebody will say that it is a very good quality product, it is a very good quality product I am using it for the last 10 years, but the other may be part or other word that actually can define that time bound performance of that product can be one word can be performance that the performance is. So, good that the customer has used it for 10 years therefore, it is a good quality product or it can be dependability or it can be reliability.

So, we will see that it is a very very reliable product therefore, it is of good it is a good quality product. So, there different denominations like performance will the product do the intended job if it does the an intended job perfectly we will say yes the performances good for example, we take example of a mobile phone if I am using a mobile phone for the last 4 years and there has not been a single maybe problem of hanging off the phone I will say the my phone I am losing for last years it has never hanged and it has always operated successfully.

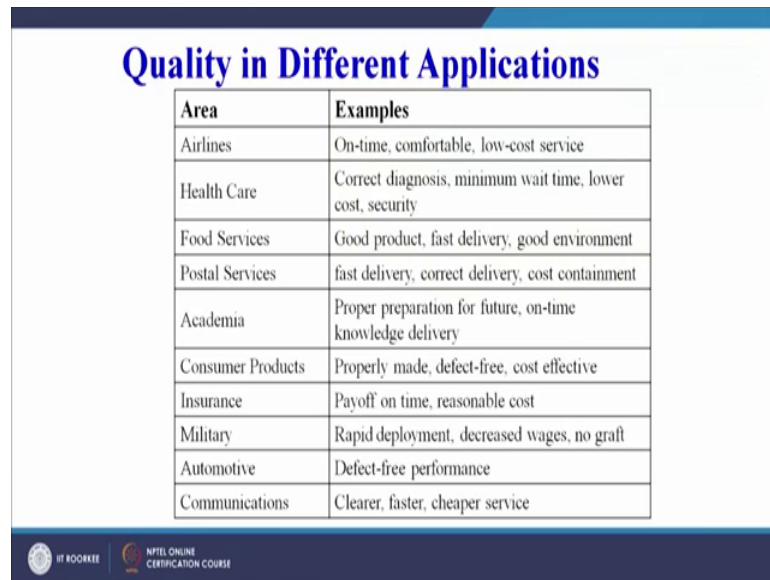
It has never given any troubleshooting or any problem to me then I will say we will say it is the performance is very good in nutshell we are saying the quality of the product is very good. Similarly, reliability, how often does the product fails so, example that I have taken me something between performance and reliability if my product has never failed for the last 4 years I will say it is a reliable product. Durability how long does the product last for example, I use a product for 10 years and still it is working with me. So, I will say that it is a durable product and a good quality product.

Serviceability how easy is it to repair the product aesthetics what does the product look like, features what does the product do, perceived quality, what is a reputation of a company about or it is product. So, basically quality has got varied dimension. So, as a customer if one particular maybe I have bought a product for a particular use for a particular intended function for example, I buy a pen and I am writing with it if for maybe for 5 years continuously I am using the same pen and I have never faced any problem with that pen.

So, I will say that the durability is good, reliability is good, performance of the pen is good, but in nutshell what I am saying that the overall quality of the pen is very good.

Now, quality in different applications I have taken I think 2 - 3 example I have taken an example of a bank, we have taken an example of a pen, we have taken an example of a shirt. So, in different dimensions or in different applications we can see quality has got different meanings.

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Area	Examples
Airlines	On-time, comfortable, low-cost service
Health Care	Correct diagnosis, minimum wait time, lower cost, security
Food Services	Good product, fast delivery, good environment
Postal Services	fast delivery, correct delivery, cost containment
Academia	Proper preparation for future, on-time knowledge delivery
Consumer Products	Properly made, defect-free, cost effective
Insurance	Payoff on time, reasonable cost
Military	Rapid deployment, decreased wages, no graft
Automotive	Defect-free performance
Communications	Clearer, faster, cheaper service

So, for example, we have seen we have highlighted it may not be possible to go through each and every area or application area, but some of them we can see for example, in airlines what can be the quality the criteria, we can say on time arrival, comfortable seats, low cost service. So, we can the cost can be one criteria, comfort level can be another criteria, on time arrivals and departures can be another criteria of branding any airline service has a good quality service.

Similarly if we talk about the postal services we can say fast delivery, correct delivery, cost containment so, all these parameters will be quality criteria for the postal services. Similarly as all of us are at least we are in to academics we are into academia so, for academia proper preparation for future on time knowledge delivery. So, all these can be the quality criteria. Similarly for automotive suppose for cars or motorcycle defect free performance can be one quality criteria, fuel efficiency can be another quality criteria. So, where we can have different types of quality criteria for judging the quality of 2 or 3 different types of competitor 2 or 3 competitors in the same area.

For example, in airline sector if we have suppose 4 companies operating the aircraft. So, we can compare them based on these quality criteria that on time arrival, comfortable, low cost and we can sometimes go to further micro detailing also the type of food being served or maybe sometimes we can see the charge for extra baggage. So, there can be number of criteria based on which we can compare different service providers in the aviation industry and then we can judge that which one is the best quality as per my requirement or as per as a customer which company I feel is giving me the best service.

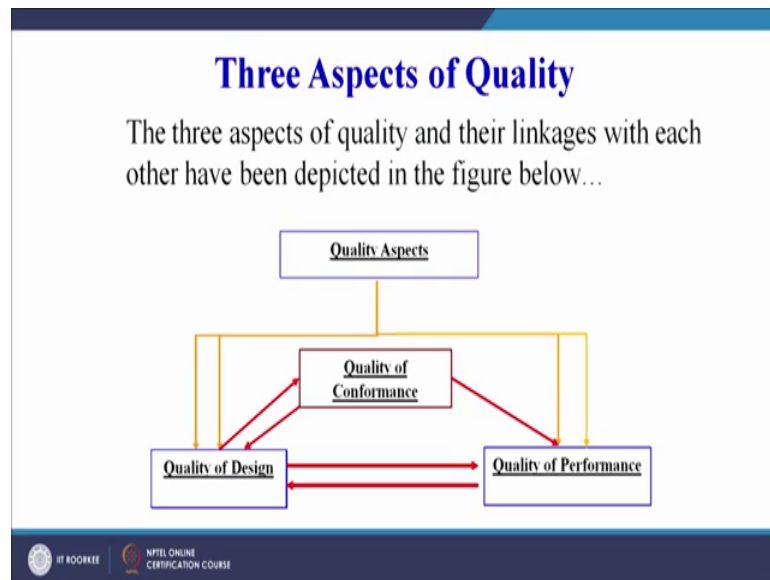
So, similarly in all different application areas we can see that the quality service is being or the, what is the quality criteria and how a customer sees a particular company as per his quality expectations. So, qualities will be variable within the maybe customer base also for example, if we are buying a soap, a bathing soap we want to buy. So, the quality of a bathing soap for one person or one customer may be different from the quality that is perceived by a customer in the completely different segment.

So, the quality is a relative term which will be perceived differently with the different customers also therefore, there are different companies focusing on different target segments of the customers for their products. So, but the quality in general will be it has to satisfy the intended need as well as the implied need of the customer from that product. Now, suppose I feel that this shirt of a particular company is satisfying my need my direct need of wearing this shirt as well as my implied needs that I must look smart in this shirt I will say it is good quality shirt as perceived as a customer from my point of view, but somebody else may say it is not a good quality shirt there are the other companies which are preparing better shirts than this.

So, if as a customer they feel that yes that is the quality they have defined, the intended uses do you find the implied needs are defined and they that needs are satisfied. So, they can say yes that is a good quality from the, those customer's point of view. So, within the customer base also we can see that how we can understand the concept of quality.

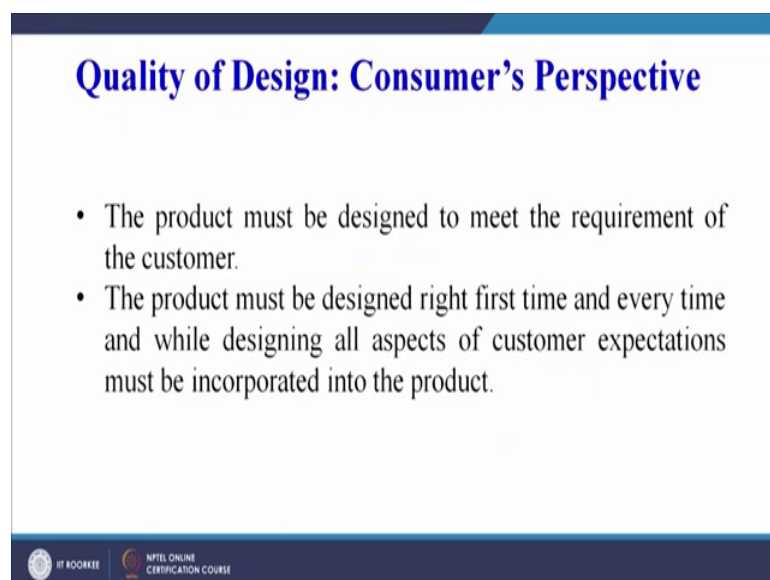
So, within the too much also the quality definitions or the concept of quality will be variable and therefore, it is important to understand that if we are managing the operation if we are producing something how to get this information that what the customers want and what customers will appreciate as a quality product if we produce a particular product and sell it in the market.

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Now, there are three aspects of quality very quickly we can see the three aspects of quality and their linkages with each other have been depicted quality aspects, quality of conformance, quality of design, quality of performance. So, the definitions given by the quality guru focus on these three important quality of conformance, performance and design.

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Now, quality of design as I have already told from consumers perspective as a customer as a consumer I may perceive this shirt as a very good quality shirt, but some other

consumer or customer may not feel the same thing. So, the quality definitions or quality concepts may vary from customer to customer the product must be designed to meet the requirement of the customer. So, the company which has produced this shirt has taken this thing into account that the design of the shirt must be such that what if some customer wants to buy this colour, shirt in half sleeves, he must be able to say he must be happy to buy this shirt.

The product must be designed right the first time and every time and while designing all aspects of customer expectations must be incorporated into the product. So, again the focus is on the customer. Now this is from the consumer's point of view the customer's point of view what design thinking should go into the design of the product or the quality design of the product.

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Quality of Design: Consumer's Perspective

The factors need to be considered while designing the product are:

- Type of product
- Cost
- Profit policy of the company
- Demand
- Availability of the parts

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Now, quality of design from consumers perspective we can see the factors that need to be considered while designing the product are what is a type of product? What will be the cost? What is the profit policy of the organization? What is the demand of that product in the market? What is the availability of the parts that are required to make that product?

Now, quality of conformance is from the manufactures perspective, now quality of design means when we are designing a product our focus is on the customer that who are our customers and what are their needs and requirements, what are the direct needs, what

are their implied needs and we must design a product in order to satisfy the customer's needs and requirement.

The quality of conformance is majorly from the manufacturer's perspective the product must be manufactured exactly as designed.

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Quality of Conformance: Manufacturer's Perspective

The product must be manufactured exactly as designed.

The activities involved at this stage include:

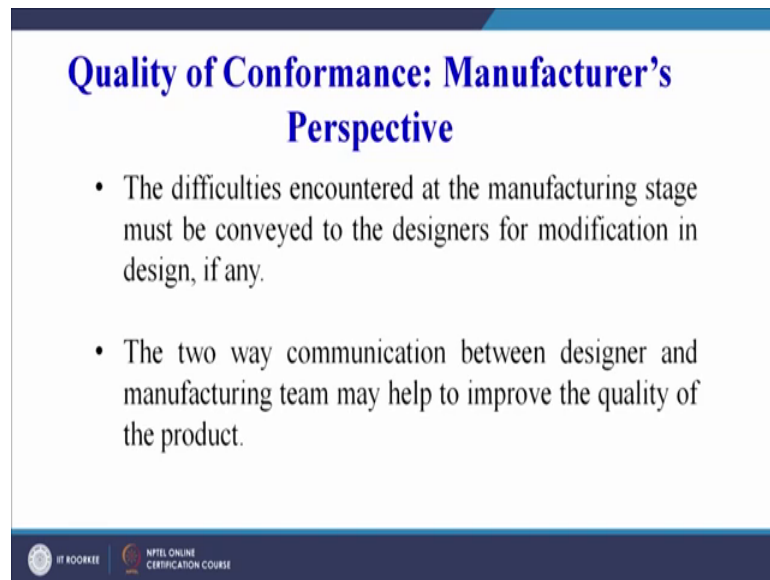
- Defect finding,
- Defect prevention,
- Defect analysis
- Rectification

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The activities involved at this stage may include defect finding, defect prevention, defect analysis, rectification which means that we have to conform to the specifications as designed. So, whenever a designer designs a product he lays out certain specifications for the manufacturer.

So, conformance to specifications basically is the manufacturer's objective that whatever are the specifications we must meet these specifications religiously in order to satisfy our customer.

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Quality of Conformance: Manufacturer's Perspective

- The difficulties encountered at the manufacturing stage must be conveyed to the designers for modification in design, if any.
- The two way communication between designer and manufacturing team may help to improve the quality of the product.

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Now, quality of conformance, from manufacturers perspective the difficulties encountered at the manufacturing stage must be conveyed to the designers for modification in design if any and if you remember in product design and development; we have touched the topic design for manufacturing this is basically where the designers and manufacturers work as a team in order to satisfy the customers demand.

The mover communication between the designer and manufacturing team may help to improve the quality of the product which is a basic aim of design for manufacturing.

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Quality of Performance: Consumer's Perspective

- The product must function as per the expectations of the customer.
- The two way communication between designers and customer is the key to have a quality product.

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Now, quality of performance is again from consumers perspectives so, quality of performance means how the product will perform. The product must function as per the expectations of the customer the two way communication between the designers and the customer is the key to have a quality product. So, you can see that there are three important words of design, quality of performance, quality of conformance. So, if all these three aspects are taken into account they are integrated into one bigger objective.

So, the overall objective is to produce a product which is acceptable by the customer the customer perceives it as a good quality product. So, for that the complete organization will need to focus on all the quality aspects and with this I think I will end the today's session and in the next session we will cover a most important topic that is total quality management

Thank you.