

**Total Quality Management - I**  
**Prof. Raghunandan Sengupta**  
**Department of Industrial and Management Engineering**  
**Indian Institute of Technology, Kanpur**

**Lecture - 04**  
**Management Aspects of Quality - I**

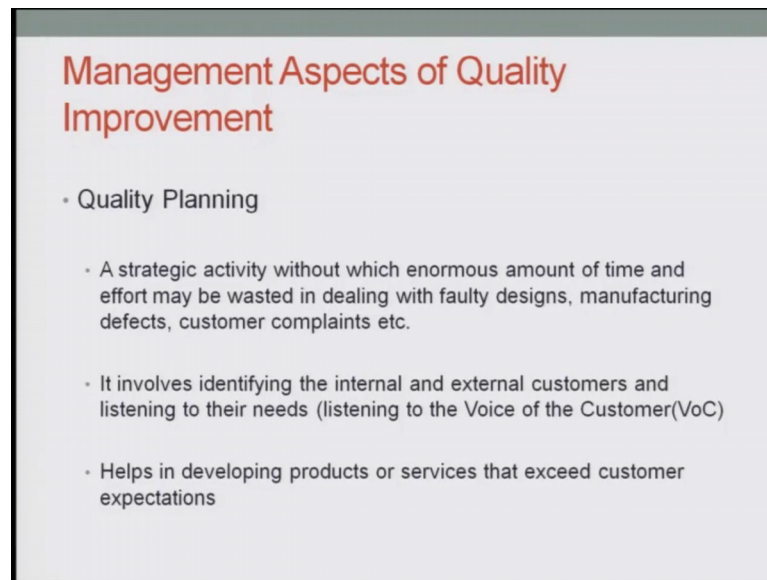
Very good morning, good evening, and welcome to all my friends, who are taking this total quality management class. I am Raghunandan sengupta from on the IME department IIT Kanpur.

So, if you remember we have discussed about the different matrix of quality, how it can be measured what are the quantities so called quantity and quality feel of quality. And quality as I said any, in one of the two lectures out of the three which I have taken. So, I always mentioned that it is something to do with the philosophy, how you do things and always trying to improve the overall process or over all qualities of services, you gave or the overall quality of the product you are going to deliver. And obviously, they would be has to be some cost implications which we will see later.

But the important fact is that you have to basically increase the concept of quality consciousness inside you, such that you can basically utilize that to improve the overall process. So, this is a in a thought process which has to come, but having said that the course which you are going to deal would be not of a philosophical terms. It would be more on practical sense in the way that we will be dealing with the different type of tools, statistical processes or different type of distribution which can be utilized on the shop floor for the services, such that you get some tangible feel that how quality can be improved.

So, this is the fourth lecture. So, coming back to the quality planning, basically what does quality planning mean?

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**Management Aspects of Quality Improvement**

- Quality Planning
  - A strategic activity without which enormous amount of time and effort may be wasted in dealing with faulty designs, manufacturing defects, customer complaints etc.
  - It involves identifying the internal and external customers and listening to their needs (listening to the Voice of the Customer (VoC))
  - Helps in developing products or services that exceed customer expectations

So, it means a strategic activity without which enormous amount of time, energy, effort and obviously cost may be wasted in dealing with faulty designs, not actually properly made products, services not being delivered properly, manufacturing defects being their customer complaints be there, customers not been satisfied.

So; obviously, it is an activity which has to be done in such a way. So, all these negative things, which are in the whole process are reduced to the maximum possible extent. Obviously, it is not always possible to make it 0, but we will basically everybody would aim to make it as close as possible to 0 such that you are able to render the product as it is with all his specifications and what the customer wants.

Quality planning also involves, identifying the internal and external customers and listening to their needs, listening to the voice of customers. So, basically it means the customers internally you may be asking who are the internal customers. So, say for example, if I am the person, who is delivering raw materials to the manufacturing plant inside the factory. So, if I basically have the raw materials in pellets or they are in Benz. So, obviously the pass on material should be such that, they have the highest quality to the manufacturer needs such that they are able to deliver the products further on to the customers.

So, obviously my customers would be both internal and as well as obviously, they would be external, but I would always try to treat. I means the person, who is delivering the

product the services would always try to treat customers, both internal and externally with the same level of competence with seven level of seriousness that you are able to deliver the products it each in each and every stage without any so called defect. Quality planning also means helps in developing products or services that exceed customer expectations.

So, if I buy a product and considering the cost is comparable to the other one and if I see the warranty life for the products is much more and the product actually functions beyond that warranty date; obviously, I am satisfied considering, that I have been able to get the goods. What the money based on which I have made a plan to buy this products.

So, as I said that it helps in developing products and services that can exceeds the customer satisfaction level.

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**Management Aspects of Quality Improvement**

- Quality Assurance - It is the set of activities that ensures the quality levels of products and services are properly maintained and that supplier and customer quality issues are properly resolved
- Documentation of quality system - policy, procedures, work instructions and specifications, and records.
- Policy -> what is to be done
- Procedure -> methods and personnel
- Work instruction and specification -> product/department oriented

Now, coming back to the concept of quality assurance, quality assurance it is the set of activities that ensures the quality level of products and services which are properly maintained, such that the supply and customer quality issues are properly resolved.

So; obviously, how would you try to basically resolve in this concept using the concept of quality assurance; obviously, there would be documentation. Documentation how the quality system works, what type of sampling plan you have? How you collect the products, what type of different type of process control charts are there, what type of

training you give to the actually shop floor person, who are doing that work. So, documentation is the quality system would basically have in details, the policy the procedures, work instructions specifications and the records, which will be maintained in on a time to time basis such that it gives your flow, that how the overall quality assurance system works.

It would also have in details the policies. So, policies would be what is to be done, in case say for example, defect of the type one occurs or say for example, what would you do if say for example, you are manufacturing car, and the car is being painted say for example, there is a dent or there is the quality of the paint is not up to the standard or the shade of the paint, which you want to deliver on to the product, which is the car, which is further on to be developed delivered on to the customer, whether the shade is not proper.

So; obviously, you will basically have a very set policy that what corrective actions you would take basically rectify that. Or say for example, you are manufacturing a fridge or considering a manufacturing washing machine and if the washing machine, the motor is not working properly of the balancing is not proper. So, what are the policies, would you basically dispend the machine and again work it or it basically will be we will scrap it.

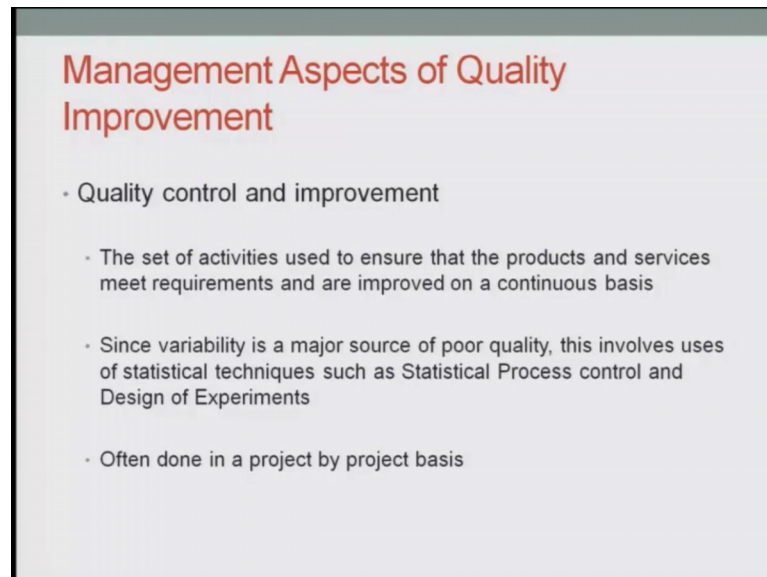
So; obviously, the policies should be very well return noun, such people follow the same thing, wherever they are and basically follow these procedures up to the satisfaction of the customer. Now customer may be as I said it can be both internal and external. So, quality assurance would also have the procedure, the methods and who are the person who are going to work. So, as I have said that the procedures that, what step should come after the first.

So, if say for example, there is a problem in the forging machine. So, what act actual action you would take to basic rectify the product and considering that you are utilizing that that machine to manufacturing some goods. Or say for example, coming to the services industries, if the services whether the doctor or whether the engineer is working to deliver some products and trying to basically make a toll bridge or say for example, a road where there is a toll tax to be paid and the machine which collects the toll.

Considering is an automatic one, is not working properly so; obviously, that there should be a policy that how will basically rectify that. So, work instruction and specification should be given in clear details, such that the work man or the person who is busy in

working on that or the person who is delivering the services or the person who is manufacturing the product, are well aware that in case this divisions in quality occurs what action he or she would take.

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The slide is titled "Management Aspects of Quality Improvement" in red text. It contains three bullet points:

- Quality control and improvement
  - The set of activities used to ensure that the products and services meet requirements and are improved on a continuous basis
  - Since variability is a major source of poor quality, this involves uses of statistical techniques such as Statistical Process control and Design of Experiments
  - Often done in a project by project basis

The next point to be discussed is basically quality control and improvements. So, under that we have 3 points. Which are the set of activities used to ensure that the products and the services meet the requirements standards asset and what are the customer's needs and how they are being met and are improved on a continuous basis such that the customer always sees that, the product which is buying products or the services whatever he or she is buying is basically able to meet the required standards, what he or she wants and in say for example, you get an extra benefit. Except I am not talking about the benefits in terms of perks or benefit in terms of a little extra on goods which you get.

Say for example, the machine which you purchased and say for example, if the machine is able to perform, at a higher environment temperature. Consider you have bought a laptop and considering the overall environment over the atmosphere. What type of dust what type of pollution, what type of heat variations, temperature variations are there? In any tropical country and if the laptop is able to perform beyond that also without basically breaking down, then the customers would definitely feel that whatever they have purchased based on their actual expectation is being made more such; obviously, it

exceeds the expectation, based on the level of services which are being provided by the service provider or the manufacturer to the customer.

Since variability, now whenever I did mentioned about variability which basically we talk in very simple parlance and white noise. This is the effect which is there from the environment on the system. So, consider you are manufacturing again a tie rod in a car or you are manufacturing example a table or a chair as a carpenter or say for example, you are doing giving some services delivering some products or say for example, you are running a school you are giving some education to the students to the society. So, on all this things they would be variability, consider from the point of view of the school maybe the quality of this teachers may be saying for example, the quality of the library services usually provide, maybe the quality of say for example, different about internet services, which you provide to the students. So, all this things would be there as a bottom part of the system.

Consider coming back to the hospital, doctors may be of different caliber, nurses maybe of different calibers. Say for example, you would not may be considering the cost structure; you do not have those type of equipments which are the required. Say for example, for MRI or the concept of says for example, different types of x rays you want to do or different type of bypasses you want to do. So, all this things would basically have an effect, such that there is a huge amount of white noise. So, these white noises are the very variability, which is there in the process are the most major source of poor quality implication for the whole process.

This involves using of statistical package concepts or techniques like if you remember it have been mentioning about now about different type of charts, p charts, x bar charts, r charts. So, all these things are to be utilized to or understand, whether the variability in the process is due to the white noises which you cannot control or they are inherent in the process due to which you have to take some corrective actions. So, these type of statistical techniques, main important being the statistical process control and the design of experiments.

So, in the initial part as you remember this is total quality management. Say for example, part one. So, we will be laying a huge amount of stress on statistical process control and the different charts and later on in total quality management 2, we will have a whole lot

of series of lectures and examples where we will consider, the concept design of experiments and how it is utilized in order to make a basically have a good knowledge about the different type of statistical process control techniques and different type of mathematical statistical methods, which you try to utilize for quality control. So, the and last another point about quality control improvement would be.

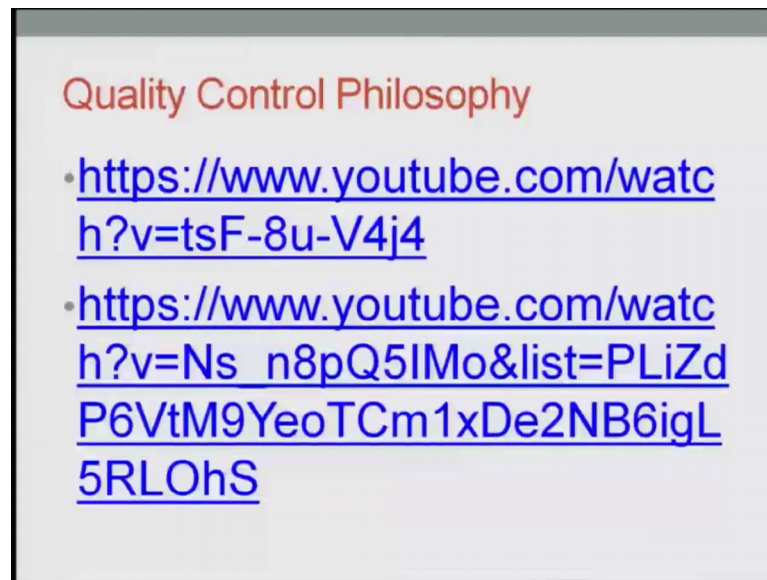
So, they are often done in a project on a project basis. So, what we see the quality as aspect for one, may not be applicable for the other. Say for example, if I am seeing the humidity is a main factor, which can be considered as a white noise in some of the processes. Consider the process being you are trying to basically manufacture a microwave, where the level of effect of humidity is very high. Or say for example, you are trying to basically manufacture an ac or consider you are trying to manufacture a water heater, where the fluctuations of the overall humidity in that place or in that room has a huge amount of effect.

So, maybe humidity may not be applicable, when you are trying to basically design a car. So, all the aspects of the white noise variations which you have obviously, they come from the environment. Now what are the actual implications of the major effects of the white noise would have for one particular product may not be applicable for the other.

But in general we will try to understand, what are the tools which are utilized to understand the effect of white noise in the internal variations and how we pay basically you try to separate them and study them independent of each other may and obviously, it would mean that we are considering a very simplistic notion that the independent structure may not hold for the effects, when you are considering them on a standalone basis, but still try to basically proceed considering the effects in such a way that, we have some very simple statistical method based on which we can study and understand how the process works and how it can be improved considering quality is the main factor on which we are going to lay our stress.

So, these 2 URL which are there in front of you obviously, I am not going to show that, be I would strongly urge the participants strongly urge the students.

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Quality Control Philosophy

- <https://www.youtube.com/watch?v=tsF-8u-V4j4>
- <https://www.youtube.com/watch?v=Nsn8pQ5IMo&list=PLiZdP6VtM9YeoTCm1xDe2NB6igL5RLOhS>

So, these 2 are some very nice videos, on YouTube related to 2 other main pioneers in quality, one was by the name of Juran. I will come to that person, little bit description later on and analysis by the name of Deming. So, and there is a very interesting history that how Deming who was basically from USA, and how the Japanese utilized his help and his concepts in order to basically improve their quality and basically captured the manufacturing market in USA. That is a history that has a whole lot of historical perspective.

But I just thought, I will show you or give you the URL of these two very interesting videos and I would strongly urge that, people if they have time I can go into the details of these videos of Deming and Juran. That will give you a very good concept that, what is the concept of quality and how physics conceptually quality has been ingrained, into the whole overall system of many of the firms or many of the or the manufacturing the service sector industries, based on what actually quality means for them. This is a very general video.

So, as I said I will try to basically discuss or mentioned, the names of few important persons, who have been pioneers in the area of total quality management and their contributions have been such that they are really considered the pioneer for the figures, in this area of quality management or quality.




So, the quality philosophy and management strategies of W Edwards Deming, were basically they were based on 14 points.

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**Quality Philosophy and Management Strategies - W. Edwards Deming**

- 14 point frame work for quality and productivity improvement

1. Create a constancy of purpose focused on the improvement of products and services
2. Adopt a new philosophy that recognizes we are in a different economic era.
3. Do not rely on mass inspection to "control" quality
4. Do not award business to suppliers on the basis of price alone, but also consider quality
5. Focus on continuous improvement



For source of image see reference

So, I will. So, go to them very briefly, try to give your philosophical feel that what deeming meant by this 14 points of quality. Based on which I can analyze a whole situation whether manufacturing, whether services, whatever it what are the equality implications for those services and the products.

So, the first point is creating a Constance, constancy of purpose focused on the improvement of the products and the services. So obviously you are all, you mean you as a main a service provider, you as the main person who is basically manufacturing this product. You may be a CEO, you maybe say for example, shop floor manager you may be the general manager production planning and control, you may be the general manager, HR you maybe a housewife. If you try to basically analyze the quality of the services, which you give to your family member, it may be say for example, the pizza delivery boy, it can be the barber. It can be the person, who delivers the milk. It can be the newspaper vendor, whoever it is it can be the doctor, the dentist and all these things.

So obviously, have a purpose based on which you will always focus that how you want to basically improve your quality. Now say for example, if I am teaching and I am basically one of the vendors or possibly basically the service providers to you as a customer, who are the student. So, I was; obviously, I will always think that yes I am

trying to basically deliver this lectures in the slide format. Is there any way that I can improve this type of program, which I am going to deliver to the students? Yes it may be possible, that I basically give some animations, give some videos, bring different type of discussions in into this program.

So, those may be different type of ways, where I am always trying to improve myself to give the best level of quality, best level of competent for the products and the services, which I am trying to deliver. Second would be as per deeming adopt a new philosophy, that recognizes that we are in a different economic area. So, as we know the economics of the overall world of the industrial, after the industrial organization. After the way things start in improving, when technology came computers came and see how the how the development and computers of robots, of chips design for computers, for different technology we are improving rapidly almost exponentially.

So obviously, think that the products you are going to deliver or the service we are going to deliver would be in a different paradigm. Consider the again coming back to the example, which I stated for myself. If I were a are a teacher in any of the school or the colleges whether in India or abroad my main mode of communication with the students would be the notes or maximum would be the green board which you see behind me, but nowadays with admin computers with invented internet; obviously, I can think that in the first step, rather than the blackboard I can use the PPT slides.

Later on it maybe say for example, I may be able to deliver the lectures, which I am doing now through the video conferencing facilities. And consider on the other hand coming not on the delivering the lectures. Consider that I was basically able to conduct exam examination by paper and pencil or paper and pen concept.

Maybe say for example, if you see nowadays the examinations, are also conducted through online mode. By going sitting in the front of the computer taking on the answers and then you take the examination. Another can be say for example, as a teacher I may be more interested to conduct the examination online mode. So, rather than on a computer I can basically develop an app, use that app and tell the students to download that based on the downloading part, which they have done I can basically give my quizzes accordingly. So, there can be different modes, of how I delivered the lectures conduct the classes and always trying to improve or improvise that, how you can

basically improve the level of quality of the level of services which I am trying to give to my customers. Do not rely on mass inspection to control quality.

So, many are doing the control quality and that this person deeming, when he is talking about the concepts of quality, mainly the focus was on manufacturing sector. Hence the third point mentions that do not do the mass inspection of all the products because that would basically take a huge amount of time and the cost implication would be astronomical. So obviously, you cannot pick and choose and basically do the qualities check for each and every product. So obviously, you need to have a good sampling plan. The word sampling plan means that, you want to basically becomes a small sample from the overall population, analyze the sample in such a way and also have a have an indication, the sample which you have picked up is actually a overall characteristics of the sample, would be basically be the reflection of the what the population is.

So, consider this even though, that may not give you a very actual idea. Considered I am in a very big city, consider it is in North India. It is the luck now or Kanpur, it is Allahabad or it in East India it can be, Calcutta. In the south it can be Chennai Madurai or in the western it can be Bombay Gandhinagar whatever it is. My main aim is to basically, consider that what is the overall average salary or disposable income of the people who are residing in the city.

But obviously, the city would have different quarters, means different municipal localities where very rich people live where basically people who earn on average salary. and they would be definitely be some areas in the city, where not very that affluent people live. So, there are poor, now if I am trying to find out the average salary. And obviously, it does not mean behave on me. That I only pickups a chunk or the sample of the whole population from only part one of the city and do my analysis.

So, say for example, if I pick up all my observations of the sample from the quarter of the city or the area of the city where all the rich people live; obviously, my overall information which I try to get from the sample would not be the best reflection of the population. Similarly if I do it from the lowest start of the society considering in the economic background, they are very poor; if I pick up that observation from that area and then try to basically draw some inference about the. Inference means try to basically

judge, how the population characteristics are and say that the average salary or disposable income of this city is very low then obviously, that is also know right.

So, I have to basically design my overall picking up the concept of sample, in such a way that it gives me the best information about the population or the best proxy of the population is there in the sample that is such that, I get all the characteristics of the population from the sample by itself. So, with the third point means that do not delay rely on the overall inspection, but basically have a very scientific judicious plan. Do not avoid businesses to suppliers on the base of price alone, but also consider quality.

So, if you are trying to basically buy furniture, consider you want to basically buy some cloth, consider you are going to basically gave a tender to build up of a plant or you want to basically if I give a tender for a painting of your house. So, considering the fact that money is very important to you which will obviously considered, but also try to find out that what is the overall level of quality, which you can get from that particular service provider or the manufacturer. Consider the point of view of trying to buy a car, there are I mean different cars in industry. They would be Hyundai, they would be Tata motors, they would be Mahindra. Whether, I am talking about cars or the LC VCs in a very in general notion, they would be Volkswagen; they would be Toyota so and so far.

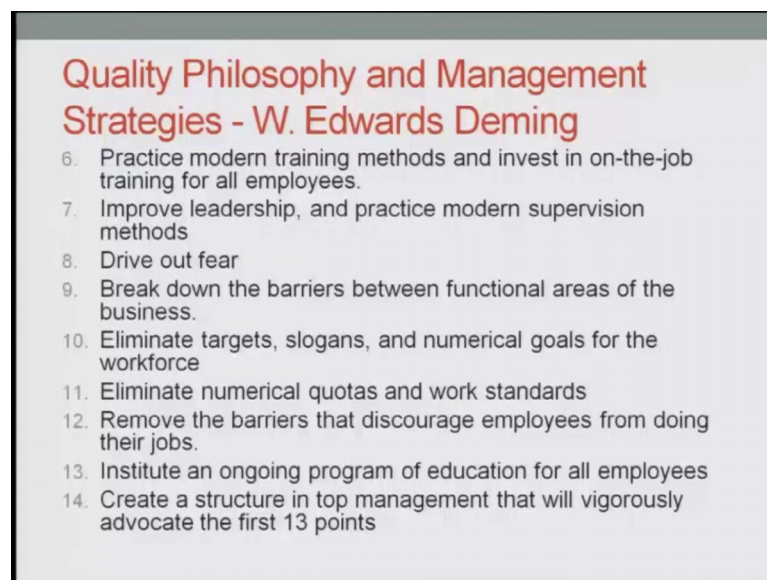
Now obviously, the cars prices are different, whether they are petrol or diesel that is the different question, but they would be different mileages would be different. But obviously, when I am trying to buy a car cost perspective, would not be the main driving factor. I will try to look that what is the overall maintenance of the car, what is the over mileage, the car guages per liter of diesel per liter of a petrol. Then, I am basically try to find out what are the safety features of that car, I will also considered that what is the overall the services the car industries able to give it to me. Then I will also consider that what is the level of say for example, boot space which I have to basically keep my luggage it maybe also that what is the basically overall number of persons who can sit in the car.

So, I will consider all these things in such a way that, over and above the price and also able to basically considered this services which are integral part of the overall product which I am going to buy, such that I am able to balance them properly. Always focus on continuous improvement. So, you always thinking that how you can improve the

product, how you can input the services, how you can improve the level of services you are going to provide for the product of the service.

So, keep improvising, keep improving such a way that the customer who is the other person, who will get your services, who will get your products would always be in such a position that, he or she would get this product; get those services before they could ever think of, The 6 point means practice modern training methods, train your employees train your personal and invest on the job training for an employee. Such that able to utilize that, those training in such a way such that the benefits with which they are able to give the overall process of manufacturing a services, actually goes into when the product is delivered.

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**Quality Philosophy and Management Strategies - W. Edwards Deming**

6. Practice modern training methods and invest in on-the-job training for all employees.
7. Improve leadership, and practice modern supervision methods
8. Drive out fear
9. Break down the barriers between functional areas of the business.
10. Eliminate targets, slogans, and numerical goals for the workforce
11. Eliminate numerical quotas and work standards
12. Remove the barriers that discourage employees from doing their jobs.
13. Institute an ongoing program of education for all employees
14. Create a structure in top management that will vigorously advocate the first 13 points

Improve leaderships and practice modern supervision methods. So, the main person who is there in the shop floor is able to basically train or able to inculcate the overall concepts. What he or she has learned onto his or her employees, in such a way or the subordinates in such a way that, they also ingrain or inculcate into them the concepts of quality and continuous improvement in the process on the products; drive out the fear.

So, the drive out fear means that, people should be able to understand that quality improvement is must quality improvement is an essential part of any process or services. Hence, people should be able to improvise in the positive sense that that overall concept of quality which is to be brought in the overall products scenario, should be there, in the

system in such a way, should be there in that human being who is doing the work in such a way that, he is able to utilize the extra learn the knowledge in such a way that the quality may be improved.

So, say for example, if as a worker I am able to design a new jigs and fixtures. But I know internally in my mind that the using this jigs and fixtures the overall quality of the product which we will improve. But if I am afraid to use that that should not be the case, where the actual management and the person who is basically manning all those staffs, all those employees, all those subordinates should be there in such a way that he or she we should encourage that these experiments, should be done in such a way that the quality level should improve.

Break down the various between functional areas of business. So, any improvement which is happening on the shop floor 1, that information should be there in shop floor 2 such that people would be able to interact with each other and utilize the concept of learning of trying to improve the quality and this permeability should be such that the information flow the knowledge flow should be such that, people would be there to inculcate these ideas utilize that in order to improve their overall quality for the products and the services; element target slogans and numerical goes for the workshop.

So obviously, do not say that we have to produce 100 units of these machines or we have to basically deliver 2000 number of say for example sauce bottles. So, emphasize on the fact that the quality has to be improved and once obviously, it would definitely mean that in the initial time whatever the time frame is maybe month's maybe day's maybe week's maybe years. The overall effect of productivity may be affected because people more became more stringent, become more careful try to basically we take more number of time or number of hours to work on that.

Obviously that would have an so called initial negative effect on the numbers of the products which we are going to manufacture or deliver. But as those slogans or numbers slogans of numerical goals are removed and the concept of quality brought in the picture you will see that, and it is generally seen that in the long run the overall implication is much more positives where once the base of quality is definitely improved, then automatically the overall production and numbers also increases.

Eliminate numerical quotas and work standards, remove the barriers that discourage employees from doing the jobs. So, this is something to do with the tenth and the eleventh point where people are restricted considering the actual quality, is not to be taken care when numbers is to be taken care. That basically puts the hinterlands on the on the employees or the subordinates who are working under you. Institute an ongoing program for education, such that you look at on the new statistical tools, educate about the different type of machines, which are coming advocate on the different type of raw materials you are trying to purchase. Such that they are able to learn and improvise on their overall process, under the supervision of say for example, the plant manager who ever it is.

Create structure in top management; obviously, this information should be coming up from the top management. So, they should also be inculcated in this idea. So, if the overall thought processes from the top managements are the positive, it will definitely populate down the line.

So, with this I will end this forth lecture and strongly urge the students basically to studying in a very philosophical terms. The concept or deeming and jurans, such then you understand what is the actually implication of quality, which you have been talking about in the last 4 lectures have a nice day.

Thank you.