Advanced Green Manufacturing Systems
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Lecture - 17
Green Quality Function Deployment - Part 1

Good morning. Welcome back to the course. In this lecture we will discuss Green Quality Function Deployment. What is Quality Function Deployment? Customers has some needs, they has certain voices, those voices are to be translated into the productions or the managers or the production managers requirement. So, quality function deployment is a technique that translates the customers voices to the manufacturers specifications or is happened will see will discuss green QFD.

How can we translate the green or ecological requirements so, the voices of the customer to the manufacturers specifications? So, QFD is a structured approach that defines the customer needs or requirements and translate them into specific plans. It helps to produce products to meet the requirements those customers has set.

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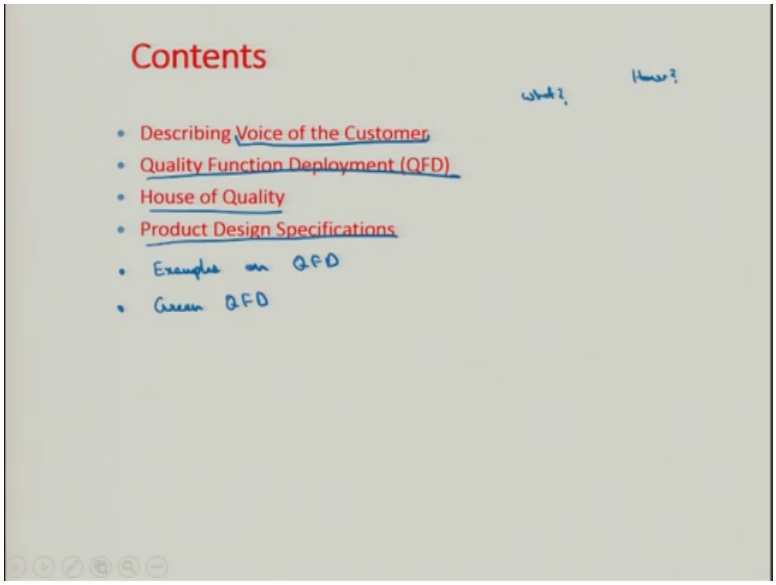

So, we have a term known as Voice of Customer which I will take first in the contents. Voice of customers is term to describe these stated and unstated customer need or

requirements. The voice of customer is captured in variety of ways; direct discussions, interviews or there certain kinds of data I will discuss primary or secondary data, the data that is already available that is secondary data from the catalogues, from feedback forms, all those things. So, the secondary data is which are already available.

Primary data is the one that is generated. We conduct interviews, we ask them to fill questionnaires. Those things we will discuss; so, voice of customer is transmitted to the manufacturers requirement. The first thing is to identify what is the voice of the customer, what does the customer need and how we will meet that? What does customer need and how we will meet that these are the going through questions. Next is QFD will discus, we will discuss what is house of quality. House of quality is one of the major techniques to employ QFD. Then we will discuss product design specifications, then I will show you some examples on QFD, then will see green QFD.

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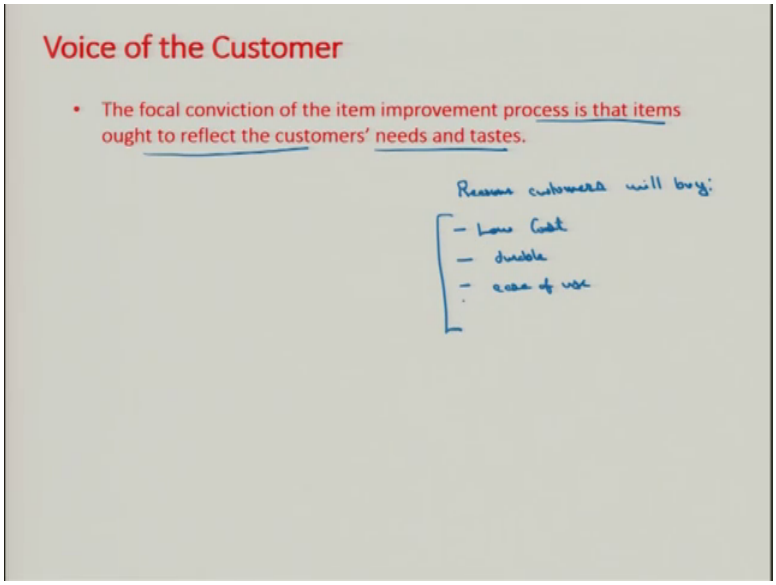

Voice of customer - the focal conviction of the item improvement process is that items ought to reflect the customer's needs and tastes. Stand out among the most critical parts of the product development cycle at this point is to comprehend or to find out the gain from the customer.

The reasons the customer would purchase your product are multiple. They would like to have product at simple, utilize product that is giving a good performance that is having a great quality, low cost products, those are green. So, the certain reasons for which the

customer would buy the product reasons customers will buy your product, low cost whatever the perception is with the customer in that low cost has to be there, the product has to be durable, then ease of use. These are the product characteristics which are discussed when I discuss the product characteristics.

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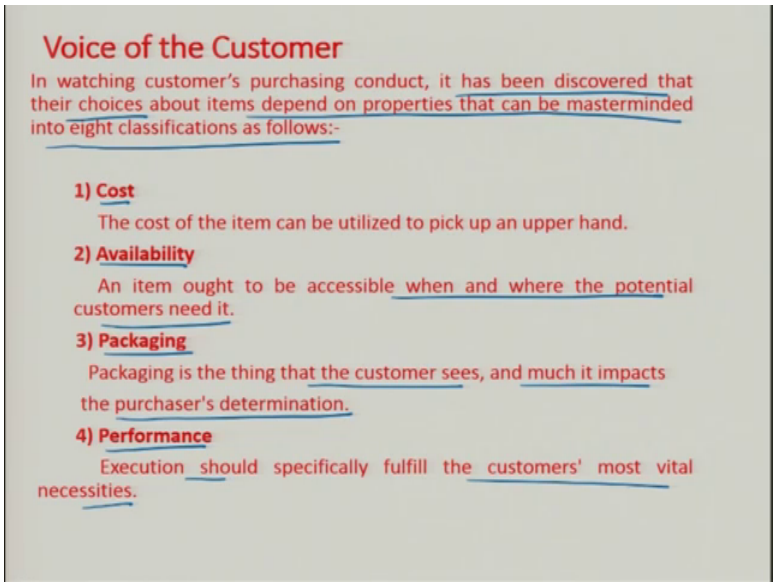

So, what is voice of customer telling us here? In watching the customer's purchasing conduct, it has been discovered that the choice is about items depend on properties that can be masterminded into 8 classifications as follows. Number 1 is cost number, 2 is availability, packaging, performance.

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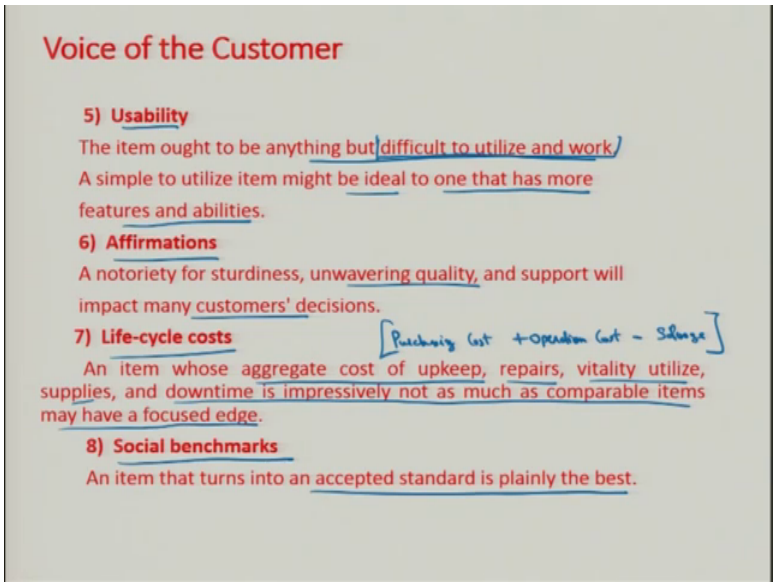

Then usability, affirmations, life cycle cost, and social benchmarks cost. The cost of the item can be utilized to pick up an upper hand. The cost is a first question the customer will ask could afford this item that is the question, that he will ask availability. Is it available locally or do I have to get it from some global market or can I just cover it, that is the availability and item ought to be accessible when and where the potential customers need it.

Packaging- packaging is the thing that the customers sees and much it impacts the purchasers determination. So, does the packaging look appealing, this is the question that customer might ask himself. Performance execution should specifically fulfill the customers most vital necessities. So, performance is can I do what I expect from this product? I will discuss Kano's model there certain exporters exciters those things are there we will just come to that. Usability: the item ought to be anything, but difficult to utilize and work. It can be anything, but difficult to utilize and work item is not desirable. Simple to utilize item might be ideal to one that has ore features and abilities. So, the question here that can be asked is do I know how to utilize the item, what is the ease of operation, how easy is the item to use, what is the human comfort involved in it, all those questions.

Affirmations- a notoriety for sturdiness, unwavering quality and support will impact many customers decisions. Affirmations is the durability, will it last, how long would it

last. Life cycle costs- life cycle costs an item whose aggregate cost of upkeep repairs vitality, utilize supplies and downtime is impressively not as much as comparable items may have a focused edge that is the lifecycle cost. Lifecycle cost is that total cost, the purchasing cost plus operation cost minus salvage cost.

We will discuss lifecycle cost, a lifecycle assessment in detail because lifecycle impact analysis has to be discussed when will discuss design for environment in the coming sessions. So, lifecycle cost and assessment would be discussed there, but some introduction to a lifecycle assessment would be given in this lecture as well because we need to see what is lifecycle assessment and how is our green QFD made from the lifecycle assessment ratings.

So, next is social benchmarks: an item that turns into an accepted standard is plainly the best, social benchmarks is what do other considers about the item, what does other people think about the item, what is the social or the regular perception about the item or of the product that are that we are going to purchase. So, those are also the factors which affect the voice of customer.

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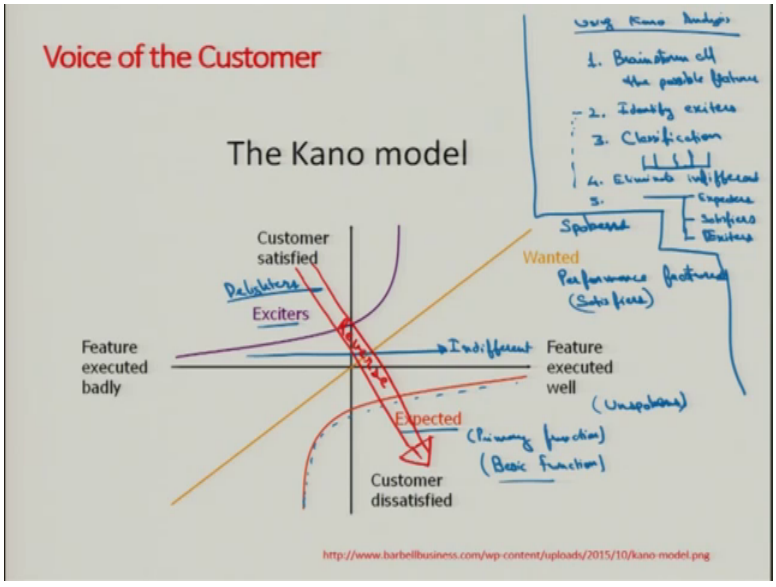

Now, voice of customer this is the Kano model. In Kano model we have these kinds of customers. These are right about the features which are expected. This is something that we call the primary function or the basic function.

You call it primary basic function in value engineering. Customer would not say I would, but a pen that as to write, the numerical comparison charts which are got filled from respondents I told them that record data is the primary function; I made them to understand what is the function. In general if you ask someone they will say what kind of pen. If I ask let me if I ask my friend what kind of pen you would like to purchase, he would not say I would like to purchase a pen that would write. He would say I would like to purchase a pen that is a fountain pen, that is a pen in blue color, those things could come.

This is something unspoken or expected a pen as to write, a chair is something that has to support a normal body weight 100 kgs weight, a bike is something that has to run in two wheels. So, these are expected items, expecters we could say it.

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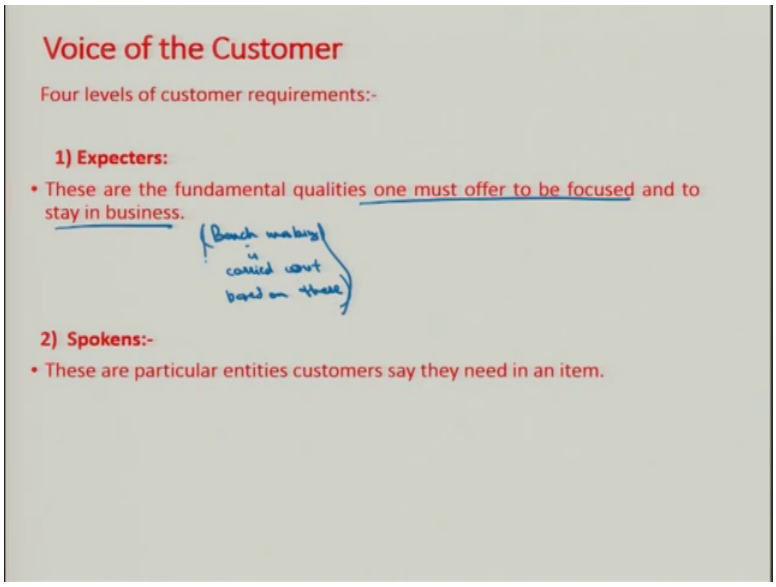

So, these are the fundamental qualities. What are expecters? These are the fundamental qualities one must offer to be focused and to stay in business. So, these are the qualities the customers accept as a piece of the item or administration that is they expect them as a standard quality, but not as an add on. Expecters are trades that are every now and again simple to quantify and in this manner I utilize part of benchmarking.

Expecters are utilized as a part of benchmarking. Benchmarking is carried out based on these generally these expecters are unspoken; if you do not speak about this, but just expect this thing the something known as spokens. These are the items which a customer

say that they need this thing, these are particular entities customer say that they need in an item, these are the things which an organization would give as they speak to the parts or the item that characterize it for the customers.

So, these are also known as satisfiers or the performance features I can put it here. These are performance features or satisfiers. So, this satisfiers are not absolute in necessary, but result in satisfaction if they are fulfilled and dissatisfaction when they are not fulfilled. The more you provide this features, the more the customer satisfy the organizations, prioritize their efforts and put their strategies using these performance attributes as well for instance more efficient the service, more the customer will appreciate it, then more promptly we get the response to an after self-service, more we would be delighted, no would be no more would be inclined towards the purchase of the product ok. More than the spokens are exciters. Exciters are something that delight the customers.

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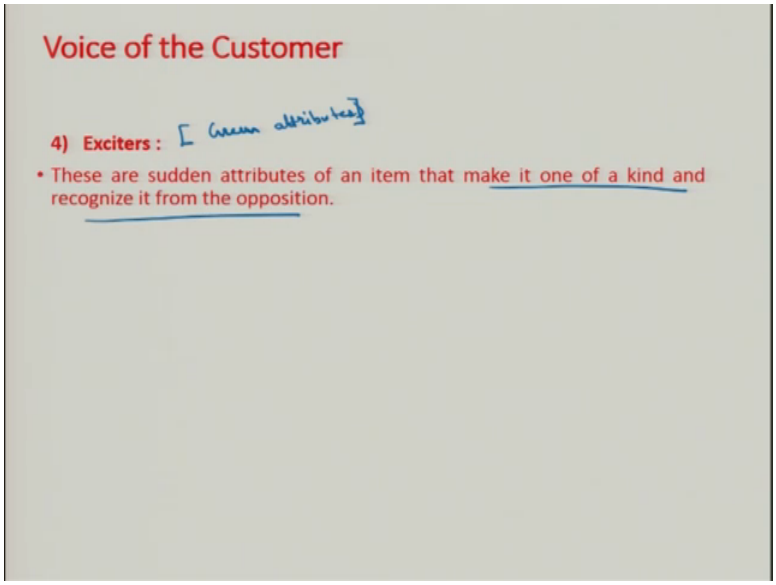

These are delighters. These are sudden attributes of an item that make it one of a kind and recognize it from the opposition that is something unique in the item. Those are exciters. So, an exciter additionally alluded as a delighter as I said a light of the fact that it characterizes item properties that are lovely shocks to the customers. Customer would say wow what a thing. So, these exciters what we expect that green attributes can be involved while the customers are using they can be made to understand that they use this product and they are also contributing to the environment. So, these can also be the

exciters in this way that is what we are going to talk in Green Quality Function Deployment here.

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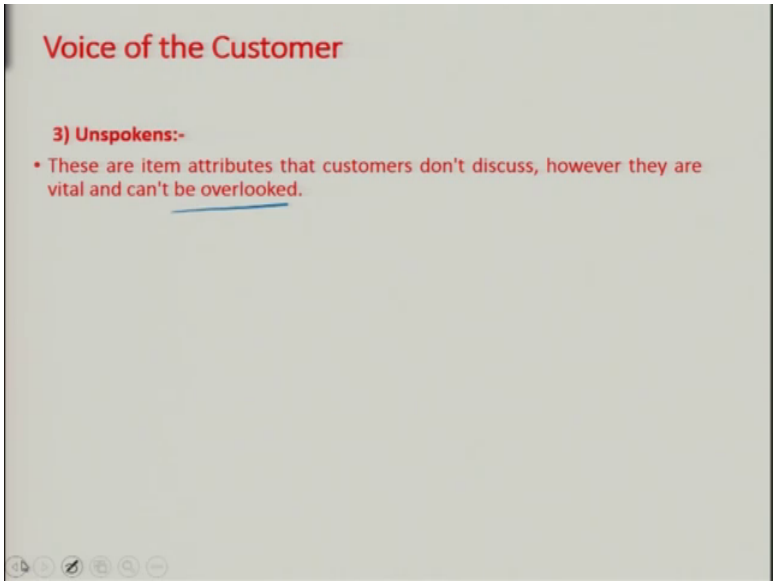

Next are unspoken: these are attributes that the customers do not discuss, however they are vital and cannot be overlooked. It is the product development groups business to find what are the unspokens. So, this product development manager should make utilization of market studies, customer meetings and should conceptualize that what are the unspokens which customers expect. Now how do the production manager or the people who decide about the design of the product use this Kano model?

The certain steps that they could follow number 1, they brainstorm all the possible features, brainstorm all the possible features using I would say Kano analysis. Once all the features are gathered, then brainstorm everything that can excite the customers, identify exciters.

Then we can use the Kano model to classify all the features as basi,c satisfied, delighter may be indifferent. These are something which are indifferent, it does not make any difference indifferent and is one more thing reverse. If customers expect something they expect the product to delight themselves, but the company is not able to do that, this acts as a reverse. So, this is reverse ok. Now, they put the features in the bins. The step is they put the features in the bins classification ok. These are the bins, they put ok, these are excites, these are satisfies, these are the primary function or expected one or unspokes.

Now, as we did in value engineering, we said that they can eliminate the unnecessary function. Similarly we can cut out the indifferent features.

Fourth is eliminate indifferent right. Now, we can make sure that the product has appropriate basic features. Select the right performance features, so that the product or we can be delivered at a specific price which a customer is willing to pay. Then think how one can build some of the delighters into the product. So, next we can work in these steps, we can work with expecters, then we can think of satisfies, then exciters which we have identified in step 2. Those come here we put the exciters here. So, this is Kano model.

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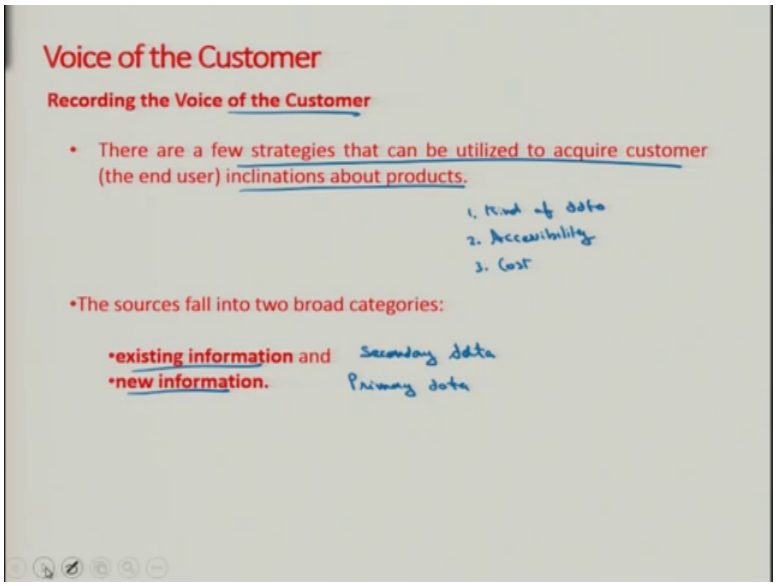

How voice of customer is seen? Now regarding the voice of the customer there are few strategies that can be utilized to acquire the customer inclinations about the product, that is the collection of data, collection of data or I can say identifying which strategy is to be utilized to see what customer wants. So, a strategy that is to be utilized depends upon the sum and the sort of data required, accessibility of the data, the cost designated to gather the information.

So, information can be existing information or new information. Existing information is known as secondary data; new information is known as primary data. The 3 factors I can put here the kind of data next is accessibility, next is cost. These are factors on which the machine is gathered.

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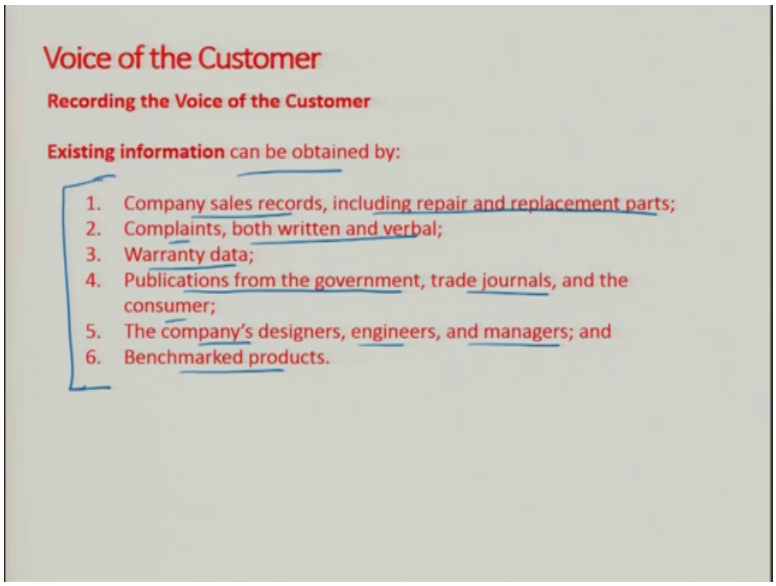

Now, existing information can be obtained from the company sales record including repair and replacement parts, complaints both written and verbal, warranty, data publications from the government, trade journals and the consumer, the companies designers, engineers and managers and benchmarked products. So, these are all the secondary information which is already there. We just need to clean the data, next extract the required information and try to develop some knowledge out of that we can use to provide the better product to the customer.

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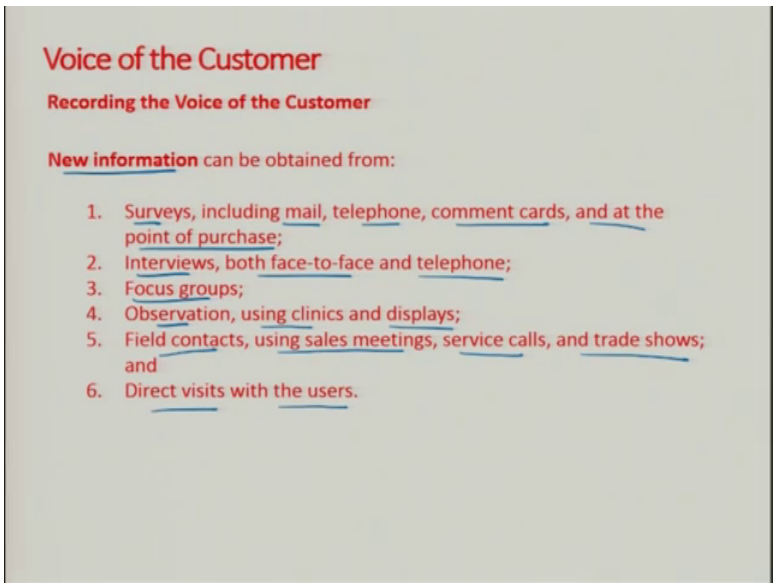

Next is new information; new information can be gathered using surveys. Surveys can be done using mail, telephone, comment, cards and at the point of purchase then interviews, both face to face and telephonic, focus groups, focus groups of the people who just talk about one product or one feature of the product. And observation that is using clinics and displays using conducting experiments and watching the responses, then feel contacts using sales meetings, service calls and trade shows, direct visits with the users. So, these are the ways, some of the ways which can be used to collect the new information that is primary information source.

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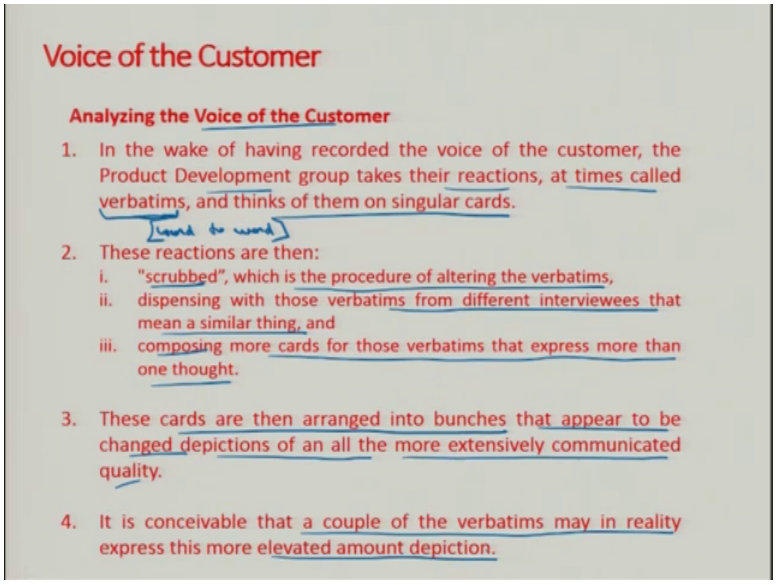

Next is analyzing the voice of the customer. In the wake of having recorded the voice of the customer, the product development group takes their reactions at times called verbatims and think of them as singular cards. Now what is what are verbatims here. We distribute the cards to the customers and we ask them to out their perception or their feedback regarding the use of the product. Sometime that happens the certain words which are similar in that verbatim, verbatim is word to word.

So, these reactions are then scrubbed which is the procedure of altering the verbatim, sometimes they are certain words that can mean the same thing. Customer says I am happy he can say I am delighted, he can say I have enjoyed. So, these words means these happy ok, then he can say the pen is affordable, the pen is low cost, pen is cheap in cost. That means, the pen is low cost. So, those words can be gathered.

Then dispensing with these verbatims from different interviews that mean a similar thing, then composing more cards for those verbatims that express more than one thought. These cards are then arranged into bunches that appear to be changed depictions of an all the more extensively communicated quality. It is conceivable that a couple of verbatims may in reality express this more elevated amount depiction. So, then these cards are grouped so as to find out what is the customer wanting.

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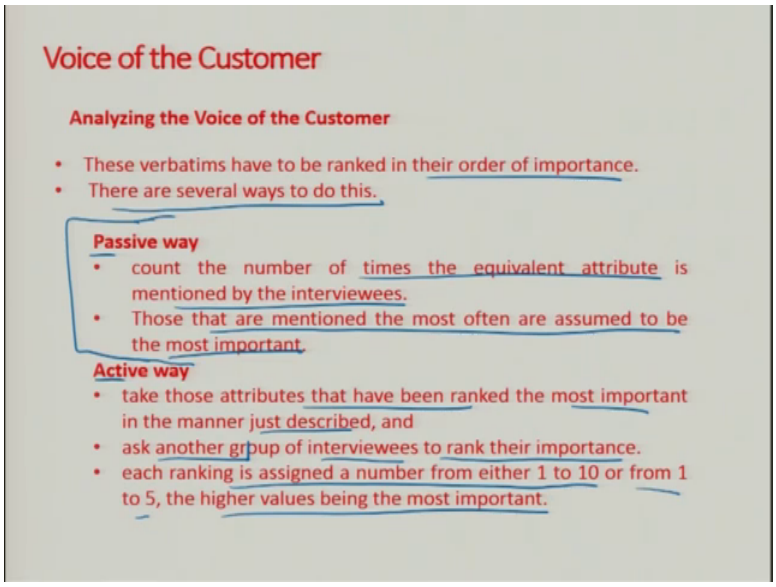

So these verbatims have to be ranked in their order of importance. There are several ways to do this, a passive way and an active way.

Passive way is with we count the number of times the equivalent attribute is mentioned by interviewees. Those that are mentioned the most often are assumed to be the most important this is the passive way ok. This is the count; maximum number of count means more important active way is take those attributes that have been ranked the most important in the manner just described. Ask another group of interviewees to rank their importance, each ranking is assigned a number from either 1 to 10 or from 1 to 5 higher value is being the most important.

Now what happens we are collecting the data in the first phase and we are confirming that the data or data verification happens in the second phase. That is an active way. Passive way is we collect the data in the first phase, then we count the number whatever the requirement is set by the customer maximum number of times that is ranked 1 and

similarly if we rank it 1 2 3 4 and so on. We compare them with the importance ratings as well.

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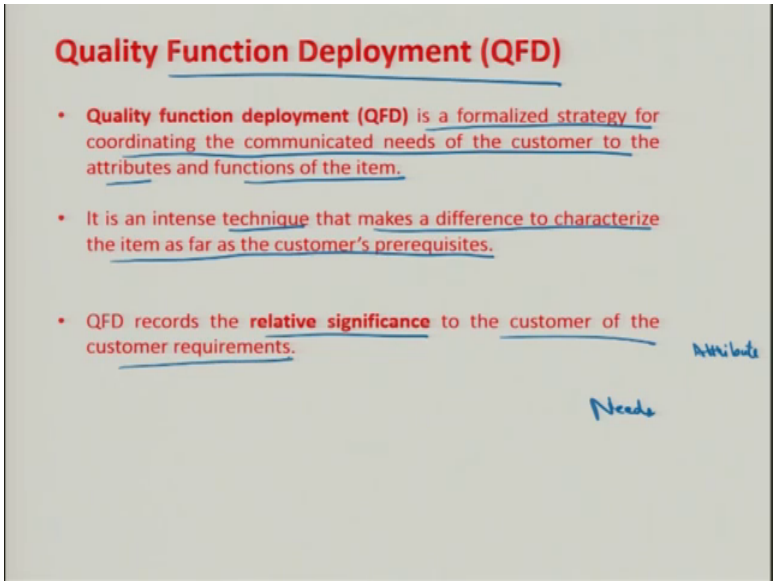

This we will see in QFD. What is QFD? Quality Function Deployment; Quality Function Deployment is the formalized strategy for coordinating the communicated needs of the customer to the attributes and functions of an item. We have customer needs, we have attributes of item, we need to find out what are the attributes we need to work on. So, this is something similar to that we have seen in decision matrix in value engineering, in Value Engineering Analysis.

So, it is an intense technique that makes a difference to characterize the item as far as the customers prerequisites. QFD records, the relative significance to the customer of the customer requirements.

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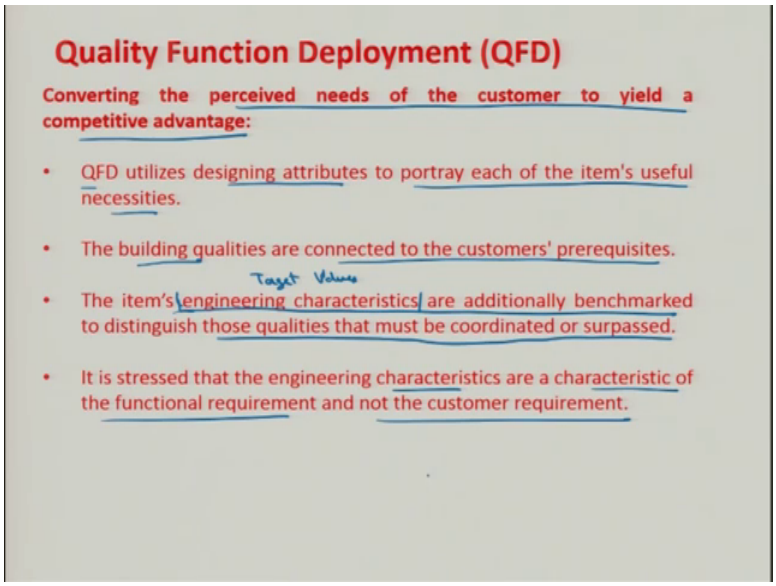

Quality Function Deployment is converting the perceived needs of the customer to yield a competitive advantage. QFD utilizes designing attributes to portray each of the item's useful necessities, it helps in building qualities, those are connected to the customer prerequisites. The items engineering characteristics are additionally benchmarked to distinguish those qualities that must be coordinated or surpassed, this is known as this engineering characteristics I will put it these are known as Target Values. It is stressed that the engineering characteristics are the characteristics of the functional requirement and not the customer requirement.

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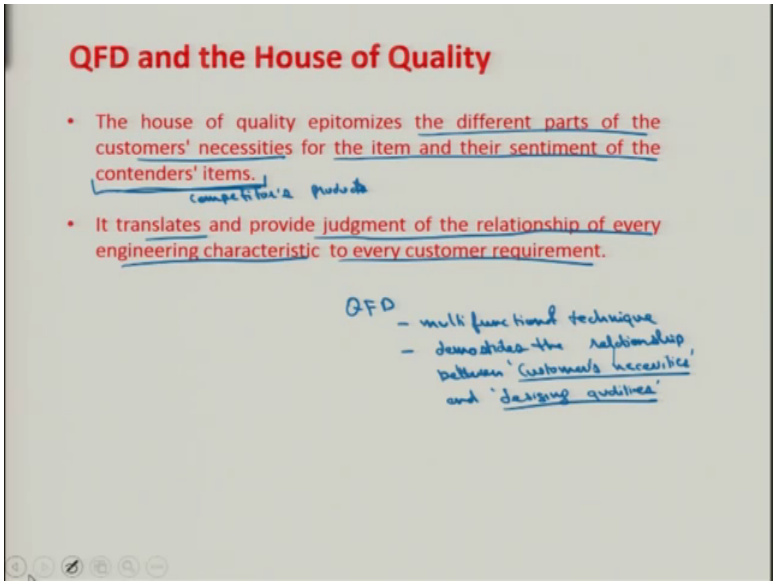

The engineering characteristic I will just show you an example of QFD and will see how QFD is constructed.

I will show you the target value is here, the house of quality epitomizes the different parts of the customer necessities for the item and their sentiment of the contenders items. So, this is the competitors products. Those are also taken into account when we discuss QFD because what is customer expectance from the competitors product and would they really purchase our product to what extent are they willing to do that.

It translates and provide the judgment of the relationship of every engineering characteristic to every customer requirement, this is QFD. Now, QFD in a nutshell I can say QFD is a multi functional technique ok. Second is it demonstrates the relationship between the customer necessities and designing qualities between customers necessities and designing qualities. By qualities I mean designing features. So, this relation is developed, this is QFD.

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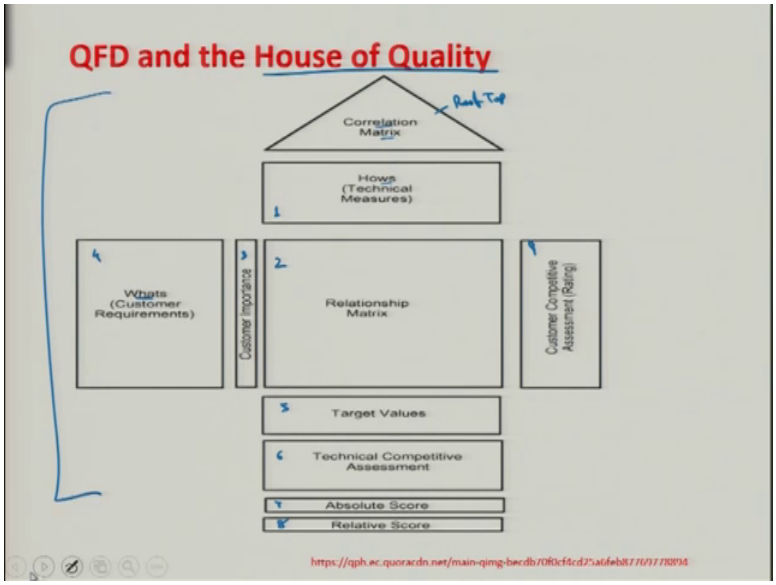

Now, what is QFD matrix? This is the house of quality. It has certain room here. This is room 1. I would say room 2 3 4 5 6 7 8 and 9 there are 9 rooms in this house and this is roof top. What has his room, what are customer requirements, importance, ratings correlation matrix, what are the house and relationship matrix?

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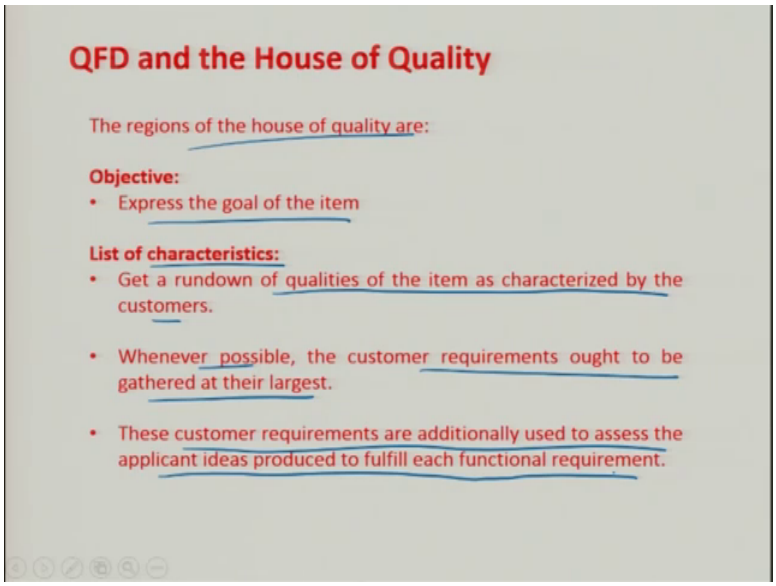

I have the discussions on this various regions of house of quality, ok. Let me first take the example. I think I will go in that way.

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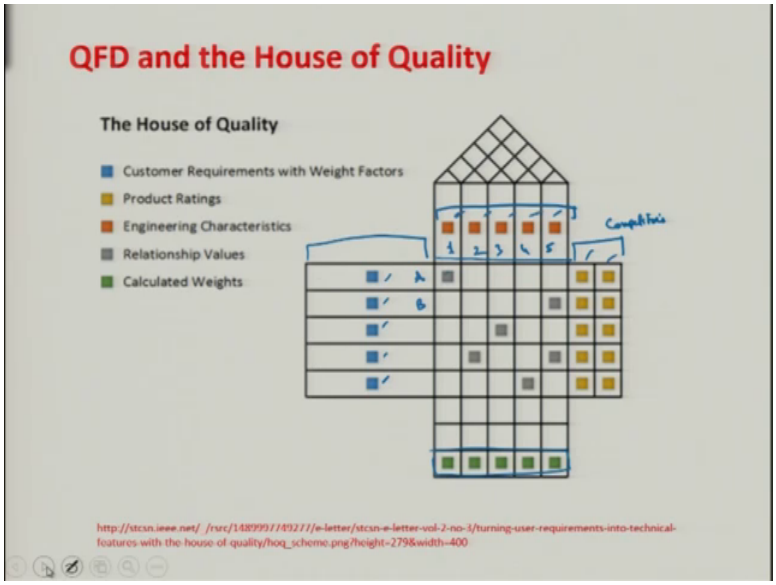

The major features in house of quality are we have customer requirements with weight factors in this room which can have certain subsections. We have the engineering characteristics here, this is customer rating. Again I am telling customer rating is how do customer rate the importance of the functions that they need and this is engineering characteristics at what is there, what can make the product to come into the real world.

This is in grey color we have relationship values. How is this requirement requirement related to the engineering characteristic 1, how is requirement B related to the engineering characteristic 1 2 3 4 5. So, this account to the functional development worksheet that we saw will see how is this different and why is this detailed version of what we saw in value Engineering. Now product ratings are here. Product ratings are the customer rating or the competitors ratings, then we have the calculated weights which are the important ratings into the ratings that we have here. Now, let me come to an example, then will discuss the QFD in detail.

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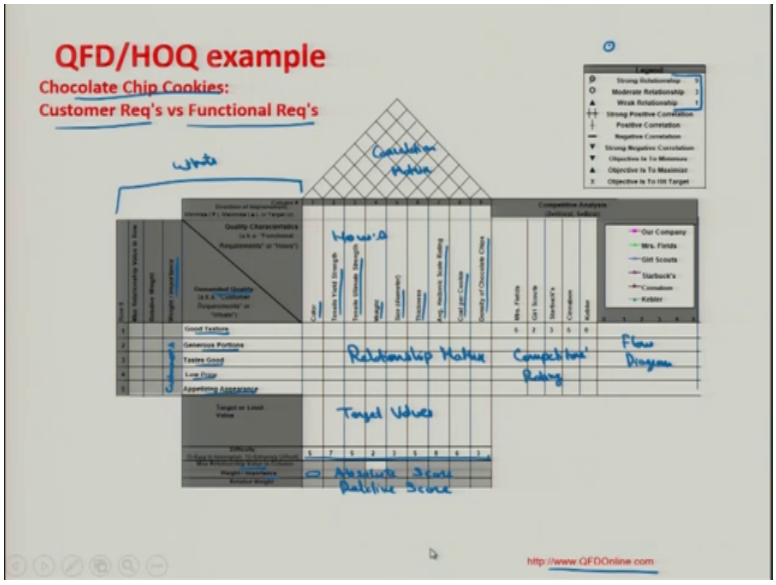

So, this is an example which are picked from the QFD online website in which they wanted to develop the chocolate chip cookies. The customer requirement and functional requirements are compared with each other. The customer demanded quality is here, customer demanded good texture in the cookies, generous portion, good taste, low price and appetizing appearance these are the customer requirements.

Those are taken and the functional requirements can be the color that has to be given to the biscuit or the cookies the tensile east ends because biscuits are to be tested and we need to see that are they crispy or not. So, that tensile strength is an engineering characteristic here. Then tensile ultimate strength of a yield strength, what is ultimate strength. Then weight of the biscuit, then size, thickness, average hedonics scale rating,

cost per cookie, density of the chocolate chips which are dispersed in the cookie to add to the taste.

Now, this density and taste, good taste should have a close relationship. Now, the relationships are given in this way. If you remember we gave the rating from 1 to 3 in case of Paired Comparison method as minor medium and major importance difference in importance. So, in this case they have given this relationship.

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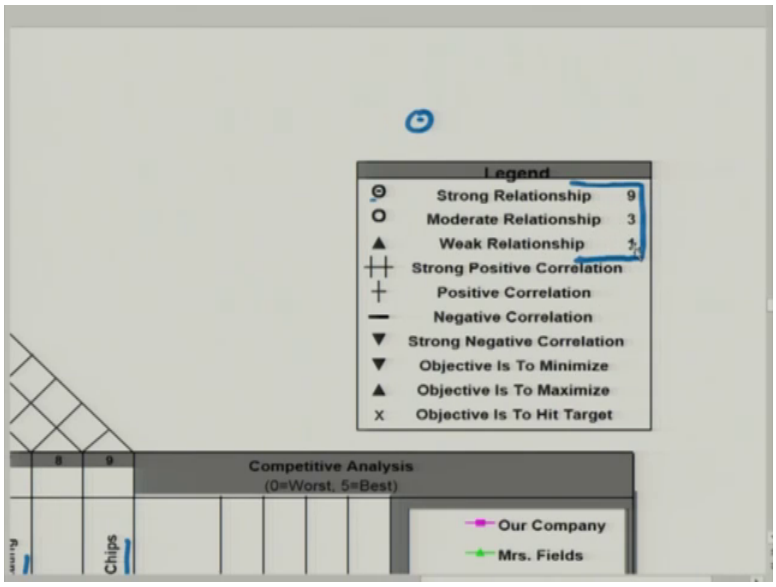

Strong relationship is here, then strong relationship means 9, then moderate relationship is 3, weak relationship is 1. This is what will put in relationship matrix, where is relationship matrix this is our relationship matrix this matrix, ok. Now, the other ratings, other comparisons we have this correlation matrix. What is correlation matrix? Correlation matrix demonstrates the level of communication among the items building qualities.

These building qualities which are color tensile, strength tensile ultimate and yield strength they should have a strong correlation weight. Are they correlated to each other or not, those are identified here. This is this roof top of the house is the correlation matrix. For this correlation matrix we have these notations here. Double plus is strong positive, single plus is positive correlation, negative is minus is negative correlation and downward arrow is strong negative correlation.

Also we have objectives will put objectives. What is the objective in this specific function? What are we going to do with this function? Are we going to improve the color, are we going to enhance it and tensile strength or decrease it, we need to see. Objective is to minimize to maximize and hit target, what are target values will put it here. So, these are the competitors Mister Fields, Girls Scouts, these are competitors. Now let us start putting data in this matrix in this house of quality. So, now we have this house; in this house of quality, we have certain rooms. This room is what customer demands. This is the room for what is what are the customer demands. So, this is our correlation matrix, ok. These are house, how would we have good texture, these are house and here we have the importance rating. Customers importance it is written here and this is our relationship matrix, these are the competitors ratings.

This is the flow diagram for the competitors rating. What is left, we have target or limit. Now color. What has to be the color, what has to tensile state as I said the requirements have to be the engineering characteristics ok. The target value have to be an engineering characteristics here as I said here. So, these are the target values; after target values we have technical competitive assessment here. If target value is this difficult, this data is already here difficult to achieve the target that is there, then maximum relationship value in the column it is presented here. Weight an important this weight is calculated here, this is absolute score absolute score and this one is relative score. How we will build this matrix let us see.

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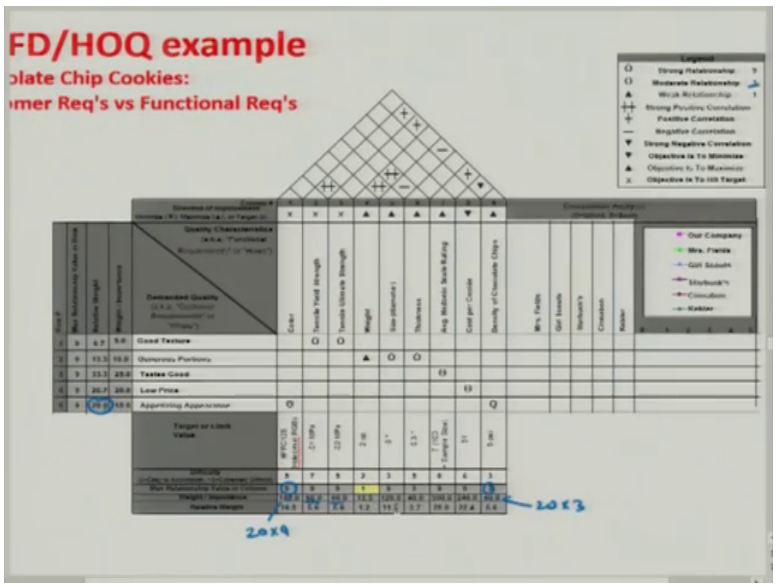

Now, some data is here.

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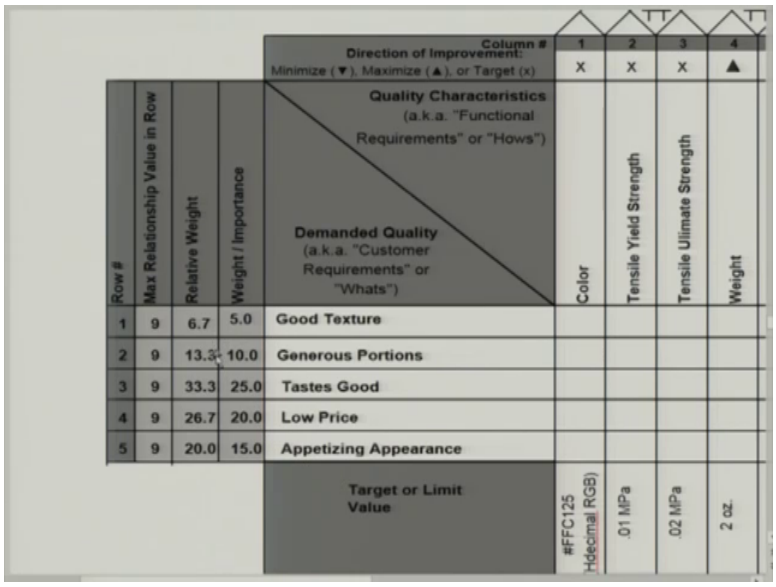

Row #	Max Relationship Value in Row	Relative Weight	Weight / Importance	Demanded Quality (a.k.a. "Customer Requirements" or "Whats")	Color	Tensile Yield Strength	Tensile Ulimate Strength	Weight
				Column #	1	2	3	4
				Direction of Improvement: Minimize (▼), Maximize (▲), or Target (x)	x	x	x	▲
				Quality Characteristics (a.k.a. "Functional Requirements" or "Hows")				
1	9	6.7	5.0	Good Texture				
2	9	13.3	10.0	Generous Portions				
3	9	33.3	25.0	Tastes Good				
4	9	26.7	20.0	Low Price				
5	9	20.0	15.0	Appetizing Appearance				
				Target or Limit Value	#FFC125 (Hdecimal RGB)	.01 MPa	.02 MPa	2 oz.

These ratings are developed by the customer. Maximum relationship value in a row can be 9; relative weight is this. Weight importance; weight importance is 5 10 25 20 15. This is the importance weight that is designed by the customer and they have given for good texture from 5 to 25 this weight is given, for good texture or you can say tastes good is the major probability it is given rate 25, importance is 25.

Next probability is low price. So, what do you expect if you ask a customer that you we are going to get you a biscuit or a cookie? They would say it has to taste good, it is the first importance. Second thing is low price, the colors and other you can say hell functions comes later.

So, this is 3rd one is appetizing appearance. It should be good for health and should be appetizer, then generous portions, then good texture; this is the rating. Now, this is the weight on importance is relative weight and this can be used here. Now these are the target values. What is the color? This is specifically the code of the color. This is specifical algebraic code for the color which color should be the yield strength should be 0.1 mega Pascal, this is the target value and this is 0.2 mega Pascal. Ultimate tensile strength weight has to be 2 ohms. Now, you can see this thing has well these are the directions of improvement as I showed you here. Directions of improvement can be to minimize to maximize or to hit the target.

So, for tensile strength and ultimate tensile strength and yield strength it is to hit the target cross is weight has to be maximized, size has to be maximized, thickness has to be maximized, average hydraulic scale rating has to be maximized, cost has to be minimized, density has to be maximized, density of chocolate chips has to be maximized. So, these are the target values; these are specifications which are generally available.

This is the secondary data might be the primary data some of the cases, but in this case it is the secondary data which is available with the manufacture and is put has that data here. Now a manufacturer or the one who is designing this matrix would put the relationship value, relationship importance is here also we have the correlations between these. The quality characteristics, the correlations these strengths that is the ultimate strength and yield strength have a strong correlation, the weight and size have a strong correlation. Bigger is the size, more will be the weight. Similarly weight and thickness has a strong correlation.

Negative correlation example is the size and thickness. The bigger would be the size, lesser would be the thickness and again negative correlation here could be this is size the negative correlation is size and density of chocolate chips. Bigger is the size, lesser would be the density, this is the correlation matrix. Now we have got the customer ratings, importance ratings, the target limits, the correlation matrix. Let us move forward and get some more data or move to the next step. Next step is we have got these relative importances.

Now, in relative importance tensile strength and good texture are related to each other. Tensile yield strength and ultimate strengths are both related to good texture, then weight is related to generous portions. What is this relation let us come to the legend again. This means strong relationship a circle with a dot, a vacant circle is moderate relationship and upward arrow is weak relationship not correlation. It is just the relationship please be mindful in this. So, this relationship you can see here. These generous portions and weight have weak relationship thickness and generous portions have moderate relationship. These relationships are put here, these are all relationships.

Now, let us add some more data in this. Now, we have got this weight importance here. Weight importance this is the maximum relationship value in column, maximum

relationship value in column that is 9; this is 9 value, this is 9, this is 9, this is maximum value is 1. What are these values? As we have seen in ligand, these are values 9 3 and 1. So, these values are here the maximum value is 9 9 9. It is 1 here, maximum value here the value should be 3. Maximum value is 3.

Now, how have we got this rating? If we remember like in the decision matrix that we made in value engineering, we were multiplying the performance ratings with the decision value of the performance criteria that the criteria to be selected that cost durability yield of operation. They have a certain rank or certain relative importance in that with the importance value of our idea. It is similar fashion here how do we get this value 180. This value is 180. 180 is this value is 20 into 9. This is 20 into 9 is 180. This value this means a vacant circle means 3. So, this is 3 20 into 3, this value is 20 into 3. Similarly this value 180 60, this 60 we have got it is 6.7 into 96.7 into 9 is around 60 again ok.

So, we have got these values, these are the weight importance, these are the weight importance or absolute weight importance for the functions that we have put here the engineering characteristics here. Now this is the relative here, relative you know we have normalized all these values with 100. So, in a way we have taken percentage rating. So, we have summed up all these values in absolute ratings, we have summed up these and this is 16.8 is 180 by the sum of these values, sum of row, sum of the second last row. The 5.6 is 60 by the sum of second last row that is absolute weight or importance value row. This is the way we have got the absolute and relative weight.

Now, this is almost complete of our target is to get this weight where will this weight. I will just let you know. Next is we have also put the competitors ratings. These are different competitors which are there the ratings are like these 5 4 5 1 5 4. These qualities which the customers have demanded, now for this competitors because we need to compare, we need to benchmark our product as well whether the customer would buy this or not.

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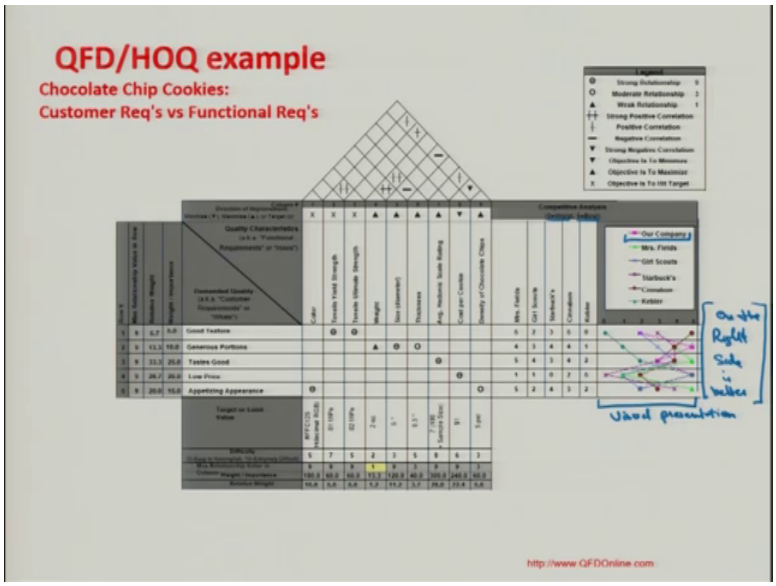

Next is we have developed the flow chart for the competitors ratings let me develop one flow chart for you here, for instance Mister Fields. This is the first company at we are comparing with the good texture is 5. So, first rating is first point is 5, second is for generous portion it is 4, for third one it is again 5, for low price it is 1. It might be high price cookie that is provided by Mister Fields that is why the price it has got rating 1.

In appetizing appearance it is again 5. So, this is the way we construct this flow diagram. This is for Mister Fields. So, we have got is visual representation of the data. This is our company, our company is this. The target is if you can see here this is 0 is worst, 5 is best. One has to be on the right side on the right side is better. So, what have we got from this house of quality, we have not completed our quality function deployment yet we have just converted the customers quality to the quality characteristics. Customers quality is good texture, generous portion, taste, cost and the quality characteristics are color, tensile, strength, then weight, size, thickness all those things.

We have got a rating for the quality characteristics here; now we can move further before that let us have a quick glance that what are these rooms. Now I think you know that what does these rooms mean. So, these are the rooms that we have built in this example.

So, objective of the house of quality is to express the goal of the item, list of characteristics, get a rundown of the qualities of the item as characterized by the customers. Whenever possible the customer requirements ought to be gathered at their

largest. These customer requirements are additionally used to assess the applicant ideas produced to fulfill each functional requirement.

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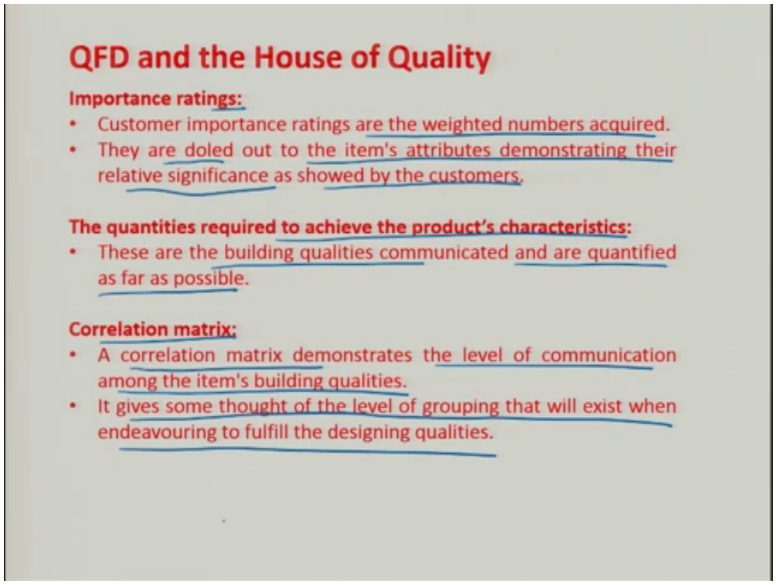

Next is what an importance ratings is that we have got in the left side. Those who are the customer importance ratings are weighted number acquired. They are doled out to the items attributes demonstrating their relative significance as showed by the customers. The difference in the color, the difference the customer think of or the importance or the ratings that have given to the different qualities those who are cost color appearance, all those things were there. The quantities required to achieve the product characteristics. These are the building qualities communicated and are quantified as far as possible.

Correlation matrix which was the roof top of the house, correlation matrix demonstrates the level of communication among the items, building qualities it gives some thought of the level of grouping that will exist when endeavoring to fulfill the designing qualities. This also demonstrates the level of grouping as often as possible realized by the physical laws representing the items, designing attributes, physical laws. We had the engineering characteristics here; what ultimate tensile physical all is more would be the bigger would be the size, more would be the weight. So, those were the correlations that we had in correlation matrix.

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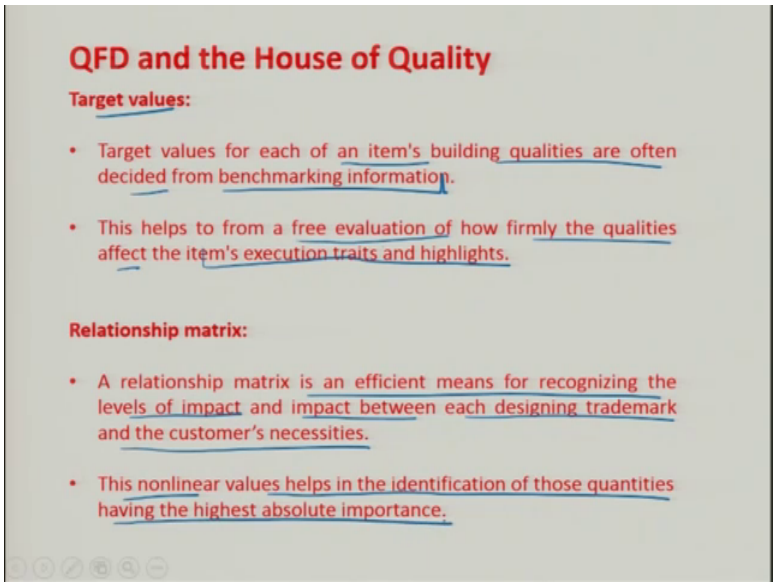

Next is target values target values for each of an items building qualities are often decided from benchmarking information. Benchmarking information the target values are like we had competitors with us, based upon them the target values were decided. This helps to form a free evaluation of how firmly the qualities affect the items execution traits and highlights.

Next is the relationship matrix; relationship matrix is an efficient means of recognizing the levels of impact and impact between each designing trademark and the customers necessities. This non-linear values helps in the identification of those quantities having the highest absolute importance.

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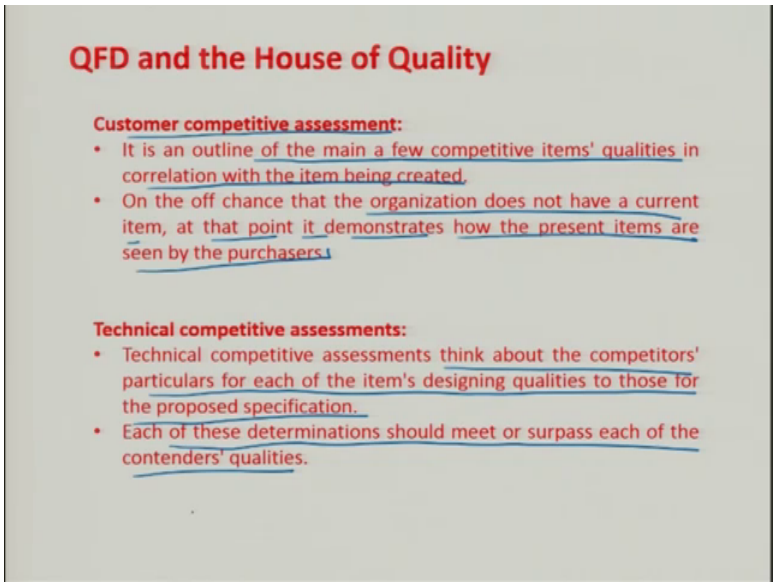

Customer competitive assessment that we had on the right hand side in our house; it is an outline of the main a few competitive items qualities in the correlation with the item being created. On the off chance that the organization does not have a current item at the point this customer competitive assessment demonstrates how the present items are seen by the purchasers or the customers.

Next is technical competitive assessment; technical competitive assessment think about the competitors particulars for each of the items designing qualities. To those for the proposed specifications, each of these determinations should meet or surpass each of the contenders or the force qualities. Now, this appraisal of the customer competitive assessment in consequential to the customer significance rating to the qualities that are allocated to the relationship framework and to the object steam sometimes.

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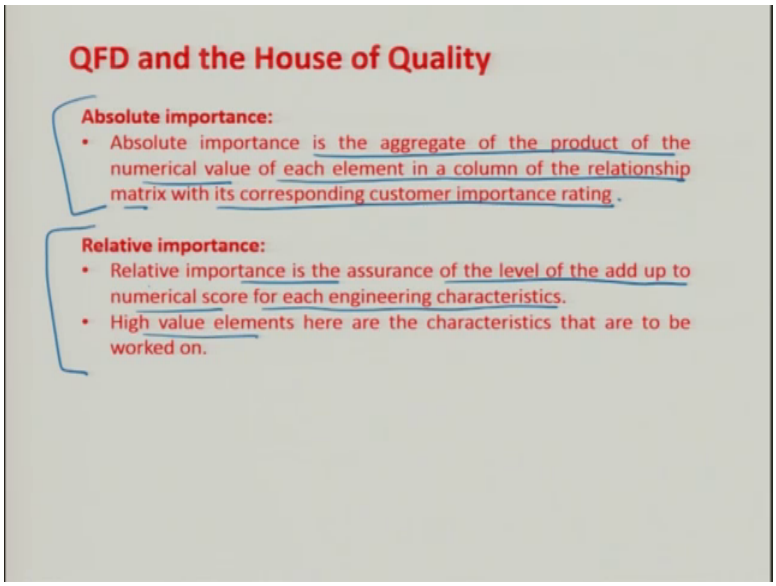

Absolute importance that we had a room at the bottom of the house, absolute importance is the aggregate of the product of the numerical value of each element in a column of the relationship matrix with corresponding customer importance rating. It was just a product relative importance is this absolute importance are ranked. Relative importance is the assurance of the level of add up to the numerical score for each engineering characteristics. High value elements here are the characteristics that are to be worked on. So, these are the room that we had discussed. Let us meet in the next lecture.

Thank you.