Product Design using Value Engineering

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Lecture - 20
Behavioral Roadblocks

Namaskar Friends! So, I welcome all of you to the last session of our course on Product Design using Value Engineering. And we have completed our discussion on the positive aspects of value engineering. We have seen that, what is the role of value engineering in the product design process, we have also tried to understand the application of value engineering in diverse fields starting from a simple pencil to a universal testing machine from a sewage treatment plant to a computer table.

So, we have touched diverse fields of engineering, of product development, of service sector also and we have found out that value engineering is not restricted to any one branch of engineering. It is a diverse field, it is an exhaustive field, it is basically a thought process, a structured thought process or creative thought process, which helps engineers, scientists and designers to come up with solutions which are cost effective, which are competitive, which are functionally relevant and reasonably expensive.

So, with this background now, we are going to close our discussion for the course on value engineering with certain pinch of salt. Now what are the challenges? What are the issues? Why each and every engineer, each and every designer, each and every scientist is not able to practice the concept tools techniques of value engineering? It means there are certain challenges; now what are these challenges that we will try to list down today.

Because based on whatever we have discussed I think most of the learners will feel too motivated to apply these concepts in diverse fields, but there are challenges. Why the poor value occur? Some of you this is something a blessing in disguise kind of thing. We will try to list out that, what are the reasons for a poor value in the product. Many times we are not able to change why? Because we feel the camera that is doing the recording for this session is the best way it can be designed know.

The answer is no. Although, this may be, the best design when it was designed when it was conceptualized, but today because of the technological advancements, because of the

change in designs available, because of the complex shapes that can be manufactured using the unconventional manufacturing processes, because of the advancements in the materials manufacturing processes, design thinking, there are chances, there are opportunities, there are possibilities that this camera can be redesigned.

It can be designed with an objective of minimizing the cost, but still satisfying the functional requirement of recording a good quality session. Good quality not in terms of what a teacher is speaking the quality of delivering or the quality of the content being delivered by the teacher is independent of the quality of the recording. So, the quality of the camera can be in terms of the clarity, in terms of the color, it is capturing so, that quality can be ascertained at a reasonably lower cost.

So, if we see that the product is already in use, it is doing its job in a most efficient effective manner, is still there are scope of improvement? Yes, still there is a scope of improvement why because there are certain reasons, because of which poor value occurs in the products. Now, what are these reasons of poor value, let us try to understand why a poor value occurs in the product?

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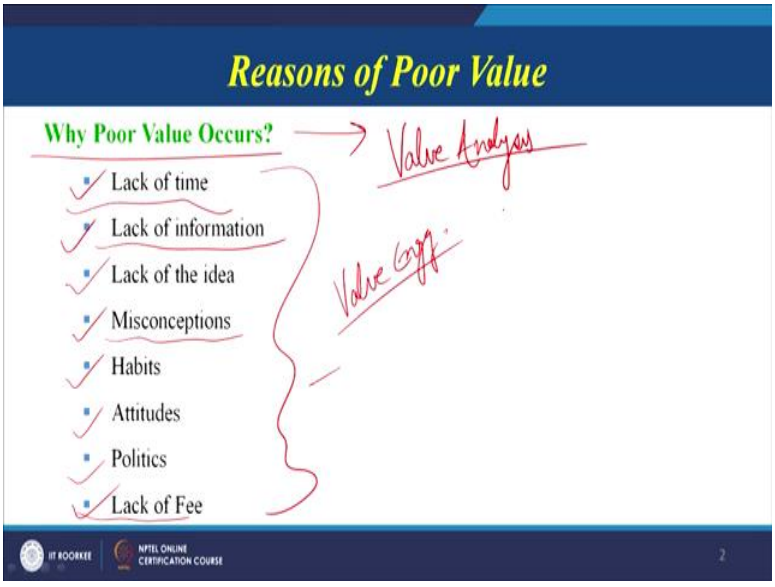

Let us try to see why poor value occurs? So, whatever products we see around us if we do the value analysis of those products, we will see that there are reasons which leads to poor value. Now, these reasons can be one is lack of time. As we have already seen, each and every company want to launch a new a modified updated version of their product at

the earliest, they want to be the market leaders, they want to be the first in the market with that technology with a particular technology.

So, in that hurry, in that over enthusiasms, sometime the company is not able to analyze clearly all the alternatives that may be possible in terms of the designs, in terms of the materials, in terms of the processes which could be cost effective. So, whatever design is available with them? Whatever materials are being used for making the other products made by the company, whatever manufacturing setup they have, they try to limit themselves to those kind of infrastructural facilities only and then, they come up with a product which lacks value why?

Because they feel, they do not have time to spend on looking for the alternatives, why because they want to be the first in the market with that technology. So, therefore, there are chances that there may be some poor value involved in that product why? Because of the lack of time.

Then, second can be the lack of information. We are not even aware that, there is a concept called value engineering and analysis, we do not have any value specialists in our organization, and we do not have information related to this topic. So, whatever standard procedure we are using for design and development of our products for the last 50 years we follow the same approach and finally, we end up with a product which is not having the competitive value. So, that is another issue, why the poor value can come into the product.

The third is lack of the idea. We do not have the idea that there can be alternative which is possible. So, we stick to our standard conventional traditional thinking process and come with a product as our forefathers have come up. So, we do not want to generate a large number of ideas, then, there are certain misconceptions. If you look at all these points and try to correlate them with what? With the case studies that we have already taken, you will see that some of these ideas are really related to the poor value functions which were there; for example, the misconception people feel that steel cannot be used for conducting the current.

But in our case study, we have seen that there are specific applications where steel can also be used for conducting the current. So, this misconception has to be removed then sometimes we have the habits also many times, we do not want to change. So, whatever

is the traditional way, we want to follow that way only, attitude is also sometimes an issue and today, we will try to see it or substantiated with the help of two cases studies also which will be the behavioral roadblocks for the application of value engineering, many time politics also play an important role, because in an organization suppose there are four engineers working at the same level.

And two engineers make a team and come up with a very you can say cost effective solution to their existing product, the other two may try to play or spoil the idea or may not like that idea may be implemented and may sabotage that idea in one way or the other. So, the office politics or the shop floor politics can sometimes sabotage some of the ideas.

Sometime, lack of fee, you do not have the funds to hire a specialist in the field of value engineering, you do not have funds to hire a consultant who can help you to achieve that target of cost minimization without compromising the functional requirement of the product. So, sometimes lack of funds also is an issue. So, based on all these points sometimes we feel that the full potential of value engineering it has not been achieved.

But slowly and slowly with the knowledge being spread across a diverse spectrum of engineers, diverse spectrum of industry people are realizing the potential that this subject can offer, and are utilizing the basic concepts of value engineering to come up with alternate materials processes and maybe alternate designs which are not only cost effective, but are also functionally superior than they are competitive products.

So, we will just have a one line discussion or one line summary of these points and quickly I will read these for you although I have explained them to all of you and these are something which are not very rocket science or a spacecraft science, it is simple ideas. So, we will just read them for you. Lack of information and time usually caused by a shortage of time.

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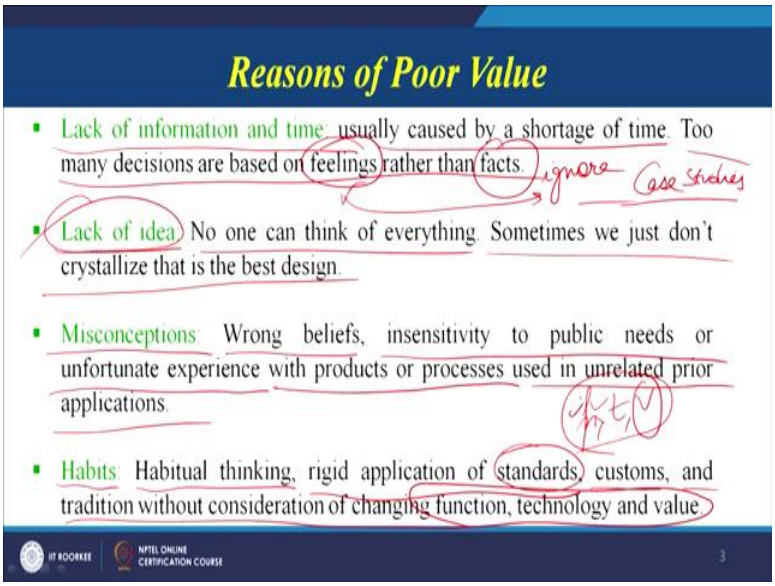

Too many decisions are based on feelings rather than facts. So, many times we ignore the facts and make the decisions based on our feelings, and this you can try to relate with the case studies that we have already discussed during our course. Lack of idea no one can think of everything. So, this is a very important sentence, I individual has got a limited thinking capacity, sometime idea which may occur to me, may not occur to my teaching assistant, but sometime idea that is occurring to the teaching assistant may not even occur to me.

So, therefore, always we have to feel, we have to be receptive to new ideas of lack of idea means that the idea did not occur to the person who is designing the product. So, sometimes we do not crystallize that in the best design, since the idea did not occur to me. So, I have not included it in my product design, then misconception, wrong beliefs, in sensitivity to public needs or unfortunate experience with products or processes used in unrelated prior applications.

So, sometimes, we have misconception a particular design may have been applied for a application which is not at all or remotely associated with the new product that we are trying to develop, but that misconception is still in my mind, and or as a product designer and I am still keeping that misconception with me. So, that is something, which will add poor value to the product because of that misconception, I will design the product in a way that it will not be able to deliver the value for which it is being designed.

Similarly, the habits; habitual thinking, the rigid application of standards, we will see in the case study today, the rigid application of standards, customs and tradition without considering the changing financial technology and value. So, without considering the function the technology and the value, we focus on our traditional mindset only, habitual thinking we are in the habit of following the standard approach which we do not want to change.

And when we do not want to change, we do not focus on the function, we do not focus on the technological advancements that have taken place, and thereby we do not focus on the value. And once we do not focus on the value, the product that we will get is definitely going to have certain poor value functions.

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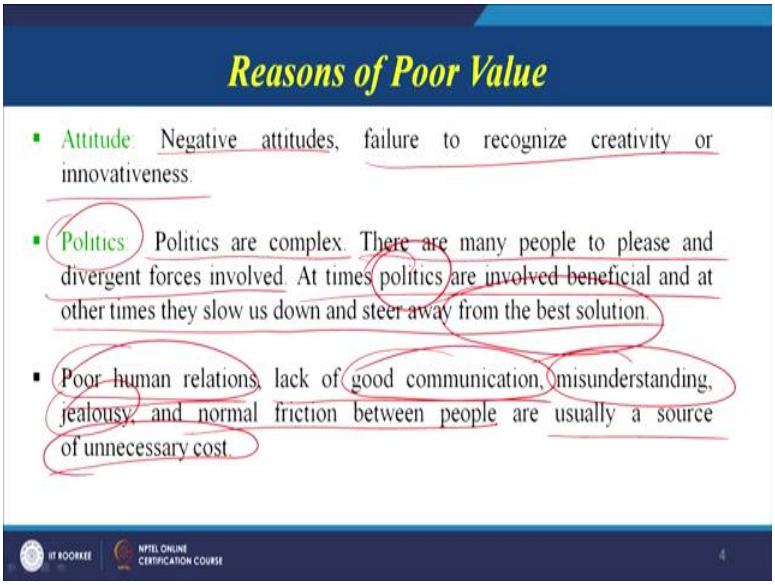

Then the attitude many times a negative attitude, failure to recognize creativity or innovative behavior. So, sometimes the attitude also plays a very important role in modifying the advantages that we could have derived after applying the value engineering approach. So, a positive attitude towards change, a positive attitude towards creativity, a positive attitude to accept the ideas which may seem silly to us; but at a later stage could be converted into a tangible product which is having high functional value. So, our attitude will definitely determine our altitude in the market share.

So, if we are positive in attitude, we will be able to rule the market, then the politics, politics are complex, there are many people to please and divergent forces involved, at

times politics are involved beneficial, and at other times, they should slow down and steer away from the best solution. So, sometimes the politics may lead to divergence from the best solution. So, poor human relations, lack of good communication; good communication, poor human relations, misunderstanding, jealousy and normal friction between people are usually source of unnecessary cost.

So, as we have seen in, one of the case studies that value engineering is not something which can be done by an individual, it is a team effort, it is a group task, it is an organizational wide thought process which has to be taken into account by the industry as a whole. So, one value analyst definitely can put the logical way in which the principles can be applied, but the inputs have to be taken from all across the industry.

So, therefore, if there is friction among the people, there is misunderstanding among the team members, there is a lack of communication among the team members, we will not be able to realize the true potential of the concept of value engineering. So, we can see here that there are large number of ideas, but most of them are related to their behavior or roadblock. So, most of them are human resource related, they have nothing to do with the technical knowledge, most of the roadblocks are related to the human value. So, in that context, we will try to take one or two case studies for today.

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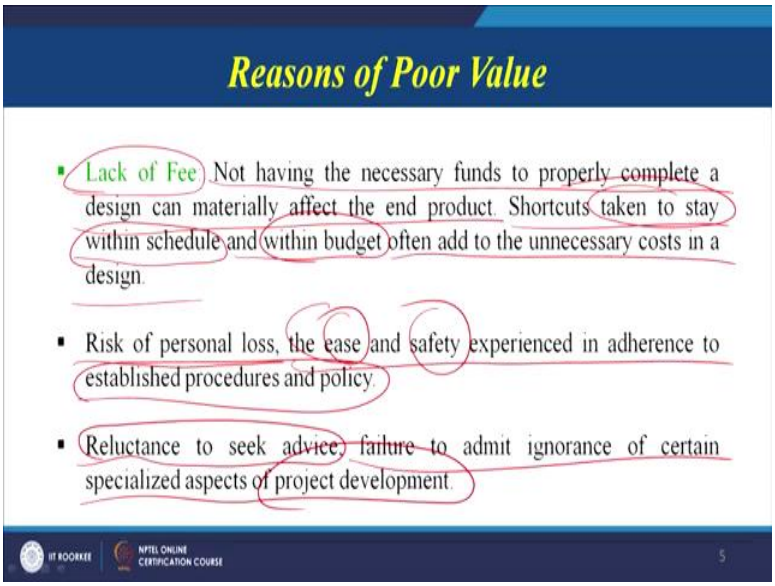

One of the last point is lack of fee. Not having the necessary funds to properly completed design can materially affect the end product. Shortcuts taken us to stay within the

schedule, again the time thing is coming into picture and within budget the cost thing is coming into picture often add to unnecessary cost in the design.

So, risk of personal loss, the ease and safety experience in adherence to the established procedure and policy. So, we do not want to change, because the old procedures are easy and safe. So, we want to just stick to our old procedures only. Then, reluctance to seek advice, failure to admit ignorance of certain specialized aspects of project or product development. Many times, this is a human psychology, we do not want to admit that I do not know this thing and that adds to the cost.

If we are open, if we are receptive, if we are ready to take into confidence, the vendors who may be better specialized than our knowledge in a specific domain of product development in a specific sub assembly, that is going to be used in our product, and we should seek their advice, we should seek their cooperation, we should seek their coordination in the product development process.

So, it is something related to behavioral aspects that we should be receptive to new ideas. So, lack of fee also sometimes we do not have the requisite funds, to have the services of a specialist value engineer. So, we can see that sticking to old traditions and not being receptive to new ideas are also the reasons for poor value in our product.

So, with this we can start our case study. So, we have seen that what are the reasons for poor value, now let us see that how these reasons actually affect our performance. Now I will read this case study for you because this is a very self explanatory case study and it has been taken from the book as all of you know techniques of value engineering written by Lawrence D Miles.

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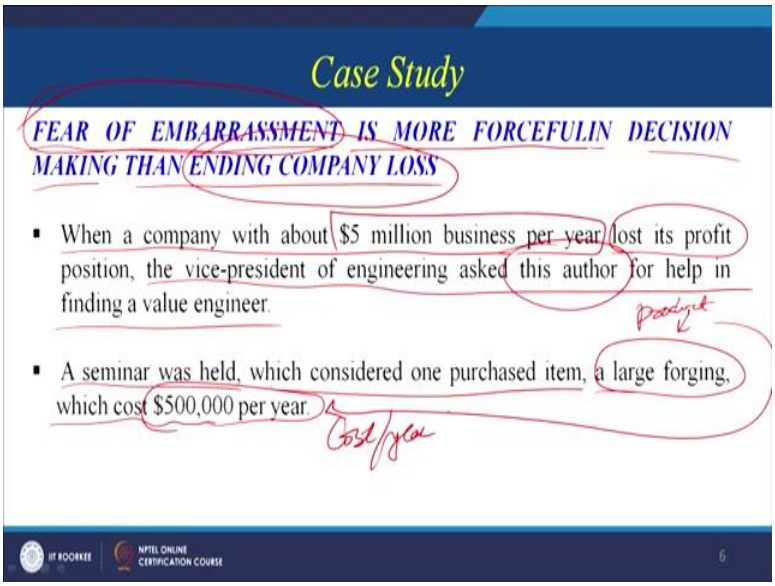

So, the title of this case studies fear of embarrassment is more forceful in decision making than ending the company loss. So, we want to end the loss that the company is making, but what is stopping us the fear of embarrassment. The company is in loss, but the fear of embarrassment of some of its officials is stopping for the individuals for taking necessary steps to end this loss.

Now, how this loss can be lost, can be stopped or you can again start making profit by the application of value engineering? Now let us see quickly, I will read it for you. When a company with about dollar 5 million business per year, 5 million business per Year Company lost its profit, the vice president of engineering asks this author maybe author of the book for help in finding a value engineer a seminar was held which considered one purchased item a large forging. So, this is the product a larger forging, which costs dollar 500,000 per year.

So, this is a product and this is the cost per year for this product. Now this is a company which is making loss and they have hired the services of a value engineer to overcome this loss, where in a large forging has been identified as a product, and the cost is also known.

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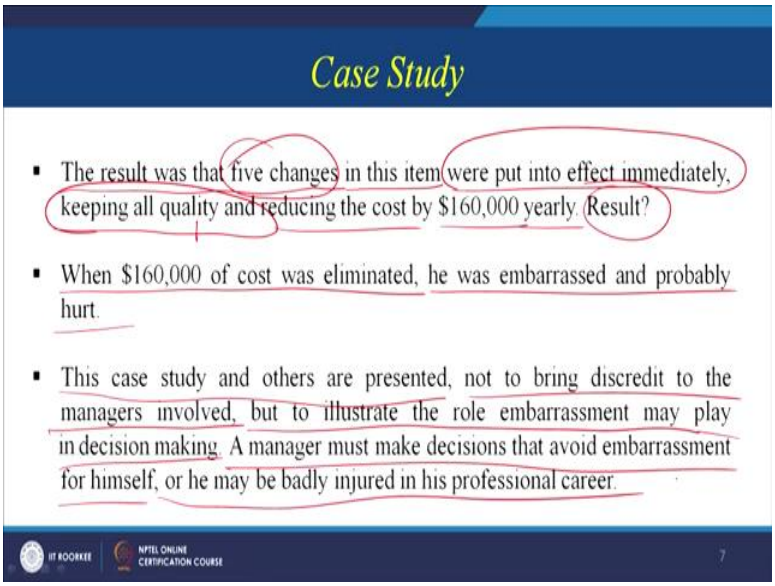

The result was that five changes now the value engineer will; obviously, be result oriented. So, the result was five changes in this item were put into effect immediately. So, five changes in that larger forging can be done keeping all quality, there is no change in the quality and reducing the cost by dollar 160,000 yearly this was a result.

So, the problem is very simple a company is making loss, a value engineer has been called on duty, a value engineer identifies a large forging to study, and then five changes are suggested in the design or manufacturing it is not mentioned in the case study, but five changes can account for saving or reducing the cost by dollar 160,000. So, what is the result? When dollar 160,000 of cost was eliminated, he was embarrassed and probably hurt who the vice president of the company, who has asked a value engineer to analyze this particular product.

This case study and others are presented not to bring discredit to the managers involved, but, to illustrate the role embarrassment may play in decision making. Now, you can see, the vice president may see it as a challenge to his authority, he may feel that this these changes could have been easily suggested by him and he could have got the credit of this saving of dollar 160,000, but, now, he is feeling embarrassed that he had to hire an outside agency to take this decision or to come up with a better solution to for this large forging. A manager must make decisions that are worth embarrassment for himself or he may be badly injured in his professional career.

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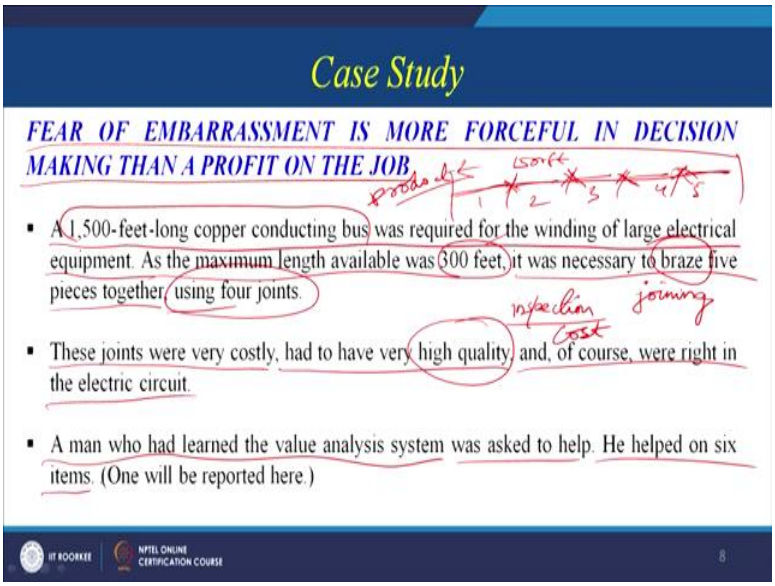

Now, this is the first case study, now, there is another case study, fear of embarrassment is more forceful in decision making than a profit on the shop. So, this is another case study here we can see of 1,500 feet long copper conducting bus was required for the winding of large electrical equipment.

So, 100 1,500 or 1500 foot long copper conducting bus. So, this is our product here. So, this product was used by a company for winding in a large electrical equipment. As the maximum length available was 300 feet only, it was necessary to braze. Now braze if some of you do not know it is a joining process. So, 300 feet pieces one 300, another 300, another 300, another 300.

So, we require 1500 total feet. So, five pieces 1, 2, 3, 4 and 5 were used and they were brazed and four joints were made to make it exactly 1,500. So, 300 feet is available it was necessity to braze five pieces is together as I have shown using four joints. So, four joints were used right number 1, 2, 3 and 4. Now this is you can say problem area why because joining will involve costs, these joints were very costly had to have very high quality and of course, were writing electric circuit. So, when you have to ensure quality you will have to do the inspection of these joints also so, that will also add to cost.

A man who had learned the value analysis system was asked to help on six items. So, maybe again a value engineer was put on this job, and he came up with six item, but only one, we are going to see here.

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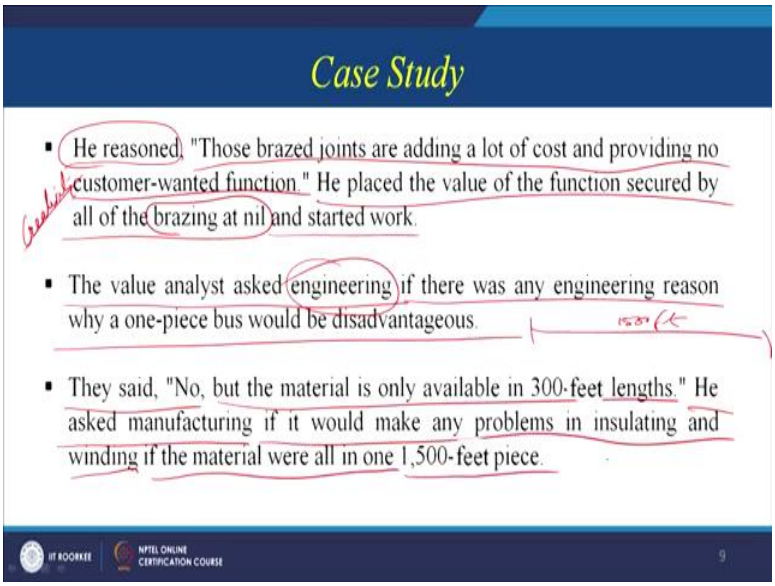

He reasoned now as we have already seen that creativity is very important in value engineering we have to challenge everything. So, he reasoned those brazed joints are adding a lot of cost and providing no customer wanted function. A customer wants or electrical equipment, he is not bothered whether we have taken 300 feet long copper conducting buses and then brazed them together to make them 1500 feet.

He is not bothered about that he is only bothered his basic idea for buying that electric equipment is for a function that is to be achieved by the electrical equipment. So, he is not bothered whether, we are using a single copper conducting bus or 1500 feet or we are using five 300 feet individual corporate buses, then, we are brazing them together. He plays the value of the function secured by all of the brazing at nil, yes, it is a sure, brazing is not at all required, it is not adding any value to the final product and he started his work.

The value analyst asks the engineering personal. If there was any engineering reason why one piece bus would be disadvantageous, one piece means directly 1500 feet long copper conducting bus. They said no, but the material is only available in 300 foot lengths, he asked the manufacturing if it would make any problems in insulating and winding, if the material were all in 1 500 foot piece. So, he then reasoned with the manufacturing department that will they find it difficult if a one single piece of 1500 feet can be requisition or bought?

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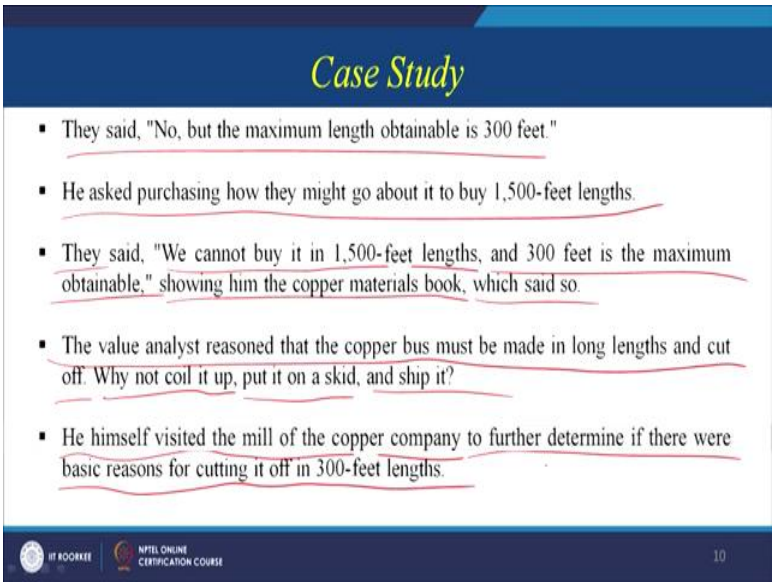

They said no, but the maximum length obtainable is 300 feet only. He asked the purchasing, how they might go about it to buy a 1500 foot long? 1500 foot long copper bus they said we cannot buy it in 1500 feet long and 300 feet is the maximum obtainable showing him the copper materials book which said so.

So, they have misconception or a data book based on which they have framed this conception that 300 is only available. The value analyst reasoned that the copper bus must be made in long length and cut off; why not coil it up, put it on a skid and ship it? So, then, he thought, he used his creativity and used this logical judgment use his information that, it may be possible that these copper buses are made in large sizes maybe 3000 feet, 4000 feet and then cut as per the customer requirements.

So, why we should not contact the vendor and ask him that if he will be able to supply us a long length of 1500 feet and if that is possible, it is very good for us because then we need not make the giant we need to do the inspection of the joints. So, he himself visited the mill of the copper company to further determine if, there were basic reasons for cutting it off in 300 feet lengths.

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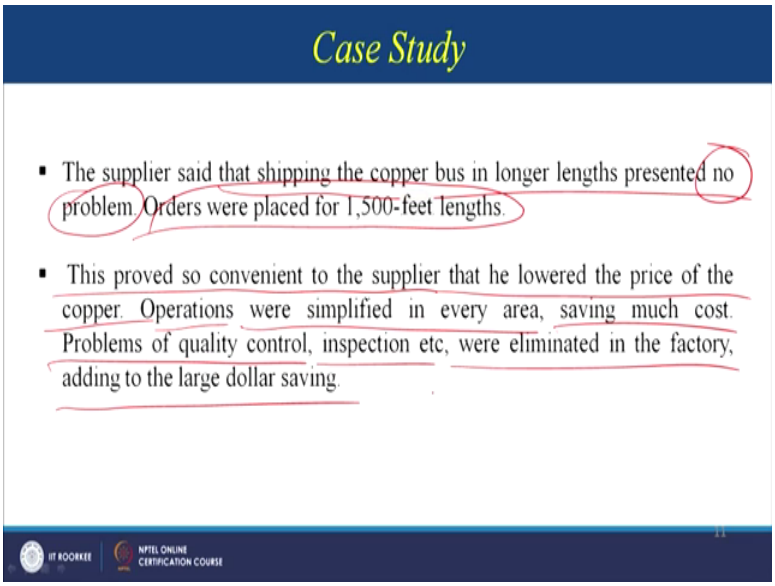

The supplier said that shipping the copper bus in longer lengths presented no problem. Now, first thing, first positive thing has come out of the discussion. All the manufacturing personal, engineering personal in the company were having this misconception that the length are available only in 300 feet only, but once the value engineer approached the supplier, the supplier said no problem in shipping orders were placed for 1500 foot long lengthd.

This proved so, convenient to the supplier that he lowered the price of the copper. Now he has now, no requirement to cut them into 300 feet lens. So, it saved additional operation for the supplier also because he has to now send 1500 feet single piece binding only. So, he reduces the cost of the material or cost of the product for the company.

From operations point of view, operations were simplified in every area, saving much cost problems of quality control or inspection extra were eliminated in the factory adding to large dollar savings. So, we can see that once with a positive attitude, when the value engineer approached the supplier, and the supplier had no problem in supplying a long length of the copper coil and it saved a lot of costs.

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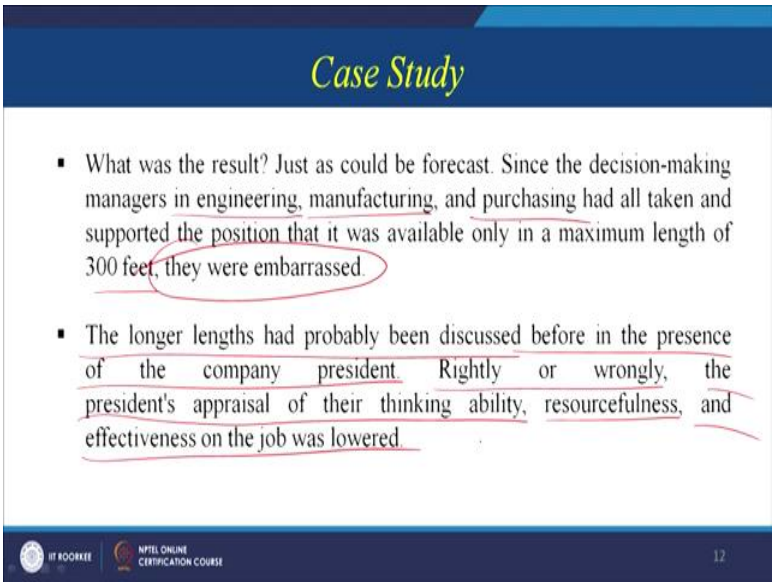

But what was the result? Just as we can forecast since, the decision making managers in engineering manufacturing and purchasing had all taken, and supported the position that it was available only in maximum length of 300 feet, they were embarrassed, who were embarrassed? People from engineering department, people from manufacturing, people from purchasing because they had this attitude or the misconception that only 300 feet long copper, wires or copper coils are available.

The longer lengths had probably been discussed before in the presence of the company president rightly or wrongly the presidents appraisal of their thinking ability resourcefulness and effectiveness on the job was lowered. So, maybe because they were embarrassed why because, they could not think out of box, they could not think that there can be a situation where they can contact the supplier and deliberate on this issue that can we get 1500 long feet wired, eliminating the coil, eliminating the need for brazing and as well as the quality control and inspection.

So, with this I think this case study it is very clear that sometimes the fear of embarrassment also is a major reason for not implementing the principles, rules, guidelines tools, techniques of value engineering. So, at the end I wish all of you very happy learning in this course, although it is a very small course of 10 hours duration, but it is a thought provoking course in today's case study, you can also see that simple common sense based decisions sometimes can save a lot of costs for the company.

So, if we have this thought process in our mind that each and every decision that we are taking, we will try to create something new, we will try to find out the alternatives which can be better than their existing solution, so, obviously, if we try 1000 ideas maybe some of them will definitely click and will save a lot of costs for our company and will help us in our professional growth as well as professional satisfaction, that we have come up with solutions which have been implemented, we have come up with solutions which have been appreciated and we have come up with solutions which are the outcome of our learning process.

So, with this I conclude this 10 hour course on product design using value engineering, I wish all the learners a very bright future and best of luck for all your future endeavors.

Thank you very much.