Management of Inventory Systems
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Lecture - 51
Value Engineering / Analysis and Stores Management

During this the 11th week; that means, is a plane ultimate week for the course management of inventory systems, we are going to discuss value engineering and value analysis. This is the concept of Value Engineering and Value Analysis and the Stores Management.

So, there will be 5 lecture sessions are the first 3 lecture sessions will be the covering the value engineering as well as the value analysis part. Including one the case study the details of a case study will be discussing followed by. Say this discussions on the stores management for which we have we have real marked you know the true lecture sessions of this week.

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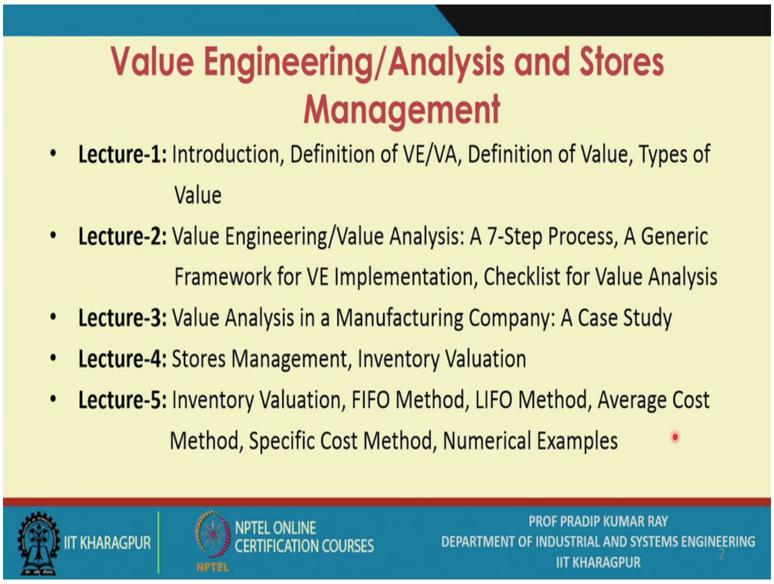

Now, let us first talk about the lecture wise for the topics which we are going to cover. During the first lecture session we will discuss, will make some introductory remarks, related to the importance of value engineering or value analysis exercise. And particularly related to say inventory management, and the stores management what extends the stores management of an organization is intimately related to this the value engineering or value analysis exercise.

So, once we discuss the importance of such an analysis, then in specific terms we are going to discuss or we will define value engineering as well as value analysis. You must have very clear idea about this definitions; that means, you will come to know the context in which these the definitions are valid. Of course, we have been using the term the value engineering. And so, you must be able to define the value and the types of value.

So, this will be the coverage for the first sessions. In the next lecture session lecture 2 the details about the value engineering exercise or the value analysis the project what are the steps involve, how do you carry out such an analysis those details will discuss. So, usually we follow a 7 step process. So, this has become very, very standard. And a for it is implementation; that means, value engineering implementation what is the generic framework we should adopt?

So, this generic framework the details of this generic framework also we will discuss. And there are few checklists; you may have to refer to while you involve yourself in value analysis exercise. So, what are these the check list items? What are the specific questions you may have? So, all these details will discuss.

During the 3rd lecture session, we will the cover a case study; that means, this case study is related to a value analysis say study we carried out in a manufacturing company. And the details of this case study we intend to discuss so that the kinds of problems you face, while you initiate a value engineering say the practices or the value engineering project.

These the problems you must know, how to overcome this problems? And what are the you know the positive gains you have? So, and how do you say the go for a say the cost reduction of, and how what does it affect this value engineering project or value analysis project? How does it affect? Or improve the value of the product or the systems? So, all these details we will discuss and we will referring we will be referring to this particular case study.

During lecture 4 session we will discuss in detail the stores management practices, what are the what are the specific objectives of stores management, and we will introduce the concept of inventory valuation. Then during the last session last lecture session, we will continue our discussions on inventory valuation.

So, why it is an important issue inventory valuation? There are the several methods you can apply for inventory valuation. So, all these methods we will discuss, and these methods are the FIFO method LIFO method, average cost method and specific cost method. These are the 4 categories of a 4 types of methods you use for inventory valuation. So, all these details we will we will discuss. And then followed by a few numerical examples, so, this will be our coverage.

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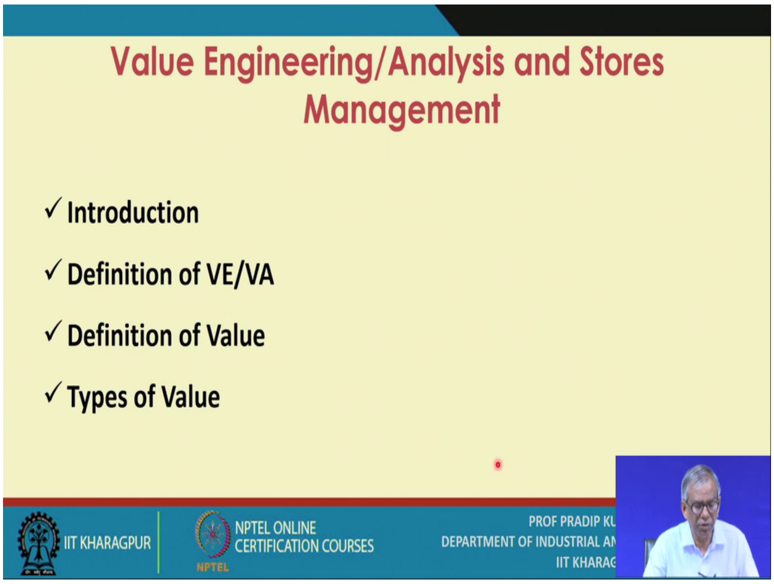

Now, during the this lecture session, we will introduce the concept of value engineering and value analysis. And the definitions of value engineering as well as the value analysis also we will discuss. The definition of value from a number of perspectives, we will also discuss at length. And how do you classify these values so, this will be our coverage. Now, let us whether talk about value engineering.

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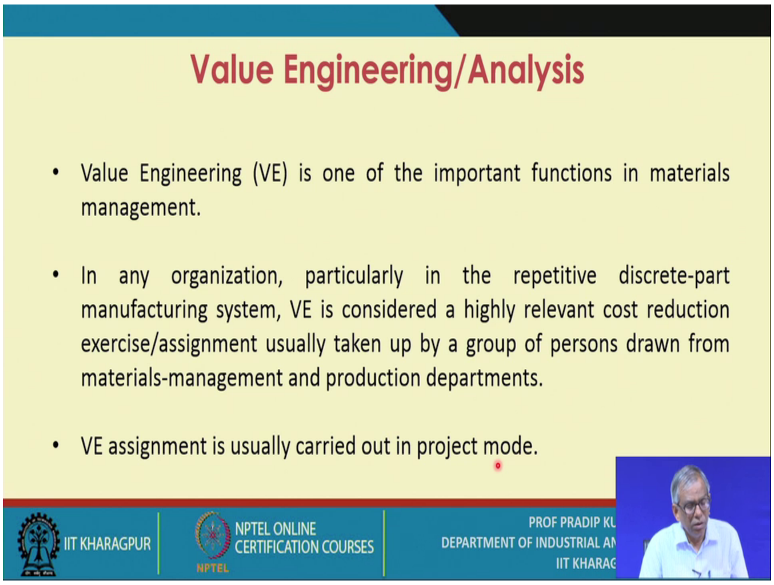

Now, what do you say that? We already we have refer to the materials management. And essentially the courses on the materials management say systems. And while we this is very important say the function in any organizations as we have already pointed out. And what we have found that there are many sub functions in the materials management function.

And one important area in materials management where you know materials management experts so, the practitioners the researchers they should concentrate, this area is value engineering.

And or the importance of a value engineering has been you say realized or the many years back. And this is a systematic procedure for a value enhancement with respect to a product with respect to a systems or with respect to a process with respect to any item. And so, the value enhancement this is essentially value enhancement exercise you have to follow a systematic procedure. And simultaneously what you try to achieve you also the go for assign of the cost reduction substantial cost reduction. And ultimately what happens that you are the product cost gets reduced. And you will have an advantage; that means, your financial performance gets improved.

So, the value engineering exercise is intimately connected with the financial performance of an organization. There are several examples we can sides there are several case studies. And majority of the progressive organizations throughout the world they have adopted this important say the approach for value enhancement. In any organization particularly in the repetitive discrete part manufacturing system. this is our say forecast area repetitive discrete part manufacturing systems.

Now, in this particular manufacturing system, VE or the Value Engineering is considered highly relevant cost reduction exercise or a assignment. So, if someone ask you that what do you what do you mean by value engineering so your, it can be answered in several ways. But the first answer should be that it is essentially a cost reduction technique.

And for cost reduction technique for the cost reduction, there could be several approaches. And there could be several alternative several say you know say the measures you can take. And here specifically when you apply value engineering technique for cost reduction your; so the your main say the focus is what extent you can go for material substitution.

So, so, through material substitution can you go for the cost reduction, for a particular product or for an item and for a system. And so, in many time it is considered as a one of a kind a project, and that is why usually these exercise or these project is taken up by a group of persons drawn from materials management and production departments; that means, you form a say the multidisciplinary group and with respect to a product there are the several types of issues. You need to consider for say the value enhancement. So, obviously, and interdisciplinary approach is required, and that is why a multidisciplinary group is formed.

So, usually for a typical say the value engineering project, we form a group of a 3 persons. And this 3 persons are drawn from a so, the different functional areas. So, the one person may be drawn from say the materials management or saying specifically from the purchase department. Or the second person may be drawn on the industrial engineering department. And the third person must be drawn from the production department. So, a 3-member group and depending on the how complex the project is and how complex the product is.

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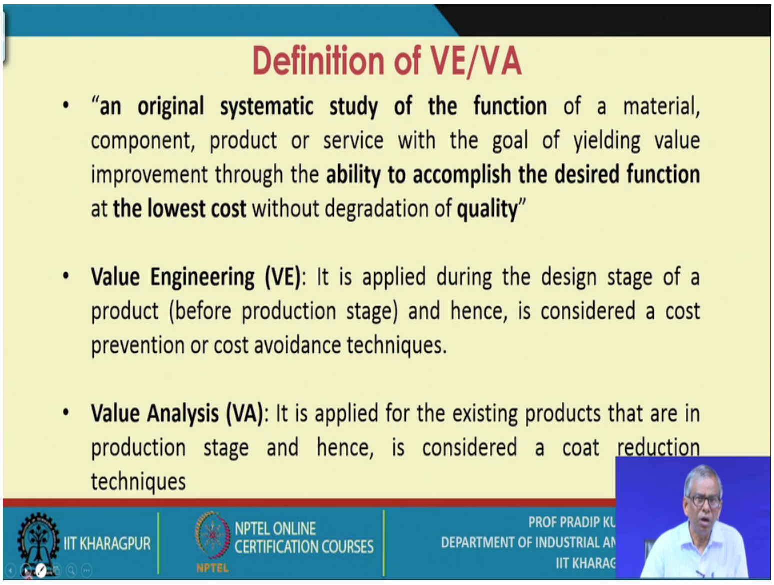

You can have a group size of say 7, or say a group size of say you know say a group size; so, a group size of say 7. So, there are cases in fact so, if you refer to the case studies on value engineering or value analysis. You come across such a situation where to deal with a very, very complex product. You need to have a group of 7 persons.

So now this value engineering assignment is usually carried out in a project mode; that means it is you assume that you may come across one of a kind situation. So, each item is different each system is different. And there is some generic approach you apply, but ultimately the kinds of data you need to refer to this data are very much dependent on the kinds of project you would be dealing with. So, always in majority of the cases that VE assignment is usually carried out in a project mode.

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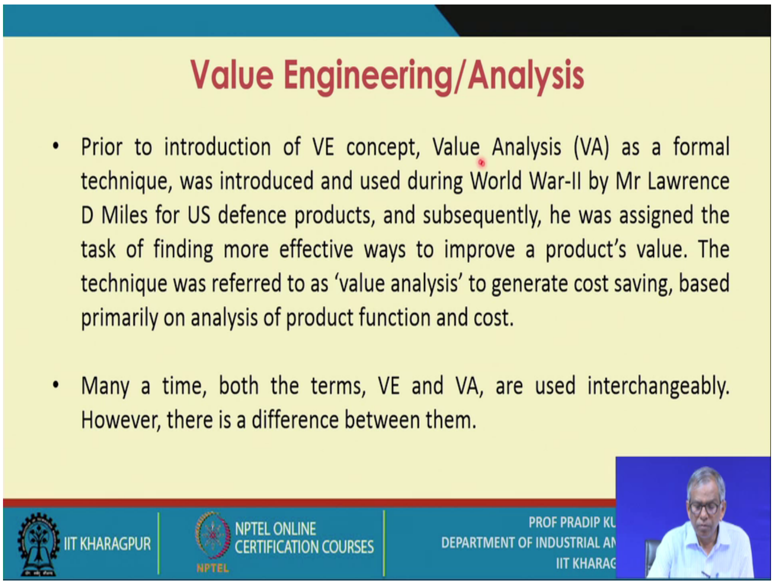

Now, there is some history behind the say in to introducing such a unique concept in a manufacturing situation. So, we will discuss definitely the value engineering concept in detail. But try to introduction of the of the value engineering exercise value engineering concept; value analysis as a formal technique was introduced. And so, it was initially known as value analysis. So, why, I will tell you definitely. So, initially it was introduced as a as a value analysis concept. And this concept was used during world war II.

And the person who actually the instrumental was instrumental in introducing this particular concept as well as who was instrumental in using this concept for a many practical problems so, he is Lawrence D Miles.

And he introduced the concept is used is concept of value analysis for US Defence products. And subsequently his concept was applied for many civilian products. And later on he was assigned the task of finding more effective ways to improve a products value. So, he is a he was the pioneer, and he was interested with this responsibility; that means, why do not you think of ways, and means why do not you think of us think of several possible measures which you can adopt for announcement of value for a product or a system.

The technique was referred to as value analysis to generate cost saving. So, your focus is cost savings based primarily on analysis of product function and cost. So, I need to consider what is the existing product cost, and to what extent this cost is related to enhancement of the functional value or the function or the performance of the product. So, and what we find that value analysis is a term we used when you apply the concept of say the value enhancement with cost reduction with material substitution or an existing product existing product mix.

But if you apply the concept at the design stage, that profit of a product; that means, product has not yet come to the production stage. So, for any product which you come across it goes through usually 3 stages. So, the first stage is the design stage, the second stage is the production stage. And then it goes to the post production stages. So, as soon as the design is design is made or the design is prescribed, now you go for the production stage followed by post production stage. Now the value analysis in value analysis what do you do? We consider the existing product, whereas if you use value engineering term essentially the concept is to be applied at the design stage of the product. Many a time both the terms VE and VA are used interchangeably.

However, there is a difference between them, is it? So, a distinction so, how do you distinguish between them. So, we first provide or you first must know, that what is the most comprehensive definition of value engineering or value analysis.

So, let me just read out statement, and you and my objective is the original definition or are the most the comprehensive definition you should be aware of. You must not forget this. So, what is the definition of VE or VA? And original systematic study of the function of a material, component or product or service with the goal of yielding value improvement or value enhancement. Through the ability to accomplish the desired function at the lowest cost; that means, you must be bothering about cost of production the cost of the product without degradation of quality.

Now, here our the main purpose is the quality as you know the quality is having many dimensions. And one of the most important dimension is the performance. So, the performance of a product performance of a system is essentially, when you talk about the performance of a systems or product we refer to the function of the product. Whether, the functional value is acceptable to you.

So, this is a complete definition of value engineering or value analysis. So, you just systematic study of the function of a material, is it ok?

So, you must be able to say represent, or you must be able to understand the function of a product or a system or a process or a material. Now, the 2 terms you have been using, the first term is the value engineering and the second one is the value analysis. So, what is value engineering? It is applied during the design stage of a product; that means, before the production stage.

And hence is considered a cost prevention or cost avoidance technique. So, this is your say this is the definition of value engineering. Whereas value analysis is applied for the existing products; that means, these products are say this materials or this you know the systems are already in use, and if you like applying say the value analysis technique; that means, you try to you intend to add more value to the product.

So, it is applied for the existing products that are in production stage and is considered a cost reduction technique.

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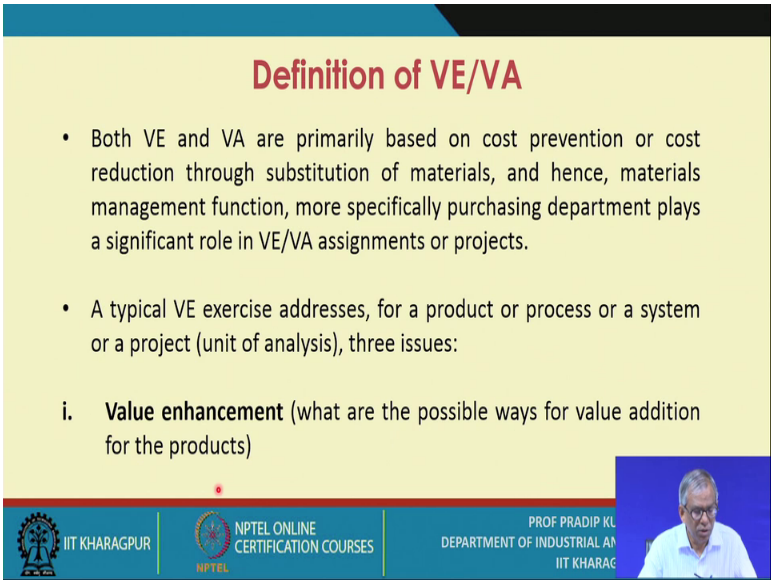

Both VE and VA are primarily based on cost prevention or cost reduction through substitution of materials. So, you must have the thorough idea are the detailed understanding of say the function of the material so, the used in a product. And as you may be knowing that say the quality of material in terms of it is say chemical compositions or physical properties.

And so, the quality you must be able to enhance the quality of the material. And many time if you have for the substitution materials technique, you get the better quality materials solving say or it is directly you know enhancing the functional value of the product. And hence the materials management function more specifically purchasing department plays a significant role in VE or VA assignments or the projects, is it?

Because ultimately, if you are main focus is material substitution. So, obviously, you know the materials management function plays an important role and more specifically the purchasing department. A typical VE exercise addresses for a product or process or a systems or a project unit of analysis, 3 issues. So, you just note down this 3 points, the first one I have already mentioned that is the value enhancement. So, what do you mean by value enhancement? That means, what are the possible ways for value addition for the products.

So, that you have to that you have to the suggest how many different ways you can say the add value to the product, is it ok? So, later on you will find that essentially you know you go for brainstorming session, and you must be very, very creative innovative in suggesting this possible ways. So, the innovation or innovative mind or the creativity is a fundamental say the conditions you must be able to fulfill while you take up any project on so, the value engineering.

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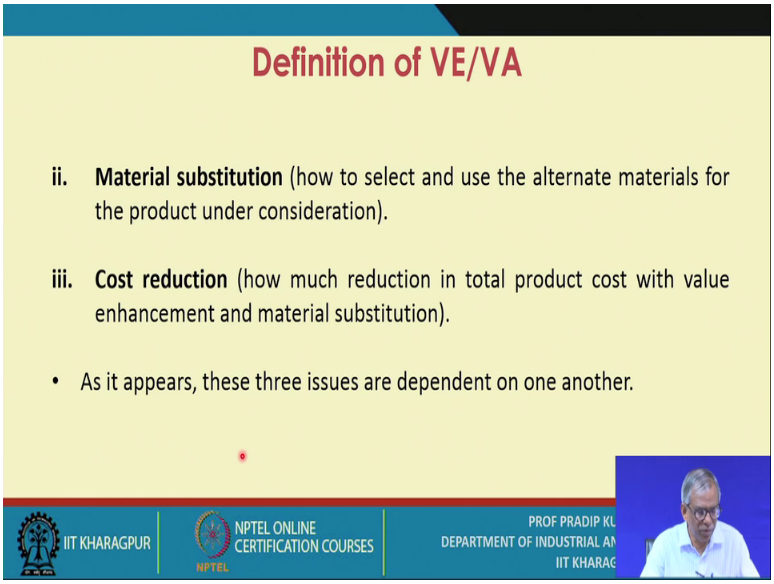

So, value enhancement is your first objective. The second when the another way is that is the material substitution. Now, what do you mean by materials substitution? How to select and use the alternate materials for the product under consideration? You may find that a product is being manufactured with a particular material. It does not mean that alternative the materials you cannot select, is it?

So, always you will find at a particular point in time this that particular material may be the best one, but as the time passes as the new materials or say the join in or they developed, what do you find that, you always you feel like so, the verifying whether a better quality material is available or not in the market.

So, obviously, you get a lot of say the information related to material substitution possibilities from your purchase department. And the third objective is cost reduction. So, cost reduction how do you how do you go for it? That means how much reduction in total product cost with value enhancement and material substitution. So, this is your main objective; that means, the first objective is value enhancement, the second one is the material substitution and the third one is the cost reduction.

As it appear this 3 issues are dependent on one another; that means, you must not focus on just one aspect you need to consider all the 3 aspects together.

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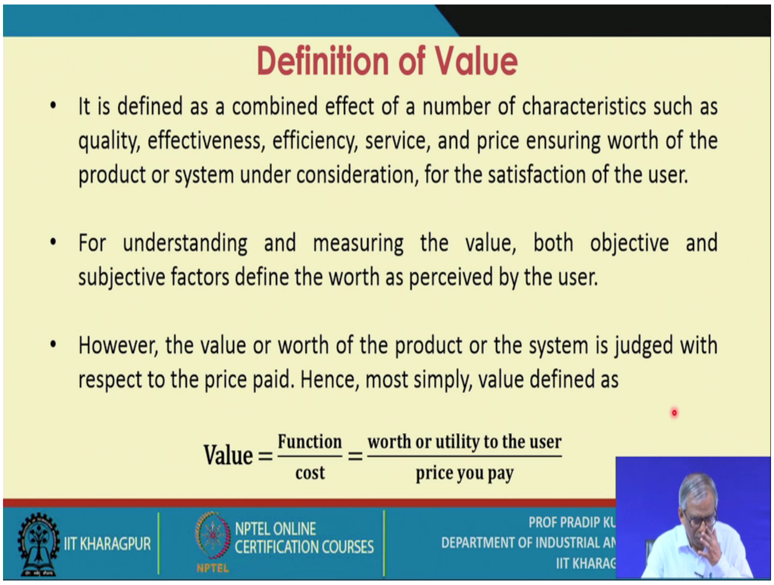

Now, what is the definition of value? It is defined as a combined effect of a number of characteristics such as quality, effectiveness is a multidimensional concept. So, it is referring to the quality, effectiveness, efficiency, service and price, ensuring worth of the product or the system under consideration for the satisfaction of the user. So, this is a complete definition of value. Now, for understanding and measuring the value, both objective and subjective factors may define the worth as perceived by the user.

So, however, the value or worth of a product or the system in a given context is just with respect to the price paid. Like, when you define a quality of a product or a system so, the price has to be mentioned at what price you are getting that level of quality. So, similarly here the value at what price? So, this question is in uppermost in your mind. Hence most simply the value is defined as value equals to the function by cost; that means, worth or utility to the user against the price you pay.

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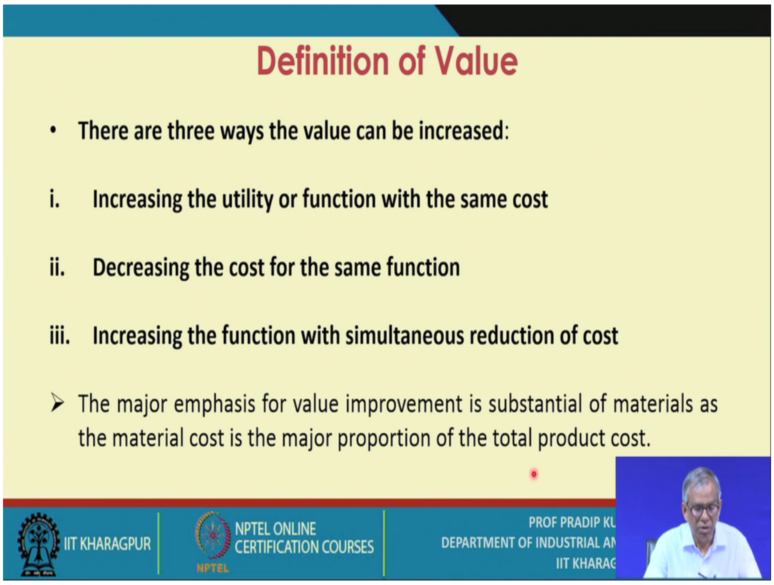

So, there are 3 ways the value can be increased. Increasing the utility or the function with the same cost that is the first approach you may off for. The second approach is decreasing the cost for the same function, that is another alternative, and the third alternative is increasing the function with simultaneous reduction of cost. The major emphasis for value improvement is substantial is substitution of materials as the material cost is the major proportion of the total product cost.

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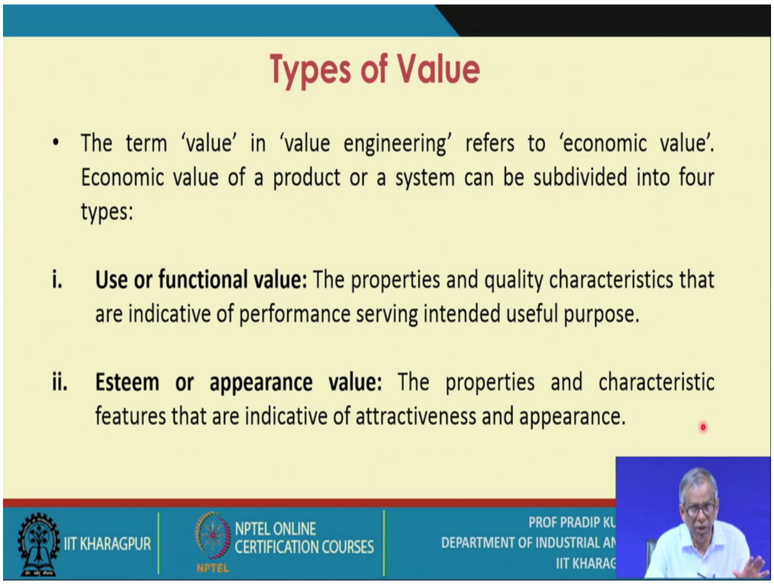

So, substitution of materials is the with the main issue and that also you should you know you should be say for the focusing on substitution of materials.

Now, the term value in value engineering refers to economic value. We are all aware of like say when we defined say the inventory. So, the inventory is idle resource with an economic value. So, similarly when you to when you use the term value. We refer to the economic value; economic value of a product or a systems can be subdivided into 4 types. So now, we are classifying the value under 4 categories. First one is the use of functional value, the properties and quality characteristics that are indicative of performance I have already pointed out, serving intended useful purpose. The second one is a esteem or a appearance value the properties and characteristics features that are indicative of attractiveness and the appearance value. So, there could be several examples.

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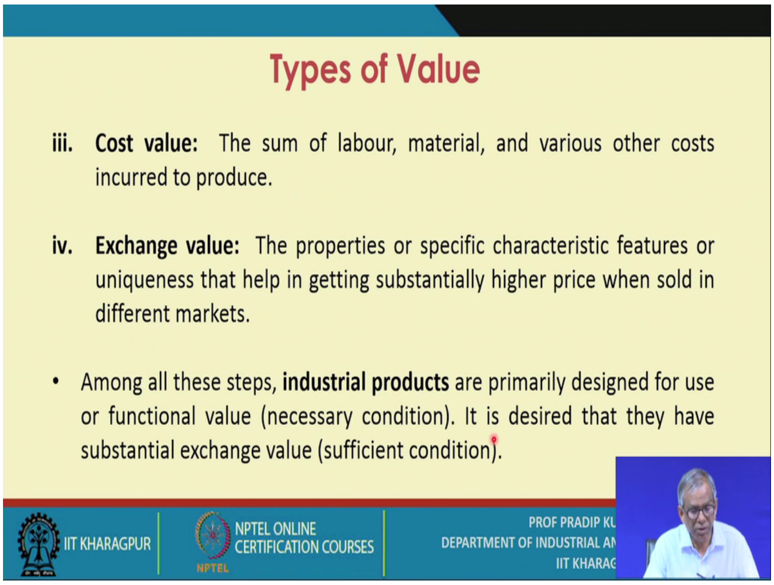

So, that is appearance value third one is the cost value, the sum of labour material and various other cost incurred to produce. And exchange value this is also very, very important. The properties or specific characteristic features or uniqueness that help in getting substantially higher price when sold in a different markets.

Like sale in the basmati rice in India, but it has when you produce in India, but you can also sell it in a foreign country. And obviously, it is exchange value is very, very high. Similarly, many Indian the textile say the products as a Indian cottons are sold with very high price. And it is considered to be a highly valued item in many parts of the world.

So, the exchange value for such products is very very high. Among all these steps industrial products are primarily designed for use of functional value necessary condition. And it is desired the day have the substantial exchange value, sufficient condition.

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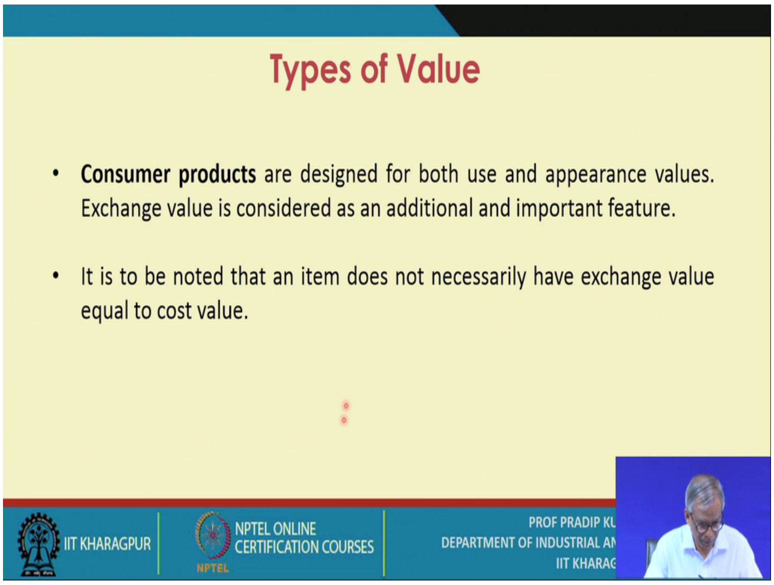

Consumer products are designed for both use and appearance values use means a functional value. And exchange value is considered as an additional and important features.

So, there are many Indian products which you find say to have a very high exchange value. And one of the you know value go for the value engineering exercise, now you the main objective is to what extent you can enhance the value of the product so that it is exchange value the increases. It is to be noted that item does not necessarily have exchange value equal to the cost value.

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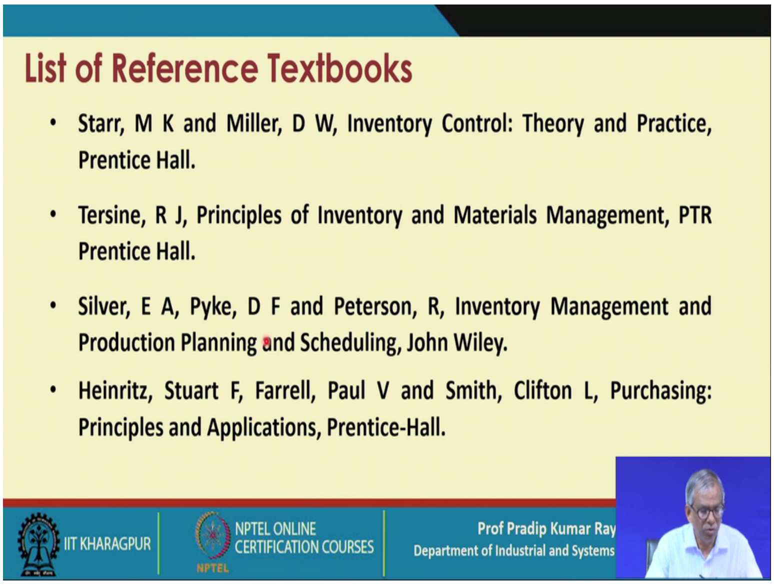

So, more or less a this session this lecture sessions we have the defined value engineering the difference between value engineering and value analysis, in which context this is 2 exercises are carried out, that is known.

Plus, we have very clearly the define say what are the different or you have identified what are the different types of values. And each and every type we have defined in clear and specific terms. So, in other to the sessions will be you know discussing other important issues related to say the value so, the engineering and value analysis.