**Management of Inventory Systems**
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**Lecture - 01**
**Introduction to Inventory and Materials Management**

As you are aware of the course called the Management of Inventory Systems, it is a 30 hour course with 12 weeks duration and a this is the first week the lecture sessions and in the first week our the main topic is Introduction to Inventory and Materials Management.

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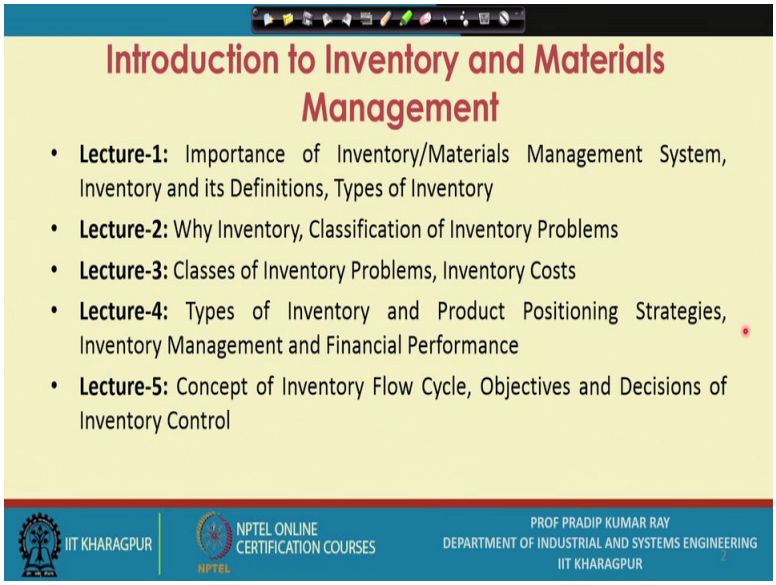


So, when we refer to this particular topic so; obviously, as you are aware there are there will be 5 sessions. On all this, first I will tell you; what are the topics to be covered against each lecture session lecture 1, we will be discussing the importance of inventory all the materials management systems inventory and its definitions and the types of inventory. On lecture 2; the topics to be covered are why inventory classification of inventory problems.

Under lecture 3, we will discuss the classes of inventory problems along with the inventory cost. The 4th session will be dealing with the types of inventory and product positioning strategies inventory management and financial performance and in the ultimate lecture session, this week will be covering the concept of inventory flow cycle is

an important concept objectives and decisions of inventory control. So, this will be our coverage in the first week.

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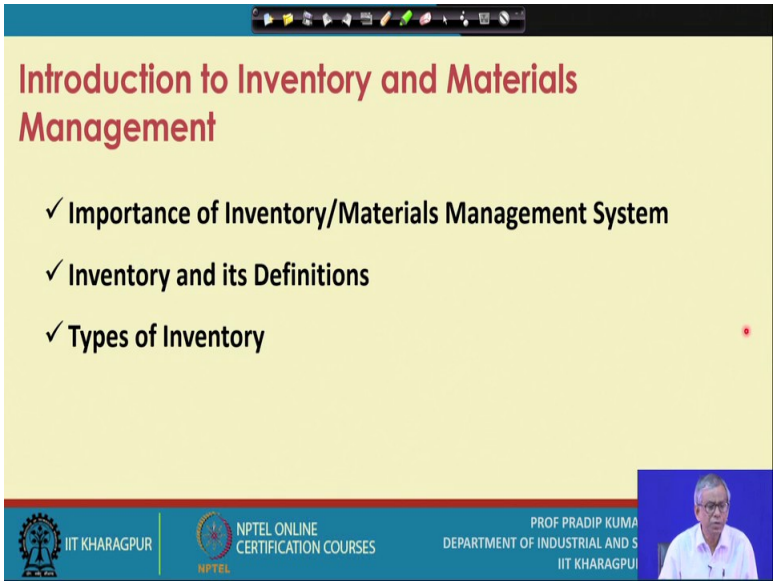


The during the session of the 3 sub topics will discuss at length the first one is the importance of inventory materials management systems; that means, why you want to have such a system in our organization, then there are different the definitions of inventory and if there is a change in the context you need to prefer a particular definition of inventory.

So, we should be aware of the different definitions of inventory and if we are aware of different definitions of inventory in a given situation which particular definition is applicable, we will come to know there are different types of inventory. So, during this lecture sessions, I will try to identify those different types of inventory.

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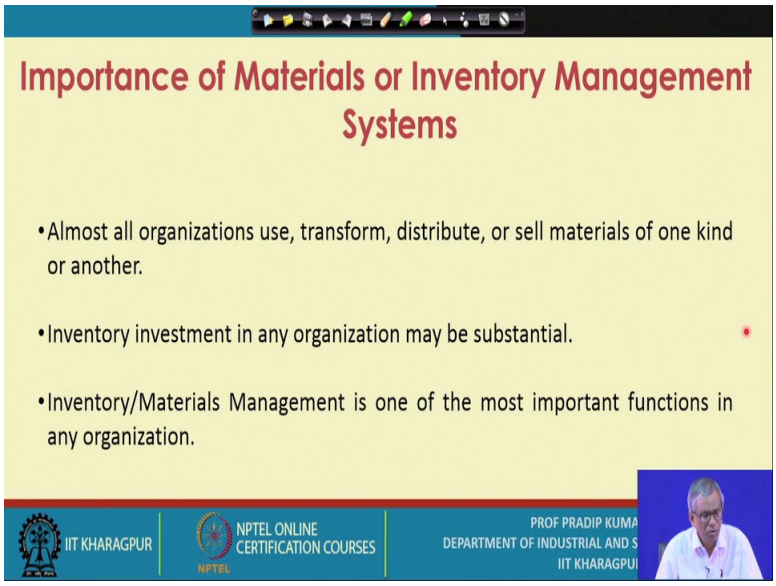


Ok, now the obvious question is that why do you want to have a materials or inventory management systems in an organizations, there are many reasons and these reasons are applicable anywhere in this world for any type of organization. So, certain points, I have mentioned like almost all organizations use transform distribute or sale materials of one kind of another; that means, the material in a given condition, it may transform self to a product or in other different forms.

So, whenever you deal with the materials and the materials having values and that is the main the component of any product on the system in many cases; obviously, we should be aware of the importance of materials or inventory management systems. So, the inventory investment in any organizations maybe substantial, we will find that one of the objectives of inventory management system is to determine this inventory investment at any point in time more scientifically and; obviously, your objective is to have the minimum inventory investment assuring the performance of an organization.

Then inventory on materials management is considered one of the most important functions in any organizations, you may be aware that you know the most of the organizations in a standard for the functional form.

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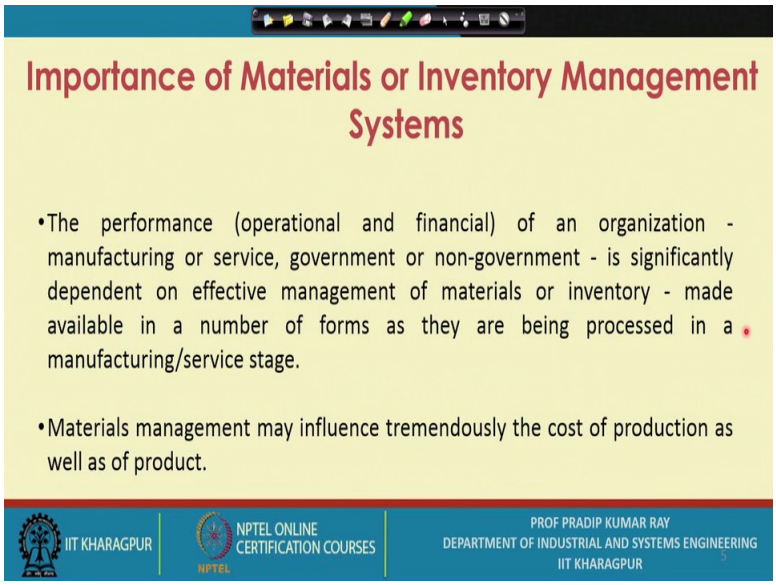


You can identify some 11 the functions as for the q 98 standards and one of the important functions without which you know the systems, you cannot run or the organization, you cannot run that is essentially the procurement function and essentially when you deal with the procurement, we try to have the best possible materials or the inventory management systems for any organization, another important point is the performance like the operational performance of an organization or any unit of analysis for any system as well as the financial performance of any organization, the organization could be manufacturing type or the service type, organization could be government organizations or non government organization.

Now, if you if you want to have an acceptable performance of the organization, what is important is that you will find that this performance is significantly dependent the point to be noted that is the significantly dependent on effective management of materials or inventory made available in a number of forms, very soon will come to know in which different forms a materials can be you know can be made available.

So, this inventory of the materials can be made available in a number of forms as their being processed in a manufacturing or a service stage is it so; that means, whenever you look at a manufacturing system ah from the perspective of materials management, we say the there is a transformation process and at each stage of transformation is a value is added now value to what value to materials or value to the inventory.

So, it you will have the raw materials and ultimately through a series of transformation process of the stages, the raw materials become the finished goods and in the finished goods, you get the best possible value that is expected. So, the materials management lies at the core of any organizational system. So, materials management by influence tremendously, the cost of production as well as a product there are 2 important you know.

So, the aspect one is the production cost and second one is the product cost, if you analyze both these are the types of cost, you will find the material cost or the inventory cost actually it is a substantial in the significant portion of the total production cost or the total product cost.

So; obviously, you must have a good materials management systems with which you can have sufficient control on the product cost as well as the production cost.

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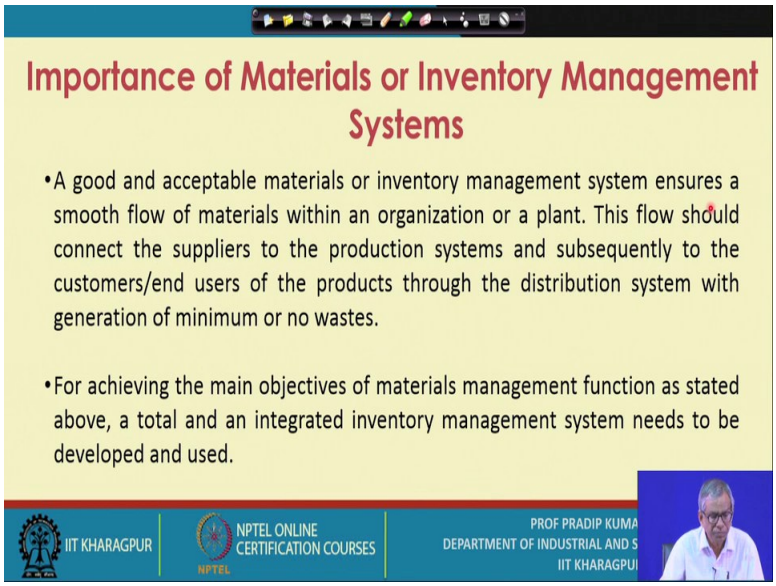


A good and acceptable materials or inventory management system ensures a smooth flow of materials within organization for plant. Now many time, it is it is observed that if the organization once to perform efficiently, excellently what is important is that the flow of materials within the production system must be very very smooth.

That means, there is hardly any you know the installing of the resources or then must not be any you know the blocking of resources whenever you visit a plan whenever you visit

an organization the work is on and what do you find that the material is flowing very very smoothly.

So, immediately we conclude that the materials management systems or inventory management system has to be very good. So, this flow should connect, the suppliers to the production systems at one end your factory systems your organization is connected to your suppliers around the other end, your factory your organization, your you know the operating plans are connected with the customers.

So, what do you need to do; that means, you need to have the control on the flow of materials from the supplier to the factory to the customers. So, this flow should connect the suppliers to the production system or the factory systems and subsequently to the customers or the end users of the products through the distribution systems, there is a process call sales and distribution so through the distribution systems; with the generation of minimum or no wastes. Now can you think of a production system or the manufacturing system, which does not generate waste.

So, there will be generation of wastes, but what do you need to do you create your inventory control systems materials control system in such a way that during the manufacturing operations or the during the manufacturing systems, you will have you must have the minimum amount of wastes. So, there must be sufficient control on the waste generation.

So, there are a very good inventory control systems, later on, you will come to know where you know your basic focus is how to control the waste and if the waste amount is minimized and will find the there is they may not be any reworking there may not be any you know the disturbance in the systems and you can it is assured that the flow of the material within the production system a different stages will be very very smooth.

So, for achieving the main objectives of materials management functions as stated above, we have highlighted what is the main objectives of the materials management function it total and an integrated inventory management system needs to be developed and used. So, there are many issues involved many factors many sub state constrains and you must have a systems approach, there are hundreds of the items hundreds of inventory items, we are dealing with the different types of inventory items and at the aggregate level, you

must have an aggregate system or so, an integrated systems or the total holistic approach you must have.

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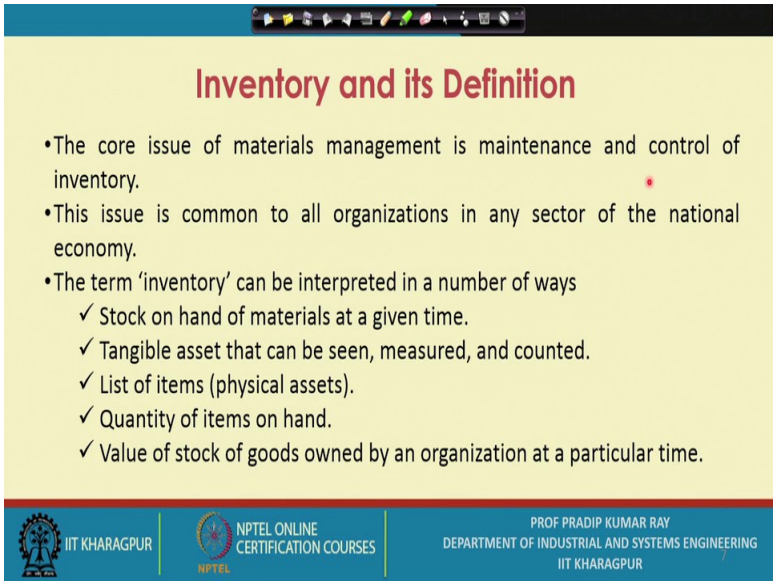


So, will be a dealing with several issues will be dealing with several kinds of modeling techniques will be referring to industry cases will be referring to several kinds of numerical the problems in this particular course and ultimately you will realize that what is you know the contribution of an integrated an holistic materials management systems what is this contribution two hours a continuous improvement process in an organizations keep in mind that if the inventory management system is excellent.

It is expected in all likelihood the performance or the financial performance as well as the operational performance of the organization will be excellent and if you can maintain that; obviously, you will be reaching a condition which is referred to as the sustainable production systems or manufacturing systems or the service systems. So, the core issue of materials management is maintenance and control of inventory.

Now this is a very serious business it is easier said than done, there are 100s of issues, you must be bothering about you must have thoroughly idea about it and that is why whenever you go through this course, it is expected that you will have sufficient knowledge and expertise with that sufficient knowledge and expertise, you will be able to maintain and control inventory in any system or subsystems.

So, this issue is common to all organizations have been telling you in any sector of the national economy ok. So, there could be different kinds of industries, but for all industries all types of industries inventory management is a very key issue. So, the term inventory can be interpreted in a number of ways. So, the if you come across you know the inventory is used, it is used in different ways so; obviously, there is a chance and there is a logical also that inventory can be defined from hundred perspectives.

So, some of these important definitions, first, I will highlight and then I will tell you that what is the best possible definition of an inventory. So, the what is inventory like in some context it is stated that or it is mentioned as or it is defined as the stock on hand of materials at a given point in time the stock of materials or the amount of the material on hand which is currently visible, it is considered a tangible asset is definitely is an asset that can be seen measured and counted; that means, there is a physical existence everybody can see then it is referred as you know of the list of items; that means, it is a physical assets.

Now, the assets could be you know the inventory could be a capital view point, even inventory could be you know the raw materials the inventory could be you know work in process inventory could be is the cash and you know even inventory could be in certain when you against a particular perspectives the human beings also can be treated as a form of inventory quantitative of items on hand.

So, this is the how much is a 1 ton or 500 tons that is amount of you know amount of it is made available at any point in time on hand and the value of stock on the value in might re comes value of stock of goods own by an organizations at a particular time. So, you have a different definitions. Now if you look at all this definitions, you will find the there is just one factor which is common in any definitions of the inventory that is very very common.

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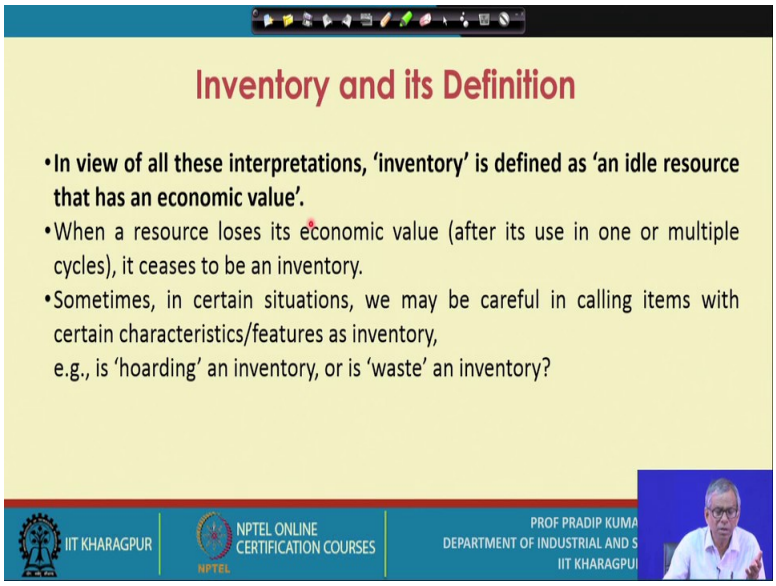


So, I want to highlight ah that common factor in the definition of an inventory. So, in view of all these interpretations inventory is defined as an idle resource that has an economic value. So, whenever you find the resource is idle likes an equipment is installed or you are using some kind of say the raw materials it stored somewhere.

Now, how do you get this materials; obviously, have paid you have spend money. So, this inventory the first it noticeable is the feature of inventory that is the inventory is an idle resources is took as idle, but it has an economic value; that means, it has not yet become the waste if you say it is a waste, it seems to be an inventory when a resource you just uses its economic value; that means, here is an item which has some price and it can be sold; that means, it has an economic value after its use in one or multiple cycles, it ceases to be an inventory is it ok, you start using it at the at the time of this installation as a and equipment as an and inventory is considered inventory.

Because it has got an economic value, but it you start using it after ten years you will find that you cannot use it. So, its functional value goes has become very old and then if it uses is functional value; obviously, you know it uses its economic value. So, after 10 years of its existence that equipment becomes non invent, sometimes, in certain situations, we may be careful in calling items with certain characteristics or features as inventory. So, this is the point to be noted some asking you this question whether hording

is considered an inventory or whether the waste considered an inventory the later on will come back to this point later on.

But at this point in time, you just keep in mind that many such questions are just only 2 questions, I have I have raised right now, but you start thinking that what will be your answer whether the hoarding is an inventory or waste an inventory ok.

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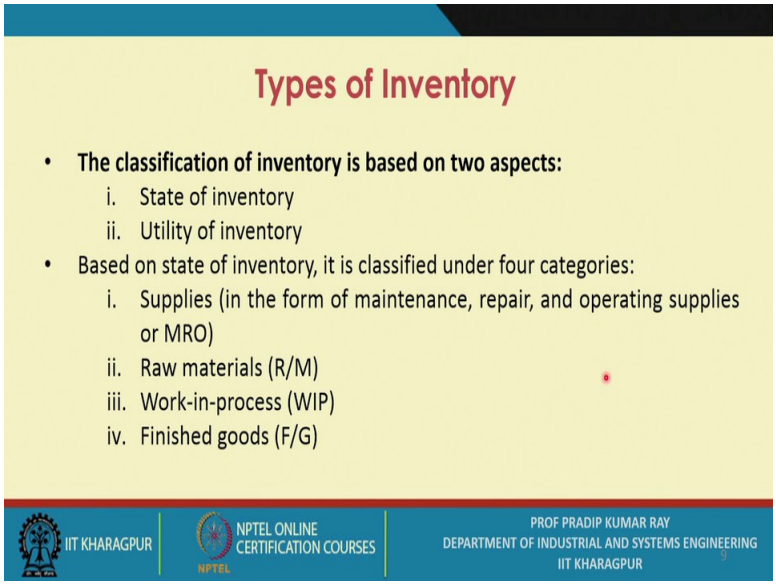


So, these are the definitions. Now I hope that you understood that the basic definition and you must not forget this definition anywhere for any type of inventory analysis you stick to this definition, right.

Now, as we have been mentioning all the time that the inventory can be made in different forms so; obviously, there are many types of inventory, you come across and this types of inventory the depend on what kind of so, the manufacturing process you are dealing with what kinds of the systems, you are dealing with and many other factors. So, first thing you need to do that you need to classify the inventory in with respect to you know considering several factors.

Now, two important factors you need to consider why you try to classify the inventory the first one is the state of inventory the point is the state of inventory or the condition of inventory statements condition and the second one use the utility of inventory. So, what is the utility? Utility is mainly utility refers to the use or usability of the inventory in

which way or how do you use an inventory? So, use value and what is the state in what condition it is

So, the based on the state of inventory, it is classified under 4 categories, there are 4 categories of inventory, everybody will find the first one in any manufacturing setup will find that one class of inventory is referred to as a supplies in the form of maintenance repair and operating supplies.

So, these are commonly called MRO items MRO items; M stands for the maintenance, R stands for the repair items and O stands for the operating supplies. This is very very common and when you are trying this is referred to as the indirect materials, there are two kinds of materials, you come across one is the direct material; that means, these materials is used in production and directly will find these materials are required for making the product.

So, those are basically referred to as the direct materials, but along with the direct materials you need to use several kinds of indirect materials those materials are definitely not going to the product, but their they are used or you know, they have to be used for making of the product with the direct material. So, the first kind is the supplies the second one is the raw materials. So, so raw materials by inventory control systems any 2 a determine and you need to use work in process inventory; that means, the raw materials is getting transformed and it could be in the incomplete state before you know ah other activities are carried out and ultimately, you get the material in the final form that is in the finished goods.

So, from the raw materials to finished goods you must first to do stage what is referred to as a work in process inventory. So, this is very important component in the inventory management systems. So, many time, the work in process inventory control becomes a serious issue and you have to have to develop whether mains you have to develop appropriate the tools and techniques and approaches to control and maintain work in process inventory ok. So, this is an important issue later on will refer to that what sort of the tools and techniques you may have to use for controlling WIP inventory and the last one is the finished goods inventory; that means, is the final product ok.

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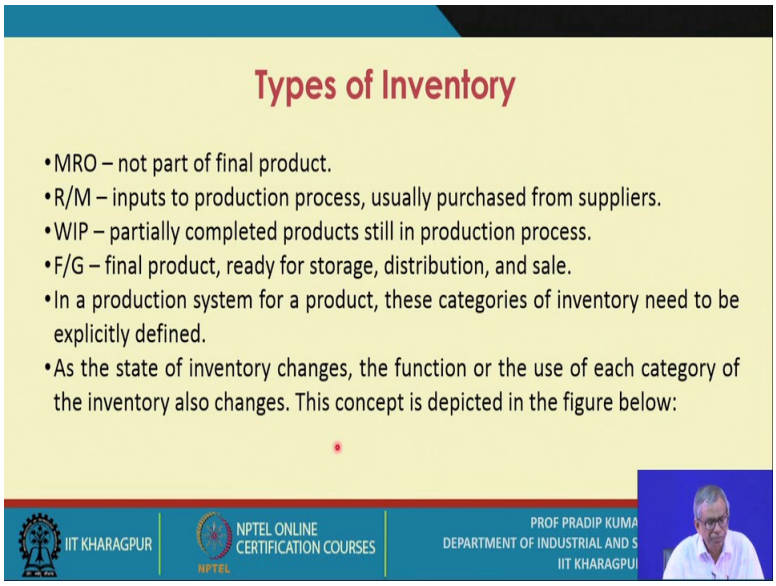


So, ultimately you know it is the final value creation we have. So, that is in the form of the finished goods. So, there are certain comments have made like MRO items not part of the final product so; that means, are indirect materials, then the raw materials when you refer to the raw materials inputs to production process ok.

So, the no production process you can initiate without this raw materials usually purchase from the supplies so; that means, your dependent on the suppliers for the supply of or the availability of raw materials WIP partially completed as I have been telling you, partially completed products still in production process, it has not gone out of the production processes, it has not gone to the finish good stage, what is finished goods?

Now, this is the final product ready for storage distribution shipment and the shipment you know the follows; obviously, the sale in a production system for a product these categories of inventory need to be explicitly define; that means, when you refer to a typical manufacturing systems particularly in the batch production; that means, you know the despite part manufacturing systems.

So, usually you know all you come across all these different types of inventory in different forms where as for the continuous processing maybe you the WIP inventory may not be a major issue is it ok. Raw materials is definitely major issue, but the WIP is may not be in WIP control WIP inventory control may not be an important issue as a

state of inventory changes the function or the use of each category of the inventory also changes this is quite logical and this concept is depicted in the figure below.

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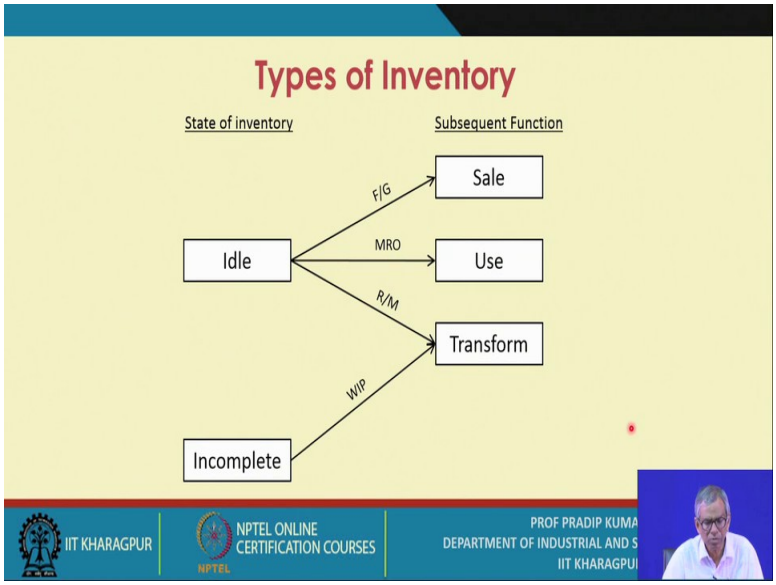


So, these are the types of inventories. So, the state of inventory as of now ok; so, either it could be in the ideal state has I have mentioned the inventory is an ideal resource or it could be an incomplete state ok. So, what could be the subsequent function the next subsequent function is the finished goods and; obviously, what do the finished goods what you do you go for selling if it is MRO item, what do you want to what do you with the MRO items? Obviously, you use it; that means, if suppose one equipment fails. So, we need to have the maintenance face. So, you start using it and if it is the raw material it was idle so; obviously, in the next stage you try to transform it.

So, these are the subsequent functions and if it is an incomplete state and incomplete state means work in process inventory at the next stage again you go for transforming it; is it ok.

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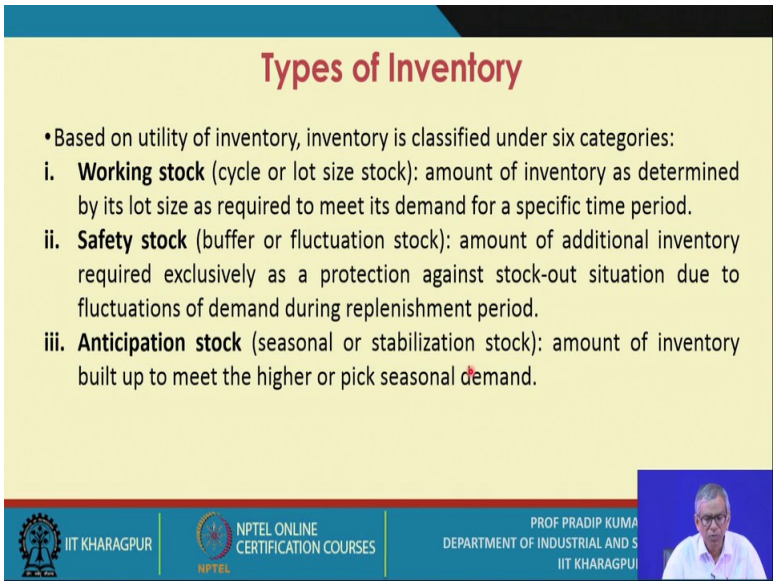


So, now there is another way you can you know, we can classify the inventory and this is based on the utility of inventory and ah as per the utility of inventory the inventory is classified under six categories. So, the first one is the working stock will be dealing with this particular type of inventory in subsequent, you know, the discussions will have several models on this how to determine the working stock this is basically the cycle or the lot size stock; is it ok?

So, you cannot have just one unit as inventory. So, what do you try to do you consolidate the requirement of an item for an extended time period and accordingly you determine the inventory. So, the amount of inventory as determined by its lot size as required meet its demand for a specified time period, then the main issue in many inventory control system is the safety stock determination. So, the safety stock or the buffer of the fluctuations stock different names are given, but it is safety stock amount of additional inventory required exclusively as a protection against stock out situation.

So, one of the main objectives of inventory control system is to do a with a stock out situation now there could be the fluctuations of demand and then there could be fluctuations of lead time. So, in order to, the avoid the stock out situation; what you need to do? You need to carry some extra stock and this is referred to the safety stock or the buffer stock anticipation stock based on the maximum demand you need to fulfill the maximum demand.

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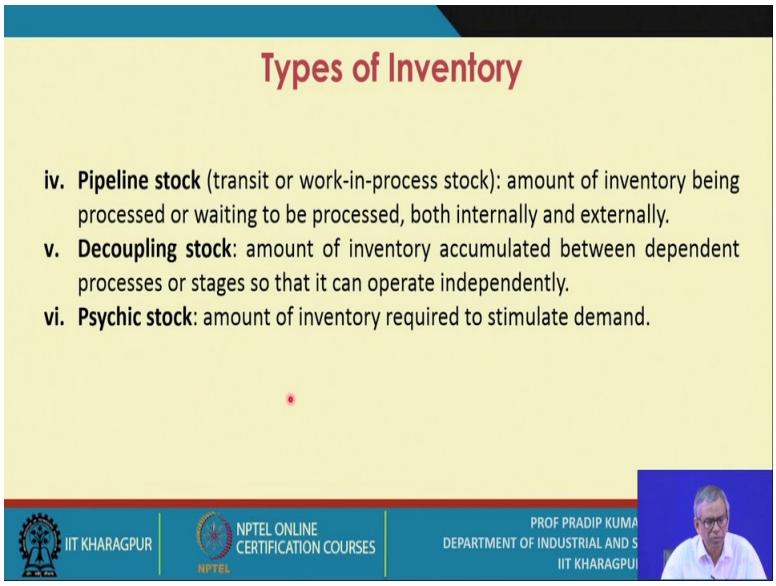


So, accordingly you create a stock of items. So, this is basically called the anticipation stock what is the pipeline stock pipeline stock is basically is the pipeline stock is in complete state and essentially it is a WIP inventory.

So, another name is given that is called pipeline stock what is decoupling stock decoupling stock is the certain amount of inventory you keep at all resources at for at any stage of a production system. So, that that particular production stage can act independently, otherwise, what will happen; that means, if you do not have any extra the inventory or the decoupling stock, you cannot decouple your system or your process from other processes or from the other systems. So, you need to work as for yours production rate you need to work independently.

So, sufficient you know it should be properly calculated based on your production rate and all. So, that you can work a also that particular production stage can work independently. So, this amount of inventory is referred to that is to be determined, this is referred to decoupling stock and of course, you have the psychic stock amount of inventory required to stimulate demand say for a car or for a new equipment or a washing machine.

So, the new model has come. So, you need some extra inventory. So, this the new models will be displayed. So, these are basically called the psychic stock. So, thank you and. So, the basics we have discussed in this lecture sessions and a my suggestion is that you go

through this topic very slow staidly and if you have any queries you please write it and keep it all this queries for the further discussions so.

Thank you so much.