Management of Inventory Systems
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Lecture – 36
JIT-based Approaches for Materials Management

So, during this week, for the course of Management of Inventory Systems, we will be taking up an important topic called JIT based Approaches for Materials Management as you may be aware that the JIT based system has been adopted by many organizations throughout the world.

And one of the main objectives of the JIT base system is to control the inventory level particularly for the dependent demand items, and the WIP inventory including the raw materials inventory.

And it is and we will accepted so the practice is in we will expected the system and as a student of. So, the materials management or inventory management; it is necessary, it is essential that you should be aware of the JIT based approaches of our inventory and the production control, and you also must know that how to apply these techniques.

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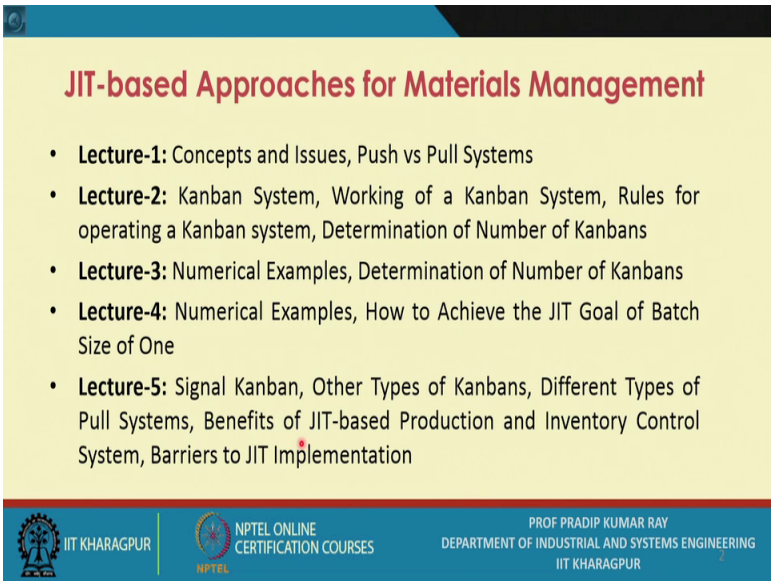

So, during this week, the several aspects of the JIT based production system particularly, it is relationship with that the materials management we are going to discuss. And in

specific terms there will be 5 subtopics, the lecture wise that is, that way we have divided the lecture sessions.

And in the first lecture session we will refer to the concepts and the issues to be, to be known when you try to develop a JIT based systems in your organization particularly, we will discuss the Push system as well as the Pull system. So, you must have a total idea about what is a push system and what is the pull system.

Then the next lecture session we will refer to the Kanban system, actually the Kanban system has been adopted by many Japanese organizations, for inventory control at the shop floor level. And it is a simple system and anyone who is actually discussing or who is trying to implement the JIT base systems at the shop floor level he or she must be aware of the Kanban systems.

Working of a Kanban systems we will explain the rules for operating a Kanban system, what are the specific rules you have to follow; and under those conditions only or the preconditions, a Kanban system is workable. And one of the important of the parameters in any Kanban system is the number of the Kanbans.

So, how to determine the number of Kanbans? And as the number of Kanbans in many instances we will find it represents say the inventory level in a particular work center or at a particular work site during a specific period of time.

In lecture 3, we will take off a number of numerical examples. And we will also continue our discussion on determination of Kanban Kanban, Kanbans number of Kanbans. In the next lecture sessions lecture 4, again we will continue with our discussion on or once on the other types of numerical or the problems.

And we also must discuss the ways and means to achieve the JIT goal of batch size of one. So, this is 1 upon one of the important or the goals of or the JIT based production system. So, how to achieve this goal? What sort of or the conditions you must impose? So, all these details we will discuss with a numerical example.

during the last lecture session, we refer to one say the modified version of the Kanban system, known as the signal Kanban. We will also refer to other types of Kanbans, different types of pull systems we should be aware of, benefits of JIT based production

and inventory control systems, and you also should be aware of the barriers to JIT implementation. So, this will be our coverage.

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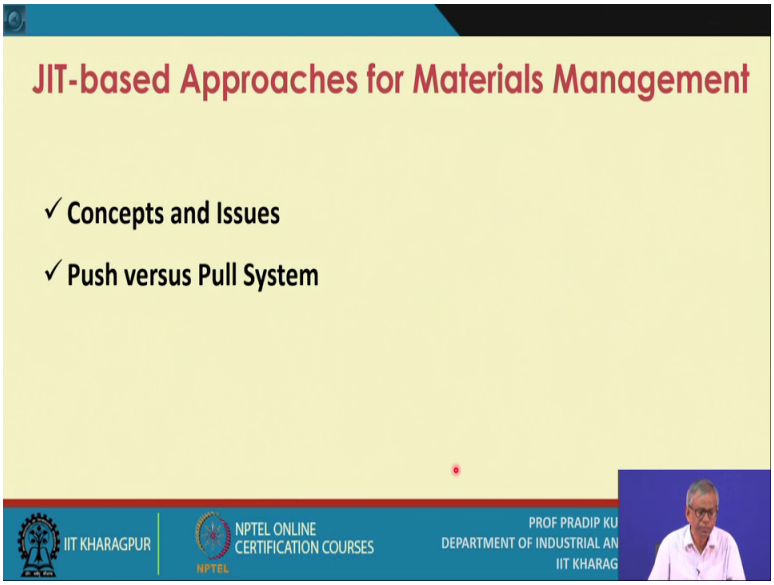

Now, the next half an hour or so during the first lecture session, we will specifically discuss the basic concepts and issues involved in JIT based approaches and then, once we have these ideas and we know that what are the are the concepts to be implemented or to be practiced in a JIT based the system.

Then the 2 types of systems will be will be discussing, the first one is the push system and as an alternative to push system we refer to the pull systems so the pull system details also we will we will explain we will discuss.

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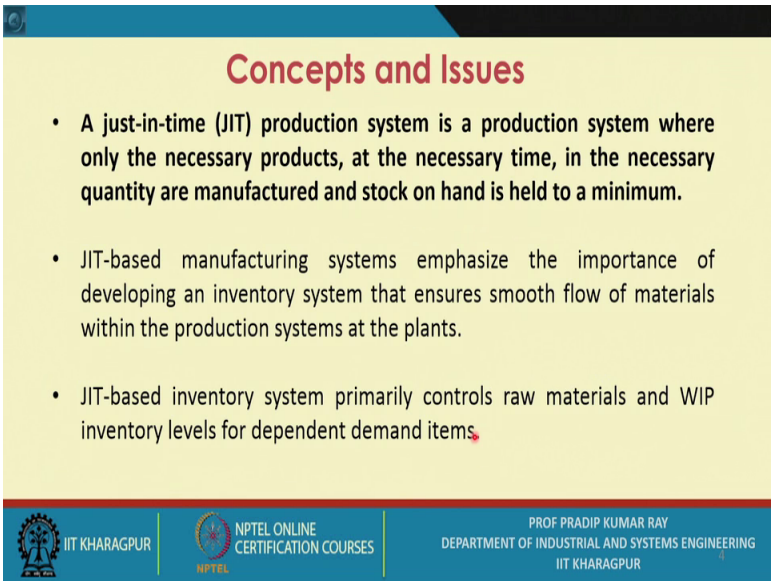

Now, you know the till the 7th week of we have referred to the inventory control systems. And you also refer to say inventory control systems along with the production control systems. The like we have discuss to what is an MRP systems and what are the modified versions of the original MRP systems. So, all these you know the tools techniques approaches for inventory and production control you are aware of.

Now, we are referring to the just in time production system. Now in a just these just in time production systems in short it is refer to the JIT based manufacturing systems of production systems. The entire philosophy of or say the production of the production and inventory control is totally different, significantly different. Now what is a JIT production system? Now it is a production system where only the necessary products at the necessary time in the necessary quantity are manufactured ok. And the stock on hand is held to a minimum.

So, when our objective is to hold the minimum level of inventory; obviously, you feel like adopting the JIT based say the production system because if you have say necessary or the products a necessary quantities; that means, the demand is assured and the you are trying to match say supply with the demand. So, that is your main objective

So, as we have already pointed out that the basic issue is how to get and a balance system; in the sense that, at any point in time or the amount of supply must match with amount of say say the demand. So, if this condition is achieved; obviously, you know

you can run the systems with minimum level of inventory. And if you can run your system with minimum level of inventory, what is the main advantage? Your main advantage is the your investment in inventory will be at the minimum and if the inventory investment is at the minimum level.

Ah. So, the main the positive impact is that you have you know the you have enough money to invest in other types of activities for improving your financial performance. So, as we have already pointed out that, the inventory actually signifies a locked up capital or the tide of capital and as quickly possible with the use of appropriate ways are mains, you must be able to release so the capital out of it.

Now so in that context you have to run the systems. So, with minimum level of inventory and if you adopt with JIT based production systems or JIT based inventory and production control system there are many instances, where the companies are able to run the systems efficiently and effectively with a smooth flow of for the materials within the production system with the minimum cost.

Now, JIT based manufacturing systems emphasize, the importance of developing an inventory system that ensures smooth flow of materials within the production systems at the plants; that means, ultimate objective is whatever the model we use, whatever the methodologies you adopt, whatever the technologies you adopt at your production system.

Now it is to be physically verified whether you are getting the best possible performance or not. It is like seeing is believing; that means, if you visit a particular plant and the plant is in running condition. And if you find that even with lemon size that all the or the resources are running, and the there is there is perfect you know the smooth flow of materials within the production system.

So, immediately you conclude that the performance has to be very, very good. And as soon as you say that the company's performance is well accepted or excellent; obviously, the inventory management systems plays a significant role. So, that is your main goal and the JIT based inventory systems primarily controls the raw materials and WIP inventory levels for dependent demand items. As I have already pointed out that the controlling the WIP inventory, inventory levels is a serious problem. So, the simple, but a effective techniques you have to adopt you have to use.

So, what the researchers have observed, what the practitioners have observed what the last you know of say few decades that, the JIT system is a is a simple systems; that means, if you have the right kind of at issued and you are really motivated, then it is very it will be easier for you to adopt it because the techniques which are used under the JIT on the JIT philosophy.

These are the techniques are easily understood. And so that is why, you know even or the people at the shop floor levels they play very important floor or the JIT for the implementation of ji JIT base tools and techniques. They can really easily understand these techniques and they feel like using it or feel like implementing them.

So, so the shop floor the level problems where you are you are essentially you are addressing many a time when you adopt JIT based inventory control system.

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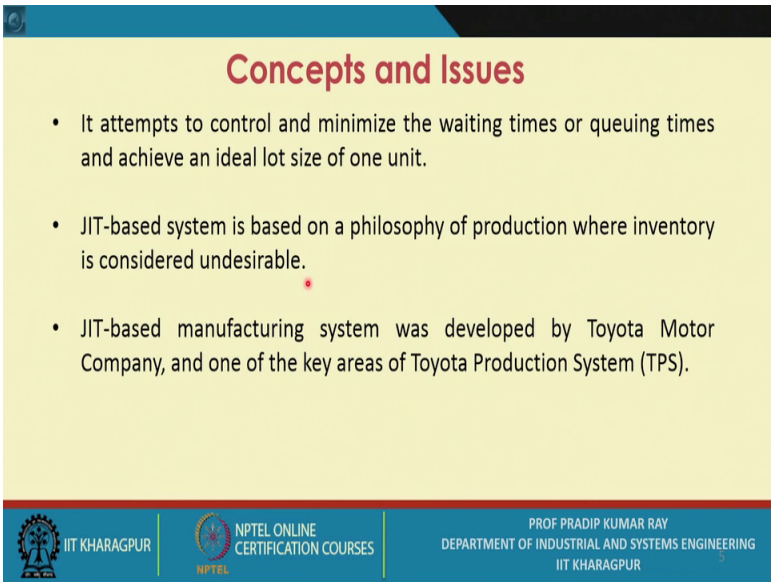

It attains to control and minimize the waiting times or the queuing times, that this is also a very, very important issue and it tries to achieve an ideal lot size of 1 unit ok. So, it is it is own you know about the positive impact on the marketing strategy later on we will understand, but here I want to emphasize on these particular aspects that is how to reduce the waiting time.

Now, what is most important is that; what is your you know for the through put time. So, the through put time is a very important parameter to be monitored and control in any

production and inventory control systems. And throughput time consists of 4important say the time elements, the first one is; obviously, the set up time, the second one is the processing time, the third one is the transfer time or says sometimes it is referred to as material handling time, and at the last one that is the 4th one that is waiting time with the queuing time.

Now, what has been observed till date that save the processing time maybe just 5 to 10 percent of the total say said the total through put time whereas, the set up time could be around 20 to 25 percent in many cases of the total through put time. And the rest 60 to 70 percent of the time say you spend on the or you will lose actually, because of the waiting and because of transform; that means, these are not value adding activities.

Now, when you talk about JIT base production systems; that means, you have to take and open approach or the total systems approach even focusing on definitely on so the improving the processing time, but more importantly, you should also takes steps to reduce significantly the set of time.

So, assert the set up time may be considered to be a non-value adding say the activity or the cost adding activity. So, it should be as soon as possible. And then the waiting time and the transfer time or the handling time as always you know the cost reading activities. So, you have to take ways and means or say the approaches to control them to minimize them ok.

So now, if you can say the minimize the waiting time and the transfer time, what you get? You get a smooth flow of materials within the production system and if you achieve these conditions, you can prove with the data and with the data that you are operating the systems with a minimum level of inventory. Now this is true for say any item and particularly when you look at the items at the shop floor these are mostly the dependent demand items.

So, if you have control on the dependent demand items and these demand items the number is usually is very huge the high numbers. So, you have you it is quite likely, that you have with a significant control on the inventory control systems within your the manufacturing setup or the production system.

So, the JIT base systems is a basically based on a philosophy of production where, inventory is considered undesirable; that means, when you trying it is mentioned that what is an inventory. So, it is referred to as definitely more the definition of inventory that means something which is considered as ideal resource or with some economic value. If it loses it is economic value; obviously, it ceases to be an inventory.

And now the another important say or the comment we make when you deal with the inventory say, inventory related, inventory control situations that is, inventory is a necessary way without inventory can you run the system, you cannot run the systems you cannot produce, but if you do not if you enable to control the inventory level, now it may act as an evil.

So, there are many instances later on in course of time will be referring to those examples. Now JIT based manufacturing system was developed by Toyota motor company. You just make a note, Toyota motor company in later 60s are in late 50s and early 60s. And one of the key areas of Toyota production system is JIT production systems, there are many areas very soon we will come to know what are those areas.

So, so even the kinds of systems the Toyota motor company has developed has implemented ok, for appropriate the production and inventory control production inventory control. So, these itself you know this is referred to as a Toyota production system or in short TPS. Now these TPS has a become a generic term and many companies throughout the world these days.

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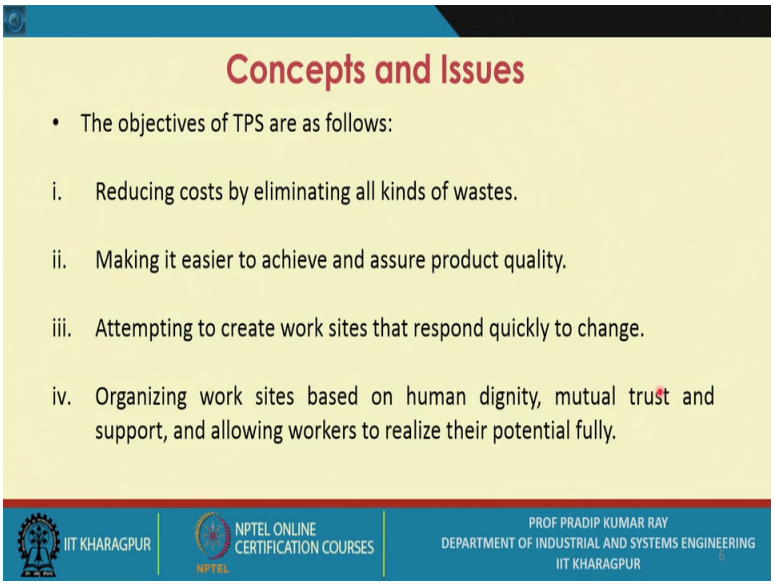

Not only the Japanese companies many companies in the west many companies in European countries, even in Asian countries they have adopted the TPS concept before the manufacturing system.

So, the TPS is a total system Toyota of production system and there are many objectives of TPS. So, there are 4 specific objectives so please make a note. First objective is reducing cost by eliminating all kinds of wastes. Now what are these wastes; that means, a given production systems you also must be aware of and you must be able to or the define this wastes, you must be able to identify these wastes, you also must be able to quantify these wastes at a particular point in time.

So, what is your first goal, the first objective is; how to reduce the different kinds of weights and that the particularly in the context of the production systems there could be many types of waste, and the inventory is considered as one of the such wastes. So, that is objective number 1, what is objective number 2? Make it making it easier to achieve and assured assure product quality; that means, it talks about quality assurance , not only quality control I presume that you know what is say the inspection, what is quality control and what is quality assurance.

Quality assurance talks about a system, what is refers to a system, where even without doing any quality control activity or without carrying out any inspection activity you can you can say, say the conclude that the produced say the or the quartz, the you know the

items in the required quantities are conforming to the specifications thereof acceptable qualities.

So, that sort of condition you have to achieve. There are many organizations throughout the world progressive organizations, they have adopted this particular system and these quality assurance systems they are in running for a long time.

Third objective is attempting to create work sites that respond quickly to change. Now please make a note of this particular objective, when you will refer to the JIT based production systems you come across a situation called Erratic demand pattern. So, if you when if you say encounter a condition called Erratic demand pattern.

So, what you need to do; the pull systems may not work as effectively. So, what you have to do; that means, the push systems should be change to the pull system, and a pull systems when you recommend when you implement it may the way very effective system to respond quickly to the change in demand ok.

So, that is your third objective and the last objective is organizing work sites based on human dignity, mutual trust and support and allowing workers to realize that potential fully, in other words what we are saying that whatever the tools and techniques you recommend to use for implementing the JIT based production systems they must be you know will were adopted and used by the workers or by the, by the you know work personnel at what levels of the organization ok. And the there must be a say so they must took compare word because many of these techniques we you will use we will find there to be a control manually.

So, the people's participation is a must and people should wholeheartedly you know the participate that is why, you know the human dignity and mutual trust and faith and support has to be there otherwise, all these tools and techniques may not be may not be effective at all ok. So, these are the 4 objectives.

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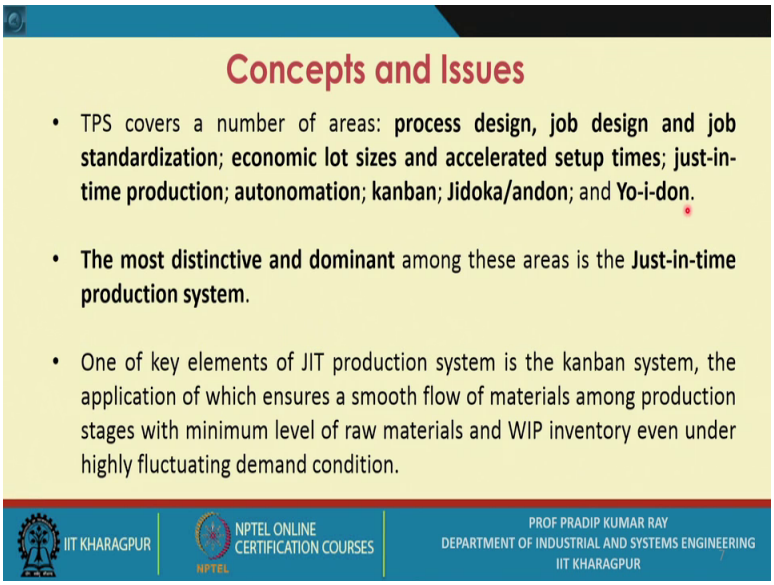

Now, the TPS covers a number of areas so please note down these areas they are very, very specifics first one is you talks about the process design, job design and job standardization. So, this is just one category.

So, so the process design you must get into the details of process design, then the job design, and the job standardization this is one set of say responsibilities you have. The second one is we will be taking of these issues, economic lot sizes and the accelerated setup times ok. So, I have already pointed out that the set of time reduction as well as in the set up cost reduction is an important goal in JIT; JIT based manufacturing systems or the production systems.

So, so, you have to say and a system which permits this condition which is the accelerated setup times; that means, set up time should be as minimum as possible ok, very quickly you can you can set up you are, you are the machine. So, machine set up time should be as minimum as possible and the entire set of activities should be as simple as possible.

Just in time production, this is one of the key areas in TPS autonomation this is a actually Toyota coin term, it means autonomation means, if you start producing at a particular machine tool a defective item the item actually, immediately the machine will stop.

The Kanban system Jidoka and Andon actually this is a for the problem warning systems Jidoka Andon and Yo I don, Yo I don basically it means the synchronous the manufacturing. The most distinctive and dominant among these areas is the just in time production system. One of the key elements of JIT production system is the Kanban systems we are going to discuss this Kanban systems in various forms in detail. The application of which ensures the smooth flow of materials among production stages with minimum level of raw materials and WIP inventory even under highly fluctuating demand condition.

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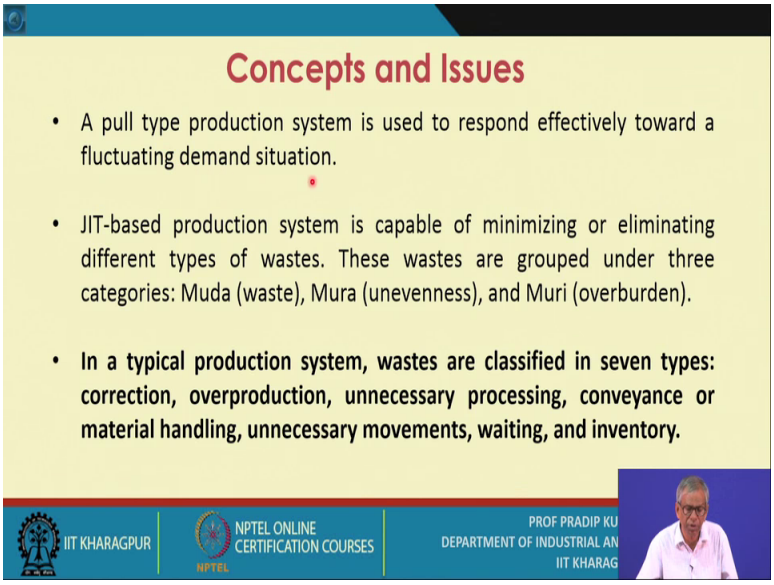

A pull type production system is used to respond effectively toward a fluctuating demand situation, JIT based production system is capable of minimizing or eliminating different types of wastes. So, these wastes are grouped under 3 categories Muda, Mura unevenness and Muri overburden. So, later on you know in details we may discuss these 3 types of say the waste.

In a typical production systems wastes are classified in seven types. So, this you know these types you must note down first one is the correction, second one is the overproduction, it is not a desirable you know aspect unnecessary processing, conveyance or material handling, unnecessary movements waiting and inventory ok.

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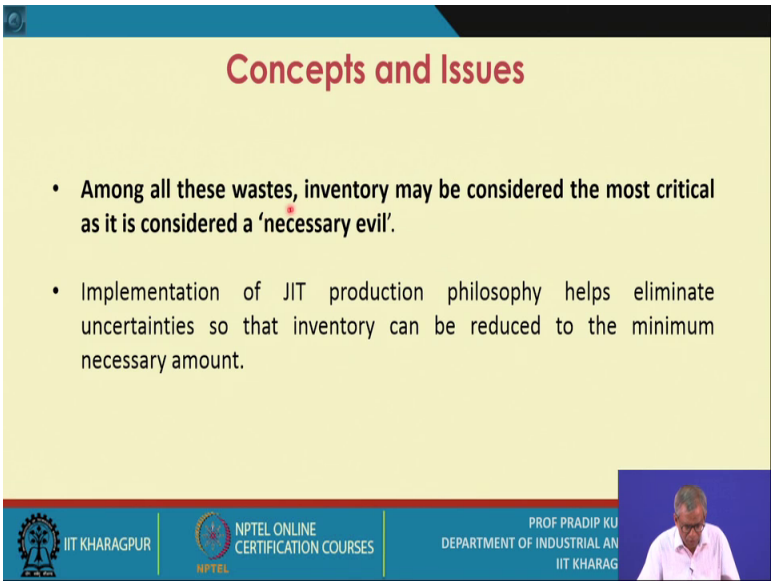

So, among all these wastes inventory may be considered the most critical as it is considered a necessary route, this point I have already mentioned. The implementation of JIT production philosophy helps eliminate uncertainties, that is the point to be noted; that means, from an uncertain the situation you may move to a certain situation so that the inventory can be reduced to the minimum necessary amount.

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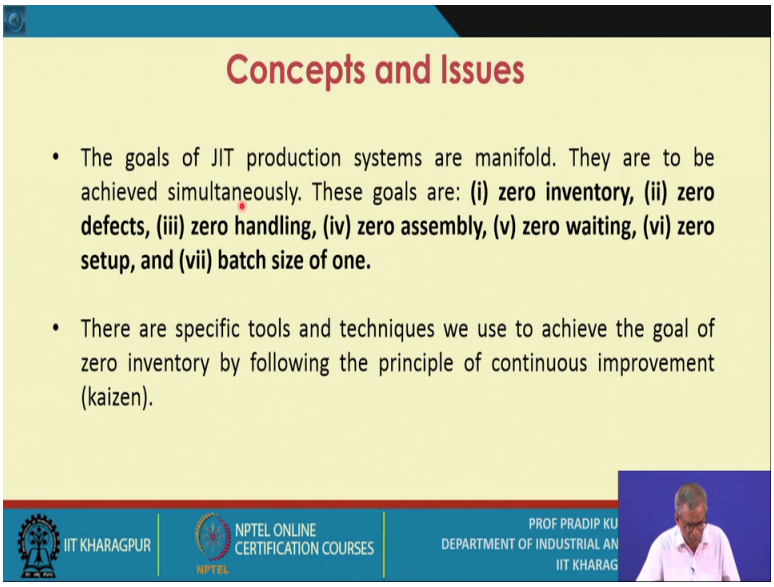

Now, the goals of JIT production systems are manifold, there are to be achieve simultaneously. This point to be is to be noted this goals are 0 inventory, 0 defects, 0

handling, 0 assembly, 0 waiting 0 set up and batch size of 1. So, there are specific tools and techniques we use later on we will come to know to achieve the goal of 0 inventory by following the principle of continuous improvement on the Kaizen, this point already I have mentioned.

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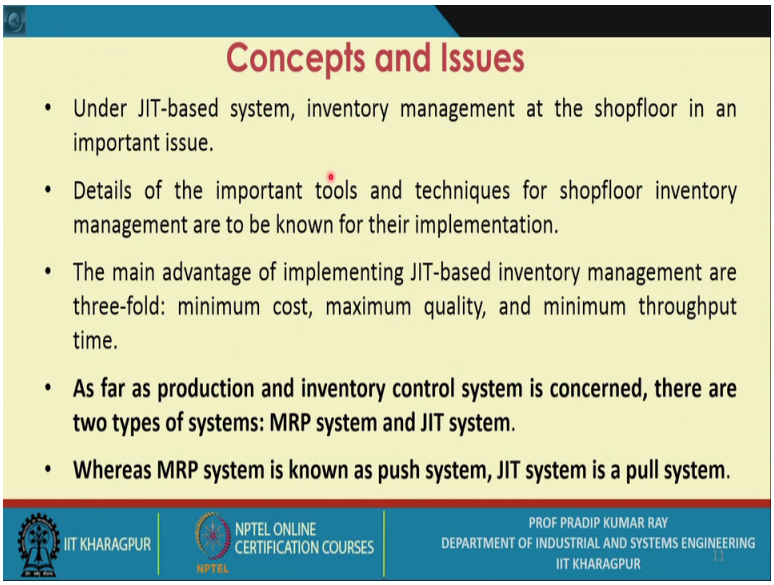

So, under JIT based systems inventory management at the shop floor is an important issue, details of the important tools and techniques for shop floor inventory management are to be known for their implementation.

The main advantage of implementing JIT based inventory management are three fold, minimum cost, maximum quality and minimum throughput time; where as far as production and inventory control system is concerned there are 2 types of systems MRP systems and JIP, system and JIT systems already we have discussed the MRP systems. So, the MRP system is known as the push system whereas, the JIT system is a pull system. Now these push and pull systems will be discussing in our next lecture sessions ok.

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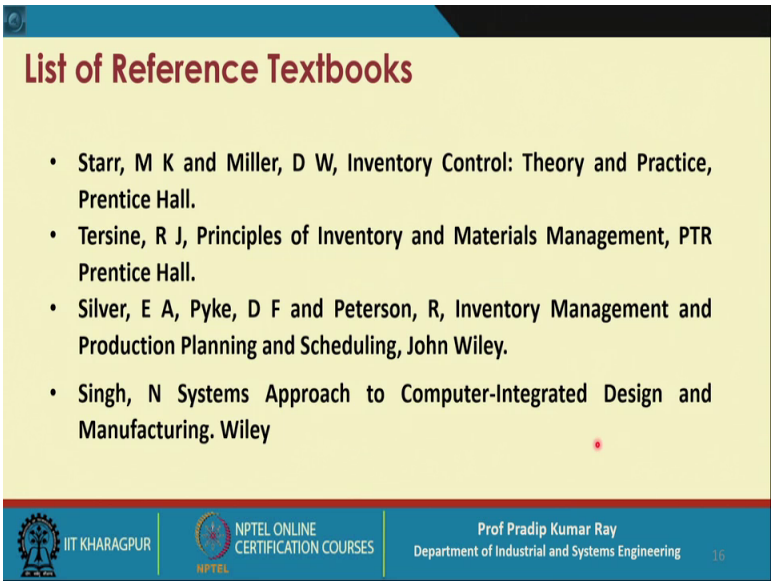

So, thank you, so I stop here.