

**Operations Management**  
**Dr. Inderdeep Singh**  
**Department of Mechanical & Industrial Engineering**  
**Indian Institute of Technology, Roorkee**

**Lecture – 51**  
**Materials Management**

[FL] Friends, so welcome to session 51 in our course on Operations Management. As all of you are well aware that this course is a 12 week course, 30 hour course on operations management and today we are going to start our discussion for week 11, in which our focus will primarily be on Materials Management. As all of you are well aware that in any industry, any manufacturing industry there is a raw material that we convert into a final product.

So, the raw material can be of different types. For example, this pointer I am having in my hand, two different types of materials you can see here; one is a metallic, another one is a non metallic material. So, we have to manage the materials in an industry. Why? Because the overall cost of the product is highly dependent upon the cost of the materials also.

So, if we are good enough, if we are intelligent enough, if we are judicious enough in the procurement of our material, in avoiding the wastage of material, in properly managing our material flow, in effective and efficient utilization of materials. So, if we are able to manage our materials properly within the organization, we will be able to earn a good amount of profit for our company or for our industry and therefore, all of us must be able to address the important points related to materials management.

So, materials management can be done by a shopkeeper also and can be, can be done by a very high and sophisticated equipment manufacturing company. So, materials are managed at different levels in different forms, but the basic concept remains the same, that we must be able to buy the materials at a reasonable price, at reasonable quality, in reasonable quantity.

We must be able to use these materials in the most effective manner; that is the wastage of materials must be avoided. And then finally, we must be able to produce a product based on these materials, so that the product is also successful in the market. So, the

overall umbrella of materials management spans from the procurement of the raw material to the final dispatch of the finished goods or finished products.

So, as an engineer, as a manager or as an industrialist, as a businessman it is very important for me to understand the concept of materials management. So, in today's session; that is the first session for week 11 in our course on operations management, our focus will be on the introductory part of materials management and thereby we will learn different techniques. For example, ABC analysis, economic order quantity and we will see certain numerical problems based on these techniques.

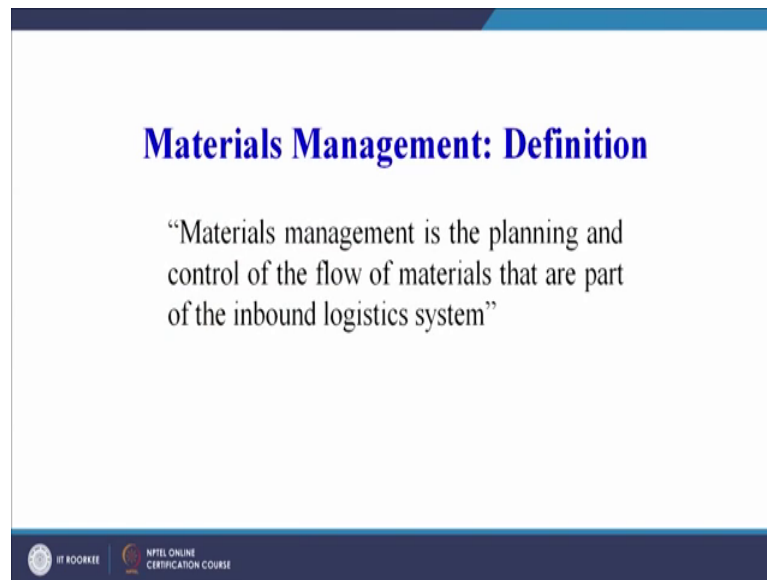
So, we have hardly 2 and a half hours available with us for discussing the complete concept of materials management which is sometimes taught as an objective course at the PG level which may span for 40 hours duration. So, 40 hour course you can imagine, we have to cover in a small duration of 2 and a half hours. So, we will have a brief idea and will acquaint ourselves with some of the most important tools that are used for managing the materials within the organization.

And if we have to be successful in managing our operations in the organization; one of the key components is the materials management. We may be very very efficient and effective in managing our operations, but if we are poor in managing the materials, the overall advantage that we derive by managing the operations may be lost, because we will be spending additional amount in the wasteful expenditure on mismanagement of materials that can be easily avoided by using certain tools and techniques.

And in these 2 and a half hours our focus will be on learning these simple tools and techniques which do not require any high end mathematical equations, it only requires simple mathematical calculations; such as addition, subtraction, multiplication and division which is known to everybody. So, basic mathematics will be used to solve certain problems, which will help us in better management of our resources, specifically the materials.

So, let us try to understand the fundamental aspect behind the materials management. So, first let us see what is the definition of materials management. So, materials management is the planning and control of the flow of materials that are part of the inbound logistics system.

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So, we are procuring the material and we have to plan our procurement process, as well as we have to control the flow of materials within the organization. So, we have to see that our materials are managed properly, the procurement process is managed properly and there is no waste of materials or may be the. Waste in the sense one example, I wish to quote here, that suppose we have bought a huge amount of material, but the usage rate is very very less. So, we have kept the materials for a long period of time, which means that we have blocked huge amount of our capital in the materials that are only stored in our storehouse and are not being used at a very frequent rate or are not being used at a very high rate.

So, we have, may be locked our capital which is not a good decision from the industrial point of view. So, that is something we can bring it down or scale it down to our households also. For example, we will never buy 2 quintiles or 3 quintals of onions at the same time; at the max depending upon the size of our family, we may go to the market and buy 5 kgs or 10 kgs of onions, so that we may consume them in a month's time and then we can buy more onions.

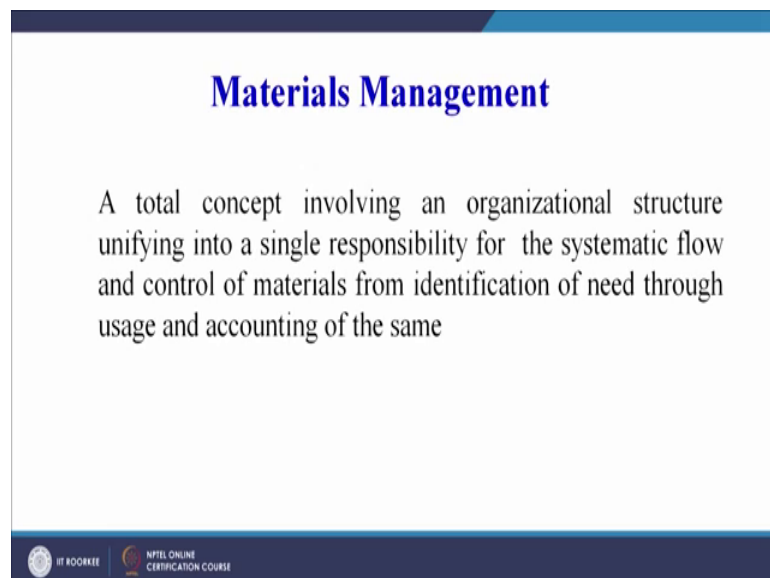
So, the materials management this is a scaled down model, similar model can be applicable in the industry also. Instead of you buying or instead of procuring a huge amount of material which is not being used at that rate will lock up lot of capital which can be easily avoided by properly managing the procurement process. As we manage the

procurement of materials in our houses, similarly using common sense we can manage the materials in the industry also and we do not wish to block lot of money in the inventory of our industry.

So, this is first thing, is the definition must be clear that why we are doing the materials management. Many times we will see that people are not able to manage the materials properly, even in our houses also. Sometimes there is some sale, so we feel that now we are getting 2 plus 5 free or 2 plus 3 free. So, let us buy these 5 commodities. So, we buy those 5 commodities, we pay also, but we are not able to use them, maybe it is lying just in our almira's so or in our trunk. So, that is something is wasteful expenditure and the material is not being utilized properly.

So, whatever we try to learn we should try to relate it with our day to day experiences, so that we remember it throughout our life. So, materials management will teach us that when we must order, how much we must order and then at what quantity we must order, in order to utilize our resources properly, in order to make use of the money that is available for us in the most judicious and in a efficient manner. This is the first definition on your screen related to materials management.

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**Materials Management**

A total concept involving an organizational structure unifying into a single responsibility for the systematic flow and control of materials from identification of need through usage and accounting of the same

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Then what is the concept; a total concept involving an organizational structure unifying into a single responsibility for the systematic flow of, flow and control of materials from the identification of need through the usage and accounting of the same. So, maybe it is a

systemic management of materials flow, planning and control. So, both functions are there we have to plan also. So, plan means, now suppose we know that we have to order 10000 car tires and we have an idea that we have forecasted as we have seen in our course on operations management only in the first 4 weeks, we had 1 complete week on forecasting. Now suppose we have a forecast for producing a certain number of cars in a month, maybe we are going to going to produce based on the forecast, suppose 2500 cars in the next month. How many tires will require? It is a 4 vehicle, 4 wheel vehicle. So, 4 wheels per car will be required. So, 4 week wheels per car means 2500 cars we plan to manufacture so multiplied by 4. So, maybe 10000 tires will be required for the next month.

So, now, we have to see that as per forecast, whether we must order all the 10000 tires at one go or we can spread this order into 2 weeks or after maybe span of 2 weeks that instead of ordering all at once, we can order it twice in a month or we can accept the order twice in a month. So, that kind of decision making is the planning, planning part. So, we are planning that when we must order, how much we must order and then once we have done this when we once we have completed this planning activity the next stage is the control. When the materials are coming we have to issue at a particular rate to the assembly line, we have to control, we have to keep a check at the usage rate of our may be the materials.

Then we have to see that when next we have to place the order. There will be a red tag that if the inventory level or if the storage level of the tires go beyond a particular or go below a particular inventory level we have to immediately issue a order and there will certainly be some lead time by which we get the next order. So, it is not only the, maybe the planning part, the controlling part is also equally important. So, for materials management we have to manage both. We have to manage the planning; we have to manage the control part also.

And to the last thing you can see that what we need to plan, what we need to manage from identification of need through usage and accounting of the same. So, we have to see the identification of need, as I have told that there will be a red tag the. We are using the materials from our storehouse, so there will be a point that we call as the reorder point which we will discuss in our subsequent sessions. So, there will be a point that when the

number goes below that reorder point, immediately we have to issue an order that we want additional raw material or additional materials.

So, we have to see the identification of neither, there is a trigger point that we require additional material. Then we have to see it through its usage and finally, the accounts have always to be managed properly. So, materials management is not only related to one function of related to materials, but it is related to different functions related to materials management

Now what are the objectives? So, whatever we have studied till, maybe the last slide or in today's session, the focus was on abstract thinking about what a materials management topic can be, but here we are trying to be very specific in terms of objectives that what do we plan to do with materials management, what are the objectives of materials management. The first is support the organ operational requirements.

So, operational requirements means that we have a set of operations being done in the organization and our materials management department or materials management section must be able to complement them, must be able to supplement them with the whatever requirements are raised by the operational department. As I have taken an example that is assembly of 10000, assembly of 2500 cars. So, the car is being assembled on the assembly line.

So, as a materials management section we have to ensure that whatever has to be assembled at different stations must be supplied there, so that the line operates continuously, so there is no break of our assembly process. So, materials management the main function is, to supplement the major operations of the organization. So, first is support the operational requirement, second is manage the material process efficiently and effectively.

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**Materials Management: Objectives**

- Support operational requirements
- Manage the material process efficiently and effectively
- Select, develop and maintain sources of supply
- Develop strong relationships with other groups
- Support organizational goals
- Develop integrated strategies that support organizational goals

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So, the materials process means that right from procurement to the usage and finally, the accounting part of the material, it has to be managed efficiently and effectively. Select, develop and maintain sources of supply. Now suppose we are buying the materials from our vendors. So, we have to develop new vendors, we have to keep maybe different vendors for our supply process. For example, suppose we are not able to procure the material from one particular supplier, because of any reason.

Because of a political unrest or because of strike, we must have our alternate sources of supply, so that we have to always keep on developing the vendors, so that we have alternate sources and sometimes the competition also is good for us. So, that we are able to negotiate for the prices also with our vendor. So, it is a major function of materials management department to select, develop and maintain the different sources of supply, also to develop strong relationships with the other group. So, we must always be in good relationship with different sources of supply or with different vendor. Sometimes in some organizations we call it the vendor development also, for the requirements we can always look up for different vendors.

Then support the organizational goals. It is something similar to the first part, support the operational requirement. So, in operational requirements our focus is on the operations specifically. In organizational goal our focus is that the brand of the company, the brand name of the company must always be held in a high esteem by the customers. And how

that is possible if we are producing a high quality product? And the quality of the product is also dependent upon the materials, the process that we are using and the quality control mechanism that the company is following.

So, that overall organizational goal is to make profit and our materials management can definitely supplement this organizational objective of profit making by properly managing the procurement, usage and the accounting of the materials. And finally, develop integrated strategies that support organizational goals. So, maybe slightly the discussion is on the theoretical part, but it is highlighting the objectives that a materials management section has to keep in mind, while they are undergoing their process of materials procurement, planning and control.

Last part; develop integrated strategies that support the organizational goal. So, always they have to keep on switching strategies, developing new and new strategies in order to procure the materials in the best and efficient manner, in order to use the materials in the most efficient manner and thereby supporting the organizational goal of making profit and satisfying the customer and as well as making a good brand name for themselves. So, that is the overall objectives of materials management department.

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**Scope of Materials Management**

- Materials requirement planning and control
- Procurement
- Inventory control
- Receiving and inspection
- Transportation
- Material handling
- Disposal of materials
- Value analysis

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Now scope of materials management where the materials management section can focus on material requirement planning and control. In the previous section we have seen that they have to develop this new and new strategies. One of the strategy that is most



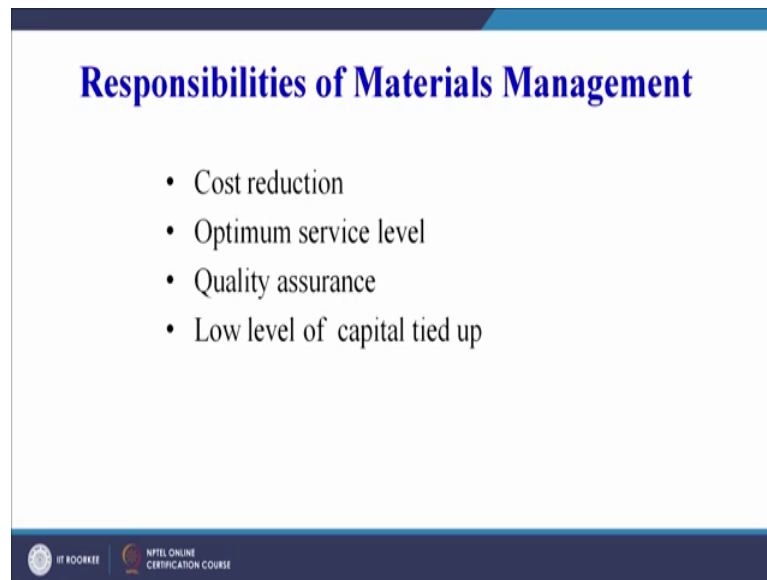
commonly used is just in time, where the material procurement is done, when it is required. So, we have one session on JIT also that we will be covering, maybe we have already I think covered JIT in our previous session.

So, we will see that if it is not covered we will cover in the next session. So, one thing is JIT. Then the materials requirement planning and control is one of the objectives, another is the procurement, they have to take care of inventory control has to be done. Inventory control we will do different types of analysis, receiving and inspection, transportation, material handling, disposal of materials, value analysis. So, all these comes under the purview of materials management and materials requirement.

Planning is one of the important things that has to be done by the materials management section. As I have already highlighted procurement, inventory control, receiving an inspection of materials, transportation of materials, material handling, disposal of materials, value analysis. If you remember in our discussion on product design and development we had session on value engineering and analysis. So, always the materials management department has to be, it has to keep a focus on that what can be the alternate materials that can be used for the similar type of application or for the same application. Can there be alternate material which is performing the function reliably, but at a relatively lower cost.

So, that type of analysis also materials management department, will continuously be doing in order to make profit for the organization. So, rest all whatever points are listed I have read them twice. So, maybe you can remember them and their self explanatory only.

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Now responsibilities as I have already told the last point of the previous slide; that is value analysis is directly relational related to cost reductions. So, always the management department or the materials management department has to be on it toes to ensure that they are able to procure the materials at the least possible cost without compromising the quality, quantity, as well as the performance of the materials. So, that is one of the major objectives of materials management or the main responsibility.

Another is the optimum service level has to be maintained; that is whenever the material is required for any operational requirement, the material must be available within the organization. It must not happen that the material has to be ordered and the process has to be stopped, because of the want of the material. This is like that we have guests in our house and we are running for buying the milk for preparing the tea. So, that is a similar thing scaled up at the industry level that there is a requirement of the material, but we are not able to manage the supply of that material; therefore, the it will be considered as a huge failure of the materials management department, and they, it means that they have not been able to discharge their responsibility properly and they will be held accountable for this loss.

So, as a big responsibility of the materials management department it, they have to ensure the cost is optimum, optimum service level is maintained, quality assurance also has to be ensured by the materials management department and then they have to ensure


that, in the beginning of today's session I have told that usually we do not want huge amount of capital to be tied up with the materials. So, we will order the material as and when required, maintaining the optimum service level, so that whenever a material is required, we may not be looking for our vendors. So, we have to ensure that low level of capital is tied up, our complete capital or a huge amount of capital is not tied up with the materials.

So, as a responsibility of the materials management department, they have to ensure cost, optimum service level, quality of the materials, as well as the low level of the capital must be invested in the storing the materials. So, now, what is inventory? I think in the previous session, no in today's session in the previous discussion I have used the word inventory number of times. So, what is inventory basically? So, inventory is a stock of items, which have been kept to meet the future demand. So, we have, we always keep some materials in store, so that can be called as the inventory.



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## What Is Inventory?

- Stock of items kept to meet future demand
- Purpose of inventory management
  - How many units to order
  - When to order



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So, inventories stock of items kept to meet the future demand. Purpose of inventory management is, that how many units to order, when to order. So, we have to answer these two questions, that how much we must order that we will get from economic order quantity EOQ analysis, and then when to order that also we will we can calculate from there, if we have the yearly demand available with us and we calculate the EOQ value. Then we can very easily find out that how many orders we must make, and when we

must make those orders in order to, so in order to manage the overall demand of one particular year.

So, these type of answers we have to look for. When we are managing the materials in an industry, we have to find out that how much material is required that will come from the forecast. Once we know this is the material requirement for our company in the next 6 months or next quarter or in the next year, we have to then plan that when to procure this material.

There is another thing as we have seen vendor development. We have also to see that from whom we have to procure this material. So, from whom means they there we have to maintain different sources of supply. So, we have to ensure from whom we have to buy the materials, how much we have to order in single go, when we have to order? So, all these answers we have to find out. And for finding these answers we have and tools and techniques that we will learn in our discussion during this week.

So, the two questions that are most important are mentioned here, how many units to order and when to order. Now what are the components of inventory? We know that what is inventory. It is the stock of materials as per our forecast. So, raw materials fall under inventory, purchased parts that we have, that are to be used for the assembly of the product will also fall under the inventory.

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**Components of Inventory**

- Raw materials
- Purchased parts
- Work-in-process (partially completed) products (WIP)
- Items being transported
- Tools and equipment

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Work-in-process; that is partially completed products that is usually we call as WIP work-in-process, we will also fall under inventory. Items being transported from one section of the company to the other section of the company through the material handling system will fall under inventory and finally, the tools and equipment will also be falling under the inventory only. So, I think our discussion today primarily is based on the fundamental aspects of materials management.

And I think we have been able to cover in this particular session that what are the objectives of materials management, why do we need to study materials management, why do we need to do materials management? Then we have seen, what is the scope of materials management that what all we can do? What are the responsibilities of materials management department? And finally, we have seen the word inventory; that what is inventory and what type of answers we have to find out in inventory management and control? And finally, we have seen that what are the different types of materials in any organization?

So, with this I conclude the today's session. In next session we will learn a technique that is used for materials management.

Thank you.