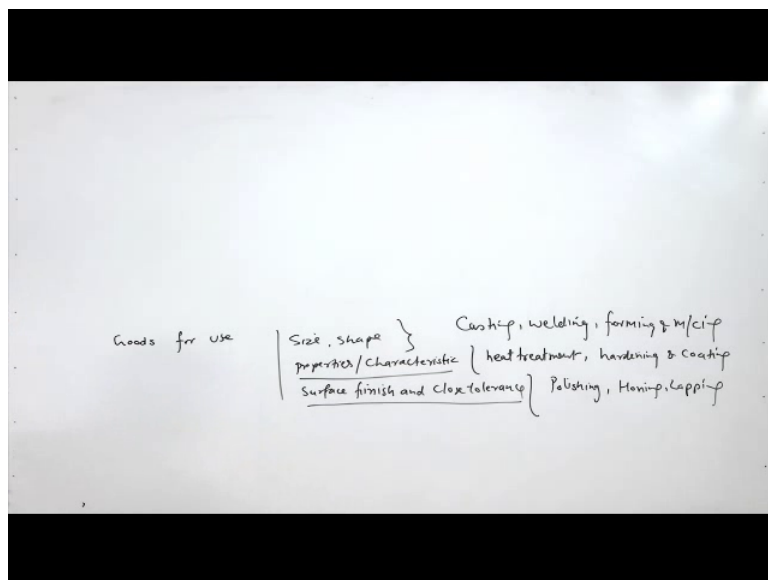


Fundamentals of Manufacturing Processes
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Lecture – 01
Understanding Manufacturing

Hello, I welcome you all in this presentation related with the subject fundamentals of the manufacturing processes. This is a very big subject having very wide scope, in this subject we will be talking about the different aspects related with the manufacturing, you know the manufacturing is used for producing the goods for use by human being, and these goods are for providing the desired service.

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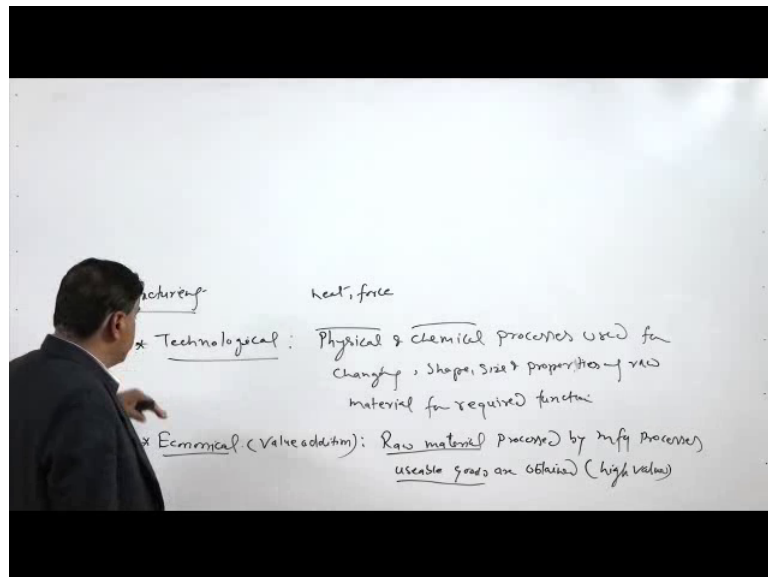
It is necessary that they have desired size, shape they also have the desired properties, so that it can perform for long properties and characteristics. So, that it can perform the desired function for long, so means life is good as well as it also has the desired surface finish and the close tolerance.

So, these are the three types of the features which need to be there in any product which is being made for used by the human being. So, for sizing and shaping a one set of the processes are used, well for a imparting the desired properties another set of the manufacturing processes are used, and similarly for surface finishing and achieving the desired close tolerance the another set of the manufacturing processes is used.

So here like for the sizing, we can use the processes like casting, welding, forming, and machining, these are the most common processes for achieving the desired size and shape. For achieving the desired set of the properties and characteristics in the goods being produced, we can perform like heat treatment, and we can perform the hardening of the surfaces, we can develop coatings on the surface, so that it has a desired characteristics.

For achieving the desired a degree of finish and the close tolerance the super finishing processes are used for example, like polishing, honing, lapping, these are some of the processes which are used for achieving these three functions related with the production of any goods manufacturing any goods, which will be usable for the service.

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So, this is what is there in manufacturing, basically we try to make something goods which can be used for the service by the human being.

So, this manufacturing process or manufacturing can be defined in the two ways; one is the technological way and another is economical way. So, when we try to define the manufacturing in the technological terms, then technologically the manufacturing is basically the set of the processes or you can say set of the physical and chemical processes used for changing the shape, size and properties; properties of raw material for required function.

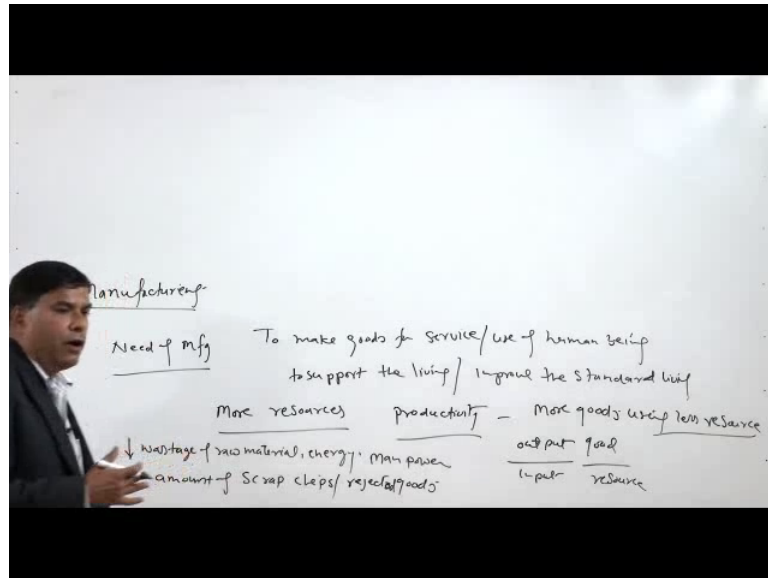
So, that the product being made can be used successfully for the long, among the physical properties like we may apply heat among the physical like the application of the heat, for melting in casting, or for fusion in welding, similarly use of force like in the forming processes for the deformation for plastic deformation. So, that required size and shape can be achieved. In the chemical process like chemistry of the raw material is modified, so that it has desired properties or chemistry of the surfaces are modified surface is modified, so that the properties are altered as per the requirement.

So, this is how technologically manufacturing processes can be defined, or can be understood. On the other hand the economical way; economically, basically manufacturing is a value addition process, what we can say value addition process, where in raw material we take raw material which is a low value, and it is a you can say although it cannot be used for any useful purpose, but when the raw material is a processed through the manufacturing processes; by manufacturing processes, of usable goods, or produced, or are obtained, so this is of the high value. So, we can say the processes are applied work is done on the raw material which is of the low value. So, that it takes the desired size and shape, and make and it is made usable good. So, that it can be used it is of the high value.

So, basically economically if we try to define the manufacturing it is a value addition process, wherein the raw material is converted into the useable goods by the manufacturing processor, and the goods which will be produced, and used by the human being will be of the higher value.

So, we know that in the manufacturing, we the purpose is to make something which will be used by the human being. So, whatever we make that should serve this primary purpose.

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So, the need of manufacturing is what to make goods for service or use of human being, what is the purpose of this, so that whatever the requirements are there for the human being those are served by the goods produced by the manufacturing.

So, purpose of this is to support the living and improve the standard of living, so what is the purpose, we need in manufacturing we need to make more and more goods, so that they can be used by the human being to support their life, and when these are made in the larger quantity the goods will be available for the public, in general.

So, that standard of living is improved, but for this purpose what we need to make more goods we need to use more resources, since the resources are limited for making the goods therefore, it is important that more goods are produced using less resources, where in the role of the productivity comes into picture, what is the target here? We need to produce more producing more goods using less resources this is the target.

So that using the less resources, we can make more, so means output in form of the goods as well as in from input in form of the resources both goods and the resources. So, when this difference is high means more goods are produced using less resources productivity is high means, we are able to make more using the fewer or lesser amount of the resources. So, that most of the things are available for use by the human being.

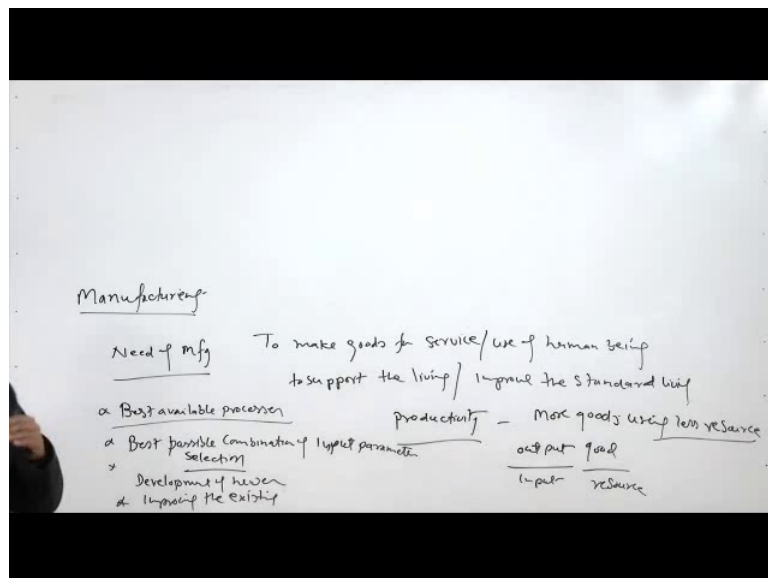
And how it can be done for this purpose what we need to do is reduce the wastage, we wastage of raw material energy manpower or whatever in resources are being used as input for producing the goods. So, these wastes need to be reduced this is one and

reducing the wastage of the like decreasing the amount of scrap, which is especially in form of like say, chips or material which is just wastage and it cannot be used for any purpose in after machining or rejected goods; rejected goods, produced of the undesirable dimensions shape, properties, soundness.

So, if the things are not sound they are not of the desired characteristics in terms of finish and tolerance, if they are not of the desired size and shape, then they need to be rejected and that will be simply a wastage of the resources in all forms like raw material manpower energy and etcetera whatever the resources need to be used.

So, efforts are made primarily for reducing the wastage in form of the raw material, in form of the different resources like raw material, energy manpower and so, that the amount of the scrap in form of chips or rejected goods can be reduced.

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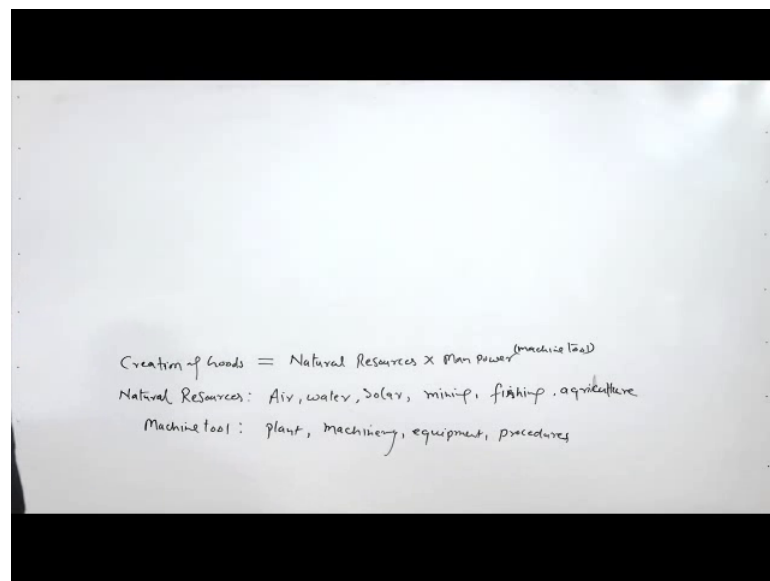


So, when and for this purpose it is required that whenever the raw material is processed we use the best available manufacturing processes, one we use the best possible combination of the input parameters and further this is what is already available and what we can choose from, so best possible combination the parameters means this will involve basically the selection; our selection, is good third we can develop or improve development of newer things, and fourth improving the existing improving the existing systems processes materials are developing the newer material newer systems.

So, these are the some of the ways by which the productivity in manufacturing can be improved, so that the rejection in form of the scrap rejection of the defective goods, and the scrap can be reduced, so that we can produce, we can manufacture more and more using the less quantity of the resources, and the purpose is that we can produce as many goods as possible, so that they are available for use by the public in general they can be made easily available to the public at the lower price, so that everybody is in position to use which in turn will help to increase the standard of living and it will help to support the life of the human being in general.

So, it is important that the proper development choices in the manufacturing processes are brought in, so that the productivity of the manufacturing processes can be improved. So, the amount of the goods being produced for the human being is the function of the natural resources being used, the manpower being used for producing the goods, and the machine tool being involved for the manufacturing

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So, you can see the creation of goods is qualitatively expressed using the expression like natural resources being used multiplied by manpower for producing the goods raised to the power machine tool involved in production of the goods. So, this is in the expressive power of the manpower.

So, if we just take of this one the natural resources multiplied by manpower will help us in producing the more volume of the goods, but when machine tool is brought into the

environment friendly, and for this purpose what we can use, using of the and how it is achieved using of the existing resources, machine tools, and technology, this is one way.

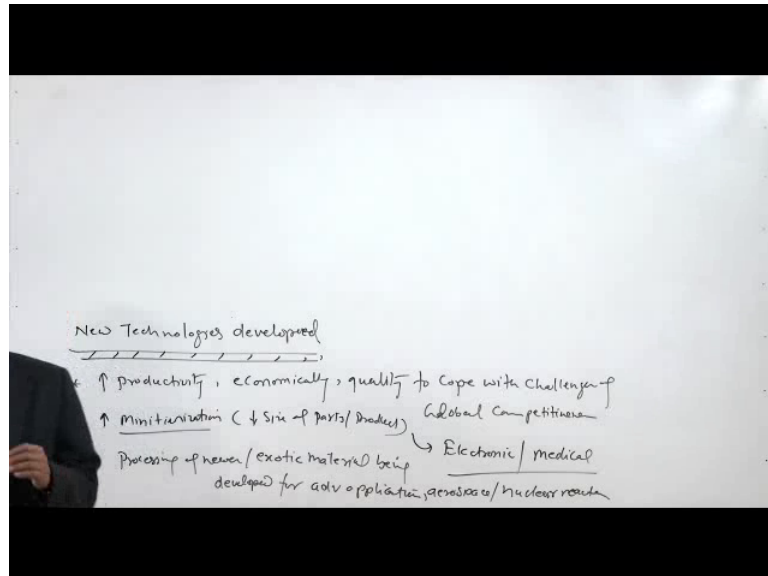
The second way is to choose the best possible option. So, selection of best possible input resources are like proper machine, proper procedure, process procedure, and parameter etcetera, environment also there is one other ways also, so that a product can be manufactured efficiently, effectively, economically and environment friendly, like the development of the new processes, materials, procedures and technologies.

So, that this objective of manufacturing product using these four attributes in from these four attributes can be achieved, there is one more way like improvement; improving the existing processes, materials, procedures, and the technologies for making the goods so, manufacturing process is basically involve science and technology of manufacturing a product you inform of these attributes means, having with these attributes, and for this it we can use following four approaches like use of the existing resources.

In form of tools materials technologies and selection of the best possible input parameters like choosing the proper combination of the process parameters, proper environment, for processing proper material, proper procedures, proper process, for making the product and the development of the newer if the existing ones are not able to help us, then one way is that improve the existing processes, materials, procedures and technologies, and even if that is not achievable means, these things cannot be achieved, then we need to develop the newer processes newer material, procedures, and the technologies, so that any product can be manufactured, efficiently, effectively, economically, and environment friendly so, that the desired purpose is achieved.

Now, as I have said the there was a one factor about which I have just talked that need to develop the newer things. So, what are the factors that derive us that force us, or that encourage us, for developing the newer things, so new technologies need to be developed for what means what are the factors which force us to develop the newer technologies, in manufacturing, so that we can deal with the issues which are coming up.

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The first factor related with the regions for developing the newer technologies and newer methods is that to deal with the requirement of the increasing productivity; increasing requirement of the productivity, so that the goods can be produced economically, and of the required quality. These things are needed to cope with to deal with to cope with the challenges of global competitiveness.

Since we are getting the products from the globe, it is rig necessary that to remain in the market whatever we make that is economical of the good quality, so that whatever products are coming from the different manufacturers from the various companies located across the world, we can meet with those challenges. So, the primary goal of the developing newer technologies is one of them is to increase the productivity, so that product can be made economically of the desired quality to meet with the global challenges of the global competition.

The second is the increasing miniaturization means, reducing size of the product, reducing size of parts or the products. This is another factor which is deriving or forcing us to develop the newer technologies, so that the parts which were of the macro scale of the larger sizes can be made of the smaller and smaller sizes.

And the 2 industries are driving basically this one is electronic industry, and another is the medical one, these are the 2 areas which are in forcing or where the demand for the smaller, and finer products is increasing. So, which in turn is forcing for the miniaturization of the products and for that the different newer technologies need to be

developed, and another one another factor is to deal with the challenges being offered by the newer materials which are being developed.

So, processing of the newer and exotic materials being developed for advanced applications like, aerospace nuclear reactor etcetera, so these are the areas where the newer materials are being developed to meet with the challenges of the high temperature and the high stresses, and those materials are really difficult to process, difficult to shape, using the existing technologies.

So, but is also forcing us to develop the newer technologies related with the manufacturing. So that is why the new technologies need to be developed for in the area of the manufacturing.

Thank you for your attention.