Industrial Engineering
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Module - 03
Lecture - 02
Factors Affecting the Productivity

Welcome students, this is the second lecture on Industrial Engineering and this 2nd lecture is based on the Factors Effecting the Productivity. And in the last lecture, I gave the introduction of the productivity and we have seen that the standard of living of a nation or of the people in a nation is significantly governed by the productivity of the nation as a whole.

A higher the productivity and better the standard of living is obtained due to the greater availability of the goods and items, services, available to the people of the national at a cheaper rate. And a number of the objectives are there of the productivity measurement and one of them is to compare the performance of a system with respect to the planned productivity or to compare the productivity of a system with the other systems at the given level.

So, if we have to compare the productivity of a system at a present with some other period, then the productivity index is used as a one of the parameter, for comparing the productivity of the system for two different periods. And so the productivity index will be the one aspect, which will be covered today in this lecture. And in addition to this, we will see that, what are the different factors effecting the time required to the job.

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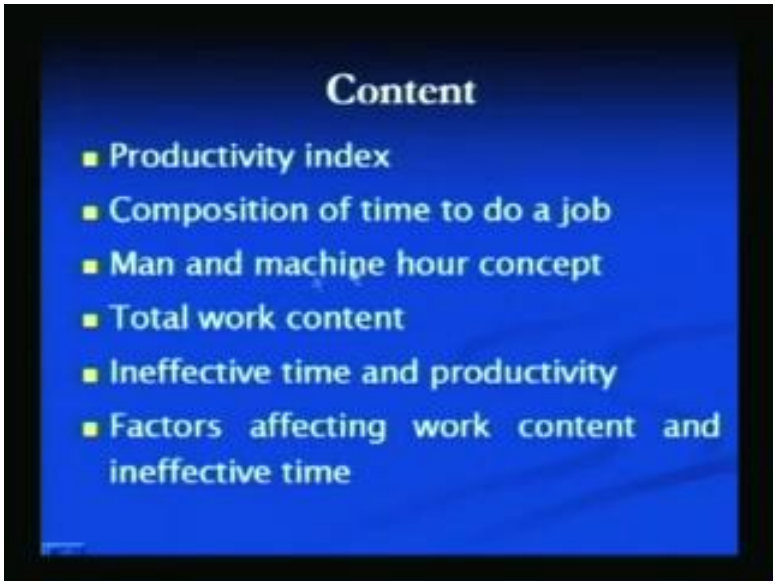

So, the factors or the different components, which lead to the time requirement to do a particular job and here basically, we will be talking about the work content to produce a given job and the ineffective time required related to that job. The man and machine hour concept will be introduced which is about the work output given by man in 1 hour or by machine in 1 hour.

The total work content, that how what are the different constituents, which result in the production of a product and during the manufacturing and ineffective time and the productivity will be related. And the different factors, which will be effecting to the work content and the ineffective time, will be covered in detail. So, that these factors will help us in looking in to the various aspects, which can be used to improve the productivity or which will form the basis for improvement in productivity. So, here this lecture will start with the productivity index and the productivity index for a particular input resource is used to compare the performance of a system with respect to that particular resource, for two different periods.

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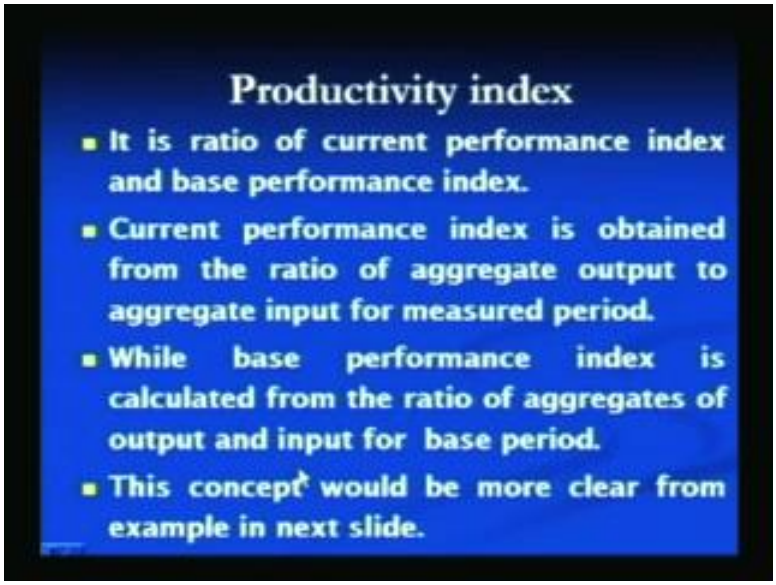

And it is defined as the ratio of the current performance index, for that particular resource with and the base performance index of that particular resource. So, here if you have to define the current performance index means, it will indicate that how effectively we are utilizing the resources at present time or when it is being measured. And how effectively, we have done it earlier, if it is being compared with some base period.

So, to define the current performance index, here we use the ratio of aggregate output to the aggregate input, for that particular resource, for the measured period, measured period is the period for which productivity is being currently measured. So, from the ratio of these two, the current performance index for a particular input resource is obtained.

And well, the base performance index is calculated from the ratio of the aggregates of the output and input, for that particular period with which things are being compared. So, that period is termed as base period and the productivity index for that period is written is the base performance index. So, here base performance index is determined from the ratio of the aggregate of output and the input for that particular period with respect to which the comparison is being made. So, here if we have understand the concept of the productivity index, we have to see one example, so that things will become more clear.

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If one organization, say A B C using the number of materials energies and as a input resource for producing one output and all these things output and input resources have been quantified in common monitory terms. Then for the base period, say for year 1990, if the output is 3500, direct labor cost is say 2400; the capital book value is 20,000. Total cost is coming 30,000, energy used is 1000 unit is and the raw material used is 28,000 unit is and the same values here have been obtained for year 2000.

If the productivity index for the year 2000 is to be obtained with respect to the year 1990, then how it will be calculated that, we can see from this example. And in this particular case, particularly we have to determine the productivity index for the labor and the same way productivity for the productivity index for the capital book value. Total cost energy used or raw material can also be obtained, so how to solve this problem, we will see here.

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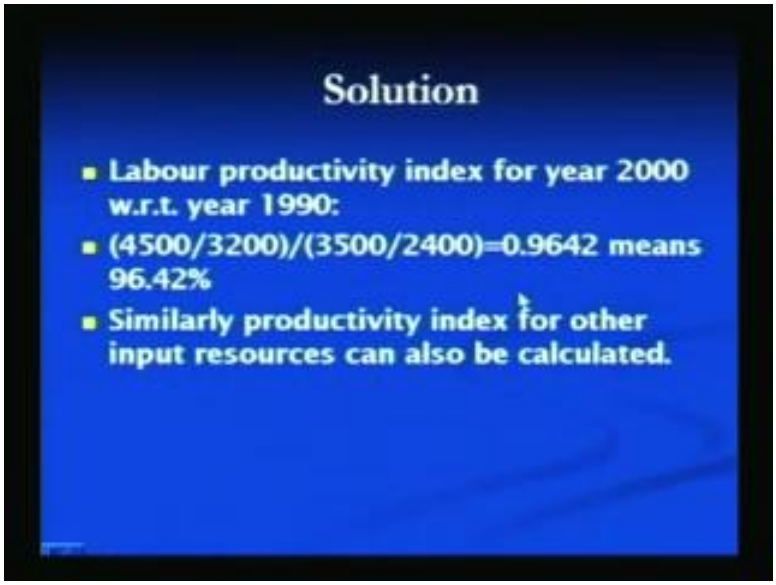

The labor productivity index for the year 2000 with respect to the year 1990 can be calculated like this. The aggregate output which is being obtained with respect to the direct labor cost which is 3200 and here the ratio of this output in the year 1990, that is 3500 divided by the direct labor cost 2400. And the ratio of these two, this particular ratio indicates the base performance index and this particular ratio indicates the current performance index.

And the ratio of these two, that the current performance index and the base performance index, gives the productivity index and which is equal to 0.9642, indirectly, we can say it is 96.42 percent. And the likewise the productivity index for other input resources can also be calculated. So, productivity index for a particular input resource indicates that how a system is utilizing, a specific input resource at for a given period and how it was doing earlier; that is the base period.

So, to compare the performance of a system with respect to a particular kind of input resource, this productivity index can be used as a good way to compare the performance of organization as far as the utilization of the resources in concerned. Here, this is what has been mentioned that, similarly the productivity index for other input resources can also be calculated.

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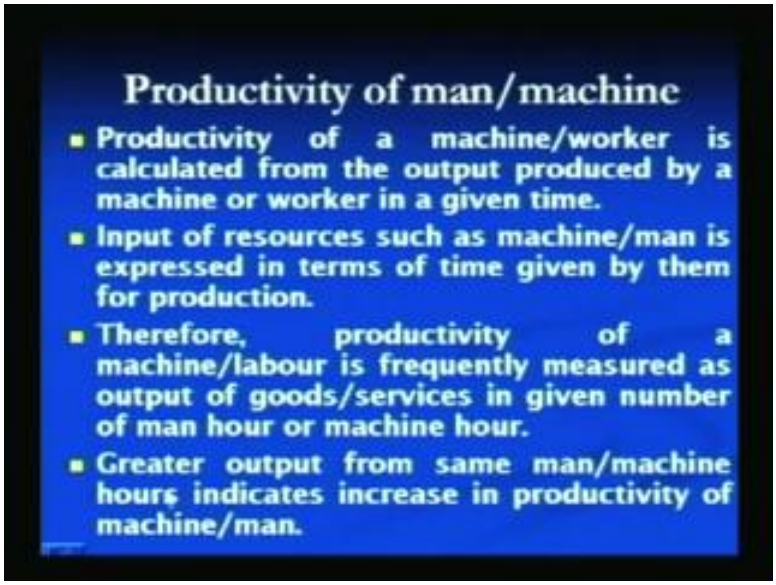

If the productivity of the man and machine is to be seen, then we have to see that how this productivity of man will be calculated or that of the machine will be calculated. So, and this concept is based on that how much output is being given by a machine in a given period or how what is the output of a man in a given period. Greater the output of a machine during the running or greater the output of the worker during the process or during the manufacturing in a given period greater will be the output.

So, to define or to quantify the productivity of a machine or a worker, basically we use the output given by the machine or worker in a given period, higher the output by the machine or the worker in a given time greater will be the productivity. And here, input resources such as man and machine, therefore expressed in terms of the time given by them for the production process.

So, if these input resources, if the magnitude of the input resources such as man or machine is to be quantified, then it is quantified in terms of the time. Because, time given by the machine or man, directly effects the volume of the output, that will be produced during the manufacturing. So, the quantification of the man and machine is a done or expressed in terms of the time given by them for the production purpose.

And therefore, productivity of the machine or labor is frequently measured as output of the goods or services in given number of man hour or the machine hour. So, here man hour and machine hour indicates the amount of the input resource in form of the man or the labor of the man or in form of running of the machine is given.

So, for the given number of the man hours, the time for which a man is working and producing certain number of goods and the time for which a machine is running and giving certain number of goods, these two things are used to quantity the productivity of the machine or the labor. And here, greater the amount of output, for the same input resources, that is man or the machine hours indicates increase in productivity of man or machine.

Like for two man hours, means if a man continues to work for two hours, if his output is 10 instead of 5, then productivity will be doubled. So, like that the extent of the output or the amount of the output which is being given by the input in form of man or machine hours, that indicates the productivity of man or machine.

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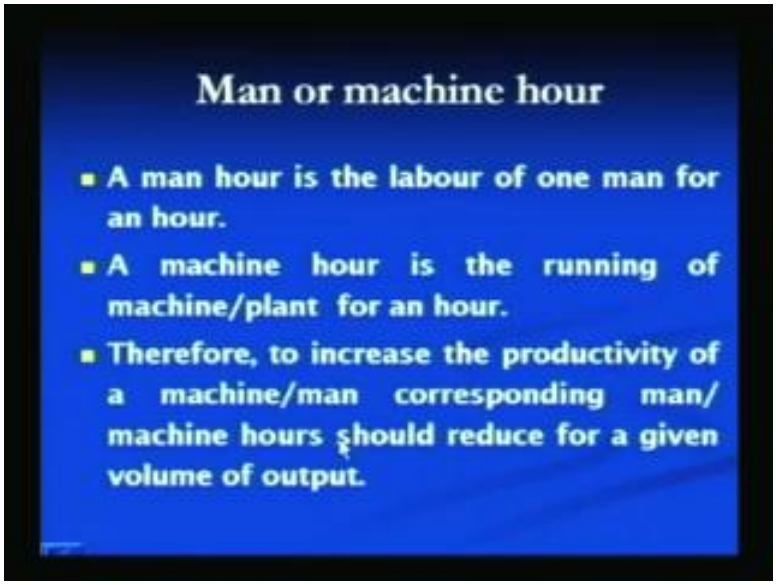

To understand the concept of man or machine hours, we have to see that, if the man hour is to be understood, then man hour is considered as the labor of one man, for one hour, in process of the production or the manufacturing of particular type of product. So, here that if a man continues to work for one hour, then that labor is termed as the input resource and it is quantified in terms of the efforts made by one man, for one hour is termed as the man hour.

While, machine hour indicates the output given by the machine, during it is running for an hour and here; that is why it is effort or output obtained as a result of running of machine or the plant for an hour. And therefore, to increase the productivity of a man or

machine, corresponding man or machine hour should reduce, for a given volume of the production.

So, if you have to see that for a producing the 100 units is of the product, how many man hours or machine hours are required. If you want to increase the productivity, then the man hours or the machine hours, means input resources. In form of these two aspects, like many hours or machine hours, should be reduced to increase the productivity of the man or to increase the productivity of the machine.

So, here increase in productivity can be obtained by reducing the man hours or the machine hours for a given volume of the production. The man hours required for producing the job depends on the on the time, required by the operator to do a given job. And the time required to do a given job is composed of that the work contained in that product or the extra time, which is required due to inefficient processing.

And the time required to covering up the activities, during which no production is taking place due to any sort of the reason. So, see the man hours, man hours will indicate the time required to do a given job. And, it will be composed of the work content plus the ineffective time, to cover the various activities in which no work is being done, as far as completion of the product is concerned. So, if you have to understand that, what are the factors, which are included in the time required to do a given job. We have to see that, what are the main constituents which need time to do a given job.

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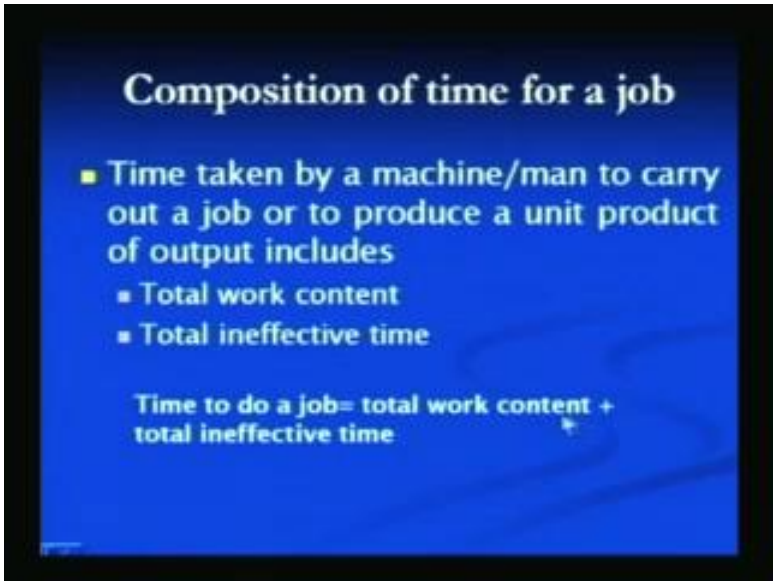

So, the time taken by a machine or man hour to carry out a job or to produce a complete product or unit includes the total work content related to that product and the ineffective time, which is associated during the production of that particular product. The total work content indicates the time period in which some work is done, towards the completion of the work, towards the completion of that product.

While in ineffective time, the work is actually not done on the product or the process which can take it forward towards it is completion. So, ineffective time is simply wastage of the time due to the various inactions of the management or the labor or the lack of action by the management or the labor. If an organization, wants to increase, it is productivity of the labor or the machine, then particularly this ineffective time is targeted first.

And efforts are made to cut down this ineffective time, so that the man hour required are machine hour required machine hours required to produce a unit output can be reduced and thereby the productivity of man or machine can be increased.

So, if we see that the total time to do a job is a combination of or the summation of the total work content is time required to do the job, plus the time during which no activity towards the completion of the job takes place. And this becomes the part of the work, because of the various interruptions, which take place during the operation. And efforts are always made to reduce this ineffective time in order to cut down or reduce the total time required to do a given job.

What is the total work content, work content indicates the work, which is got to be done on the work piece and for it is completion. And here, if we have to define it, it is the amount of work content in that particular product or process and it is measured in terms of the work inputs.

In terms of the inputs, which are required in terms of the man hours or the machine hours, how much time is to be given by the labor to produce given job; in which actually the worker works on the product towards it is completion or machine works on the raw material and brings it forward or takes it forward, towards it is completion.

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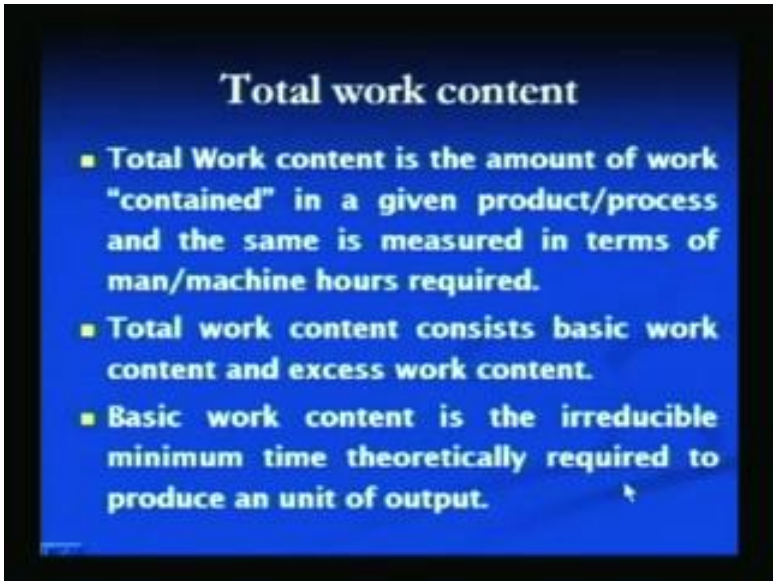

So, here the how much the man or the machine hours required to actually do something on the work piece or on the product towards, so that it can be completed. So, that is what is the total work content, the amount of work content in the product or process and the same is measured in terms of the man hour or machine hours required.

And the total work content is a combination of the basically the two types of the work, one is the basic work or the basic work content which is the minimum work input required to complete the job. And another one is the additional work, which is got to be done to complete the job and due to various inefficiencies of the system or the product design, this excess work content is observed and that is required to be done.

So, if you have to reduce the total work content, then excess work content is targeted or efforts are made to reduce the excess work contents, because basic work content is the work, which is the minimum required work to complete a given job or operation. So, this two the basic work content and the excess work content is to be understood very clearly for attacking the excess work content and making the strategies for increasing the productivity.

If you have to define the basic work content, it is the irreducible minimum theoretically required time; means the further reduction in the work content is not possible. So, that much volume of the work which is required to do a given job is defined as the basic work content. And it is irreducible minimum theoretically required time to produce a unit of the output.

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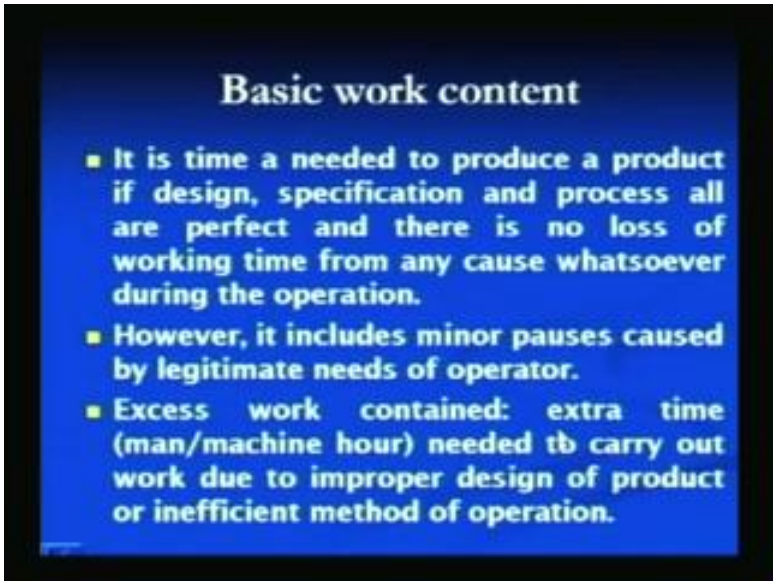

So, basic work content particularly is considered, when the work content, when the product design or the manufacturing process is perfect and if these things are imperfect, then extra work will be required to do same job. So, the condition is that to define the work content, that it is the work content, that will be required to complete the job and when it is done in uninterrupted manner.

And the product design and the operation or the manufacturing process, which is being used, is perfect to do a given job. So, if you have to quantify and basic work content is quantified as the time needed to produce a product, if the design specification and the manufacturing process all are perfect and there is no loss of the working time. Means the process is carried out in uninterrupted manner, what so ever the reasons during the operation.

Except, the work maybe stopped to fulfill the legitimate needs of the workers, which are got to be fulfilled during the operation. So, in the basic work content, this is the only thing which is included, that minor pauses caused by the legitimate needs of the operators and the excess work content is the extra work, that is required got to be done to complete the product. And it is quantified as the extra time of the man or the machine is required to carry out the work.

This may be caused by the improper design of the product or inefficient the method of the production which is being used to produce the given product. So, these two things particularly contribute towards the excess work content or extra work required to do job,

then the basic work content. Basic work content will be the minimum required job got to be done to complete it.

And due to inefficiency of the manufacturing system or improper design, some extra work is required and that is known as the excess work content. And during both these periods, means the time required to do the basic work content and the time required to do the excess work content. Something is done on the product or the operation, which will bring it forward, towards it, is completion. While, in case of the ineffective time, no work is done on the operation or on the product towards it is completion.

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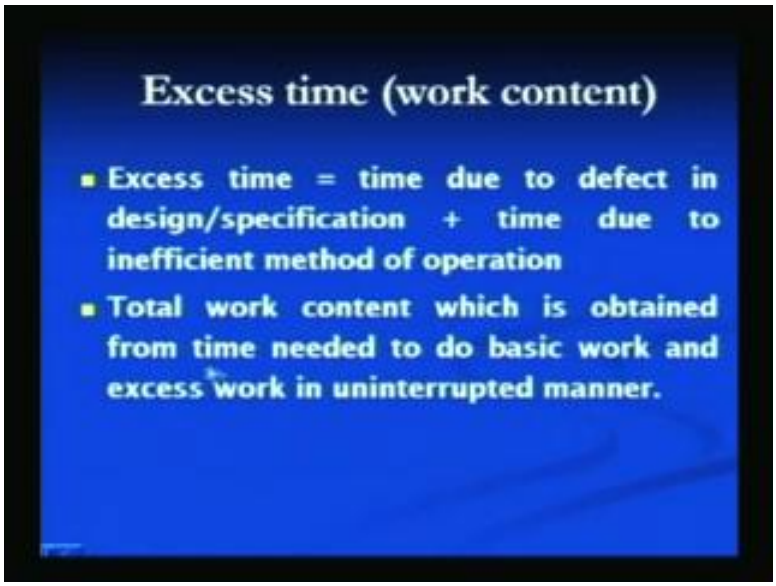

So, the excess time, if we have to define then, it is made of the time extra time, which is required to complete the product, due to the defect in design of the product, which is being manufactured or it is specifications. And the extra time, which is required to do the job, if the process is inefficient or the manufacturing method is not perfect. So, the extra time required, to complete the job caused by the inefficient design or imperfect design or imperfect inefficient method of manufacturing contributes to the excess time.

The total work content, which is obtained from the time needed to do the basic work and the excess work in uninterrupted manner and this is how the time required to do a given job is obtained provided ineffective time is neglected or not taken into account. So, the total work content will indicate the time required to do some work on the product, for it is completion and which will include the basic work plus excess work and this operation will be carried out in uninterrupted manner.

But, in actually practice, this rarely happens, because interruptions are frequently observed during the manufacturing process or during the production of the products. So, here due to the frequent interruptions in the operation, productivity is adversely affected because it contributes significantly towards the ineffective time.

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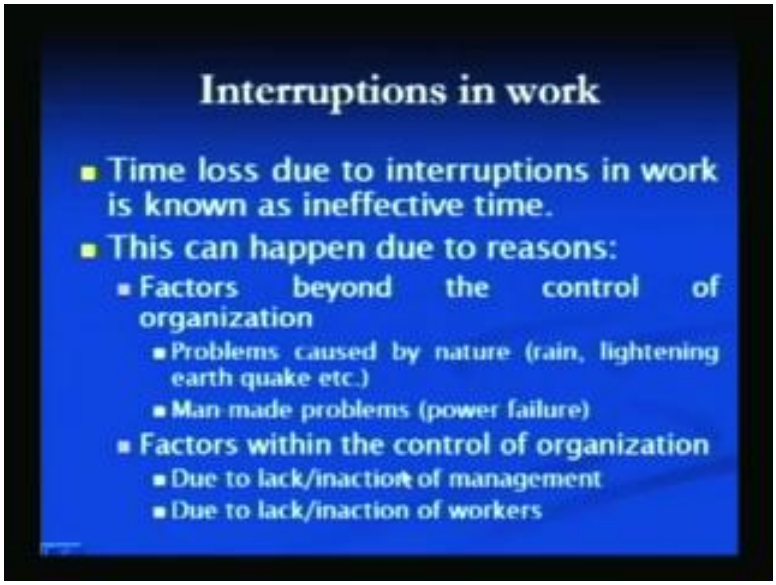

So, interruptions in work, leads to increase the ineffective time or the time loss due the interruptions in work is known as ineffective time and this can happen due to the various reasons. And like the factors which can be controlled by the organization, but it is not controlling due to the lack of fraction or the factors which are beyond the control of the organization itself.

So, because some of the extra things may happen during the production process itself, because of which it may take somewhat longer time to produce the job and in that period there may not be any work. So, the reasons or the factors, which lead to the ineffective time and are beyond the control of the organization, can be like the problems caused by the nature, like rains, lightening or earthquake.

If these things are affecting the success of operation, then operation will be stopped and that will cause unnecessary ineffective time and the man made problems, like availability of the power, can be the one reason. Because, most of the manufacturing systems; nowadays are based on the use of the electricity or the power supply. If the power failure is there, then also the frequent stoppages in the work can be there and that can lead to the increase in ineffective time.

These are the factors, which are beyond the control of the organization and will lead to the increase in the ineffective time or decrease the productivity of the organization. The factors, which are within the control of the organization, but due to the inaction on the part of the management or on the part of the workers, this ineffective can also increase, so ineffective time caused by the management is found significant.

And ineffective time, due to the inaction or lack of the management activity is contributed contributes to 80 percent of the total ineffective time. And only 10 to 15 percent ineffective time, normally occurs due to the lack of the action from the worker side. So, basically management is held responsible for the longer or the higher value of the ineffective times.

And therefore, there is need to target, this ineffective time particularly caused by the poor management actions or the policies. As we have seen that, the total work contents plus the ineffective time contributes to or leads to decide the time required to complete the job.

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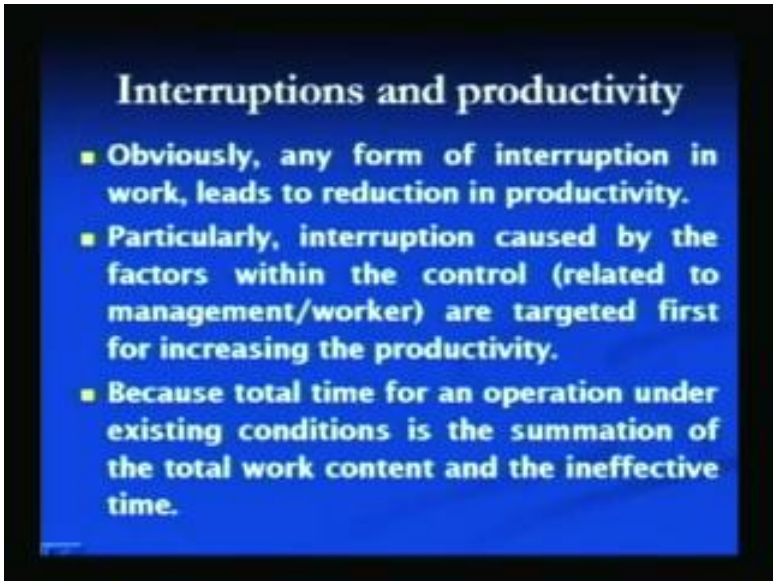

And if there is increase in interruptions, it will increase the ineffective time and which in turn will adversely affect the productivity of the organization. Because, for producing the unit item, it will take longer time, longer man hours or the machine hours. So, the man or the machine productivity is adversely affected, because of these interruptions. Particularly the interruptions, caused by the factors within the control of the organization like due to the inaction of the management or the workers are targeted first for increasing

the productivity. And therefore, like the material is not available for the workers to do the job, due to the poor production planning or the material management or the equipment which are to be used are not in good condition, service conditions are not good.

So, all these things happen, because of the managements in action, those things we will see in detail in the next portion of this lecture. And because the total time for an operation, under existing conditions is the summation of the total work content and ineffective time.

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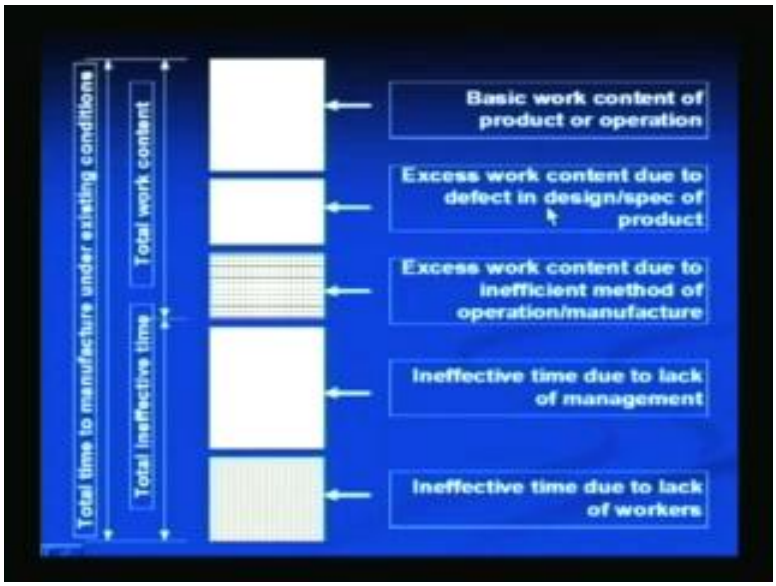

Here we can schematically, that what are the different constituents forming the total time required to given job and if we see here, this portion indicates the basic work content which is the minimum amount of the work required to do a given job. But, if our design of the product or it is specifications are not perfect, then it will take somewhat more work to complete the job.

And total time required, means total work required to do the job, when it is design is not perfect will be this much. This length will indicate the amount of work ought to be done, when the basic work content is added and the excess work due to the imperfect design is added. But, sometimes the method of the manufacturing being used for production of the product is also not perfect and that also increases the work required to do that particular job.

So, here addition of that excess work leads to further increase the time in which work will be done on the product to complete it. And if we see, all these three blocks, this one corresponding to the basic work content, this is corresponding to the excess work content due to the imperfect design of the product. And this block indicating the excess work required, due to the inefficient method of the manufacturing and summation of all these three work contents, forms the total work content.

This will be also be indicating the time required to do some work on the product, so that it can be completed and in this time there is no ineffective time. Ineffective time comes due to the inaction or either of the management or of the workers. And the excess time or the ineffective time, due to the lack of the management activities is found more compared, to that of ineffective time caused by the workers.

So, if we add the ineffective time, due to the lack of the management activities or due to the lack of the workers activities, then sum of these two forms the total ineffective time. Here we can see that, with respect to the total work content and the total ineffective time is also significant and therefore, to increase the productivity, this time is targeted first. So, that the productivity can be increased, because this is unnecessary time required or to complete that particular job.

And addition of both the total work content and the ineffective time forms the total time required to manufacture the product in given conditions. Given conditions means present set of the manufacturing unit, present set of the management activities or the present set of the workers or the design of the product. So, means under the existing conditions what will be the time required to complete the job; that can be seen from these five blocks.

This is the minimum time required to complete the job, this is the irreducible time and this is the theoretical time. When, the work is completed in uninterrupted manner particularly when design of the product and the manufacturing method being used are perfect. While, other things means, other works will go on adding, if the inefficient method is being used or imperfect design is being used for the production purpose.

So, the piling up of the five blocks indicates the total time required completing the job under the existing conditions and one by one, we will see that what are the factors, due to which excess work content increases and how those things can be avoided. So, to avoid the excess work content, due to the improper design or due to the inefficient method of manufacturing, what are the different aspects, we should be looked in to.

And in the same way, what are the actions due to which, what are the actions, which are not taken by the management and therefore, it leads to the ineffective time. And how the worker should contribute to reduce the ineffective time, those things we will see in detail one by one. The work content due to the product or process, it indicates the imperfect design of the product or the process.

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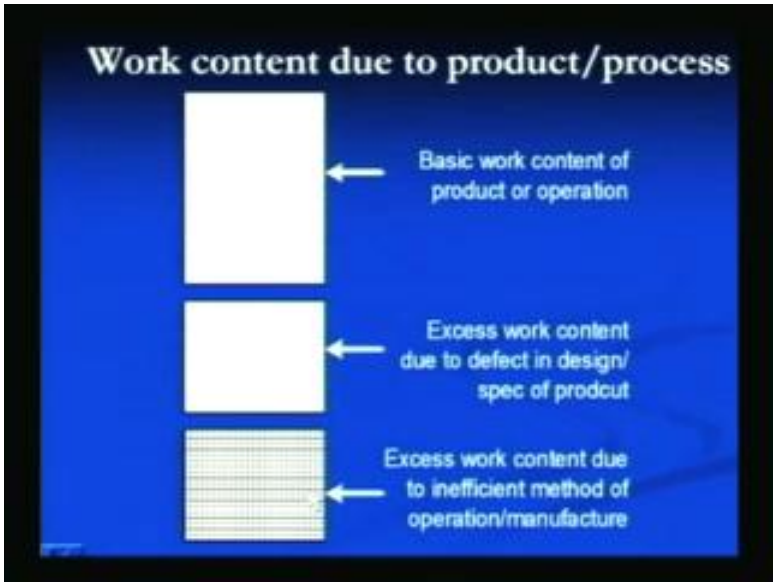

This first block is the basic work content portion to complete the job; the second block the excess work contents, due to defect in design or the specification of the product. And this third one is the excess work content, due to the inefficient method of manufacturing or the operation.

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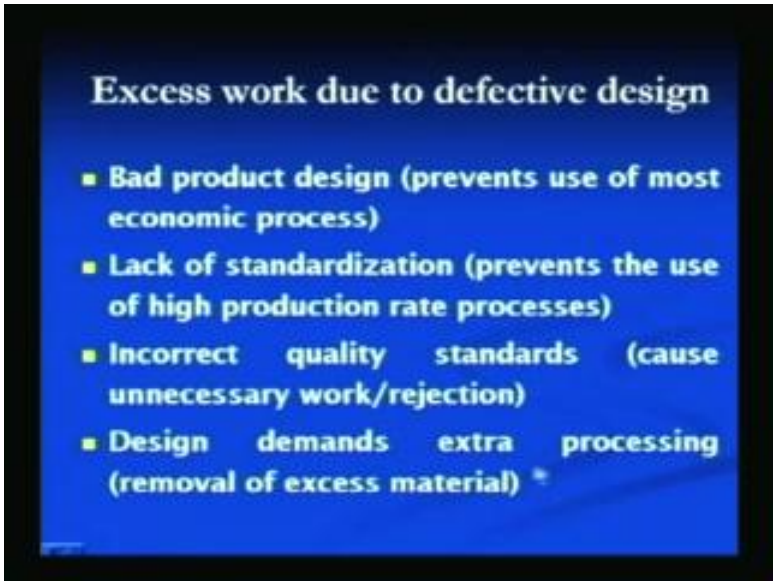

Excess work content, due to the defect in design, caused by the number of parameters related to the product and one of them is say bad product design, if the design of the product is such that, it does not allow to use the most efficient manufacturing method. Then, it will unnecessarily increase the time required to carry out the job to produce one complete unit, using some low efficient or a lower efficiency methods.

Like, if we use the milling machine to produce a particular product, it will take somewhat lesser time, compared to that of shaping machine, which because of the difference in the metal removal rates, which are available with these two systems. So, it depends that, whether the design of the product will allow to using the most efficient economic process and economic process or not.

So, if the design can be modified, then it will be possible to use the most economic process to increase the productivity. Lack of standardization, if the products being produced are not standardized means the large varieties are there and the products of the large variety are produced in small quantities. Then, that will prevent the use of the high production rate processes.

Because, if we use a high production rate processes we can produce the things rapidly and that to very cheaply and make them available in the large quantities at the lower rates. So, if the products are not standardized, these are very large in variety and the only small amount of the products is to be produced, then it will prevent the use of the use of the high production rate.

Incorrect quality standard is another item, related to the design of the products, if the quality standards, which has been set for the production purpose of particularly product are not correct are not optimum. Either the quality standards are too high or the too low, then that will lead to the reduced productivity, because at very high quality standards will lead to the rejection of the materials. And the lower quality of the product, will lead to the reduced acceptance of the product in the market.

And accordingly the company may face the problems regarding the marketing related aspects. So, here the optimum quality standards are to be set, after giving the due considerations to the requirements of the market or the customers and the technical requirements of the product. So, that it can perform for the long, but excess on the higher side or in the lower side will not be good from the productivity point of view.

The design demands extra processing of the material, this point is related to the fact, that the material should be designed in such a way, that it needs minimum processing. And therefore, the raw material should be selected in such a way, that it can be processed easily with the less work input. And just for example, if the lot of material is to be removed to get the desired size and shape, after machining process, than it will reduce the productivity. So, that design should be such that, it reduces the amount of work, which is required to get the desired size and shape using the given raw material.

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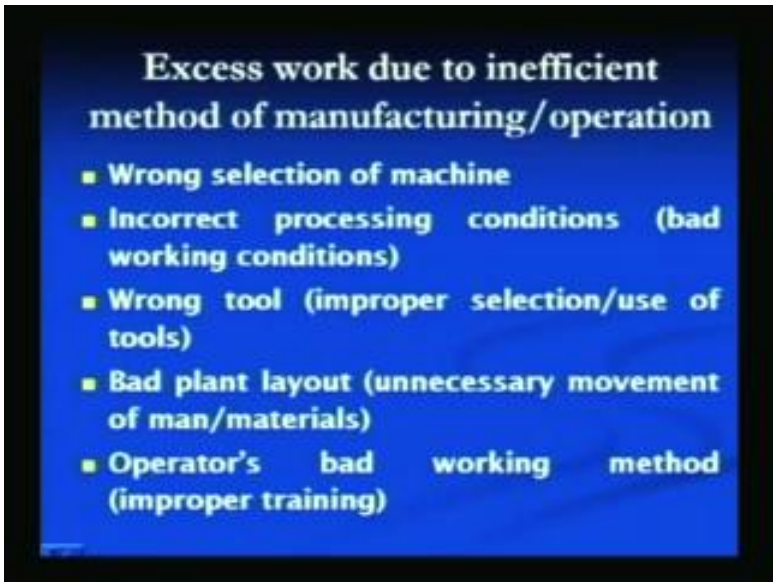

And if you have to see, the excess work content caused by the inefficient methods or operation, which is being used for producing a given product then, it can be the wrong

selection of machine tool. Means, if the process planning function is not performing the desired job, then the selection of the wrong machine to do a particular job, will unnecessarily take time to complete the job.

The same example can be sited here also, like if the high volume production machine is required to produce the large quantities. Instead of selecting the high volume production process a low volume production process is selected, then it will unnecessarily take longer time to produce the same job. So, wrong selection of the machine can lead to the excess time required to do the job.

Incorrect processing conditions, like the parameters which have been selected for processing the product are not optimum one and because of which it can take the longer time. So, the optimum selection is also important for reducing the excess work content, the wrong tool has been selected; so and if the wrong tool has been selected.

Then, it will not allow to use the optimum conditions, which will reduce the excess work content or a wrong tool will require the longer time to complete the same job and which in turn will increase the work content, that will be simply increase the excess work. The bad plant is a plant layout is about the setting of the different equipments and the machines in an organization.

So, how these have been arranged and in which order these have been arranged, that plays a significant role. Improper plant layout design, leads to the unnecessary movement of the man and material and which in turn increases the time required to complete the job. And if unnecessary movements are there, then that will increase the extra work required to do the same job.

Therefore, the plant layout should be designed properly, so that the unnecessary movements of the man and material can be reduced. The operators bad working method, if the operator does not know, the quality of the product and does not understand the way by which system will respond. If, he does not care properly, during the operation, then that can lead to the reduced performance of the process, as far as production of particular product is concerned.

And therefore, it will be necessary to give the desired training and if this training is not given, then the bad working methods can be adopted, which can lead to the excess work content. Some other factors, because of which the ineffective time is caused, we will see

in detail now one by one. Like, ineffective time is the time during which work is not done on the product or the process, does not move forward to for it is completion.

So, and this can happen due to the two reasons, basically one is the lack of the management action and another is lack of the workers action, who are suppose to do the given job. And as far as the ineffective time, caused by the lack of actions of the management is concerned, there are varieties of the actions, if those are missing by the management side; then there can be significant ineffective time.

And the first factor, which is related to the ineffective time caused by the inaction of the management, is the excessive product variety, being manufactured and supplied by an organization. If the product variety is too much and the organization is looking to fulfill the demands of the each and every customer, then the volume of the product to be manufactured by the organization will be reduced.

And to produce, the large varieties of the products, it will required to change the setting of the tools and the machines very frequently and workers will also not get trained to do a particular type of the job. So, all these things will increase the ineffectiveness and ineffective time required to the same job.

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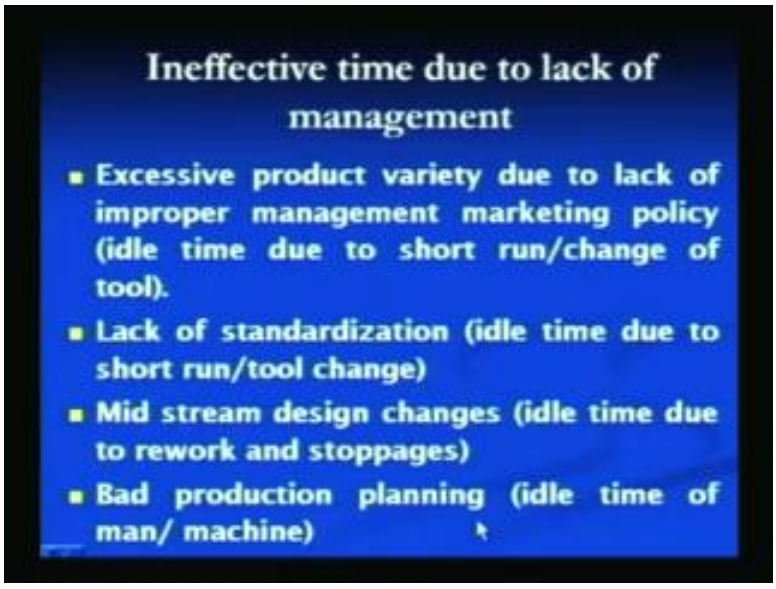

So, here if the product variety is too much, then it will increase the ineffective time and particularly due to the short runs and because of which frequent changes are to be made in the tool or the machine settings. And this particular point is related to the marketing policy of the organization, whether organization wants to fulfill the demand of each and

every customer. Or it is looking for a small variety and the large volume production of the specialized product.

So, the ineffective time related to this particular factor, depends on the marketing policy of that particular organization. If it goes for with the specialized products in the large quantities, then ineffective time will decrease as far as this point is concerned. The lack of standardization, if the organization is manufacturing, variety of the products, that will lead to the ideal time, due to the short runs and the small volume of the productions which will require a frequent change in machine tool setting.

And the mid stream design changes, if the product which is being manufactured is not developed properly, before going for the production, then it may not be able to fulfill the requirements of the market or of the customers. So, frequently due to the failure of the product to satisfy the market needs or to the custom needs, it is required to change the design of the product frequently in between the production process.

So, that those mid stream changes, lead to the increase ineffective time and because whatever the product has all ready been produced, those are to be reworked or to be remanufactured. So, all these things will increase the ineffective time caused by the mid stream design changes and that will require, means whatever has been produced and after change of the design, it will be required to carry out either reworking on the product or it has to be remanufactured, because material may be thrown as a scrap.

And the bad production planning is another component related to the inaction of the management. If the management is not working properly on the production planning side, then there may be a situation where workers are free and they do not have any job to do. So, the planning has to be strong, so that the work can be made available to do by the workers. So, otherwise the poor planning will lead to the lack of the work to the workers and which in turn will cause the ideal time of the machine or the man.

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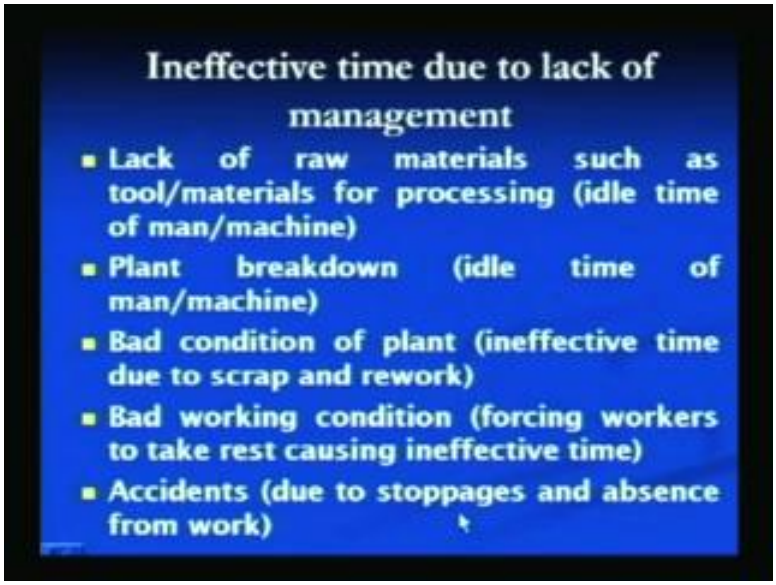

Some other factors, related the lack of the management and it is effect on the ineffective time are lack of raw material. Like the tools and the materials, which are required for the production of particular product are not available. Due to the poor material control, if the tools and materials are not available to the workers to produce the desired output, then it will lead to simply the ideal time of the man and machine, which in turn will adversely affect the productivity.

The plant breakdown is the another factor, if during the operation, if the plant is not being made available, then it will lead to the ideal of the man and machine and here the bad working condition of the plant. Bad working condition of the plant, lead to the imperfect production of the product, means whatever is being manufactured may not be of the quality, which is required.

And reduced quality of the product, due to the bad condition of the plant itself, can lead to the significant a scrap and the rework requirements, which will again, will lead to the ineffective time. The bad working conditions like the temperature is too high, sound is too much or humidity is too much in the working environment. Then, that will force the workers to go for a small rest; then it will lead to the increased ineffective time.

But, this happens due to the bad working conditions and management should take the steps to avoid such bad work conditions. Otherwise, it will force the workers to go for rest and which will lead to the ineffective time. Accidents are also caused the frequent stoppages of the work and the absence of the workers from the work.

Ineffective time is also caused by the lack of the actions from the worker side, but this ineffective time caused by the workers is not found as significant as that of the management means the factors related to the management. And here, if we see that what are the factors, because of which ineffective time is caused by the workers.

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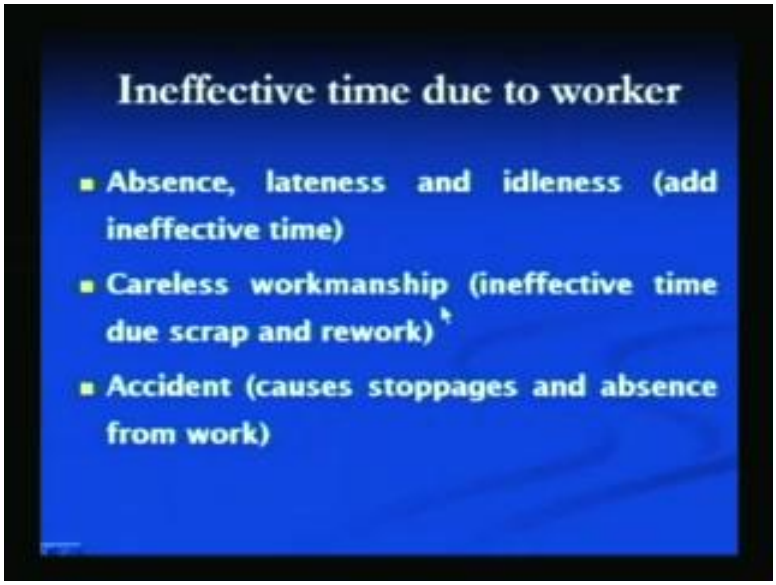

Here, we can see that absence from the work lateness and idleness, all these things add to the workers and this particularly happens, when workers are not motivated to carry out the job. And this particularly and this is caused by means this kind of situation comes particularly, when the personal policy of the organization is not in favor of the workers and the careless workmanship also leads to increase the ineffective time.

Because, in this period, they may work with the system, but the output may not be effective, because of the scrap may be produced or whatever is produced, that is required to be worked on further to bring it up to the required quality. So, here the training is to be given to avoid the careless workmanship to the workers.

And here the accidents, if the workers are not sincere and they are not working carefully, that can also lead to the accidents and the accidents can cause the stoppages and the absence and their absence from the work. So, here if the workers are not sincere and not working carefully, then that also can lead to the ineffective time.

So, here now, I would like to summarize this lecture, in this we have seen that, what is the significance of the productivity index and what are the different constituents, which forms the time required to carry out a particular job. And if the management is not taking

the actions properly at right time, if the workers are not taking the action properly at right time, it increases the ineffective time and which simply decreases the productivity of the organization.

Now, thank you for your attention.