Work System Design
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Lecture - 12
Steps Involved in Work Study

Namaskar friends welcome to session 12 in our course on Work System Design. Currently we are in the third week of our discussion. In the first 2 weeks focused on the concept of productivity where we have tried to understand the basic concept of productivity, we have seen factors affecting productivity, causes of low productivity, productivity improvement techniques.

Also we have tried to understand and solve certain problems related to calculation of productivity and seen some case studies that where the changes, changes in technology, changes in employee morale, changes in process, changes in design of the product have led to the improvement in productivity. So in the current week our target is on work study. Now work study is systematic examination and critical evaluation of the work that is being done.

We tend to compare the current or the existing method of doing work with the new and proposed method of doing the work and try to understand that why the newer method or the novel method or the creative method or the proposed method is better as compared to the existing or the current method, but how to do this, this has to be done in a very, very systematic manner.

So there are the steps involved which we need to take into account systematically step by step we try to develop our new method and then establish that method then train our employees in that method so that they perform their task in the new and proposed method. Now what are the advantages of the proposed method? what will be the target areas of the proposed method.

Why do we need to develop a new method that we have already seen in the previous session? So the new method will definitely be easier, it will be cost effective, it will otherwise be effective, it can be efficient, it can be productive, it can be profitable, so you can use n number of explanation to highlight the importance of the new method or proposed method.

So the summary is that current method we are for example in the last session also I highlighted this point.

I am recording this session here; this is a standard way of recording the session. We can always think of that how this experience, my experience as a speaker and your experience as learners can be further improved. So the current method is what we are following today. The proposed method can be a better method which may be for example now I am speaking, you have any doubt we have to answer the doubt in the discussion forum.

So one better method can be that we are discussing the topic online, immediately if there is a doubt you can put forward the doubt, I can try to answer it, if I am not able to answer maybe there can be other person in the, you can say teleconferencing, who can answer the question or in the online discussion somebody may type the answer, you get your answer not from me but from another learner.

So all that can be one improvement in the way this work of recording as well as knowledge sharing is going on or is being conducted. So always there is a scope for improvement. So steps involved in work study we will focus on the standard steps which have to be followed to perform the systematic work study. So in third week our target is on understanding the basic concepts of work study.

And in the previous session if you remember we have already seen the basic concept of work study, the frame work of work study we have seen that it is broadly divided into 2 basic areas, one is the method study, another one is the work measurement and then now we will try to see that what are the steps involved in work study. So let us quickly see advantages of work study that we will definitely undertake the process if there are certain advantages.

As I have highlighted in today's session in the very beginning only that what our new method is going to give us. What is going to be the advantages of our new method, certainly it is going to be easier. It is going to be more effective, more efficient, more productive, more profitable. How we can develop that method? we can develop that method by systematic process of critical examination of the current method of doing the job.

We will try to see what is the current method, we will try to break down the current method into the individual work element, then focus on each work element whether it is required, whether it is not required, whether it is redundant, can 2 or 3 work elements be combined together, can a specific tool be designed to help the worker in a particular work element. So that is basically the examination of the current method.

And then finding out the answers to the questions that I have just put forth. So there has to be certain advantage in our proposed method or the new method or certain benefits that we foresee that if we change the way we are doing our work or performing our work or the worker is doing his job. If we can change it, it can give us some benefits. We can foresee that yes by changing the way of doing the work we can foresee certain advantages.

Then only we are going to undertake this task, otherwise we will say the current method of doing the job is fine with us. Let us continue with the same method. So advantages of work study that will definitely act as a booster dose for us that yes these are the advantages why not to critically examine the current method. Maybe we may find some other way of doing this task which is better.

Now what will be the advantages that we can get that we can forsee, increased productivity and increased efficiency.

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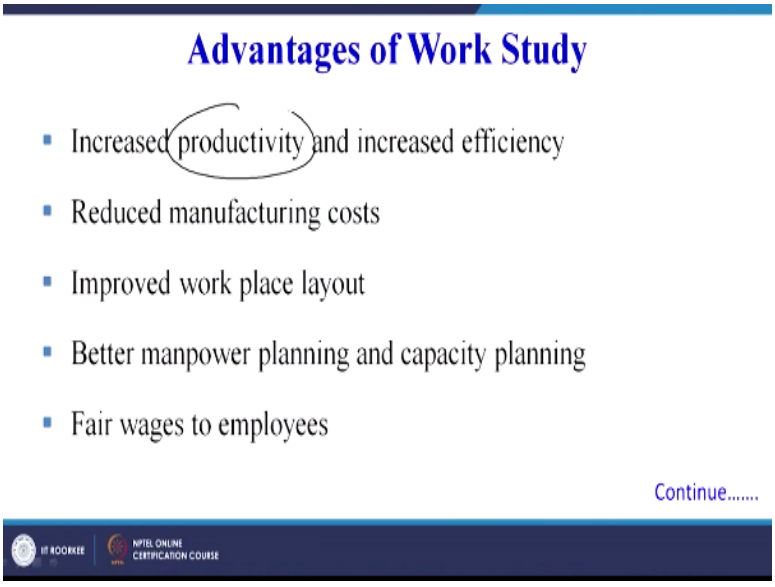

Again the word productivity is coming in picture and we have already spent enough time on understanding the term productivity doing some calculation on productivity and finding out

that how productivity is beneficial for the organization. So if we apply the concept of work study it will definitely lead to improvement in the productivity as well as efficiency. So our efficiency will improve, our productivity will improve.

And I have definitely I remember in the last session on productivity in week #2, I have given a difference between the two, that how our productivity is different from efficiency with the help of an example of a doctor who amputates the wrong leg of the patient, just you can refer back I cannot maybe we do not have sufficient time to again refer back to that case, but at least you know that there is a difference between productivity and efficiency.

But if we apply a systematic work study approach both our productivity and efficiency are bound to increase. Then the manufacturing costs can be reduced, our elimination of waste, better utilisation of time will help us to realize lower manufacturing cost. Improved work place layout we will see the string diagram approach when we study method study that which will help us to have a better layout of our work place.

So it will help us in the better layout, better man power planning and capacity planning as we have seen in the previous session one of the targets of work study is to optimally utilize the 5 M's which are used in manufacturing. So when you optimally utilize your resources you can do better man power planning as well as your better capacity planning and in capacity planning in our course on operations management I think we have recorded 2 lectures specifically focused on capacity planning.

So work study will help us to realize our capacity and use it in the best possible manner. Then when we know that how much work has to be assigned to a worker in a particular day or in a particular week very easily we can fix his salary accordingly. So it will help us to set the fair wages to the employees if we can do a systematic work study.

And if you remember in causes of low productivity we have said that many time the wages, the benefits to the employees are increased without affecting the output which leads to low productivity. So if we do a systematic work study we know that this employee is going to do this much work in his 8 hour shift very easily we can calculate that how much salary or wages we can give him without affecting the profitability of the organization.

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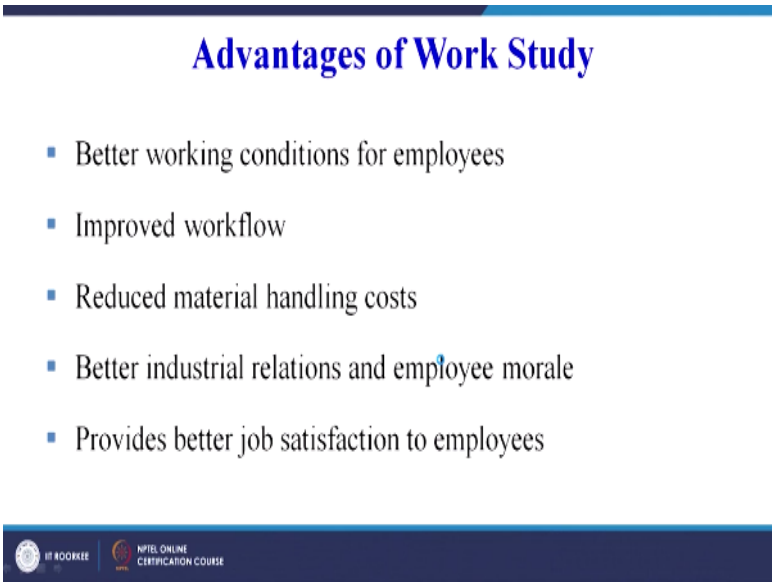

Then it is going to lead for better working condition for the employee we can find out that what can be the better working environment for our employee using the concept of work study, improved work flow, reduced material handling costs, better industrial relations and employee morale, provides better job satisfaction to employees. So we can see that on all the 3 important aspects.

What are the 3 important aspects? one is the machines, equipments, tools, systems, they are going to be better or properly managed. The sequence of steps will be optimized. Second is the employees. From employees point of view also we are going to gain much benefit. They will be highly motivated, their morale will be high, so their morale and motivation will certainly translate into productivity and profitability.

The third is the working environment, the work place design that is also going to provide a boost to the way the work is being done. When the workers are ready they are highly motivated to perform their task, the environment that we are providing them is also congenial to hard work and maybe smart work and then the systems in place are also responding to the way the work has to be done.

The overall system performance is going to improve and we can say the productivity of the system will be always good or it will be from better to best. So there are advantages not only from the administration or from the owners or from the promoter's point of view, but work system design will definitely help us in optimizing each and every important we can say point

or each and every factor that is responsible for the manufacturing activity starting from the machines, equipment, men, environment.

Each and every important point is the focus area of work system design. So we can see that if we focus on all these important points we are certainly going to realize many advantages and how we can do this now that is very, very important. I think last half an hour discussion that is session number 11 and today also 5-7 minutes we have spent on emphasizing the importance of work study only.

That we must focus on this important aspect of engineering in order to realize our goals. Now let us see how we can do it. Now work study procedure, work study is the procedure oriented and systematic study. So it is not something which is abstract. It is a scientific method. It is a systematic method. It is a procedural method so we can follow the steps and try to solve our problem or there is no problem basically.

I am recording here I am having no problem. I am doing recording activity, but certainly there can be certain improvement or there can be various improvements in this work that I am doing. So basically always there is scope of improvement and when we do a systematic analysis of the current method automatically using creativity new and new methods are going to come. So the aim is to establish one best way which we have seen in method study.

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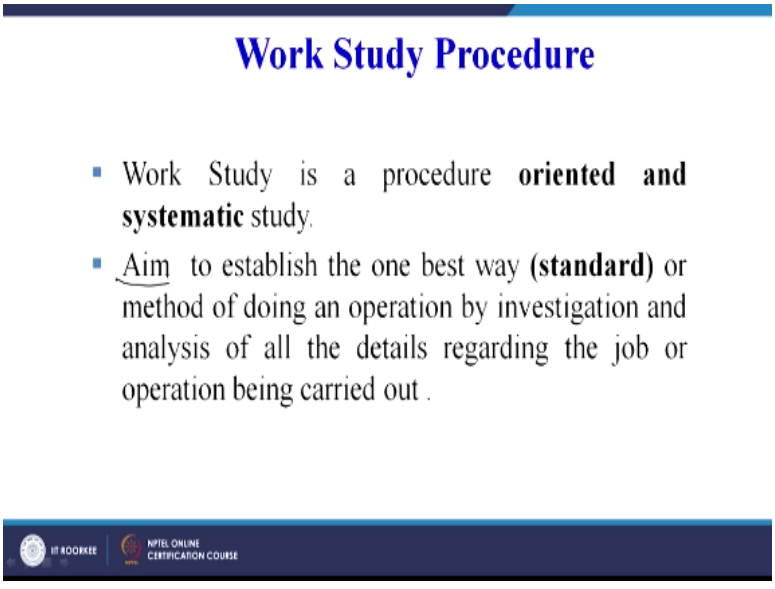

What is the aim, the aim is to establish the one best way or method? So that we can call as the standard method of doing an operation. How we will do that? we can do that by investigating

and analysis of all the details regarding the job or the operation being carried out. So what does that mean? it means that job or operation being carried out that is the current method of doing the job.

So we have a current method of doing the job and from this current method we want to design a standard method of doing the job which is going to be the best way of doing the job. So that is our target now. We are currently focusing or we are currently doing the work by one particular manner, can there be a better method of doing the job. So let us take the steps involved in work study.

Now on your screen you can see that there are different steps that we have to follow in a systematic manner and try to solve the problem or try to establish the one best method of doing the work.

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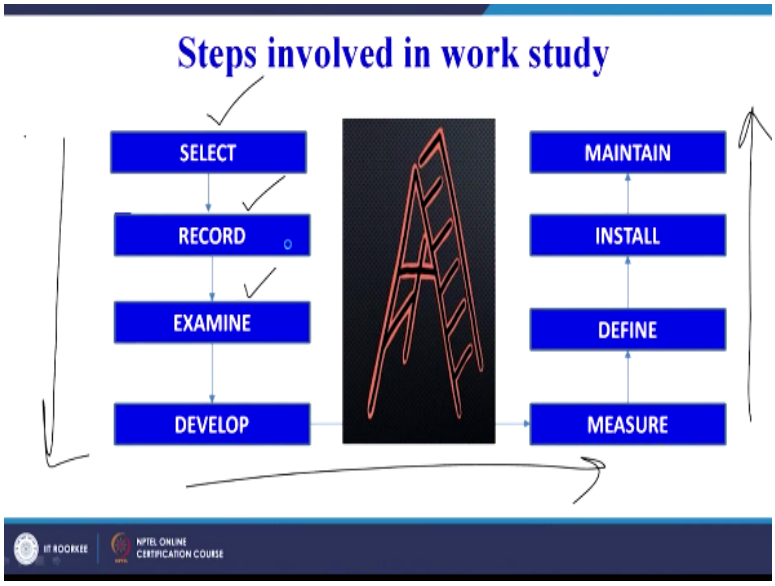

Now you can see what are the steps involved, so we move in this particular sequence in this direction so select, record, examine, develop, measure, define, install and maintain. We will try to see each one of this with one slide or maybe wherever possible with one example. Now first thing is we have to select the work that we have to study as the topic is work system design and we are discussing work study.

So first thing is we need to identify the work element or the job or the task that is under our investigation that we want to investigate. Then we have to record all possible information related to that work that how the work is being done, who is responsible for doing the work,

why it is being done in that particular manner only. So we have to record all that information maybe the why part may come in the examination stage.

So first we will not ask why, but we will try to establish that how the work is being done, what is the sequence being followed, who is the person or the worker or the team of worker responsible for doing that work. So first one is identification of the work, second one is recording all information related to that work or the job or the task. Next is examination, so we will examine that why this work is being done in this manner only.

When it was designed? when it was last reviewed? so we will try to examine the way the work is being done. Then we will see that can there be a better method of doing this job? can the number of workers involved in doing this job be reduced? can the time required to perform this task be reduced? can there be a assistive device which can help the workers to perform this task easily?

Can the environment be changed in a way that the work is done easily by the workers? workers feel comfortable while doing the job, can some changes be done that the work becomes safer? the work environment becomes more safe, so we will try to develop maybe a new or a modified method of doing the task. So we will use all our creative juices. We will use our innovative skills to find out the better method, the best method of doing the work.

So we can see the first 4 steps are very, very important, maybe in organization hundreds of different types of work maybe going on. So first is to identify, second is to get all information related to that work, third is to examine the work that is being done. To breakdown the work in to it is various elements then try to develop a new or improved method of doing the work. Then what we need to do? we need to measure.

What we need to measure? that in current method 4 workers are involved for 3 days so 2 resources were workers and days, then we measure that if we change the way we are doing the work, 2 workers are required for 2 days. So we say that the worker requirement has come down. The time requirement has come down. So we will do that measure and comparison between the current and the modified, proposed, improved, best method of doing the work.

So then we have to measure. Once we have measured the improvement we know this is the better method we will define it. We will outline the steps required to do the task. We will try to figure out that what can be the best, we are not figuring out now. We have already developed, so we are defining that these are the steps involved in doing this work.

This is the standard way each and every worker must do this job or this task then we will install it, maybe it becomes the standard protocol which we say standard operating procedure some time which has to be followed, then we have to maintain that method. The workers may find doing the task in a much easier manner so they may try to revert back to some other method or the method suitable to them.

But then as managers, as administrators we have to ensure that they follow the systematic method which has been established which is better from all other perspectives, from all other point of view, on all criteria we establish that the proposed method is better than the current or the existing method of doing the work. Now let us quickly try to see each one of these. First one is select.

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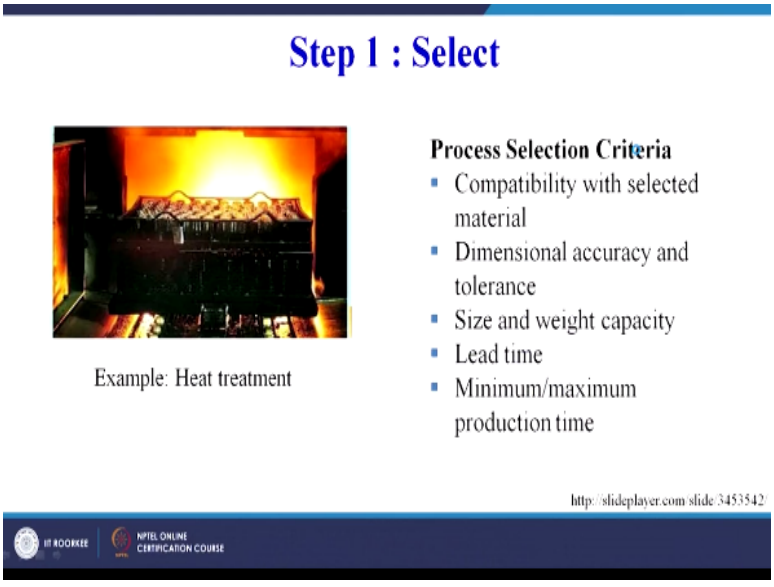

So process selection criteria quickly we can have an idea, compatibility with the selected material, dimensional accuracy and tolerance. Size and weight capacity, lead time, minimum/maximum production time, so example taken here is suppose we select the heat treatment process. So in heat treatment maybe this is the possible criteria.

So this is one thing, out of the whole sequence of operations or type of process is being done in an organization we focus on one particular process that is the heat treatment process and see that we are going to change or propose a new way of heat treatment based on these criteria. Second is record, now during record or collect all relevant details concerned about the job or the process using various recording techniques.

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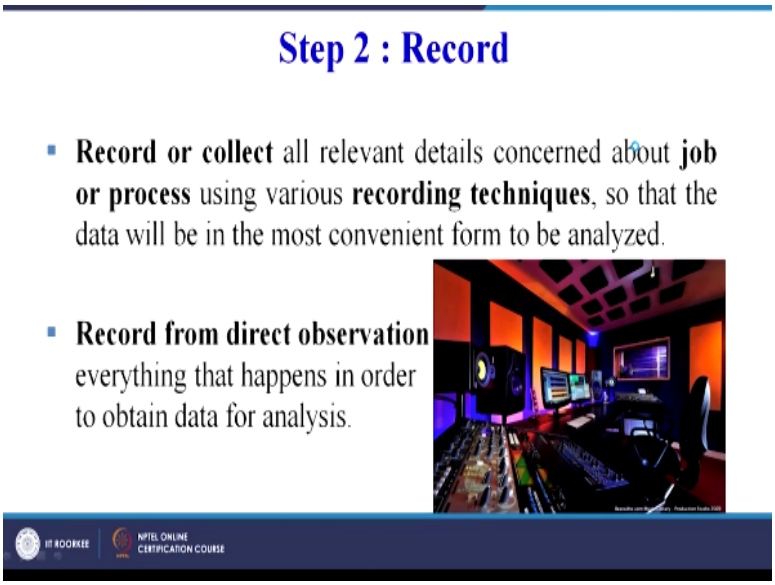

So that the data will be in the most convenient form to be analyzed. So we may use certain graphical tools, we may use certain tabular tools to record the information in a very, very systematic manner why because once we have recorded all the information in a systematic manner we have to compare this information with our proposed method. Because we are going in the subsequent steps.

We are going to develop a new or a better method of doing the same job so when we have all the data listed in a very, very systematic manner then for the proposed method also we can make another column and try to compare that what was the existing scenario and what is the proposed scenario and if you remember in our last session on productivity in week #2, we have seen a change in design of a gunsight reticle.

So in that we have seen the improvements were shown in a tabular form. So and the criteria was listed, the current design, how much may be time or what is the weight or how much are the number of parts and then in the proposed design what are the changes and then what is the percentage improvement.

So it is very, very important to record the data in the most systematic manner so that it later on can be used as a comparative tool and help us to compare between the existing and the proposed method of doing the work. So recording maybe done from direct observation. We can do the direct observation of everything that happens in order to obtain the data for analysis.

We must record how much time is being taken, how many workers are involved, how many operations are involved, so all this data has to be recorded systematically. Third is examined, examine the recorded facts critically and challenge everything that is being done.

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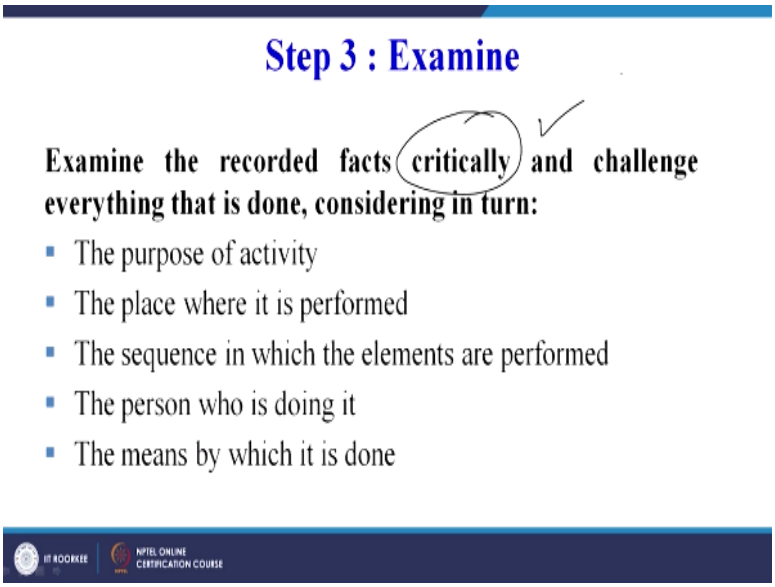

So first thing is we have to be very, very critical. If we accept the way, the things are being done and we assume that this is the best way then we cannot come up with the better or improved method. So critically we have to examine we have to find out that what can be the improvement, what is wrong, what can be improve, so that is critical examination and another important tool given here is challenge everything.

Try to find out that why this is being done, why only this person is doing the job, why only these sequence of operations is being followed. So what we need to challenge is, we need to challenge the purpose of the activity. First we need to establish that whether this work is really required or not. If it is required, then what can be the best way of doing this job. First thing is just challenge of purpose of the activity.

The place where it is performed. The sequence in which the elements are performed. The person responsible who is doing it, the means by which it is being done or the resources utilized. So you can see we have to challenge the very purpose. We have to challenge the place where it is done. We have to challenge the sequence of operation. We have to challenge the person who is doing it and we have to challenge the means by which it is being done.

There can be other questions also and those questions will help us in the critical examination of the work that we try to undertake under work study or that we try to investigate under work study. Then these are few point very important points to be noted. Step 1, 2 and 3 occur in every study. Whether the technique being used is method study or work measurement. Now these are the 2 important techniques one is the method study, another one is the work measurement.

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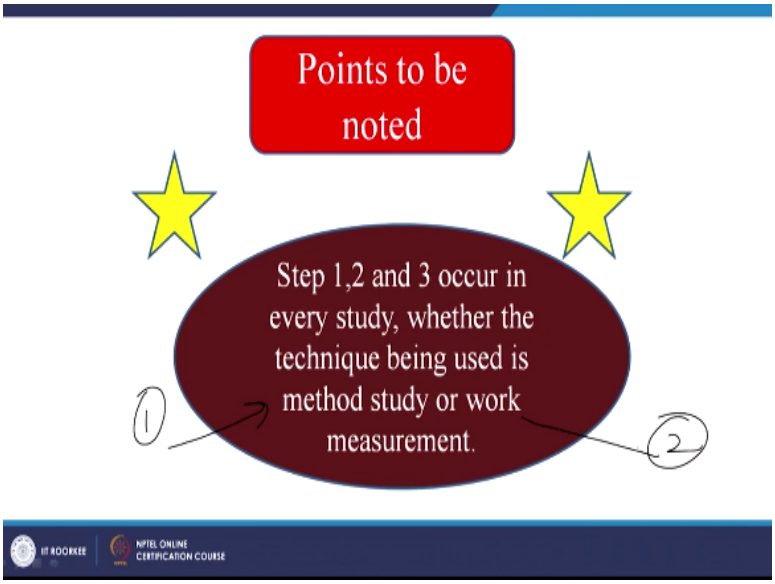

And step number 1, 2, 3 are common. So we have to select, record and examine, then we will go to step 4 that is develop.

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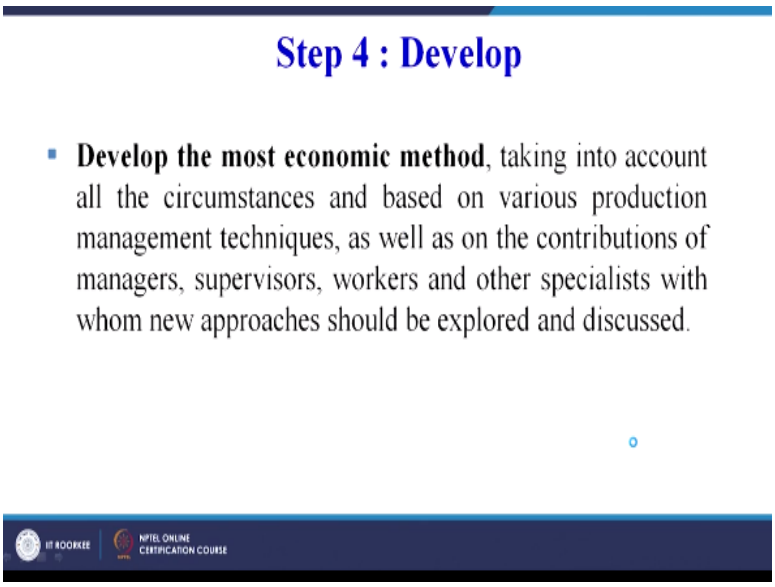

Develop the most economic method, now economic may not always be in terms of money. Economic can be in terms of number of people involved, economic can also be in terms of the labour effort involved. So we can see it is not only economically from money point of view only, it can be economically from effort point of view also. So it can be economical from safety point of view also.

So develop the most economic method taking into account all the circumstances and based on various production management techniques as well as on the contributions of managers, supervisors, workers and other specialist which whom new approaches should be explored and discussed. So now the real part, the more creative part, the more innovative part comes into picture.

Now if you go to a particular industry you select a particular process to be studied, it is being done on a continuous basis, you can record all information related to that process. You can further examine it in terms of where it is being done? who is responsible for doing it? what are the sequence of operations followed? how may sequence of operations are there? what is the time being take to do the task? so all that is recording.

So all 3 are done in a very, very systematic, so 3 important points. Selection, recording and examining, but the most important part is that how to develop the best method. So all these 3 steps are easier maybe once the work is being done you can record, you can examine, but finally how to develop the new method. So developing is where your real creativity will come into picture.

So here one maybe hint is dropped here that information or contributions in developing the new method can be based on managers, supervisors, workers and other specialist and the new approaches or new ways of doing the work can be deliberated and maybe proposed and tested that whether the new methods are better or not.

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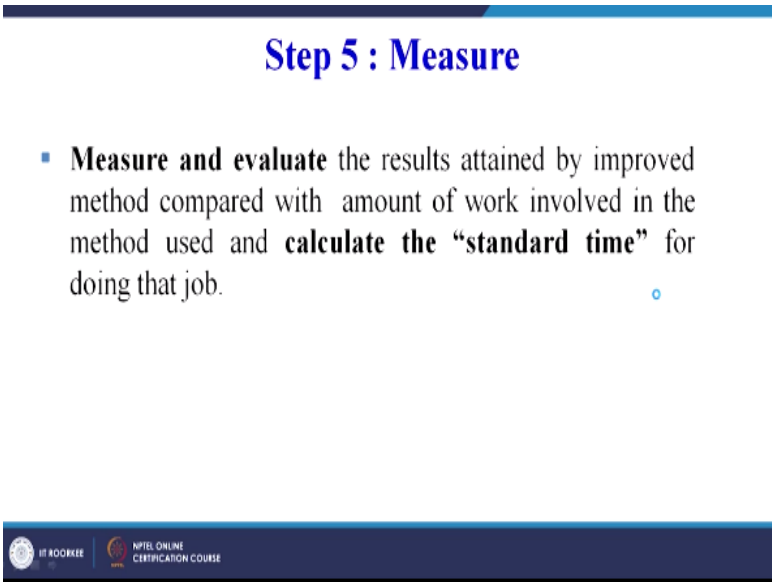

Then measure and evaluate the results attained by improved method, compared with the amount of work involved in the method used and calculate the standard time for doing the job. Now we can see in measure as I have already told when we record the thing systematically we can compare between the proposed and the current method of doing the job and once our proposed method is giving us better results.

Then, the next stage is we will set the standard time for doing that job. So measure and evaluate the results attained by improved method as compared with the previous method and if we see that yes there are improvements. Yes, we are finding certain advantages of the new method then we will go further and calculate the standard time which is one of the important aims of work measurement. So step 4 is the part of method study practice.

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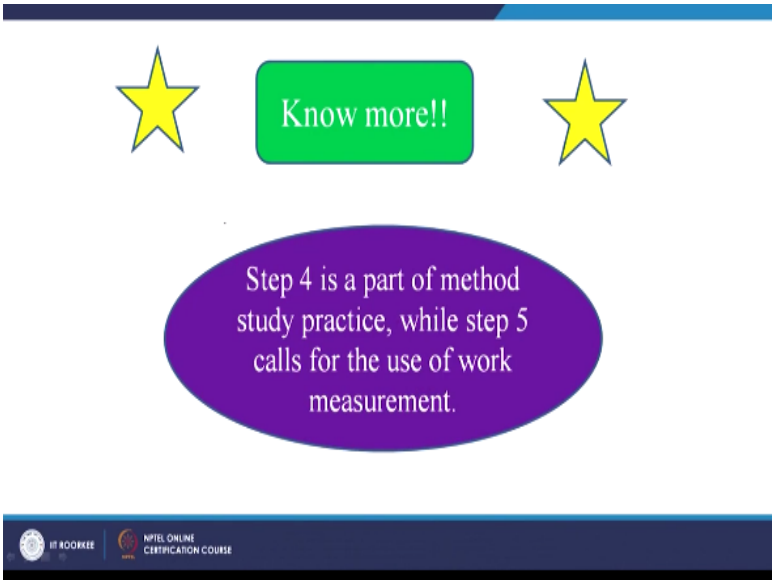

While step 5 calls for use of work measurement. So you can see we can have step 5 where measure and we have to calculate the standard time which is important part of our work measurement technique. So we have to calculate the standard time which will be done under work measurement. So previous parts are under method study where we are trying to develop the best method of doing the job. Then we have to define the new method and related standard time.

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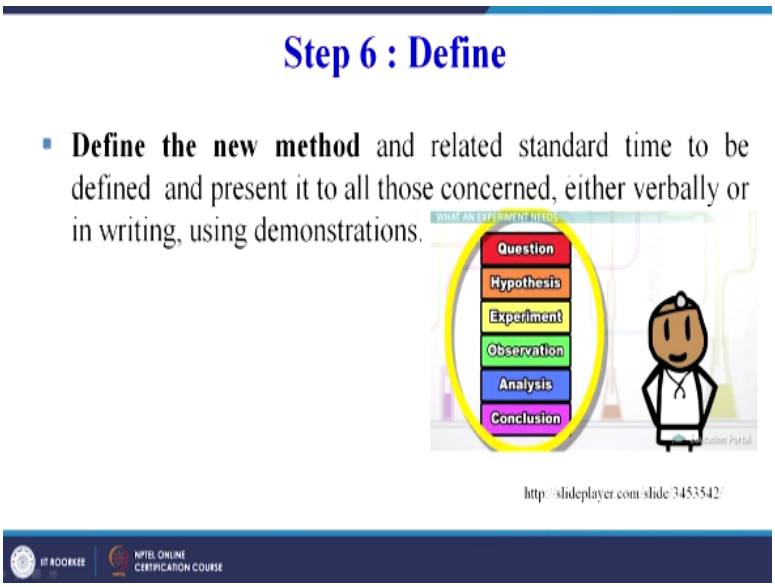

Now 2 things we have done. We have selected work to be studied. We have recorded all facts related to the work. We have examined the various fact that where it is being done what is the sequence followed, who is going it, we have examined that. We have developed or proposed a new method of doing the job then we have measured that what are the improvements possible and then based on that we have found out the standard time for doing the job.

And finally we have to define now, define the new method and related standard time to be defined and present it to all those concerned either verbally or in writing or using the demonstrations. So we have to now define that this is the sequence of steps. This is the way we are going to do this work. This is the procedure we are going to follow for doing this work. This is the standard practice for doing this work.

And this much time must be taken for doing this work following this standard procedure. To all this is systematically defined or in Layman's term we can say a standard operating procedure is laid out with respect of standard time also. The procedure plus the time taken for doing the work, so that has to be laid out, then finally we have to install that method.

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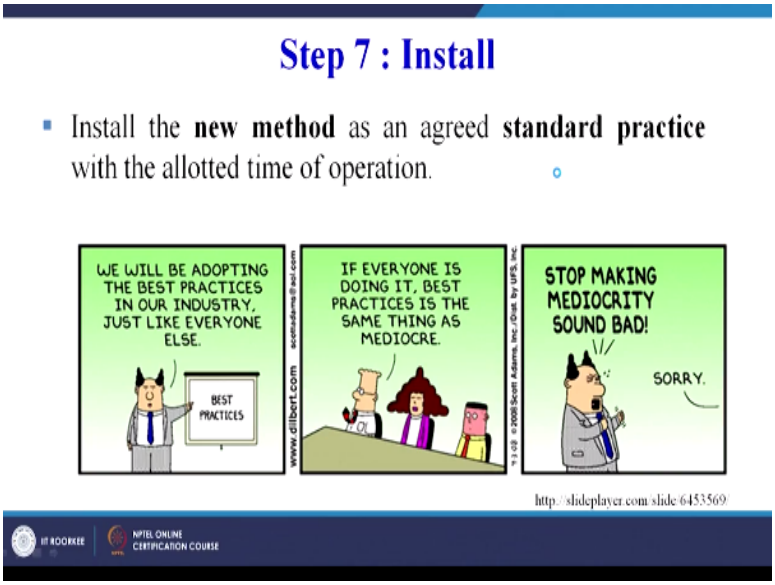

Install the new method as an agreed standard practice with the alloted time of operation. So once we define it then it has to be put into practice, it has to be implemented every worker must do the work using the standard method only and in the standard time found out using work measurement techniques. So just quickly I will read it for you.

Sometimes we feel that if we follow the standard approaches only we are not developing new method so it is leading to mediocrity, so that is not the case. We have to follow the standard method because it is beneficial not only for us but also for our organization and in the long run beneficial for the country also. So we can see just these things I will read. We will be adopting the best practices in our industry just like everyone else.

So the best method is proposed maybe it is defined. If everyone is doing it best practice is the same thing as being mediocre. So usually we have that notion that if everyone is doing the same thing then what is so special about us. Stop meeting mediocrity sound bad. So then we can say that sometimes using a standard procedure or standard method is definitely going to be better than using the wrong method or a poor method of doing the work.

So always we must strive to develop new and new methods of doing the job, but once we established one way of doing the job which is giving us better result, we must follow it and then maybe by use of technology, by use of better understanding of the way work is being done we can further think of improving the method, so this is the continuous process and standard methods are definitely going to be useful for the organization.

So continuously we must strive to evolve and come up with newer and newer methods of doing the job but by the time we are innovating we are creating we must follow the standards. And finally we must maintain.

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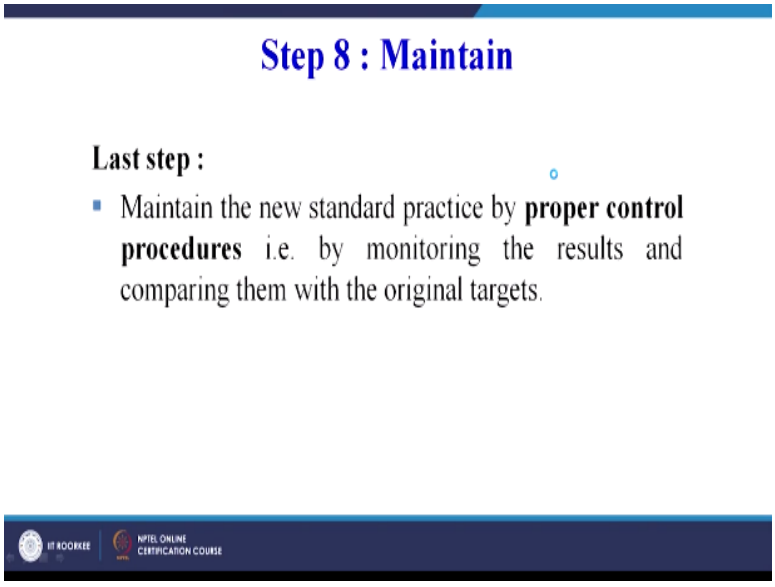

The last step is maintained the new standard practice by proper control procedures. So important thing is control procedures. We must keep a tab, we must keep a check, we must understand, we must make it understand maybe we must emphasize to our employees that they must follow the standard procedure or a standard method of doing the work because that is the current best method of doing the job.

That is why monitoring the results and comparing them with the original targets. So we have to maintain our best method in terms of control so that the workers may not go back to their previous method or the method that they find better as compared to the standard method which has been established using the concepts of work study. So basically I will stop today now basically we have tried to understand the various steps involved.

And the steps basically I will just summarize what we have covered, first thing is we have to select the work that has to be done, then record all the information related to that work then we have to examine, finally we have to develop a new method. Once we have developed a new method we have to compare the new method with the existing method or the current method in the measure stage.

Once we have measured the findings we have to define that how the work has to be done. Once we have defined we have to implement or install the method in the shop floor and finally we have to maintain we must ensure using the proper control procedures that the workers are doing the work as per the standard procedures laid out as a result of developing a new method.

Also the time standards must be adhered to, so with this I conclude today's session. We will carry forward our discussion on this topic of work study in the next session. Thank you.