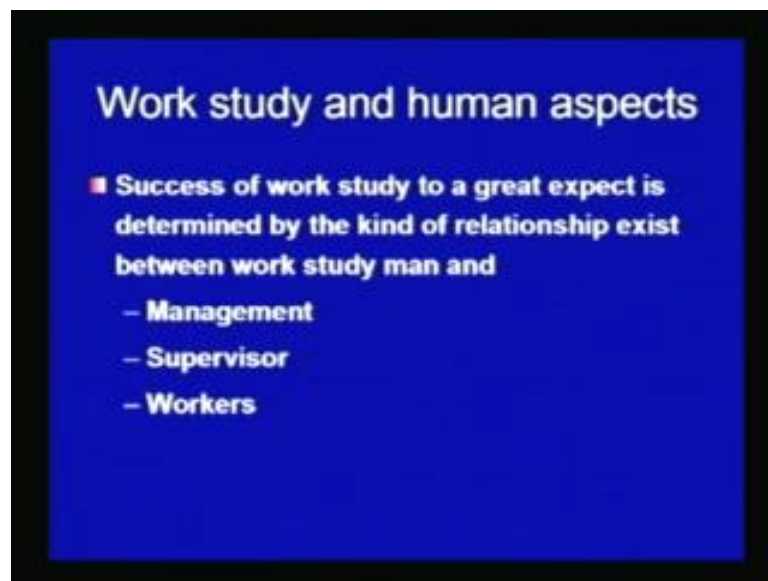


Industrial Engineering
Dr. D.K. Dwivedi
Department of Mechanical & Industrial Engineering
Indian Institute of Technology, Roorkee

Module - 03
Lecture - 04
Work Study and Human Component and Method Study

Dear students, in today's presentation, I shall be talking about the Work Study and the role of Human Component in success of the work study. The same time will also be introducing the one of the work study technique; that is the Method Study. Work study is carried out by work study man and for when, he will be carrying out work study; he will be interacting with the different persons. So, for the success of the work study, it is necessary that the relationship of between the work study man and the other persons involved with whom he will be interacting, during the work study or maintained in reasonably good form.

(Refer Slide Time: 01:19)

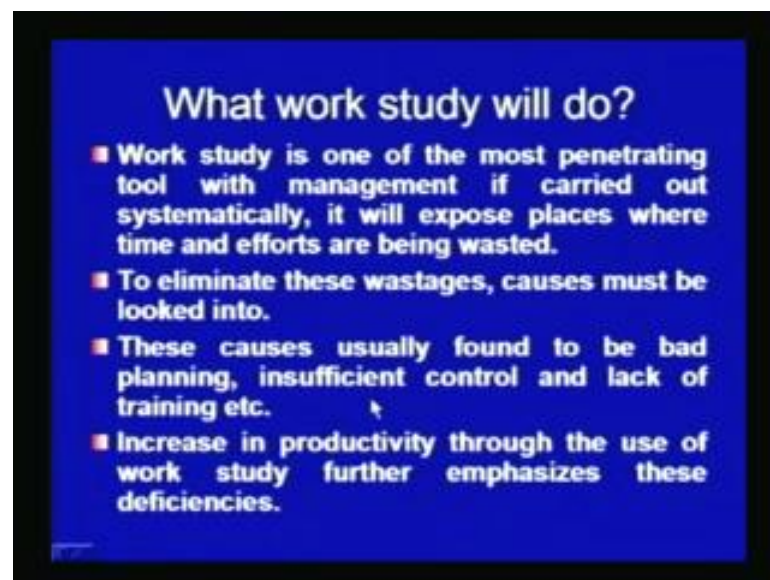


The success of the work study to a great extent is determined by the kind of relationship which exist between the work study man and the three kind of the people with whom he will be dealing, in these are management, supervisors and the workers. The job of improving in the given method for improved productivity is done by the work study man and which will be able to help to increase the productivity of the organization.

But, the success of this implementing, the improved method and increasing the productivity to a great extent is in depend decided by the support of the management. So, if the management is there in the support of the work study man, it will be easy for the work study man to carry out the required changes, which will be good for improvement of the productivity of the organization.

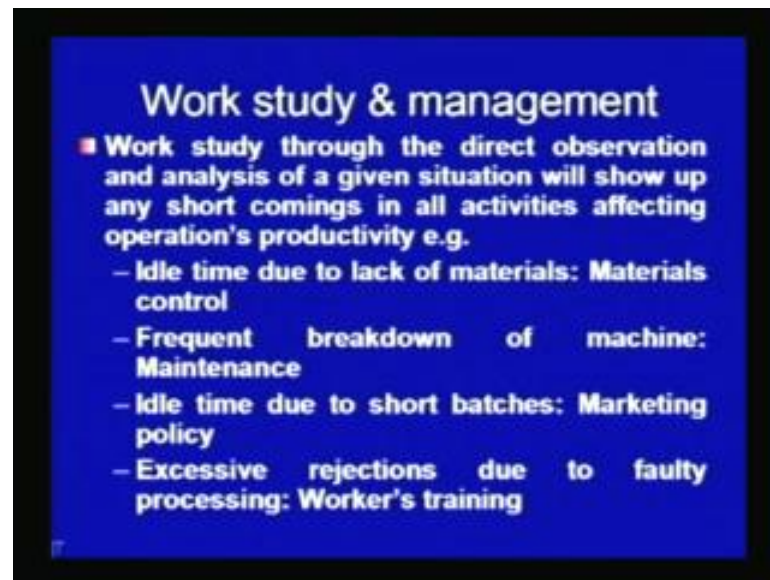
So, one by one, I will be taking up, that how work study man relationship with the management, supervisor and workers can be important in the work study. What work study, does actually is that, it is such a kind of tool available with the one management, which helps to find out the various deficiencies in the different areas; where work is done, work study is one of the most penetrating tool with the management.

(Refer Slide Time: 02:58)



And when, it is carried out systematically, it helps to point out various deficiencies; it exposes the places, where time and efforts are being wasted. And to eliminate these wastages and use of the wastage of the resources, many times causes are looked into. So, that those causes can be taken care of and when these causes are looked into, many times it is found that, these are related with the bad planning insufficient control and the lack of the training, and on these aspects management is suppose to looked into. So, for increasing the productivity through the use of work study, further emphasizes, these deficiencies, if by using work study technique method is improved and that will further confirm the deficiencies in above areas.

(Refer Slide Time: 04:00)



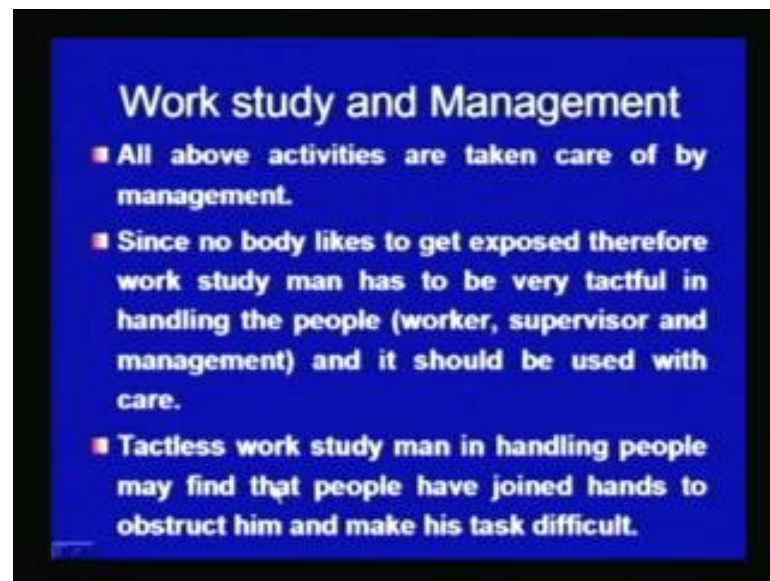
So, if these deficiencies are pointed out, it can lead to expose the management people, who are suppose to be responsible for those activities. So, the through the work study, which is carried out by the direct observation an analysis of a given situation, indicates the shortcomings in the activities, affecting the productivity of given operation. And these shortcomings may appear in form of idle time, due to the lack of material, which is to be taken care of by the material control department or the section.

It may be inform of frequent breakdowns, which may be due to the poor maintenance of the equipment being done by the maintenance department. Idle time, due to the short batches, may be due to the marketing policy of the management, like increased variety being produced in small batches frequently leads to the increased idle time. Due to the short batch batches, which are to be produced and excessive rejections of the component being manufactured by the organization, due to the faulty processing.

Faulty processing, many times lead is caused by the carelessness of the workers, if they have not been trained, they have not been told about the importance of the proper working, that will lead to the significantly high percentage of the rejections. So, proper workers training is important, if you see all these points like poor material control, causing the idle time, due to the lack of material, poor maintenance causing due to the idle time, due to the frequent breakdowns.

Idle time caused by the short batches which are to be produce, due to the improper marketing policy and excessive rejections. Also, lead to the increased ineffective time due to the fault processing and all these ineffective times and idle times are caused by the different activities, which are taken care of by the management. And if these deficiencies are pointed out, it will expose the inactiveness on the part of the management.

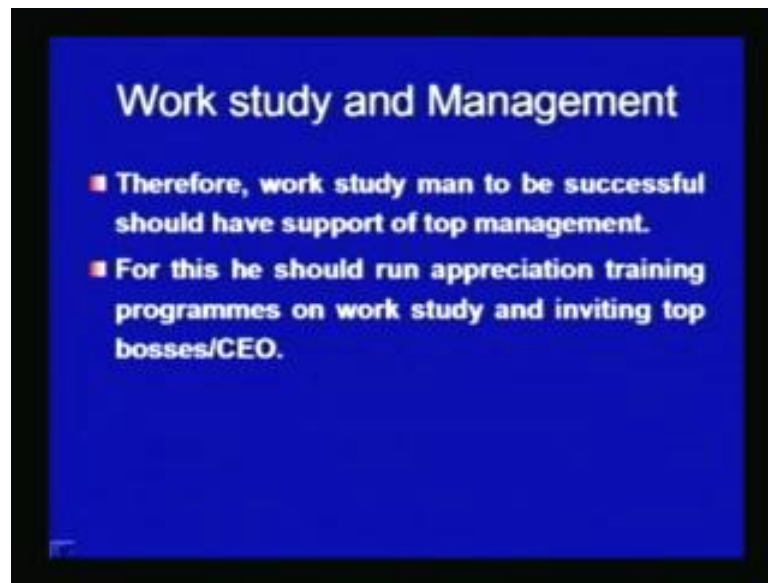
(Refer Slide Time: 06:25)



And that is why, if the activities, if these deficiencies are exposed, then management will not feel good about them self and because nobody likes to get exposed. Therefore, work study man has to be very tactful in handling the people including workers, supervisors and in and the management. If the deficiency of someone is exposed, then he does not like to be in that kind of position and that is why the work study man, when he is pointing out the deficiencies, he has to be very tactful.

So, he is able to convey the message at the same time, it does not lead to very comfortable situation, that tactless work study man. Otherwise, can find himself in very difficult position, where the people who are been exposed will join hands and obstruct him from making any task or any good work. On as a part of the work study which has to contribute for increasing the productivity. So, if the handling of the people by the work study man is not proper and it is tactless, then people will come together and will obstruct him from carrying out any useful work.

(Refer Slide Time: 08:05)



And therefore, success of the work study, it is necessary that work study man handles the people from the management, supervisors and workers, tactfully. And it is necessary, that to get the support of the management, he is able to convince the top management of the organization. And to gain the support of the top management, it will be better, if he informs and he gives the enough idea about the importance of the work study.

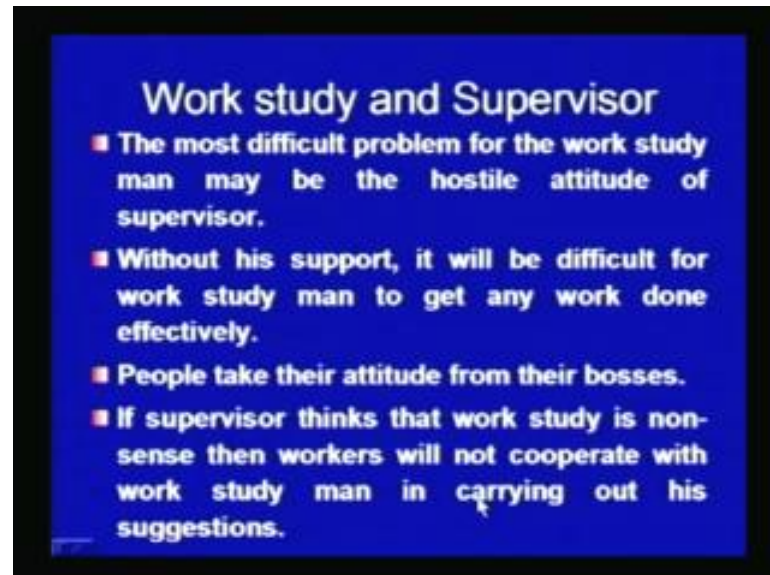
And it is capabilities, as far as a increasing the productivity of the organization is concerned and betterment of the organization is concerned. So, for this purpose he should run the appreciation courses, under the training program on the work study by inviting the top bosses and the CEO of the organization. Running of these courses help the work study man to importance of the work study and to the management people and which in turn helps him to gain their acceptance.

And their confidence in carrying out the work study, the supervisor is the representative of the management on the shop floor and role of the supervisor is very important in success of the work study, because the supervisor is the person, who has been responsible for carrying out and the things smoothly in the shop floor.

If the work study man, through the application of the work study is able to bring in significant improvement in the productivity of the department or of the plant. Then, supervisor may feel that, he is deficiencies will be pointed out and his position will

become awkward. And that is why; the work study man may face the maximum challenge and the difficulties from the supervisor.

(Refer Slide Time: 10:40)

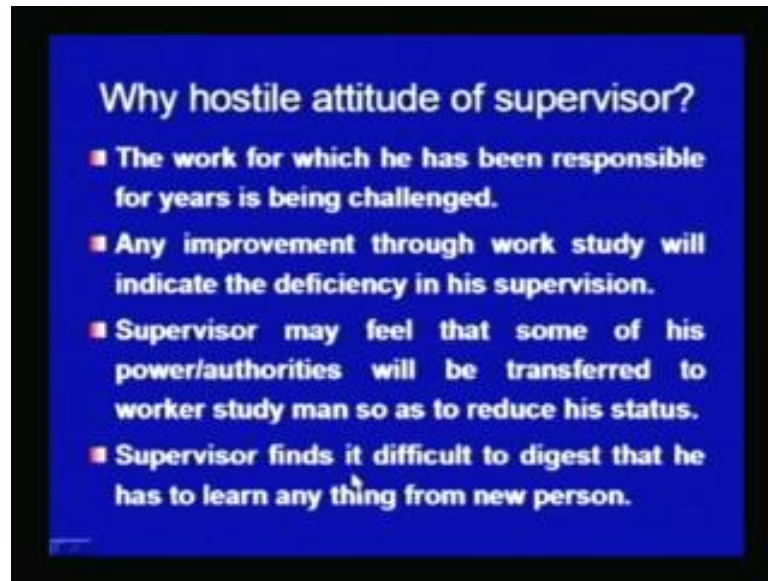


The most difficult problem for the work study man may be the hostile attitude of the supervisor, because he has been the person, who was responsible for the process planning. For hiring and firing of the persons, for the job planning, for giving the instructions and for developing the methods, for carrying out the different jobs. If his work is being challenged, he may he will not have very good attitude towards the work study man.

And that is why, for the success of the work study, it is necessary that his support is obtained without his support, it is difficult for the work study man to get any work done effectively. Because, you know that people take their attitude from their top bosses, since the workers work under the supervisor and that is why, they will be taking their attitude from the supervisor attitude.

So, if the supervisor feels that the work study is not fruitful, it is just nonsense then the workers will also not be cooperating with the work study man in carrying out the suggestions being given by him. So, if the supervisor thinks that, work study is nonsense and workers will also not cooperate with the work study man in carrying out the suggestions, so that improved method can be developed.

(Refer Slide Time: 12:21)



The hostile attitude of the worker of the supervisor, towards the work study man is caused by the various factors like the work for which he has been responsible for the years is being challenged. This is the kind of feeling supervisors have and any improvement through the work study, will further indicate the deficiencies on his supervision.

And the supervisor may further feel that some of his authorities and the power will be transferred to the work study man. So, has to reduce his status because most of the job on the shop floor, like job planning, the development of the methods, hiring of the people and giving the responsibilities and settling the disputes related with the shop floor are settled by the supervisors.

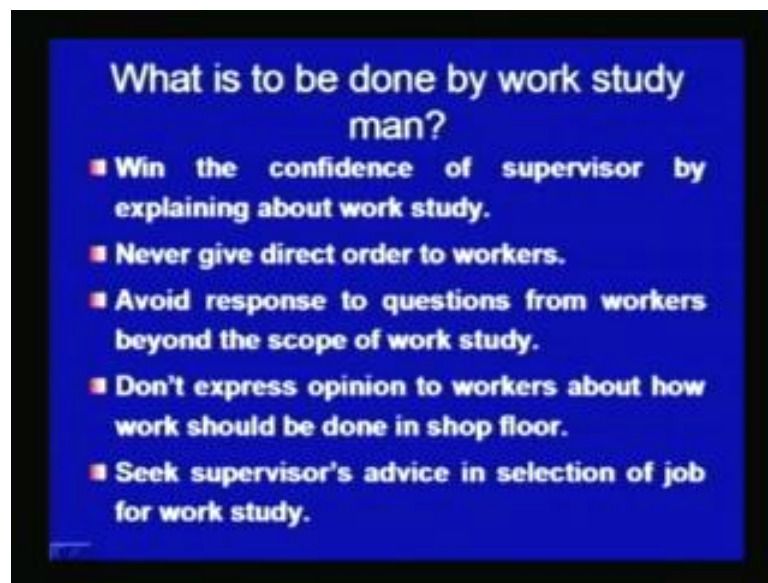
And with the entrance of the work study man, some of these responsibilities may be given and to the work study man like development of the method for carrying out the job and improving the productivity of the section. So, that is why, the supervisor may feel that some of his authorities will be transferred to the work study man, which in turn will reduce his status.

Supervisor also finds it difficult to digest, that he has to learn anything from the new person of the same field. Because, work study man has the only tool, that he can investigate the work systematically and can come up with the number of alternatives for carrying out the same job and can help also to develop the better method. So, he is a

comparatively newer person, while the supervisor has been there in the shop floor for many years.

So, it becomes difficult for the supervisors to digest, that he has to learn anything from the new person, who is coming in form of a work study man. So, what a work study man should do to deal with the supervisors having very hostile attitude towards them. To deal with supervisors, it is necessary, that his confidence may win by the work study man.

(Refer Slide Time: 14:51)



By explaining the importance of the work study and it is objective and the methodology which will be used by him to improve the existing methods. And he should avoid giving the direct orders to the workers and he should always route the instructions, through the supervisors only. So, that a supervisor does not feel any threat in his presence as far as authority and the powers are concern.

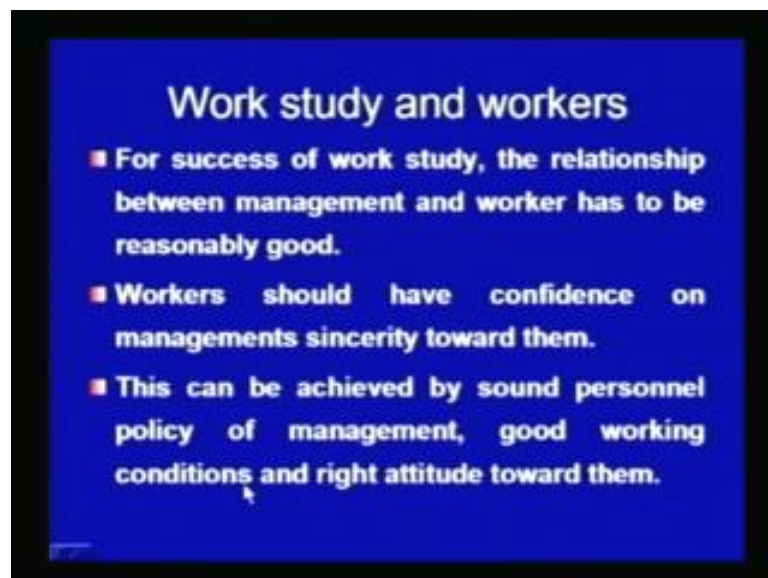
And the work study man should avoid the response to the any questions, from the workers, which are beyond the scope of the work study. He can explain the things related with the work study to workers, but he should avoid, the response to the questions being asked by the worker beyond the scope of work study. He should not express opinion to the workers, about work should done in the shop floor, this may be considered as a criticism of the supervisor.

And the supervisor may come against the work study man in carrying out in any effective job and to win the confidence of the supervisor, he can further ask the advice. He can seek the advice of the supervisor for selection of the job, which should be taken up for the method study and for improvement of the given the situation. Because, supervisor has been very close to the work and he may be having number of ideas on what on which method and which area needs improvement and how it can be improved.

So, the inputs from the supervisors can be very useful for work study man in improving the given job and the selection of the given, job for increasing the productivity of the organization. The workers are also dealt by the super work study man, because whatever method, he will be developing, whatever time study he will be conducting, he will have to interact with the workers.

So, the if the workers act sincerely on the instructions of the work study man, then it becomes a easy for the work study man to get the things done and to carry out this study systematically. But, if the workers do not cooperate the success of the work study chances for the success of the work study also decreases significantly, that is why for the success of the work study.

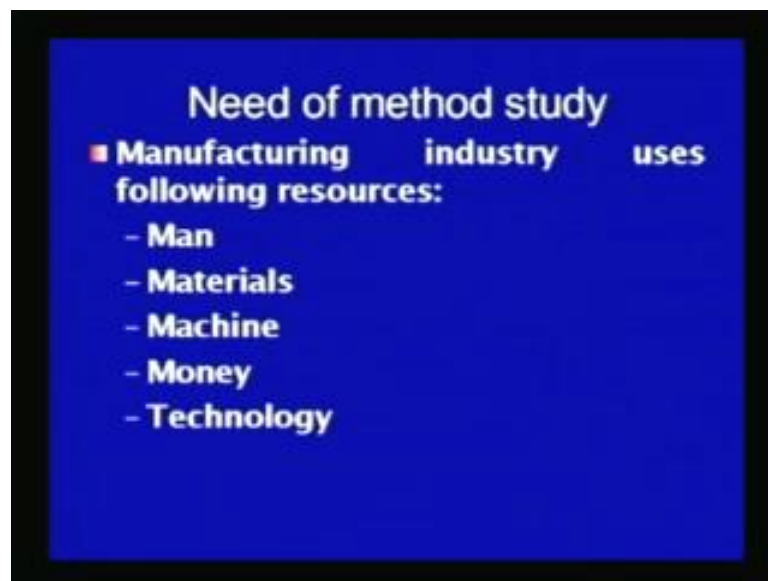
(Refer Slide Time: 17:45)



It is necessary that relationship between the workers and the management are reasonably good, if the workers do not have faith on the sincerity of the management towards them, they will not contribute effectively in that case. Workers should have, that is why

confidence on the management sincerity and for the better or reasonably good relationship. It is necessary, that the management has a sound personal policy for the workers and provides the reasonably good working conditions. And has the right attitude towards them, for looking into their problems and addressing their grievances. So, that they will have the workers will think that management is sincere towards them and does not consider only as a tool of production.

(Refer Slide Time: 18:42)



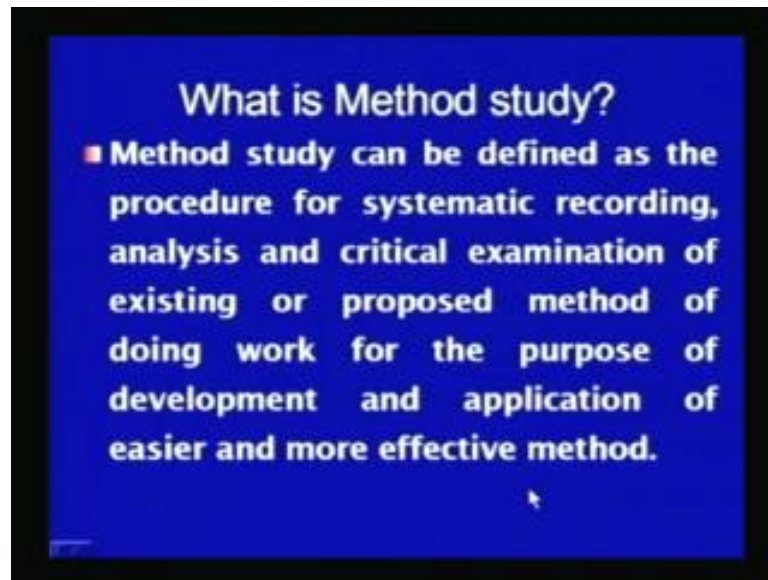
So, here we have seen that the need of, it is required that work study man should have the reasonably good relationship with the management people with the supervisors and with the workers for carrying out any effective job and improving the methods for better for productivity of the organization. We have seen that, the work study involves the method study and the work measurement as a two techniques.

The work study is basically used for a improving the methods of a given job and setting the standard of performance. So, that the productivity of the organization as a whole can be increased, this is the one of the techniques for increasing the productivity of the organization. So, here now I will introduce the need of the method study and the different basic steps related with the method study.

As we know that, in the manufacturing industry the various types of the resources are used, which are which may be in form of the man material machine money and the technology. These resources are to be used very effectively, if the productivity is to be

improved and the attitude of the zero tolerance, towards the wastage of any form should be developed for having better productivity. This resource that is why must be used in most effective and efficient manner.

(Refer Slide Time: 20:32)



The method study is defined as a procedure of systematic recording analysis and critical examination of existing or proposed method of doing the job, for the purpose of the development and the application for is application of easier and effective method. Here, there are the few things in this definition, like work study can look into the existing method and can develop a proposed method for carrying out the given job.

And it is done by a systematic recording of the things, which are being done a while carrying out a given job after recording. It is the critical analysis to find out, what is redundant and what is required, what is not required and then developing the new effective and easy method; so that the economy and the efficiency of a given situation can be improved. Basically it involves, so it is procedure, which involves the systematic recording analysis and critical examination for developing new efficient and effective method for carrying out the given job.

(Refer Slide Time: 21:58)



There are many objectives of the work study, which can be achieved when work is method study is applied, method study objectives include, the improving the process and procedure. The different processes, which are being used for producing a particular job, those can be improved or the entire procedure right from the preparation of the raw material, holding, cutting or the processing conditions, post processing conditions, packing etcetera.

Entire procedure itself can be improved instead of just one a step or one process, improving the plant layout, this is very important. The objective, which can be achieved by the method study of improving the plant layout, which helps to helps to identify the locations of the different stations, which where they should be placed for the reduced moment of the man and material and avoiding the unnecessary long moments and in course of the production.

So, setting of the different stations equipments machineries and the department etcetera will help in improving the existing plant layout or of the layout of the organization for reduced irrelevant moment. And reducing the unnecessary moment of the material and the man in course of the operation or the production, improvement in use of man machine and the materials, it helps to increase the effective utilization of the man by reducing the time required for carrying out job by the man.

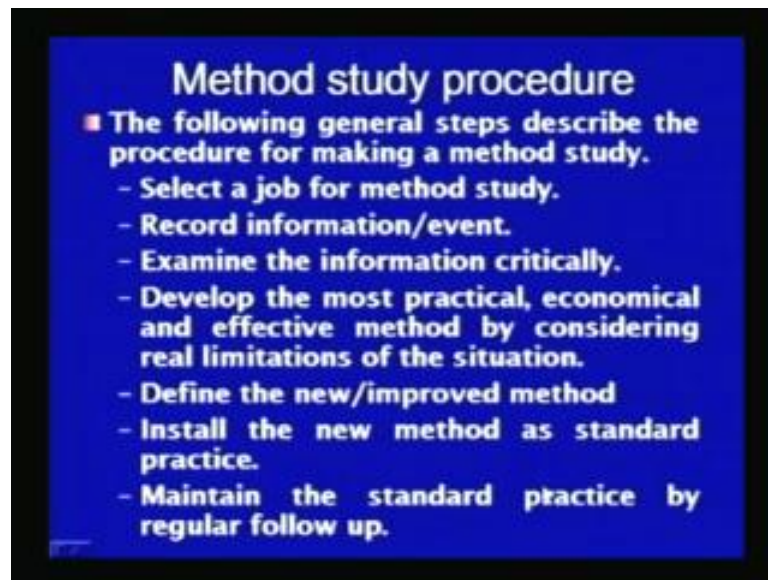
It helps to increase the machine utilization and it also helps to reduce the wastage of the material in course of production. Another important objective is the improvement in design of the plant and the equipment, through the use of ergonomics the design of the plant work place and the equipments can be developed. In a such way, that they need less time and less effort of the worker for carrying out the same job.

Improvement in flow of production and the processes can also be achieved for reduced wastage of the material man movement and efficient production system. Economy in human effort can also be achieved by reducing the unnecessary fatigue of the operator, for this work places and the work method and the movements, during the work are developed in such a way, that they need the less effort from the operator. So, that unnecessary fatigue during the operation is reduced.

The method standardization, when in method study, entire methodology being used for developing a method developing a job is investigated systematically, it helps to find out the different components related with the method. And a detailed investigation further helps to find out, that what are the things which are important and the productive for producing a given job. So, when detailed breakup is available of given method, that helps to establish the method and in a standardized a form.

Improving the working conditions and the safety standard, this is one of the aspect of the method study, where what are the working conditions, which should be developed for efficient working of the equipments and the operators. So, that they can continue to perform without need of extra unnecessary breaks and improved safety standards also helps to decrease the accidents, during the operations and a which in turn helps to increase the productivity of the organization.

(Refer Slide Time: 26:54)



The method study procedure, a method study is carried out by following seven steps, one by one and these steps are like a selection of the job for method study. The selection of the job for method study is very important, because the time and the resources are invested in carry out the method study. That is why, the job should be selected in such a way, that it is economically important for the organizations and it is productivity also will contribute significantly in increasing the economy of the organization.

The second step in method study procedure is the record of the information and the events; it involves the recording of the different events and the activities, which are carried out, while performing a given job. So, these activities are recorded, systematically in such a way, that these can be analyzed systematically and easily later on.

That is why, for the recording purpose the different techniques are used for recording, the job recording the methodology, which is being used to carrying out the given job. Next, after the recording, when all the relevant details have been noted down and recorded properly, it is important to examine them critically. So, the recorded information is examined critically to see that, what are the relevant and the important elements of the job and what are the unproductive activities are the part of the job.

So, the methodology for carrying out the job can be improved by either simplifying by combining, some of the steps of the methodology or by eliminating, some of the steps

which are not required. The decision about that can be taken, only after the critical examination of the different steps, which are being used for carrying out the given job. And after identifying that, what are the things, which are to be eliminated, what are the steps, which are to be combined and what are steps to be simplified.

And we finally come to know that, what should be done for improving the given job and when that those components are applied, like this job is to be done in this in this manner. This person should do it and this sequence it should be done and this is how it should be done and this is the person, who will be doing it.

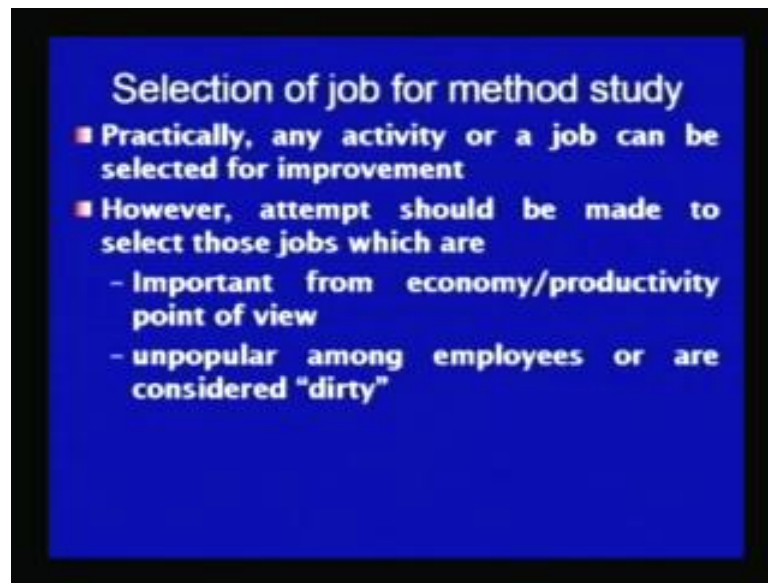
And when, these five components are applied and obtained these five components helps to develop the most practical economical and effective method for considering a method for carrying out the given job keeping in mind the real limitations of a given situation. And after, developing the new one improved method, it is defined, definition involves that, what are the exact things, which will be required carrying out the given job.

So, right from the raw material, the processing conditions, the post treatments, the packing, the time for each element, everything is defined in the exact manner in which it is to be done. So, that definition helps to specify each and everything which is to be done for carrying out, the job by the improved method. And once things have been defined properly the new method is installed as a standard practice.

So, this may require, that the additional tooling, additional raw material, additional training to the workers, if required that is given first and after that the new method is implemented as a standard practice. And after implementing, it is required to check the things regularly, so that people will not switch back to the original or the old method. For that purpose, it is required to have proper follow ups.

So, that the new job is maintained as a standard practice and if required some corrections can be made in the in new method as from the practicability point of view. Now, one by one all the seven steps of the method study will be a discussed in detail and then we will start with the first step of selection of the job for the method study. Practically, any job can be taken for carrying out the method study, but since the method study involves the use of resources time manpower. And that is why; it should not be carried out for those jobs, which are not important for the organization from the economics point of view.

(Refer Slide Time: 33:06)

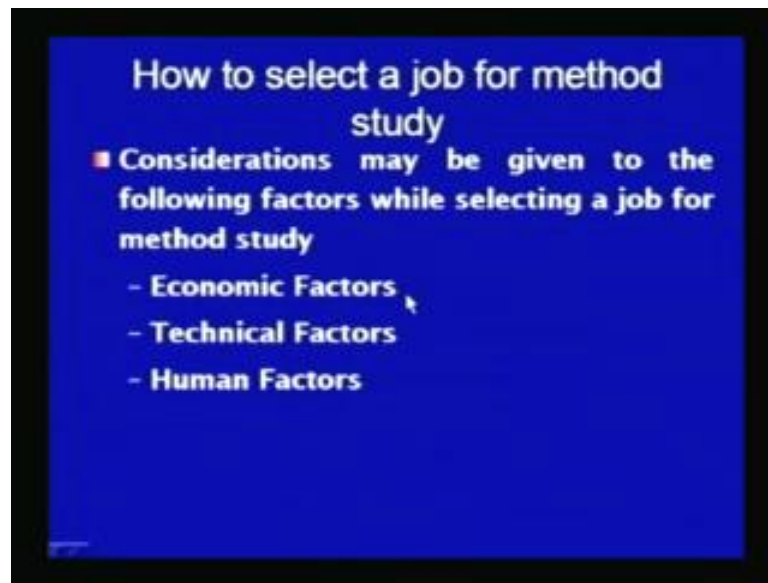


However, attempt can be made for those jobs, which are important from the economy and productivity point of view. In addition to the jobs, which are important from the economy point of view, the jobs which are unpopular among the employees and which are considered to be dirty or also selected for the method study.

The jobs like which needs extra effort and which are causing excessive fatigue to the workers are considered to be unpopular among the workers and they do not want to work under those conditions and on those operations. So, if such kind of the jobs where workers consider the certain jobs unpopular. If they are taken by the work study man, for improvement and then that helps to develop favorable environment for the worker study man.

So, by improving such unpopular jobs, he would learn earn goodwill from the employees. As well as the management, which will further help him for the studies in future of those jobs which workers about which opinion of the worker may not be very good, this point will be elaborated in the next slide.

(Refer Slide Time: 34:35)

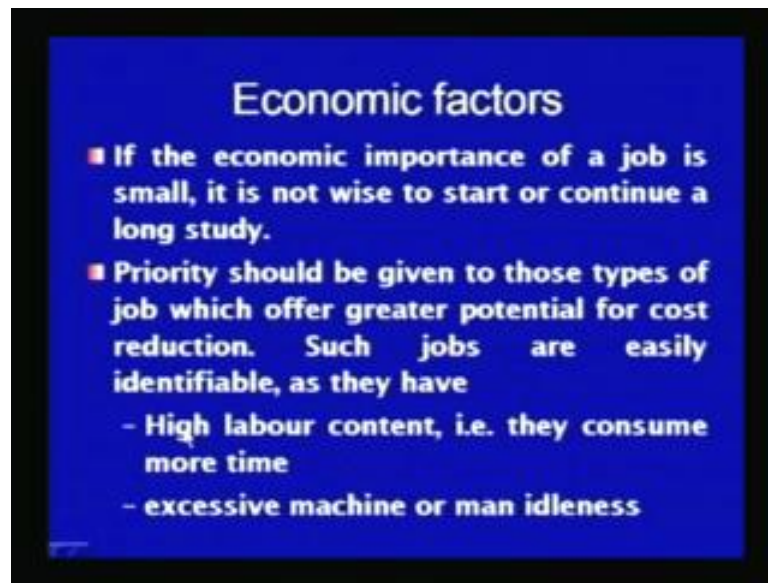


And from the consideration may be given to the jobs, following kind of the jobs for selection, for carrying out the method study. That the factors, which are to be considered, for selection of the job, for carrying out the method study are the three and these are very important, unlike economic factors. The jobs, which is being selected should be important from the economy point of view of the organization, it should increase the productivity of the organization.

Technical factors like factors the technical factors, it involves that the technical expertise require to handle the given job or to handle the given method for improvement should be available. Either, work study man should be the expert of the field or the required expert of a given field is available to him for the technical inputs. And the third factor, which is also very important is that the feeling of the human being, when work study is carried out.

If the study of a particular method is going to cause unrest and ill feeling, for the management by the workers, then that kind of a study should not be carried out, all these factors will be elaborated one by one. Economic factor is very important, because it is important for the economy of the organization and it is productivity.

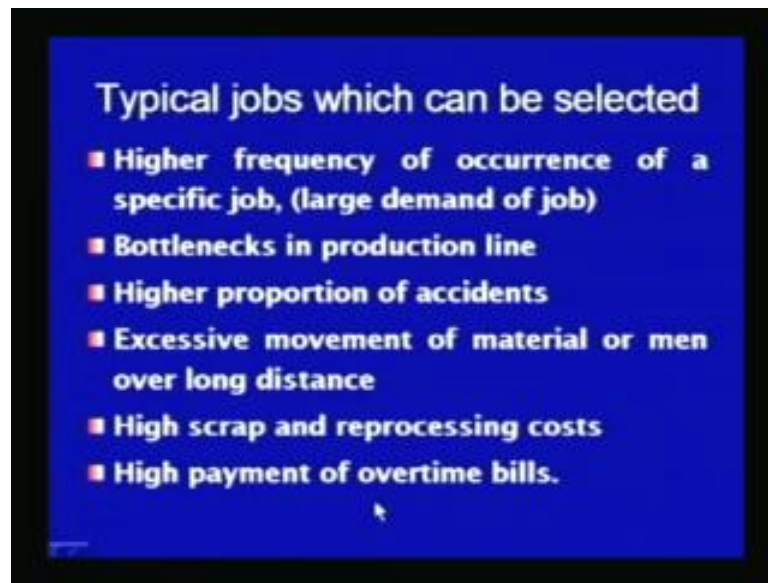
(Refer Slide Time: 36:29)



So, if the economic importance of a job is not much, then it should not be taken up for the study, because if the method study for a job of a small importance will necessarily lead to the investment of the manpower and the resources. And which ultimately will not deliver the desired results in terms of the economy and productivity of the organization. Therefore, it is not wise to start and continue the long time method study, for the jobs of low economic importance.

Therefore, priority should be given for those jobs, which offer greater potential for the cost reduction and such kind of jobs can be easily identified. They will either be having higher labour content, because they will like, they are consuming more time, for carrying out the given job or excessive man or machine idleness. The machine remains idle or the manpower remains idle for long time. The reasons for those can be looked into for improving the existing method and so as to reduce the idleness of the man and machine and also to look reduce the labour content or the work content related with the job.

(Refer Slide Time: 38:06)

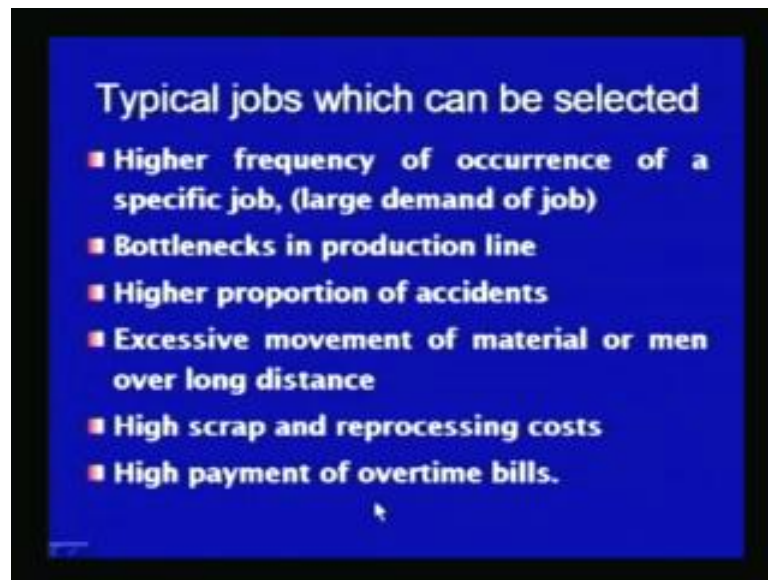


Other cases, where a study can be carried out from the economic point of view includes the high frequency of occurrence of the given job, means many times that same job is repeated and carrying carried out. And the bottleneck in the production line, a particular station is consider to being the bottleneck in entire production line and because of which other machines are also underutilized. So, that station can be taking enough for in method study.

Higher proportion of the accidente, under the certain environment, is a good case for carrying out the method study. Excessive movement of the material and man, over the long distances, this is important, because it will be taking up the lot of wastage of the time man and the wastage of the resources. So, if by the method study the excessive movement of the man and material can be reduced, it will simply increase the productivity of the organization.

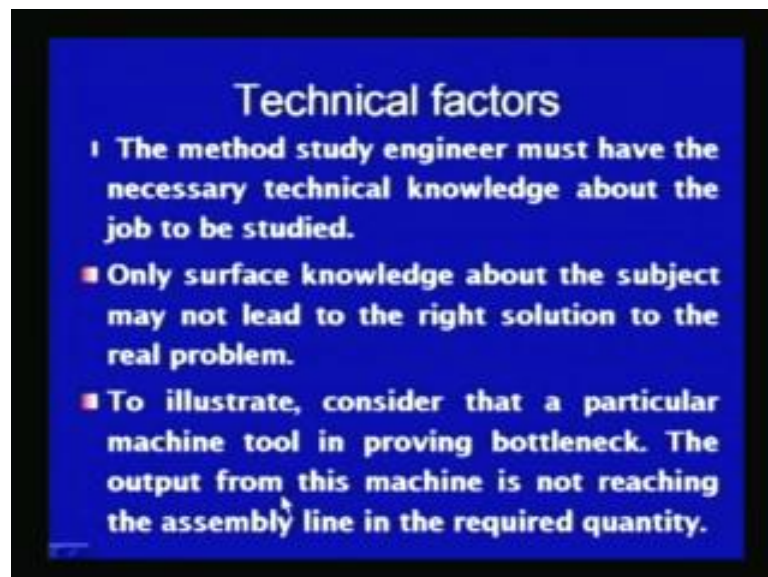
Another the possible job, which can be taken up for the method study is the system or the station, causing the high scrap and reprocessing cost. So, the reasons for high scrap can be looked into for a increasing the productivity and improving the existing method. The high payment of the overtime bills can also be one of the case where method study can be carried out.

(Refer Slide Time: 39:46)



Among the technical factors, the most important thing in the work study and method study of a given situation is that the either work study man should have the expertise of the given field in which study is to be conducted or the technical expertise should be available to him.

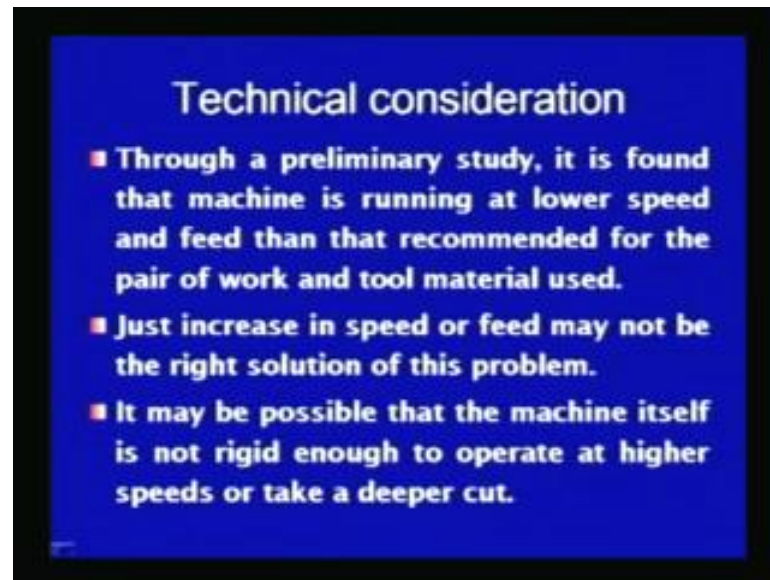
(Refer Slide Time: 40:07)



The method study engineers must have necessary technical knowledge about the job to be studied. Only the surface knowledge will not help him to look into the technical aspects of the given and to come up with the better solution. That is why, if we take up

this example to clarify the importance of the technical expertise, for carrying out the method study. Like, if a particular machine tool is proving bottleneck and from the output of this machine is not reaching the assembly line in the required quantity.

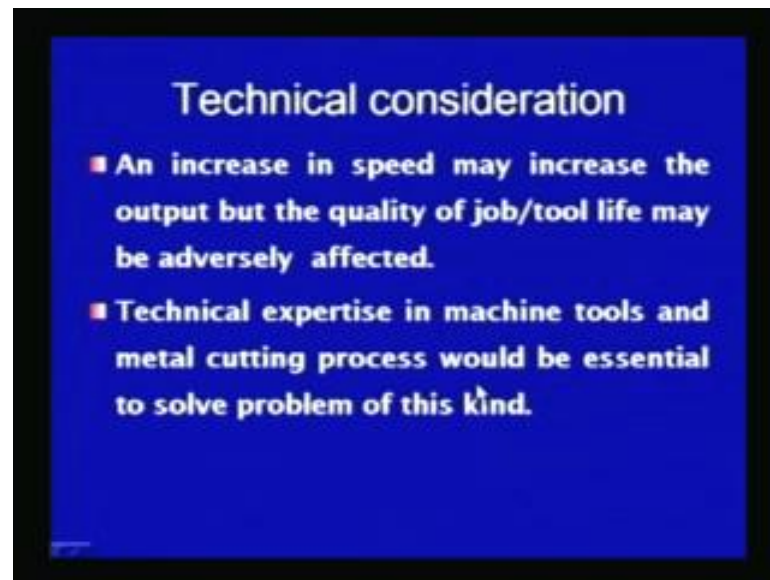
(Refer Slide Time: 40:47)



Then, through a preliminary study indicates that machine is running at lower speed and the feed, then that is recommended for the fair of work and tool material used. So, if the work study man thinks that simply by increasing the speed and the feed of the machine, the production rate can be increased and it may be incorrect and the wrong also. In many cases, because simply increasing the speed and feed, can lead to the poor the quality of the product or increased the tooling cost.

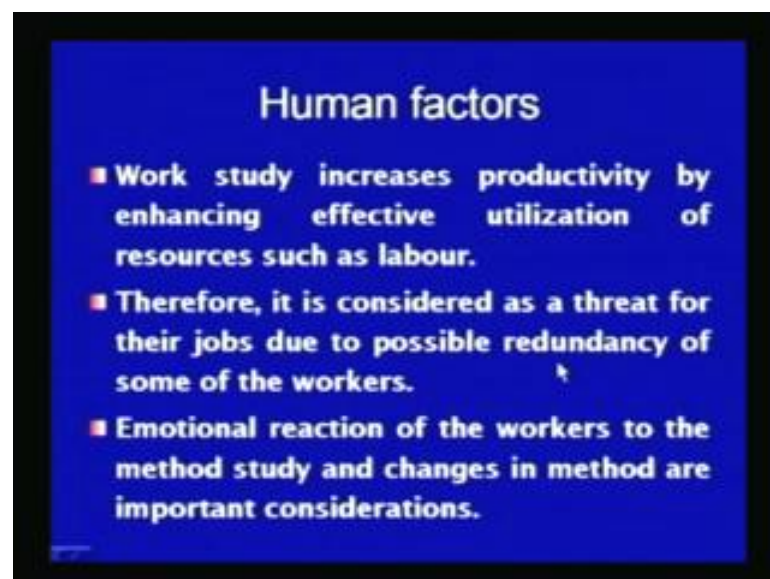
Because, increase in feed and their speed, mainly the failure of the tools or machine, it itself may not be able to withstand under those high speed and feed conditions. So, this kind of possibility can be only explored by the machine tool expert. It may be possible that machine, itself is not ready enough to operate at a higher speeds and to take the deeper cuts.

(Refer Slide Time: 41:56)



It would be important to look into that an increase in speed and feed may also lead to the poor quality of the job and the reduced tool life. So, the technical expert in the field of machine tools and metal cutting can give the more a proper solution to the given problem. Like, what should be done for increasing in the productivity of a given situation, where the low output is being achieved, due to the lower use of lower speed and the depth of cut or the feed, so which are being used.

(Refer Slide Time: 42:37)

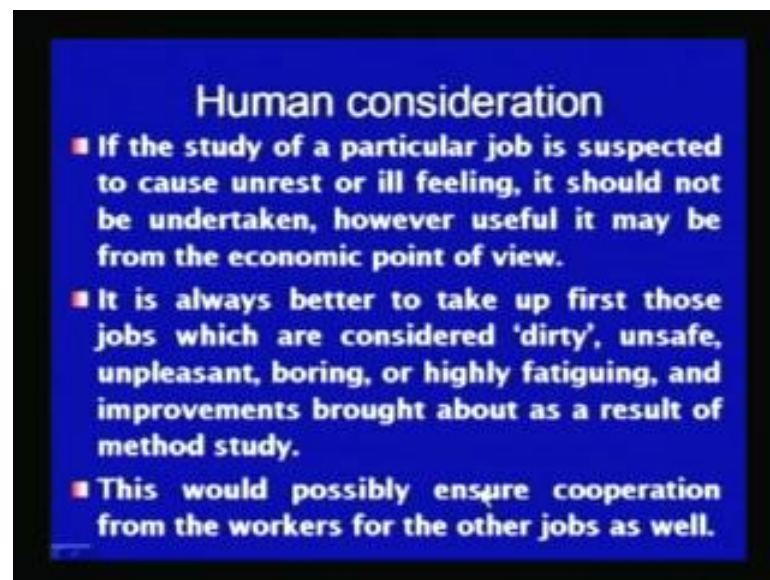


So, if the person is not having enough expertise, about the technical aspects of the job, which is to be looked into and he may not be able to come up with the better solution, another important aspect in selection of the job is the human factors. Human factor is important; because work study and the method study will frequently lead to the improved method. An improved method will increase the productivity of the man and machine or of the entire department.

So, improvement in productivity of the labour and utilization of the resources in form of labour can make some of the workers redundant. And therefore, the increase in productivity of the labour with the application of the work study and method study is considered as a threat for their jobs by the workers.

Because of this possibility of redundancy of the some of the workers and that is why emotional reactions can be expected from the workers, towards the work study man and in carrying out the method study. Therefore, changes in method study are important consideration from the human factors point of view.

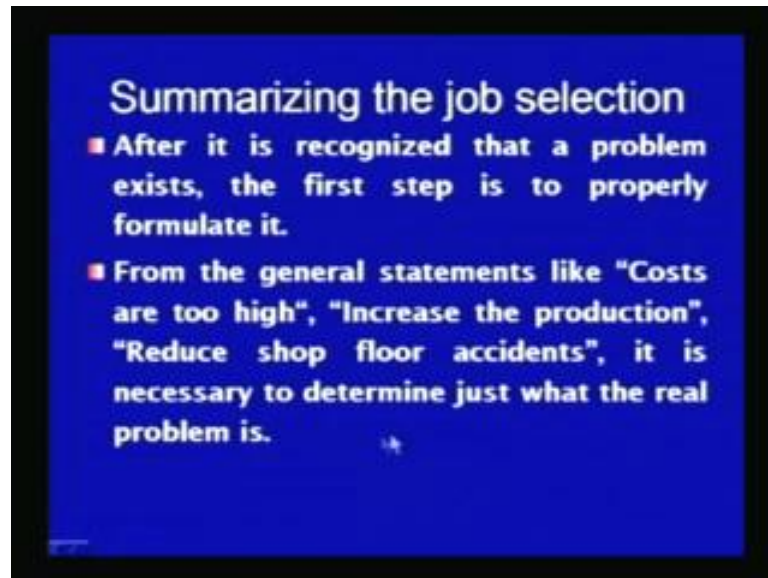
(Refer Slide Time: 44:12)



If the method study of the particular job can lead to the unrest and ill feeling, towards the management, then it should not be taken up. It may be important from the economics point of view, but if the workers and their unions come against the work study man in carrying out. The work study of particular job, which can lead to the significant redundancy of the workers, then it, should not be taken up immediately.

Under such conditions, it is always good to take up those jobs which are considered to be dirty and unpopular among the workers. So, that the work study man can gain their confidence and can win their confidence and achieve their support, which will help him ultimately to look into those methods, which are actually to be targeted by the method study.

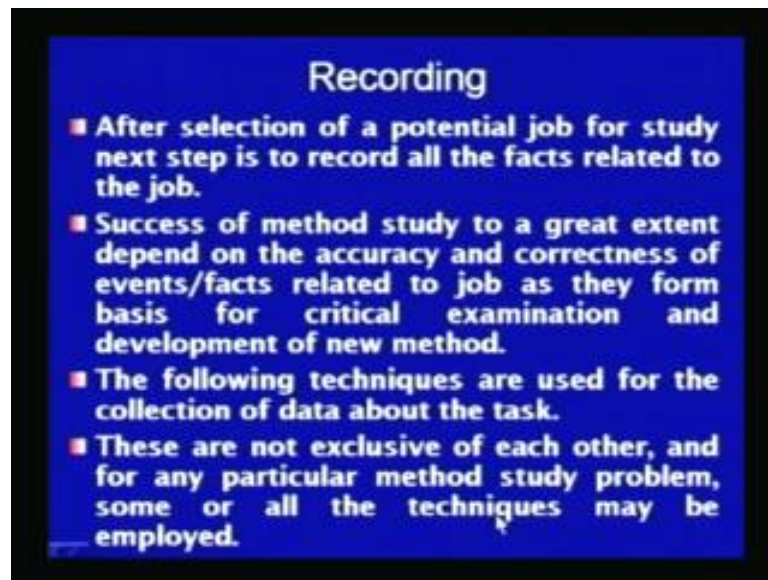
(Refer Slide Time: 45:26)



Now, this will possibly ensure the cooperation from the workers, for other jobs which are which are really important for the productivity and economy of the organization. So, here if you summarize, that it is important to recognize the problem. And after recognition, it is necessary to formulate and define it properly, that what kind of problem is there; related with the job, which is to be studied by the method study.

And instead of making the general statements, like the costs are too high increase the production reduce the shop floor accidents. It is necessary to deal and so necessary to determine and define exactly, what is to be done for the betterment of the organization by the method study.

(Refer Slide Time: 46:13)



The next step in the method study is the recording, after the selection of the job, for the method study and defining the problem to be addressed related with the job. Next step is to record the different events and activities, which are being carried out during the job. For the purpose of recording, that all the relevant facts related to the particular job are recorded, so that they are available for the required analysis and improving the existing method.

Success of the method study, largely depends upon the accurately and clearly the data recorded, which is subsequently analyzed for developing the improved method. If the recorded data is not accurate and it is not correct, then it the work method study may not be able to come up with the better method, for a given situation. And therefore, success of the method study to a great extent depends on the accuracy and the correctness of the events and the facts related with the job.

As they form basis for the critical examination and the development of the new method, some of the techniques which are used for collection of the data, about the task will be covered in some of the following slides. And these techniques, which will be covered, are not exclusive to each other and these are not used for any particular method study problem.

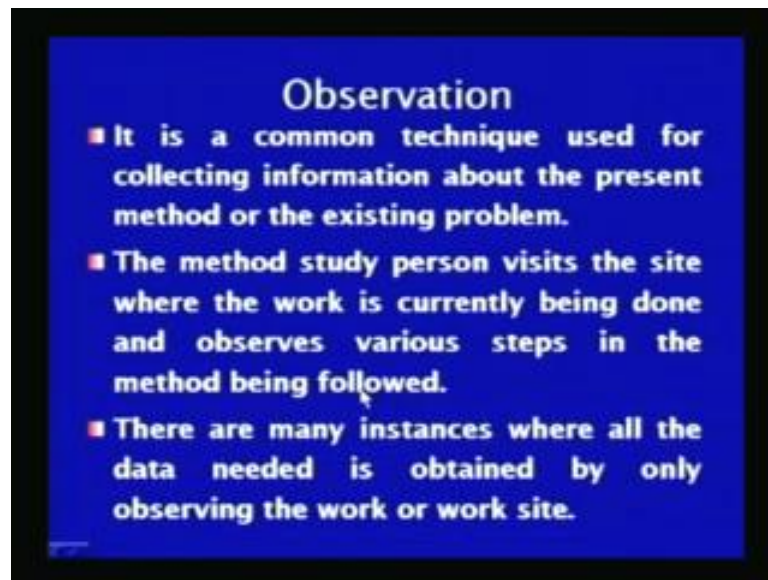
Any technique can be used and or for one case two or three number of techniques can also be used. These are independent of each other, depending upon the situation and the objective of this study a particular recording technique is selected.

(Refer Slide Time: 48:32)



These recording techniques are like discussions information can be collected, through the discussions, through the observations, through the records, through the motion pictures and films, through the charts and through the diagrams. You see the method which is being carried out for the method, which is being used for carrying out a particular job information in detail about that can be collected through these techniques.

(Refer Slide Time: 49:14)

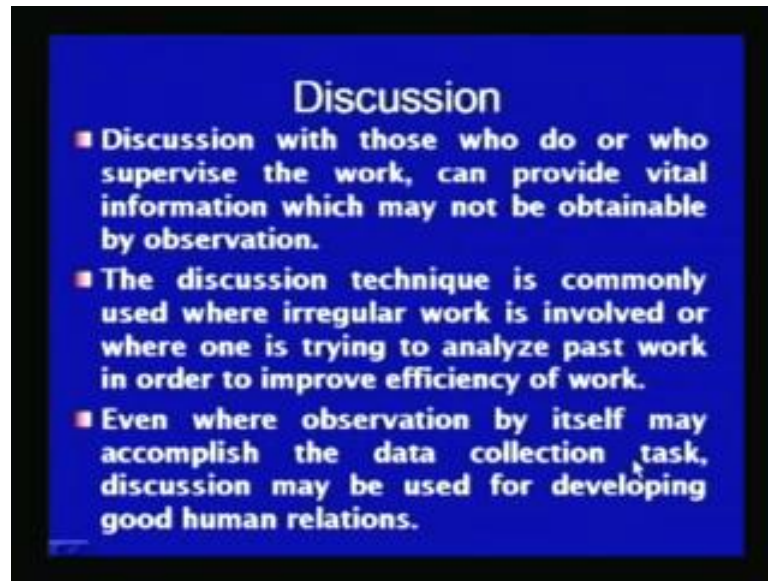


And then, these can be entered suitably for the analysis purpose, the observation is one it is common practice, where the information is collected about the present method of doing a job. Where, the people simply visit is to the shop floor and they observe the things the way by which, they are being carried out. The method study person visit is the site, where work is currently being done and observes various step in the method, which is being followed.

There are many instances, where also the data needed is obtained only observing the work site, but for this method to be effective. It is necessary, that the work study man has thorough knowledge about the way by the thing should have been done and he has the background information required related with the job.

Discussion is the another technique of collecting the data, where discussion with those, whoever do the job, actually or who supervise the work can provide the vital information, which may not be obtainable by the observation only. The many things which cannot be seen by the work study man, just by the observation, information about those aspects can be obtained, through the discussions with the workers and the supervisors, which are closer to the work.

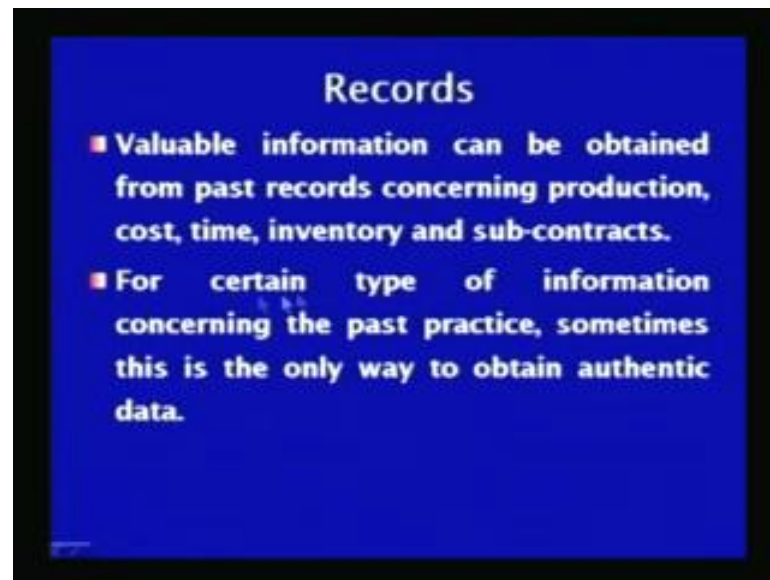
(Refer Slide Time: 50:39)



So, the discussion technique is commonly used, where a regular work is involved or where one is trying to analyze the past work in order to improve the efficiency of the work. Even, where observation by itself may accomplish the data collection task and discussion may be used for developing a good human relationship. So, for those jobs, which are carried out regularly or the data is available in form of records and more clear information is to be obtained.

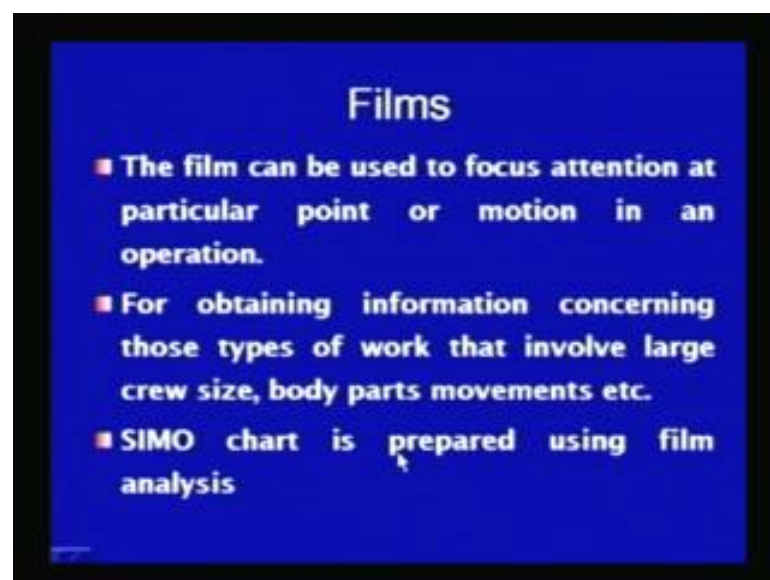
Discussion are found very useful, with those who are either directly involved in carrying out the job or those who are supervising the things. In addition to the obtaining information desired, for a developing the improved method, discussions also help in developing the better human relationship with the supervisor and the workers.

(Refer Slide Time: 51:50)



The records is the another way of collecting the information, for improving the existing method like the valuable information can be obtained, from the past records, concerning the production, cost, time, inventory and the subcontracts. And for certain types of the information, concerning past practice, sometimes this is only way to obtain the authentic data.

(Refer Slide Time: 52:08)

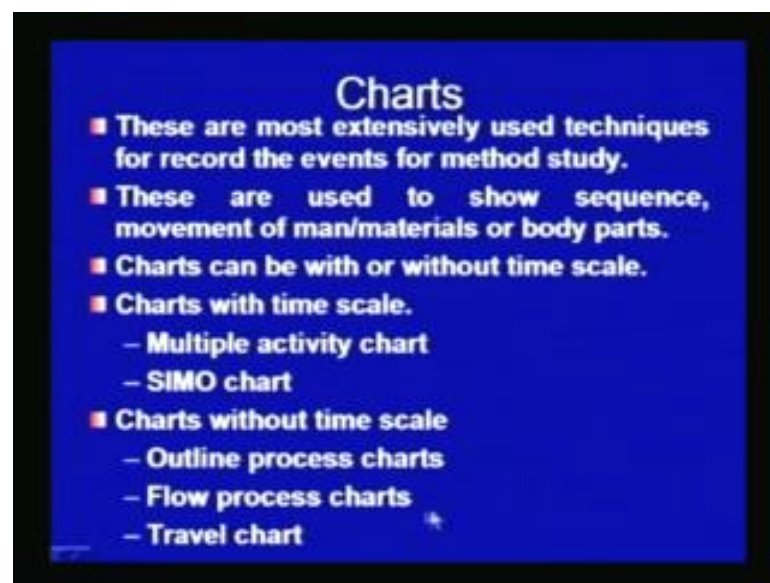


The films, these are another way of collecting the information, about what is being done, the films can be used to focus attention at a particular point or the general picture of the

entire shop floor as whole. The motion in an operation in general can be seen of the operator or the different operators and during the job. The films are also very effectively used for obtaining the information, about the group of the peoples, movement or the movements of the body parts of the operator during the operation.

These things help to develop the better method for carrying out the job at the work place itself or for better organization of in the in the large shop floors. The films are also used for developing the SIMO charts, which is also known as Simultaneous Motion Charts, using the film. Where, micro motion films are made and those are analyzed one by one frame by a frame to see what is being done at the different movements. And those activities are recorded in SIMO chart for seeing and for analyzing the jobs, which are of very short cycles.

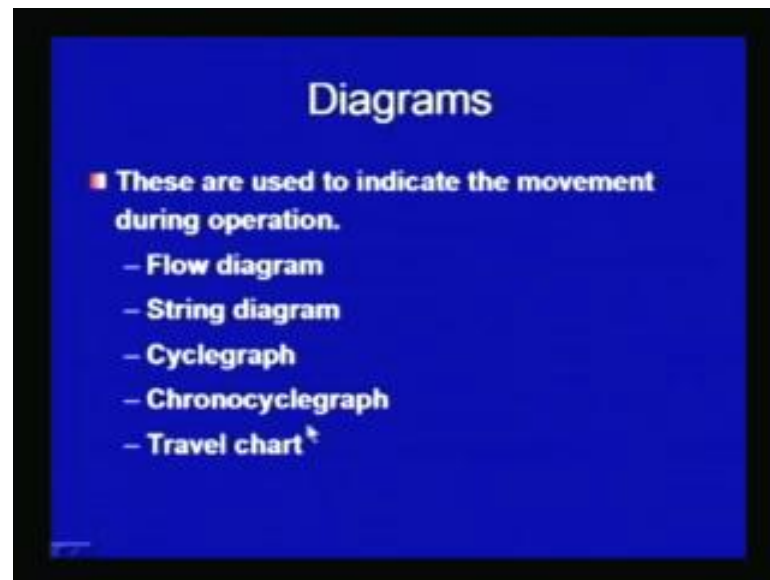
(Refer Slide Time: 53:47)



The charts are very commonly used methods of recording the information; various types of the charts are used in method study, which will be covered in detail. And these charts are used mainly to show the sequence and the movement of the man material or of the body parts during the operation. The charts can be developed with time scale or without time scale itself.

The charts with the time scale are the multiple activity chart and the SIMO chart and the charts without time scale, which are developed are the outline process chart known OPC and the flow process chart known as FPC and the travel chart.

(Refer Slide Time: 54:36)



The diagrams are also very effectively use to show the movement of the material and the man, during the operation and these diagrams are the flow diagram, string diagrams, cyclegraph, chronocyclegraphs and the travel chart. So, now I shall summarize this presentation in which we have seen that the relationship between the work study man and the other human beings, who are involved in the in the organizations activities is very important, for the success of the work study and the method work study. At the same time, I have introduced the method study technique, which is one of the technique of the work study and we have seen the basic procedure of the method study and some of the recording techniques. These recording techniques will be covered in detail in other lectures.

Thank you.