Industrial Engineering
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Module - 3
Lecture - 5
Recording Techniques for Method Study Part – 1

Dear students, in this presentation I will be taking about the different Recording Techniques, which are used in Method Study for recording the events and the different details related with the job.

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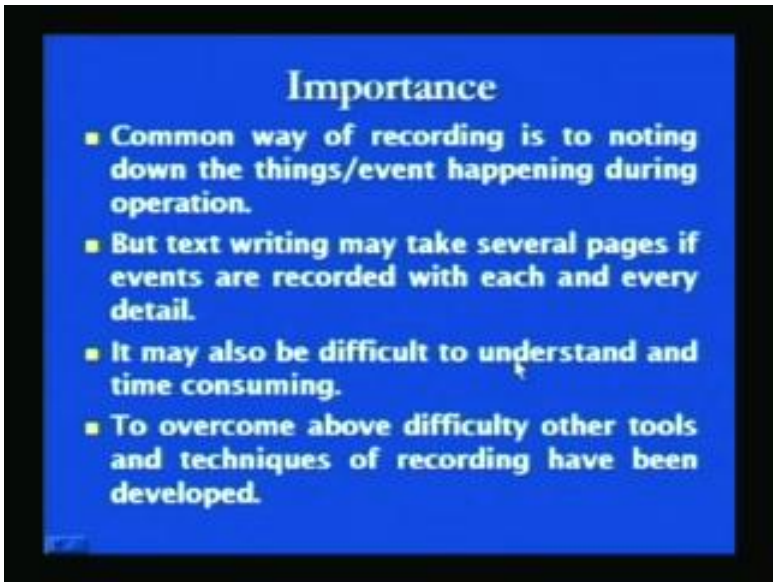

Here, if you see that when job is carried out the different steps are taken in during the manufacturing of a product or a for producing a particular kind of thing. So, for recording purpose of the different events and activities, which are being used for carrying out the job are to be recorded and one of the simplest ways way is that the things are noted down, whatever is being down is noted down in form of text. And if the text is noted down in for each and every detail of what is being done during the actual operation, then it may take number of pages.

And which maybe a very difficult task to go through and understand what is being done actually during the operation. And that is why the simple way of writing down noting down the things for recording purpose is not found very effective, text writing maybe very time consuming and may take several pages, if each and every detail is to be

recorded. And which will be difficult also to understand and will take longtime, to overcome the simplest method difficulties related with the simple method of text writing to record the things is that use of a standard techniques.

And the methods for recording the events and activities, which are being used for carrying out a particular job, to and that is why the different techniques have been developed over a period of time, which are commonly used by the method studying man for recording the events and activities during the operation.

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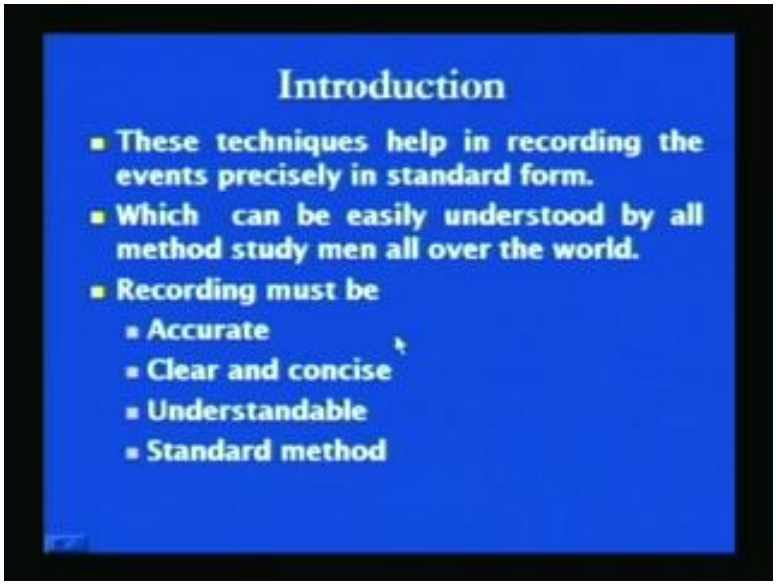

And these techniques are have been developed and being used worldwide and therefore, these are in very standard form. And when the techniques are used in a standard form to record the events, they can be understood worldwide across the countries, across the world, for and the same one recording can be easily understood by the work study men by any of the county or by any of the region, because these are followed these are done in a standard way.

The common important thing common and more important thing for recording purpose is that, the whatever recording is done for recording of the different events and activities, related with the job is that these recording must be done accurately, this should be clear and concise. And this should be easily understandable and standard method is used for recording the different events and activities during the job for method study. These are the some of the things, which should be there in recording by a particular method. And

for a recording purpose mainly two techniques are invariably used these are the charts and the diagrams.

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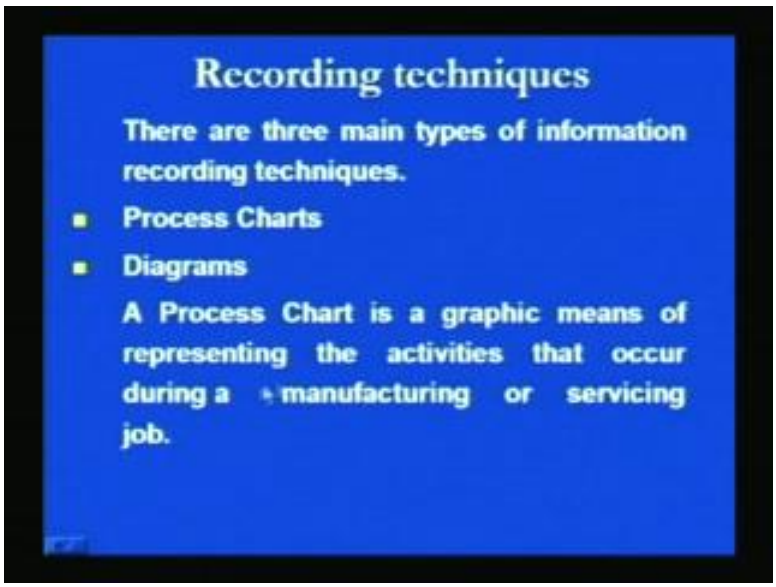

The charts and the diagrams are very extensively and commonly used to record the events and activities, ranging from the entire plant to a particular department. The process chart is defined as a graphic means of representing the activities, that occur during the manufacturing or servicing of a job.

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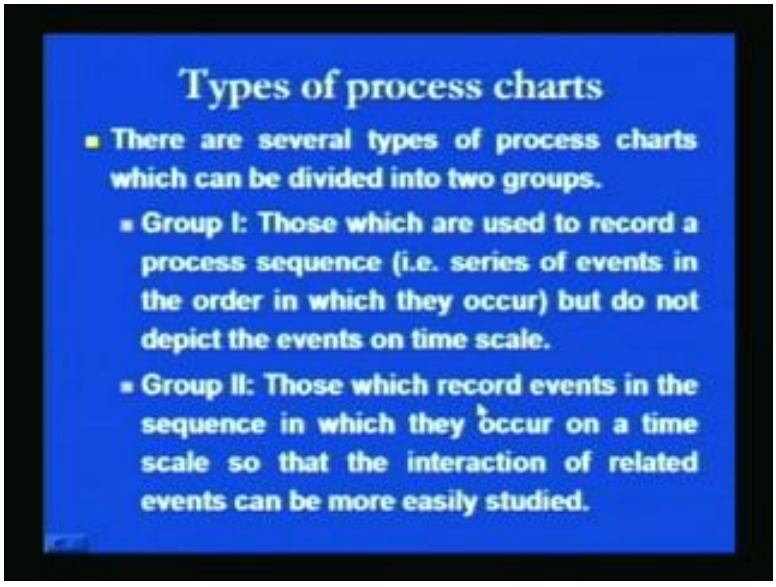

While, the diagrams commonly used for indicating the movement of the material and men during the operation. There are several types of the process charts, which are used

for according the events during the job in method study, the most of the charts can be divided into the two groups based on the way by which they are developed. And this classification is based on the fact that whether time is scale is being used for recording the events by a particular technique or chart or not.

The group one includes those charts, which are used to record the process sequence without anytime scale. And the another group, which includes those techniques and the charts in which the events are recorded on a common time scale, so that the interaction related with the different events can be easily understood. So, in group 1 those charts are placed where no time scale is used to show the different activities, which are required for completing a particular job.

While, in group 2 those charts are placed where common time scale is used to show the different events and activities required to complete the job. And the presence of a common time scale helps to understand the relationship between the various activities, which are carried out either in sequence or at the same time while job is done.

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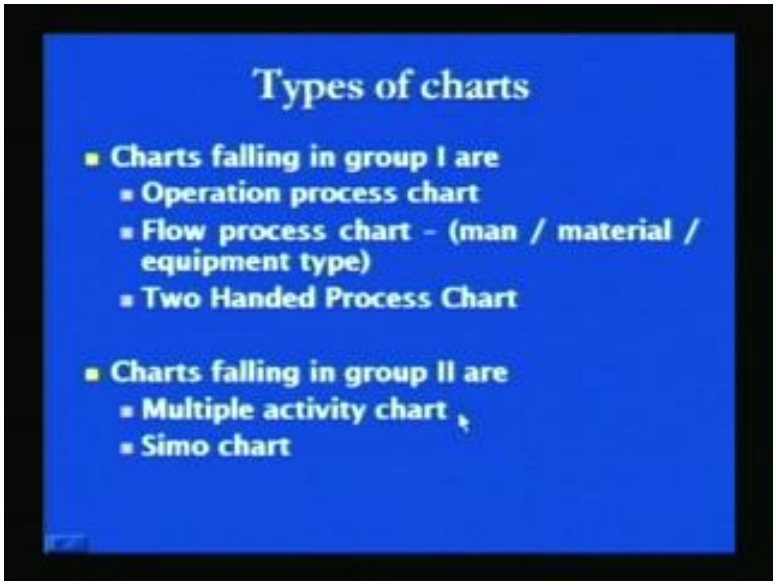

The charts which fall in group 1 are of following three types which are very common, one is known as operation process chart also called outline process chart and the flow process chart man type material type or equipment type. The flow process chart can be of three different types depending upon the what is the focus or the focus or what is the subject which is being targeted. So, if the man is being targeted then flow process chart

of men type, if the material is being targeted then it is flow process chart of the material type and accordingly the equipment type flow process chart.

In flow process chart of men type, it is shown that what work is being done by the man, like, he turns, he drills, he works on a particular system. On the other hand, the material type flow chart shows that what is being done with that material like the mild steel plate is being drilled or it is been cut or the wood is being planned or the shaped. So, what is happening with that material is recorded in the flow process chart, while in the equipment type flow process chart, how that equipment is being used in course of the processing or in course of manufacturing, that is recorded in flow process chart.

Two hand process chart is basically used to show, the way by which the two hands of the human being are engaged are of the operator are engaged during the operation. And all these charts are made without any common time scale, while the charts which fall in group 2 are plotted with the time scale and these are the multiple activity chart and the Simo chart multiple activity chart, this chart shows the different subjects and their activities on common time scale.

In this way, since the different activities are shown against the common time scale that helps to see the things clearly the interrelationship between the various activities. And which in turn helps to combined the sum of the activities, which can be done together at the same time if possible. So, the multiple activity chart are further of the different types like, the men and material, men and the number of machines, the number of machines and men like that.

And the Simo chart is the abbreviation of the Simultaneous Motion chart, this is the chart which is developed after the analysis of the films, which are made for a very short cycled jobs. This is also common time scale chart, this is a chart where a common time scale is used to show the interrelationship between the different activities, which are broken in form of a very small movements or group of the movements which are called therbligs and the time scale which is used in the Simo charts is called wink w i n k.

So, but these the Simo chart is mainly used for very short cycled jobs, like packing of the sweets or doing similar other some kind of the short cycled jobs. And in light of that the because, the range of the activities which are carried out in the industries is very wide and that is why the for recording the activities and the sequence of the operation and the recording movements of the man and material for each purpose the different types of

recording technique is used. Here, you will see depending upon the purpose of the recording, different for a given purpose recording, different recording techniques are available.

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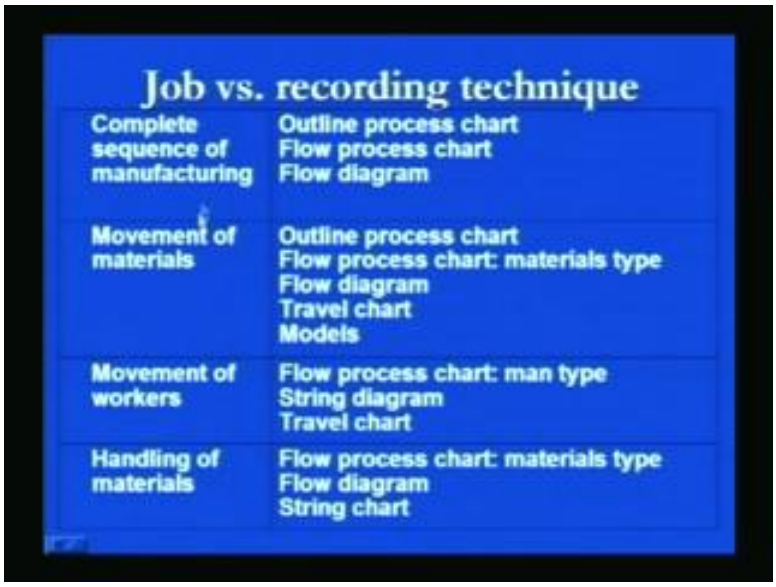

So, here if you see the recording techniques can be used for the different purposes like, study of the entire sequence of the manufacturing of a particular product or to study the movement of the man or material during the operation, to study the movement of the worker to investigate, the handling of the material and likewise various other objectives. Depending upon the kind of objectives, the specific kind of process chart can be selected depending upon the range of operation also.

So, the complete sequence of manufacturing can be investigated using the outline process chart or the flow process chart or flow diagram. Outline process chart basically indicates the combination of the main operations and inspections only, while the flow process chart indicates the operation, inspection, transport, delay and the storage all the five major activities which are carried out during the any kind of the job.

Flow diagram basically indicates, the different events and activities along with the way by which the different stations are located and the kind of movements, which is taking place between the different stations during the operations or during the manufacturing. The movement of the material can be indicated using the outline process chart flow, process chart of the material type flow diagram, travel diagram and with the help of the models also.

The movement of the workers in a plant can be shown using the flow process chart of the man type, string diagram and the travel chart. The string diagram and the travel chart are very useful in analyzing the way by which person goes through the different stations during the job. And this analysis can be used to find out the way by which different stations to be located, so that the distance to be traveled during the operation of the worker can be reduced significantly.

The material handling can be investigated using the flow process chart of the material type the flow diagram and the string diagram. And using these charts the activities can be recorded from for achieving these different objectives and to understand the way by which the different activities are carried out from the beginning to the end or the way by which movement of man or material or equipment is taking place.

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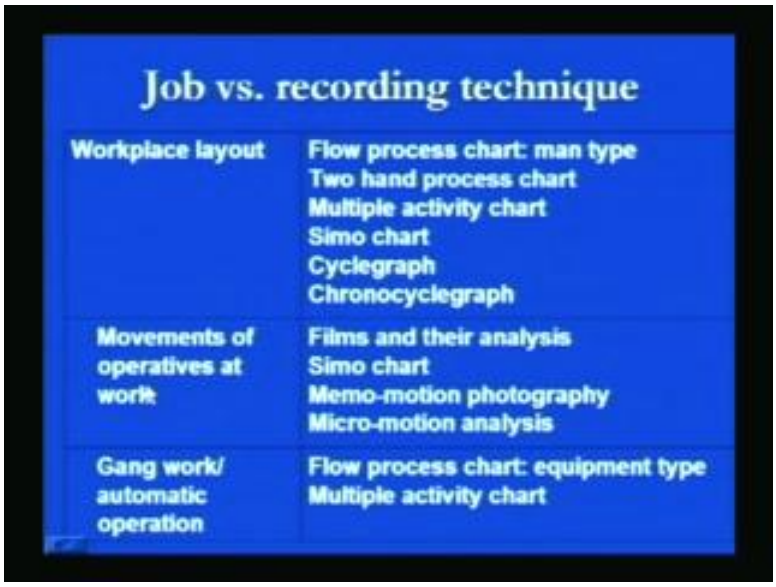

The other objectives like the kind of workplace layout study or it is optimization of the plant layout. The movement of the operators at work, means the kind of the way by which the body parts and the individual body parts movement is taking place or the way by which operator is moving during the operation or the in gang work, where number of workers are working during the operation or one worker is looking after the number of a automatic machines.

The work can be investigated such kind of studies can be made using the different types of the recording techniques. For example, workplace layout can be investigated from the improvement point of view, so as the reduce the unnecessary and irrelevant movement of

the man and material during the operation. And the techniques which can be used for workplace layout is study, includes the flow process chart, man type, the two hand process chart, multiple activity chart, Simo chart, cycle graph and the chrono cycle graph.

These are the new techniques developed by the Gill berth and in which the light source is basically used to trace the path of movement of the body parts or of the human being during the operation. And those movements are recorded using the cameras and which are seen in form of continues lines, white lines in case of cycle graphs and pear shaped dots in case of the chrono cycle graphs. Chrono cycle graphs is found more useful compared to the cycle graphs, in showing the direction of the movement and the acceleration or deceleration during the movement of the different body parts.

The movement of the operator at work can be investigated using the films followed by their analysis Simo charts, memo motion photography or micro motion analysis. The films are made using the conventional cameras or high speed cameras to see, the way by which either body parts are being used or the kind of movements of the human being during the operation or movement of the operators during the operation is taking place.

Simo chart is mainly used for the short cycle jobs and here the high speed films are made and which are analyzed to develop the Simo chart, memo motion study is also known as time lapsed photography. Where, the photographs of the shop floor, entire shop floor or the area of the interest are taken at the interval of the certain period not in a standard form like 24 frames per second. But, the photography is carried out in interval of 1 second to or the 2 to 4 photographs in a minute.

So, depending upon the frames are not continuously captured, but the photography is carried out at the different intervals. So, that the activities which are of very long duration can be captured using the limited or few number of the photographs, which can be investigated easily for the improvement purpose. And the gang work and automatic operations can be investigated using the flow process chart of equipment type or the multiple activity chart.

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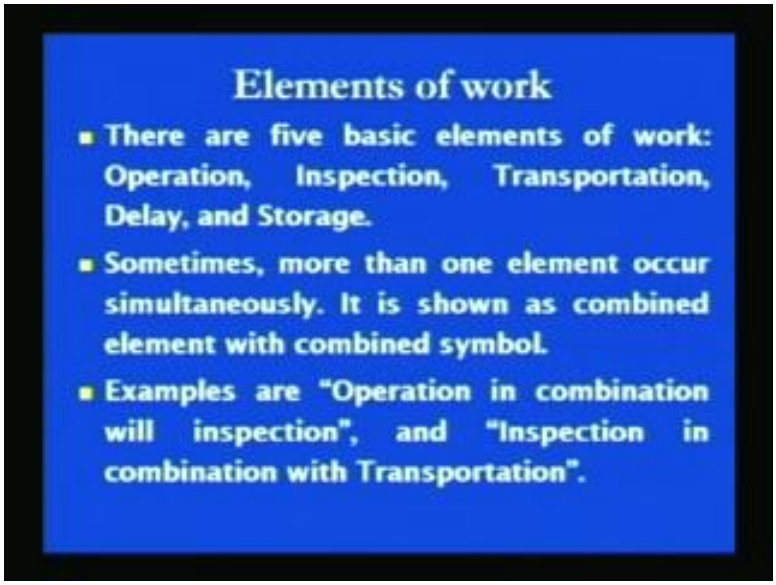

For a recording purpose in method study the five basic elements are used and in from and work is investigated in terms of these five basic elements. And these elements are operation, inspection, transportation, delay and the storage and whether it is flow process chart of the material type, man type or the machine type these symbols are invariably used for showing the different events during the job. Sometimes, more than one element also occur simultaneously and it that case these elements are shown in combined in form of combined symbol, like operation and inspections are sometimes clubbed together.

Similarly, if the inspection and a transport events occur at the same time, then the inspection and transport events can be shown using combined symbol. The operation event elaborate, when it is considered and what are things covered under the operation.

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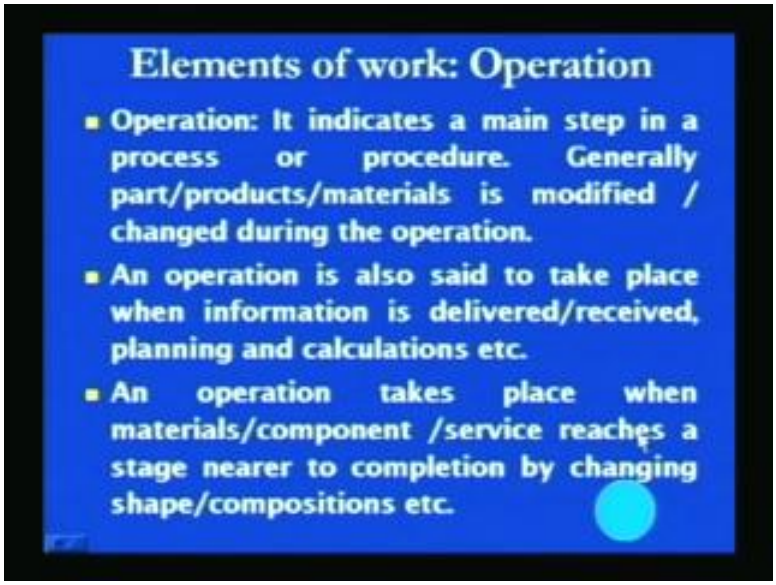

Operation mainly indicates, the main step in process or procedure and generally when the part or the product or material is processed, changed or edited or anything which is done during the operation, helps the product or the raw material to move forward in it is completion. So, and a main step in which some changes in size, shape, composition or anything which is done helps the product to move forward it is come towards it is completion is considered as a operation.

In the operation the product raw material can be modified or changed, operation is also said to take place, when the information is delivered or received when planning is carried out or when calculations are completed. In operation events, the something is done in such a way that the process moves forward towards it is completion and an operation takes place, when material, component, service reaches a stage nearer to the completion by changing shape or it is composition. Or any other which is done to, so that at a product or the process, reaches nearer towards it is completion and it is shown by a circle sign, so operation is indicated with the help of circle sign.

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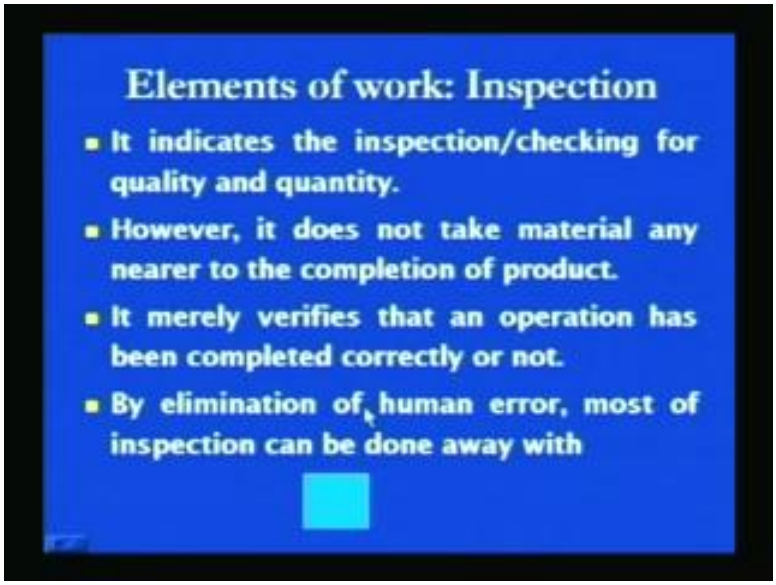

Inspection is another event, which is frequently carried out it indicates the inspection or checking for quality and quantity. Any quality can be checked or quantity can be checked in inspection, it does not take the material any nearer to the completion of the product. It does not help the product in completing it is journey, towards the completion it is only a step where the things are checked for their correctness, for the correctness of the operation, which has been done on the material or correctness of the process, which has been done on the material.

It does not take the material any nearer to the completion of the product, it only checks that operation has been completed correctly or not, by elimination of the human error. If efforts can be made to reduce, the human error then inspection can be avoided or it can be done away with it and inspection is shown by a square sign. A square sign is used to show the inspection and inspection can be in form of checking the length counting the number of pieces or measuring the surface roughness checking the strength or anything which helps to see that the operation has been done successfully is consider as a part of inspection or as a inspection step.

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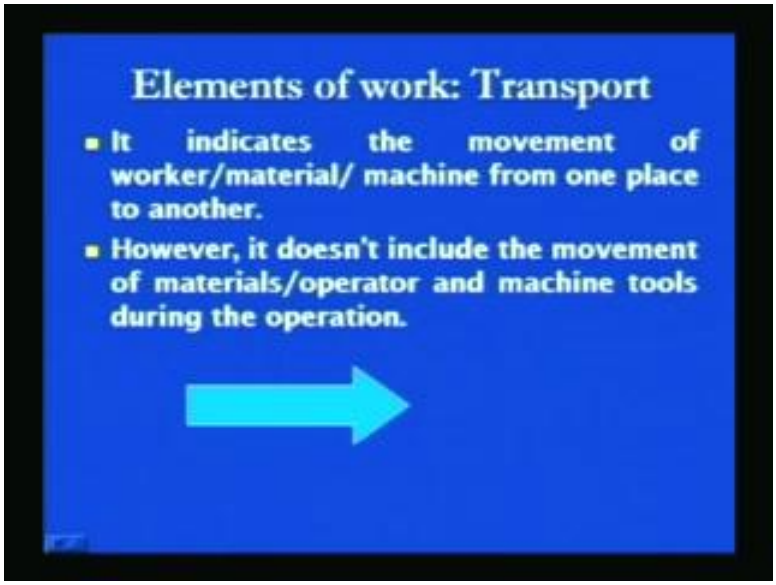

The third element is the transport, transport indicates the movement of the men or the material, transport is use to show the movement or of the men or of the material or the machine from one place to the another. But, the movement of the men or the material during the operation are not considered as a part of the transport, the only movement of the men and material from one place to the another are considered as transport elements. Movements which are taking place during the operation on the machine or of the material or of operator are not considered under the transport and transport element is indicated by an arrow.

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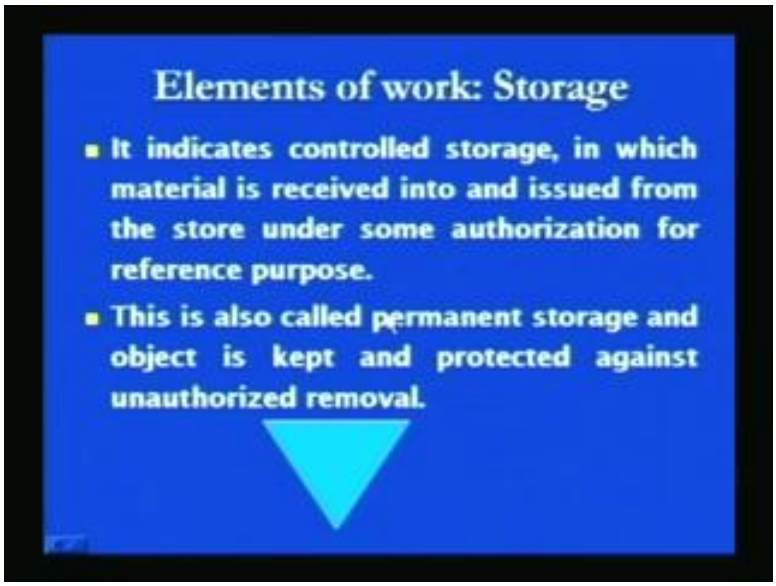

The fourth element is the storage, where the material which is semi processed or the raw material or any other item, whether it is paper or anything else which is kept under control and it is issued or received from the store under some authorization for the reference purpose is considered under the storage element. So, storage element is one where things are kept under control and they are realized or received only against some the sort of authorization and the people are not allowed to tamper or to move them here and there in uncontrolled way under the storage.

So, this storage is also called the permanent storage and the object is kept and protected against the unauthorized removal. So, the events or element which shows the controlled storage of the material and it is issued and received under some authorization is indicated by a storage, and is kept under the storage element and it is shown by a triangle sign.

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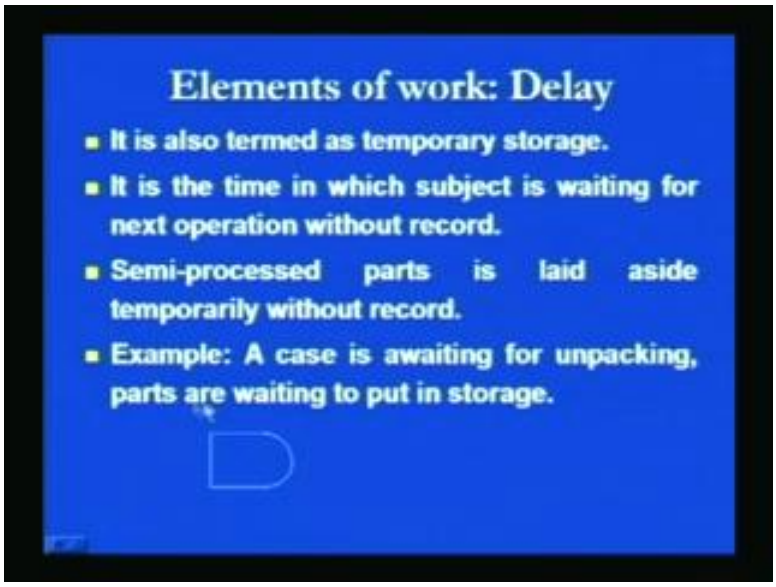

The delay is fifth and the last element, which is normally used in the method study for the recording purpose, this is also known as temporary storage, where raw material or the object is kept in waiting for the next operation without record or it is just lying on the shop floor without any kind of custody or authorization. The semi finished product is laid aside temporarily without record can be consider under the delay or the object is waiting in the shop floor for the next operation without record can be considered under the delay.

For example, like a case is waiting for unpacking, parts are waiting to be put in a storage can be shown by the delay sign and the sign for the delay is of the D shape. The out of the number of charts which has been described, like the charts which are made on

common time scale or charts which are made without time scale. So, the charts which are made without time scale are flow process chart, outline process chart and out of these charts here outline process chart will be taken up.

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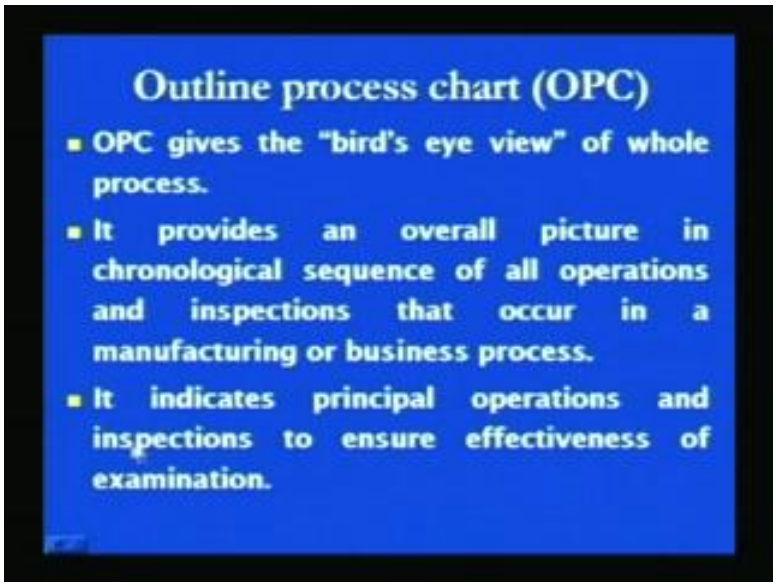

First this Outline Process Chart also called the OPC, the outline process chart gives the bird's eye view of the whole process or of the entire plant. And that is why it helps to give the overall picture in chronological sequence of all important operations and inspection that occur in the manufacturing or process or the business process. In outline process chart only operations and inspections elements are shown, while other three elements like, transport, storage and the delay are not shown in the outline process chart.

It shows all important operations and inspection of the either entire plant or of the entire department, depending upon the nature of the job which is being studied. This mainly use to show the sequence of all operations and the inspections, which are carried out during the operation. It indicates mainly the principle operations and inspection to ensure the effectiveness of the examination, because in a plant the hundreds of types of the operations and inspections are carried out.

So, if the only inspection and operations are covered the effectiveness of the outline process chart is maintained. If other three elements are also included in this chart, then it will become two complex cumbersome and difficult to understand, so if only the principle operations and inspections are included it ensures the effectiveness of the examination of the outline process chart.

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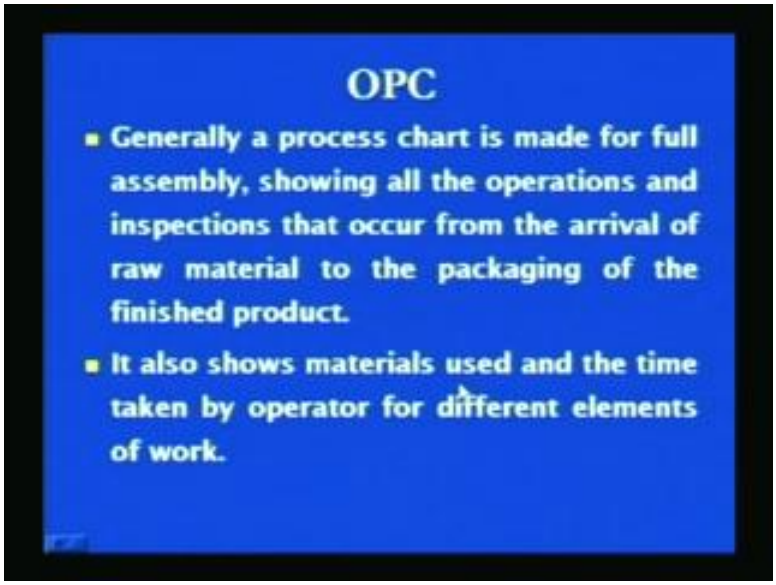

Outline process chart is normally made for a full assembly, showing the all operations and inspections, which are taking place from the arrival of the raw material to the packing of the finished product. So, all operations important operations and inspections which are carried out in the different subassemblies of the main assembly are shown in outline process chart and these may start from the raw material to the packing of the finished product.

It also shows that raw material used and the time taken by the operator for the different elements of the work. A time is not shown on the time scale, but it is written on the left side of the symbol for which it is showing a particular kind of the element, like the how much time it will take to complete a particular operation is shown on the left side of the symbol.

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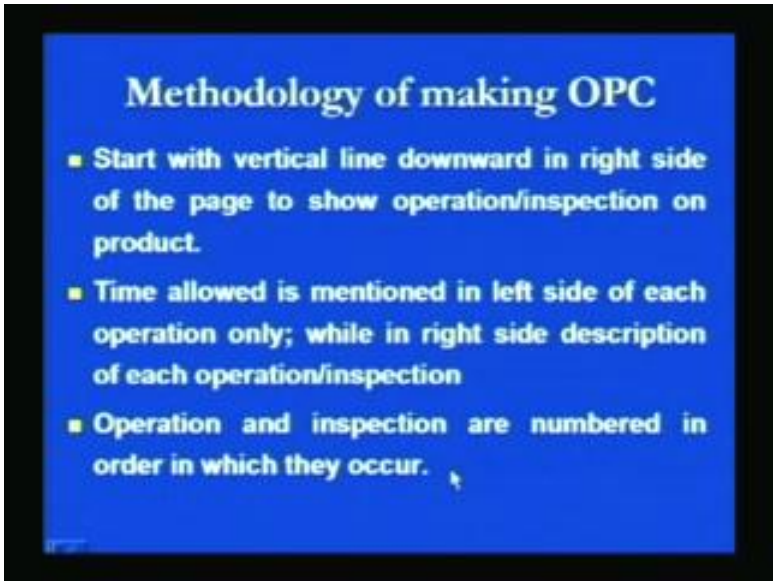

For making the outline process chat, normally the process is started by drawing a vertical line in the downward direction from the top right hand side of the paper. And starting with the operations and inspections which are to be recorded on in course of the manufacturing of a particular product. For preparing the outline process chart, we start by drawing a vertical line in downward direction, in the right side of the page to show the different operations and inspections, which are to be done for completing a given product.

The time allowed for completing the operation is mentioned in the left side of the each operation it is not mandatory, but it can be mentioned in the left side of the each operation. While, in the right side of the symbol of the operation description of the operation or of the inspection is made, time for the inspections is not mentioned, the operation and inspections are then numbered in the order in which they occur.

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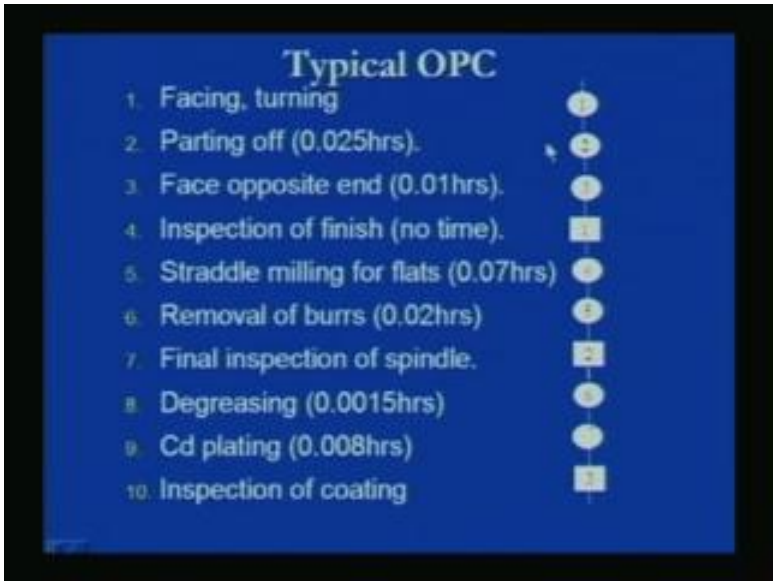

And for example, a typical outline process chart if is to be shown for say the facing and turning operation are considered as a operation, parting off is a considered as a operation, face opposite end is and considered another operation. Then, inspection of the finish of the machine component is considered as a inspection and the straddle milling for flat surfaces is considered as another operation, removal of burrs is considered as another operation, final inspection of the inspection is consider as second inspection, degreasing is considered as a operation, cadmium plating is considered another operation and a inspection of the coating is considered as a inspection.

So, if these are the different the steps which are been carried out for machining and then degreasing plating and the inspections, then these operations can be shown using symbols like, circle and the inspection. It can be seen that, first three operations are carried out in continuation and that is why they are numbered as 1, 2, 3, after that it comes again the inspection, inspection for finish is shown be the square line and a numbered as a first or the one inspection number one.

After that, the straddle milling removal of the burrs are the two different operations which are carried out before final inspection of the spindle, this is the second inspection numbered as a two. And after the inspection machining inspection of the spindle the degreasing is carried out and the cadmium plating is carried out. So, these are the two additional operations will be numbered as a 6 and 7, while after completion of the plating the spindle is inspected for quality of the coating, so this is a third inspection will be

numbered as a third inspection. So, this is how the operations and inspections are numbered and the time allowed is mentioned here in the left side. And the time allowed is mentioned only for the operations not for the inspection as can be seen here.

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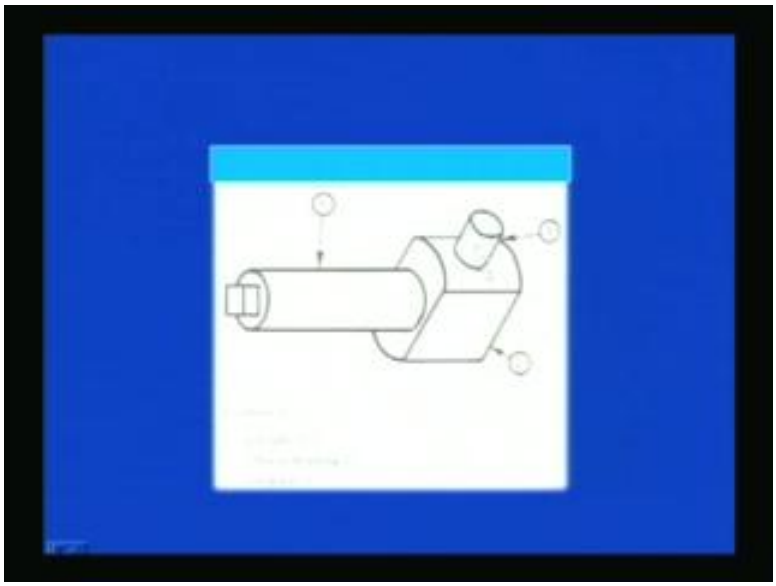

So, say here this is the product which is to be manufactured having the three different subassemblies or subcomponents. Here, is the main part a spindle this is the second part and this is the third part, if these are to be manufactured this will be manufactured separately using the different operations and followed by the inspections as per needs. This is assembly is to be made by manufacturing these three parts independently and then they are assembled to get the desired component, so the entire operations and inspections in carrying out in developing these three subassemblies first and then developing a final assembly as a total product.

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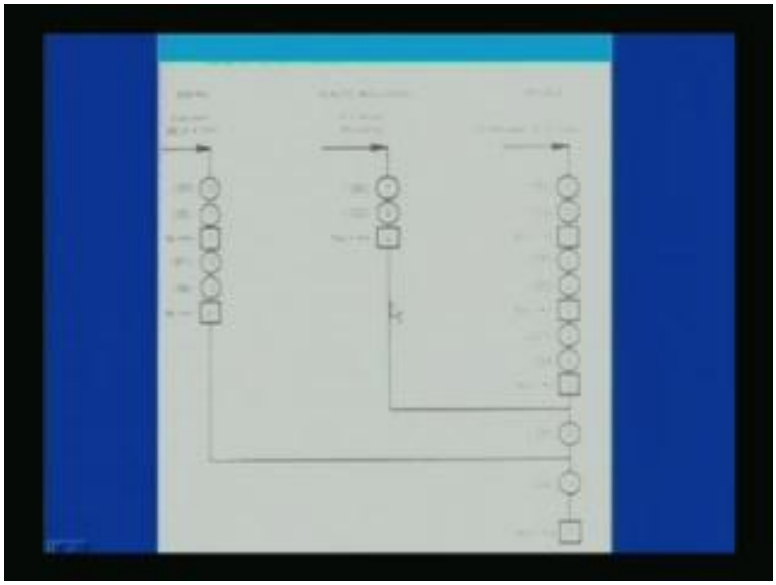

So, if you see this slide here the three different subassemblies, which are required to be manufactured for making one complete assembly, there are three different vertical lines, one is this, another is this and this is third one. Each vertical line indicates the different operations and inspections required for manufacturing each of the assemblies, so always we start from the right hand side of the page by drawing a vertical line and one by one we show all the operations and inspections required for completing the main component of the assembly.

Say, from here to here indicating the operations and inspections required for completing the main component of the assembly. And then we come to the second line indicating the important operations and inspection required for completing the second the subassembly. And the second subassembly is assembled with the main component, which has been manufactured all ready, so this assembly is shown by drawing the connecting a horizontal line with the two vertical lines. And here whatever is the sequence of number of operations, which has been here with the main component.

The after that we start the numbering of the operations in the second component and the inspection numbering in the second component manufacturing. And then, we come to the third components manufacturing operations and the inspections required, the manufacturing of the third subassembly shown by this third line along with the inspection and operations required. And once, these subassembly is completed it is

assembled with the main component, with which another subassembly has all ready been assembled.

And likewise, we go for the numbering here we will be following the 1, 2, 3 up to here after that we will shift the operations and inspection number to the second subassembly and then operation number and inspection number are shifted to third assembly. And likewise each assembling process is also considered as one operation and after completing all the assemblies, the entire product is checked for the correctness of the assembling process using the inspection process.

So, this is how if the number of operations and inspections are to be carried out on the different subassemblies of a big product, then each can be shown using the outline process chart giving the number of the operations and the inspection in sequence.

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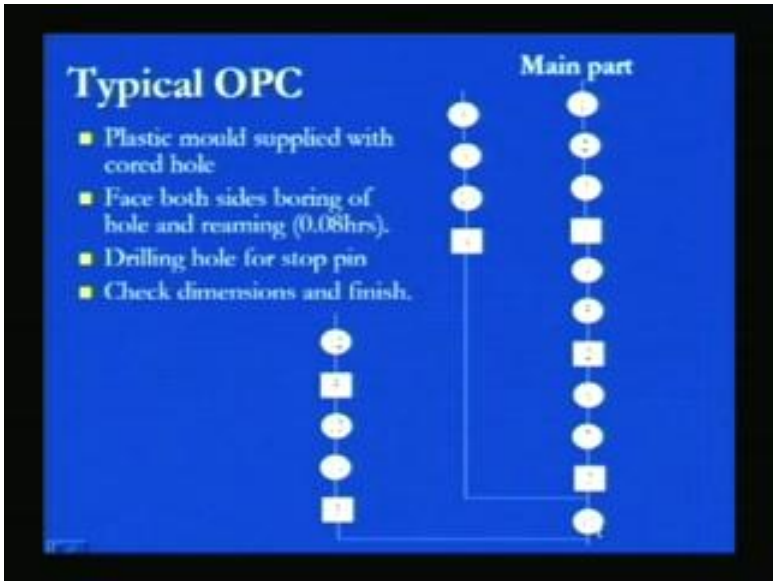

Here, the same can be shown clearly here the main part which is to be manufactured, second part which is to be manufactured and third part to be manufactured, along with their numbers, here starting from 1, 2, 3, 4, 5, 6 and then here we come 7 and then 8, 9 10. And then, here the next is the 11th is the assembly of the second subassembly and then we come to the operations for the third subassembly required for it is manufacturing as 12, 13, 14. Likewise, inspections are also numbered 1, 2, 3, 4, 5, 6 and so on this is how outline process chart is made.

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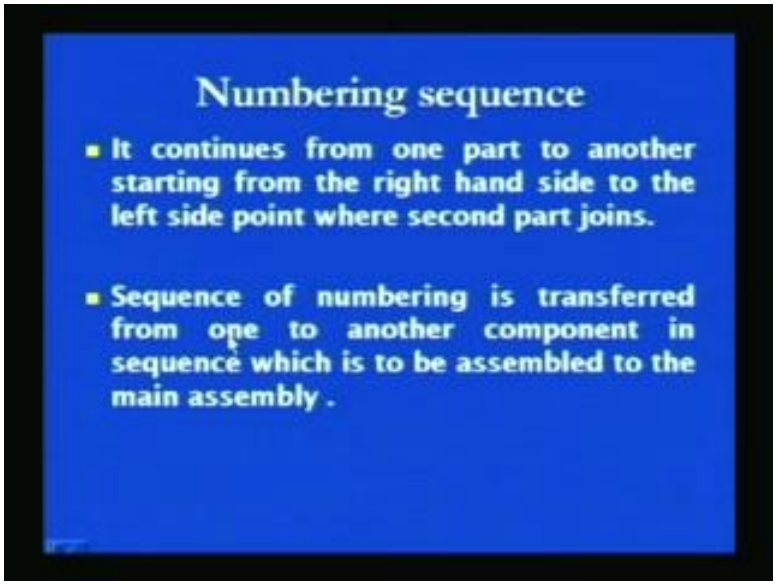

So, the methodology of numbering sequence is like this, where it continuous from one part to another starting from the right hand side to the left side point, where second part joins. And the sequence of numbering is transferred from one to another component in sequence which is to be assembled to the main assembly.

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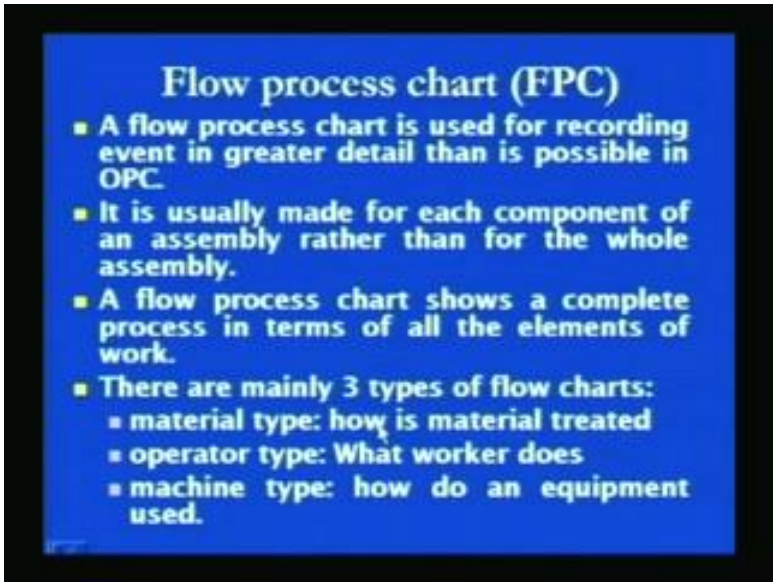

The flow process chart is the another chart, which is commonly used for a recording different events and activities in method study. The flow process chart records the things in much greater detail compared to the outline process chart and because, it includes additionally three events and elements, which are normally used in carrying out a given

job. In addition to the operations and inspection, the transport, the delay and a storage also used to show the way by which things are done for carrying out the job in flow process chart.

It is usually made for each component of an assembly, rather than whole assembly, because it is made in greater detail. So, the flow process chart shows a complete process in terms of all elements of the work, all five elements of the work are shown in flow process chart. There are three are three main types of the flow process chart, material type which shows that how material is treated or processed during the operation, operator type flow process chart shows that what worker does like, he cuts, drills or processes the material. And the machine type flow process chart shows that how an equipment is being used during the operation.

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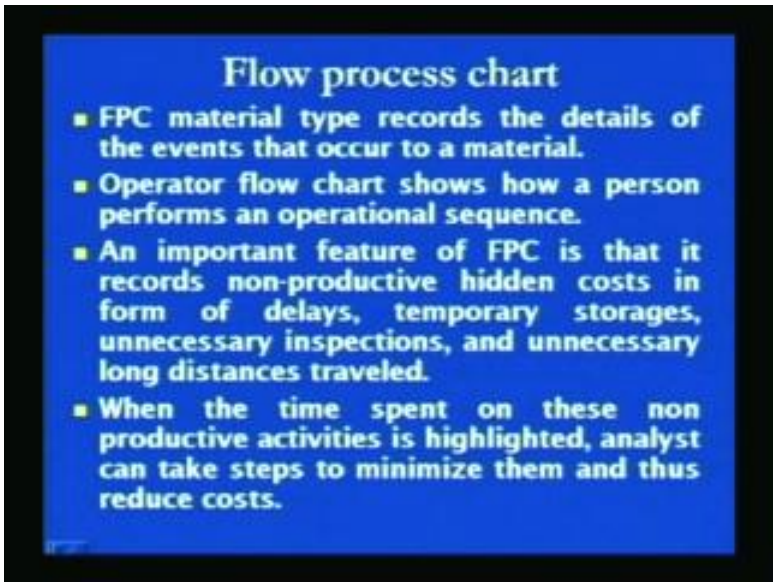

The flow process material type records the details of the events that occur to the a material and the operator flow process chart shows a person performs an operations in sequence. And important feature of flow process chart is that, it records all those activities which are present as a hidden cost in form of a delays, temporary storages and unnecessary inspections, and unnecessary travel over a long distances.

Because of this feature, because the flow process charts, record the things in greater detail, it is able to expose all those irrelevant, unnecessary, extra activities in form the operations in form of the delays, temporary storages, and inspections or movements over a long distances. This kind of analysis helps the method study man to improve the

method easily for improving the existing method and increasing the productivity of a given process.

When, time spent on these activity is highlighted analyst can take steps to minimize them and so as to reduce the cost. So, if the time related with the unproductive activities is quantified, it helps to provide the venues where work can be done by the method study man for improving the existing method and so as to reduce the cost.

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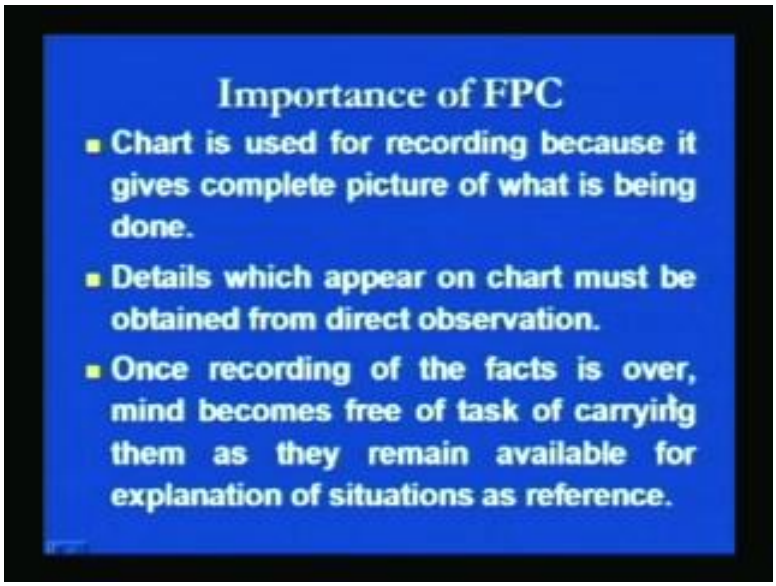

The flow process chart is used for recording, because it gives a complete picture of what is being done. And the details which appear on the chart must be obtained by the direct observations and once, the chart as been made the mind will be free for the analysis of the different tasks which are being done. So, the importance is that things have been recorded in greater detail and now the mind is free for the critical analysis of the different activities, which are being done in performing the different tasks, under these critical analysis will eventually help to develop the new and improved method of carrying out the job and reducing unnecessary wastages for increasing the productivity.

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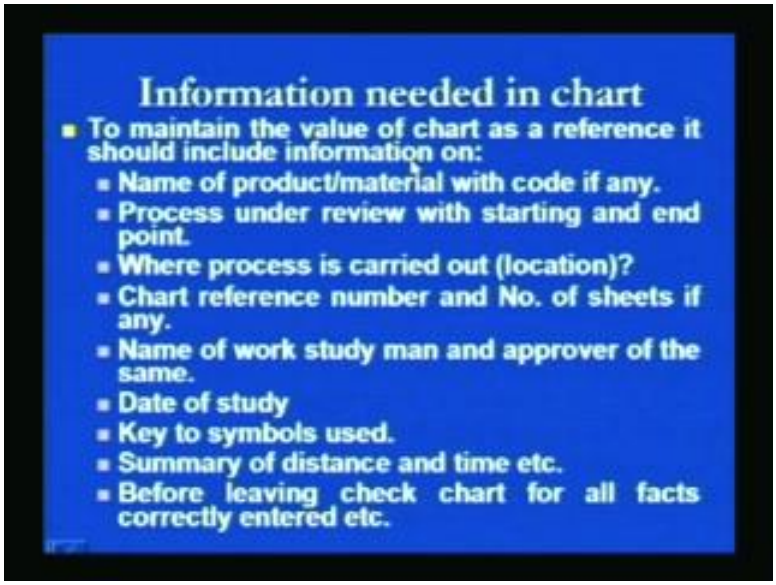

And the information's which are to be recorded with the flow process chart is a mentioned very clearly. So, that the things can be traced out easily in future, like the name of the product or the material with code, which is being investigated in the method study. The process under review with the starting and the ending date is mentioned and the where process is carried out, means the department or the sections where a study is being made.

The name of work study man and the approver of the same is also mentioned, the date of the study and the key symbols being used for recording the events using the chart is also mentioned. The summary of the different distances being covered by the man and material during the operation, and the time being taken by them is also mentioned and before leaving the things check in the chart all the details have been entered correctly.

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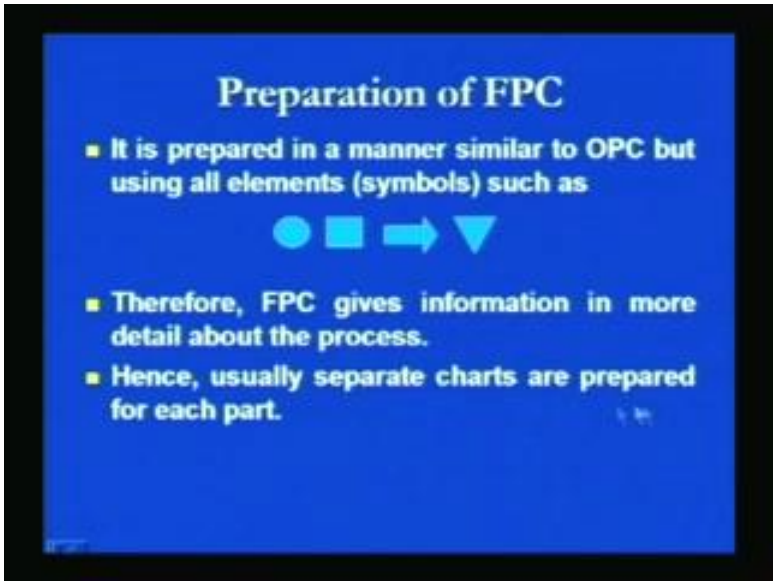

The for preparing the flow process chart, these are the symbols which are commonly use like operation, inspection, transport and the storage. Delay is also used where material is kept under the unauthorized conditions, like waiting of the material for further processing. It is prepared in a manner similar to the Outline Process Chart, that is called OPC, but using all elements in form of the following symbols.

Therefore, because of use the all elements of the work in showing the flow process chart, in showing the methodology which is being used for producing, the given job, the flow process chart gives the information in more detail about the process. And hence, usually separate chart is prepared for each part, instead of preparing the different methods and the inspection, operation, transport, delays and storages which are related with the manufacturing of a particular product of a big assembly, the flow process chart that is why normally made for each part.

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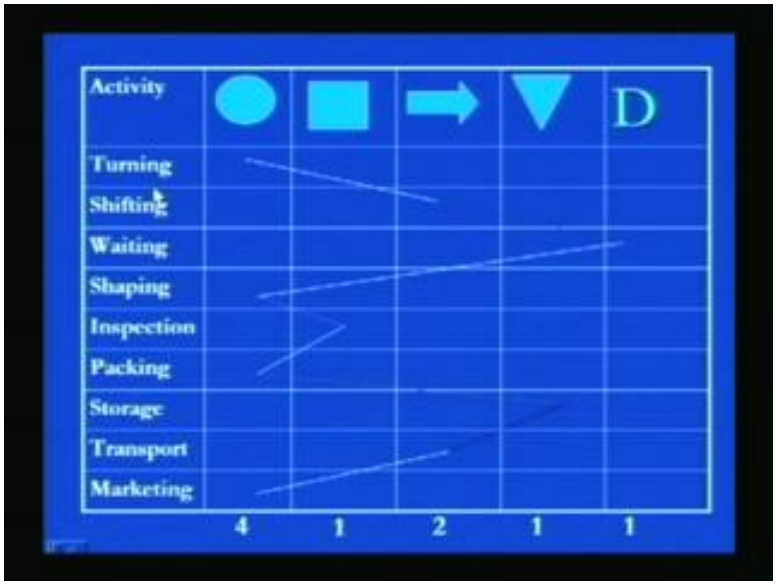

It can be seen that during an operations, say the first operation which is being carried out is turning, then material is moved for the next operation of the shaping. It can been seen, that after turning which is being shown by the circle symbol indicates the operation and then it is shifted, the shifting is shown by here this the transport sign and then material is kept aside and waiting for further processing by shaping. So, here the waiting is indicated by the temporary storage or the delay, the after the short delay here it is processed further by the shaping operation, after shaping it is inspected which is shown by this square sign.

And then it is packed again shown by the operation symbol and then in store shown by this symbol and after the storage it is transported shown by the transport and then it is marketing is shown by the operation symbol. So, this is how if you see the summary can be made of the different elements, which are being used for producing particular product and till it is marketing. Here, you can see that there are in total four operations, one inspection, two transports and here one storage and one delay.

So, summary of this can be made of the different elements which are being used for the recording purpose. And the summary at the same time can also be made for the different distances, which are being covered between the different stations and the time being taken by the worker or the material for moving from one place to another.

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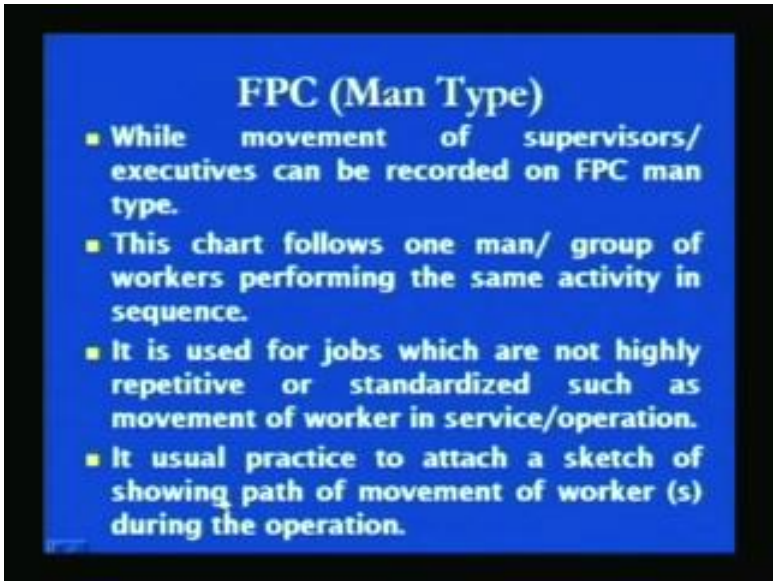

The flow process chart of men type shows that, what shows mainly the movement of the worker or the supervisor on the flow process chart. It is not used for recording the movements which are very frequent. But, the movements which are random and carried out sometimes in a day, this flow process char is found good for the recording the movements of like, supervisors and the executives in the flow process chart.

The this chart follows one man or group of the men working or performing the same activity in sequence. It is used for the jobs which are not highly repetitive or standardized such as movement of worker in service or an operation, in a for example, in a hotel or in kitchen if someone is working, he will always be moving in cyclic manner where is a short cycle jobs which will be done by the worker. So, for standardized the jobs which are not highly repetitive and a standardized those can be studied effectively using the flow process chart. It is usual practice to attach the sketch of showing the path of movement of worker during the operation.

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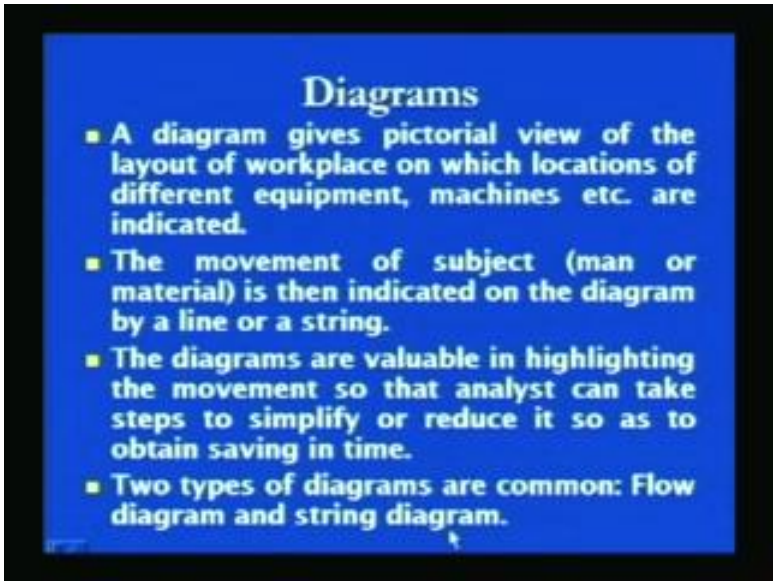

The diagrams are the another type of method showing the movement of the man or material during the operation, a diagram gives the pictorial view of the layout of the workplace on which locations of the different equipment, machines, etcetera are located are shown. And a the movement of a given subject one subject can be taken up for the study as a man or material and which is then indicated on the diagram by a line or by using a string. The diagrams are valuable in highlighting the movement, so that analyst can take a steps to simplify or it reduce the extent of movement. So, as to obtain the saving in timing and the two types of diagrams are commonly used in method study, one is flow diagram, another is string diagram.

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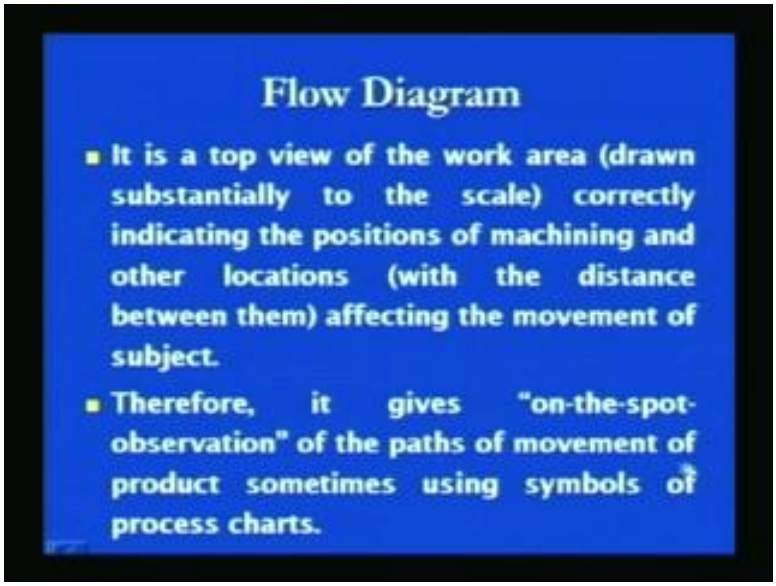

Flow diagram shows the top view of the work area, which is drawn largely to a scale and correctly indicating the positions of the machines and the different sections and the departments, which are effecting the movement of the subject that can be the material or the man. Therefore, it gives on the spot observation of the path of the movement of the product and sometimes symbols are also used, the symbols, which are used in flow process chart are also used in flow diagram, to show the different events and activities being carried out by the operator. Or the events and the activities or the elements with which material is being treated during the operation.

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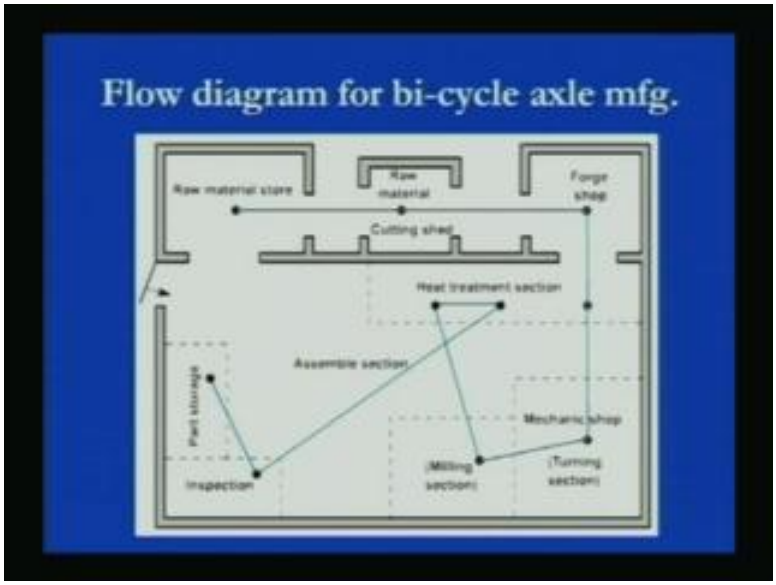

As I have said that flow diagram shows the top view of a the department or the section where work is being done, indicating the different stations where work is carried out. And also shows the different points, where points which can affect the extent of movement of the worker during the operation, for example here this is an example related with the manufacturing of bicycle axle manufacturing, material is taken for the stores and then it is moved from a stores to the cutting section.

Here, the material is cut in the desired size and then the raw material is send to the forging shop, where the material is forced. And then here it is brought to the machines of here mechanical shop or the turning shop, material is turned and then the things are mild, after milling here it is sent to heat treatment section, where heat two different heat treatments are carried out. After completing the heat treatment it is transported and then finally, things are inspected axle is inspected and then sent to the stores section.

So, this is how using the flow diagram we can show the different stations where work is carried out. And then, you can also show the different points effecting the movement of the material from effects it is journey from the raw material state to the final finished product state. Here, now I will summaries in this presentation we have seen the different recording techniques, which are used in method study. Mainly, we have covered the outline process chart, flow process chart and the flow diagram, other techniques of for the which are used in the recording of the method study, I shall be covering in the other lectures.

Thank you for your attention.