Organization Management
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Module No. # 03
Lecture No. # 33
Issues of Mechanisation, Automation and Computerisation

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We are going to talk now about the issues of mechanisation, automation and computerisation - not per se mechanisation, automation and computerisation, but how it affects the functioning of organizations and, therefore, by implication, how it affects the decision making in organizations.

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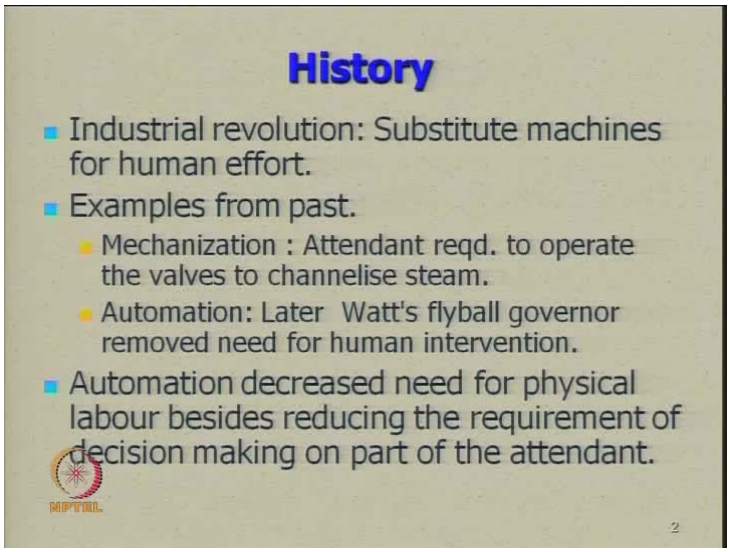

The industrial revolution, as everyone knows, was directed towards faster modes of production and substituting with the efforts of the machine, the efforts of human effort. Mechanisation is almost as old as the history of the industrial revolution in its present incarnation.

There is nothing new about mechanization. In fact, mechanisation is at the core of the emergence of the industrial society. You can see examples of it from the requirements to operate the valves to channelize steam. Similarly, automation - Later Watt's flyball governor removed the need for human intervention; but then automation followed mechanisation and computerisation followed automation. It does not mean that the three cannot co-exist, but this is where you listen very carefully - the three did not originate together.

The first process to emerge on the industrial scene was that of mechanisation. As mechanisation got more sophisticated, sequentially, automation emerged. And you will notice that I am not saying mechanisation was replaced by automation. No, I am saying that automation sequentially emerged.

If automation were to sequentially emerge, it follows that automation and mechanisation can exist together. It is not as if it is a progressive evaluation; it is a progressive evolution. Where you mechanise will be a factor of the requirement and where you automate will be a factor of the requirement. Automation decreased the need for physical

labor besides reducing the requirement of decision part on the part of the attendant. The word attendant here is not the attendant as we use in an Indian work environment. The word attendant here is meant to indicate a person who attends to machines - it is a description.

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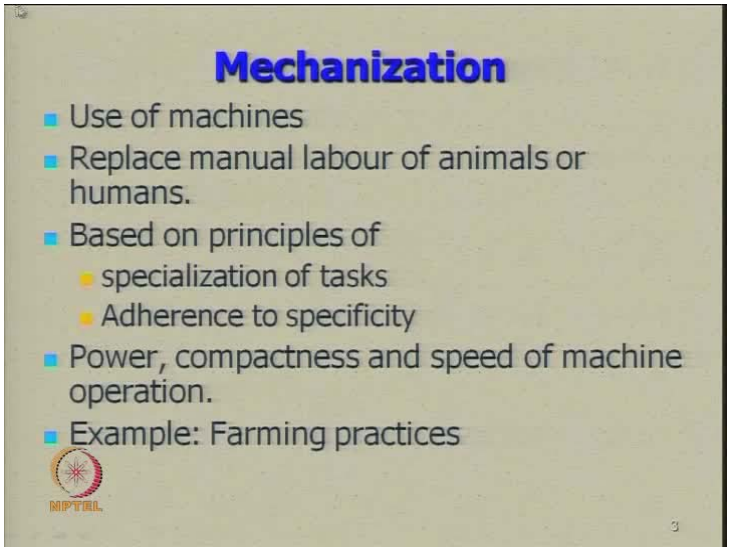

Mechanisation is: the use of machines, it replaces manual labor of animals or human beings, it is based on the principles of specialization of tasks and adherence to specificity, power compactness and speed of machine operations, an example of farming practices. It is not as if mechanisation takes place only in the industry; mechanisation can also take place in the ((parts)).

In fact, mechanisation can take place in any environment including the domestic environment. When you get a grinder in place of a human grinding contraption, it is a process of mechanisation; but that does not make the kitchen an industry. Mechanisation is a process of substitution of manual or animal effort by machine effort.

Now, that does not mean that you have dispensed with the manual component. The manual component will very much be there. Even when you operate the grinding machine - somebody has to be there to switch on the grinding machine - somebody has to be there to calibrate the machine. It is only when the calibration becomes integrated into the mechanised system; only when the calibration is by itself that the word automatic comes in. When the word automatic comes in - that is the process of

automation. The moment you feed, the machines comes on its own then it is an automatic machine. Even then no automatic machine is a 100 percent automatic machine; there will always be control panels.

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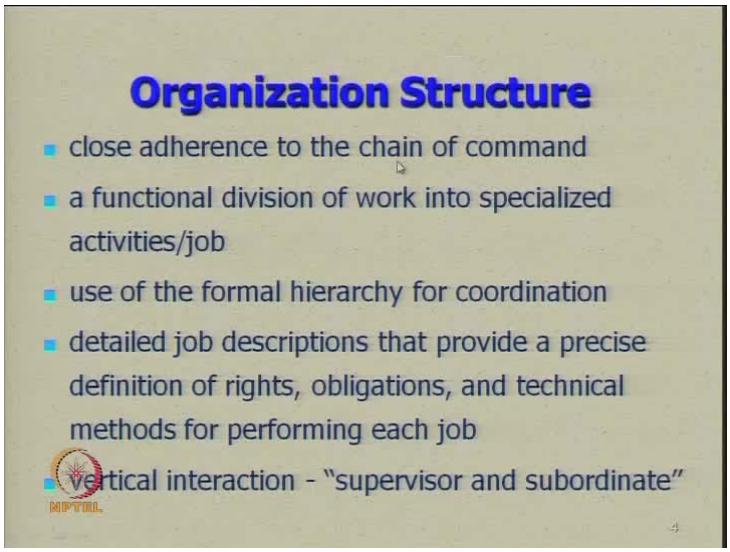

There has to be some initial command. All the subsequent processes may have been converted into self-generating systems. But the question of the world rotating on its own just does not arise; somebody has to trigger it off. Close adherence to the chain of command would be a close parallel to what mechanisation does. Just as in operating a machine each action follows a command; when you apply that principle to an organization then it shows that there is a close adherence to a chain of command. For each action to follow there has to be a command issued. Very much in the same manner, how in mechanisation for each action to follow somebody has to press that button; it does not happen on its own.

If you are to ponder over issues of mechanisation, automation, and computerisation in organizations - there are two types of concerns. One is - how does the emergence of mechanisation alter the decision making systems of the organization? The other is - what are the analogies between a mechanised machine system and the running of an organization? The analogies are very simple. Just as a mechanised machine system will need a line of command - a sequence of command; so also an organization will also have

a mechanized in-codes system, which means there will be a chain of command for each action.

A functional division of work will be converted into specialized activities. Just as in a machine you press that command and only so much will be done. For the next action another command has to be given to the machine - now grind, so the grinding is there; ejection will not follow grinding on its own; somebody will have say, now eject. The same principle is transferred to the running of an organization and from functional tasks it converts itself into specialized tasks. Each division does its bit and then stops. The next division gets into the act only on command. Very much the same manner as in a machine - you give a command then the grinding takes place and the machine stops there. You give another command then the ejection takes place. Then, you give yet another command then the collection takes place.

So, convert that into the functioning of organizations and you will find that there will have to be a distribution of tasks in a specialized manner leading to specialized activities and jobs. Use of formal hierarchy will be used for coordination. Detailed job descriptions that provide a precise definition of rights, obligations and technical methods of performing each job. The character of job descriptions will change, because it is only when job descriptions change will the divisional characteristics change.

If you are applying the principle of mechanisation to organizations, then you get job profiles of a particular variety. On the other hand, if you apply the principles of general management - there are no specialized tasks typically in small and medium enterprises - there are no specialized tasks. The person who is doing your sales job will also step in as a security man, if required. The person who will who is doing your security job may also be sent off as a purchase person to acquire some raw material. But when you have specialized tasks with growing sophistication; you cannot send your security man to do the purchases.

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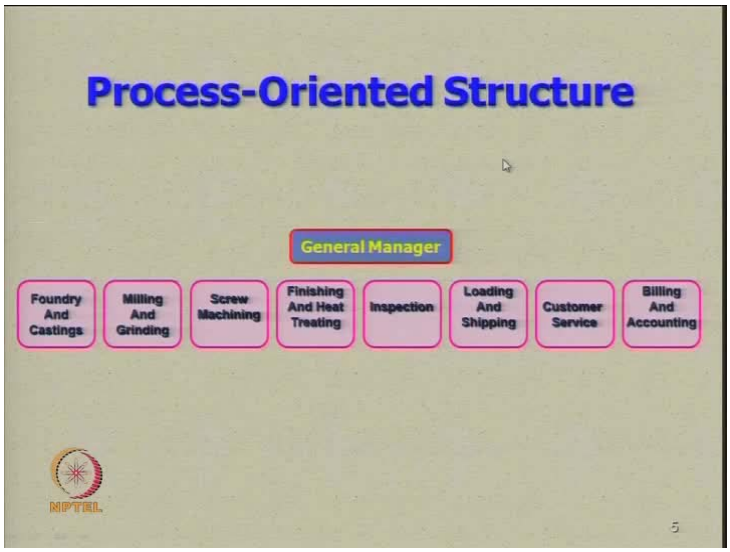

It is very much a factor of what will work and what will not work for an organization. In a mechanised structure there is a vertical interaction between supervisor and subordinate, because the command principle is very clear. In a process- oriented structure - this is how it would look - you will have a general manager but below the general manager - there will be foundry and castings; milling and grinding; screw machining; finishing and heat treating; inspection; loading and shipping; customer services; and billing and accounting.

These eight task clusters do not have a hierarchy amongst them. It is not as if foundry and casting is a superior task to inspection; it is also not as if inspection is superior to customer services. All these are sequential; all these are of equal value and being of equal value they are put at the same scalar level. The command for all of them will come from the general manager. It is not as if there will be a separate command sequence for each of these models.

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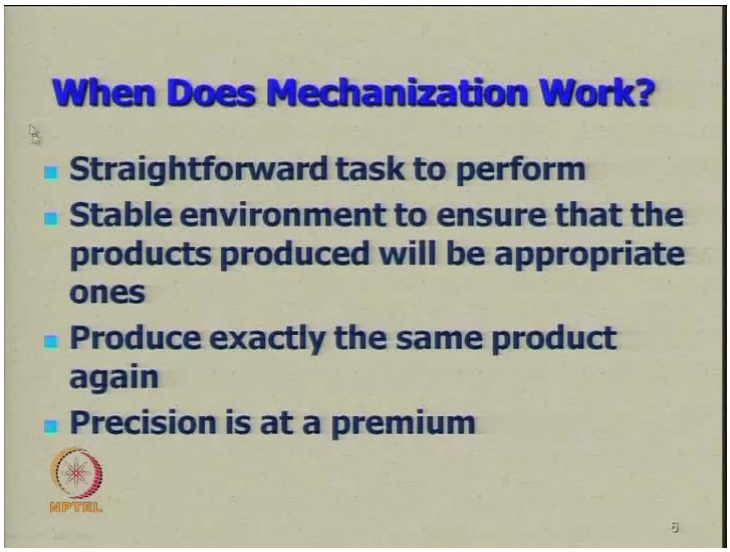

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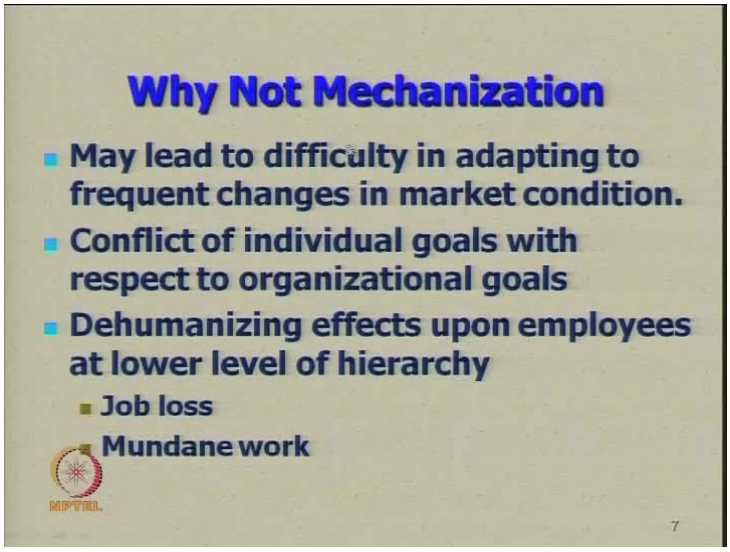

This is a process-oriented structure as differentiated from a hierarchy-oriented structure - which I was describing to you till now. Mechanisation works when there are straightforward tasks to perform; when there is a stable environment to ensure that the products produced will be appropriate ones. Mechanisation does not work in a situation of turbulence. When the need is to produce exactly the same product over and over again; precision is at a premium. Premium here means at high importance; therefore, you calibrate the machine and you do not give a chance for fluctuations in different components of the product, because the shape, the size and the specifications are all

determined mechanically and they cannot be altered. Mechanisation, however, will not work in circumstances in which it creates difficulties in adapting to frequent changes in market conditions.

So, mechanisation is confined predominantly to a stable set-up. It does not apply to a fast changing environment which is why you cannot have mechanisation in a computer hardware industry. If you have mechanisation there the lifespan of the boundaries of that mechanisation will be very short-lived. What you will have to do in an environment - say hardware I T industry - is to create a set of equipment based on a certain broadband technology which can absorb the fluctuations between the stated boundary conditions. So long as the boundary conditions remain constant the machine will be able to function. There again if the boundary conditions change the machinery - the plant will not function, because the specifications are beyond the comprehension of the automation process.

We go back to the point where we began. I would wish you to see the contextual character of mechanisation - something which is alas - very often overlooked. It will also not work when there is a conflict of individual goals with respect to the organizational goals, because the machine will not grow but the individual will. Therefore, the job satisfaction component of the individual working on that machine may go down and he may lose interest.

Similarly, you may replace the machine and the machine becomes more sophisticated and there has been no skill formation over and beyond what the individual had who operated the machine. He cannot operate the machine which is why it is important to understand that training is an essential investment in an industrial process. It is not an optional extra because if you do not invest in training your manpower will not have the skills to operate that technology on a continuing basis; because the technology can and will change. People frozen at a circle level will not be able to operate that technology and that is the end of Solomon Grundy; which is a metaphorical way and allegorical way of describing that the process will come to end; it would not operate.

Mechanisation also has difficulties because it dehumanizes the environment of employees. Again, the word dehumanizing is not a word from the vocabulary of a judgment; by dehumanizing, you are saying it non-humanizes. Of course, it does because

mechanisation was supposed to replace human beings. There is a growing feeling of loneliness in the job. I know it is fashionable these days to say I am working from home and you feel very glorified - you work from home. Jolly good - work from home. After working from home you realize that there is no group to relate to because the spouse has gone away, the children have gone to work and you are sitting there live looking at your walls and empty spaces in your room and there is nothing to break your monotony. Then, comes the next expression - I am traveling. You meet any one - he is traveling. What do you do when you travel? You get into an aircraft and you get out. Then, you end up at terminal 3 as they would be doing today and you walk 4 kilometers and you discover you spend more time walking around the terminal than you did in the air. Good luck to you - you are traveling. They are emotive words. You feel very edified the moment you say you are traveling. I am grossly tempted each time somebody says that to me and what were you doing when you are traveling? I was sitting in the aircraft – Oh! how great. But there is something about the aura of aviation which makes you feel good. Even if it means that your planes are late, you do not get proper food, you get clumsy service and all the other risks which you run; but you feel great flying. I do not know what is so great; that is my problem may be.

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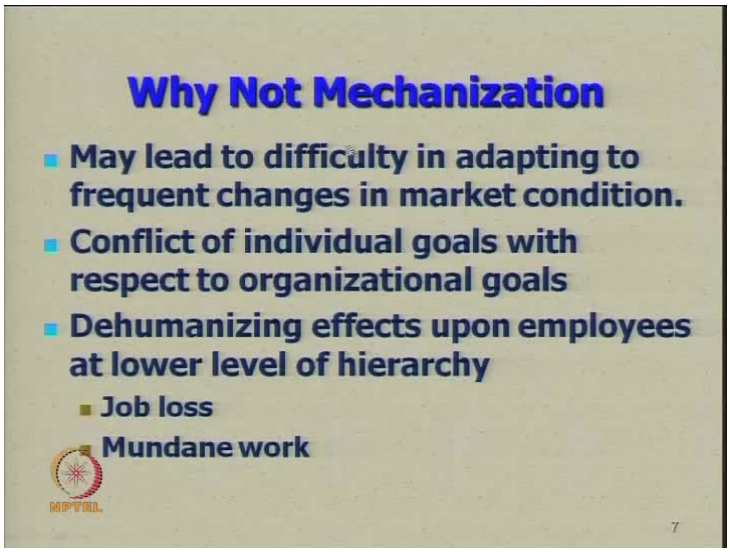

Why is working from home such a big thing? I do not know. It is a very dehumanizing type of work and the word dehumanizing again is not a judgment. It takes away the human component. You go to work in an office, you work in small groups, you discuss common issues and as you discuss newer solution emerges. You fraternize, there is a sense of fellowship and there is a sense of belonging. In fact, the truth in most people's working life is they spend more waking hours at the workplace than they spend at their home. Because, what they spend at their home - more than 50 percent of the time is taken away by sleep and of the remaining half - one-fourth is taken away by brushing, bathing, hopefully - whatever else. I know bathing may not be a daily ritual but that is the matter of personal choice; who am I to comment upon it.

The fact of the matter is that more of your waking hours are spend at your workstation than at your home station. If you are happily married then, of course, even one-fourth of the half - remember half went to work, half went home; of the half which went home, one-quarter is spent in sleeping, so one-quarter was left; of that one-quarter, half - half of the last quarter is spent quarrelling with your spouse and telling her how wrong it is - how wrong she is - how wise you are and vice-versa. None of those battles ever get resolved; but then, of course, each one waits for one's own chance to pounce on the other one. Happy hunting - there are no victors in it. So, that is what happens at home.

At work place when you go and flatter, hopefully, some of it will work on your colleagues and your boss. At home you very soon become you get conditioned to the fact that nothing even flatters your wife. She turns around and says that you are a flatterer and you just want to get an extra dish tonight, I am not going to cook it for you. Look at all the types of domestic quarrels which you have - vegetarian and non-vegetarian - going out for a movie and going out for a ballet - going out in the large car and going out in this small car - going to an South Indian restaurant and going to an Italian restaurant - everything is a quarrel; you cannot agree on anything. Happy hunting as I would say. You go to work, the boss determines just what you do. Of course, you lap it up because if you lap it up and please the boss; there are lollies at the end of it.

Nobody has looked at the sociology of human aggregation. All what I am trying to tell you is that mechanisation is not always a sociological blessing; you can forget the rest of what I told you. Which is what made Gandhi - Gandhi. He started talking of going back to doing things with his hand so he got immortalized. Even today, Churchill is not as

well celebrated as Gandhi is and Churchill spent a lot of his time calling Gandhi all sorts of things. For those of you who did not know, Churchill did not like Gandhi at all. He referred to him as a naked [FL] but the fact is the naked [FL] took over the cigar smoking Englishman and today Gandhi is a bigger international celebrity than Churchill will ever be - though Churchill is also very widely celebrated. The long and short of it is - what did Gandhi do? He turned the whole thing upside down. He said: down with mechanisation, down with automation, back to your hands and keep life simple. People still do not follow him but people still celebrate him.

If anyone did the number of statues built to Gandhi all over the world; he would far out do any living or dead human being with the number of statues built to him. He walks everywhere from New York to you name it with his [FL] He is invincible. Gandhi became Gandhi by undoing mechanisation - by undoing automation; so working with the hand is not such unusual thing at all.

Why must you be continuously producing more and faster? Then, you start doing what the IT industry does - you start replacing one model with another because and the better still, you start you stop producing the replacement. What does the person do? He has to replace his model. How smart! I will not give you these spares, now buy another one. Why should I buy another one? Because your old one has broken down. Why did it break down? The spares were designed to break down.

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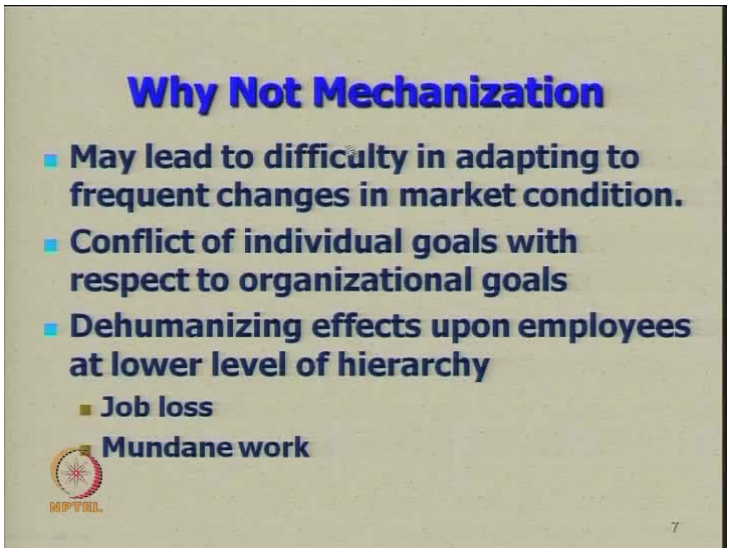

These spares had a life span of seven and half months, this had worked for eight and half months; you had one month bonus, so - what do I do? Buy a new one. No, you do not realize it now; but my light-hearted way of conveying apart, one day this planet will wake up to the sheer stupidity of continuous replacement. We are already in an era where you must replace for the sake of replacement. Telephone is a great example; I T is another example. It is not as if every change marks a higher level of technology; no, that is not true. You change the model from one type of handset to another type of handset - all you do is change the keys; it is not a new type of technology. Better still you want to kill the old model to stop producing the battery that kills the model as nothing else does. [FL]

Obviously, you have to go to Bombay. I will not name the street but you can get the battery of even the model of mobile which was manufactured in 1792. Do not ask me if mobile was there in 1792? There are expressive ways of giving you an example. You find out whether there was a mobile in 1792 or not; I am not going to educate you on that. My way of saying that you will get a battery of even 1792 mobile is a metaphorical way of saying you will get the battery of the most outdated mobile; even if that mobile will not work but you will get the battery. This is the reverse kick of the promoter saying we will not make the battery.

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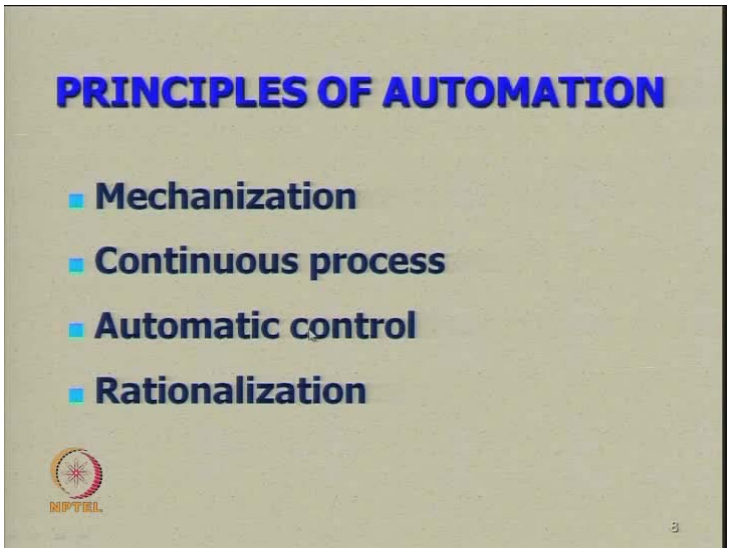

Having said that, mechanisation has a dehumanizing character on work. You may like it or you may not like it, but that is the way it is. so what. Let us get to the principles of automation then. Automation is mechanisation plus continuous process plus automatic control plus rationalization. Really speaking, automation is mechanisation plus. Automation does involve mechanization; in other words, you cannot have automation without mechanisation though you can have mechanisation without automation; it is as simple as that.

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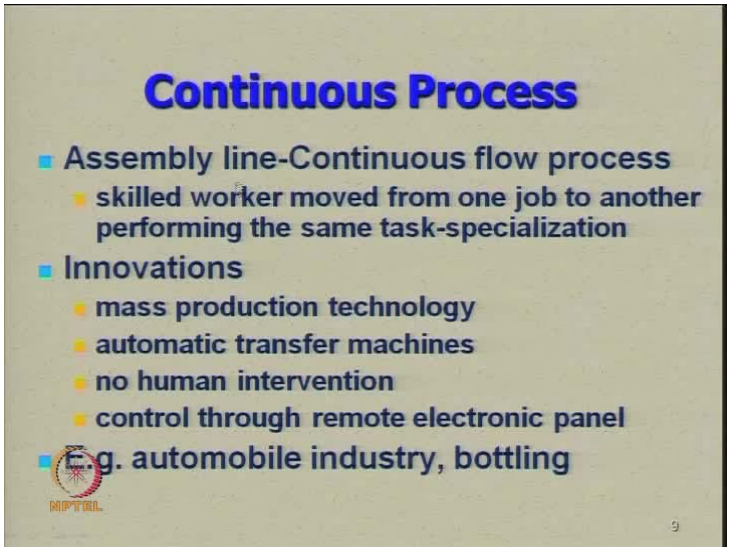

For example: assembly line-continuous flow processes - skilled workers move from one job to another performing the same task-specialization. What are the innovations that can take place in this? You can have mass production technology; you can have automatic transfer machines; there are no human interventions; there is control through remote electronic panel. Obviously, the illustrations of these are copious in both the automobile industry and in the bottling industry. This does not mean that these are the only two industries where it happens. But if I am going to give you illustration - illustration will forever be a random selection and the eternal question will remain - why these two industries? Why not another industry? So before you put that in the frequently asked questions, let me say, whichever industry I say, you would have a question; therefore, learn to live with the question.

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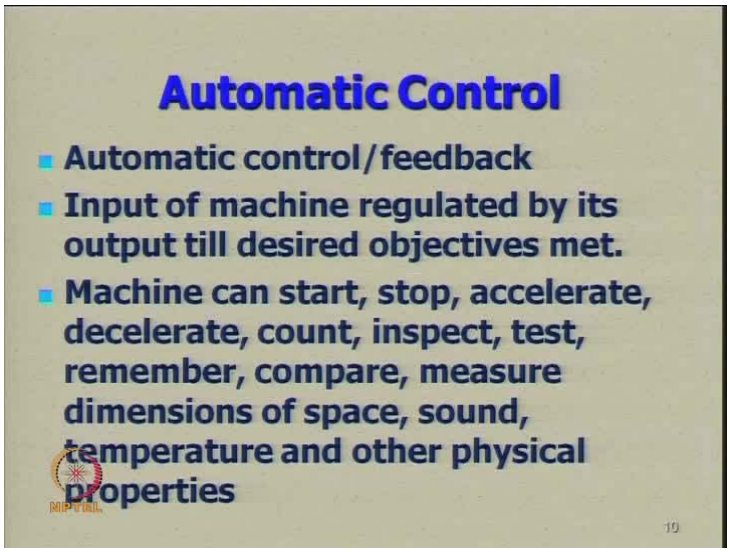

The automatic control requires feedback. Input of machine regulated by its output till desired objectives met - this is a very important component of automatic control. Machine can start, stop, accelerate, decelerate, count, inspect, test, remember, compare, measure dimensions of space, sound, temperature and other physical properties on its own. That is why, when you get into a car - it is called a panel - you can see the speed, you can see the type, the extent of fuel you have, you can read the temperature; much more so in an aircraft. You can make it more and more sophisticated. All these are happening automatically.

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You do not have it to give a command to say - now, you go and measure the temperature; no, you get the temperature as it is. If there are any production problems, the system intervenes and suggests alternate courses of action; that is a great advantage of the automatic process. There is a little bit - even though basic - troubleshooting built into the system.

For example: CNC which is Computer Numerical Controlled. CNC controlled processing machines metal, plastic, wood with programs with modifiable parameters and run by electronic controlling system.

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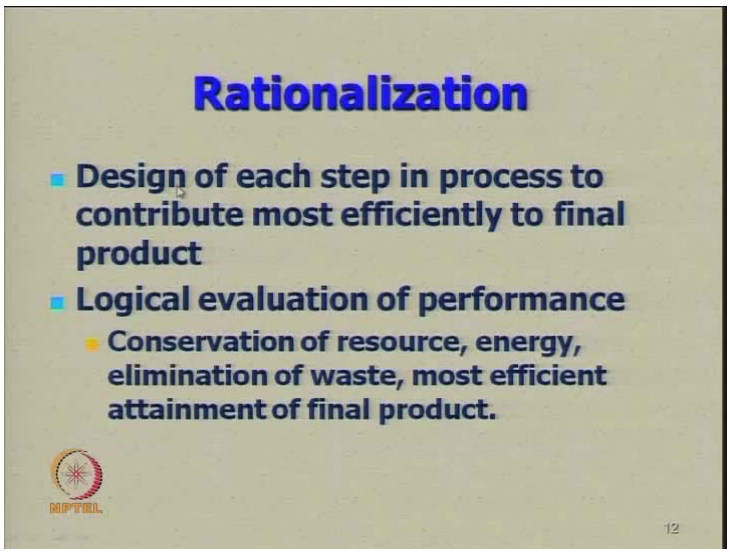

Design of each step in process to contribute most efficiently to the final product - but this happens only when you know what you want. The trip-up is very simple; most people in life do not know what they want. Conservation of resources, energy, elimination of waste, most efficient attainment of final product; all these are logical evaluation of performance.

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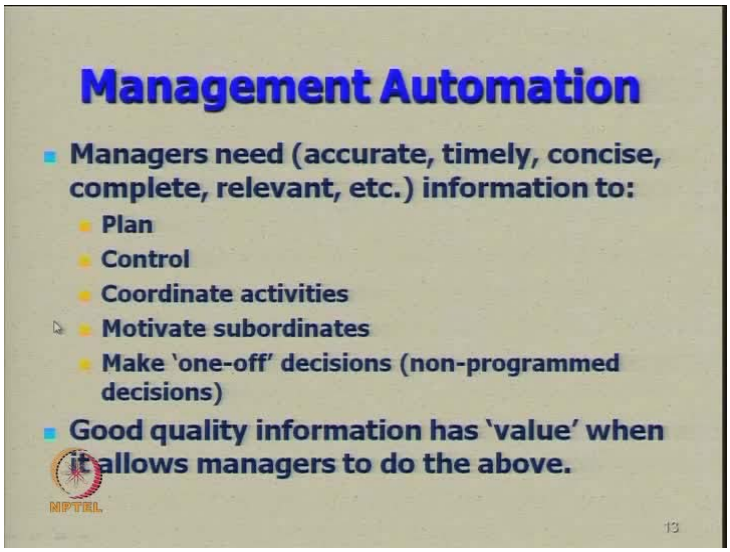

What happens when there is automation of the management process? Remember, again, we are walking on two legs. One change takes place when you have automated the production process. It will call for a different style, different structure of management. Cut! The second kind of analogy happens - what happens when you start managing on the principle of automation? That is in other words - you bring in the principles of automation to your managerial decision-making. This will happen when managers need accurate, timely, concise, complete and relevant information.

This happens for the management plan - this happens for management control; any deviation must be reported to the management for coordination purposes. The other day I was visiting the plant of gears. The manager and director told me with great pride - I have a system installed for 24 hours update if there is a shortfall in supply to any of the customers. Sometimes, I get a call deep into the night to say 15 batches of supply are needed with customer x; there is a shortage. A command is given to enhance production in 3 hours. We are able to meet it without disrupting the production processes of the customer. There are obvious advantages of following the principles of automation in decision making and this is what automation does. It would be a very different ball game, if you waited to intervene after the customer called you up; or better still you said put your complaint down in writing, send it in replicate and send it by courier or registered mail - not the best way to manage. An automated management control will tell the competent authority that there is a shortage of 25 batches of supply; by merely matching

what is in the order book with what is the goal production capacity. Automatically, the machinery will tell you we are going to run short by so much in another 3 hours.

So, there are virtues of the principles of automation in organization management. Itcan be used to motivate subordinates. It can make one-of decision - non-programmed decisions and good quality information as value when it allows managers to do the above. Please note this - all these 5 dimensions are information items. Management really survives on automation, if the information items reach the manager before the decision is actually due.

We have moved well beyond right information in right format at the right place at the right time - that is how management was taught 10 years ago. Today, we have an operational system where you have the right information in the right format at the right place even before the incumbent knows that this decision is due. In other words, it is preemptive pooling together of the necessary information required in decision making. Therefore, the definition of quality information is when the information allows the manager to do the above.

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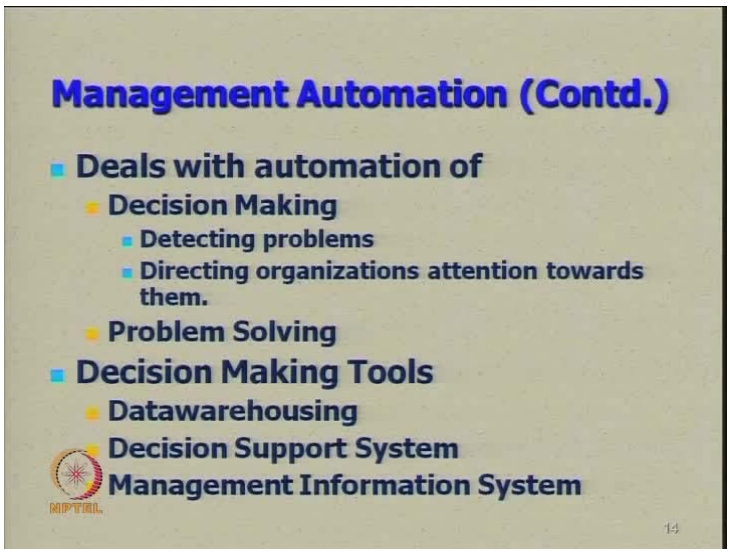

It deals with automation of decision making. In how many ways can automation of decision making enable this? You detect the problems; you direct the organizations towards them. Please notice very carefully what I am saying.

You detect the problem and you direct the organizations towards them. An automated decision making process will be self-equilibrating to a point where decision making parameters will change as per the definition of the problem itself and the problem will be detected before it actually surfaces. Therefore, the old theory in management from symptoms to the cause becomes dated. You live in an era where the symptoms should not be allowed to erupt.

The important thing, therefore, is not staying ahead of the competitor - that theory is now passé. My competitor may be an idiot; what glory do I get by staying ahead of him. You know you are constantly insisting stay ahead of your competitor stay; you are assuming that competitor is worth staying ahead of - he may be dumb.

This is much in the same manner in which you propagate the feeling that in the ultimate analysis - it is aggressive, competitiveness and stiffness which gives you the cutting edge; no, aggressive and competitiveness does not give you the cutting edge. What gives you the cutting edge is staying ahead of the problem itself. I am not bothered with the competition. A theory which is missing in marketing and which needs to be understood - there are enough market segments at least in this country to make every technology relevant. Listen to me very carefully, because it cuts across popular management thought and I am willing to debate it; because this country exists through several millennia simultaneously. It lives in 5th century BC and it lives in 22nd century AD.

If I want to sell, I merely alter my market segmentation. In case, some of you still do not get it. Let us me explain to you. The different universes of market segmentation occurs because of variations in infrastructure - because of variations in demographic profiles - because of variations in life styles - because of variations in access to that pocket - and even these four are good enough to show to you that market segmentation are also of different centuries available. Cutting out off the frills. I was driving up to Shimla and my fan belt broke. It was an ambassador car. To just give you the essential of the story, there was no habitat inciting distance. We managed to trek the nearest hut where predictably they lived a good Sardarji and predictably he had met various motorists like us.

He ((roundly)) gave us a dressing down saying, you do not know how to run a car and you acquire a car then you go around creating problems for yourself and everyone else. He talked non-stop from his hut to the car. We did not have a choice, so we kept lapping

it up. He brought what is for want of my inability to translate. [FL] a rope made of [FL] which is jute.[FL] He tied it up and he said [FL] and when I tried to give him money - he said [FL] With sheer contempt, he drove us away and told us that Solan is so many kilometers away; this will last you till then.

Now, tell me how would Mr. Henry Ford run his car? [FL] And we happily got to Solan. Now, you can go on playing the [FL] of the latest - the best - the biggest, because that is what charms you; real life does not work that way at all.

So, what are you competing with? I am under no illusion that even after having said that much - the next man who will come to teach management will be also teaching you competitiveness. Bless them all! The relevance of my raising this here is: mechanisation, automation and computerisation are interventions to better the decision making process to the appropriate problems - simple. In fact, I would plead that I will not go for automation where mechanisation does. If I can get water out of a well through a pulley, I do not see why I should press an automatic button for the bucket to go in and pull out the water; I see no reason at all. Well, I am willing to debate it, because you would want, - some of you anyhow - automate the drawing out of the water. Take it from me - it will be more of a problem installing that automated switch there which can be done technically, because there will be no electricity around.

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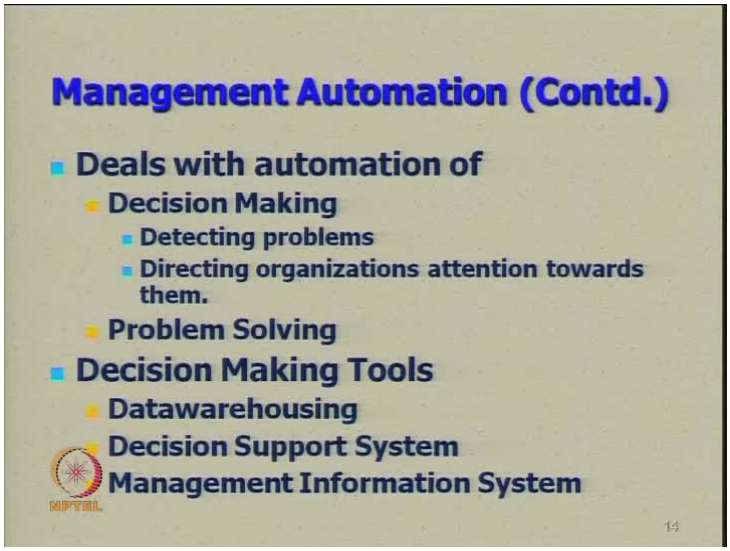

After you have done that the break down will take place every two months, then there will be no mechanic around. When the mechanic will come, it will be nightfall; so you wait till the following day. You have spent more on the maintenance of the automatic switch to draw out the water than by standing there and simply pulling it up with a pulley. Why should I automate when I can survive with mechanisation? Does not cut ground very much! Banks after banks are competing with each other in this country on U B S universal banking - total computerisation. Lovely, sounds great! After all, India is already duly certified to be not only emerging but having emerged as a power. Please note the certificate has been issued in the convocation - India has emerged as a superpower - just in case you did not know.

Again be that as it may. The truth is all this does not work if there is no power available for 15 hours. Continuous water Continuous power availability even in large part of the metropolis is a rarity. You go to a tower and you find out how long does the power come for? Not, how for how long the water goes away - how long does the power come for? Please see the revised formulation. What are we talking about?

This disaster is bound to take place if you are a person routed intellectually in some prestigious center of the West and trying to teach another group of people who want to migrate there from books which are printed in cheap Indian editions having phased out in that environment and you are giving A grades. God bless them all! Someday, some of us will arise from our dreams to realize that - that management is the best, which works the best in that context. Water used to come in a particular campus four times a day - 10 years ago - in the morning till 10 o' clock in the afternoon between 12.30 and 1.30 and in the evening again from 7 to 9. Then, water became twice a day; the lunchtime water disappeared; then the timing started shrinking; then the timing started receding.

Now, water is available in the morning between 5 and 6.30 [FL] which is a German of [FL] which is the Spanish. That is progress for you - greater mechanisation, greater automation, greater computerisation - we have emerged as a superpower.

Of course, it is not my purpose to prick anybody's happiness bubble, but I cannot see how I can teach management in a fantasy mode; because, ultimately, after you have learnt management through these sessions, you will want to go and practice it. You will turn around and say did this fellow know any management at all when he was talking of

mechanisation, automation and computerization; he knew nothing that automation requires power supply. This teacher happens to know it. This facilitator are call me an or instructor or whatever the word fancies you will teach you only that management which works; the rest is nice for the industrial version of Mills and Boons. Well, you might ask - what is industrial version of Mills and Boons? Now, Mills and Boons sell fantasies of romance; you can sell fantasies of industrialization. We will all move from mechanisation to automation and from automation to computerisation [FL] - become all world powers. What are we talking about?

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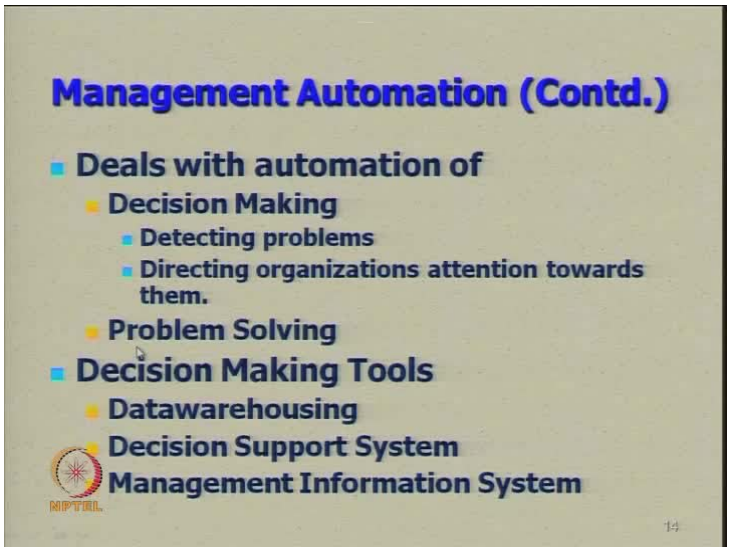

Whatever it is that we are talking about, let us be very clear on what ground conditions are and let us base our industrial environment on where it should be - squarely the context in which industry will come up. Therefore, if you have automation - it is of detecting the problems before they emerge and directing organizations attention towards them. I have just spent about 10 minutes of your time trying to explain to you what all this means. Then, of course, the favorite clap trap phrases you would feel almost cheated if I did not use them - data warehousing - you got it right. Do not forget data mining and then data aggregation - beautiful words; words which everyone understands. You use them in a group and you ask them - do you understand what data mining stands for? Everyone says yes, because no one wants to acknowledge he does not know what data mining is; you would be awfully stupid if you did not know what data mining is.

I cannot have you as let you suffer from a sense of disappointment by not using data warehousing in decision making; as far as automation is concerned - it is an essential part of data housing. Then, of course, decision support systems; my IT friends tell me decisions supports the systems - as a concept - is passé. I said, “Oh really! What was it substituted with?”

They said, “You do not know.” I said, “I do not know.” It is substituted with electronically enabled decision systems. I asked, “What is the difference?” He said, “What is the difference? You throw out an old shirt and you wear a new one, have you changed?” I said, “No, the shirt has changed.” The worlds have changed - what is your problem? It was the same thing.

We will now talk of decision support systems and management information systems. Now, incidentally, management information systems has also grown. You are no longer talking of management information systems; you are talking of human resources information systems, marketing information systems. Yes, believe me, financial information systems. What is the difference? You ask an information systems specialist. I am not going to discuss that here, but it has got everything to do with automated decision making.

Again the light-hearted way of treating it apart - the serious component is - there are specializations even in management information systems. The question is the kind of aggregation which takes place in financial management systems of management information systems will be very different from the kind of aggregation which takes place in human resources information systems.

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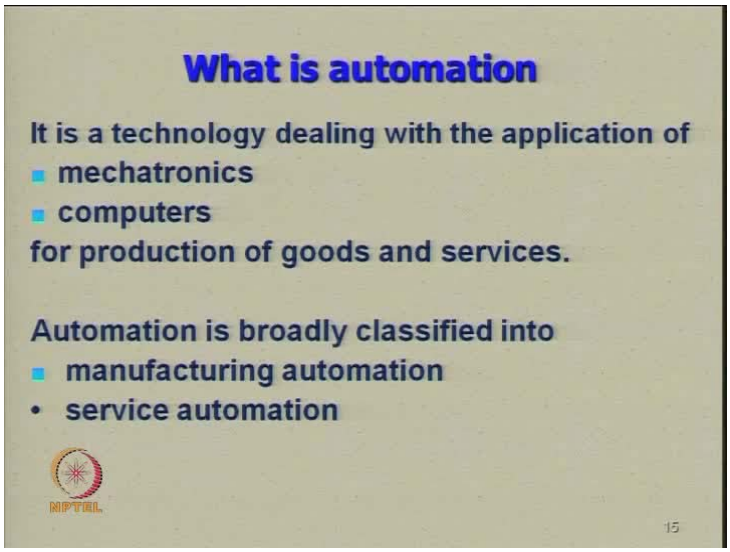

Therefore, what is automation? Some of these fundamental questions never go away like the question - who am I? Vedas were asking this question, we are still asking that question and they will be still asking that question several millennia down the street. So, finally, it was solved by somebody saying [FL] I am Brahma - I am the divine. Now, you cannot argue beyond that because there is no concept beyond the divine. There will still be debate - you know that typical teenage dilemma - who am I? Why was I born? What is my mission in life? God knows, nobody ever knew anything about it; but it is all the same thing. Several learned books are written on it and I cannot call them you know not worth reading. You must keep the publication industry going just as much as you keep any other industry going - you must read all his books. The fact of the matter is it is technology dealing with applications of mechatronics and computers for production of goods and services. Automation is broadly classified into: manufacturing automation and servicing automation. We shall pick that up shortly.