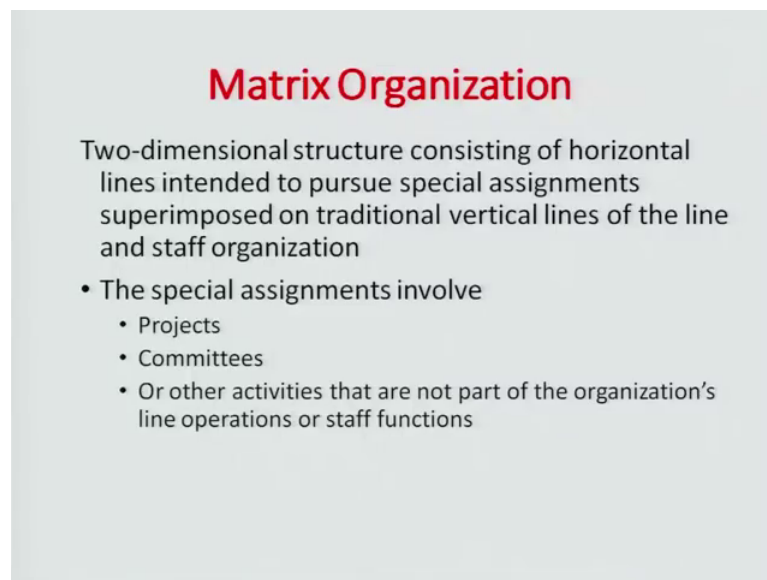**Applied Ergonomics**
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Module – 03
Lecture – 15
Organization Ergonomics part-2

Hello and welcome to this lecture 15 on applied ergonomics we were talking about the different line and staff organization modules and what are some of the associated challenges. We also discussed about how such organizations could be incorporated in factory like environment and what could be the associated problems again with some line and staff kind of organization systems. Let us look at two different aspects now which come more into the purview of the modern organizations which exists which are known as matrix type organization.

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And this is a new concept coming because of cross disciplinary approach to problem solving which has happened in the modern days.

So, it is typically a 2 dimensional structure consisting of horizontal lines intended to pursue special assignments superimposed on the traditional vertical lines of the staff

organization approach line and staff approach that has been done before. So, while you are reporting to a certain authority in a vertical manner you always have a chance to interact within your level or even crisscross you know I mean let us say one level even up in the organization.

So, that there are certain purposes which are accomplished, these purposes could be special assignments like projects I think I had mentioned earlier in one of the lectures about a special defect elimination campaign like associated with a certain defect in the automotive which comes because of multiple you know problem centers associated with the different aspects of production of the automotive.

There could be in terms of committees for example, in organizations there typically people who need to take certain decisions which are purchase decisions where not one person, but a committee of individuals from different departments in put in. This is a very important step in concurrent engineering approaches where even the designing of a product because of the nature of the diverse, you know nature of diverse aspects of a product today are basically done with not one stakeholder who is the designer, but multiple stakeholders like even the finance team or the marketing team or the q a team or the production team participates with the designer to design a product.

So, such kind of you know committee based special assignment are done at every level within an organization today to look at or let us say to borrow each others strengths in order to get the best performance initiated on an activity which is planned. So, there can be other activities that are not part of organizations line operations or staff functions which can also be put in under such matrix organizations, typically if I looked at the line diagram again you know.

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Matrix Organization Structure
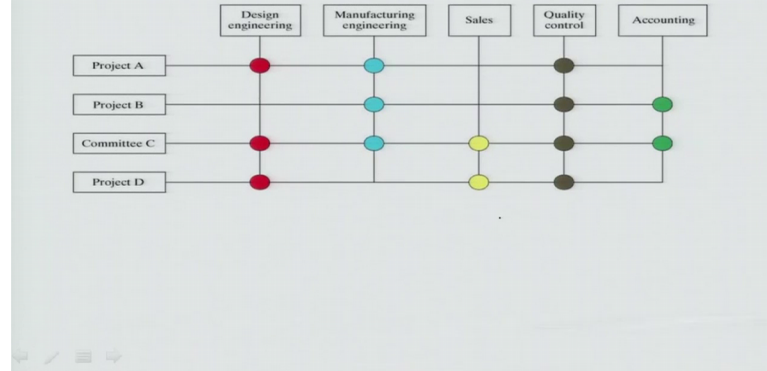
For example let us say we talk about a concurrent approach of designing a product with multiple stakeholders including design engineering, manufacturing engineering, sales, quality control accounting.

So, a problem example could be just as simple as machining something on a turning centre where there is a roll coming from the q a and roll also coming from the marketing guys, a roll again coming from let us say the engineering guys or the manufacturing team there could be aspects of process capability of a machine which could be built in by the manufacturing team.

Whereas, aspects of how much quality is needed and not needed and the finance team giving things about how much cost would be imparted because of whatever is happening and the whole activity design of the process design with a central theme of this product of turning a staff could be done by multiple stakeholders in this manner. So, such activities are nowadays very commonplace and therefore, these kinds of structures where people reporting to different discipline for example you know at different times.

Although they themselves would report to in formally to one boss who is vertically placed you know maybe just on the top, but then there is always a cross talking between different disciplines in such matrix organization structure systems.

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Advantages and Disadvantages

- Advantages of matrix organization:
  - Focuses attention and resources on the special assignment
  - Collects expert knowledge from different areas to solve the problem
- Disadvantages of matrix organization:
  - Project or committee members must report to two bosses
  - Performance appraisal becomes complicated
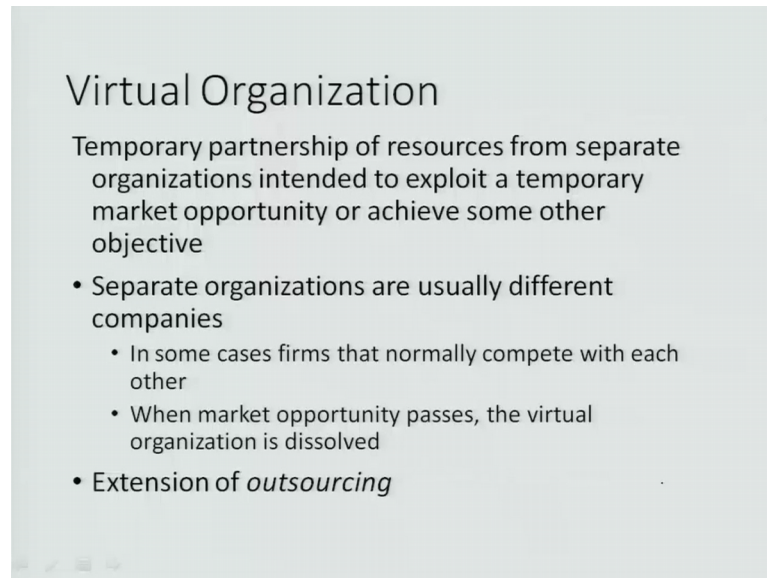 - Line and staff functions may become short-handed

There are advantages and disadvantages of a matrix organization, sometimes the focuses typically tend to be attentive to resources, attentive to special assignments and the routine organizational objectives are not achieved because of such special assignments and. So, therefore, one we at once we are trying to draw a vertical line of functionality it should be the role and responsibility of the of the vertical line to a vertical lining to sort of a vertical order let us say to ensure that the routine functionality is being carried out in accordance with in a timely manner.

While the cross functional ability also needs to be addressed in a timely manner. So, that again you have to look back on the line organization level, a vertical line for doing that kind of planning you of course, collect the advantages of matrix organizations are including collects expert knowledge from different areas to solve the problem. So, it becomes a better solution accepted by all, now while we talk about advantages of course, the major disadvantage here is that a project or a committee has to report to multiple stakeholders, multiple bosses and then it becomes very challenging to evaluate the performance when it talks about giving benefits including promotions etcetera because then. In fact, for a promotional decision to happen there has to be a cross functional team of those people whom the concerned person reported and because there is no line of command of a person.

Otherwise working in design engineering reporting to somebody some manager and manufacturing engineering there may be some shortcomings because of this daily interaction which may have come up to the manufacturing engineering department where

if such a person is involved in promotional decision for this person there may be some problem and the decision may not be arrived at correctly. So, these are some disadvantages or challenges faced by matrix based organizations, similarly line and staff functions may become sometimes shorthanded they may not have priority. So, these are the advantages and disadvantages of a matrix organization.

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So, let us now talk about virtual organization, these are more you know more of a recent concept that some temporary partnerships of resources from separate organizations are these, are developed.

And the basic intention is to exploit a temporary market opportunity which may have just propped in where support services from 2 or more organizations may be needed and ultimately the goal is to achieve some objective some market objective which has come up. Now separate organizations could be typically different companies in some cases forms that normally compete with each other can come together for attending to a tender where you know you may just work it out that let us saying zone one I would try to get and zone 2 some other organization in may. So, there is some kind of a tie up which happens. So, that maximum market let us say share could be snatched by a certain group of such virtual organizations.

So; obviously, when the opportunity passes away the organization is dissolved you know. So, this typically can also be extension of outsourcing that is also some kind of a virtual

organization, you are using somebody else's manpower or facilities or services for running the show and your organization which is there. So, even that also can result in some kind of a virtual organization. So, will sort of change gears a little bit now and look into what are the motivations in ergonomics particularly when we talk about work management and there are different approaches, theories which are intended for, you know giving a viewpoint as to how performance appraisal or evaluation can be done and what can be the level of motivation in principle with different workers.

And why a person should be motivated to do something or do tasks. So, there are different theories like the Maslow's hierarchy of needs or even McGregor's x and y theory which would sort of give you an idea of in a very standard manner, what are the needs and necessities behind motivation to happen motivation at every level of a work system and then very important factors which are related to let us say the overall ambience the environment even the lighting could be a very critical performance motivator. So, there are certain studies also I would like to discuss through this section which talks about the same.

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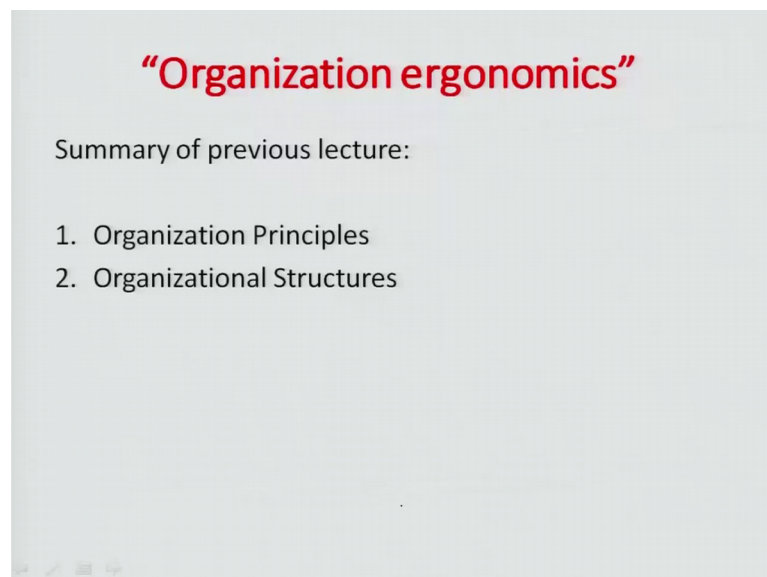
So, let us look at motivation and as you know that in summary we have already looked at principals we have already looked at different structures we have tried to understand the advantages, disadvantages of the structures.

The whole idea is that whoever is associated with such organizational structures or even deriving the principles of humans and human subjects are basically having a need driven approach for being able to execute a task and when it comes to do that how much would be the motivation within for a accomplishment to be carried out is quite variant based on the mental setup of such human factors and. So, therefore, it is important to study motivation and particularly worker motivation.
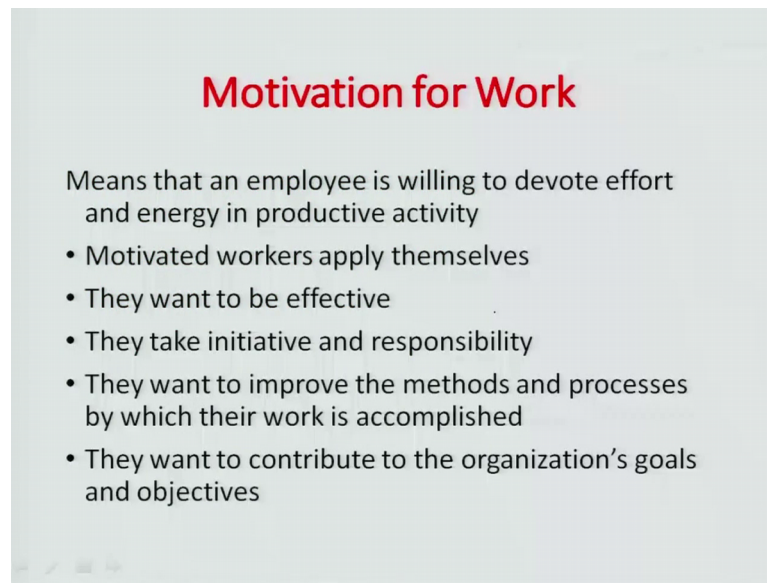
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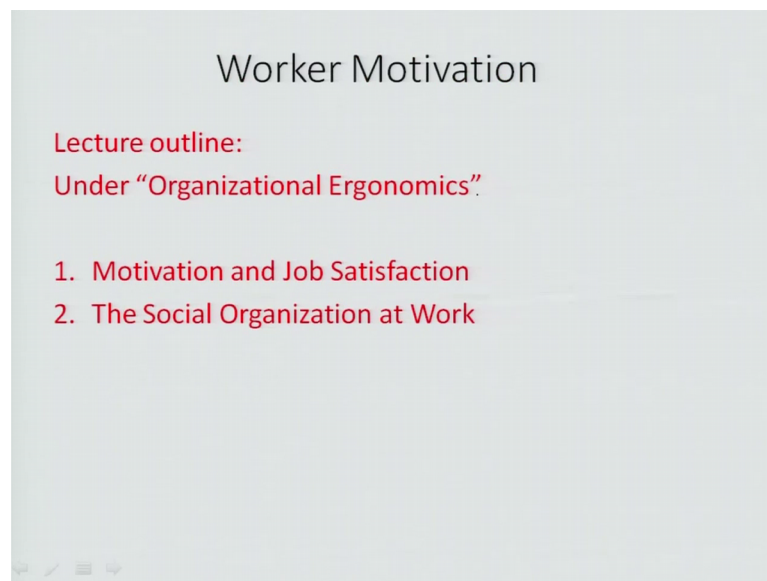
When we talk about generally work management principles or even organizational structures so we call this worker motivation it is a topic under organizational ergonomics and; obviously, the goal here would be to study what are the reasons what are the underlying reasons behind person to feel motivated to deliver the responsibility that has been given to him through a through a certain structured manner.

And also it is important that after delivering the responsibility how satisfied a person is with his work and how things could be better or how could be plan things in a better manner. So, that the person may be more satisfied to accomplish such a job factor and. So, typically we would look at motivation from within motivation coming from the job and a third very important aspect which is the social organizational model at work as such and this would give you a sort of a basis of understanding, what can be done at a planning level. So, that people are always satisfied and motivated to continue in a repetitive manner of what they are doing.

So, what is motivation? Motivation for work typically means that an employee is willing to devote effort and energy in a productive manner.

So, that there is quality work being performed in terms of the responsibility given to him from a organization structure, motivator motivated workers would apply themselves do everything possible for doing that deliverance which they are intended to, they want to be effective they take initiative and responsibility more and more. So, it helps in order to carry out routine tasks of an organization they would of course, want to improve the methods and processes which are existing by which their work could be accomplished in a better manner and. So, some of these things have to be heard, heard at a much broader level and addressed immediately. So, that they can motivate themselves for the work carried out.

And finally, they want to contribute to the organizations goals and objectives they have a feeling of belongingness which actually is a function of their motivation to work or perform duties and therefore, it is important to look at this aspect in a very scientific manner.

Motivation Theories

- Maslow's needs gratification theory
- Herzberg's dual factor theory
- McGregor's Theory X and Theory Y

So, as far as motivation theories exists in human psychology there are 3 different theories which are in place, the first being the Maslow's hierarchy of needs it is called the need gratification theory. Then there is the Herzberg's dual factor theory and finally, the McGregor's theory x and y. So, let us look at individually what these theories would propose in terms of an operator psyche, a worker psyche which could be utilized for arriving at decision making and planning structures which would be always motivating or satisfying. So, that work can get carried out repetitively in a quality manner.

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Maslow's Needs Gratification Theory

- Humans attempt to satisfy five basic needs, arranged in hierarchical order
  1. Physiological needs - thirst, hunger, sleep, activity, sex
  2. Safety and security - protection against danger
  3. Love and esteem by others - social needs
  4. Self-esteem - to be worthy in own mind
  5. Self-actualization - achieve one's potential
     - If lower-order needs are satisfied, then person will seek to satisfy higher-order needs

So, let us look at Maslow's hierarchy of needs theory. So, the basic assumption here is that humans attempted to satisfy 5 basic needs and that is a in a pyramidal manner the it

is arranged in a hierarchical order and these needs can be classified into physiological needs, physiological needs includes needs related to thirst, hunger, sleep, activity so on so forth. There are also safety and security needs which are related to protection against danger that is very very again important order and then of course, there are esteem needs esteem and love because this is more like from a social aspect side that how much a person can develop self respect for oneself through once he has met his basic needs and security and safety needs.

So, the esteem needs is about finding out a place in the system a position where people here you, hear your voice and try to make a domain of work where you are important. So, that is what social needs are and then of course, there are there are self esteem needs which is basically related to be worthy in one's own mind, one owns conscience for example, today I may start thinking that what do I do to be the best teacher in the world. So, this is something where you are competing against yourself and trying to develop that self esteem to yourself. So, that is worthy to be in one's own mind how a person is delivering what he is doing and then finally, there is a 5th need which is about self actualization.

So, once we have attained that esteem level you were somebody which the society looks at, listens you know tries to imbibe the actions done by individual, the next level is how you can be your own competitor and achieve one's own highest potential level. So, this is the self actualization level and so therefore, this is the, this is a hierarchical need structure which is there in every humans psyche that once your basic needs are met and your security needs are met how you can be somebody who are in great sort of social network with each other.

Where there is a lot of care and affection associated with you and then how one can be placed at a level where people start hearing you giving respect to you and then finally, at a level where you are your own competitor you become perfect according to what you are because there is nobody else who is there in the system who can compete.

So, this is the sort of hierarchy in which the need structures go and if lower order needs are satisfied then persons will seek to satisfy higher order needs in a hierarchical manner. So, this is one theory, the other theory which exists is the Herzberg's dual factor theory.

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Herzberg's Dual Factor Theory

- Two types of factors motivate people:
  - Extrinsic factors - job factors that originate from outside the actual work content and potentially result in job dissatisfaction
    - Called *dissatisfiers*
  - Intrinsic factors - job factors that relate to the content of the work itself
    - Called *satisfiers*

Where typically think of 2 types of factors which will motivate people one are the intrinsic factors, intrinsic factors are job factors that originate from outside the actual work content and potentially results in job dissatisfaction, things related to policy matters, things related to let us say you know wages or salaries or competence of supervision and these can generally be recorded as dissatisfiers for a kind of you know worker or a subject human subject. Then there are intrinsic factors which are job factors related to the content of the work itself and if these factors can be addressed it can lead to more and more satisfaction of a person to a certain job they called satisfiers.

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Extrinsic and Intrinsic Factors

Extrinsic factors	Intrinsic factors
Wages or salary	Achievement and personal satisfaction in completing a task or project
Company policies	Recognition
Competence of supervision	The work itself (job content)
Interpersonal relations	Responsibility for one's own work
Working conditions	Responsibility for others
Status in organization	Advancement and growth
Job security	
Personal life	

Now, if I looked at what are those extrinsic and intrinsic factors things like wages or salary, company policies, competence of supervision, interpersonal relations, working condition, status in an organization, job security, person life this could be some of the intrinsic factors, person has some relative at home who is sick and he is still attending duty. So, can we do something so that the stress burden that the person has gets limited it will definitely result in him to be more of coming towards the satisfier side whether the dissatisfier is that factor of the continuous stress that he is having in mind because of a family member who is sick or admitted somewhere the hospital.

So, you can see about how intrinsic, extrinsic factors and how can be they can be intrinsically defined by providing some help etcetera. So, that there can be proper motivation in a particular job, there can be intrinsic factors like achievements or person satisfaction in completing a task or project there can be recognition. Each and every time there is a contest which is one in terms of let us say quality circle contests etcetera being routinely practiced within production organizations, it brings a lot of esteem value, lot of visibility within the organizational social framework and it can be considered to be a motivator to work for quality or work for betterment by systemic improvement or more thinking or innovation in place. So, these are intrinsic factors which would cause from this one a recognition aspect which comes in the work itself can be a motivator.

If the work is done in a proper manner in a lighted condition well lit up condition, in a condition which has a comfortable temperature setting person may feel 100 percent efficient to carry out the task and therefore, these environmental factors are very important to enable the satisfaction level of person, responsibilities of one's own work could again be very important intrinsic factor responsibility for others advancement and growth. So, these are some of the intrinsic factors. So, typically every job or task in a work system can be measured in terms of extrinsic and extrinsic, intrinsic factors in the combination of these from time to time and a reversal of the extrinsic towards the intrinsic by giving some kind of motivation is always helpful to maintain integrity within an organization structure.

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The third theory which exists and is in place is the theory x and y proposed by McGregor which believes that you know there are 2 alternative models or assumptions about worker behavior. One model theory x is a negative model which says that by nature of worker is lazy or you know worker does not work unless he has been given a proper system to work. So, this is the underlying assumption central view which is taken. So, some management designs an organization structure based on theory x. So, it gives you a negative view of the workers, but now there is generally a shift towards the theory y which says that it is a very positive thing that a worker has if you can involve the worker in the process of participation and decision making and people here and modern organizations look at that aspect that how much of decision making and ownership could be given to the you know down the levels in all different levels.

So, that there is some kind of a feeling towards an organization which develops and motivates the concerned level of human factor the worker to work progressively towards contributing to the overall success. So, this is definitely a better description of workers in the latter half of 20th century and in fact early 21st century based on theory y version. So, theory x basically assumes that humans have an aversion to work will try to avoid it as much as possible, workers must be coerced and directed well. So, that they do not do anything wrong, they have a limited ability and intellectual capacity they have an average worker.

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So, they have they have their own preferences they need to be told what has to be done otherwise they will not do it in a proper manner or again it just assumes that theory x kind of seeks a security above all for a system to be working in a proper manner.

So, it is more like by push or by disciplinarian measures that a system works, theory y necessitates physical energy. So, it basically thinks of physical energy and mental efforts in work as a natural, as natural as resting or playing which enables motivation within for delivery to happen of the work objectives.

It shows self direction and control when pursuing objectives to which commitments have been made earlier, it accepts and seeks you know a degree of responsibility within each human factor which is involved in such a, such a work system it generally talks about creativity, imagination, ingenuity, it intellectual potential of a widely distributed sort of set of traits between the population the human factors which are involved in a in a work system and. So, in this way the approaches to think about a work system is completely varied between the theory x and theory y in such motivational studies associated with organizations.

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Conclusions on Worker Motivation

- People respond to two general types of motivation:
  - Positive motivation - affecting the behavior of workers using the prospect of gains and rewards
    - Money, bonuses, recognition, friendship
  - Negative motivation - affecting the behavior of workers using threats or fear
    - Demotion, job loss, holding back recognition

So, in conclusion if I wanted to really conclude things about what are the factors associated with worker motivation, people would generally respond to 2 types of motivation. One is a positive motivation which affects the behavior of workers using the prospective prospects of gains and rewards, this could be in terms of let us say additional money, additional bonuses additional recognition.

This is a very big aspect right now which talks about need based psychology associated with human factors, additional friendships which are formulated this could enable a person to work better. There could be aspects of negative motivation affecting the behavior of workers using threats or fears for example, there could be a monitoring system which demotes somebody or there is a job loss or there is a holding back of recognition which may allow some people who otherwise are smart enough to understand moves and be very you know negative in their approach to fall prey to such system and get back on track.

So, these are generally how you would classify the worker motivation to be based on some of the theories that have been discussed before. So, I will like to conclude this particular section in the interest of time, but then we would like to again look at things related to different jobs the level of satisfaction, the morale behind carrying out a job and some other environmental factors which are responsible for well good performance in a job in probably in the next lecture so as of now.

Thank you very much.