Human Factors Engineering
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Lecture - 52
Problems of Shift Workers, Shift Work and Human Performance

During this the second lecture sessions related to Shift Work I will be discussing two important issues- one is what kinds of problems the shift worker may encounter because before you design a shift schedule applicable in a particular workplace for a given set of workers or a given set of jobs, you should be aware of both common problems as well as the special problems being faced by the workers the shift workers if they are engaged in night shift or evening shift, you also must know that what are the alternatives you have with which even if the person is working in night shift his or her performance is guaranteed assured not fully, but at least 80 to 90% of his or her performance.

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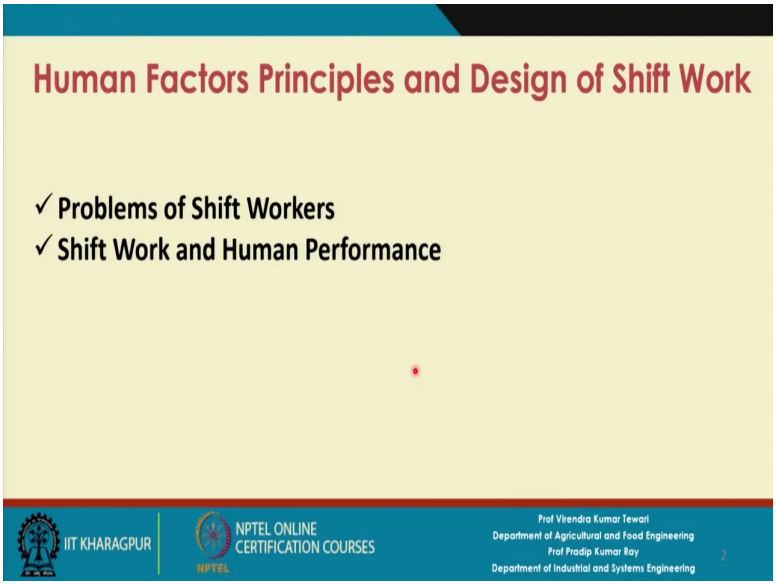

So, the next half an hour or so, I will be specifically discussing the problems of the shift workers and the shift work and human performance.

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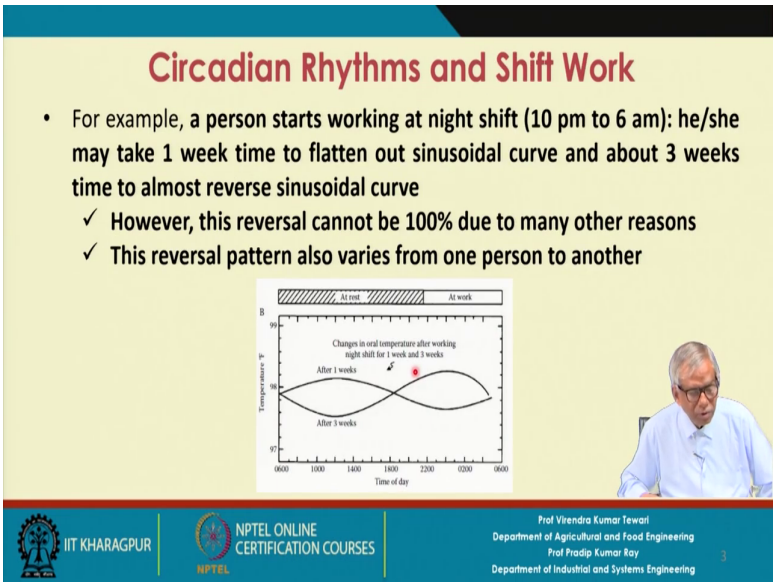

Let me again refer to the circadian rhythm and the shift work relationship Because any shift works the circadian rhythm is basically disturbed and obviously, there will be some negative impact. So, now, you have to take some preventive measures or corrective measures so, that negative impact should be as minimized.

One way you can reverse this sinusoidal curve diagonal cycle is that you ask the person to continue with the shift work for 3 weeks, in all likelihood you will find that under certain conditions, that his diagonal cycle is reversed. If you refer to this particular figure what you find that with respect to a particular physiological parameter, oral temperature or body temperature.

After the night shift for 1 week, almost the curve becomes the flattened and after 3 weeks the curve gets reversed which is called as sinusoidal curve, but 100-percentage reversal is not possible because it is basically related to say acclimatization.

So, your body is slowly getting acclimatized to any kind of situation, the habit changes However, this reversal cannot be 100 percent due to many other reasons and these reversal pattern also varies from one person to another.

In ergonomic design the design must be suitable for a person, at the individual level. Normally, what we find that the traditional approach means that the work system you design for a particular group.

So, you have to validate your ergonomic design with respect to each and every individual in the group that means, the design of work system for everyone that is the rule you have to follow.

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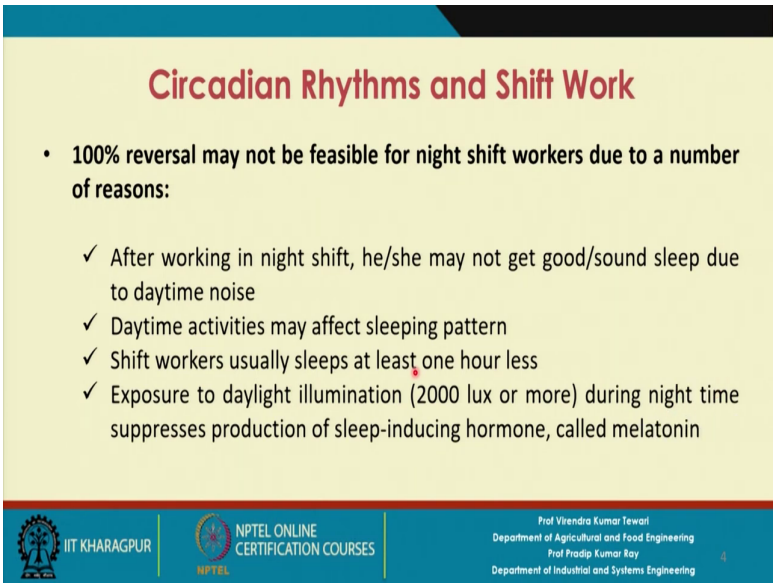

The next best alternative is designed for a small group, the entire population of at a particular workplace is divided into a number of samples or the subgroups and the sub groups with some common characteristic. Suppose you have some ten groups. Now for each group you have data and you try to fit them for night shift with respect to a particular. So, there are different approaches you follow and it takes time to implement.

100% reversal may not be feasible for night shift workers due to a number of reasons:

1. After working in night shift, he/she may not get good/sound sleep due to daytime noise.
2. Daytime activities may affect sleeping pattern.
3. Shift workers usually sleeps at least one hour less.
4. Exposure to daylight illumination (2000 lux or more) during night time suppresses production of sleep-inducing hormone, called melatonin.

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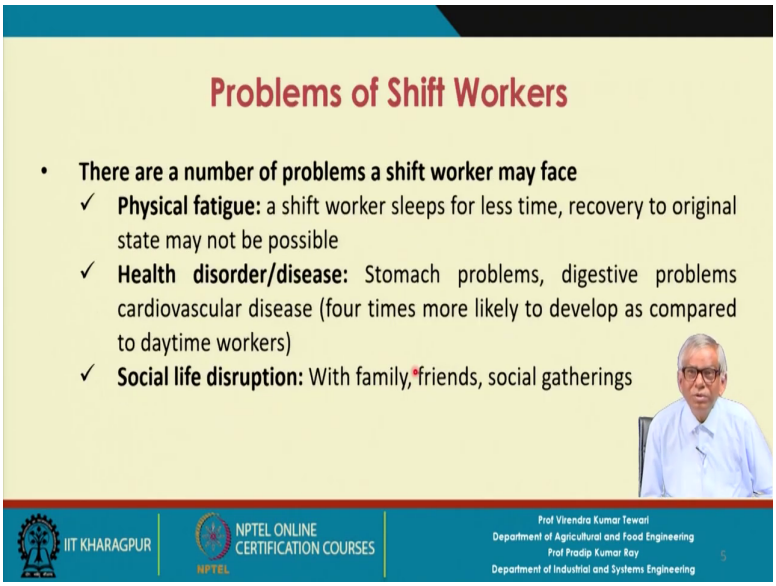

There are a number of problems that shift worker may face. So, let me discuss what are those problems. Physical fatigue: a shift worker sleeps for less time, recovery to original state may not be possible. Health disorder/disease: there are many kinds of health disorders or health disease you may have as a night shift worker. Some common problems are Stomach problems, digestive problems cardiovascular disease (four times more likely to develop as compared to daytime workers). Social life disruption: With family, friends, social gatherings. So, you are in relaxed mood so, you cannot do your work on time.

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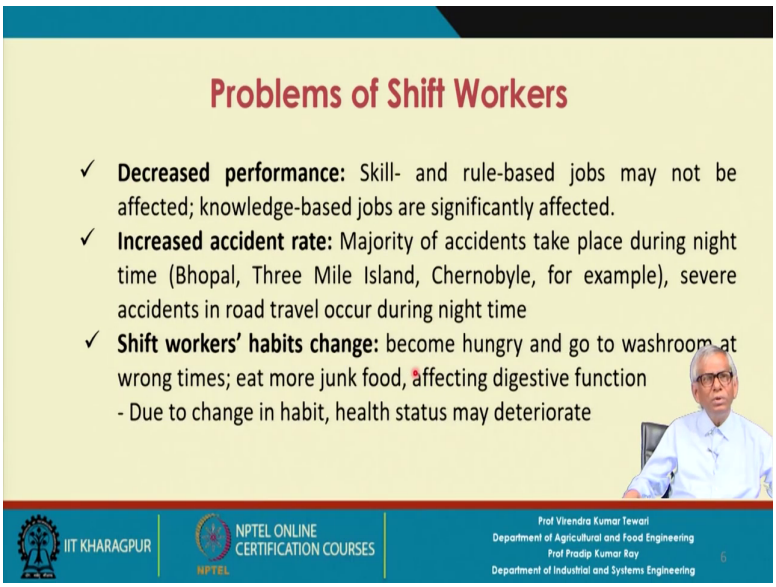

Decreased performance: Skill- and rule-based jobs may not be affected; knowledge-based jobs are significantly affected.

Increased accident rate: Majority of accidents take place during night time (Bhopal, Three Mile Island, Chernobyle, for example), severe accidents in road travel occur during night time.

Shift workers' habits change:

1. become hungry and go to washroom at wrong times,
2. eat more junk food,
3. affecting digestive function- due to change in habit, health status may deteriorate.

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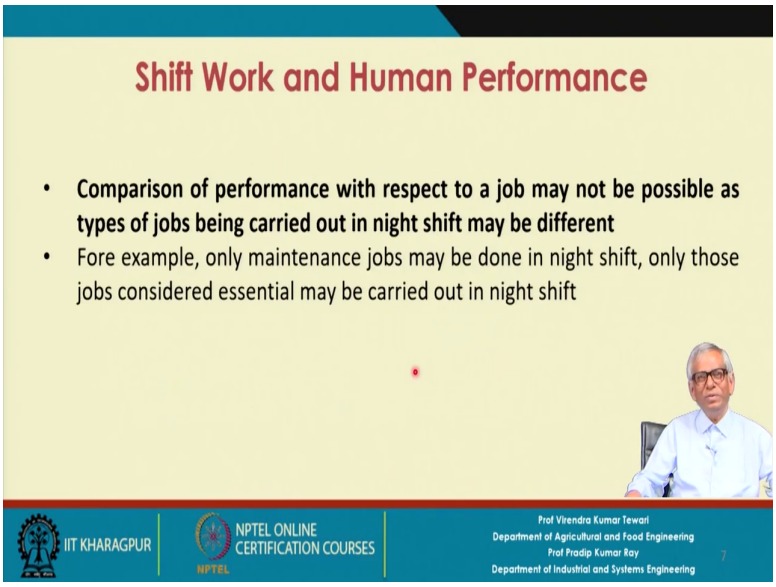

So, in a given workplace suppose you are asked to design the shift schedule and the night shift schedule you need to consider all these points, you will find for the first time the day time worker will be engaged for the night time, you do not have as such no data with you So, what you try to do, you must be aware of all these kinds of problems and then you start with a particular schedule and then constantly you observe what kinds of problems they are facing and, you get the feedback from them and you try to tune the schedules at the individual level.

Comparison of performance with respect to a job may not be possible as types of jobs being carried out in night shift may be different. For example, only maintenance jobs may be done in night shift, only those jobs considered essential may be carried out in night shift.

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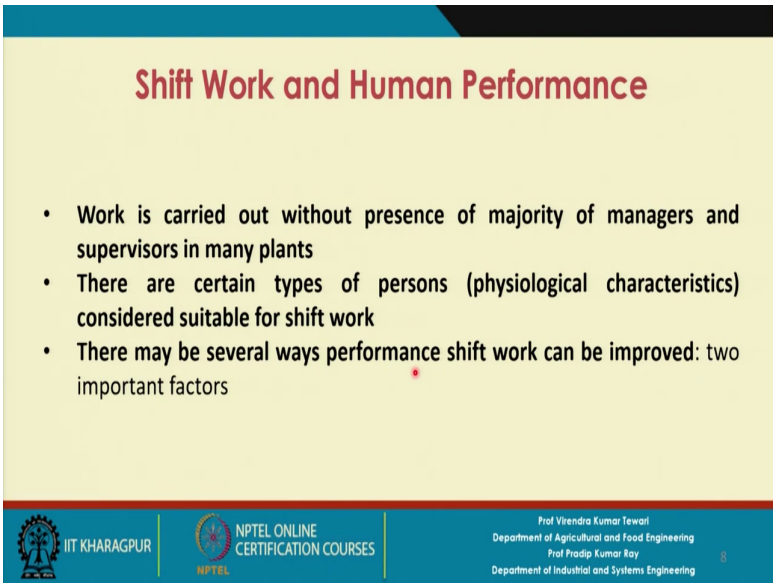

So, work is carried out without presence of majority of the managers and the supervisors in many plans. You become risk aversive because you are running the machine So, suppose there is some error on your part there is no one to support you.

What do you find that during night shift there is no presence of managers or supervisors. So, if something happens suppose very difficult to get the support immediately. So, you do not take any risk. So, one way to avoid the risk is to work at a slow pace. So, you become more attentive, work rate is less.

So, there are certain types of persons having physiological characteristics considered suitable for shift work.

You should try to check or verify whether FJM approach (fits job to man) is possible or not and whether that approach is feasible at a given point in time is it at this point in time.

There may be several ways performance shift work can be improved: two important factors are mentioned below:

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How is this person whether his or her characteristics is matching with the requirements of the shift work is the first thing you must check. Now these factors cause problems in shift work mainly adoption to night shift. So, what you try to do first you check that what are the characteristics which basically defines the suitability of a person for shift work.

Some of the factors are given below which shows that that particular person is not suitable for job. First is Single living persons. Second is Persons with gastric or digestive disorders. Third is Persons with inadequate sleeping facilities.

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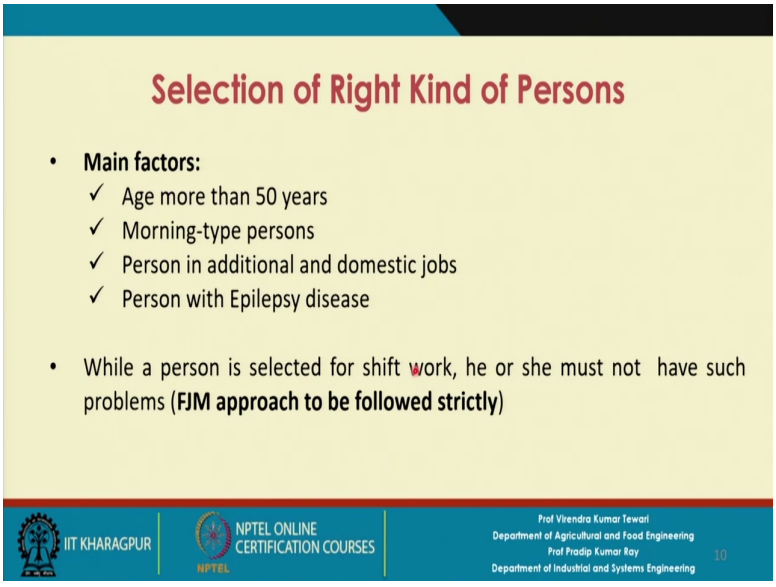

Third is Age more than 50 years, they are not found suitable for the shift work. Fourth is morning type of persons: there are two kinds of persons we have. One is morning type and another type of person that is called evening type. That means, the morning type person goes to bed at 10 O' clock in the night and the gets up next morning at 6 O' clock. If you are a morning type person then the shift work should not be given to you. Fifth is Person in additional or domestic jobs – some people are working in night shift someone but it is a part time job that means he is working even in daytime. So, he is not suitable for shift work. Sixth and last is the person with epilepsy disease. While a person is selected for shift work, he or she must not have such problems (FJM approach to be followed strictly).

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