Health, Safety and Environmental Management in Petroleum and offshore Engineering

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Module No. # 01

Lecture No. # 01

Introduction to HSE

Dear friends, now let us move on to module 1: lecture 1. We are going to discuss health safety and environmental management under the braces of NPTEL programme at IIT madras. In the previous introductive lecture, we discussed about a brief necessity for HSE.

Now, we shall discuss about introduction HSE, basic terms and the definitions; safety assurance in assessment; safety in design and operation; organizing for safety; hazard classification assessment; hazard evaluation hazard control; importance of safety in petroleum offshore industry.

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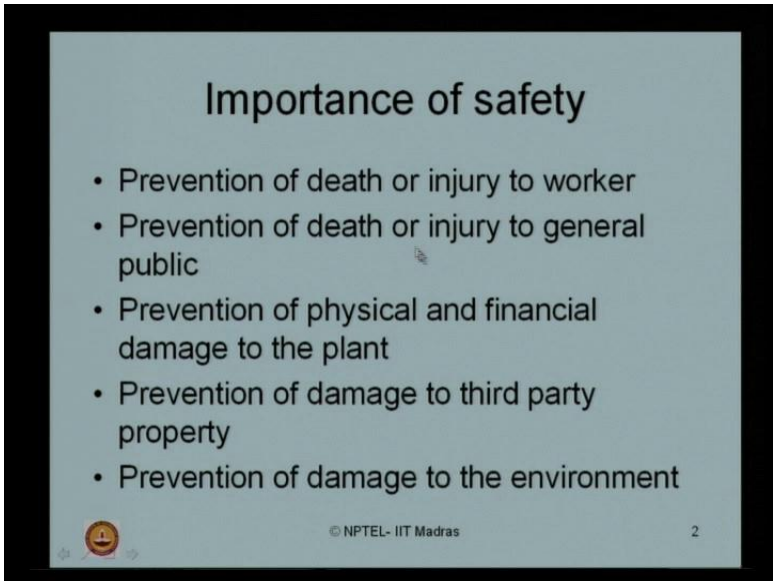

What is importance of safety? Prevention of death or injury to the worker is the foremost importance of safety; prevention of death or injury to general public; prevention of

physical and financial damage to the process plant; prevention of damage to third party property, and prevention of damage to the environment. All these when put together, highlight the necessity or importance of safety.

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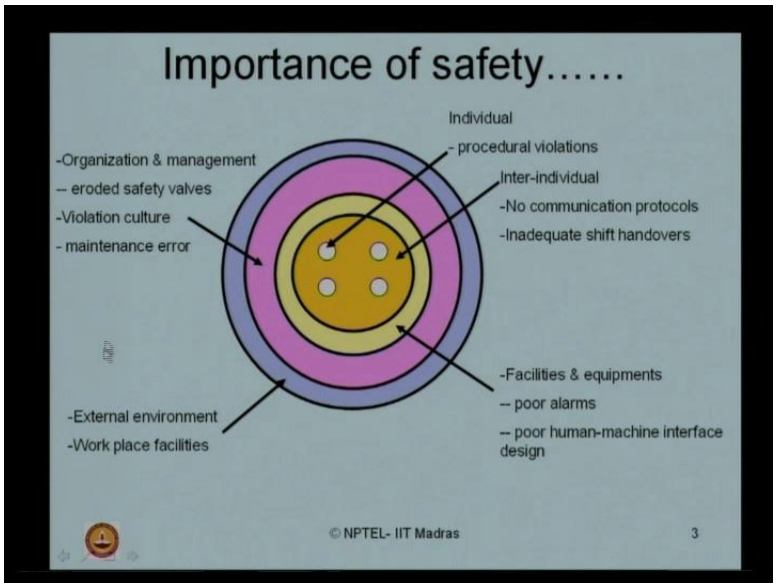

Now, this can be explained diagrammatically like this. Let us say, in a process industry, we have core of individual groups. Let us say, these individuals do procedural violations. These procedural violations done by this group is carried forward by the inter-individual phenomenon. There is no communication protocol between the groups, because there is an inadequate shift handovers; this results in a further complication in facilities in equipments. For example, if the facilities had poor alarm system, poor human machine interface design then the complication is added further. The outer tablet of organization and management, for example, under this coverage, will have difficulties with eroded safety valves. There is a violation culture existing in the organization; there has been a serious maintenance error. Let us say, now this capsule added to all the previous complications, makes things more difficult for the outer profile, which is external environment. So, this is depending upon, what are the facilities we have in the work place.

My dear friends, if any of the errors or violations created by individual group, gets aligned with all the subsequent errors done at different levels, you end up in what is called as a disaster.

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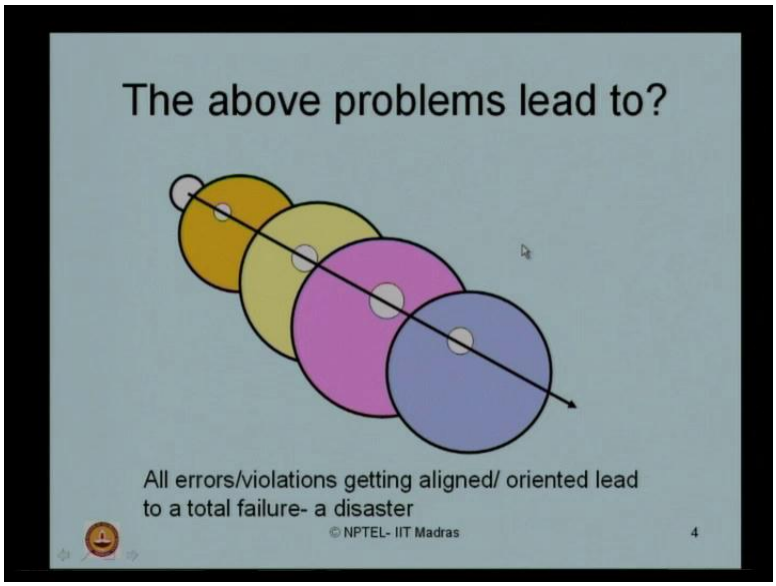

So, if these errors are unfortunately aligned and oriented then you end up in what is called as a disaster. So, these above problems together lead to what we call as a final disaster.

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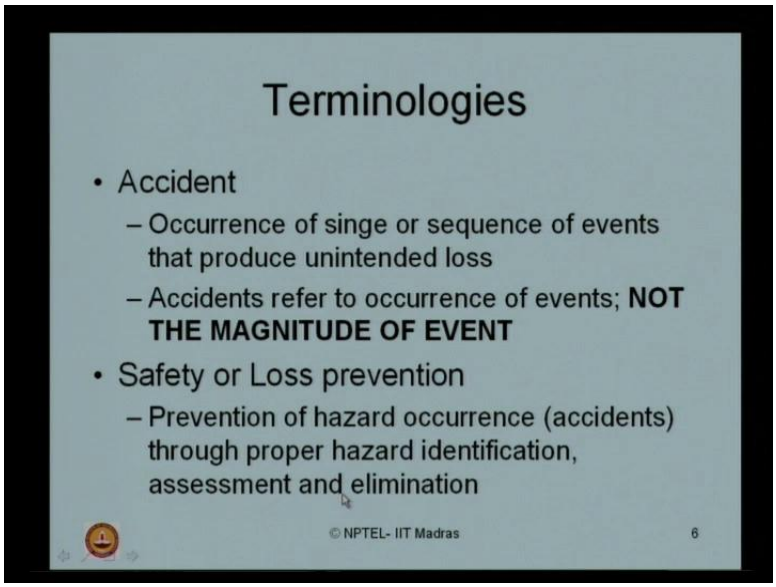

Now, we will see some basic terms and definitions in HSE. What is an accident? It is defined as occurrence of single or sequence of events that produces unintended loss. Accidents refer to occurrence of the events only; it is not the magnitude of the events.

Safety or loss prevention is defined as the prevention of hazard occurrence. We may say prevention of accident occurrence through proper hazard identification, assessment and elimination.

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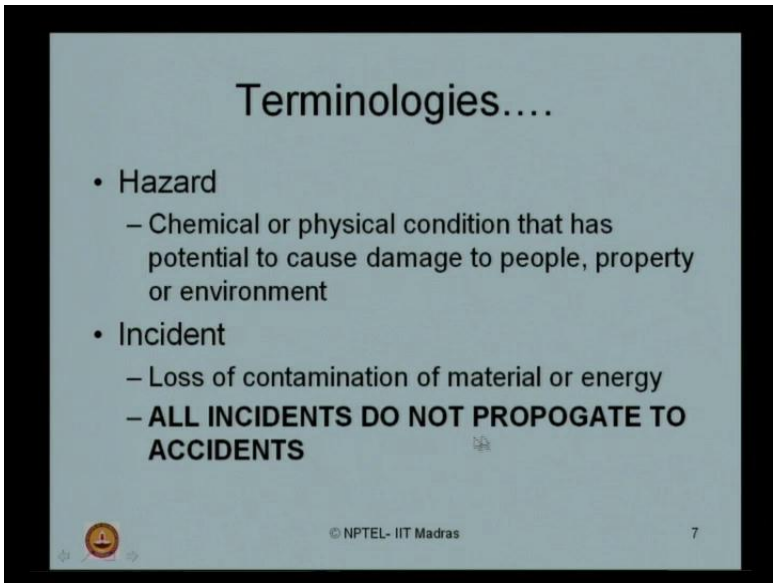

What is a hazard? It is defined as a chemical or a physical condition that has potential to cause damage to people, property or environment. What is an incident? It is loss of contamination of material or energy. Dear friends, please remember that all incidents do not propagate to accidents.

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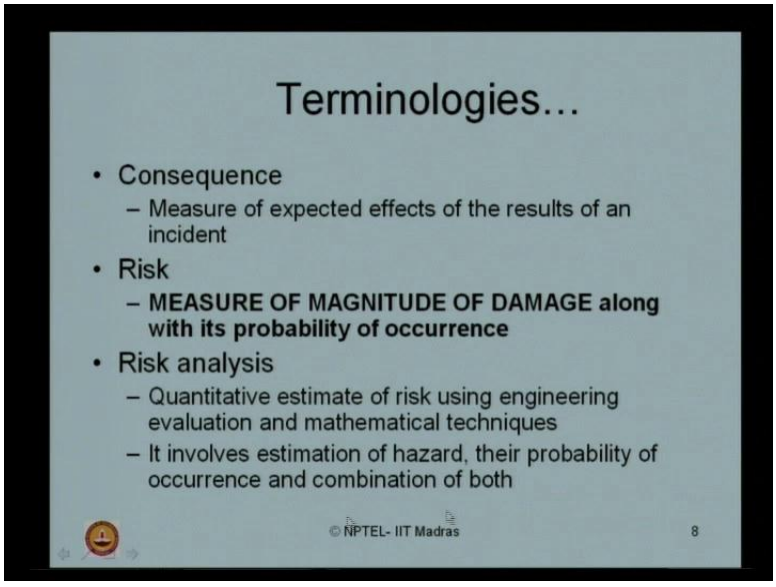

What is called as a consequence? It is a measure of expected effects of the results of an incident. Then how do you define risk? Risk is a measure of magnitude of damage along with its probability of occurrence. What do we actually do in risk analysis; it is a quantitative estimate of risk using engineering evaluation and mathematical techniques. This involves estimation of hazard, their probability of occurrence and combination of both.

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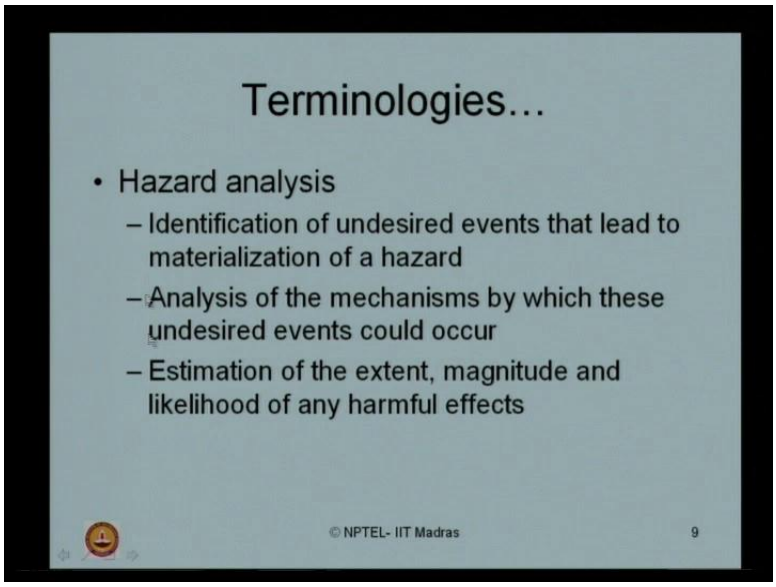

Then what do we do is called as hazard analysis. Identification of undesired events that leads to materialization of a hazard; after you identify you analyze the mechanisms by which these undesired events could have occured. Then estimate the extent, magnitude and likelihood of any harmful effects caused by the identified hazards. That is what we try to do in a hazard analysis.

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Then, other frequently used terminology in HSE is what people call as a safety program. What is a safety program? Safety program is categorized into two parts. One is what is called as a good program. This identifies and eliminates existing safety hazards. The other one is called an outstanding program, which prevents the existence of a hazard in the first place itself. The ingredients or the input for a safety program are as follows: Knowledge about safety, experience on safety, technical competence to carry out such program, and safety management support. Above all, you have to have a strong commitment to safety.

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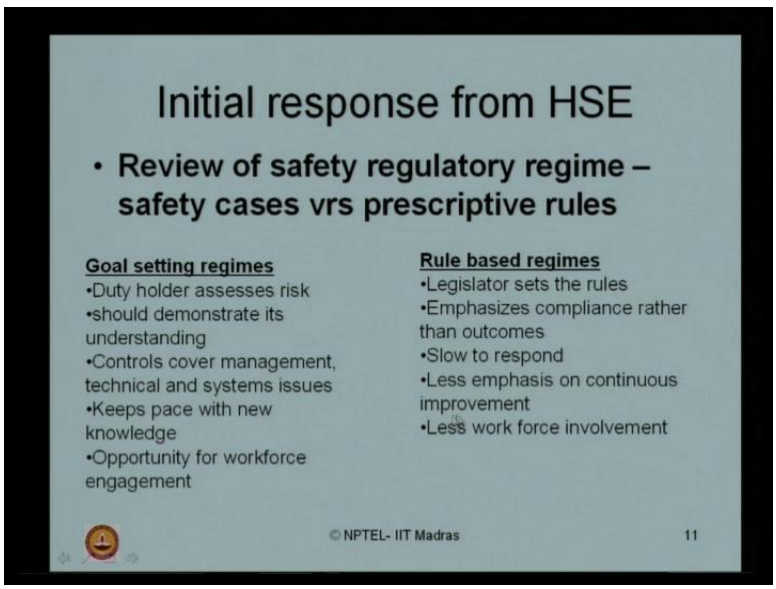

Let us quickly see, what is an initial response from HSE? The review of safety regulatory regime that is safety cases versus prescriptive rules. Let us see, how do they compare themselves. This can be seen in two parts. One is what is called as goal setting regimes; other is what is called as rule based regimes. In goal setting regimes, the duty holder assesses the risk. He should demonstrate its understanding. Then Controls cover management, technical and system issues. Keeps space with a new knowledge; opportunity for workforce engagement is created in this regime.

Whereas, if we look, safety, is a rule based regime then the legislator sets the rules to follow safety. They generally emphasize compliance rather than outcomes. This kind of systems are very slow to respond. There is less emphasis on continuous improvement, but there is a less work force involvement in such kinds of regimes.

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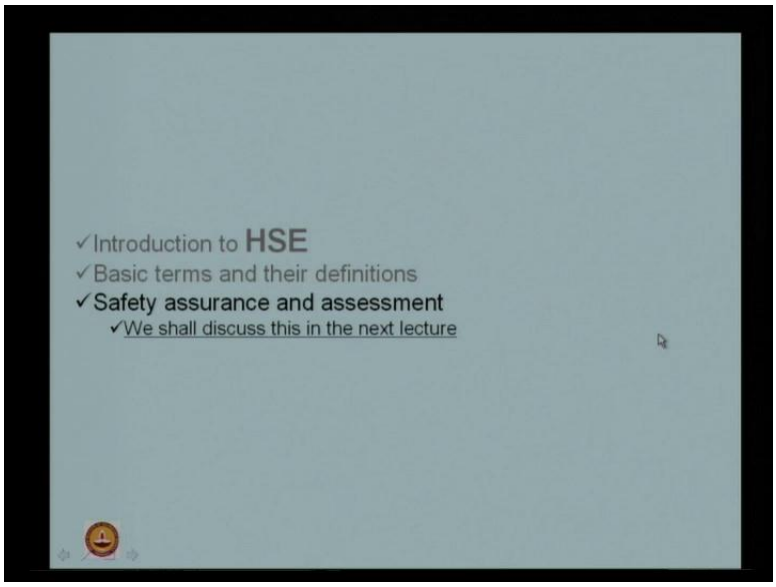

Now, we have seen basic introduction to HSE, some terminologies and the definitions in HSE. We will look into safety assurance and assessment in the next lecture.

Thank you.