

Chemical Process Safety
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Lecture - 59
Safety: Laws and Regulations

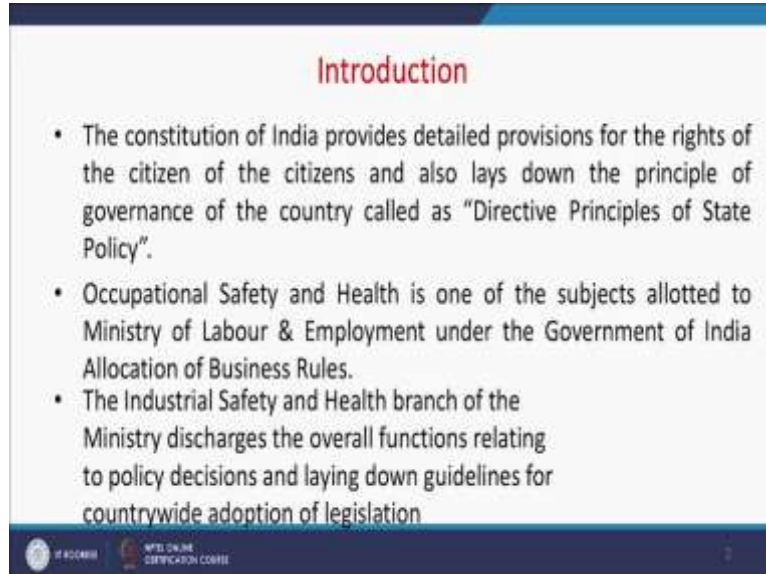
Welcome to the module of Safety Laws and Regulations. Now the laws and regulations are integral part of any chemical process safety aspect because these laws and regulations they not only guard the workers or people those who are adjoining, but also they are the custodians of environment, and also they provide the latest safety guidelines for the industry also, so that any kind of economic losses, any kind of human fatality, any kind of environmental damage can be avoided.

So from time to time the different regulating agencies including the government, state government or central government, they used to amend these laws and regulations based on the feedback and based on the impact of various industries to the environment as well as human aspect so they need to update those laws and regulations.

Now, because one of the preamble of these law and regulations is that the right to live or right to take healthy a air, right to take safe drinking water, these are the fundamental right of every citizen of any country. So based on these types of requirements, different government, state government or central government, they frame the regulations, they frame the different laws to protect the interest of their citizen.

Now here, based on the requirement of every state in Indian context, they are free to frame the law which are for the beneficiaries of their citizen. But while framing these laws the government also take into account that it should not hamper the employment opportunity of their citizens, so there is a need to balance these two aspects and then to frame the laws because ultimately as I discussed that these laws are also the guiding factor for the industry to work upon.

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Introduction

- The constitution of India provides detailed provisions for the rights of the citizen of the citizens and also lays down the principle of governance of the country called as "Directive Principles of State Policy".
- Occupational Safety and Health is one of the subjects allotted to Ministry of Labour & Employment under the Government of India Allocation of Business Rules.
- The Industrial Safety and Health branch of the Ministry discharges the overall functions relating to policy decisions and laying down guidelines for countrywide adoption of legislation

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So let us have an introduction about this aspect, the Constitution of India this provides a detailed provision for the rights of the citizens and also lays down different types of principle of governance of the country, they are called the Directives Principles of the State Policy. So occupational safety and health is one of the subjects allotted to the Ministry of Labour and Employment under the Government of India location of business rules.

So Ministry of Labour and Employment, and nowadays the National Integral Ministry of Environment and Forests, and different regulatory bodies like CPCB, et cetera, they frame all those safety and health or environmental rules for the safe guard of the citizens of India. So the industrial safety and health branch of the ministry, they discharges the overall functions related to policy decisions and laying down the guidelines for country adoption of those legislations.

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National Policy on Safety, Health and Environment at Workplace (NPSHEW)

- Declared on 20th February, 2009 by Ministry of Labour & Employment
- The purpose of this policy is to establish a preventive safety and health culture in the country through elimination of the incidents of work related injuries, diseases, fatalities, disasters and to enhance the well being of employees in all the sectors of economic activity in the country.

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Now there is a national policy on safety, health and environment at workplace, so this was declared on 28th February 2009 by the Ministry of Labour and Employment. Now the basic purpose of this policy is to establish a preventive safety and health culture in the country through elimination of the incidents of work-related injuries, diseases, fatalities, disasters, and to enhance the well-being of employees in all the sectors of economic activity in the country. Now remember when we talk about injuries, disease, fatalities, disasters, et cetera.

When these types of guiding factors are being framed by the regulatory body then it is abiding factor for industry to follow up so that they can frame their safety design safety manuals, processes according to those guidelines as laid down by the regulatory body so that the fatality is either within the industry or injuries within the industry or illness within the industry as well as the outer can be minimized.


Now there are certain features of this policy that it recognizes the safe and healthy working environment as a fundamental human right. It aims at enhancing the well-being of the employee and the society at large by eliminating work-related injuries and diseases. It enumerates the goals to be achieved and brings into focus the objectives of continuous reduction in the incidence of work-related injuries and diseases. So we can see that these are the general guidelines of this policy and all the sub policies can be framed accordingly, or you can say this is the mission statement or a vision statement of this policy.

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Major Occupational Safety and Health (OSH) Legislation

There are four main legislations that cover Occupational Safety and Health at workplace.

- i. The Factories Act, 1948 , covering factories wherein the enforcement of safety at workplace is by the Chief Inspector of Factories in the respective states,
- ii. The Mines Act, 1952 and Mines Rules, 1955 for mining industry where the enforcement is by the Directorate General of Mines Safety (DGMS) under Ministry of Labour & Employment , Government of India.



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Now there are major occupational safety and health legislations, so let us have a look about those major legislations. So there are 4 main legislations that cover the occupational safety and health at workplace. So first in this category was established way back in 1948 and that is called The Factories Act 1948. Now they covers the factories wherein the enforcement of safety at workplace by the Chief Inspector of factories in the respective States. Then later on the Mines Act came into picture and the Mines Rule came into the picture in 1952 and 1955 respectively for the mining industry, where the enforcement is by the Director General of Mines Safety DGMS under the Ministry of Labour and Employment, Government of India.

Now remember, whenever we are framing these rules, they are purely based on the present and partially the future context. So whenever any kind of technological advancement, any kind of environmental demand they may take place in due course of time then there may be an utmost need to change or reframe those act or laws. So based on this factor there are certain amendments and certain new laws they came into existence in due course of time.

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Major Occupational Safety and Health (OSH) Legislation

iii. The Dock Workers (Safety, Health and Welfare) Act, 1986 followed by notification of the Dock Workers (Safety, Health and Welfare) Regulations, 1990 dealing with the major ports of India and the enforcement is by the Directorate General of Factory Advice Service & Labour Institutes (DGFASLI), under Ministry of Labour & Employment, Government of India.



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So in 1986 the Dock Workers (safety, health and welfare) Act was passed by regulatory body like Parliament followed by the notification of Dock Workers (safety health and welfare) Regulations 1990 dealing with the major ports of India and the enforcement is by the Director General of Factory Advice Service And Labour Institutes under the Ministry of Labour and Employment, Government of India, so they have framed the rules and regulations for the various dock workers.

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Major Occupational Safety and Health (OSH) Legislation

iv. The Building & Other Construction Workers (Regulations of Employment and Conditions of Service) Act, 1996 , covering construction workers at construction sites wherein the enforcement is by the Directorate General Labour Welfare in the central sphere and by the Labour Commissioners/Factory Inspectorates in the States/UTs.



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Then The Building And Other Construction Workers Regulation Employment Condition of the Service Act 1996 was framed covering the construction workers at construction sites where in the enforcement is by the Director General Labour Welfare in the central sphere and

by the Labour Commissioners and factory inspectors in the States and union Territories, so these are the various legislations.


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The Indian Boilers Act 1923

- It is amended in 2007
- The Act is to consolidate and amend the law relating to steam boilers, The Indian Boilers Regulations, 1950 (amended 2010) and The Boilers Rules of respective States.

The Motor Transport Workers Act, 1961 (amended 1986)

- An Act to provide for the welfare of motor transport workers and to regulate the conditions of their work. The act is supplemented by the Motor Transport Workers Rules, 1964.



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Apart from other acts being implemented and those are very specific in nature for the different industries. Like you can see there is an Indian boiler Act that was established in 1923. Later on it was amended in 2007, now this act is to consolidate and amend the law relating to steam boilers because boiler is a pressure vessel, so to cater the need of any kind of safety operation or safety-related issues this Indian boiler because once it bursts then definitely it may be catastrophic for the worker those who are adjoining and sometimes it may hamper the adjoining areas nearby the factories.


And if you recall, there was a major pressure vessel failure took place at NTPC (())(8:51) plant. So to overcome such types of problems, The Indian Boiler Regulation Act 1950 was again amended in 2010 and The Boilers Rules of respective States. So every state they are having their own boiler rules and boiler certification aspects or certification schools so that they can not only prevent the pressure hazard, but also the environmental hazard too.

Apart from this, The Motor Transport Workers Act 1961, which was amended in 1986. Now the opportunity of this act to provide for the welfare of motor transport workers and to regulate the condition of their work, so this act is supplemented by the motor transport worker rule 1964.

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The Dangerous Machines (Regulation) Act, 1983

- An Act to provide for the regulation of trade and commerce in production, supply, distribution and use of the product of any industry producing dangerous machines with a view to securing the welfare of labour, operating any such machine and for payment of compensation for death or bodily injury suffered by any labourer while operating any such a machine and for matters connected there with or incidental there to.
- The act is supplemented by the Dangerous Machines (Regulation) Rules, 1984 (amended 2007).



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Another act was passed in 1983 that is Dangerous Machine Regulation Act, now this act to provide for the regulation of trade and commerce in production, supply distribution and the use of the product of any industry producing dangerous machines with the view of securing the welfare of labours operating any such machine and for the payment of compensation for death or badly injured or suffered by any labour while operating any such machine and for metal connecting with incidental thereto. So this act was again amended or supplemented by The Dangerous Machine Regulation Rules 1984 which was again amended in 2007 by the Parliament.

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- **The Motor Transport Workers Act, 1961 (amended 1986)**
- **The Plantation Labour Act, 1951 (amended 2010) and Rules there under**
- **The Beedi Cigar Workers (Conditions of Employment) Act, 1966 (amended 1993)**
- **The Shops and Commercial Establishments Acts**
- **The Explosives Act, 1884 (amended 1983)**
- **The Petroleum Act, 1934**
- **The Inflammable Substances Act, 1952**
- **The Insecticides Act, 1968 (amended 2000)**



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Another is the Motor Transport Workers Act 1961 because sometimes within industry there may be certain issues related to the transportation, so this act was amended in 1986. Apart from this there are several other acts being passed by the regulator body for the welfare of either workers or the persons or by general public like Plantation Labour Act 1951, this was amended in 2010 and rules there under The Beedi Cigar Workers that is the condition of employment Act 1966, which was amended in 1993.

The Shops and Commercial Establishment Act, The Explosives Act 1884 amended in 1983, there was a Petroleum Act which was established in 1934. The Inflammable Substances Act which was passed by the Parliament in 1952, then there was there is an Insecticides Act, in 1968 it was passed and it was amended in the year 2000.

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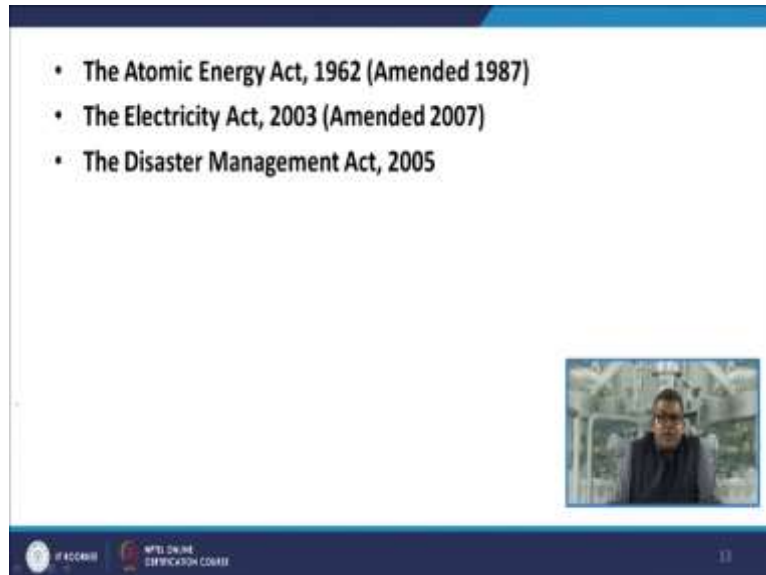
- The Oil Fields (Regulation and Development) Act, 1948
- The Petroleum and Natural Gas Regulation Board Act, 2006
- The Environment (Protection) Act, 1986 (amended 1991)
- The Water (Preventions Control of Pollution) Act, (Amended 1988)
- The Water (Prevention & Control of Pollution) Cess Act, 1977 (Amended 2003)
- The Air (Prevention & Control of Pollution) Act, 1981 (Amended 1987)
- The Public Liability Insurance Act, 1991 (Amended 1992)
- The National Green Tribunal Act, 2010

Apart from this The Oil Field Regulations and Development Act in 1948, The Petroleum and Natural Gas Regulation Board was established by the act of Parliament in 2006. The Environmental Protection Act to keep the safeguard of the environment of any industry that was amended in 1991. The Water Prevention and Control of Pollution Act it was amended in 1988, previously it was constituted by the Parliament.

The Water Prevention and Control of Pollution Cess Act 1977 and which was duly amended in 2003. The Air Prevention and Control of Pollution Act in 1981 and it was amended in 1987. The Public Liability Insurance Act because sometimes whenever there is any kind of incident takes place then definitely they will have a fixation of liabilities and there are so many insurance companies they are playing in cross-country.

So those who take care of all kinds of compensation so that the economic losses to the either employer or employee can be minimized, so government of India they constituted Public Liability Insurance Act 1981, it was amended in 1992. Then in 2010 The National Green Tribunals Act to safeguard the environment was passed by the Parliament in 2010.

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• The Atomic Energy Act, 1962 (Amended 1987)

• The Electricity Act, 2003 (Amended 2007)

• The Disaster Management Act, 2005

13

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Another is Atomic Energy act 1962 amended in 1987, then Electricity Act which was passed in 2003 and it was duly amended in 2007 and The Disaster Management Act that was passed in 2005.

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Compensation to Employees

- The Workmen's Compensation Act of 1923, which was in 2009 amended to Employees' Compensation Act of 1923
- It provide for the payment by certain class of Employers to their employees compensation for injury by accident.
- This covers all Employees including Contract Workmen that meet with an Accident or are affected by Occupational Disease.
- The Act specifies the compensation payable to the employee for the type of permanent disablement dependent on the salary and age o the employee.

14

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The slide features a blue header and footer. The title 'Compensation to Employees' is in red. The footer contains the WPI Online Certification Course logo and the number 14. A small video inset in the bottom right corner shows a man in a blue shirt speaking.

Now, let us have a look about the compensation to employees. Now the compensation aspect is extremely important because whenever any kind of injury or fatality or any kind of hazard takes place, then definitely the health aspect, physical fitness aspect or life aspect of any employee obviously it will be at the stake. So in that particular case to fix the responsibility of the employer The Workman Compensation Act was passed in 1923, so which was in 2009 amended to The Employees Compensation Act.

Now it provides for the payment by certain class of employers to their employees compensation for injury by accident, this covers all employees including the contract workman that meet with an accident or they are affected by any kind of occupational disease, injury, illness, et cetera. Now the act specifies the compensation payable to the employee for a type of permanent disablement depended on the salary and the age of the employee, so there is a factor through which they can decide that how much compensation needs to be paid for any particular employees in case of any injury or in case of any say fatality or illness, et cetera.

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The slide features a title 'Compensation to Employees' in red text at the top. Below the title are two bullet points: '• The Act also provides compensation to be paid to the dependents of the employee that meets with a fatal accident.' and '• The Act provides for each State Government to appoint a Commissioner to decide on any disputes on the amount of compensation payable by the employer to the employee.' In the bottom right corner of the slide, there is a small video inset showing a person speaking. At the bottom of the slide, there are logos for 'IACARDI' and 'NPTEL ONLINE EMPOWERMENT COURSE' on the left, and the number '15' on the right.

Now this act also provides compensation to be paid to the dependents of the employee that meets with the fatal accident and sometimes this is a very usual practice in industrial establishment. So the act provides for each state government to appoint a commissioner to decide on any dispute on the amount of compensation being paid by the employer to the employee. So the state governments they form the redressal aspect by appointing of the commissioner.

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The Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989

- This rule is amended in Year 1994 and 2000, and called as "The Manufacture, Storage and Import of Hazardous Chemical (Amendment) Rules, 2000".

Objective:

- It provides procedures and safeguards for handling of hazardous chemicals at the workplace (industry, storage, pipeline) and
- lay down the requirements for the industry and authorities to manage chemical emergencies



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Now, let us have the look about The Manufacture, Storage and Import of Hazardous Chemical Rule 1989. Now the preamble of this particular act was that in 1980 the growth of chemical industry was tremendous by the establishment of different refineries, petrochemical plants, et cetera, so there was a dire need to fix up the rules and regulations to cover all kinds of hazardous operations including storage of chemicals, et cetera and that was the need of the time when the Bhopal accident in 1984 took place. So the government of India they framed the rule to regulate the different operations of hazardous chemicals.

Now this rule was amended in 1994 and 2000 and called as The Manufacture, Storage and Import of Hazardous Chemical Rule 2000. So the objective of this particular rule is to provide the procedure and safeguards for handling of any kind of hazardous chemicals at workplace, maybe industries, storage, pipeline, maybe process, et cetera. And to lay down the requirements for the industry and authorities to manage the chemical emergency.

Now the previous slides we have discussed that they not only put forward the guidelines, they not only put forward the regulations, but also gives an idea of the employer so that they can become safe and they can design their process with respect to the safety operations.

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Provisions

- Notification of major Accidents (Rule 5):
 - Occupier shall notify and furnish report (if necessary), to the concerned authority if major accident occurs
 - The concerned authority should undertake full analysis of the accident and send requisite information to ministry of environment and Forest

So there are certain provisions made by the government in this particular rule that is the notification of major accidents that is rule number 5. The occupier shall notify and furnish report if necessary to the concerned authorities if major accident occurs, because in past several accident they did occur and the employer or the plant officer they did not report the proper things to the local authorities or authority. Now another provision is that the concerned authorities should undertake full analyses of the accident & send requisite information to the Ministry of Environment and Forests.

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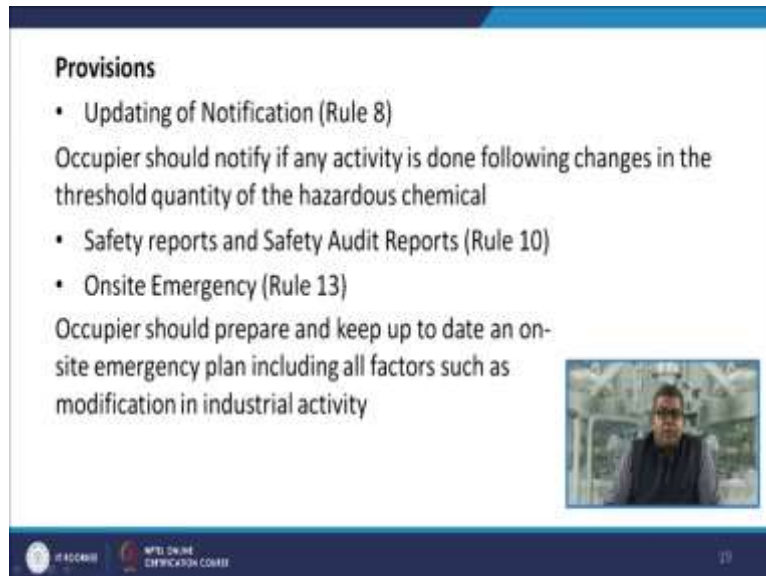
Provisions

- Site Notification (Rule 7)
 - Occupier shall not undertake any industrial activity unless he had submitted a written report to the concerned authority.
 - If any chemical is or is liable to reach the threshold then the the nactivity should be notified accordingly

Another provision is related to the site notification that is rule number 7 as on date. The occupier shall not undertake any industrial activity unless he had submitted a written report to


the concerned authority. Now if any chemical is liable to reach the threshold then the activity should be notified accordingly, so threshold we have already discussed. In case if it reaches the threshold that means there are certain malfunctioning in the process, so any kind of runaway, any kind of hazard may take place so it should be notified accordingly to the authorities.

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Provisions

- Updating of Notification (Rule 8)
Occupier should notify if any activity is done following changes in the threshold quantity of the hazardous chemical
- Safety reports and Safety Audit Reports (Rule 10)
- Onsite Emergency (Rule 13)
Occupier should prepare and keep up to date an on-site emergency plan including all factors such as modification in industrial activity



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Another provision is that updating the notification that is rule number 8 that occupier should notify if any activity is done following changes in the threshold quantity of the hazardous chemical. So they are attributed to the safety reports and safety audit reports that is rule number 10, and on-site emergency. So occupier should prepare and keep up to date on-site emergency plan including all factors such as modification in the industrial process or industrial activity. So occupier means the owner or the officials of that particular industry.

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Provisions

- Submission of Data to authority for offsite plan (Rule 14)
- Disclosure of Information (Rule 16)
- Hazardous Chemicals Import Rules (Rule 18)

Any person responsible for importing hazardous chemical in India shall provide at the time of import or within 30 days from the import:

1. The name and address of the person receiving the consignment in India
2. The port of entry in India
3. Mode of transport from exporting country in India
4. The quantity of chemicals being imported
5. Complete product safety information

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Another provision is that they must submit the data to the authority for any kind of off-site plan, they must disclose all kind of information relevant to the safety of the worker. They must follow certain rules and regulations as laid down by the government from time to time under the hazardous chemical import rule.

So any person responsible for importing hazardous chemical in India shall provide at the time of import or within 30 days from the import that is the name and address of the person receiving the consignment in India so that they can fix the responsibility, the port of entry in India because in India we are having several ports, at which port they are going to receive the material, so that the necessary precautions can be taken place at that particular port.

Now mode transportation from exporting country in India, the quantity of chemicals being imported, the complete product safety information, so these types of things should be reported to the concerning authorities. Then there is a thing related to the monitoring and implementation mechanism.

Now concerned authorities identify their roles and responsibilities defined in various sections for monitoring and implementation. Now in this particular case, industrial authority need to prepare the safety report and get safety audit conducted and submit report to the concerned authorities. And the concerned authorities their responsibility is to review and monitor the implementation of recommendation of that particular audit. So the authorities related to the industrial establishment, they need to prepare and submit an on-site emergency plan in case

of they are dealing with the hazardous substances so in case of any eventuality they must prepare themselves for any escape or any safety aspect.

The notification of major accidents by the occupier to the concerned authority which after full analysis and the requisite information by the Ministry of Environment and Forest. Now concerned authorities will prepare and keep up to date and off-site emergency plan containing details specified in various schedules and sometimes it may be required to carry out the mock trial once in a year or by 6 monthly or quarterly, et cetera, that may be decided from time to time by the concerning authorities.

Now concerned authority shall serve an improvement notice in case of person has entered into the previous of these rules and requiring that person to remedy for any kind of contravention. So this type of approach is again essential and this has been laid down in rule number 19 of this particular act.

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List of Specific Chemicals/ Criteria

- Schedule 1 part 1 gives the criteria for identifying toxic, flammable and explosive chemicals and part 2 lists 648 hazardous chemicals
- Schedule 2 lists 25 chemicals and 5 categories along with two set of threshold quantities as qualification for applicability of various rules to isolated storages.
- Schedule 3 lists 179 chemicals (part 1) and 6 categories (part 2) along with two sets of threshold quantities as qualification for applicability of various rules to industrial installations.

The slide includes a small video inset showing a person speaking. At the bottom, there are logos for ACCI and IITD ONLINE EDUCATION CENTER, and a page number 23.

Now there are lists of specific chemicals and criteria, so various schedules and different parts they give the criteria for identifying any kind of toxic, flammable, explosive chemicals and other parts related to the hazardous chemicals because sometimes several accidents they took place just because of the involvement of hazardous chemicals like in Bhopal, et cetera.


Now schedule 2 lists 25 chemicals and 5 categories along with the two set of threshold quantities as qualification for applicability of various rules to isolate storage because sometimes when we are handling such type of hazardous chemicals then you may need to isolate them, so this schedule gives an idea about this.



Now schedule 3 lists 179 chemicals in part 1 and 6 categories along with 2 sets of threshold quantities as qualification for applicability of various rules to the industrial establishments.

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Toxic Chemicals

SR. NO.	Degree of Toxicity	Oral toxicity LD 50 (mg/kg)	Dermal toxicity LD 50 (mg/kg)	Inhalation toxicity LC 50 (mg/l)
1	Extremely toxic	>5	<40	<0.5
2	Highly toxic	>5-50	>40-2000	<0.5-2.0
3	Toxic	>50-200	>200-1000	>2-10




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 14



Now these are the stable reflects, different type of parameters of toxic chemicals, now you can see that the degree of toxicity, then oral toxicity attributed to LD50 in terms of milligram per kilogram, then dermal toxicity with respect to LD50, then inhalation toxicity with respect to lethal concentration 50 having the unit of milligram per litre. So extremely toxic, highly toxic, toxic, so the ranges are given with respect to these toxic chemicals.

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Flammable Chemicals

- **flammable gases:** Gases which at 20°C and at standard pressure of 101.3 KPa are:-
 - ignitable when in a mixture of 13 percent or less by volume with air, or
 - have a flammable range with air of at least 12 percentage points regardless of the lower flammable limits.
- **extremely flammable liquids:** chemicals which have flash point lower than or equal to 23°C and boiling point less than 35°C

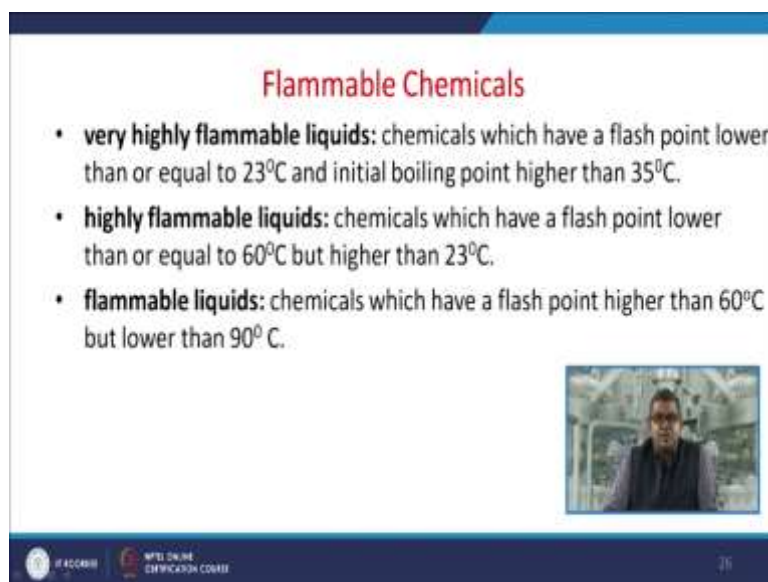


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 15

Then there are certain guidelines attributed to the flammable chemicals, so flammable gases which at 20 degree Celsius at standard pressure of 101.3 kilopascals, they are ignitable when

a mixture of 13 percent or less by volume with air or have a flammable range with air of at least 12 percent point regardless of the lower flammable limits. Now there are extremely flammable liquids, the chemicals which have flash point lower than or equal to 23 degree Celsius and boiling point less than 35 degree Celsius.

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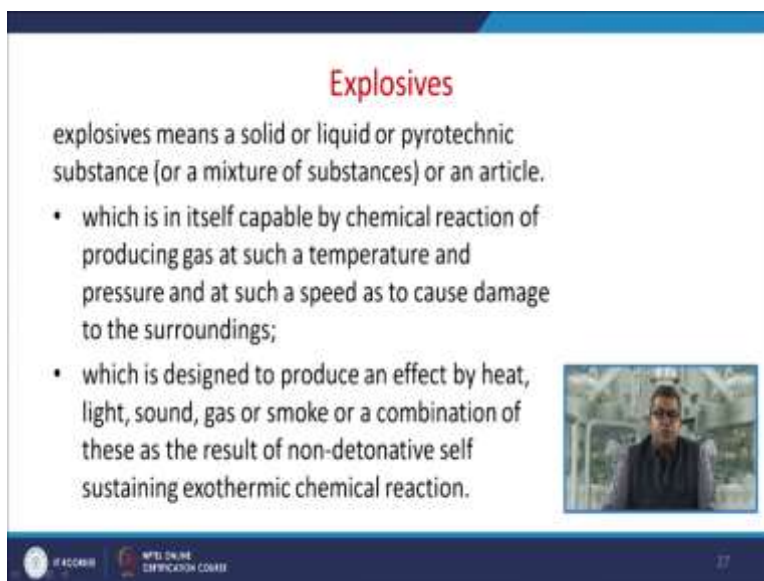
Flammable Chemicals

- **very highly flammable liquids:** chemicals which have a flash point lower than or equal to 23°C and initial boiling point higher than 35°C.
- **highly flammable liquids:** chemicals which have a flash point lower than or equal to 60°C but higher than 23°C.
- **flammable liquids:** chemicals which have a flash point higher than 60°C but lower than 90°C.

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There are certain very highly flammable liquids, the chemicals which have flash points lower than or equal to 23 degree Celsius and initial boiling point higher than 35 degree Celsius. There are highly flammable liquids, the chemicals or liquid which have a flash point lower than or equal to 60 degree Celsius but higher than 23 degree Celsius. There are certain flammable liquids, the liquids those who are having the flashpoint higher than 60 degree Celsius but lower than 90 degree Celsius, so this is the categorisation of the flammable chemicals.

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Explosives

explosives means a solid or liquid or pyrotechnic substance (or a mixture of substances) or an article.

- which is in itself capable by chemical reaction of producing gas at such a temperature and pressure and at such a speed as to cause damage to the surroundings;
- which is designed to produce an effect by heat, light, sound, gas or smoke or a combination of these as the result of non-detonative self sustaining exothermic chemical reaction.

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Now there are certain things related to the explosives, we have already discussed the explosives in the recent module. So explosive means a solid or a liquid or pyrotechnic substance or a mixture of substances or an article which is in itself capable of by chemical reaction of producing gas at such a temperature and pressure and such a speed as to cause damage to the surrounding.

One best example is the firecrackers, now which is designed to produce an effect by heat, light, sound, gas or smoke or a combination of these, as a result of non-detonative self-sustaining exothermal chemical reaction.

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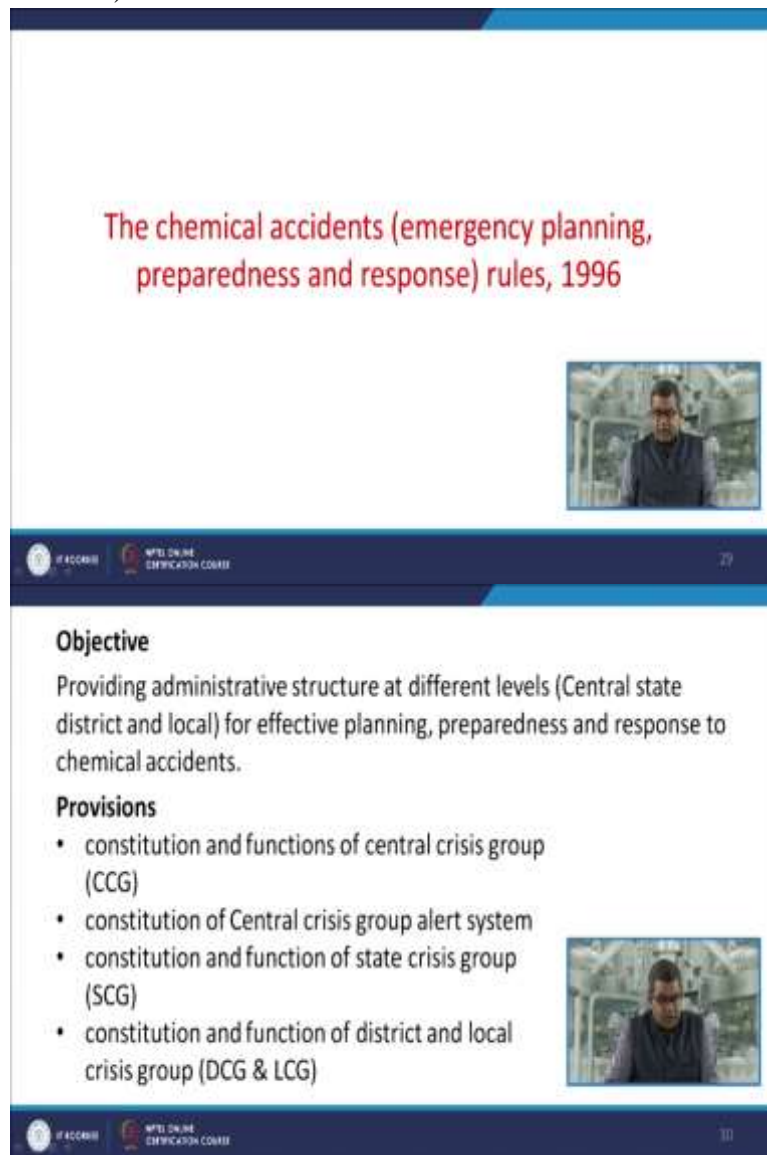
Database/ Report Generated

- List of Major Accident Hazard units
- Safety Reports/ Safety Audit Reports
- On-site emergency plans
- Off-site emergency plans
- List of hazardous chemicals imported into the country
- List of major accidents involving hazardous chemicals

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So, based on the data collected you must prepare the database generation of the report, so you must list the major accident hazard units. Then the safety reports, safety audit reports, et cetera, then on-site, off-site emergency plans, list of various hazardous chemicals imported into the country, the list of major accidents involving those hazardous chemicals, so this covers the entire database.

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The chemical accidents (emergency planning, preparedness and response) rules, 1996

Objective
Providing administrative structure at different levels (Central state district and local) for effective planning, preparedness and response to chemical accidents.

Provisions

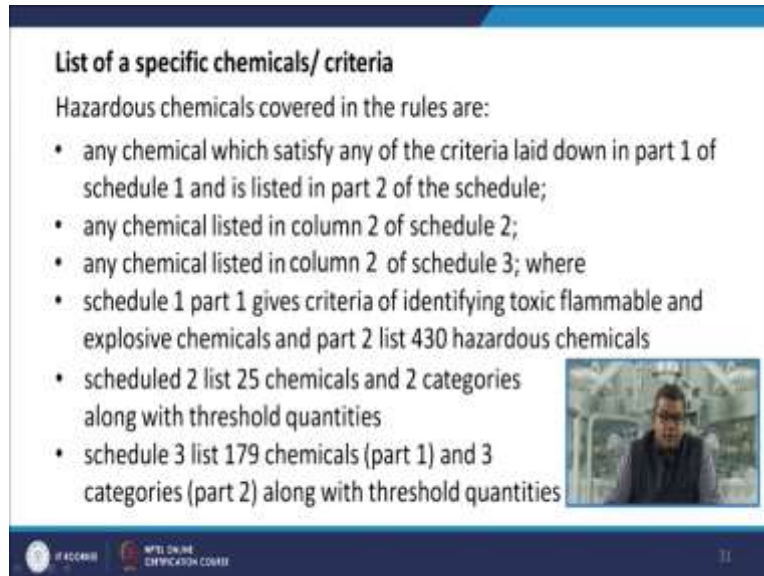
- constitution and functions of central crisis group (CCG)
- constitution of Central crisis group alert system
- constitution and function of state crisis group (SCG)
- constitution and function of district and local crisis group (DCG & LCG)

79

Now another rule is the chemical accidents or emergency planning response rules in 1996. Now the objective of this particular rule is to provide the administrative structure at different levels, maybe central, maybe state, maybe district or maybe local level for effective planning, preparedness and response to the chemical accidents. Now the provision of this rule, the Constitution and Function of Central crisis group, the Constitution of central crisis group alert

system, the Constitution and function of state crisis group SCG, then the Constitution and function of district and local crisis group may be DCG and LCG.

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List of a specific chemicals/ criteria

Hazardous chemicals covered in the rules are:

- any chemical which satisfy any of the criteria laid down in part 1 of schedule 1 and is listed in part 2 of the schedule;
- any chemical listed in column 2 of schedule 2;
- any chemical listed in column 2 of schedule 3; where
- schedule 1 part 1 gives criteria of identifying toxic flammable and explosive chemicals and part 2 list 430 hazardous chemicals
- scheduled 2 list 25 chemicals and 2 categories along with threshold quantities
- schedule 3 list 179 chemicals (part 1) and 3 categories (part 2) along with threshold quantities

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Now there are certain list of specific chemicals and criteria. So hazardous chemicals covered in this rule are, any chemical which satisfy any of the criteria laid down in part 1 of schedule 1 and is listed in part 2 of the schedule. So any chemical which is listed in the column 2 of the schedule 2 which you can have from this particular rule, any chemical listed in column of schedule 3, different schedules are given for identifying the toxic flammable and explosive chemicals and those chemicals are listed in schedule 1 para 1.

Similarly, different categories along with the quantities have been specified in this particular rule and which are listed in schedule 3, so they have listed almost 179 chemicals with respect to this listing.

The next aspect once you have enlisted these chemicals and monitoring and implementation mechanism. So CCG monitors the post-accident situation arising out of major chemical accidents, conducts the post-accident analysis review, district off-site emergency plan and review the progress report to state crisis group. Now this state crisis group reviews the off-site emergency plan in the state, monitors the post-accident situation and review the progress report being submitted by district crisis group.

Now further, this district crisis group they review the onsite emergency plan prepared by the industrial employer or occupier, monitor chemical accidents and they conduct the full-scale mock trial of chemical accidents each year. So this local crisis group because after district

crisis group the local crisis group comes into the picture. So LCG locates the population likely to be affected by any chemical accident or any chemical industry proximity and conduct one full-scale mock trial of chemical accident in every 6 months.

Now preamble of all these rules was The Factories Act 1948, so after independence it was thought that we will be subjected to the industrial growth and when we are subjected to the industrial growth then we need to frame several rules which are related to the safety, which are related to the industrial harmony of any establishment so the government framed they passed The Factories Act 1948.

Now the salient features we are going to discuss in this particular section, so let us have that first question that what is Factory Act. Premises where on 10 or more percent are engaged if power is used or 20 or more persons are engaged if power is not used in a manufacturing process.

Now because the baseline of all those rules of this 1948 Factories Act, so objective of this 1948 Factories Act was that this act has been enacted primarily with the objective of protecting workers employed in the factory against industrial and occupational hazard. Now it directs the owner of the occupier with certain obligations to protect the workers and to secure them of their employment in conducive to their health and safety.

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Where it is Applicable?

- The Act is applicable to any place wherein **manufacturing process** is carried on with or without the aid of power source, not with standing that;
 - The number of persons employed less than 10, with the aid of power and less than 20 if working without the aid of power
 - The person working therein are not employed by the owner thereof but are working with the permission of, or under agreement with, such owner

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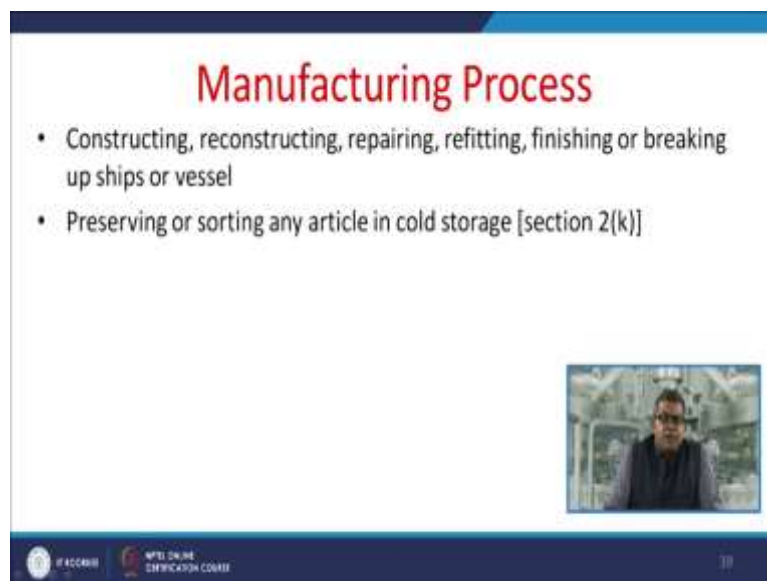
Now the question arises once you the frame the rule, then where it is applicable? So this act is applicable to any place wherein the manufacturing process is carried out with or without the

aid of power source, notwithstanding that the number of persons employed less than 10 with the aid of power, and less than 20 working without the aid of power.

Now the person working there in are not employed by the owner thereof, but are working with the permission or under the agreement with such owner, so it covers the contractual workers also. So whenever we are talking about any kind of process then question arises that what is the manufacturing process? So the manufacturing process means any process used for making, altering, repairing, ornamenting, finishing, packaging, oiling, washing, cleaning, breaking, demolishing or otherwise treating or adopting any article or substance with a view to its use, sale, transport, delivery or disposal, so you see that there is a wide coverage of all industrial operations.

It covers the pumping of oil, water, sewage or any other substance or generating, transforming or transmitting power or composing types of printing, lithography, photogravure and other similar process or bookbinding, et cetera, so these are the various processes being enlisted.

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The slide features a blue header with the title "Manufacturing Process" in red. Below the title, there are two bullet points: "Constructing, reconstructing, repairing, refitting, finishing or breaking up ships or vessel" and "Preserving or sorting any article in cold storage [section 2(k)]". In the bottom right corner, there is a small video inset showing a man in a dark vest and glasses. At the bottom of the slide, there are logos for "ACCABH" and "NPTI ONLINE EDUCATION COURSE" along with the number "10".

Apart from this, the construction process, reconstruction process, repairing, recto fitting, finishing, breaking et cetera. Preserving or sorting of any articles in the cold storage, et cetera so they cover the entire manufacturing aspect under this law. There are certain important features attributed to this in a particular law that is the power to exempt during public emergency. Now power to exempt any factory or any establishment or a class or a description of factories from all or any of the provision of this act during the public emergency. The

notification is issued in the official gadget, the maximum time period for the exemption is 3 months.

Another section deals with the approver licensing registration of different factories, so making an application to the government or a Chief Inspector along with the duty certified plan and specifications required by the rules they send to the State government and the Chief Inspector by a registered post and no orders is communicated to the applicant within 3 months from the date on which it is so sent when the permission due to be granted. If the application is rejected, then appeal can be made to the government within 30 days from the date of such rejection. This is extremely important that is the general duties of occupier, so occupier shall assure the health, safety and welfare of all workers while they are at work in that industrial establishment.

Now see, if you recall the latest amendment to the different rules, everywhere it is the responsibility of the occupier to ensure all these aspects which we have discussed in this particular line. Now every occupier shall prepare a written statement of his general policies with respect to the health and safety of the workers. Now bring such statements and any revision thereof to the notice of all the workers, so you cannot amend all those things with respect to your own interest when you are an occupier. Another is that inspecting staff, the State government may appoint any authority may be the chief inspector, maybe the additional Chief Inspector, joint chief inspector, deputy chief inspector, et cetera.

Now they will prescribe their duties and qualifications and every district registration, be an inspector for his district, every inspector is deemed to be a public servant within the meaning of the Indian panel code.

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Important Features

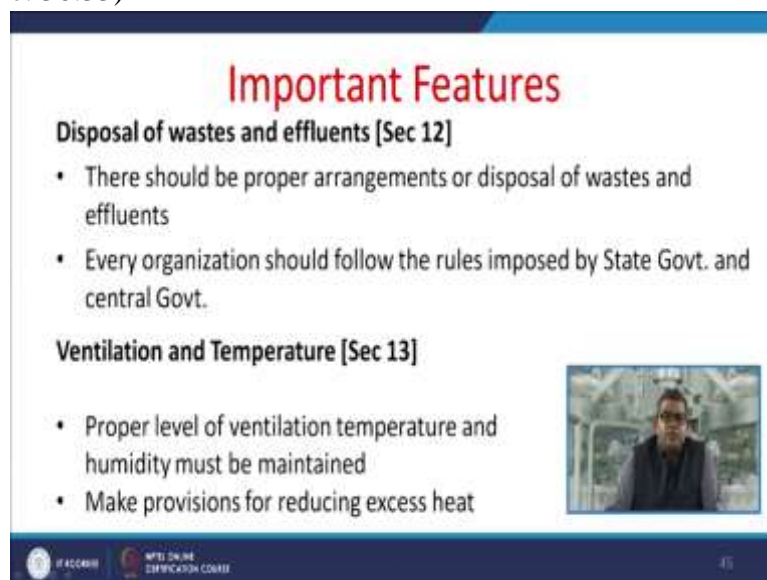
Power of Inspectors [Sec 9]

- Enter factory premises for investigation
- Examine the premises
- Inquire into any accident or dangerous occurrence
- Require the production of any register, record or other document and can seize or copy it
- Take measurement and photographs

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There are certain powers they were attributed to inspectors like enter the factory premises for investigation, they can examine the premises. They can enquire into any accidents or dangerous occurrence. Require the production of any register, record or any other document they can seize or copy it, they can take the measurements and the photographs so they have you can say N number of powers for safeguard of the employees.

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Important Features

Disposal of wastes and effluents [Sec 12]

- There should be proper arrangements or disposal of wastes and effluents
- Every organization should follow the rules imposed by State Govt. and central Govt.

Ventilation and Temperature [Sec 13]

- Proper level of ventilation temperature and humidity must be maintained
- Make provisions for reducing excess heat

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Another feature was attributed to that particular rule was the disposal of waste and effluents. Now there should be a proper arrangement of disposal of waste and effluents, now every organization should follow the rules imposed by state government and central government from time to time, so this is mandatory for the occupier. Another thing was attributed to the

ventilation and temperature, say there must be a proper level of ventilation, temperature and humidity, and it is the responsibility of the occupier to maintain it. Then they will make a provision for reducing any kind of excess heat that may be because of the mechanical or because of the chemical.

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Important Features

Dust and Fumes [Sec 14]

- Effective measures should be taken to prevent inhalation or accumulation of dust & fume.
- If any exhaust appliance is necessary for, it shall be applied as near as possible to the point of origin of the dust, fume or other impurity.

Artificial Humidification [Sec 15]

- If humidity is developed artificially, keep it in limits
- Water used for the humidification should be clean

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Another thing attributed to the dust and fumes, so effective measures should be taken to prevent the inhalation or accumulation of dust and fumes. Now if any exhaust appliance is necessary for it, it shall be applied as near as possible to the point of origin of the dust and fumes or other impurities so we can say that they suggest the guidelines for the safety designing. There must be certain provisions for the artificial humidification, if humidity is developed artificially, keep it in limits so that the workers cannot exhaust. The water used for humidification should be clean so that any kind of contamination to the workers be prevented.

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Important Features

Drinking water[Sec 18]

- There should be drinking water
- Drinking points to be marked as drinking water. They should be atleast 6 meters away from the wash room/ urinal/ latrine/spittoons
- For workers greater than 250, cool water facility is also implied



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Another section deals with the drinking water aspect. So they ensure that there should be adequate supply of drinking water within the factory premises. Now drinking points to be marked as drinking water, nowadays the proper pictorial figures they are being used for marking of such drinking water. Now they should be at least 6 meters away from washroom, Urinals, latrines, spittoon, et cetera. For workers greater than 250, (cold) cool water facility is also be implied or implemented within the factory premises.


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Important Features

Section 21: Fencing of machinery

- i. every moving part of a prime-mover and every flywheel connected to a prime-mover, whether the prime-mover or flywheel is in the engine-house or not;
- ii. the headrace and tailrace of every water-wheel and water-turbine;
- iii. any part of a stock bar which projects beyond the head stock of a lathe; and

Every dangerous part must be secularly fence

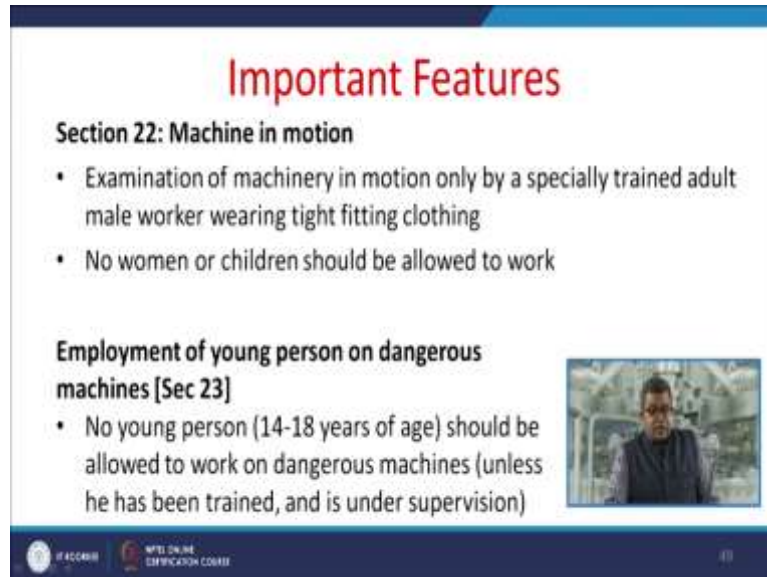


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Then there was a section related to the fencing of machine, so every moving part of a prime mover and every flywheel connected to a prime mover whether the prime mover or flywheel is in the engine-house or not. The headrace and the trailrace of every water wheel or water

turbine, any part of the stock bar which projects beyond the headstock of lathe, and every dangerous or moving part must be securely fenced and that was being mandatory in this Factories Act 1948.

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Important Features

Section 22: Machine in motion

- Examination of machinery in motion only by a specially trained adult male worker wearing tight fitting clothing
- No women or children should be allowed to work

Employment of young person on dangerous machines [Sec 23]

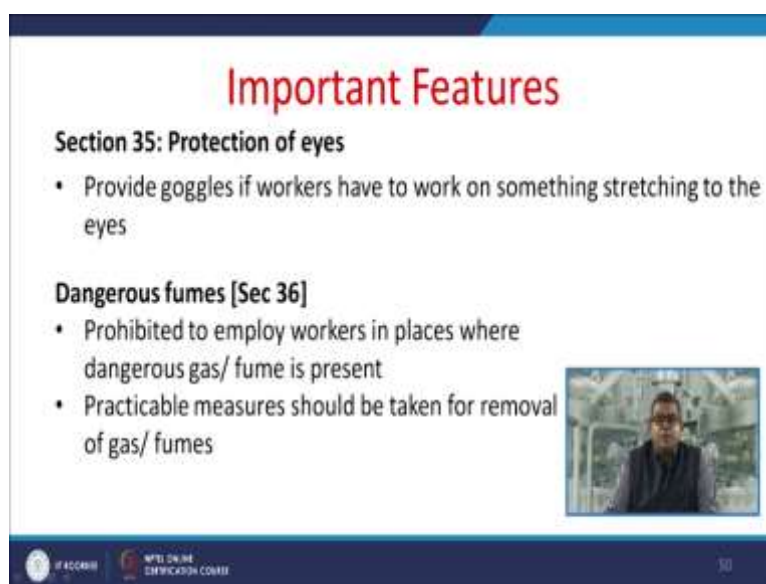
- No young person (14-18 years of age) should be allowed to work on dangerous machines (unless he has been trained, and is under supervision)

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Another section dealt with the machine in motion, so examination of machinery in motion only by specially trained adult male worker wearing tightfitting clothing so that any kind of hazard may be prevented, so no women or children should be allowed to work that was the provision being made in that Factories Act 1948.

Another section dealt with the employment of a young person on dangerous machines, so no young person that is between 14 to 18 years of age should be allowed to work on dangerous machines. And later on the rule has been made that the young person below the age of 18 should not be employed in any circumstances in any establishment.

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Important Features


Section 35: Protection of eyes

- Provide goggles if workers have to work on something stretching to the eyes

Dangerous fumes [Sec 36]

- Prohibited to employ workers in places where dangerous gas/ fume is present
- Practicable measures should be taken for removal of gas/ fumes





And under the section 35 there was a provision for the protection of eyes, so it was mandatory to provide the goggles if workers have to work on something stretching to the eyes. There was a section related to the dangerous fumes that prohibited to employ worker in place where the dangerous gas, fumes is supposed to be present. Then the practicable measures should be taken for the removal of any kind of gas or fumes that was being mandatory under section 36.

So in this particular module we have discussed about various laws, rules, regulations being applicable for various kinds of chemical processes in Indian context and we discussed that how these rules and regulations they are beneficial not only for the person those who are working within the establishment or living at the periphery but they also provide a very guiding tool for proper the designing of any kind of chemical process establishment.

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  11

So, in case if you have further queries or reading then you may refer to the references which are listed in this particular slide, thank you very much.