

Study Circle Career Development Institute



मुलाखतीत विचारल्या जाणाऱ्या प्रश्नांचा स्रोत

DUTIES & RESPONSIBILITIES of **Deputy Director, Industrial Safety and Health, Group A**

Responsibilities of Deputy Director, Industrial Safety and Health

- * Deputy Director, Industrial Safety and Health is an Inspector appointed under the provision of **Section 8(1) of Factories Act, 1948.**
- * **Enforcement of legislations - In the designated Local limits his duties in general mainly consist of the enforcement of following legislation's of technical nature-**
 - 1) Workmen's Compensation Act 1923
 - 2) Factories Act 1948 and Rules made there under
 - 3) Maharashtra factories Rules, 1963
 - 4) Environment protection Act 1986 and made there under
 - 5) Manufacture, Storage and Import of Hazardous Chemicals Rules 1989
 - 6) Central Motor Vehicle Rules, 1989
 - 7) Public Liability Insurance Act, 1991
 - 8) Chemicals Accidents (Emergency Planning Preparedness and Response) Rules 1996
 - 9) National Building Code, 2016
 - 10) Occupation Safety, Health and working Conditions Code 2020
- * Any other notifications and Ordinances promulgated under above Acts.

Duties of Deputy Director, Industrial Safety and Health

- 1) **Visit for inspections, amenability checks and Duties wrt dangerous Machine parts and mechanical motions –**
 - 1) **Identification & assessment** of dangerous mechanical motions and dangerous parts of various types of machines in factories
 - 2) **Monitor provision of the guards** based upon the engineering principles of machine guarding.
- 2) **Enquiry of complaints & every serious and fatal accident events of -**
 - 1) fires
 - 2) explosions
 - 3) toxic gas release
- 3) **Checking Area Classification Code** on protection of electrical equipment's from being sources of ignition such as flameproof fitting etc.

- 4) **Monitoring compliance of periodic inspections & testing of -**
 - 1) various types of pressure vessels, pressure system,
 - 2) safety relief system
 - 3) hoist tackles
 - 4) thermic fluid heaters, solvent extraction plants

- 5) **Monitoring, scrutinizing & checking of the various submissions generated through the statutory compliance's such as reports on –**
 - 1) Safety Audit
 - 2) Risk Assessment
 - 3) Environmental Impact Assessment
 - 4) Disaster Control Planning
 - 5) Safety Reports
 - 6) Hazard & Operability Study
 - 7) Vulnerability Analysis
 - 8) Maximum Credible loss Sanction reports
 - 9) Event Tree Analysis
 - 10) Fault Tree Analysis
 - 11) Failure Mode & Analysis

- 6) **Monitoring of provision & maintenance of –**
 - 1) Occupational Health Centre
 - 2) periodic medical examination of the workers by doctor

- 7) **Monitoring of work environment** for maintaining potentially toxic substance below TLV wherever necessary.

- 8) **Prosecutions – launch prosecutions in defaulting cases -**
 - 1) conduct case as Assistant Public Prosecutor in Court of Law.
 - 2) in case of imminent danger to prohibit the use of plant or process by passing Orders.

- 9) **Render technical support to the district authorities –**
 - 1) in preparation and updating of the Off-site Disaster Control Plan
 - 2) in conducting mock drill
 - 3) work as member secretary of Local Crisis Group and District Crisis Group

- 10) **Assistance to the Jt. Director in matters regarding –**
 - 1) approval of plans
 - 2) license application
 - 3) various exemption
 - 4) making reports to Government
 - 5) correspondence with Unions

Knowledge wrt Duties of dd Industrial Safety and Health

- 1) **Salient features of various acts and procedures**
- 2) **National and International disasters**
- 3) **Dangerous Machine parts and mechanical motions**
- 4) **Accidents**
- 5) **Use of advance technologies in the field of Safety**
- 6) **Hazard Identification and Risk assessment**

Salient features of various acts and procedures –

- 1) ddIHS as Assistant Public Prosecutor
- 2) ddIHS as member secretary of Local Crisis Group and District Crisis Group
- 3) ddIHS as assistance to the Jt. Director
- 4) Enforcement of legislations
- 5) dealing with Defaulting cases
- 6) passing Orders for closure

National and International disasters

- 7) Disaster Control Planning
- 8) On site and Off site emergency plan
- 9) Mock drills
- 10) Fire and explosion prevention
- 11) SOP wrt toxic gas release
- 12) Maximum Credible loss Scenario

Dangerous Machine parts and mechanical motions

- 13) Pressure vessels, pressure system, hoist tackles,
- 14) Thermic fluid heaters, solvent extraction plants
- 15) Principles of machine guarding
- 16) Personal Protective equipment
- 17) Ergonomics
- 18) Protection of electrical equipment's from being sources of ignition - flameproof fitting

Accidents

- 19) Theories of accident
- 20) Accident prevention
- 21) Protection of electrical equipment's from being sources of ignition - flameproof fitting
- 22) Maintaining potentially toxic substance below TLV
- 23) Area Classification Code
- 24) Accident enquiry
- 25) Occupational Health Centre
- 26) Periodic medical examination of the workers by doctor
- 27) Environmental Impact Assessment

Use of advance technologies in the field of Safety

- 28) Safety relief system
- 29) Process Safety management
- 30) Safety Audit
- 31) Safety Reports
- 32) Chemical Industry Safety

Hazard Identification and Risk assessment

- 33) Hazard & Operability Study - HAZOP
- 34) Vulnerability Analysis
- 35) Quantitative risk assessment
- 36) Qualitative risk assessment
- 37) What-if analysis
- 38) Event Tree Analysis
- 39) FMEA (failure mode and effect analysis)
- 40) FTA (fault tree analysis)

1) Salient features of various acts and procedures

- 1) **ddIHS as Assistant Public Prosecutor**
- 2) **ddIHS as member secretary of Local Crisis Group and District Crisis Group**
- 3) **ddIHS as assistance to the Jt. Director**
- 4) **Enforcement of legislations**
- 5) **dealing with Defaulting cases**
- 6) **passing Orders for closure**

Where an offence under the Environment Protection Act has been committed by any department of Government, the **Head of the department shall be deemed to be guilty** and shall be liable to be proceeded against and punished accordingly with few exceptions.

Facilities for women workers -

As per the Occupational Safety, Health And Working Conditions Code 2020, women shall be entitled to be employed in all establishments for all types of work and they may also be employed, with their consent **before 6 a.m. and beyond 7 p.m.** subject to such conditions relating to safety, holidays and working hours or any other condition to be observed by the employer as may be prescribed by the appropriate government.

Closure of the establishment -

As per, the Occupational Safety, Health and Working Conditions Code, 2020, the employer of an establishment shall, within **30 days of the closing of the establishment**, inform the closing of such establishment and certify payment of all dues to the workers employed in such establishment, to the registering officer in such manner as may be prescribed by the Central Government.

Leave -

As per the Occupational Safety, Health and Working Conditions Code, 2020, every worker employed in an establishment shall be entitled for leave in a calendar year with wages, when he has worked **180 days or more in such calendar year and he shall be entitled for 1 day leave for every 20 days of his work**, except for adolescent worker and worker employed below ground mine.

Contract Labour -

Chapter XI, Part I, Contract Labour, of Occupational Safety, Health and Working Conditions Code, 2020, shall apply to every establishment in which **50 or more contract labour** are employed or were employed on any day of the preceding twelve months through contract.

Migrant workers-

As per Occupational Safety, Health and working Conditions Code 2020, the employer, of every establishment, which employed ten or more **Inter-state migrant worker**, shall pay, to every **Inter-state migrant worker** employed in his establishment, in a year a lump sum amount of fare for to and fro journey to his native place from the place of his employment, in the manner taking into account the minimum service for entitlement, periodicity and class of travel and such other matters as may be prescribed by the appropriate government.

Advisory Committee wrt insurance policy -

As per the Public Liability Insurance Act, 1991, the Central Government may, from time to time, constitute an Advisory Committee, on the matters relating to the insurance policy under this Act, and is to be appointed by the Central Government consisting of -

- 1) 3 officers representing the Central Government,
- 2) 2 persons representing the insurers,
- 3) 2 persons representing the owners,
- 4) 2 persons from amongst the experts of insurance or hazardous substances
- 5) **Chairman of Advisory Committee shall be one of the members representing Central Government.**

Copmenasation under Public Liability Insurance Act, 1991 -

As per the Public Liability Insurance Act, 1991, where the death of any person (other than a workman) has resulted from an accident, the owner shall be liable to give relief of **Rs. 25,000** per person in addition to reimbursement of medical expenses if any, incurred on the victim up to a maximum of Rs. 12,500.

Basic requirement to be followed as per the Indian Factories Act, 1948 -

1. Proper drainage system
2. Adequate ventilation
3. Availability of drinking water
4. *Availability of bus facility*

Limits wrt lift, put down, carry or move any load -

As per Maharashtra Factories Rules 1963, no adult male, unaided by another person, or mechanical aid, be required or allowed to lift, put down, carry or move any load of material, article, tools or appliance exceeding **55 kilograms**.

As per Maharashtra Factories Rules, 1963, **no adult female**, unaided by another person, or mechanical aid, be required or allowed to lift, put down, carry or move any load of material, article, tools or appliance **exceeding 30 kg**.

Drinking water-

As per Maharashtra Factories Rules, 1963, the **quantity of drinking water** to be provided for the workers in every factory shall be at least **5 litres a day per worker** employed in the factory and such drinking water shall be readily available at all times during working hours.

Form 3 -

As per Maharashtra Factories Rules, 1963, an application for **renewal of licence for a period not exceeding 5 years** shall be made to Chief Inspector or Deputy Chief Inspector authorized by the State Government in this behalf in **Form 3** accompanied by the fees specified in the schedule, not later than 2 months before the licence expiry date except when factory commences work on or after last day of November in any year.

Form 11 -

As per Maharashtra Factories Rules, 1963, a register shall be maintained to record particulars of examinations of hoists or lifts and shall give particulars as shown in **Form 11**.

Form 12 -

As per Maharashtra Factories Rules, 1963, **All lifting machine, chain, and rope of lifting tackle** except a fibre rope or fibre rope sling, shall be taken into use in any factory, for the first time only after it has been tested and all parts thoroughly examined by a competent person and a certificate of such test examination signed by the person, specifying the safe working load or loads has been obtained and a register in **Form 12** containing the particulars specified therein shall be kept of every examination made.

Renewal of a licence -

As per Maharashtra Factories Rules, 1963, where an application for grant or **renewal of a licence** is duly made in accordance with these rules and if no licence has been issued or renewed, nor refused, within a period of **4 months** the factory in respect of which the licence is to be granted or renewed shall be deemed to be duly licensed.

As per the Workmen's Compensation Act, 1923, the employer shall not be liable to pay compensation in following conditions -

1. In respect of any injury which does not result in the total or partial disablement of the workman for a period exceeding three days.
2. In respect of any injury, not resulting in death caused by an accident which is directly attributable to the workman having been at the time thereof under the influence of drink or drugs.
3. In respect of any injury, not resulting in death caused by an accident which is directly attributable to the wilful disobedience of the workman to an order expressly given, or to a rule expressly framed, for the purpose of securing the safety of workman.
4. In respect of any injury, not resulting in death caused by an accident which is directly attributable to the wilful removal or disregard by the workman of any safety guard or other device which he knew to have been provided for the purpose of securing the safety of workmen.

Rooms for the use of children under the age of 6 years -

As per Factories Act 1948, in every factory, wherein more than **30 women workers** are ordinarily employed, there shall be provided and maintained a **suitable room or rooms for the use of children under the age of 6 years of such women.**

Certificate of fitness -

As per Factories Act 1948, whoever knowingly uses or attempts to use, as a **certificate of fitness** granted to himself under section 70, a certificate granted to another person under that section, shall be punishable with **imprisonment for a term which may extend to two months or with fine which may extend to 1 thousand or with both.**

Adolescent -

As per Factories Act 1948, “**adolescent**” means a person who has completed his 15th year of age but has not completed his 18 th year.

Non-employability of children-

As per Factories Act 1948, no child shall be employed or permitted to work, in any factory **during the night and for more than four and a half hours on any day.**

28 August 1948 - The Factories Act 1948 was passed by the Constituent Assembly of independent India.

1 April 1949 - The Factories Act 1948 came into force.

As per Factories Act 1948, no adult worker shall be required or allowed to work in a factory for more than **48 hours in any week.**

2) National and International disasters

- 7) **Disaster Control Planning**
- 8) **On site and Off site emergency plan**
- 9) **Mock drills**
- 10) **Fire and explosion prevention**
- 11) **SOP wrt toxic gas release**
- 12) **Maximum Credible loss Scenario**

Natural & manmade Disasters

In 2013, major flash floods killed thousands of people in the state of **Uttarakhand.**

The 9/11 terrorist attack on the twin towers of the World Trade Center, was in the city of **New York.**

Terrorist attack on the Indian city of Mumbai where a train station, two hotels etc were attacked happened in the month of **November 2008**

Chernobyl Nuclear Power Plant disaster on 26th April 1986, a routine 20-second shut down of the system seemed to be another test of the electrical equipment, but seven seconds later, a surge created a chemical explosion that released nearly 520 dangerous radionuclides into the atmosphere.

Seveso, Italy

California

Fukushima

Styrene gas leaked from LG Polymers at Andhra Pradesh on 7 May 2020.

Methyl isocyanate gas leaked from Union Carbide India Ltd., at Bhopal on 3 December 1984.

The Bhopal disaster chemical leak that took place on 3rd December 1984 in the city of Bhopal, Madhya Pradesh, was from the **methyl isocyanate** plant, owned by the Indian Subsidiary of Union Carbide.

ethyl mercaptan

methylene dioxide

sulphuric acid

Methylethyl ketone

Phosgene

Ammonia

acetylene

nitrogen

helium

Ammonia

Chlorine

Bromine

The Deepwater Horizon oil rig explosion on 20 April 2010 in the Gulf of Mexico led to the spill of **about 4 million** gallon crude oil.

Ethnic conflicts are human (society) made disasters.

3) Dangerous Machine parts and mechanical motions

- 13) **Pressure vessels, pressure system, hoist tackles,**
- 14) **Thermic fluid heaters, solvent extraction plants**
- 15) **Principles of machine guarding**
- 16) **Personal Protective equipment**
- 17) **Ergonomics**
- 18) **Protection of electrical equipment's from being sources of ignition - flameproof fitting**

Factory building -

As per Maharashtra Factories Rules 1963, in every factory building, the exit shall be so located that **the travel distance to reach at least one of them on the floor shall not exceed 30 metres.**

As per Maharashtra Factories Rules 1963, the minimum intensity of **illumination in passageways, corridors and stairways shall be 50 Lux.**

In Maharashtra Factories Rules, 1963, unless the context otherwise requires, 'Degrees' (or temperature) means degrees **on the Fahrenheit scale.**

As per Maharashtra Factories Rules 1963, in every factory, the maximum permissible noise exposure levels, continuous or a number of short-term exposures, for eight hours per day is **90 dBA.**

Pressure plant or pressure vessel -

As per Maharashtra Factories Rules, 1963, **every pressure plant or pressure vessel** shall be fitted with, a suitable pressure gauge with a dial range not less than **1.5 times and not exceeding twice the maximum safe working pressure**, easily visible and designed to show, at all times, the correct internal pressure in kilograms per square centimetre and marked with prominent red mark at the maximum safe working pressure of the pressure plant or pressure vessel.

Examination of Hoist and lift Maintenance -

In every factory, every hoist and lift shall be properly maintained, and shall be thoroughly examined by a competent person at least once in every period of **6 months.**

Examination of machine parts -

As per Factories Act 1948, all parts including the working gear, of every lifting machine and every chain, rope or lifting tackle shall be of good construction, sound material, adequate strength, free of defects, properly maintained and **thoroughly examined by a competent person at least once in every period of 12 months or as Chief Inspector may specify in writing.**

For machine guarding in many industries, Physical guards are replaced by **light curtains** which are preventing accidents and also improving production in some industries.

adjustable guards

plastic guards

Responsibilities of employer, to provide a safe and healthy working environment -

1. Provide and maintain workplaces, machinery and equipment, and use work methods, which are safe and without risk to health as is reasonably practicable.
2. Give the necessary instructions and training to managers and staff, taking account of the functions and capacities of different categories of workers.
3. Provide adequate supervision of work, of work practices, and of the application and use of occupational safety and health measures.
4. *Provide adequate personal protective clothing and equipment at a cost to the worker, when hazards cannot be otherwise prevented or controlled.*

Management responsibilities related to Occupational Health and Safety trainings -

1. Give each worker practical and appropriate instruction, taking account of his or her skills and professional experience, to perform a specific function
2. Provide training involving the acquisition of knowledge and know-how to be applied in a specific job and corresponding to the qualifications, which may consist of initial training for entry to a particular trade or profession, the introduction of new methods or a transfer to another job
3. Give refresher courses to update the knowledge acquired through training
4. Provide further training, thus enabling workers to acquire new knowledge, supplement existing knowledge, or specialize in a particular area by acquiring more detailed knowledge.

The organization's OH & S policy is a public statement signed by the **top management** declaring its commitment and intent to manage its OH&S responsibilities.

The **top management** has the ultimate responsibility for the safety and health programme in an organisation.

4) Accidents

- 19) Theories of accident
- 20) Accident prevention
- 21) Protection of electrical equipment's from being sources of ignition - flameproof fitting
- 22) Maintaining potentially toxic substance below TLV
- 23) Area Classification Code
- 24) Accident enquiry
- 25) Occupational Health Centre
- 26) Periodic medical examination of the workers by doctor
- 27) Environmental Impact Assessment

Ergonomics - The scientific study of the relationship between the workman (People) and his working environment (Machine) that helps in reduction of musculoskeletal disorders.

In the Heinrich model of foundation of major injury accident in industry, he stated that for every mishap resulting in an injury, there are many other similar accidents that cause no injuries and it was estimated that in a unit group of 330 accidents of the same kind, 300 results in no injury, 29 in minor injury and 1 in major or lost time injury.

Chronological order the five factors as per Heinrich wrt the occurrence of a preventable injury-
As per Heinrich, the occurrence of a preventable injury is the natural culmination of a series of events, which invariably occur in a fixed and logical manner.

- 1) Social environment Ancestry
- 2) Fault of person
- 3) Unsafe Act, mechanical or physical hazard
- 4) Accident
- 5) Injury

Duties of workers wrt the prevention of occupational accidents and diseases -

The cooperation of workers within the organization is vital for the prevention of occupational accidents and diseases.

1. Take reasonable care for their own safety and that of other persons who may be affected by their acts or omissions
2. Comply with safety and health procedures and instructions given for their own safety and health, and those of others
3. Use safety devices and protective equipment correctly and not render them inoperative
4. *Should not report minor injury accidents which arises in the course of work.*

The huge amount of information on accident statistics, health data, environmental aspects, trainings can, now, be easily stored, analysed, transmitted and used for presenting an accurate MIS to management, which will show the results of investments in OH&S. Here MIS means **Management Information System**

Accident causing death -

As per, the Occupational Safety, Health and Working Conditions Code, 2020, where at any place in a factory, an accident occurs which causes death, or which causes any bodily injury by reason of which the injured person is prevented from **working for a period of 48 hours or more**, immediately following the accident, then employer or manager of the factory, shall send notice thereof to such authorities, in such manner and within such time, as prescribed by the appropriate Government.

Ambulance room -

As per Occupational Safety, Health and working Conditions Code 2020, Welfare Provisions, the Central Government may also prescribe for, Ambulance room in every factory, mine, building or other construction work wherein more than **500 workers** are ordinarily employed

Ambulance room -

As per Factories Act 1948, in every factory wherein more than **500 workers** are ordinarily employed, there shall be provided and maintained an **ambulance room** of the prescribed size, containing the prescribed equipment, in the charge of medical and nursing staff as prescribed and shall always be readily available during working hours.

First-aid box

As per Factories Act 1948, in every factory, there shall be provided and maintained **first-aid boxes** or cupboards equipped with the prescribed contents, and the number of such boxes or cupboards to be provided **shall not be less than one for every 150 workers ordinarily employed in the factory.**

Compensation to a workman, where death results from the injury -

As per the Workmen's Compensation Act 1923, the amount of compensation to a workman, where death results from the injury out of and in the course of his employment, shall be **50% of the monthly wages of the deceased workman multiplied by the relevant factor** or an amount of eighty thousand rupees, whichever is more.

Notice wrt circumstances attending the death or serious bodily injury -

As per the Workmen's Compensation Act, 1923, where, by any law for the time being in force, notice is required to be given to any authority, by or on behalf of an employer, of any accident occurring on his premises which results in death or serious bodily injury, the person required to give the notice shall, within **7 days of the death or serious bodily injury**, send a report, to the Commissioner giving the circumstances attending the death or serious bodily injury.

As per the National Building Code, 2016, for high rise buildings more than two years old, fire evacuation drills shall be conducted, at least once **every 6 months.**

Procedures for the assessment of worker's health wrt detection and identification of abnormalities -

Information about conditions in the working environment and the health of workers is necessary for planning, implementing and evaluating OH&S programmes, policies, and worker's health surveillance involves procedures for the assessment of worker's health by means of detection and identification of any abnormalities, and include -

- 1) Biological monitoring
- 2) Medical examinations
- 3) Questionnaires
- 4) Radiological examinations
- 5) Reviews of worker's health records
- 6) *Ergonomics*

Crisis Group

Central Crisis Group -

Central Crisis Group shall be the apex body to deal with major chemical accidents and to provide expert guidance for handling major chemical accidents.

State Crisis Group -

The State Crisis Group shall meet at least once in **three months** and follow such procedure for transaction of business as it deems fit.

District Crisis Group -

One of the function of the **District Crisis Group** is to review all the on-site emergency plans prepared by the occupier of Major Accident Hazards installation for the preparation of their off-site emergency plan.

Local Crisis Group -

The Local Crisis Group shall conduct at least one full scale mock-drill of a chemical accident at a site every **six months** and forward a report to the District Crisis Group.

5) Use of advance technologies in the field of Safety

- 28) Safety relief system
- 29) Process Safety management
- 30) Safety Audit
- 31) Safety Reports
- 32) Chemical Industry Safety

National Occupational Safety and Health Advisory Board

As per, Occupational Safety, Health and Working Conditions Code, 2020, the Central Government shall, by notification, constitute the National Occupational Safety and Health Advisory Board to discharge the functions conferred on it by or under this code and to advise Central Government and **Secretary, Ministry of Labour and Employment** shall be the Chairperson ex officio of the Board.

As per, the Occupational Safety, Health and Working Conditions Code, 2020, the terms of office of the members on the National Occupational Safety and Health Advisory Board, from **representatives of employers and employees shall be 3 years** and the procedure for their nominations and discharge of their functions shall be such as may be prescribed by the Central Government.

Safety Committee -

As per Maharashtra Factories Rules 1963, there shall be a Safety Committee, in every factory, wherein **250 or more workers** are ordinarily employed, or which carries on any dangerous or hazardous process or operation and employs more than 50 workers.

As per Maharashtra Factories Rules 1963, the **tenure of the Safety Committee shall be 2 years.**

Safety Officer -

As per Factories Act 1948, in every factory, wherein **1000** or more workers are ordinarily employed or wherein, any manufacturing process or operation which involves any risk of bodily injury, poisoning or disease, or any other hazard to health, to the persons employed in the factory is carried on, the occupier shall employ such number of **Safety Officers** as may be specified in the notification by the State Government.

Safety officers-

As per, Occupational Safety, Health and Working Conditions Code, 2020, In every factory carrying on hazardous process wherein **250 workers or more** are ordinarily employed, the employer shall appoint such number of safety officers, who shall possess such qualifications and perform such duties, as may be prescribed by appropriate Government.

Misuse of appliances wrt health, safety or welfare of the workers-

As per Factories Act 1948, If any worker employed in a factory, wilfully interferes with or misuses any appliance, convenience or other thing provided in a factory for the purposes of securing the health, safety or welfare of the workers therein, he shall be punishable with **imprisonment for a term which may extend to 3 months or with fine which may extend to 1 hundred rupees, or with both.**

6) Hazard Identification and Risk assessment

- 33) Hazard & Operability Study - HAZOP
- 34) Vulnerability Analysis
- 35) Quantitative risk assessment
- 36) Qualitative risk assessment
- 37) What-if analysis
- 38) Event Tree Analysis
- 39) FMEA (failure mode and effect analysis)
- 40) FTA (fault tree analysis)

ALARP = As Low As Reasonably Practicable , risks at workplace controlled and brought down to ALARP.

AOPD = Active Opto-electronic Protective Device

A new technology for Press brake safety options is the laser AOPD, which allows the operator to work within very close proximity of the point of hazard, significantly improves the productivity of the press brake and reduces operator injuries and fatigue.

ADAS = Advanced Driver Assistance Systems

The main goal of ADAS is to reduce road risks that are caused by human factors. It includes advanced technologies and safety systems that assist drivers during road journeys.

ADAS in a vehicle can support in **applying brakes, maintaining distance and keeping vehicle in lane**

BLEVE = Boiling Liquid Expanding Vapor Explosion, as per NFPA

CBRN = Chemical, Biological, Radiological and Nuclear safety

COSHH = Control of Substances Hazardous to Health

COSHH is a regulation in the United Kingdom, to prevent the ill effects of hazardous substances on employees, also used as a guideline for best practices in India and COSHH means **Control of Substances Hazardous to Health**

MSDS = Material Safety Data Sheet

STEL = Short Term Exposure Limit, as per OSHA

VTS = Vehicle Tracking System

UN classification of dangerous goods -

Class 1 :

Class 2 :

Class 3 : flammable liquid

explosives

radioactive material

oxidising substances, organic peroxides

Carbon dioxide gas extinguishes fire mainly by **smothering** principle

Dry chemical powder having monoammonium phosphate as the main chemical constituent can be used for extinguishing **Class A, B and C fires**.

The triangle illustrates the three elements a fire needs to ignite. These elements are **air, heat and fuel**.

As per IS 15683, **Black** coloured band denotes the carbon dioxide fire extinguisher.

Red

Blue

White

Flash point is the lowest temperature at which the application of an ignition source will cause a flame to flash across the surface of the liquid.

Boiling point

Vapour pressure

Evaporation point

Class A Fires -

Class B Fires - Fires in oils, petrol, grease or oil-based paints

Class C Fires -

Class D Fires -

Oil or grease in contact with **compressed oxygen** will cause fire and explosion.

Specially designed glasses that are used by a welder are called **shaded glasses like cobalt blue lenses**

Signage board indications -

A green square or rectangle on a safety signage board indicates **safety equipment or information about first aid equipment.**

fire prevention

radiant hazards

firefighting equipment

Cautionary sign - A pedestrian crossing sign

Mandatory sign

Informative sign

Mandatory, cautionary and informative sign

Hierarchy of controls for Controlling exposure to hazards in the workplace -

Controlling exposure to hazards in the workplace is vital to protecting workers and as per the hierarchy of controls. Control actions as per the hierarchy depending on their effectiveness starting with the most effective are -

- 1) Elimination
- 2) Substitution
- 3) Engineering controls
- 4) Administrative controls
- 5) Personal Protective Equipment (PPE)

Quantity of flammable liquids -

As per Maharashtra Factories Rules, 1963, the **quantity of flammable liquids** in any work room shall be the minimum required for the processes carried on in such room, shall be stored in suitable containers with close fitting covers and **not more than 20 litres of flammable liquids having a flash point of 20°C or less shall be kept or stored in any work room.**

Safety Committee wrt factories with hazardous process -

As per Factories Act 1948, the occupier of every factory, where a hazardous process takes place, shall set up a **Safety Committee consisting of equal number of representatives of workers and management** to promote cooperation between the workers and the management in maintaining proper safety and health at work and to review periodically the measures taken in that behalf.

As per the Central Motor Vehicle Rules, 1989, the driver of a goods carriage, transporting any dangerous or hazardous goods shall, on the occurrence of an accident involving any dangerous or hazardous goods transported by this carriage, **report forthwith to the nearest police station and inform**

the owner of the goods carriage or the transporter regarding the accident.

As per Chemical Accidents Rules 1996, the **Central Government** shall set up a Crisis Alert System and publish a list of Major Accident Hazard installations.

As per Petroleum Rules 2002, classification of hazardous area, a hazardous area shall be deemed to be **Division '0'** area, if inflammable gas or vapours are expected to be continuously present in the area.

Division '3'

Division '2'

Division '1'

Schedule 2 -

As per the Manufacture, Storage and Import of Hazardous Chemical Rules, 1989, schedule 2, for the purpose of **determining the threshold quantity of a hazardous chemical** at an isolated storage, account shall also be taken of any hazardous chemical which is, in that part of any pipeline under the control of the occupier having control of the site, which is within **500 metres** of that site and connected to it.

Schedule 4 -

As per the Manufacture, Storage and Import of Hazardous Chemical Rules, 1989, **industrial activity** means an operation or process carried out in an industrial installation referred to in Schedule 4 involving one or more hazardous chemicals and includes on-site storage or transport associated with the operation or isolated storage or pipeline.

Schedule 5 -

As per the Rule 3, of Manufacture, Storage and Import of Hazardous Chemical Rules, 1989, the **duties of the authorities** are specified in schedule 5 of the rules.

As per the Manufacture, Storage and Import of Hazardous Chemical Rules, 1989, any person responsible for importing hazardous chemicals in India shall provide information pertaining to the hazardous chemical, like product safety information, mode of transport, port of entry in India, details of the person receiving the consignment etc. to the concerned authorities as identified in Column 2 of Schedule 5 of the rules **before 30 days or as reasonably possible but not later than, the date of import.**

