



COUNTRY REPORT - INDIA

By

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National Safety Council



National Safety Council
expresses its sincere thanks to the
Management of Korea Occupational
Safety and Health Agency (KOSHA),
Ulsan, Korea for inviting NSC to
attend this training programme on
Occupational Safety and Health

NSC Headquarters at Navi Mumbai



About NSC



- ❑ **Set up by the Ministry of Labour, Govt. of India on 4th March 1966**
- ❑ **As an independent, non commercial, non-profit making and autonomous body at the National level**
- ❑ **Registered as Society under Societies Registration Act, 1860 and Trust under Bombay Public Trust Act, 1950.**

About NSC



Infrastructure

- ☐ 2240 sq. m. carpet area
- ☐ Training Centre
- ☐ Auditorium
- ☐ Board Room
- ☐ Library
- ☐ Dining Room

Human Resource

Director General	1
Deputy Director G	1
Director	3
Advisor	2
Deputy Director	2
Assistant Director	8
Technical Officer	1
Staff	37
Total	55

About NSC



Consultancy Services



- ☐ **Safety Audits**
- ☐ **Fire Safety Audits**
- ☐ **Electrical Safety Audits**
- ☐ **Risk Assessment / Analysis**
- ☐ **Health Impact Assessment**
- ☐ **HAZOP Studies**
- ☐ **Safety Studies**
- ☐ **Safety Awareness Surveys**
- ☐ **Preparation Review of On-site Emergency Plan**
- ☐ **Preparation of Safety Report**
- ☐ **Preparation of Safety Manuals etc.**



Training



Developing and Conducting Safety Training for :

- ☐ Executives
- ☐ Workers Representatives /
Trade
- ☐ Union Officials
- ☐ Workers
- ☐ Safety Professionals
- ☐ Safety Committee Members
etc.



Appreciation Programmes



Recognizing manufacturing and construction sectors by giving them Safety Awards at National Level for developing and sustaining Occupational Safety & Health Management Systems and Procedures



Promotional Materials



- ☐ National Safety Calendar
- ☐ HSE Diary
- ☐ Safety Posters
- ☐ Pocket Guides
- ☐ Safety Films (8 films)
- ☐ HSE articles
- ☐ Industrial Safety Chronicle (Quarterly)
- ☐ Industrial Safety News (Bimonthly)
- ☐ HSE Guides (4 vol.)
- ☐ Guide Book on Fire Safety



OSH Related LAWS & REGULATIONS in INDIA



Background



- Cotton mills were established in 1851 in India.
- Conditions in mills was not good..
- Factory owners exploited men, women, children by taking work from them in complete disregard of their health and strength.
- The first Factories Act passed in India in 1881.
- It has then steadily convert into welfare measures.
- Comprehensive act was enacted immediately after independence and named as “The Factories Act, 1948”.

BHOPAL TRAGEDY

2 DEC 1984



31 years later.....



"People think all the girls here are infected. They don't want to marry here. You will find unwed, overage girls in almost every home."

-- Says Bano Bi



Accident Statistics of Factories in INDIA

By

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Assistant Director (Tech)
National Safety Council

Growth of Factories - Year wise

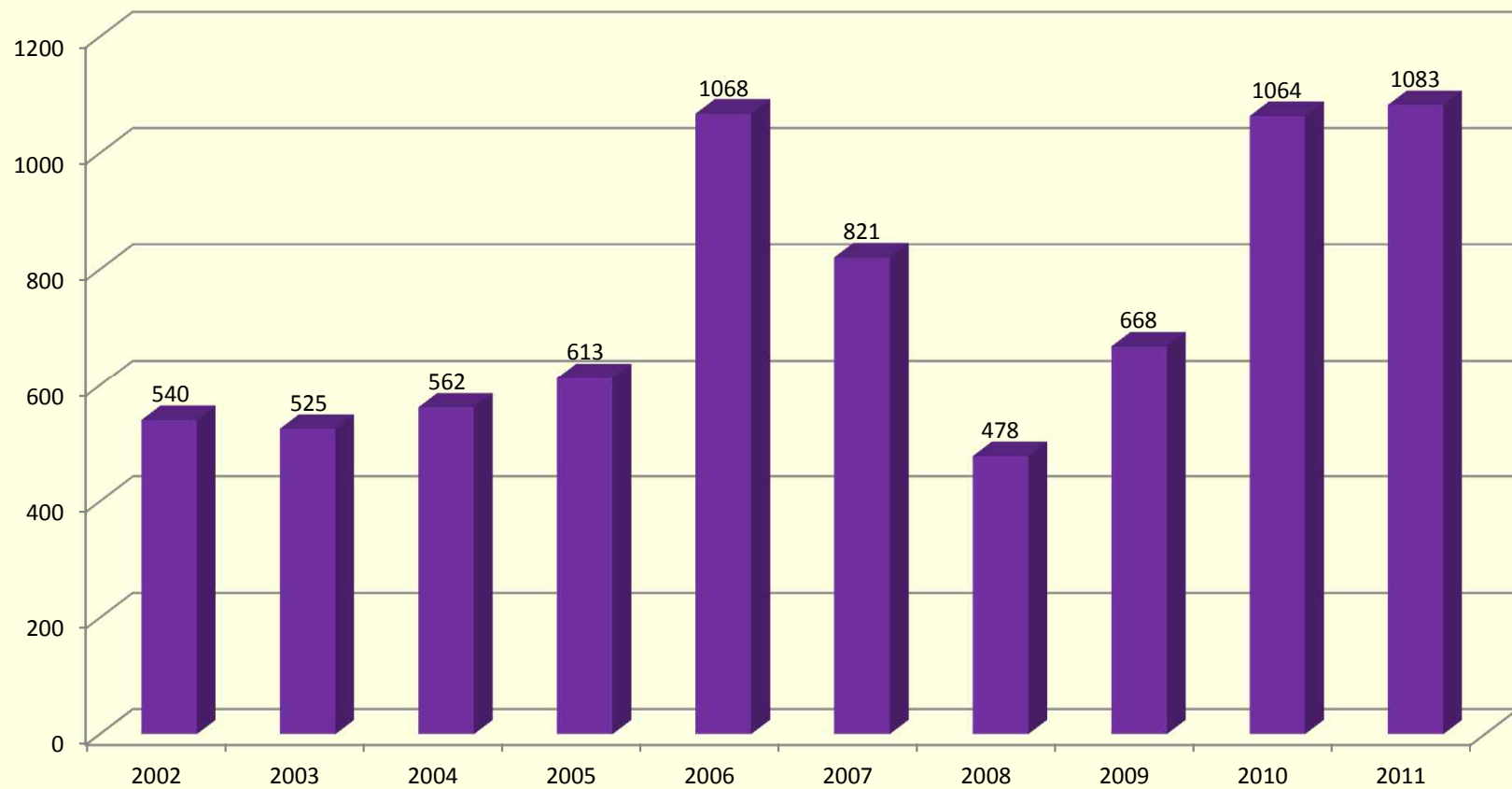


- No. of working Factories under public sector
- No. of working Factories under private sector
- Total No. of working Factories

Industrial Fatal Injuries



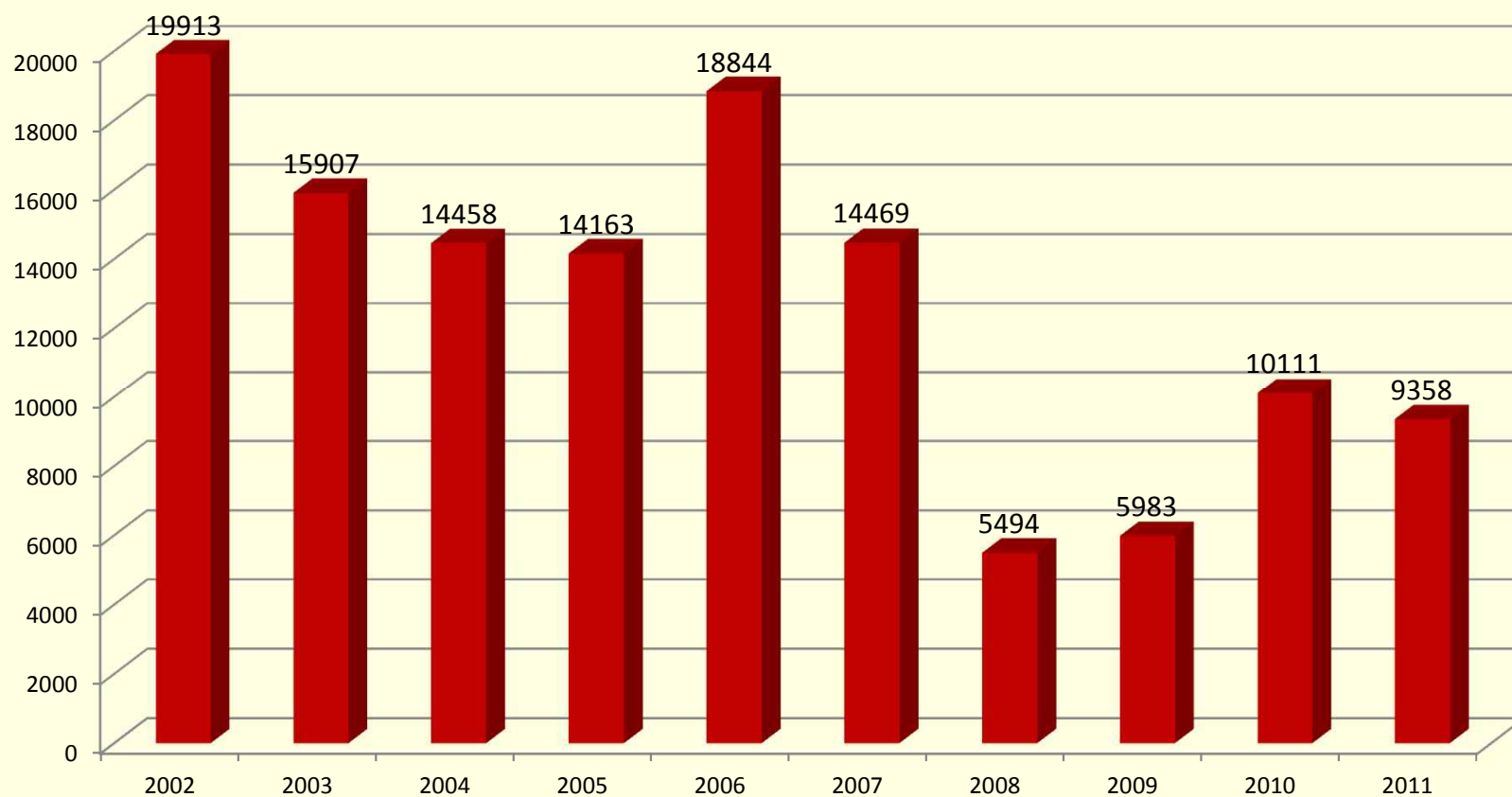
No. of Fatal Injuries



Industrial Non- Fatal Injuries



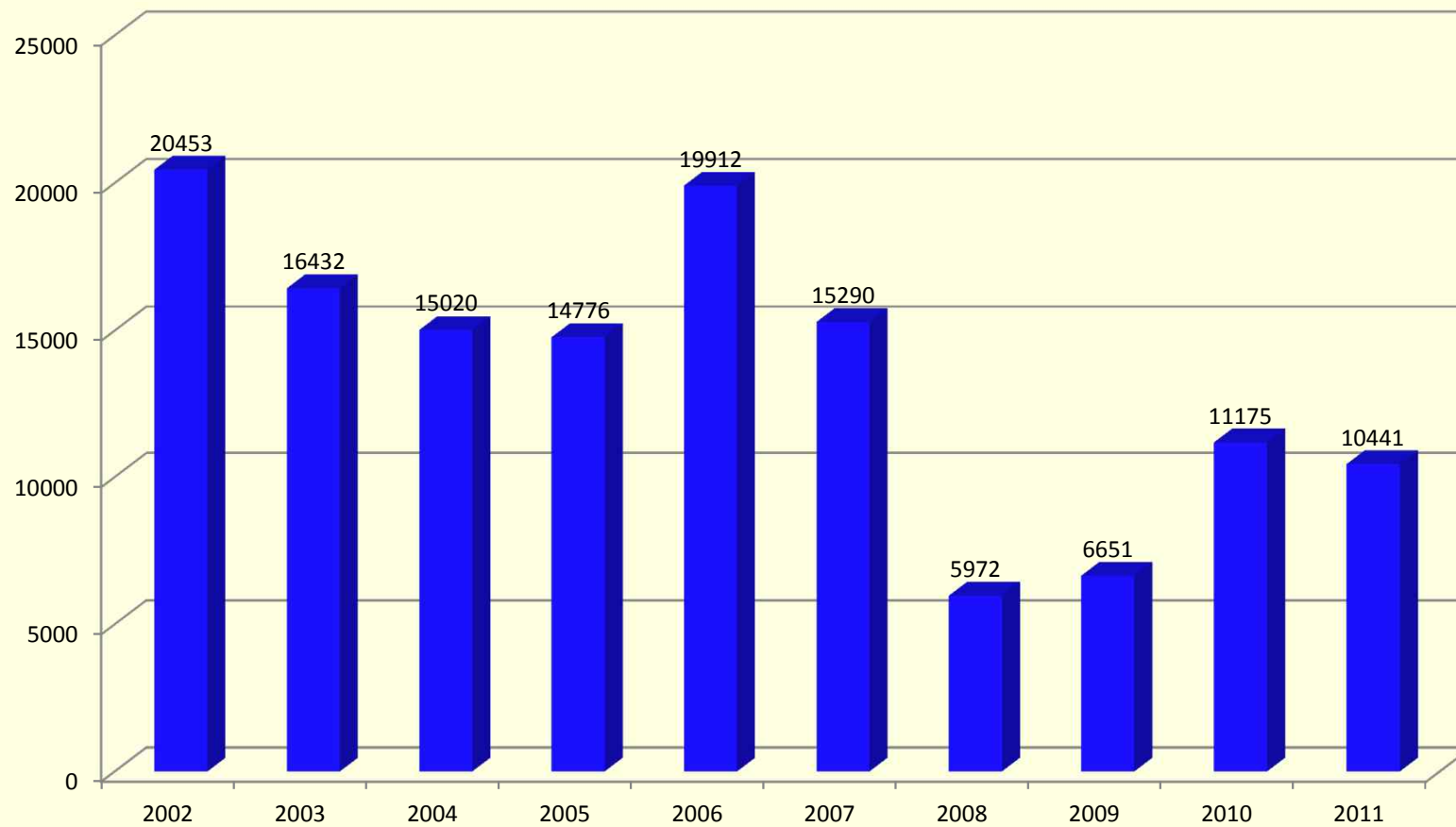
No. of Non-Fatal Injuries



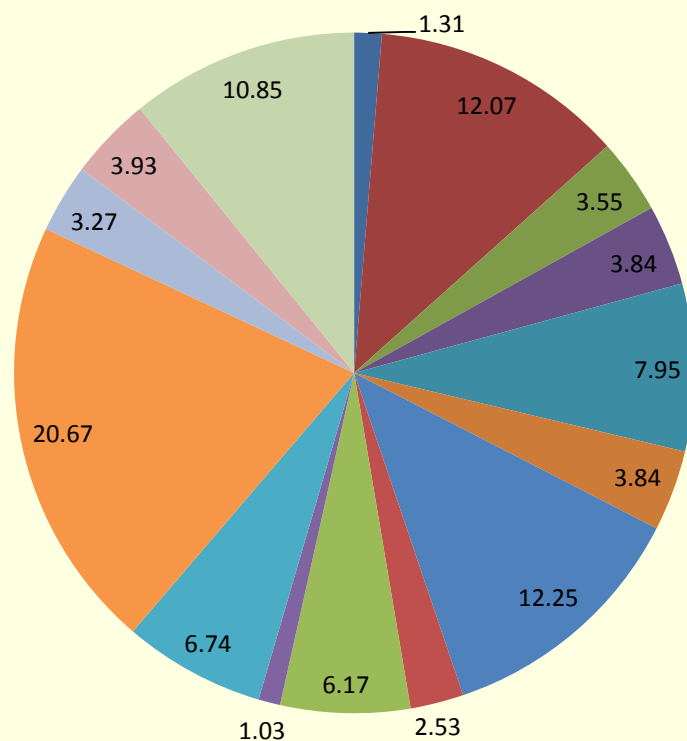
Total Injuries



Total Injuries

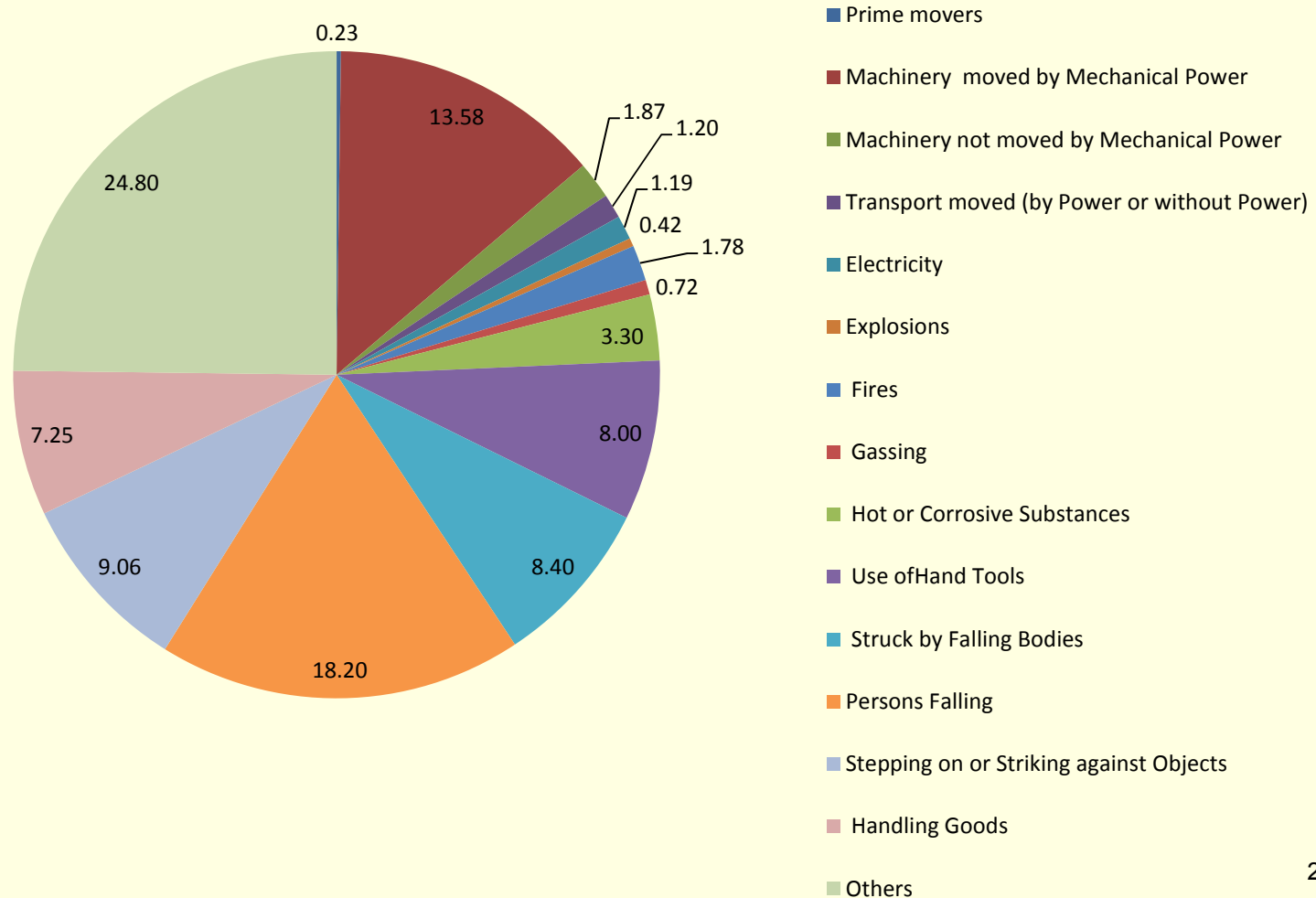


Industrial Injuries in Factories by Causes - Fatal



- Prime movers
- Machinery moved by Mechanical Power
- Machinery not moved by Mechanical Power
- Transport moved (by Power or without Power)
- Electricity
- Explosions
- Fires
- Gassing
- Hot or Corrosive Substances
- Use of Hand Tools
- Struck by Falling Bodies
- Persons Falling
- Stepping on or Striking against Objects
- Handling Goods
- Others

Industrial Injuries in Factories by Causes - Non-Fatal





Law Applicability

Started implementation of Laws & Regulations:

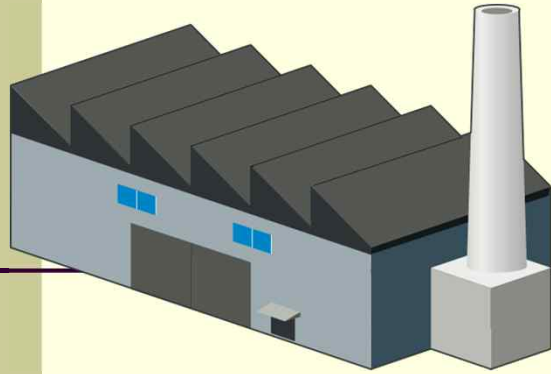
Factories Act started to implement in 1948 which is basically prepared for the Welfare of the labours.

The Factories Act, 1948 came into force on the 1st day of April, 1949 and extends to the whole of India.

Amendments after 1948 i.e. in 1950, 1954, 1956, 1976, 1987, 2001 and now proposed in 2014.



After Bhopal Tragedy, The 1987 amendment marks the major turning point in the history of the Factories Act. The amendment is based on Health & Safety at Work Act, 1974 of UK and in line with the ILO convention 155 (1981) on occupational health and safety. The health of the workers becomes the focal point.



Factory



“Factory”- premises where
Ten workers are working
with aid of power and
Twenty workers are
working without aid of
power.

Main Chapters



Chapter	Topics
I	Preliminary
II	The inspecting staff
III	Health
IV	Safety
IV – A	Provisions related to hazardous process
V	Welfare
VI	Working ours of adults
VII	Employment of young persons
VIII	Annual leave with wages
IX	Special Provision
X	Penalties and Procedures
XI	Supplementary

Provisions relating to hazardous process (Chapter IV-A).



The main features of this amendment are:

41-A to 41-H are the provisions relating to hazardous process to take care of Occupational Health and Safety.

Factories Act, 1948 should be followed by:

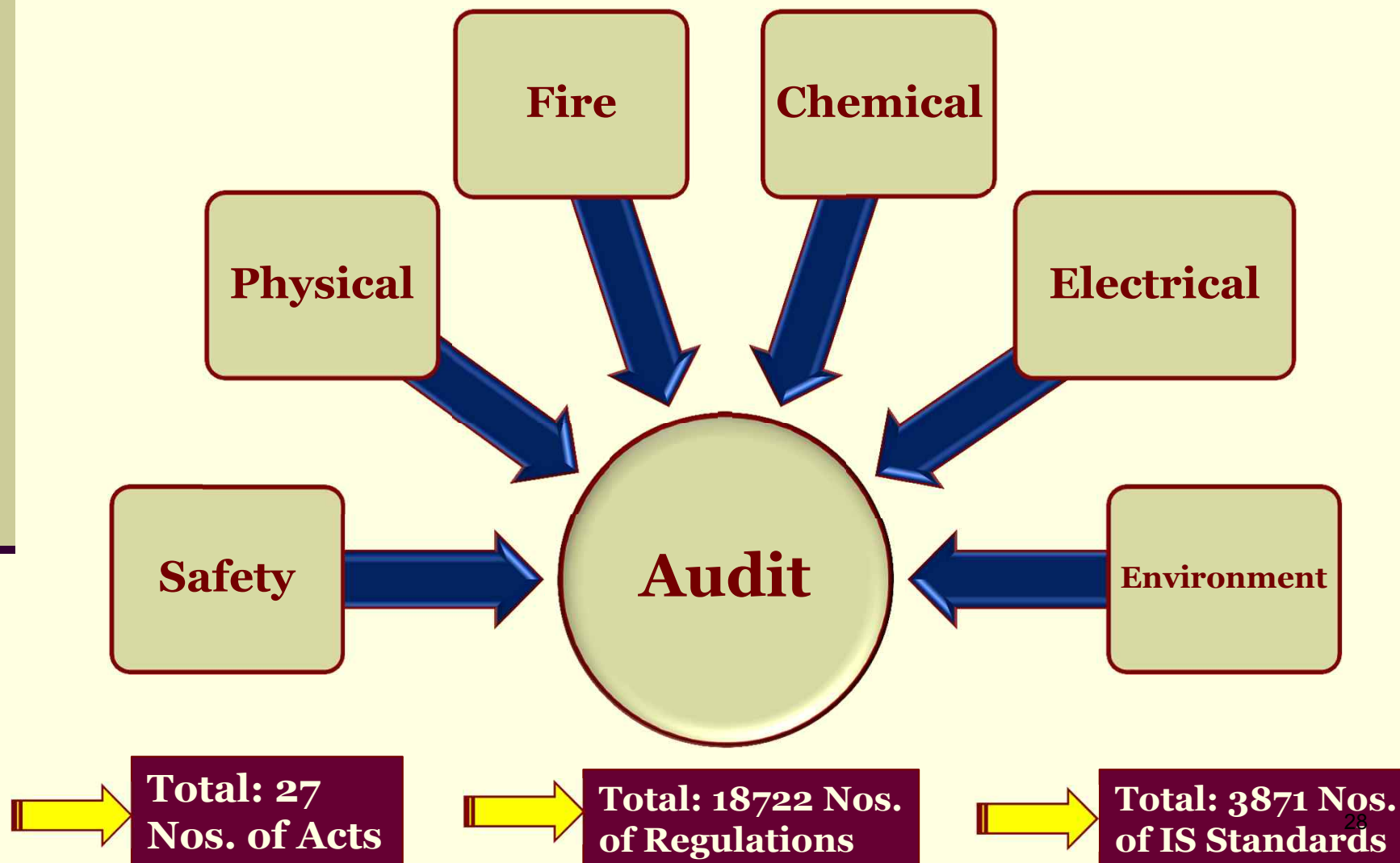
- 1. Occupier**
- 2. Worker**
- 3. Visitor**

Permission for Licenses to be taken from



- i. **Factory License: Directorate Industrial Safety and Health, State Government : Factories Act, 1948**
- ii. **Discharge of Air & Water : State & Central Pollution Control Board**
- iii. **Authorization of Hazardous Waste & Bio-medical Waste: Hazardous Waste Rules, 2008**
- iv. **License for import and Store Petroleum class A/B/C: Petroleum Act, 1934 and Petroleum Rules, 2011.**

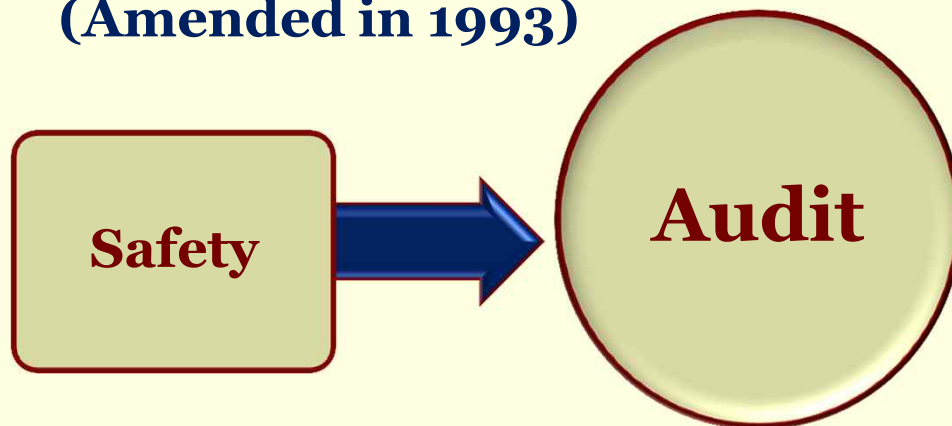
Safety Audit System as per IS 14489:1998



Safety Management System should take care of:



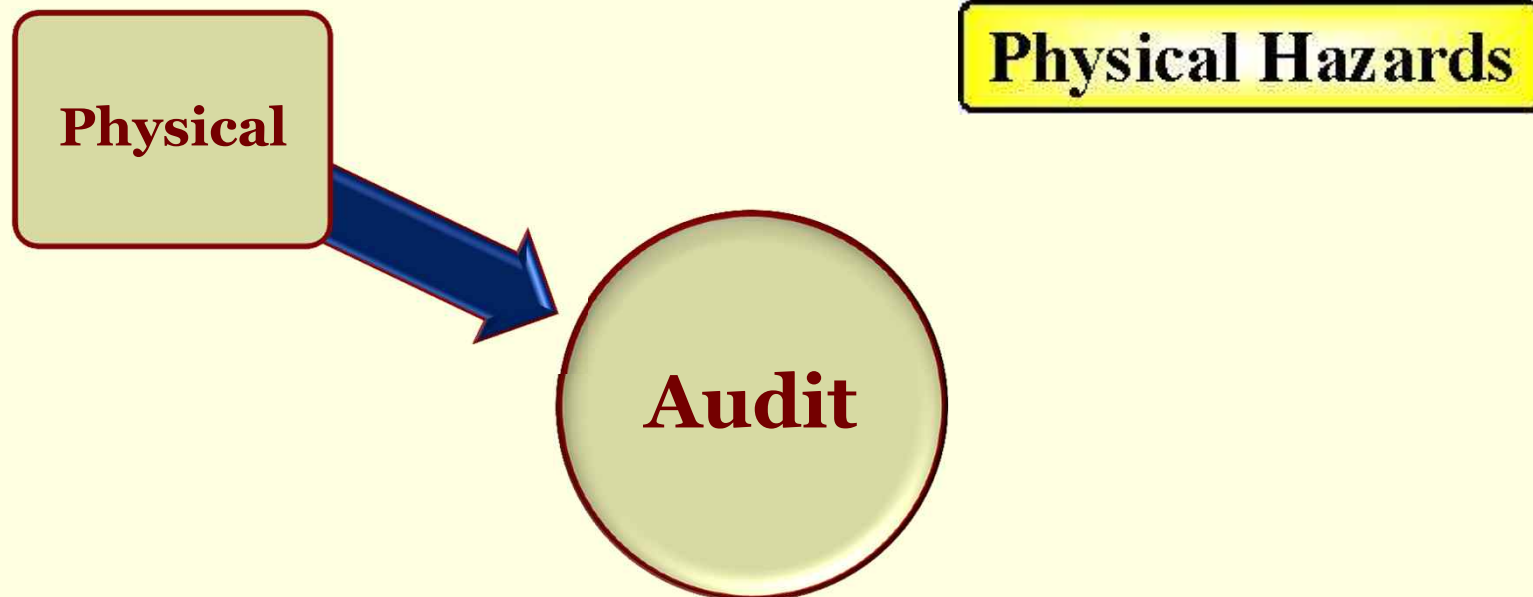
- i. The Factories Act, 1948**
- ii. State Factory Rules of respective States**
- iii. The Mines Act, 1952**
- iv. The Dock Workers (Safety, Health & Welfare) Act, 1986**
- v. The Building and Other Construction Workers (Regulation of Employment & Conditions of Service) Act, 1996**
- vi. The Shops and Commercial Establishments Acts**
- vii. Public Liability Insurance Act, 1991 and Rules 1991 (Amended in 1993)**



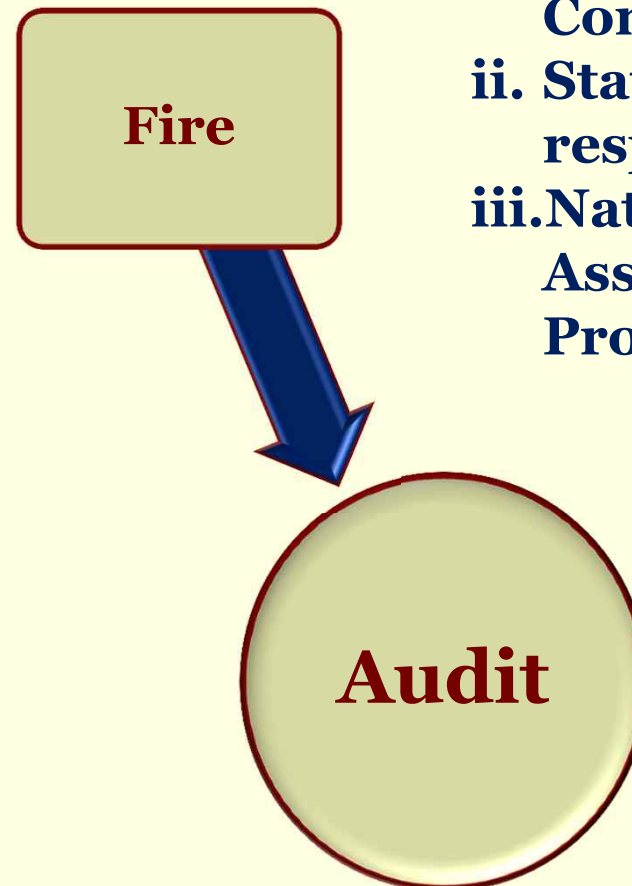
Physical Hazard Management System should take care of:



- i. The Indian Boilers Act, 1923 (amended 2007)**
- ii. The Dangerous Machines (Regulation) Act, 1983**
- iii. The Motor Vehicles Act, 1988 (amended 2013)**
- iv. Storage license under SMPV (Unfired) Rules, 1981 (As amended in 2002)**



Fire Management System should take care of:



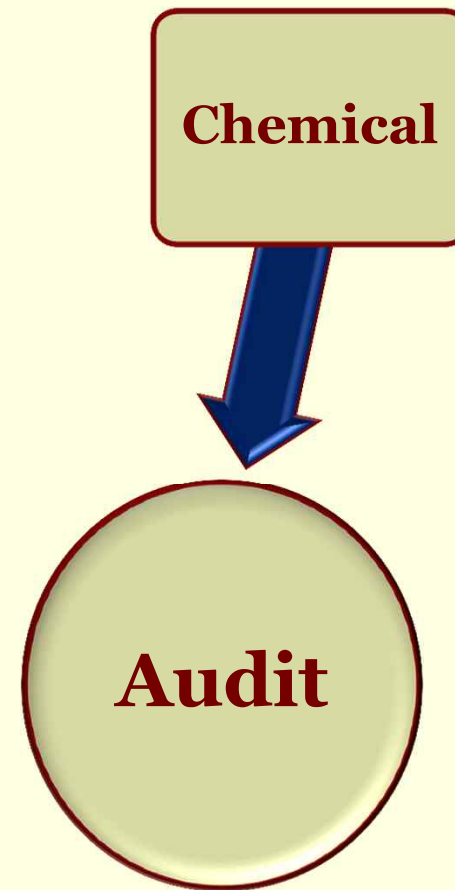
- i. Tariff Advisory Committee Fire Manuals**
- ii. State Factory Rules of respective States**
- iii. National Fire Protection Association – Fire Protection Handbook**



Chemical Hazard Management System should take care of:



- i. The Explosives Act, 1884 (amended 1983)
- ii. The Petroleum Act, 1934
- iii. The Inflammable Substances Act, 1952
- iv. The Insecticides Act, 1968 (amended 2000)
- v. The Oilfields (Regulation and Development) Act, 1948
- vi. The Petroleum and Natural Gas Regulation Board Act, 2006
- vii. The Disaster Management Act, 2005
- viii.. The Atomic Energy Act, 1962 (amended 1987)



Chemical Hazard Management System should take care of:



- i. The Petroleum Rules, 2002 (amended 2011)**
- ii. The Calcium Carbide Rules, 1987**
- iii. The Cinematograph Film Rules, 1948**
- iv. The Insecticides Rules, 1971 (amended 2006)**
- v. The Petroleum and Natural Gas (Safety in Offshore Operations) Rules, 2009**
- vi. Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989 (As amended in 2004).**

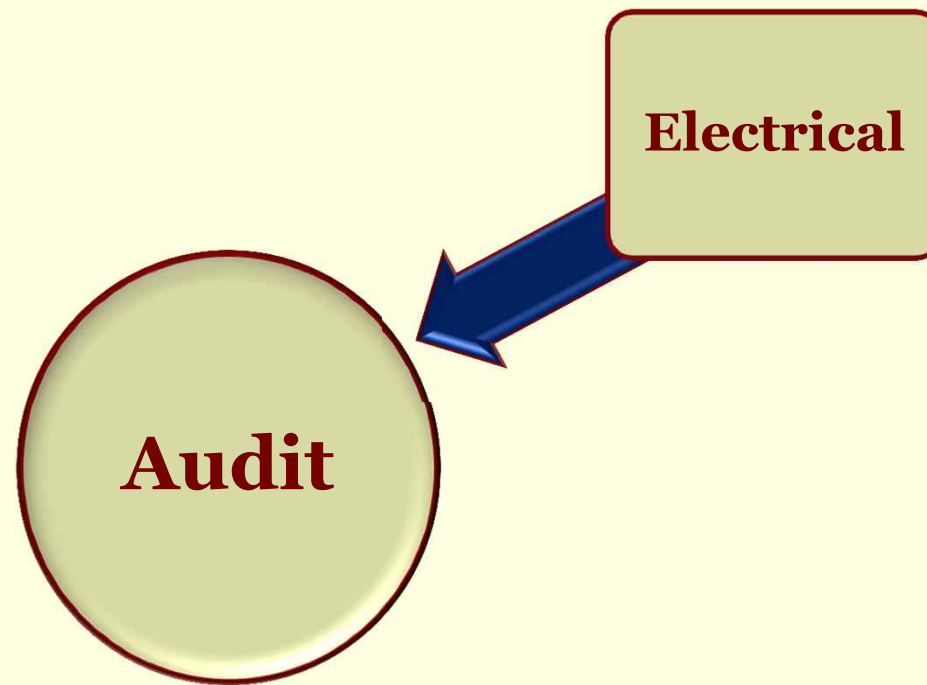
As per MSIHC Rules, 1989, Every organization which Manufacture, Storage and Import of Hazardous Chemicals should carried out as follows:

- i. Safety Report : Rule 10-12**
- ii. Safety Audit : Rule 10-12**
- iii. On-Site Emergency Plan – Rule 13**
- iv. Risk Assessment and Consequence Modeling – Rule 10.1
Schedule 8**

Electrical Hazard Management System should take care of:



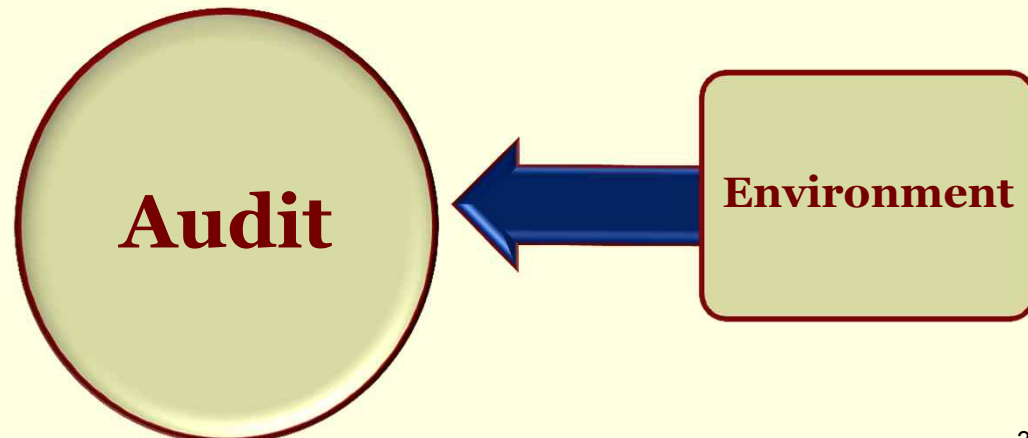
- ✓ The Central Electricity Authority (Measures Relating to Safety & Electricity Supply) Regulations, 2010
- X The Electricity Act, 2003 (amended 2007) and The Indian Electricity Rules, 1956 (amended 2006)



Environment Management System should take care of:



- i. The Environment (Protection) Act, 1986 (amended 1991)**
- ii. The Water (Preventions Control of Pollution) Act, 1974 (amended 1988)**
- iii. The Air (Prevention & Control of Pollution) Act, 1981 (amended 1987)**
- iv. The National Green Tribunal Act, 2010**
- v. The Energy Conservation Act, 2001 (amended 2010)**
- vi. The Hazardous Wastes (Management, Handling and Transboundry Movement) Rules, 2008 (amended 2010)**



What is Risk Assessment



In India, we are carried out two types of Risk Assessments are as follows:

- 1. Qualitative Risk Analysis: for all type of industries and services : OHSAS 18001**
- 2. Quantitative Risk Analysis: For Chemicals – Airborne and Flammable Chemicals : IS 15656**

Qualitative Risk Analysis



Why discuss OHSMS?

To Know what is –

- ☐ Hazard
- ☐ Risk
- ☐ Relationship between Hazard and Risk
- ☐ Preventive and control measures



Assessment for the safety of activities/places /operation, such as lathe machine, substation, placement of cylinders, construction.

Hazard



A **source** or **situation** with a potential to cause harm in terms of human injury or ill health, damage to property, damage to the environment or a combination of this.



Source

Situation

Risk



The combination of frequency, or probability of occurrence and consequence of a specified hazardous event.



Minor injury
due to slip or
fall

Serious
Injury/death
due to fall
from cliff

Prevention and Control Measure



Prevention/Elimination

Containment/Isolation

Education/Training

PPE

ERICPD



Provide
Waste Bin

Provide
barriers or
warning
signs



Relationship between Hazard & Risk



- ❖ Accidents don't just happen
- ❖ Illness is not random
- ❖ Fatalities are not fated

They are caused

Hazard

Dust

Work at height

Work with VDU

Flammable Chemicals

Electricity

Risk

Respiratory illness

Falls

Eye strain/Back ache

Fire / Explosion

Electrical shock



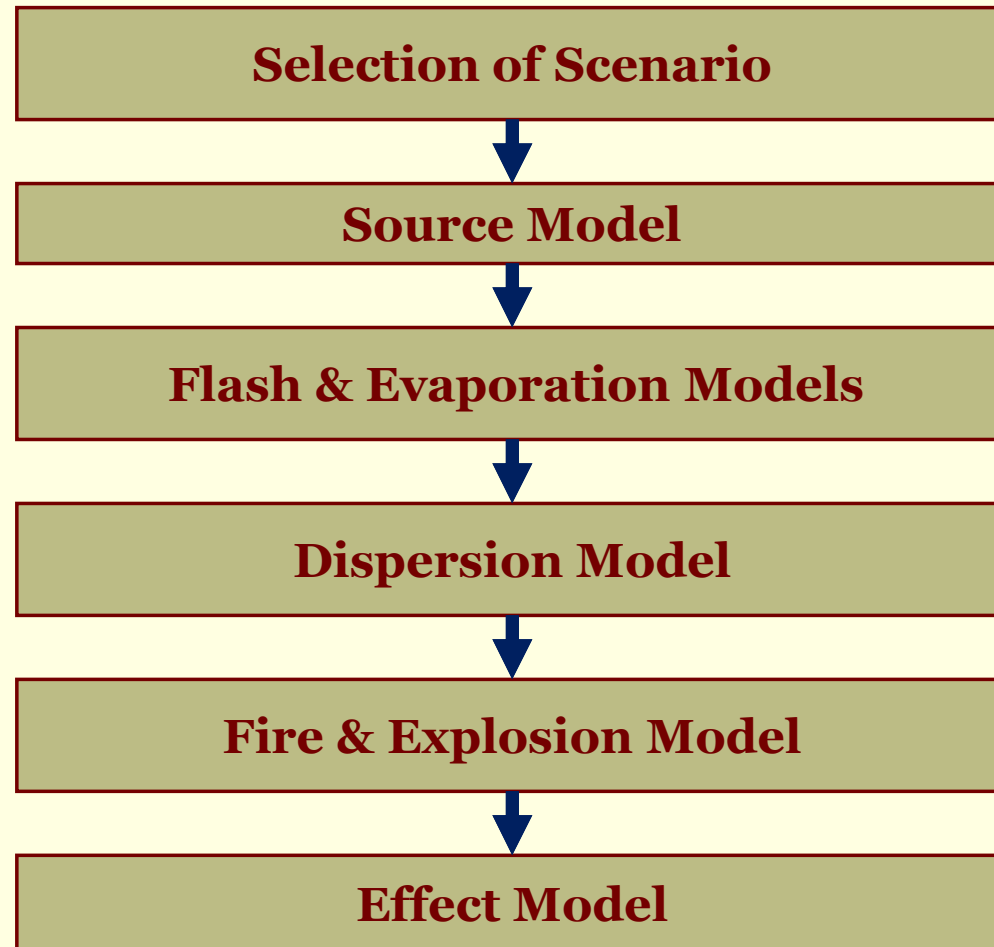
Quantitative Risk Analysis



- ❑ **Identification of Hazard** – Finding hazardous areas in plant/industry
- ❑ **Consequence analysis** – How far the effect can spread - at what intensity
- ❑ **Frequency estimation** – What is chance of the release – historical evidence
- ❑ **Risk calculation** – Combining Consequence and Frequency

****In India, we are carried out Consequence Modeling and Risk calculation by using DNV Phast Risk 7.1 Software, ALOHA Software and by Hand Calculation**

Steps Consequence Analysis



Selection of Scenario

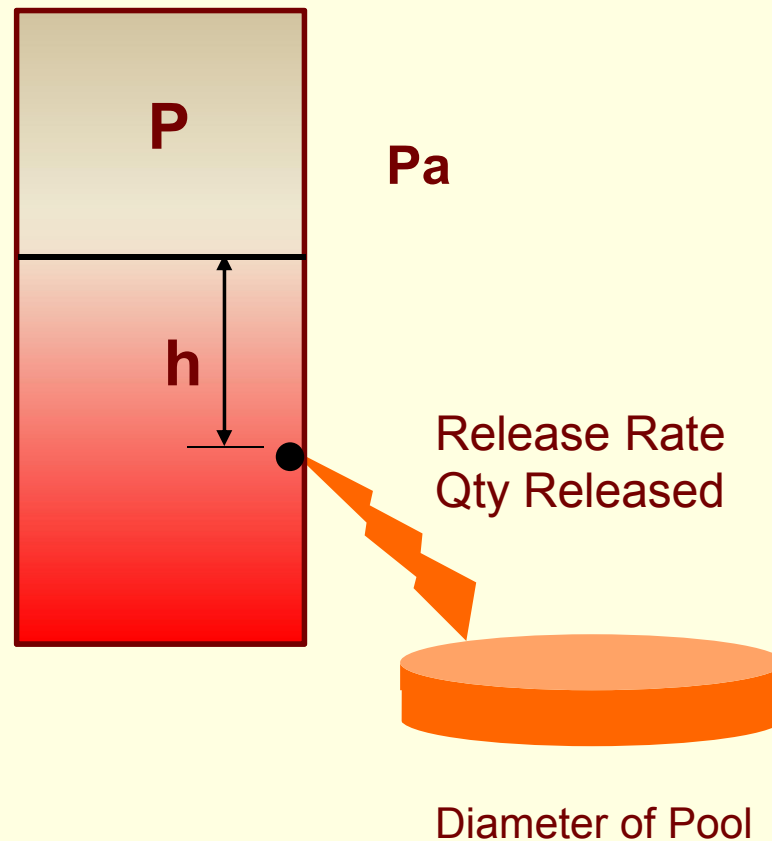


Results loss of containment which can be hazardous properties like toxic, flammable, or both.

Types of Scenarios are as follows :

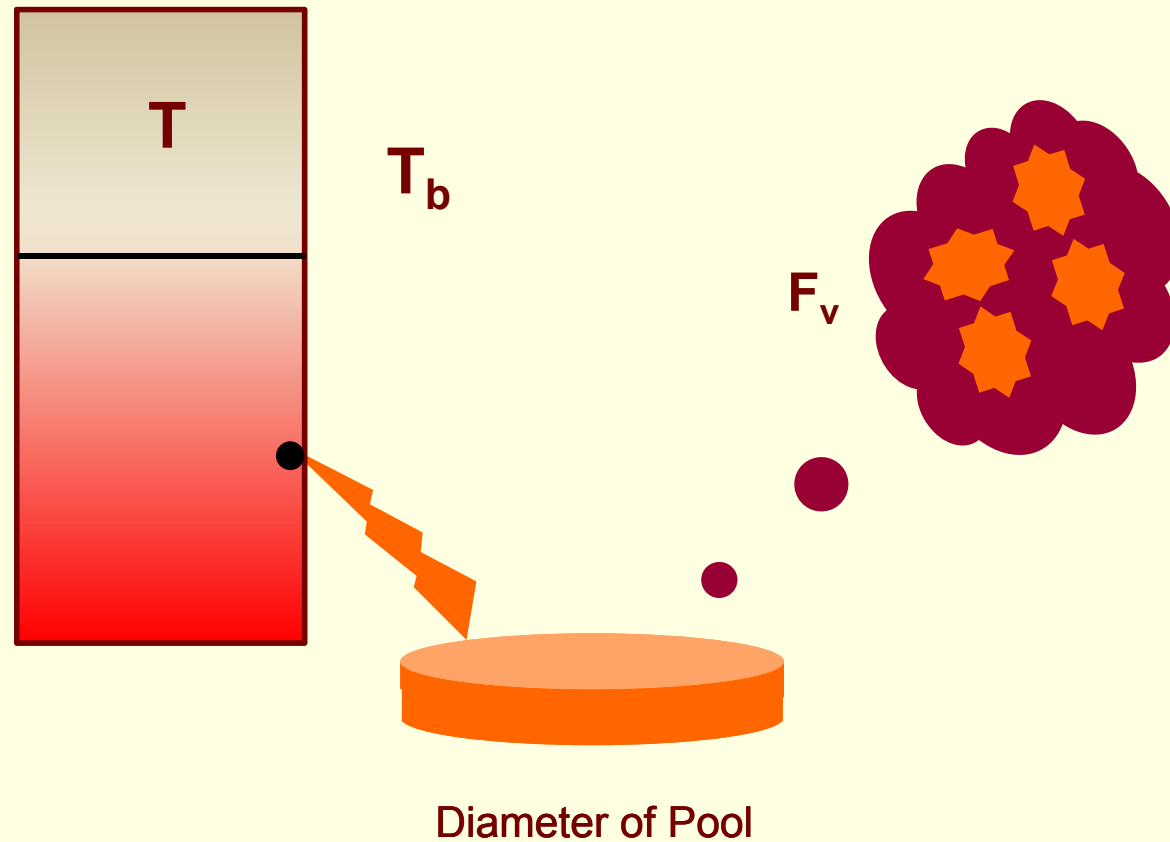
- **Rupture of vessel**
- **Hole in Vessel / Pipeline**
- **Rupture or break-up of pipeline**
- **Run away reaction, etc.**

Source Model



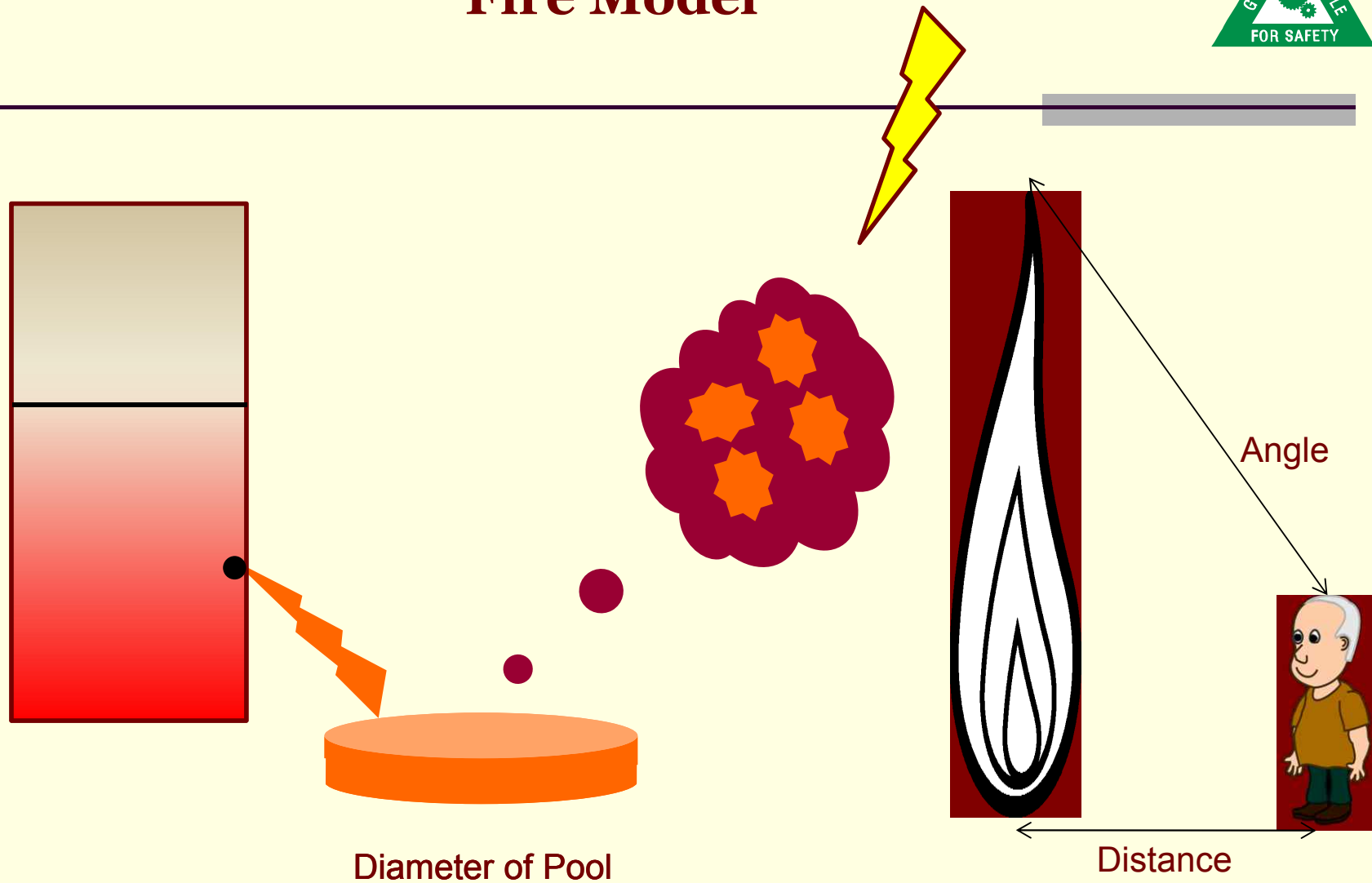
Model describes material discharge from the leak

Flash & Evaporation Model



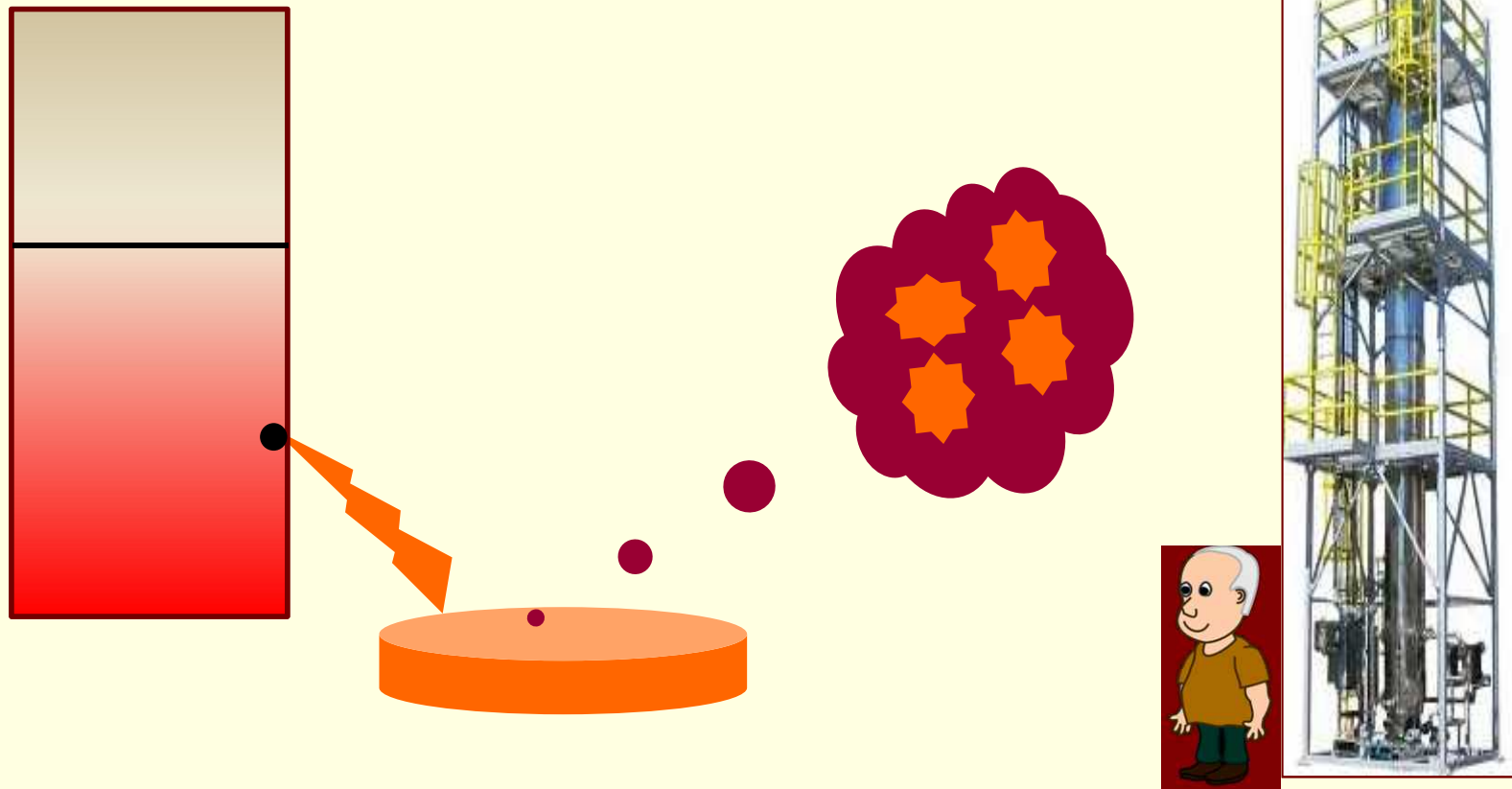
Model estimate total vapor rate to form a cloud

Fire Model



Fire Model converts Source Model into Energy Hazard model

Effect Model



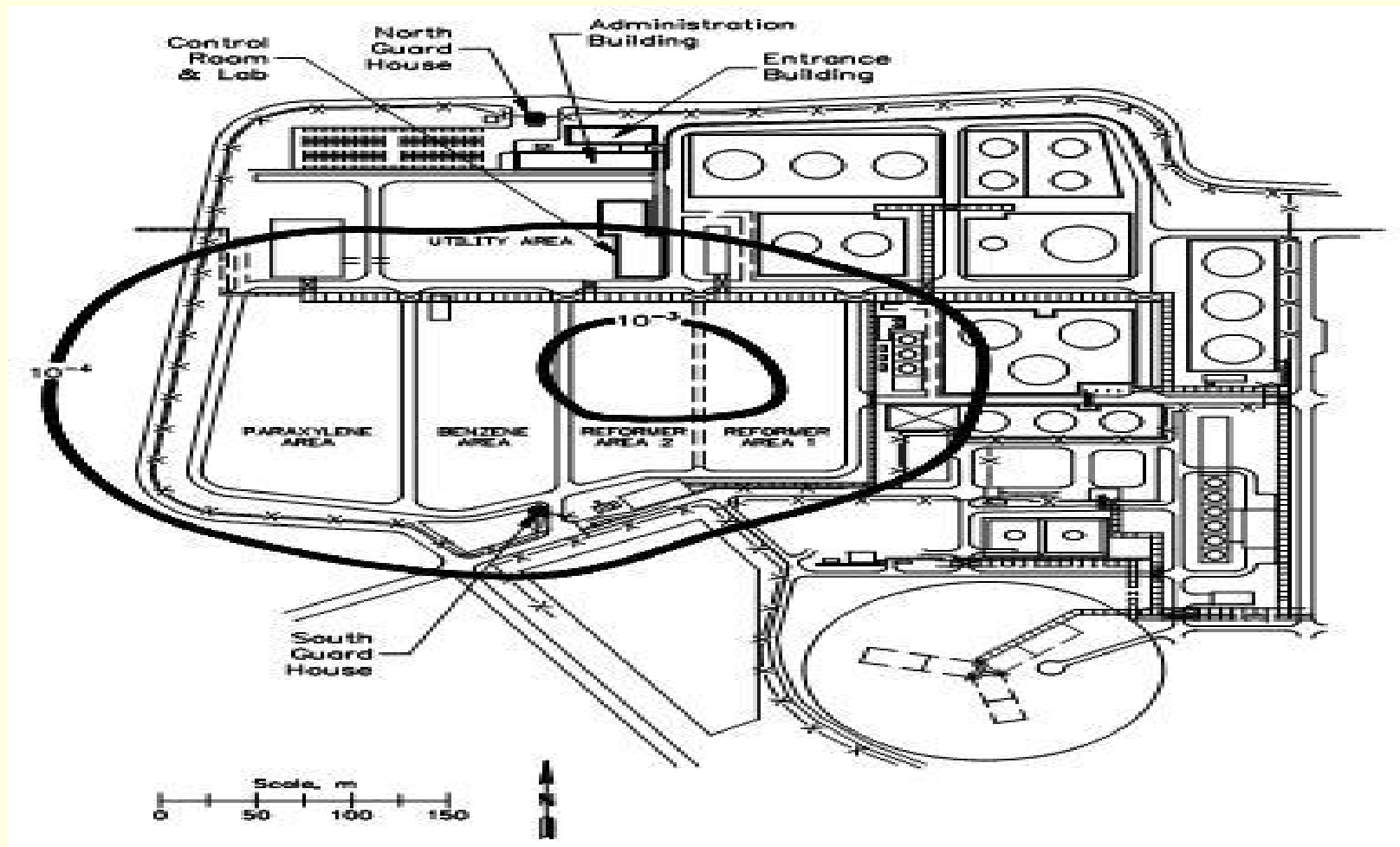
Model describes effect of dispersion or energy hazard on people and structures

Applicability of Consequence Analysis



Model	Applicability
Source	Estimating discharge rates, total quantity released etc.
Flash and Evaporation	Calculating the rate at which the material becomes air borne
Dispersion	Downwind concentration of the airborne quantity
Fire and Explosion	Thermal radiation and explosion overpressures
Effect	Thermal radiation, overpressure and toxic concentration results into effects on people and structures.

Result of Consequence Analysis





THANK YOU





**On behalf of NSC and on behalf of the Team,
We are thankful to KOSHA Management for
arranging this kind of Informative Training
programme. We are also thankful for the
warm hospitality extended to us.**

**We look forward to further collaborative
activities.**