ISEI-SM

(SAFETY MANAGEMENT AT WORKPLACE)

Prepared by

Institution of Safety Engineers (India)

www.iseindia.in

INSTITUTION OF SAFETY ENGINEERS (INDIA)

Welcome

in training

ISEI-SM (Safety Mgt. at work place)

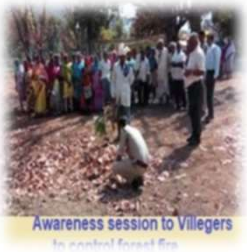
on

22/07/2024

MEMBERSHIP SERVICES

JOURNAL PUBLICATION

SAFETY HEALTH ENVIRONMENT RELATED TRAINING & SERVICES



ABOUT US

Institution of Safety Engineers (India) is Non - Profitable organisation set up in year 2012 under ZJEW Trust, Govt. Reg. No. 5240 & Regd. Under Govt. of India and working with objective to prevent accident, protect environment & minimize losses during disaster. Institution of safety engineers (India) imparting Safety, Health, Environment & quality related training to needy & provide similar services to industries, organization, institution to achieve zero harm.

OUR SPEAKER

DR. S RAMPURI

PhD, Chartered Engineer (CEng), M.Tech (Env. Science & Engg.), M.I.E, A.M.I.E (Mech. Engg.), B.Tech (Electrical), NEBOSH-IGC, IOSH-MS, ADOSHEM, Lead Auditor (ISO 9001:2015, ISO 14001:2015, ISO 45001:2018, BS OHSAS 18001:2007, ISO 50001:2011**), PGHRD, PGDGC, OSHA-30 Hours Training, IDOHSEM, SMISE, ADOHSEM, M.Sc (Disaster Management)** with ***Post Dip. In Industrial safety*** from ***Regional Labour Institute*** (Government of India, Ministry of Labour & Employment) –Kolkata, with **18+ Yr's Experience** in Manufacturing, Production, Engineering, Construction & contracts company as EHS & Sustainability Professional in India & Abroad.

COURSE MODULE

- Principle of Safety Mgt.
- Hazard identification
- Risk Assessment & Control at work Place
- Practical, Assessment & Report

COURSE OBJECTIVE

Aim of this course is to provide essential skills & Knowledge to professional to control work place risk.

1
- Lesson 1
- Introduction

2
- Lesson 2
- Terms & Definition

3
- Lesson 3
- Reason to Manage Safety at work place

4
- Lesson 4
- Principle of Safety Management

5
- Lesson 4
- Cause of Accident& its Control Prevention Strategies

6
- Lesson 5
- Hazard in Industries & hazard Control method

7
- Lesson 6
- Safety Management System (SMS) & Its Element

8
- Lesson 7
- Housekeeping & PPE's

9
- Lesson 8
- Performance Evaluation
- Leading Indicator & Lagging Indicator

10
- Conclusion,
- Question & Answer

CONTENT OF COURSE

11
- **Lesson 1**
- **Fire Safety**

12
- **Lesson 2**
- **Risk Control at work place (Working at height, Welding, Gas cutting, Ladder, Safety Scaffolding, Safety, Gas Cylinder Storage Safety, Hoisting & Rigging Safety, Fork Lift Safety etc.**

13
- **Lesson 3**
- **Safety Culture including BBS**

14
- **Lesson 4**
- **Safety Inspection, checklist Based inspection, HIRA, JSA, Accident Investigation, Safety Audit**

15
- **Lesson 5**
- **Machinery Safety, Radiation Safety, Electrical Safety, Chemical Safety, Ergonomics, Hotel & Hospitality industries safety etc.**

16
- **Lesson 6**
- **IS14489, ISO 45001, ISO 14001, ISO 9001 & Legislation**

17
- **Lesson 7**
- **Safety Reporting**

18
- **Lesson 8**
- **Conclusion,**
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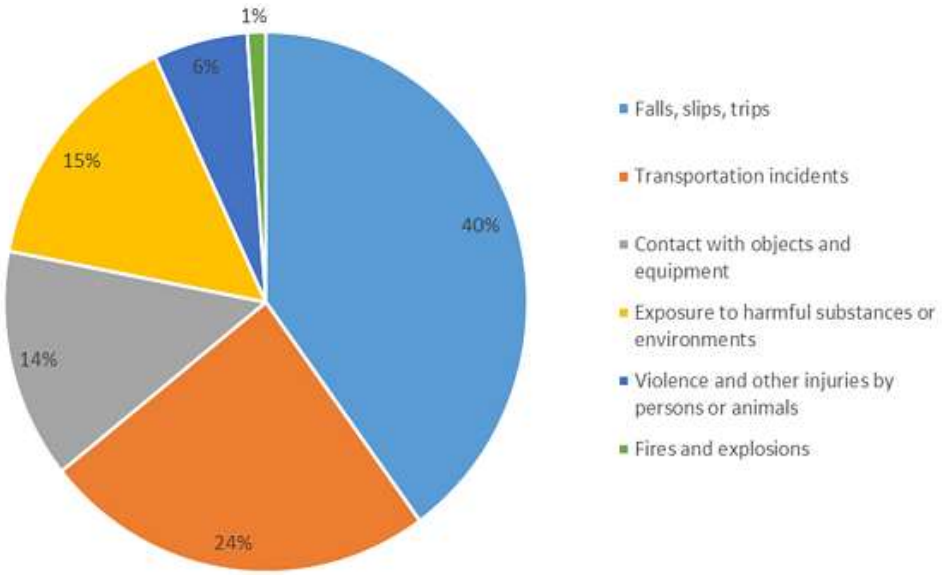
SAFETY MANAGEMENT AT WORKPLACE

Industries playing vital role to growth country in Term of Economy, create employment opportunities. Industries has positive and Negative impacts. Positive impacts is good for country development and it create employment opportunities. Negative impacts is injury, Death of person and damage of environment and this harmful for any country.

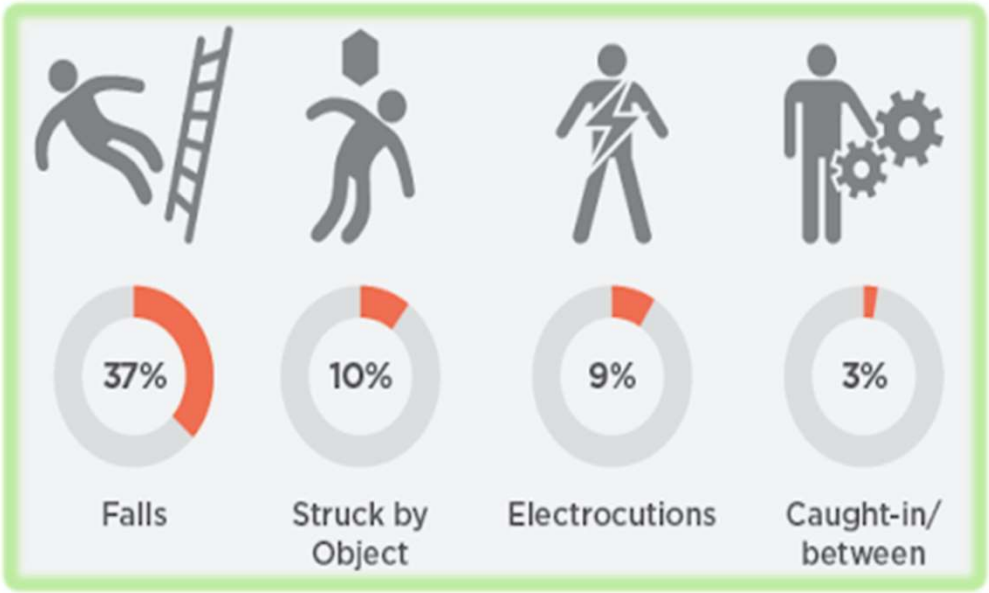
Each and every year several accident occur in industries due to ineffective safety management system. Effective safety management system always help to create safe healthy work environment.

To Control work place risk is essential parameter to success any business.

CONSTRUCTION WORKERS FATALITY BY EVENT OR EXPOSURE

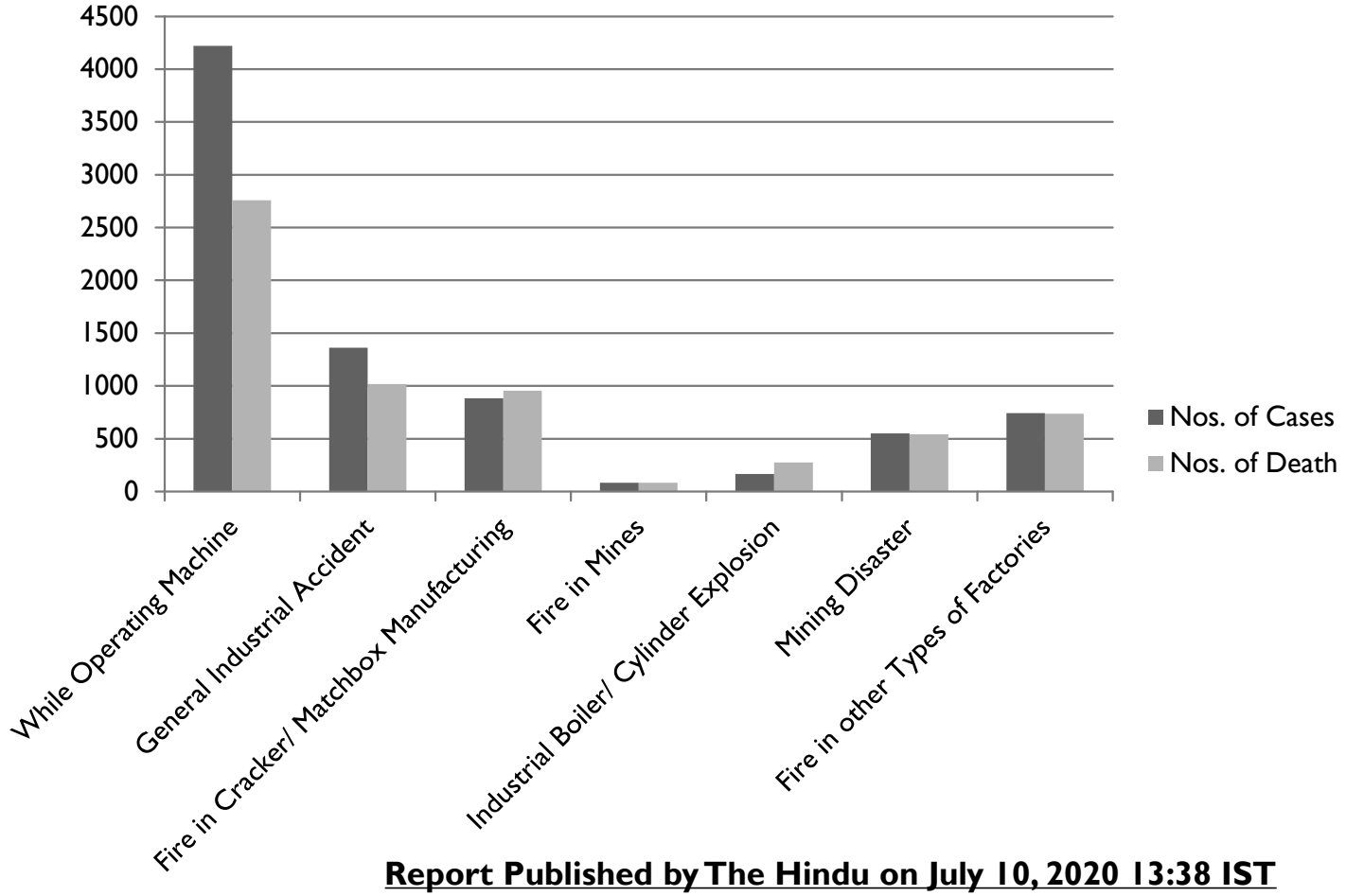


CONSTRUCTION FATAL FOUR



OSHA, USA in year 2013

INDUSTRIAL ACCIDENT 2014-2017



Report Published by The Hindu on July 10, 2020 13:38 IST

REASON TO MANAGE SAFETY AT WORK PLACE

a) Social Need

The accident causes social loss in great magnitude in form of suffering, loss of earning capacity and cost due to disturbance to economic efficiency. The economic costs are more tangible.

b) Management Need

Management bears huge loss due to accident. Cost of accident is two Types Direct & Indirect cost. Indirect cost is several times more than Direct Cost. Direct cost includes medical expenses, compensation to the injured or their families.

c) Legal Need

As per The Building & other construction Act 1996, Factories Act 1948 and several other related Acts & rules the general duty of the employer is to ensure Health & Safety of his employee & protect the Environment.

d) Humatarian Need

The Humanitarian reason for prevention of accidents is based on notion that it is duty of every person to ensure safety of his fellow men

TERM & DEFINITION

Hazard : Source or situation that have potential to cause harm

Accident : Event that results harm in term of injury, fatality or property damage or all together.

Incident: Hazardous event where no harm occurs

Risk : Effect of uncertainty or possibility of loss or injury.

In other term, Combination of Likelihood & Consequences of specific hazardous event occurring

Risk : likelihood (L) of potential hazardous event X

consequence (C) of hazardous event

For example: cement there is a risk that it may cause harm but the levels of risk depend on the circumstances.

Near miss : Narrow escape of injury or harm

Example: A stone falls from height and close to your body but there is no accident or damage to the property

Hazard identification: process of recognizing that a hazard exists and defining its nature of harm.

Hazardous event: occurrence that results in, or has the potential to result in, an accident

Non-Conformity: The non-fulfillment of specified requirement.

Conformity: The Fulfillment of specified requirement

TERM & DEFINITION

Hazard identification: Process of recognizing that a hazard exists and defining its nature of harm.

Health: Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.

Dangerous occurrence: Any occurrence of serious nature which could have caused injury/ death to person but did not, is called dangerous occurrence.

Observation: A statement of fact made in the course of an audit or inspection.

OH & S objectives: Goals, in terms of OH & S performance that an organization sets itself to achieve.

Status review: Formal evaluation of the OH&S management system.

Organization : company, corporation, firm, enterprise or institution or part or combination thereof whether incorporated or not, public or private, that has its own functions and administration.

Ill health: Identifiable disease or adverse health condition that is judged to have been caused by or made worse by a person's work activity or environment

Safety culture: Product of individual and group values, attitudes, competencies and patterns of behaviour that determine the commitment to, and the style and proficiency of, an organization's approach to health and safety.

PRINCIPLE OF SAFETY MANAGEMENT

Safety management begins with incident management.

Safety Management is major parameter of industries business to control work place risk and results of business success.

Causes of Accident in Industries are basically Human & Mechanical Failure.

88% Accident occurs at industries due to unsafe Act, 10% Unsafe condition & 2% Natural causes as per Domino Theory

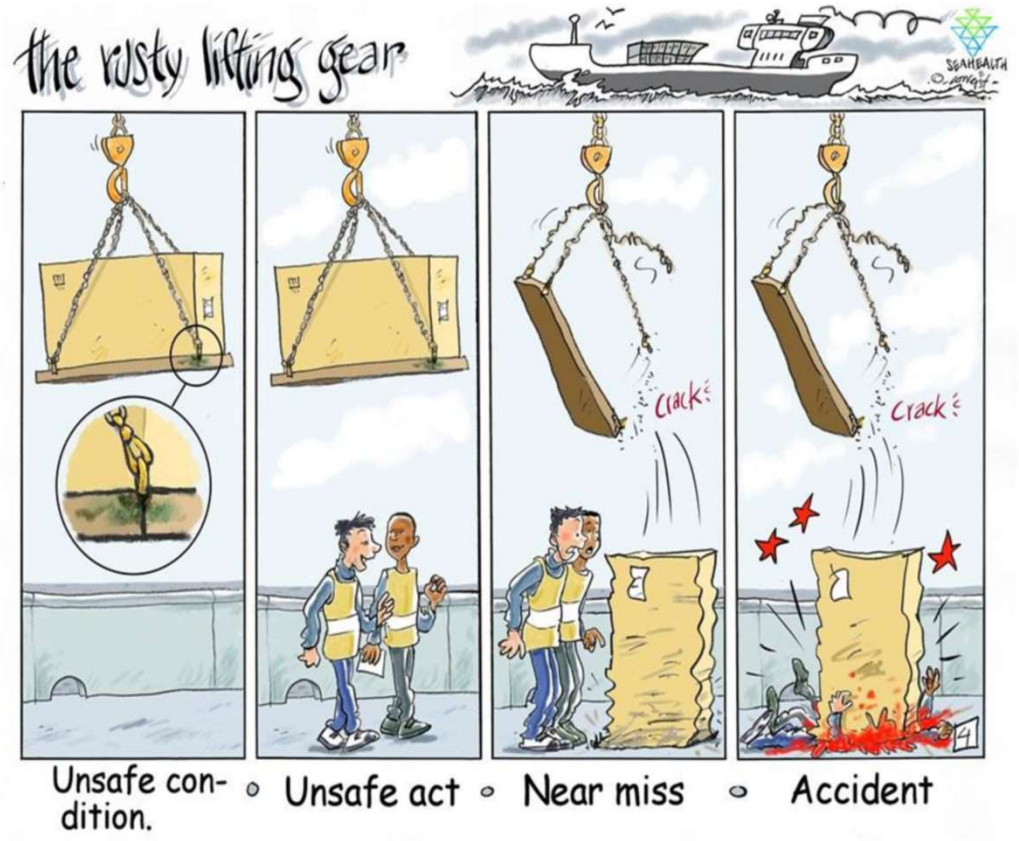
Risk related to industries can be minimised or control up to Tolerable level to take adequate Safety Control measure or Hazard control method.

Accident in a industries can be prevented to Eliminate work place Hazard & Prevent unsafe practices

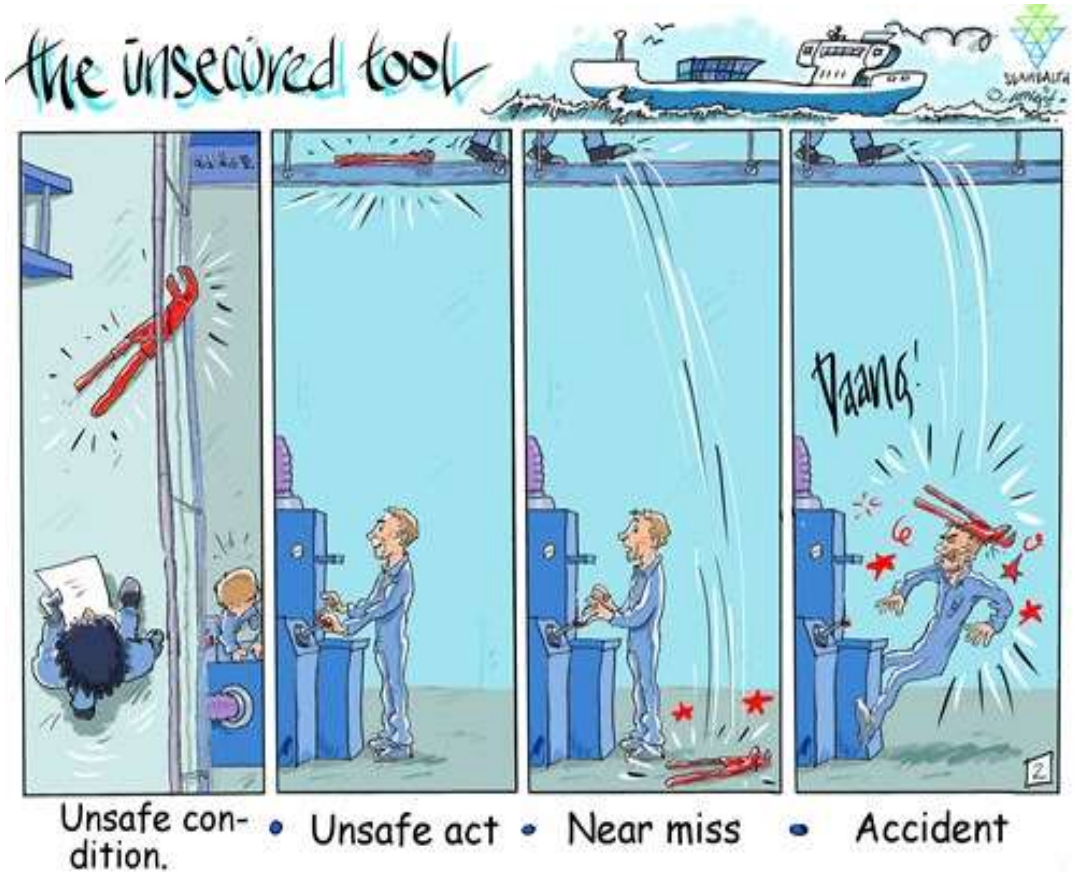
CAUSES OF ACCIDENT IN INDUSTRIES

Unsafe Act & unsafe Condition are basic cause of any Accident . When both conjugate at one point accident happened.

In other words, Human and mechanical failure are caused of accident.



CAUSES OF ACCIDENT IN INDUSTRIES



Un-Safe Act (U.A)

Committing mistake by person or any act that may lead to accident is known as unsafe act. Following are example of unsafe act:

- Working without wearing safety helmet & safety Shoes
- Working at height without wearing full body harness.
- Taking Rest in working Areas
- working or Taking rest below Hanging Load
- Over speeding
- Operating equipment without qualification or authorization.
- Lack of/or improper use of PPE
- Operating equipment at unsafe speeds
- Failure to warn
- Bypass or removal of safety devices
- Using defective equipment etc.

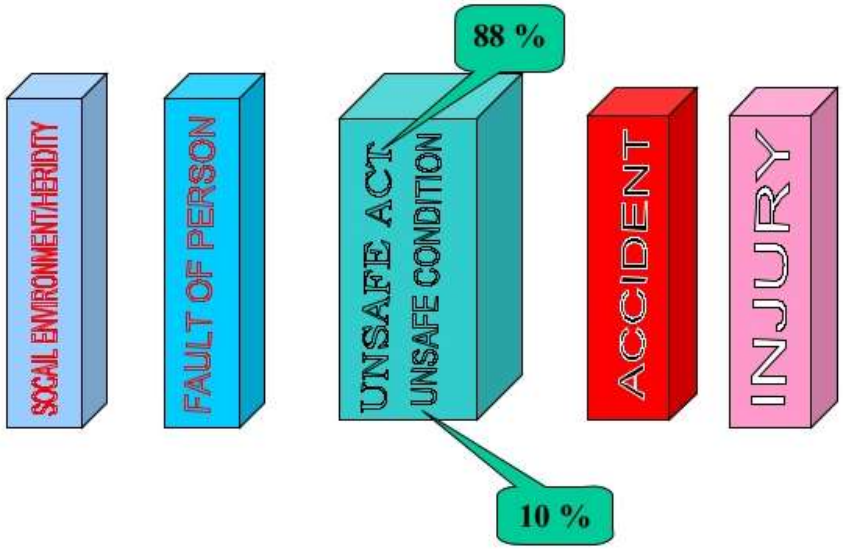
Un-Safe Condition (U.C)

Any sources or situation or conditions that have potential to create accident is known as unsafe condition. Following are example of unsafe Condition:

- Damage welding Cable
- Mechanical guard not Provided on rotating parts
- Defective sling or lifting equipment.
- Defective work platform
- Floor or platform Opening, Pits
- Poor housekeeping
- Defective tools, equipment or supplies
- Inadequate supports or guards
- Congestion in the workplace
- Inadequate warning systems
- Hazardous atmospheric conditions etc.

Domino Theory

88% Accident occurred due to unsafe act, 10% due to Unsafe Condition & 2% due to natural calamity.



Henrich Theory of Accident Causation

This theory says that 30000 unsafe acts and unsafe condition create 3000 Near miss, 300 Minor accidents, 30 major accidents and 1 fatal accident.

ACCIDENT PREVENTION STRATEGIES

Accident can be prevented to control **unsafe acts & unsafe condition**.

To eliminate workplace hazard is best option to prevent accident.

CONSEQUENCE OF ACCIDENT

Direct Consequences

- Personal injury
- Property loss
- Environmental Damage

Indirect Consequences

- Lost income
- Medical expenses
- Time to retrain another person
- Decreased employee moral

COST OF ACCIDENT

Costs of Accident are two types, Direct Cost & Indirect Cost. Indirect Cost is several Times more than Direct Cost.

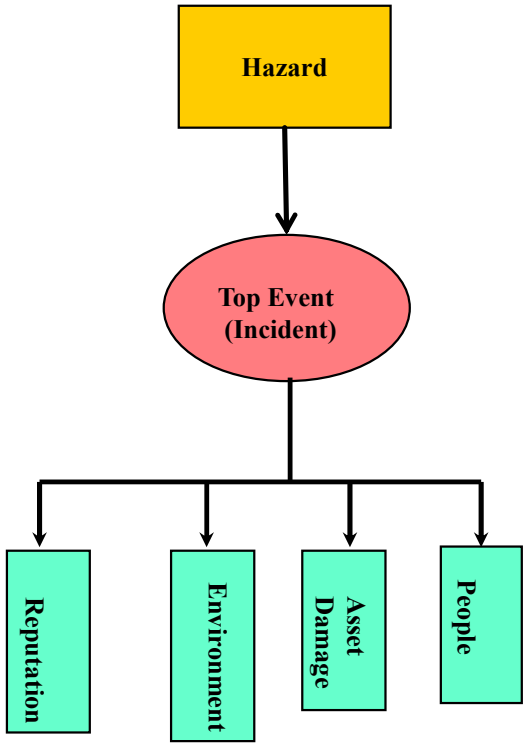
Direct Costs

- Fines in the criminal courts.
- First- aid or medical cost.
- Workers sick pay.
- Overtime to make up for the lost time.
- Lost production time whilst dealing with the injury.
- Compensation payable to the victim.
- Increase in insurance premium and indemnity payment.

Indirect Costs

- Loss of staff morale in the organization.
- Damage to public image and business reputation.
- Cost of recruiting and training temporary or replacement of labour.
- Cost of remedial action following an investigation.
- General difficulties in recruiting and retaining staff.
- Compliance with any enforcement notice served.
- Repairs of damaged equipment and property
- Productivity

CHAIN OF EVENT IN INDUSTRIES



Lack of Control

Unsafe Act + Unsafe condition

Event

Consequences

Accident, Property/ Environment damage, Poor organization reputation, Prosecution by legal authority , Business failure etc.

POTENTIAL SOURCES OF HARM (HAZARD)

HAZARD IN INDUSTRIES

Different Types of hazard found in an industries as per their Nature. Following are Types of Hazard:

- **Fall of person** due to poor workmanship, loss of balance, uneven surface, floor opening, poor work platform, working at height without using full body harness, Defective ladder or stair, slippery floor, Loose material in assess etc.
- **Fall of material** due to failure of lifting appliances, Tools & tackles, loose material keeping at edge on height or near floor opening, Poor method of Material lifting & shifting etc.
- **Mechanical hazard** (Entanglement, contact with sharp edge, Ejection like chip and small particle emitting during grinding job.)
- **Electrical hazard** Like Fire, Electrocution, Eye flash, Burn injury, Fall due to electrical shock.
- Biological hazard
- **Fire Hazard** due to hot job near flammable material, Inadequate storage of Flammable material, Poor earthing system of flammable material storage tank, Smoking.
- **Physical Hazard** like heat, Poor illumination, Cold stress,
- **Environmental hazard** like dust, fumes, Gases, NOx, SOx, Noise etc.
- Hazard due to not fulfilling Ergonomical factor includes repetitive movement, manual handling, workplace/job/task design, uncomfortable workstation and poor body positioning
- **Chemical hazard** like dust, fumes, gases create central nervous system problem & respiratory problem due to exposure and create skin problem when come in its contact.
- **Radiation Hazard,** Ionizing Radiation & Non-Ionising Radiation
- Vehicle movement may cause of hit to person, Hit to object or Collision or topples

Long term exposure of Noise create Hearing loss & Known as Noise induced hearing Loss (NIHL). Vibration create vibration induced white finger.

CLASSIFICATION OF HAZARD

FALL HAZARD

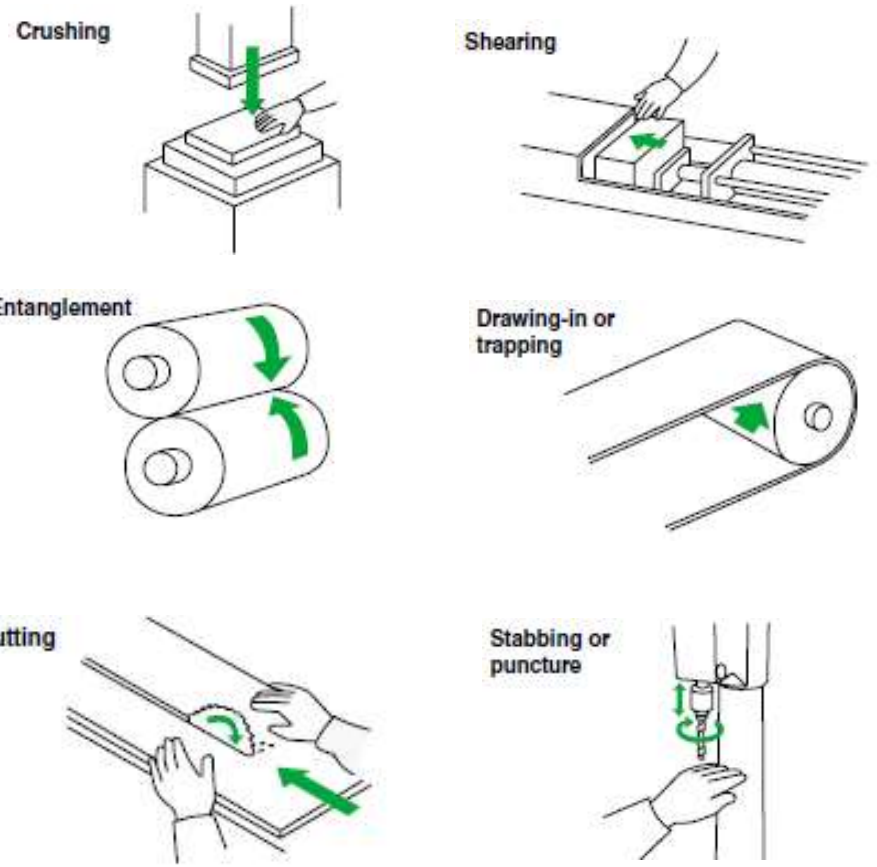
- **Fall of Person** : Due to poor workmanship, loss of balance, uneven surface, floor opening, poor work platform, working at height without using full body harness, Defective ladder or stair, slippery floor, Loose material in assess etc. Slip & Trip hazard also comes under Fall hazard
- **Fall of Materials**: Due to failure of lifting appliances, Tools & tackles, Loose material Keeping at edge on height or near floor opening, Poor method of Material lifting & shifting etc.

CLASSIFICATION OF HAZARD

MECHANICAL HAZARD:

Entanglement, Crushing, Shearing, Cutting, Drawing-in or trapping, Impact, Friction or abrasion, Stabbing or puncture etc. are few example of mechanical hazards.

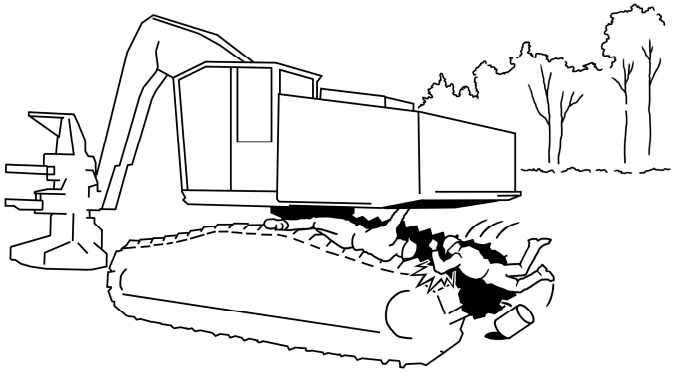
MECHANICAL HAZARD



CLASSIFICATION OF HAZARD

VEHICLE & EARTH MOVING EQUIPMENTS RELATED HAZARD:

Vehicle movement may cause of hit to person, Hit to object or Collision or topples etc.



CLASSIFICATION OF HAZARD

FIRE HAZARD

Such as Flammable storage near heat sources, Cooking or any sources that have potential to cause of fire and fire accident results loss of lives and property






CLASSIFICATION OF HAZARD

ELECTRICAL HAZARD

Such as Defective electrical Tools, Damage power cable, Use of Non-standard hand tools during electrical work, Static electricity, over load electrical equipment may cause of Electrocution, Fire, Burn injury, eye flash, Fall due to electrical shock.

CLASSIFICATION OF HAZARD

Physical Hazard: Such as Heat, Cold, Poor illumination etc. Heat may cause of heat stress, Cold may cause of cold stress, Poor illumination results eye strain or resulted any unsafe act

Vibration

Noise

Low Temp.

High Temp.

CLASSIFICATION OF HAZARD

CHEMICAL HAZARD

like dust, fumes, gases effect to central nervous system problem & respiratory problem due to inhalation and create skin problem when come in its contact.

CLASSIFICATION OF HAZARD

ENVIRONMENTAL HAZARD:

Such Potential Sources of harm that effect to environment and human being such as dust, fumes, Gases, NOx, SOx, Noise etc. Noise is also comes under physical hazard.

ENVIRONMENTAL HAZARD

CLASSIFICATION OF HAZARD

Biological hazard includes Bacteria, Viruses, Mold and Fungi, Blood and Body Fluids that found at work place site during catering operation facility or Occupational health center facility area may exposed to personnel through inhalation, ingestion, injection or contact with skin.

Radiation hazard may be Ionizing radiation and non-ionising radiation. X-ray, Gama ray are example of Ionizing radiation and ultraviolet (UV), lasers, radiofrequency etc are example of Non-ionizing radiation, found at site in industries.

CLASSIFICATION OF HAZARD

HAZARD DUE TO NOT FULLFILLING ERGONOMICAL FACTOR includes repetitive movement, manual handling, workplace/job/task design, uncomfortable workstation and poor body positioning. Therefore several types of Hazard found at workplace in industries.

ERGONOMICAL HAZARD

HAZARD CONTROL METHOD IN INDUSTRIES

Eliminate

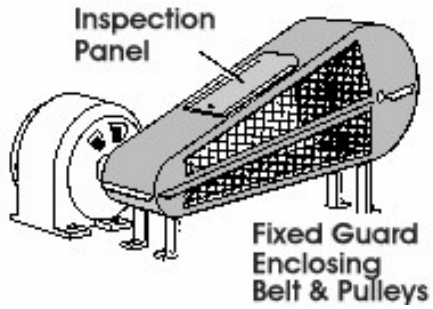
Isolate

Substitute

Engineering Control

Administrative Control

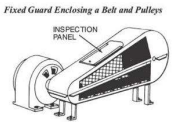
Personnel Protective Equipments



HAZARD CONTROL METHOD THAT RECOMMEND FOR AUDIT OBSERVATION, IF APPLICABLE

E I S E A P

Most effective

Eliminate	Kill to hazard, cover hazard,	Eliminate to hazard
Isolate	Put up temporary barrier	
Substitute	Use other route, other material	Substitute to process or method
Engineering	Construct Wall, Guard	
Administrative	put up notice, job rotation	Training, Enforcement of rules, Supervision
PPE	Safety helmet, Safety Shoes, gloves, respirator	

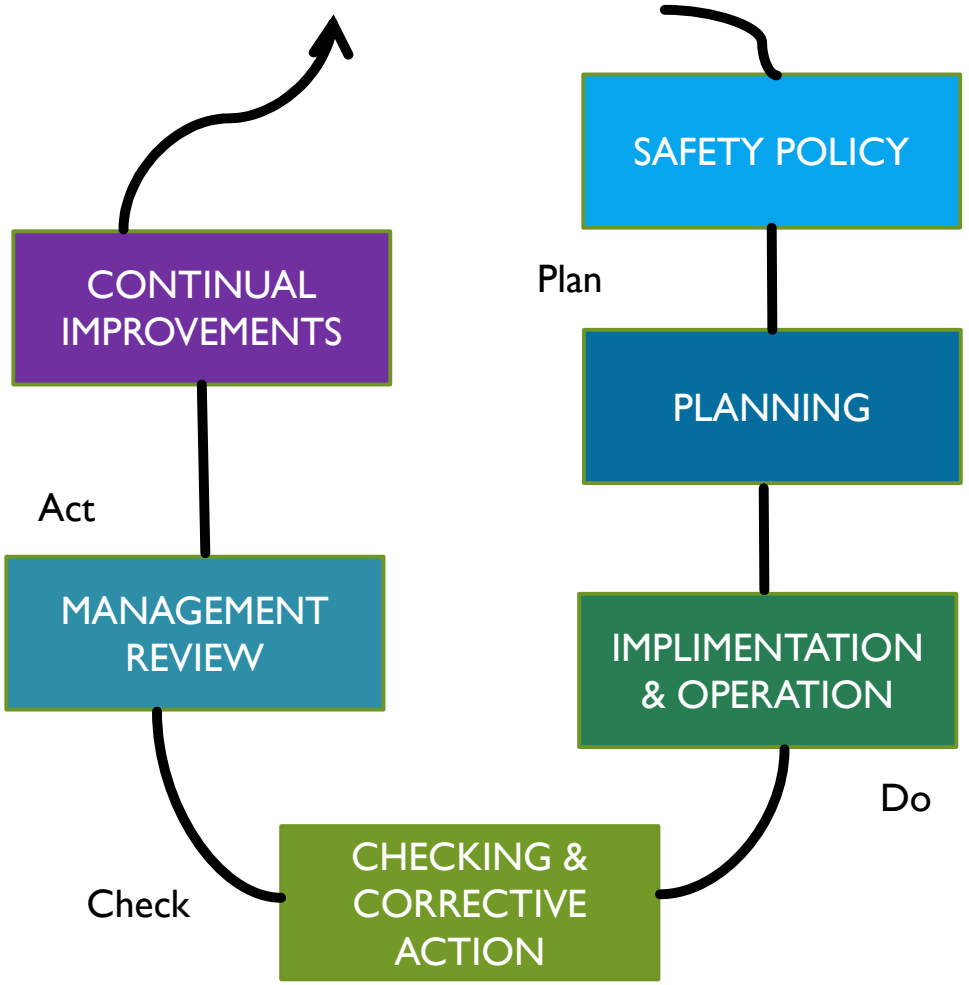
SAFETY MANAGEMENT SYSTEM

A safety management system (SMS) is effective process used to manage safety elements in a industries workplace to create safe healthy work environment.

The SMS is used in a industries to manage significant safety risk and protect to environment.

A SMS provides a systematic way to continuously identify, monitor hazard and control risk while maintaining assurance that these risk controls are effective

ELEMENT OF SAFETY MANAGENT SYSTEM



SAFETY POLICY

Written Statement signed by Top Management for getting its intent to achieve safety related objective & Target

RNSN Seriate

RNSN SERIATE (P) LIMITED

Health, Safety & Environment (HSE) Policy

RNSN SERIATE (P) LIMITED is committed to ensure Safe healthy work environment to protect human being as well as Environment. In Order to achieve Health Safety & environment related objective, Policy is:

- Ensure compliance on based on relevant National, International Rules, Regulation, Norms & Codes
- To main high Safety Standard at workplace, we adopt best Safety Practices & Conduct Safety Program regularly.
- To Plan & effective implementation of Safety Health, Environment management system
- Being new organisation, always seek opportunities and Continual improvements in products, process, Services and Peoples to ensure compliance & standards.

RNSN Seriate (P) Limited takes all necessary steps to achieve zero harm & increase stakeholders satisfaction.

Date: 30/11/2018

Director

PLANNING

PLANNING INCLUDES:

- ❑ Planning for Hazard Identification, Risk Assessment, Risk control
- ❑ Legal & Other Requirements
- ❑ Identify to Objectives
- ❑ Safety Management Program
- ❑ Safety Management arrangements

Effective Planning is concerned with prevention through identifying, eliminating and controlling hazards and risk.

IMPLIMENTATION & OPERATION

IMPLIMENTATION & OPERATION INCLUDES:

- Structure & Responsibility
- Training, Awareness & Competence
- Consultation & Communication
- Documentation
- Document & Data Control
- Operational Control, Emergency Preparedness & Response

CHECKING

&

CORRECTIVE ACTION

CHECKING & CORRECTIVE ACTION INCLUDES

- Performance Measurement & Monitoring
- Accident, Incidents, Non-conformances and corrective and preventive action
- Record & Record Management
- Safety Audit

MANAGEMENTNT REVIEW

Top management should review industries Safety Managements system to ensure its continuing suitability, adequacy & effectiveness

CONTINUAL IMPROVEMENTS

Effective approach to identify gap & seek opportunities to improve SMS in any industries.

PERFORMANCE EVALUATION

Performance evaluation Help to know organization Safety performance, compliance Status, identify to threat & look effective measure to eliminate or control such threat to improve safety performance.

Several Component use to know organisation Safety Performance and few are :

- ❑ Accident Rate
- ❑ Frequency Rate
- ❑ Severity Rate
- ❑ Compliance of Safety Observation (Non-Conformance)
- ❑ Percentage of Training

  (Hours of Training x 100)/ Total Man hours
- ❑ Reporting Culture
- ❑ Leading & Lagging Indicator etc.

LEDING INDICATOR

- Leading indicators are proactive and preventive measures to control work place risk.
- Leading indicator help to know existing system is effective to control work place risk or not.
- Help to ensure effective Activities & Program to Control work place Risk
- U.C, U.A, Training, Safety Meeting, Safety Program are example of Leading indicator

LAGGING INDICATOR

- Lagging Indicator is Reactive Approach
- Lagging indicators alert about failure & identify to gaps that was reason of failure
- Lagging indicators measure the occurrence and frequency of events that occurred in the past
- Injuries, Illnesses, fatalities, Property damage cases, Fire Incident, Environmental degradation related Accident are example of Lagging Indicator.

HOW LEDING INDICATOR HELP TO IMPROVE SAFETY PERFORMANCE

- ❑ Identify to Conformance & do effective plan
- ❑ Prevent workplace injuries and illnesses.
- ❑ Reduce costs associated with incidents.
- ❑ Improve productivity and overall organizational performance.
- ❑ Optimize safety and health performance.
- ❑ Raise worker participation.
- ❑ Increase Organisation Reputation

A.R, F.R & S.R CALCULATION

$$\text{Accident Rate} = \frac{\text{Total Numbers of Lost Time injury}}{\text{Average Numbers of employees}} \times 1000$$

$$\text{Frequency Rate} = \frac{\text{Total Numbers of Lost Time injury}}{\text{Total Man-hours worked}} \times 1000000$$

$$\text{Severity rate} = \frac{\text{Total Man Days Lost}}{\text{Total Man-hours worked}} \times 1000000$$

Example:

Employees	:	200 (Average)
Working hours (W.H)	:	8 hours Per Day
Numbers of Days in a Month	:	26
Lost Time Injury (L.T.I)	:	02
Total Man day Lost	:	11 days
Total Man-hours	:	Average No. of Employees per day
		× No. of Day in Month × Working hours per day
Total Man-hours	:	200 × 8 × 26 = 41600 hours

$$\text{Accident rate} = \frac{02}{200} \times 1000 = 10 \text{ Per Thousand}$$

$$\text{Frequency Rate} = \frac{02}{41600} \times 1000000 = 48.07$$

$$\text{Severity rate} = \frac{11}{41600} \times 1000000 = 264.42$$

Note: Here accident Rate is calculated on lost time injury. This calculation is based on IS3786.

Housekeeping

Good housekeeping always increases productivity. It prevents injury such as fall, Trip, Slip, fire etc. Poor Housekeeping is source of Accident.

Good housekeeping means materials have stacked properly & kept separately. All walkways are free from any obstruction.

Example of Poor Housekeeping

Cost of Poor Housekeeping

- Slips, trips, and falls
- Fires
- Chemical and machine accidents
- Injuries from electrical problems
- Collisions and falling objects
- Health problems

Benefits of Good Housekeeping

- Eliminates accident and fire hazards.
- Maintains safe, healthy work conditions.
- Saves time, money, materials, space, and effort.
- Improves productivity and quality.
- Boosts Employees morale.
- Reflects a well-run organization.

Housekeeping

Example of Housekeeping

5'S method (Japanese management technique)

The 5S method, which takes its name from the first letter of each of the five operations, is a Japanese management technique derived from the Toyota Production System (TPS). It is based on 5 simple principles:

Japanese	English	Brief Description
SERI	Sort	Take out unnecessary items & eliminate latter
SEITON	Systematize	Arrange necessary items in good order for use
SEISO	Sweep	Clean your work place
SEIKETSU	Sanitize	Maintain high standard of housekeeping
SHITSUKE	Self discipline	Maintain on regular basis to above parameter

Personal Protective Equipment (PPE)

Personal protective equipment (PPE) refers to Safety helmets, safety shoes, gloves, high-visibility clothing, goggles, or equipment designed to protect personnel from injury or exposure. PPE does not eliminate to hazard, it minimises the severity of hazardous event and protect to personnel from exposure of hazard.

Personal Protective Equipment (PPE)

Safety Helmet

Safety Shoes

Ear plug

Ear muff

Safety helmet attached with Shield

Shield

Nitrile gloves

Cotton gloves

Lather / welding gloves

Safety Harness

Apron

Safety Mask

Goggle

Heat resistance suit

Self-contained breathing apparatus

Types of personal protective equipment

PPE can be classified in the following categories, based on the type of protection:

•Head protection – for example, Safety helmets, hard hats

•Foot protection – for example, Safety shoes/boots

•Respiratory protection - for example, disposable, cartridge, air line, half or full face

•Eye protection – for example, goggles/ spectacles, shields, visors

•Hearing protection – for example, plugs & ear muffs.

•Hand protection – for example, gloves and barrier creams

•Working from heights - for example, harness and fall arrest devices

•Skin protection – for example, Full body suit, Heat resistant suit

•Other personal protective equipment: This may include PPE for specific job such disposable clothing for working with chemicals, radiation hazards, painting, welding, Gas cutting. Examples include lead aprons for X-Ray protection; sleeve protectors, aprons, coveralls when using chemicals; leather jackets, trousers and spats for welding; thermal and cold protective clothing for work near furnaces and cool rooms.

NON-CONFORMANCE IDENTIFICATION TECHNIQUES

- Job Safety Analysis
- Hazard identification & risk control
- Safety inspection
- Checklist based inspection
- Consultation with employees
- Near miss/Incident Investigation
- Fault tree Analysis
- What if Analysis
- Safety survey
- Safety Tours

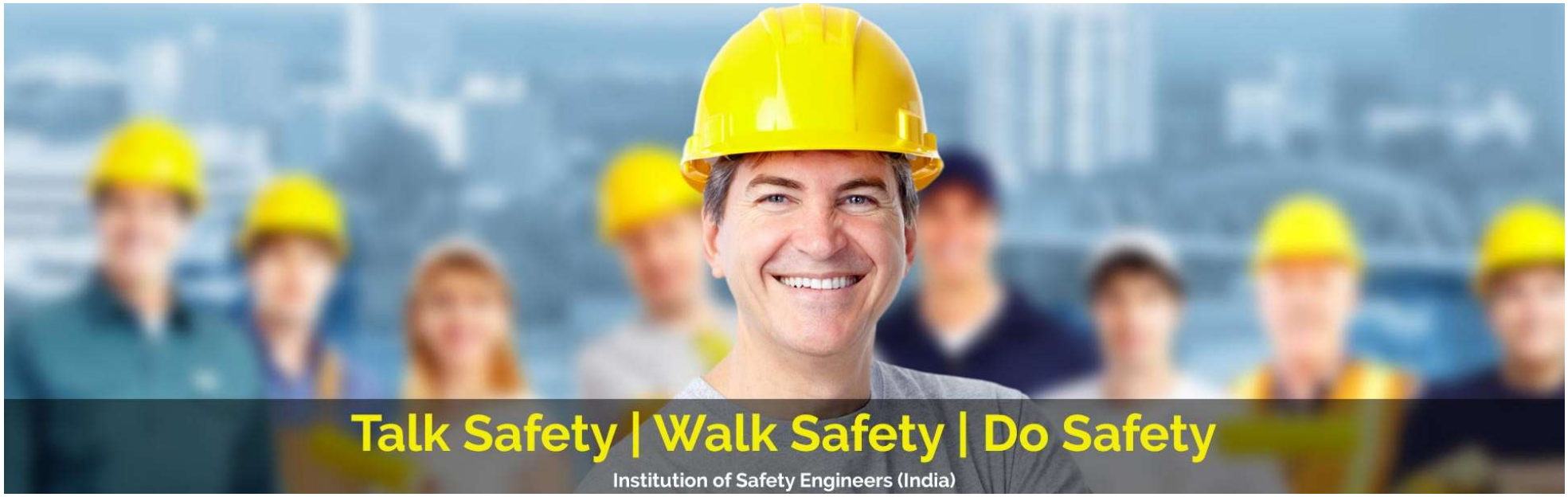
NON-CONFORMANCE IDENTIFICATION TECHNIQUES

- Safety audit
- Hazard and operability (HAZOP) Study
- Failure Mode & Effect Analysis (FMEA)
- Failure Modes, Effects and Criticality Analysis (FMECA)
- Construction Hazard Analysis (CHA)
- Preliminary Hazard Analysis (PHA)
- Operational Hazard Analysis (OHA)
- Safety Sampling
- Environmental Monitoring etc.

QUESTION & ANSWER

References:

- ISEI Manual, IS 18001, IS 14489
- ISO 45001, ISO 14001, ISO 9001



THANK YOU!

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