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Institution of Safety Engineers (India)

“Aim to prevent Accident, Protect Environment & Minimises Losses during disaster”

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This Issue Journal Include

- V2-I3-1-1 Accident investigation at workplace
- V2-I3-1-2 HAZOP study in Process Industries
- V2-I3-1-3 Effective Safety Management system in Industries



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Plan Prevent Protect



Accident Investigation at work place

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Abstract

Every day several accidents occur in this world due to human failure, Mechanical failure or poor work environment. To prevent similar accident or incident, A effective accident investigation must be carry out. Accident investigation is a Techniques used to analyse and find root cause of any accident. Accident investigation is also known as hazard identification techniques. In this articles details information are included about investigation method & reporting procedure. This article is very helpful to learn and use effective approach to investigate any incident and accident.

Objective

- » To find out cause of an accident
- » Identify cost of accident
- » Fulfilling Legal requirements
- » To identify failure and seeking opportunities to improve Safety management system
- » Implementing to recommendation within whole organization to prevent similar future accident

Key word: Accident Investigation, Cause of Accident, Chain of event, immediate cause and root cause, Accident investigation procedure, Accident investigation report Preparation method.

1. Types of accident

- ♣ Lost Time Injury:
 - » Fatality
 - » Permanent Total Disability
 - » Permanent Partial Disability
 - » Lost Work Days Case
- ♣ Serious Injury
- ♣ Serious Occupational illness / Diseases
- ♣ Serious Dangerous Occurrence
- ♣ Restricted Work Case
- ♣ Medical Treatment Case
- ♣ First Aid Injury
- ♣ Equipment / Property Damage

2. Accident Investigation





Accident investigation is a process used to identify causes of accident and ensuring their corrective measure to prevent similar future accident. Accident Investigation always helps to control workplace risk to learn from past Accident. Based on Accident investigation report, organization take necessary action to minimise workplace risk As Low as Reasonable Practicable (ALARP). Accident Investigation is effective Method used to determine the underlying causes of accidents and such information used to ensure effective recommendation for taking preventive action to avoid any future accident.

Accident investigation should be carried out by competent person as per regulatory requirement and in consultation with relevant stakeholder. The accident investigation report should be submitted to the organization for their effective implementation. Investigation not carried out to blame any person, it is carried out to identify gaps of failure and improve safety management system within organisation. Blame culture always develop negative behaviour among employees and it create poor safety culture. Accident Investigation is ineffective unless all causes are determined and corrected. So accident investigation should be carry out effective manner to find out all root cause and ensuring adequate recommendation to prevent similar future accident. Immediate and root cause are two major factor of cause of accident or incident. Effective investigation will help to identify immediate and root causes of accident and ensure their corrective measure to prevent future accident.

3. Term & Definition

Near Miss : Near misses (or near hits) are any form of incident that could have resulted in injuries or loss but did not. Example A worker runs into the workshop and stumbles, but regains his balance and carries on unharmed.

Hazard : Source or situations that have potential to harm. Naked Power cable, Un-Guarded rotating parts, Slippery floor are few example of Hazard.

Incident : Hazardous event where no harm occur.

Accident : Any undesired event that create injury, Fatality, property damage, Environment damage, Harm to environment or combination of these.

Injury : Harm to a person or living thing due to accident. It include cuts, fracture, bruises, wound, punctured skin etc.

Occupational Disease : An occupational disease is a disease or disorder that is caused by the work or working conditions. Noise induce hearing loss,



Silicosis, Asbestosis are few example of occupational diseases.

: Accident or a natural catastrophe that causes huge damage, destruction, loss of life or Environmental loss. Disaster may be man-made or natural.

Major Fire, Floods, Tsunami, Bursting of Chemical tank, Huge losses due to sudden toxic gas release are few example of Disaster.

Dangerous occurrence:

: Any occurrence of serious nature that could have the potential of death or serious injury but did not.

Environmental damage

: Any activity that effect (either directly or indirectly) to environment and it cause of Pollution, deforestation, overconsumption, overexploitation of natural resources.

4. Accident causation Theory

Unsafe Act & unsafe Condition is basic cause of any accident. When both conjugate at one point, accident happened. In other words, Human and mechanical failure are cause of an accident.

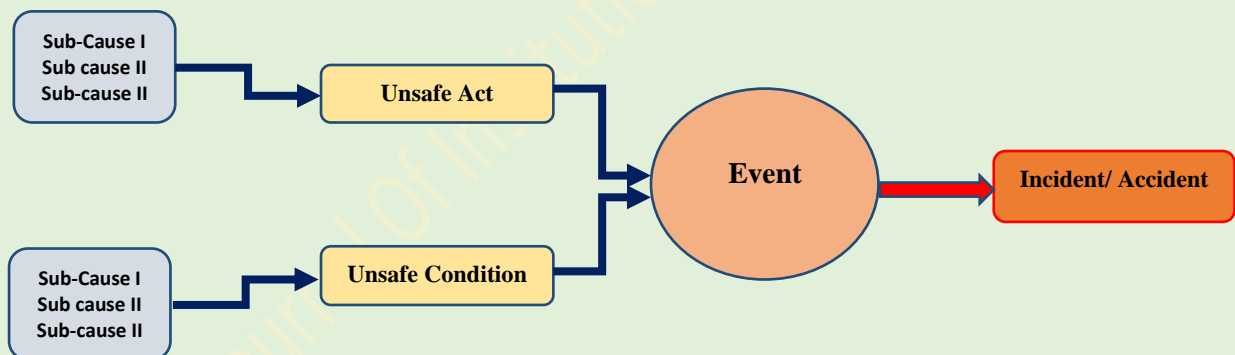


Figure 4 (a) Unsafe Act and Unsafe Condition

It is very important to investigate Near-miss case, to minimize or control accidents in future. The accident ratio studies and their limitations are defined in the below accident triangle.

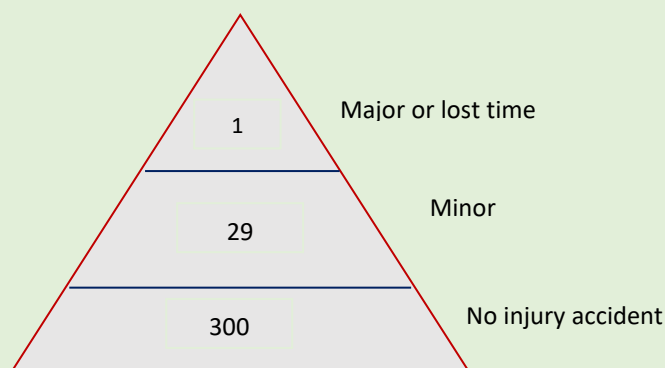
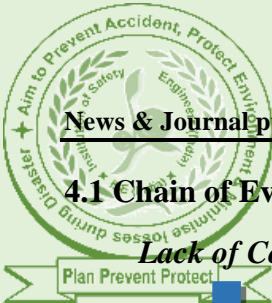


Figure 4 (b) Heinrich triangle



4.1 Chain of Event

Lack of Control

Unsafe Act + Unsafe condition

Event

Consequences

Accident, Property/ Environment damage, Organizational loss

5. What to investigate during investigation?

Any Accident that caused personnel injury, Property damage or harmed to organization must be investigate. Near miss like incident also investigates to find causes and taking necessary action to avoid any future similar accident. Following are few category of Incident/accident that should be investigated.

- » Near Miss
- » Injury
- » Accident (Minor, Major & Fatal)
- » Occupational Disease/ Illness
- » Disaster
- » Dangerous occurrence
- » Environmental damage

6. Who should investigate?

Accident can be investigate by any people that have good knowledge and adequate experience in field of Accident investigation & reporting field. Major accident should be investigate by group of people of organisation. Organisation should form Committee for effective Accident Investigation.

Members of the Accident investigation team can include:

- » Employees with good knowledge & experience in field of investigation
- » Supervisor of the work area





- » safety officer/Manger
- » Safety committee Member
- » "Outside" experts
 - » Representative from respective state government authority
 - » union representative, if applicable

Some Investigation must be conducted jointly with Organization team and government authority. Organisation must follow safety rules of respective state or country and on based on this they should conduct investigation.

7. Stage of Accident investigation

Stage I: Immediate action

In case of Accident Happen, Immediate action must be taken and it include, making the area Safe, Preserving the scene, Notifying to relevant authority/ Person and Sending the victim for Aid.

Stage II: Plan the investigation

In second step, plan for investigation and Team to be formed to investigate the accident. We consider all resources that required for investigation and time required to complete investigation. For Major Accident, form Team of Two or more people for effective investigation.

Stage III: Data collection/ Gathering information

Collect Data from different sources to visit & capture Accident Location, Witness and Checklist. For gathering information Ask, question with witness. We can ask question with victim. Investigation Team ask Question in similar way

- » What happen?
- » When did happen?
- » Why did happen?
- » How did happen?
- » Where did happen?
- » Who was involve?

Investigation Team can collect Incident related information through different sources like checklist, Operation safety manual, Manufacturer manual, MSDS etc.

Stage IV: Data analysis

In this step, we analyse the data. Accident is chain of event investigation team identify the sequence of event and identify human and mechanical failure in each event. Identify all influencing factor that lead to cause of human error. When asking question always uses correct way and it should not show that Failures happen by themselves/victim. So avoid asking such question that raise blame like statements. Need to identify root & underlying causes in effective ways and it should be record.



Stage V: Corrective actions

Corrective action must be ensuring on based of identified cause of accident. Adequate corrective action must be use as recommendation.

Stage VI: Report Preparation, Reporting & Follow up

Prepare report with finding and effective corrective/ Preventive action to avoid similar future accident. Communicate to investigation report within organisation through email, discuss in meeting, share case study in training to aware to the organisation people. Report section should be including:

Section I	Brief Details of Incident/Accident	In this section Write down Name of Victim, Date & Time of Accident, Age, Designation, Location of Accident, Type of Accident (First Aid, Minor, Major, Fatality, Near miss, Dangerous occurrence etc), Injured body parts (such as head, hand, foot or multiple injury) etc. If any point not applicable, Write down not applicable.
Section II	Accident Summary	In this section, brief summarise to accident. Summary Include how accident happen and What was person doing during accident.
Section III	Sketches	Draw Sketch of Accident Location, equipment and Victim body parts.
Section IV	Cause of Accident	Identify cause of Accident. Causes of accident should be categorized in Immediate cause and Root cause. Team must be clearly identified to Immediate & Root cause of accident.
	Immediate cause	The cause that directly resulted in an accident An immediate cause is defined as acts (Unsafe act) or conditions (Unsafe Condition) that lead directly to the accident. These might be unguarded rotating part of machine, Employee error, Non-use of personal protective equipment, lack of concentration, Fatigue, stress and poor housekeeping.
	Root Cause	The root or underlying cause is a condition that allowed to developed immediate cause such as poor safety culture, Poor management commitment.
Section V	Witness	Write down Witness name, Designation and their statements.
Section VI	Recommendation	Write down effective recommendation as per observed cause and strictly implementation to be ensure to prevent similar



future accident.

Investigation team can add additional section such as name of Investigation team members, their finding and comments etc in the report.

8. Summary

Every day several accidents occur in this world due human failure and Mechanical failure and to prevent similar future accident, need to carry out effective accident investigation. Organisation should use effective approach to identify all causes of accident. For effective investigation Team member must be good knowledge and experience in field of accident investigation. Effective investigation determines many factor such as what happened, how happened and how to control similar future accident. An accident investigation technique involves gathering and analyzing facts of accident and developing plan with recommendation to prevent similar accident. Accident Investigation is ineffective unless all causes are determined and corrected.

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Hazard and operability (HAZOP) Study in Process industries

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Abstract

In every year several accident occur in process industries due to Failure of pipe lines, equipment, system or existing process facility and it results hazardous chemical leak, fire, explosion, rupture or damage to existing system. Such accident occurs in Process industries due to availability of process related potential source of harm and this is known as hazard. To identify process related hazard is challenging job for everyone and later such hazard may lead to cause of accident. Result of accident is injury, fatality, property damaged, damage to environment or combination of these together.

In industries, Hazard identification & Risk assessment, Checklist based inspection, Job safety analysis like different techniques is used to identify hazard in which one Technique is Hazard and operability (HAZOP) study. HAZOP is very effective safety tool used to identify process related hazard. This article is very helpful to learn the HAZOP study procedure, identify process related hazard and ensuring their risk management to prevent any possibility of failure of pipe lines, system or equipment or existing process facility. This articles help to know the procedure to conduct effective study and prepare HAZOP study report.

Key word

Process Hazard identification, Process safety, Operational hazard finding, Operational Risk control, Design intention, Guide word, Deviation, Consequence

Objective of HAZOP study

- To check a design & system
- Identify Process hazard.
- Identify Causes of Deviation & evaluate to consequence of Deviation
- To decide whether and where to build
- To identify gap in existing facility that may cause of operational failure.
- To improve the safety of existing facilities
- Prevent to failure of Process facility, existing system and equipment.

1. Introduction

In process Industries, Failure of system or existing facility cause huge losses to organisation and such failure occur due to deviation of pressure, Temperature, flow like parameter. Such deviation is known as hazard and different method used to identify process related hazard in which one method is Hazard





and operability (HAZOP) study. A HAZOP study technique is used to identify process or operational hazards and operability problems. In industries, every day several injury occur, huge loss of organisation due to minor operational failure and such failure occurs due to not taking adequate control measure to eliminate hazard or minimise process related risk As Low as Reasonable Practicable .

Hazard and operability (HAZOP) study is detailed examination of existing process or operation in order to identify and evaluate the potential sources of harm that may lead to cause of equipment or system failure and it result injury, equipment damage, disaster or any harm. A HAZOP study is performed by multidisciplinary team members including operational managers, Engineers, Chemists, safety professional, Hygienist and other experts to identify process related hazards, Process related risk and design flows. Concept of HAZOP involve how plant might be deviate from the design intent and if process related problem identify during study then team try to find out effective solution to prevent deviation/ operational failure. Prime Objective of HAZOP study is to identify process related deviation/problem. HAZOP is based on several expert views with different background, work together or separate to identify problem and at ends of their work, they combined result together to interact each other. Guide word is main component of HAZOP study. For HAZOP study, firstly there is need to Team formation with expertise in their field. The success or failure of the HAZOP study depends on several parameters:

- Accuracy of P & I diagram and other available data such as operational manual, MSDS of chemical etc that will be used during study.
- Team member Competence, Experience & Skill
- Knowledge about Process or operation & process hazard
- Ability of team member thinking/brainstorming to evaluate deviations, causes and Consequences
- Effective Report and risk communication.
- Effective implementation to recommendation as per HAZOP study report.

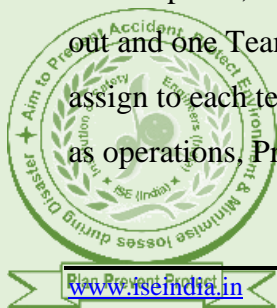
2. Method of HAZOP study

Definition, Preparation, Examination, Report and follow are its main phase of HAZOP study.

2.1 Phase in HAZOP Study

Phase I: Definition

In This phase, clearly define and mention Aim & objective of HAZOP study. Team selection is carried out and one Team member will be act as leader. Role and responsibility should be clearly define and assign to each team member. HAZOP team including different person with a variety of expertise such as operations, Production, maintenance, instrumentation, engineering/process design, Chemical



engineer / Chemist, Safety other specialists as needed. They should be good knowledge about process and variation. Following are few examples of guide word and deviation:

Parameter	Guide word	Deviation
Pressure	More, less	More Pressure, Less Pressure
Temperature	More, Less	More Temperature, Less Temperature
Flow	More, Less, None, Reverse, other, also	More Flow, Less Flow, No flow, Reverse flow, other flow, Contamination
Viscosity	More, Less	More Viscosity, Less Viscosity
Reaction	More, Less, None	Intense reaction, reaction incomplete, No reaction
Corrosion	Corrosion of tube	Damage to tube

Phase II: Preparation

In this Phase, HAZOP team prepare plan to conduct study. This typically includes piping and instrument diagrams (P&ID) or process model and examine every section and component of process to use guide word by HAZOP team. For each element, HAZOP team identify operating parameter of system that may lead to deviate to system or existing process facility such as Pressure, Temperature, Flow Rate etc. Target also define to complete study within certain time frame and team mutually agree and decide the way to record collected data.

Phase III: Examination phase

In this Stage, HAZOP team Select the System and divide into different parts, define design intent in each part. Team will identify probability of deviation to use guide word, deviation Consequence and cause of deviation. All finding and data will be recorded and agreed action will be noted. Team will select effective recommendation/ possible control measure to avoid developing any deviation to protect to existing facility and system. A simple format of HAZOP study is given below

Format for HAZOP study

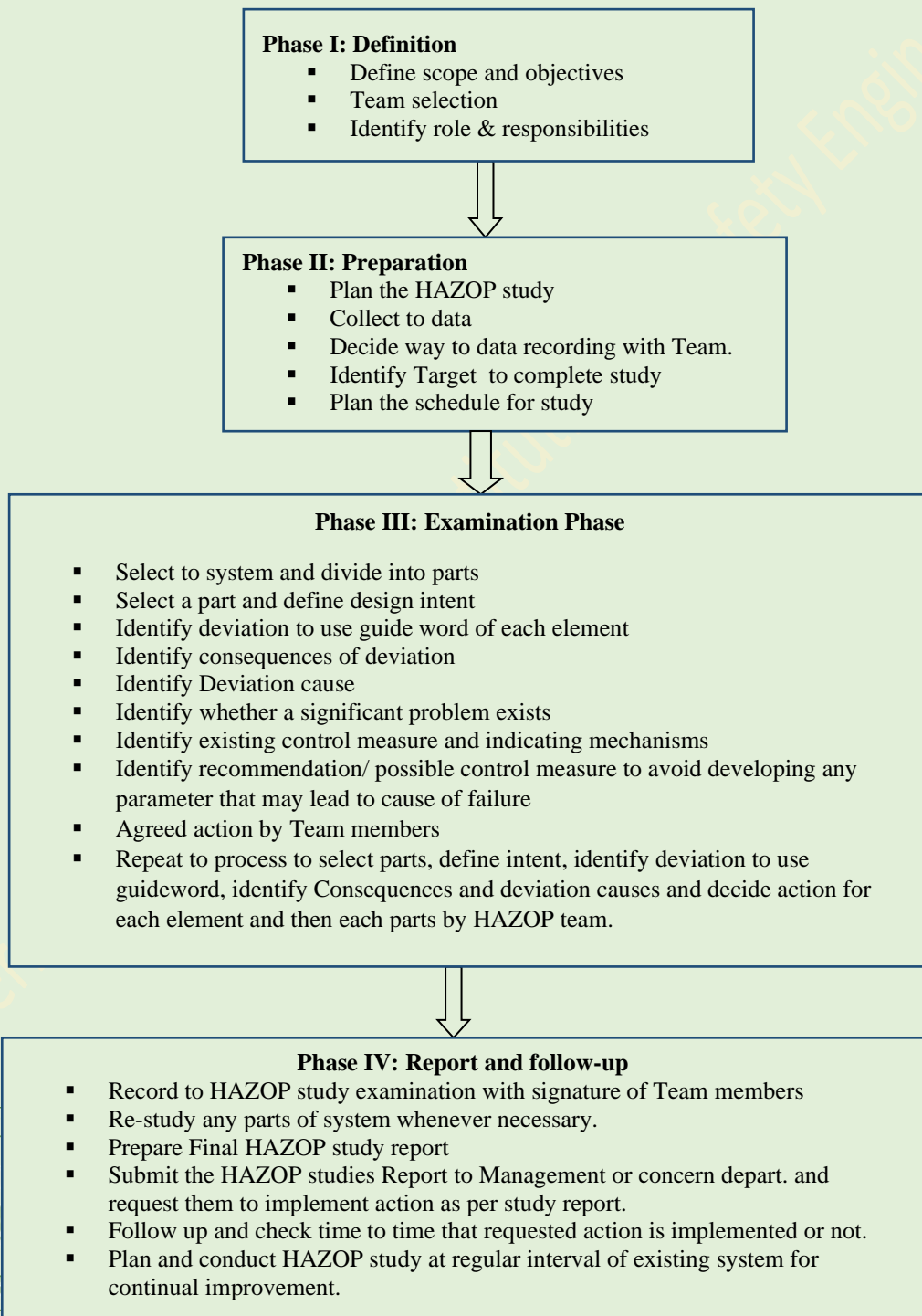
Name of equipment:

Guide word	Deviation	cause	consequence	Action

Phase IV: Report & Follow up

In this stage, All HAZOP study examination related data should be recorded and Final report will be prepared and Submit to Management or concern department to implement action/recommendation as per study report. Team member should follow up regularly and check that requested action/recommendation is implemented or not. Plan and conduct HAZOP study at regular interval to identify deviation and taking needful action for safety of Process plant and existing facility for continual improvement.

2.2 Phase of HAZOP Study



2.3 HAZOP Study Report of Heat exchanger

A Heat exchanger is considered for HAZOP study. Flow, Pressure, Corrosion, contaminants are consider parameter. More Less, corrosion, Contaminant is considers guide word. On based on this is study carried and report prepared.

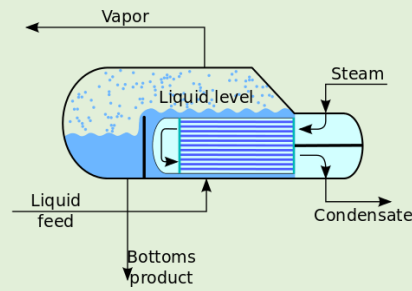


Fig. 2.3, Heat exchanger

Guide word	Deviation	Causes	Consequences	Action
More	Flow (More cooling water Flow)	Cooling water valve failure	Process fluid Temperature decrease	Provide Temperature Gauge & Low temp. Alarm
Less	Flow (Less cooling water Flow)	Blockage of pipe	Temperature remains constant of Process Fluid	Provide High Temperature alarm
More	Pressure (More pressure on Tube Side)	Failure of Process Fluid Valve	Brusting of Tube	Installing High Pressure alarm
corrosion	Corrosion of Tube	Hardness of Cooling water	Crack of Tube and less Cooling	Inspection & Proper maintenance
Contamination	Contamination of Process Fluid Line	Leakage of Tube and cooling water goes in	Contamination of Process Fluid	Proper maintenance & Operator Alert

3. Result & Discussion

In this Heat exchanger Fig. 2.3, more, less, Corrosion, contamination like guide word is used to identify deviation, Deviation causes and consequences of deviation. In Heat exchanger, more flow of fluid may be cause of Valve failure and it results decreases of Fluid temperature, less flow of fluid may be blockage to pipe and it results Failure to pipe. Similarly Corrosion may be cause of hardness to cooling water and damage to tube of heat exchanger, Contaminates may be contaminate to fluid and it result leakage of tube. On based on these, team ensure effective recommendation to prevent deviation and save to equipment and system from any failure. Team imagine the probability of deviation and imagine consequence of deviation. On based on this, they ensure remedial measure. Pressure gauge, High temperature alarm, regular inspection and maintenance are few actions are recommended to prevent catastrophic event. HAZOP team member recorded their observation and team members take jointly decision of examination to finalise the report.

Conclusion

HAZOP is very effective way to identify process related hazard and ensuring effective control measure



to protect System or existing facility. Some time existing facility parameter such as pressure, Temperature increase or decrease or deviate due to operability problem and it results equipment damage, failure to system or any major accident. To prevent similar accident, HAZOP study is carry out to examine the system, identify deviation to use guideword, identify Cause of deviation, imagine to consequence of deviation and based on observation, Team ensure recommendation to avoid any future accident.

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Effective Implementation of Safety Management system (SMS) in Industries

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Abstract

Effective implementation of Safety Management system (SMS) is very important for every industry. Ineffective implementation of Safety Management system (SMS) always causes of organisational harm and it results injury, property damage, poor organisation reputation etc. Effective Safety Management system helps to prevent industrial accident and increase productivity. The main objective to publish this paper is to analyse the effective safety management system in industries to minimise the Risk and prevent any harm that occur inside industries.

Keywords: Safety Management system (SMS), Element of Safety Management System, Effective method to implement SMS, Benefit of safety Management system

Objective:

- Help to create safe Healthy work environment
- Reducing work place injury
- Increasing business opportunities
- Increasing moral of employees
- Protection from prosecution by legal authority
- Provide measurable systems for verifying Safety performance & finding opportunities for improvement.
- Enhancing organisation reputation.

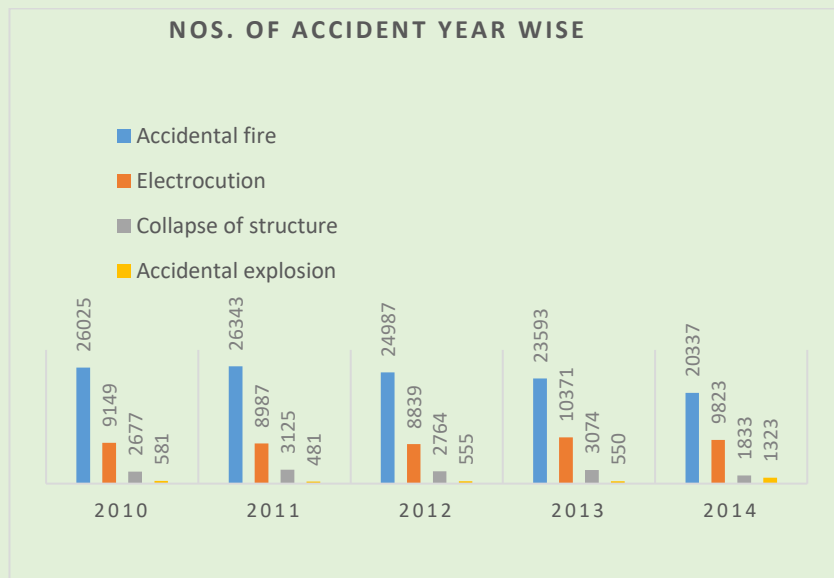
1. Introduction

Safety management system (SMS) is systematically and effective approach to managing health and safety risk at workplace in industries. Effective Safety management system helps to minimise risk as low as reasonable practicable (ALARP) & creating safe healthy work environment. SMSs help to improve safety performance. As per The Factories Act 1948, Occupier is responsible to take all practicable steps to ensure safety of their employees and associates. Occupier means, a person that have ultimate control over the factories. As per The Building and Other Construction Workers' (Regulation of Employment and Conditions of Service) Central Rules 1998, Employer is responsible to ensure safety of employees and associates. Good health and safety management practices encourage higher staff retention and increased productivity.

Safety Management system (SMS) plays vital role to create safe healthy work environment and improve organisation safety performance. Organisation means industries and it may be process industries or



production industries or construction industries or other nature of industries. Organisation always effect due to poor SMS system and at current scenario effective SMS required for every organisation to manage SMS at workplace and growing their business. Now Numbers of governmental and non-governmental organisation working in field of Safety to protect the environment as well as human beings. Safety is important because it protects to person, organisational property & Environment. SMS help to increase profitability of any organisation and help to protect from prosecution, maintain good relation with stakeholder. Management, Legal and Social point of view effective SMS required on priority basis for every organisation.



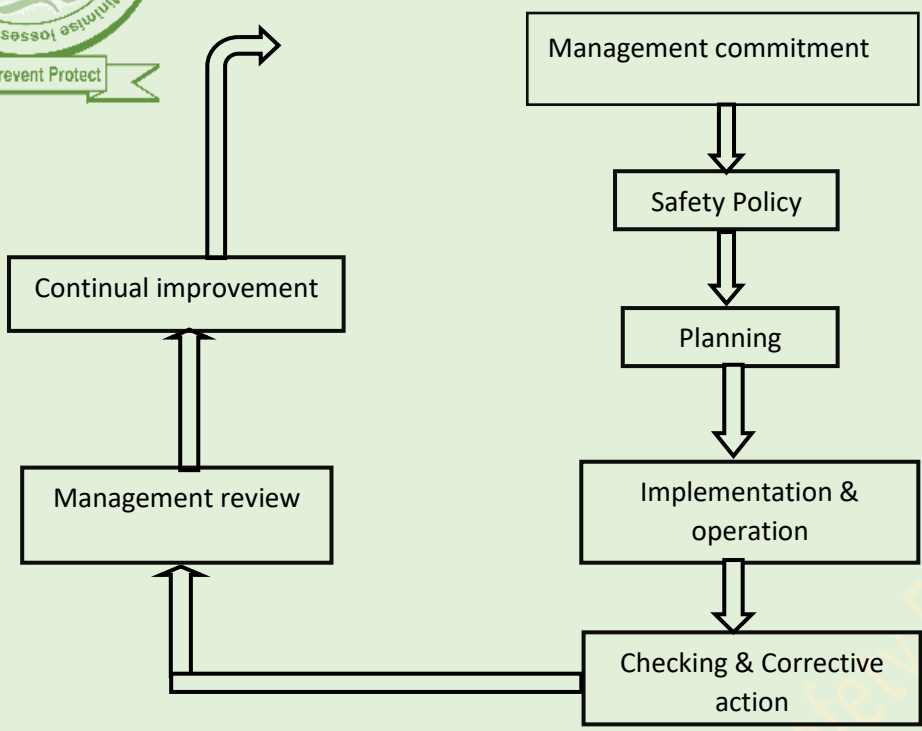
Number of Accident Cases (Source National crime record bureau-India)

2. Elements of Safety Management System (SMS)

Following are element of Safety Management System (SMS) that is used to control work place risk in industries:

- Management commitment & Safety Policy
- Planning
- Implementation & operation
- Checking & corrective action
- Management Review
- Continual improvements

When all elements integrate together and implemented properly then workplace became safe and no any event occurs or less probability of injury except natural calamities. To make Disaster plan and its execution in proper manner can minimize severity of harm that arises due to natural calamities like earthquake, cyclone, tsunami etc.



Safety management system (SMS)

Safe work place means, Risk is minimise as Law as reasonable practicable (ALARP) at workplace. Risk is combination of likelihood and consequences of specific hazardous event occurring. Hazard is source or situation that have potential to cause harm. In simple SMSs means workplace hazard are identified and adequate control measure is to be taken to prevent accident or any harm. Effective SMS help to prevent incident, increasing moral of employee and maintain good relation with stakeholders. Following are steps to an effective SMS and these steps form a continual cycle of SMS performance improvement in a organisation.

2.1 Top management commitment and Safety policy

Safety policy is Top management commitment for getting their intent to achieving safety related objective and target. Policy is finalised on based on organisation safety objective. It should contribute all aspects of business performance as part of a demonstrable commitment to continual improvement and the development of human factors including the culture, attitude and beliefs within the organization. The organization’s top management should set in place procedures to define, document and endorse its Safety policy. This policy statement should be signed and dated by the top Management person with responsibility of Safety. Depending on the type of organization and risks associated with the organization’s operations, the policy statement might need to be briefed in more detail. Objective, Target should be measurable with Role & responsibilities to manage safe work place easily inside organisation.

The Safety policy and its statement should be reviewed periodically and revised by top management.





whenever required and necessary action should be taken to improve Safety performance. Safety policy whenever required and necessary action should be taken to improve Safety performance. Safety policy should be communicated to all person at their work place and concerns interested parties for improving safety performance. Organisation should be define role & Responsibility and should be clear and safety task to be allocated to all individuals for getting organisation objective with in time frame.

2.2 Planning

Planning shows how to deliver Safety policy for getting organisation objective within time frame. It is integral parts of design, development and implementation of risk assessment and determining control concerns with safety. Organisation ensure safety related compliance as per legal requirements. They plan for conducting different types of safety activity like safety inspection, safety training, Formation & safety committing meeting schedules, Safety survey, safety audit etc. for controlling Risk at workplace. The planning address to setting safety related objectives, identifying hazard, assessing Risk and Taking adequate measure to controlling risk.

Effective planning is concerned with designing, developing and ensuring suitable management arrangements, precautions at workplace and their associated risk control systems proportionate to the needs, hazards and risks of the organization and operating, maintaining and improving the system to suit changing needs and process hazards and risks. Identifying legal and other requirements and ensure their compliance. Prepare emergency plan, for saving human lives and environment during emergency like fire, explosion, structure collapse, Toxic gas leakage etc.

2.3 Implementation & Operation

Different activity considered under planning stage must be executed for achieving organisation objective. Organisation structure should be designed, approved and allocate safety Role & Responsibilities to concern individuals. Conduct Safety Training, Safety awareness program & documented it. Carry out Safety inspection, Safety Audit as per plan and Take necessary action as per observation to eliminate hazards or Minimise risk. As per Hazard identification, Risk assessment and determination control document, take adequate control measure to minimise Risk to Tolerable level. Prepared emergency plan to be approved and implemented for minimising effect of any future emergency such as fire, explosion, and structure collapse as soon as possible (ASAP). Make proper co-ordination between each department and concern person. Communicate safety related message to all organisational people, it will help to ensure safety related compliance.

2.4 Checking & corrective action

It includes Performance measurement, monitoring, Conducting Safety audit, Safety survey, Finding non-conformity and taking appropriate corrective action. All Incident should be investigation and corrective, preventive action should be taken to prevent similar future incident. Manage and keep all





Safety record for future purposes. Measure, monitor and evaluate safety performance to determine the effectiveness of risk management and if necessary, take preventive and corrective action.

2.5 Management review and continual improvement

Review and continually improve the Safety management system (SMS), with the objective for improving Safety performance. As per IS 14489:1998, organisation can conduct Safety audit. Safety personnel play major role to develop and implementing effective safety management system in a organisation. Firstly organisation ensure element of Safety audit with the help of Code of practice on occupational safety & Health audit, IS 14489. Safety policy, Organisation structure & Task allocation, Safety Training, Monitoring, Reviewing, Reporting, emergency arrangement and resources are few major element of safety audit. Safety audit help to find deviation of organisation and correcting them.

3. Effective Safety Management system in organization

Following are few major steps used to develop and implementing effective SMS:

- know your legal responsibilities, Top management set organisation objective and make a commitment to health and safety
- Identify Non-conformity, assess Risk and manage risk at workplace.
- Impart training to aware to people, carry out supervision like activity and take necessary corrective and preventive action.
- Report, record and investigate incidents including Near miss, corrective and preventive action to be taken to avoid similar future incident.
- Involve to employees in safety Mgt. system to improve health and safety culture at workplace.
- Prepare and approve emergency plan and be ready for handling emergencies
- Reporting, Record keeping and necessary action to be taken for manage risk on priority basis.

Proper planning, organising, motivating, training & communicating play major role to ensure effective SMS in any organisation.

4. Effect of Safety Management system

Safety Management system (SMS) has positive and negative impacts. Positive impacts is result of effective SMS and it help to ensure safe work environment and increase to organisation safety performance. Negative impact means Loss of organisational reputation, getting punishment by legal authorities, Poor relation with stakeholder etc. Finally Poor safety management management system hampered to business of organisation, So negative impact is always bad for organisation. So every organisation prefer to improve their SMSs on priority basis for growing their business.

5. Recommendation

Know Legal responsibilities, set up objective and top management commitment to be signed and communicated to all individual of organisation with their role and responsibilities. Identify hazard and





control at work place by hazard control method. Eliminate the hazard, Isolate the hazard, Engineering control method, Administrative control measure & PPE's are the steps to control hazard. Firstly we try to eliminate the hazard, if unable to eliminate then we control the hazard by next method. This method is also known as Hierarchy of Hazard control technique help to create safe healthy work environment and achieving zero harm.

Safety inspection, safety audit like activity should be carry our continual basis for finding non-conformity and taking corrective action. All near miss like incident should be investigated and preventive action must be taken to avoid similar future incident. All recommendations should be specific, appropriate, proportionate, prioritized and timescaled. Safety training to be imparted and reward program to be conducted regularly for increasing Safety awareness among people. All Safety related record should be documented for future purposes. Safety policy should be revised and updated at periodic interval as per organisation future objective for improving their Safety performance.

6. Summary

Safety Management System (SMS) plays vital role to grow any organisation. SMS help to identify workplace non-conformity and Minimising Risk up to tolerable level. Safety performance increases due to effective Safety management system. It helps to delegating and assigning clear role and responsibility for getting Safety objective with in time frame. It minimises Direct and indirect cost those arises due to incident, so productivity increase of organisation. Effective Safety management system also protect from prosecution by legal authorities. An effective safety management system help to control risks at workplace; fulfilling statutory requirements; developing positive culture, increasing moral and work efficiency of person. It is also help to finding solution to improve safety performance and improving business opportunities.

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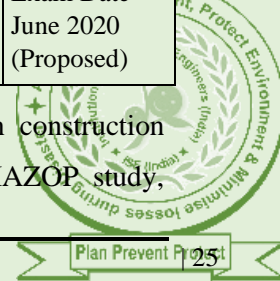


Training Calendar

ISE (India) Training Calendar (October-2019 to December-2019)

Training Title/ Course	Duration	Schedule	Location	Remarks
ISE-SM (Safety Management at work place)	3 day or Min.24 hours Training	03/10/2019 to 05/10/2019	Raipur	
ISE- ICCOHSEM (International Certificate course in Occupational Health Safety & Env. Mgt.)	Min. 96 hours Training	11/10/2019 to 19/10/2019	Raipur	Exam Date 21/10/2019
Lead Auditor ISO 45001:2018	5 days	22/10/2019 to 26/10/2019	Raipur	Raipur
First Aid	1 days	29/10/2019	Raipur	
ISE- ICCOHSEM (International Certificate course in Occupational Health Safety & Env. Mgt.)	E-learning	Last Date of Registration 30/10/2019	Al-Hasa	Exam Date 15/11/2019
Lead Auditor ISO 14001:2015	5 day	04/11/2019 to 08/11/2019	Raipur	
ISE- ICCOHSEM (International Certificate course in Occupational Health Safety & Env. Mgt.)	Min. 96 hours Training	11/11/2019 to 19/11/2019	Raipur	Exam Date 20/11/2019
ISE- ICCOHSEM (International Certificate course in Occupational Health Safety & Env. Mgt.)	Min. 96 hours Training	11/11/2019 to 19/11/2019	Delhi	Exam Date 20/11/2019
ISE-SM (Safety Management at work place)	3 day or Min.24 hours Training	26/11/2019 to 28/11/2019	Raipur	
Integrated Lead Auditor (ISO 45001:2018, ISO 9001:2015, ISO 14001:2015)	5 day	02/12/2019 to 07/12/2019	Raipur	
ISE- ICCOHSEM (International Certificate course in Occupational Health Safety & Env. Mgt.)	Min. 96 hours Training	09/12/2019 to 17/12/2019	Raipur	Exam Date 18/12/2019
ISE- ICCOHSEM (International Certificate course in Occupational Health Safety & Env. Mgt.)	E-learning	Last Date of Registration 14/12/2019	Dammam	Exam Date 27/12/2019
Lead Auditor ISO 9001:2015	5 day	23/12/2019 to 27/12/2019	Raipur	
ISE-SM (Safety Management at work place)	3 day or Min.24 hours Training	30/12/2019 to 31/12/2019	Raipur	
Diploma/ Post Diploma in industrial Safety/Fire/Env.	One year	December 2019-20	Raipur/ Rampur	
ISE- IDOHSEM (International Diploma in Occupational Health Safety & Env. Mgt.)	One year	Last Date of Registration 16/12/2019	Raipur	Exam Date June 2020 (Proposed)
ISE- IDOHSEM (International Diploma in Occupational Health Safety & Env. Mgt.)	E-learning	Last Date of Registration 16/12/2019	Al-Hasa	Exam Date June 2020 (Proposed)

Risk assessment & Control, Behaviour Based Safety, chemical safety in industries, Safety in construction industries, Scaffolding safety, Petroleum & Gas industries safety, Ergonomics, Mock Drill, HAZOP study,





Emergency planning, Disaster Mgt., Fire Safety, Environmental Mgt., EIA Like Training also conduct as per organisational Need.



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