CHAPTER 2

ACCIDENTS AND SAFETY
ACCIDENTS

Accident is unintended, unplanned happening during the course of employment resulting in personal injury, damage to plant-machinery or both. This, in turn, affects flow of production. Accident is an unexpected, unplanned occurrence interrupts the completion of an activity.

There is awareness of the dangers and bad effects of accidents, people do not think seriously about safety.

There is knowingly or unknowingly, temptation to think that accidents are beyond control. They are part of the job, or an act of God! Many of us feel that safety is somebody else's job. The safety equipment's are costly, safety measures are time consuming and some of us hide under umbrella of ignorance. (i.e. "No one told me", "Safety devices are not comfortable" and "I am accountable for production and not for safety"). The end result of such thinking exposes employee to an accident.

As the causes of accidents are related to technical and human factors, it has attracted the attention of the psychologists, sociologists and engineers. Psychologists are concerned with the theoretical considerations of accident causation and the research into accident control through selection and training and the social and psychological factors that influence the individuals' behaviour in general. Engineers and safety officers usually render necessary practical advise on certain aspects of safety in industry. They look upon accident prevention basically as an engineering problem to be solved through proper design of mechanical safety devices. Actually accident prevention and safety require a multidimensional approach. This has assumed importance because of large-scale industrialization in which human beings are beset with mechanical, electrical, chemical and radiation hazards. In addition to this, industry today is characterised by complicated mechanisms intricate job requirements and fast moving production lines. One of the consequences of this is increasing accidents. To come out of clutches of accident risk, it is necessary to understand what is accident and the causes of accidents.
Causes of Accidents

Industrialization, expansion or modification of existing factories, and setting up of new industries have given rise to industrial hazards and accidents. The causes of accidents can broadly be divided into three groups:

1. Technical causes:

Defective and worn out machinery, poor maintenance, lack of precautions like safety guards, fencing of dangerous machines, wrong and bad layout, rooms crowded with machines, raw materials and waste products, neglect in housekeeping and working conditions.

2. Personnel causes:

Improper recruitment, selection and placement in industries; personal and social factors like carelessness, ignorance, inadequate skill, improper supervision, relationship with the supervisor and other colleagues, and family problems.

3. Psychological causes:

Various studies show that psychological, mental and emotional imbalances are at the root of several accidents. It is well-known that emotionally disturbed or mentally pre-occupied persons meet with more accidents than a normal person. The psychological factors associated with accidents are fatigue, tiredness, overwork, monotony, boredom, and lack of self-confidence. A balanced worker is more likely to avoid hazards than an unbalanced one. Accidents do not distribute themselves by chance but they happen frequently to some men and infrequently to others, as a logical result of a combination of circumstances. One of the oldest theories advanced in safety psychology is "Accident Proneness." In brief, this theory of accident behaviour states that some individuals have accidents
repeatedly; that a relatively small proportion of individuals have experienced a relatively large proportion of accidents because of their "inherent unequal liabilities."

4. Non-observance of Safety Rules:

The pre-dominant cause of accidents is the sheer non-observance of industrial safety rules and low priority given to them in our country. A majority of the industries in the small-scale and unorganised sector, which employ over 65 per cent of the work force, do not fulfill even elementary safety requirements. There are cases of chemical plants which do not have even first-aid arrangement which are a pre-requisite for opening a chemical unit. Even in the organized sector a majority of establishments either do not have medical rooms or they are inadequately equipped with medicines and instruments.

5. Miscellaneous causes:

(a) inability of the workers to grasp the implications of a process;

(b) neglect of safety regulations by workers and their reluctance to use safety equipments;

(c) haste on the part of the workers particularly when they are on incentive payment schemes;

(d) liberal attitude taken by the E.S.I. doctors in certification of accident injuries.
Some of the causes of industrial accidents noted by the National Commission on Labour are:

(a) human failure due to carelessness, ignorance, inadequate skill, improper supervision, and so on;

(b) rapid industrialization;

(c) expansion or modification of existing factories;

(d) setting up of new industries involving hazards not known earlier;

(e) lack of safety consciousness on the part of both workers and managements;

(f) inadequate realization of the financial implications of accidents.

Industrial accidents are the end-products of unsafe acts and unsafe conditions of work. However, accidents are preventable—they do not just happen. They usually occur as a result of the combination of a number of factors of which the three main ones are technical equipment, the working environment, and the worker. Ultimately, all industrial accidents are either—directly or indirectly attributable to human failings.

Damage, disorganization, distress, disablement, death, any or all of these may result from a limited accident or a major incident. The manual lifting and carrying of objects gives rise to more accidents than any other activity. Most of these accidents can be traced to one or more of the following factors:

(1) faulty lifting techniques;
(2) load too heavy or too awkward;

(3) failure to wear personal protective equipment, especially for hands and feet.

Major hazards such as the risk of fire or explosion in chemical works or large-scale liquid installations which could endanger a substantial area around or the possible release of clouds of toxic gas or vapour, the escape of dangerous pathogens or the release of radioactive substances are now widely recognised. There have been some dramatic incidents with considerable damage, loss of life or disease but the overall number of injuries is still low as compared with other accidents.

Main causes of accidents which are mentioned in the following table:

<table>
<thead>
<tr>
<th>Unsafe Actions</th>
<th>Unsafe Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meaning: Unsafe action means disregarding or deviating from procedures laid down.</td>
<td>Meaning: Unsafe condition is the place or work situation which gives rise to hazard potential resulting in likely accidents.</td>
</tr>
<tr>
<td>Working - Operating at unsafe speed - feed</td>
<td>Untidy - slippery surface</td>
</tr>
<tr>
<td>Taking posture which is not safe.</td>
<td>Unsafe arrangement of equipment-layout.</td>
</tr>
<tr>
<td>Disregard to personal protective equipment and failure to use them.</td>
<td>Unfavourable atmospheric conditions</td>
</tr>
<tr>
<td>Use of unsafe equipment</td>
<td>Defective equipment- tool.</td>
</tr>
<tr>
<td>Unsafe storing</td>
<td>Bad illumination - ventilation - poorly designed machinery.</td>
</tr>
<tr>
<td>Non-adherence to rules regulations and instructions.</td>
<td>In-operative safety devices.</td>
</tr>
</tbody>
</table>

Fig. : Unsafe Actions and Unsafe Conditions
Some theories of accident/causes are:

- H.W. Heinrich theory of accidents says, out of the unsafe actions – conditions, resulting accidents, 90.9% will not give rise to injury. 8.8% will result into minor injury accident and 0.3% will be the accidents resulting into lost time accidents.
Dr. Russell Ferret, of University of Arizona explains in his theory of causation accidents that the accidents are the result of causal chain of (one or many) combination human errors. The causes are:

1. Overload. 2. Situational Incompatibility. 3. Lack of knowledge and skills.

The Factors like: Load → Physical, Environment → Light, Noise, Dust, Fumes, Internal Mental Condition → Worry, Emotions, Pressure, Fatigue etc., give rise to likely human errors initiating incidents → which result in accident.

The Peterson theory of accident differs from Ferrel theory. According to Peterson employees commit error because of their own conscious or unconscious decisions. Their decision to error is many a times a result of over confidence or perceiving low probability of an accident. The interactions under the influence of stresses between man-machine and the environment would also lead to an accident.

Domino’s Multiple Causation theory explains that whenever there is an incident accident there are many contributing factors, causes and sub-causes. Random combination of some factors ultimately results into accidents.

Revised version of Domino’s theory speaks for lack of management controls leading to origin of basic and immediate causes resulting to accident and loss, damage or injury to one involved in accident.

No individual will like to get injured. No organisation will like to bear losses and incur unnecessary costs. Hence, it is necessary that we work safely and also prevent others from doing the unsafe act. Each and everyone of us must adhere to safe working norms follow instructions and use the protective equipment’s.
ACCIDENT REPORTING : INVESTIGATION AND ANALYSIS

- The industrialisation is rapidly growing. Consequently, employees engaged in industry are subjected to hazards of mechanical, electrical, chemical and environmental factors.

Industrial safety and accident prevention are interlinked. Therefore, recording of accident/occurrence, its investigation and analysis should be done meticulously and religiously.

As per provisions of the Laws of the Land, it is necessary to record and report such appropriate authorities.

ACCIDENT REPORTING

- The chart below will explain the reporting of an accident dangerous occurrence:

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Accident / Dangerous Occurrence

Resulting in Injury to employee
- To be reported to ESI Local Office if the employee is covered under ESI Act

Fatal accident or serious injury likely to result in death
- To be reported to inspectorate of factories

Occurrences resulting into damages - fire, explosion, building collapse etc.
- To be reported to Inspectorate of Factories in case of employee's absence from work for more than 48 hours

To be reported to Collectorate office, Civil Surgeon and Local Body and Police Station

Major disaster
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Reporting of accident has great importance in accident prevention programme. To report and record the accident, the following method and formats can be used:

1. Intimation of Accident/Incidence.

2. First Aid Report.

3. Accident report from employer to ESI office and Factory Inspectorate Office.

Employer is required to maintain records in accident register. Reports and register maintained must bear signature of authorities e.g. Factory manager, Manager Safety officer etc. under the Factories Act.

INVESTIGATION OF ACCIDENT

Correctly and timely reporting of incidence/accident will help in proper investigation of such happenings. While investigating the causes one should go into all details questioning. How ? When ? Why ? And also probe employees involved, directly or indirectly, leading such undesirable situation and find out root cause of an accident. This process will definitely help the management to plan preventive measures and execute them.

ANALYSIS OF ACCIDENT

Both accident reporting and accident investigation is useful for analysis of accidents. Following Table will be useful for preparing detailed analysis of all accidents and this analysis can be used for the preventive measures to be undertaken to achieve ultimate objective of 'ZERO' accident.
Additionally, analysis of skills, age and sex of the injured will be useful.

It is necessary also to know how to calculate frequency rate, severity rate of accidents and also days charged per injury. Frequency rate provides us the knowledge as to how often accidents take place and severity rate explains how serious was the nature of accidents happened during the given period.

Following are the formulae to arrive at frequency rate, severity rate and days charged are injury:

1. Frequency Rate, \( F.R. \):
   \[
   F.R. = \frac{\text{Number of Accident} \times 10,00,000}{\text{Total Number of Man Hours Worked}}
   \]

2. Severity Rate, \( S.R. \):
   \[
   S.R. = \frac{\text{Number of Man Hours Lost} \times 10,00,000}{\text{Total Number of Man Hours Worked}}
   \]

3. Days Charged Per Injury:
   \[
   \frac{S.R.}{F.R}
   \]

**COST OF ACCIDENTS**

Undoubtedly, accidents are costly. Enormous built in costs are there in any incidence of accident. Our country bears loss of over Rs. 25 crores per annum on account of industrial accidents. Hence, it is necessary to understand the cost of the accident.
Like an *Iceberg*, whose visible area above water is only 1/10 and remaining is under the water, only a small part of direct accident costs are seen and there are more indirect costs that need to be accounted.

**THE DIRECT AND INDIRECT COST OF ACCIDENTS ARE AS UNDER:**

**Direct Costs**

1. Compensation amount on account of loss of wages (temporary disablement permanent disablement).
2. Expenditure incurred on medical treatment and on hospitalization.
3. Costs on account of rehabilitation of injured.
5. Damages to property, materials, machinery, building, etc.
6. Other public liabilities.

(All the above mentioned costs are measurable).

**Indirect Costs**

1. Loss of time of injured person and others e.g. co-worker, supervisor, medical advisors etc.
2. Cost of ambulance - transportation.
3. Cost of administrative processing of accident reporting.
4. Loss of production and idle machine time.

5. Loss of skill due to disablement.

6. Unclaimable insurance amount.

7. Repairs and replacement of plant machinery.

8. Loss of confidence/morale of the injured.


10. Likely bad image of the organisation.

11. Work stoppage!

12. Less productivity

13. Miscellaneous expenses.


15. Extra-overtime wages to others.

**PREVENTION OF ACCIDENTS**

The indirect costs of accidents are on an average four times the direct costs. After careful study of 75,000 lost time accident cases from insurance files, he found that 98 per cent of the accidents were caused by either unsafe actions or unsafe mechanical or physical conditions or both and that they could be prevented by correction of the unsafe acts and conditions.
The basic theory of accident prevention may be briefly stated as: (1) an accident occurs only as a result of unsafe act or unsafe coalition or both; (2) injury occurs only as the result of an accident; (4) unsafe actions or unsafe mechanical or physical conditions exist only because of faults on the part of persons; and (3) faults of persons are inherited or acquired from the environment. The reasons or causes for the faults are: (i) lack of knowledge or skill and (ii) improper mechanical and physical environment, (iii) improper proper psychological characteristics, (iv) anatomical or physiological characteristics. In this way, in every accidental occurrence, there is always a chain of events which occurs in a logical and fixed order. Each link in the chain of is dependent upon the preceding link. This theory is called as the Heinrich theory of chain of injury occurrence.

Heinrich has stated, the three underlying principles of accident prevention are:

(1) the creation and maintenance of interest,

(2) fact finding, and

(3) action based on the facts.

The five steps of industrial accident prevention proposed by Heinrich are:

(1) organisation

(2) fact finding,

(3) analysis,

(4) selection of remedy and

(5) application of remedy.
Generally, unsafe actions are grouped under the following heads:

(i) operating or working at unsafe speed; (ii) operating without authority, (iii) using unsafe equipments, using hands instead of equipments or using equipments unsafely; (iv) making safety devices inoperative; (v) taking unsafe position or posture; (vi) unsafe loading, placing, mixing and combining, (vii) working or moving or dangerous equipments; and (viii) failure to use safe attire or personal protective devices. The unsafe acts may be due to lack of knowledge or skill on the part of the worker, certain bodily defects and wrong attitudes. More accidents are caused due to improper attitudes than due to ignorance or bodily defects. Some of the wrong attitudes are:

(1) over-confidence or temptation to show off;

(2) negligence towards use of safety appliances;

(2) absent mindedness;

(4) lack of interest in the job;

(5) violent temper;

(6) nervousness;

(7) fatalistic view of life and

(8) disregard for safety of others.

Generally, the unsafe mechanical/physical conditions are classified as under:

(1) unsafe illumination;

(2) inadequately guarded or defective machines;
(3) hazardous arrangements and process;

(4) unsafe methods and planning;

(5) unsafe dress or apparel; and

(6) unsafe ventilation.

The unsafe conditions can be corrected by:

(1) removing defects from machines by regular and constant check-ups and inspections;

(2) providing proper guards to the dangerous parts of the machines;

(3) making provision for adequate lighting;

(4) preventing workers from working with loose clothes and

(5) maintaining proper plant layout and house-keeping.

For the guidance of governments and industry a Tripartite Technical Conference organised by the I.L.O. in 1948 formulated a "Model Code" of Safety Regulations for Industrial Establishments Rule 82 of this Code deals with guarding of machinery. The guards should be properly designed, constructed and used so that they can:

(1) prevent all access to the danger zone;

(2) provide positive protection;

(3) not interfere unnecessarily with production;
(4) cause the operator no discomfort or inconvenience;

(5) constitute preferably a built-in feature;

(6) operate automatically or with minimum effort;

(7) provide for machine oiling, inspection, adjustment and repair;

(8) be suitable for the job and the machine;

(9) resist normal wear and shock;

(10) withstand long use with minimum maintenance;

(11) not constitute a hazard by themselves;

(12) protect against unforeseen operational contingencies; and

(13) be durable and fire and erosion resistant.

The preventive measures can be grouped as under:

1. Inspection of plant safety:

   This is one of the principal means of locating accident causes. They help to determine the prior measures essential to guard against hazards. To detect unsafe conditions and correct them in time is one of the best ways of demonstrating a interest of management and sincerity in prevention of accident.
2. The Management System:

The main reasons many times relate to the management system and other operation problems. They may be due to management policies and procedures, training, supervision etc.

3. Controlling environment causes:

This includes checking of plans, blue-prints, purchase orders, proper maintenance, inspection to detect defects in plans and materials to correct defects, formulate safe procedures, suitable layout and equipment for proper house-keeping, illumination and ventilation improvement, safe dress or apparel or personal protective equipments. Safety management also includes identifying and changing hazardous working conditions and evaluation of the effectiveness health efforts and safety.

4. Controlling behaviouristic causes:

This deals with physiological and psychological factors such as job analysis, job training, supervision, discipline, personal work, physical examination of workers, proper placement.

5. Analysis of job safety:

Job safety analysis is a procedure of analysing jobs, for the specific object to find the hazards in each step in the job and developing safety precautions to be adopted. This is properly done at the planning stage. But the technique can be applied at any stage. This is very important means of discovering hazards in an existing process.
6. **Investigation of accident**

Quick investigation of all accidents is essential to find out the causes and getting them corrected. Investigation of accident should not be a fault-finding exercise but a fact finding one. Discovering accidents includes investigation of all the causes of previous accidents to record all the facts concerning each accident to analyse and tabulate the same, inspection of all the tools, equipments, machines regularly.

7. **Supplementary activities**

Supplementary activities consist of measures such as:

1. Employee participation in safety campaigns and contests, safety meetings and safety stunts, first-aid training, plant fire-brigades, plant inspection, accident investigation, job safety analysis, safety committees, safety suggestion system. The success of any safety-programme will depend on the co-operation and the employees commitment. They must be involved in the formulation and implementation of policies. It is a pity that organised trade unions have not taken up the cause of industrial safety seriously though their own members suffer most from accidents. They can start industrial safety education on their own taking help from ISHA (Industrial Safety and Health Association), Central Labour Institute Inspectorate of Factories. They can demand setting up of joint safety committees. They have to seriously think of industrial safety along with the management,

2. Plant advertising media such as posters and pictures, plant bulletin boards, plant newspapers, messages in pay envelopes, display of interesting objects, signs and slogans, exhibitions and film, and radio/T.V.
(3) Safety education through audio-visual aids like newspapers, posters, bulletin boards, and safety training courses for top and middle management executives, supervisory personnel trade union officials and for the rank and file workers,

(4) Standardisation of safety activities like fixing of official, semi-official, and unofficial standards for safe construction and maintenance of certain types of industrial equipments, hygienic practices, personal detective devices and codification of safety rules and regulations,

(5) Research in technical, medical, psychological and statistical aspects of safety for finding the effects of psychological, physiological, pathological, environmental and technological factors on health and safety.

**Accident prevention is a sound business policy**: It will show remarkable improvements when we can:

1. create consciousness of cost and hence realization that accidents are to be avoided to be able to face competition;
2. obtain full co-operation of trade union leaders to guide and motivate workers to adopt safe practice;
3. exert social pressure on employers to obtain their active involvement in safety;
4. extend propaganda so that every worker and his family realise the hazards in his profession and that his safety depends on himself;
5. improve on the type, quality and availability of personal protective equipments suitable for Indian conditions; and
6. introduce some incentive schemes for safety performance as response in certain cases have been excellent.
Some of the points that supervisors/foremen should pay attention on in accident-prevention are:

1. To develop safe working conditions;
2. Create safe work habits on a personalised basis;
3. To promote of employee participation in safety; and
4. To correct action when safety rules are ignored.

The supervisor is the main person in accident prevention and responsible for the enforcement of safety measures, the safety engineer is the general adviser on safety. The matters on which the safety engineer will report to an advise management will include:

1. the planning of new building or the alteration of existing ones;
2. the acquisition of new machines and other equipment;
3. arrangement for the testing, maintenance and repair of equipment and safety devices of all kinds; and
4. protection from fire.

Traditionally psychologists have laid emphasis on the right main for the right job in accident prevention programmes. But now industrial psychologists are gradually switching over from narrower motivational aspects to the broader concept of improving quality of working life. But, in modern days ergonomics or
human engineering has become a fast growing technology which is concerned with "fitting the job to the main". It is "engineering for human use". The purpose of ergonomics is to achieves the best mutual adjustment of man and his work, for the improvement of human efficiency and well-being. The application of ergonomics has made as important contribution in reduction of industrial accidents and in improvement of the overall health and workers efficiency. Presently, a well recognised discipline and is an integral part of advanced organisational health service. Training in ergonomics involves machines designing tools, materials, equipments, manufacturing processes, lay-out of work places, work methods and environment for achieving greater efficiency of man and machine. Presently, more research is being done in this area.

Safety programmes help to create awareness of occupational hazards and of the importance of safe work practices and use of available safety equipment. The methods normally used to promote employee awareness include safety committees; recording and posting safety performance records; providing recognition and awards to individuals and units with good safety records; creating rules and regulations regarding work behaviour and use of safety equipment; and safety training programmes.

**STATUTORY SAFETY PROVISIONS**

The Factories Act, 1948, lays down in Chapter IV certain standards of safety to be adopted by the factories covered under it. Its main provisions regarding safety are:

1. The dangerous parts of the machines like prime movers, flywheel, electric generator, rotary converters, and the like are to be properly fenced.

2. Young persons are not to be employed on dangerous or moving machines.
3. Prohibition of employment of women and children near cotton openers.

4. Hoists and lifts are to be of good mechanical construction of sound material and adequate strength and properly maintained. They are to be thoroughly examined by a competent person at least once in every period of 6 months.

5. All flooring, steps, stairs, passages and gangways should be of sound construction, and should be properly maintained, and where necessary, provided with hand-rails.

6. No person is to be employed in any factory to lift, carry or move any load so heavy as to be likely to cause him injury.

7. Special care is to be taken for protection of eyes from particles or fragments thrown off in the course of manufacturing process or risk to the eyes by reason of exposure to excessive light.

8. Precautions are to be taken against dangerous fumes inflammable dust, and gas.

9. Precautions in case of fire: One of the most common precautions against fire is the "No Smoking" rule. Other precautions are (i) fire resistant construction of buildings; (ii) careful and safe storages and handling of inflammable material; (iii) provision of adequate fire extinguishing equipment; (iv) a fire alarm system and (v) alert, efficient and well trained fire fighting squads/promptly available at all times.

The Factories (Amendment) Act, 1987 contains certain provisions regarding grant of permission of the initial location of a factory involving a hazardous process or for the expansion of any such factory. The State Government may appoint a Site Appraisal Committee for this purpose. It also provides that the occupier shall in every factory where a hazardous process takes place, or where hazardous substances are used or handled, set up a safety committee consisting of equal
number of representatives of workers and management to promote co-operation between the workers and management in maintaining proper health and safety at work.

The legal provisions relating to safety are primarily covered in the Factories Act, 1948. However, there are some specialized safety laws like:

1. **Indian Explosives Act, 1884**

   This Act regulates manufacture, possession, use, sale, transport, of explosives. Three sets of Rules exist: (a) Static and Mobile Pressure Vessels Rules, 1981; (b) Gas Cylinder Rules, 1983; (c) Explosives Rules, 1983.

2. **Indian Electricity Act, 1910**

   The Indian Electricity Act, 1910, and the Indian Electricity Rules, 1976, prescribe safety in electric installations both domestic and industrial.

3. **Indian Boilers Act, 1923**

   This Act governs the inspection and repair of Steam Boilers, as well as the procedure for annual certification of boilers by the Boiler Inspectorate.

4. **Petroleum Act, 1934**

   The Petroleum Act, 1934 and the Petroleum Rules, 1976 classify petroleum into three classes, depending on their flash point. Separate Rules are established for each class dealing with the import, transport, storage, production, refining and blending.

   Prevention of accident is a must. It is the responsibility of each and every one of us. Well planned accident prevention programme will reduce/eliminate bad effect/consequences of social, economical, legal and human aspects of society at large.
Management, while planning, designing, organizing, directing and controlling prevention programme, must keep in mind the following:

1. Discipline.
2. Training and Education.
3. Propaganda.
4. Emergency plans - on site - off site.
5. Instruction Boards.
7. Regular preventive maintenance.
8. Safety committee.
10. Continuous dialogue with employees on safety matters.

**Accident Prevention Means Nothing But Attending To:**

=> Engineering, Education and Enforcement

Sign, warning and instruction boards have great importance in safety and accident prevention programme. To avoid likely accident, it is necessary to undertake a survey/an audit of the premises and then display boards at eye catching level, such as:

1. Prohibition of Smoking.
2. Use of Helmets or Goggles.


4. Defective Equipment.

5. Do Not Start.

6. Work Permit is essential.

7. Danger.

8. High Voltage, etc.

Formation of safety committee, safety groups and appointment of safety monitors work centre plays a major role in accident prevention programme.

Enforcement of safety rules and regulations, adhering to instructions of safe working will definitely prevent and eliminate accidents and occurrences which damage plants property.

On going trainings and education activity promoting safety awareness, among employees at all level will positively help in executing accident prevention programme.

Employee's active involvement and management's concern and full support is essential to create productive and safe work relationship throughout the organisation.
ASSESSMENT OF THE ACCIDENT COST

1. Name of the injured person and his details: _______________________

2. Brief description of the accident: _______________________

3. Major remarks of investigation:

<table>
<thead>
<tr>
<th>(I) Time Lost</th>
<th>No. of EMPS</th>
<th>Actual Time Lost</th>
<th>Wages</th>
<th>(II) Loss of Production</th>
<th>Direct Cost</th>
<th>Indirect Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Result on co-workers</td>
<td>1. Discussing</td>
<td></td>
<td></td>
<td>Effects</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Watching</td>
<td></td>
<td></td>
<td>1. Same section/machine operation of the injured.</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>3. Helping the injured on the day of accident.</td>
<td></td>
<td></td>
<td>2. Other operation delayed.</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4. Employee absence.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>(III) Repairs</th>
<th>Value Rs.</th>
<th>Wages of</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Replacement of damaged parts of</td>
<td></td>
<td>Employees attending to the repairs and maintenance work: Rs. ________</td>
</tr>
<tr>
<td>2. New machine equipment</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(IV) Cost of First Aid</th>
<th>Rs.</th>
<th>(V) Cost of Transportation required to shift injured to Hospital</th>
<th>Rs.</th>
<th>(VI) Cost of Medical Treatment</th>
<th>Rs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(VIII) Other Cost Like</td>
<td>Rs.</td>
<td>(IX) Total Cost (I) to (VIII)</td>
<td></td>
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<tr>
<td>1. Loss of Efficiency of the injured</td>
<td>Rs.</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>2. Overtime to other workers</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>3. Temporary employment if required.</td>
<td></td>
<td>Rs.</td>
<td></td>
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</tr>
</tbody>
</table>

**How to exercise Management control to prevent accident**

**Methods**

<table>
<thead>
<tr>
<th>By identifying/investigation causes</th>
<th>By elimination of unsafe action</th>
<th>By elimination of unsafe conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Detail Accident Investigation</td>
<td>2. Competent and Close Supervision</td>
<td>2. Rectifying unsuitable defective physical environmental conditions</td>
</tr>
<tr>
<td>3. Inspection and safety audit of plants, machinery and equipment's.</td>
<td>3. Exercising plant and personnel discipline.</td>
<td>3. Safe design of machines and equipment.</td>
</tr>
<tr>
<td>5. Appropriate level of illumination, noise and ventilation.</td>
<td></td>
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<tr>
<td>6. Providing right type of safety appliances and apparels.</td>
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</tbody>
</table>