INDUSTRIAL AND ORGANISATION PSYCHOLOGY

UNIT - II ACCIDENT AND SAFETY

What is industrial accident?

An **industrial accident** is any **accident** that happens to a person in the course of their **work** that results in an injury. ... In fact, more than 337 million **accidents** happen on the job each year.

What are the types of industrial accidents?

Some of the most common industrial accidents are as follows:

- Slips and **falls**. Workers should be provided non-slip footwear and proper training in safety procedures to avoid resulting injuries such as musculoskeletal pain. ...
- Falling objects. ...
- Chemical burns/exposure. ...
- Improper lifting/overexertion.

What are the causes of accidents in industry?

The basic causes of industrial accidents are:

- Inherent Hazards or Nature of Job: There are many jobs in **industries** which are highly prone to **accidents**. ...
- Slipping, Tripping or Falling on the Floor: ...
- Collision and Obstruction: ...
- Equipments and Machines: ...
- Fire hazards: ...
- Unsafe Acts: ...
- Miscellaneous **Causes**:

What are 4 main causes of accidents?

Following are eight of the most common causes of accidents in the workplace:

- Lifting. ...

- Fatigue. ...
- Dehydration. ...
- Poor Lighting. ...
- Hazardous Materials. ...
- Acts of Workplace Violence. ...
- Trips and Falls. ...
- Stress.

What are types of accident?

Accident Types

- **Accidents at Work**. You may have been involved in an accident whilst at work. ...
- Slip/Trip Claims (public liability) ...
- Industrial Diseases and Illnesses. ...
- **Road Traffic Accidents**. ...
- Accidents Abroad. ...
- Accidents involving Animals. ...
- Sports Related Injuries.
- Clinical Negligence.

What is accident in safety?

Accident, unexpected event, typically sudden in nature and associated with injury, loss, or harm. ... With appropriate **safety** precautions and awareness of one's actions and environment, many **accidents** can be avoided or prevented.

How do accidents occur?

Sometimes, **accidents occur** for a combination of reasons, from bad visibility to unsafe road design, or other drivers lack caution. While the causes of **accidents** can vary, the consequences are often the same, resulting in everything from vehicular and property damage to serious **injuries**.

What is effect of accident?
The mental and emotional **injuries** after a car accident can include mental anguish, emotional diWhat is safety and accident prevention?

Accident prevention refers to the plans, preparations and actions taken to avoid or stop an **accident** before it happens. ... It is a legal obligation of organizations to comply with the laws, standard practices, and **safety** observations to avoid emergencies and **accidents**. Many **accidents** occur due to human factors.

stress, fear, anger, humiliation, anxiety, shock, embarrassment, random episodes of crying, loss of appetite, weight fluctuations, lack of energy, sexual dysfunction, **mood swings**, and **sleep disturbances**.

Industrial Accidents: Introduction, Meaning and Definitions, Nature, Personal Characteristics and a Few Others

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Industrial Accidents – Introduction

An industrial accident is an unexpected occurrence in an industrial establishment causing bodily injury to one or more

persons. Under the Factories Act, 1948, an industrial accident has been defined as “an occurrence in an industrial establishment causing bodily injury to a person which makes him unfit to resume his duties in the next 48 hours.”

In other words, it is an unexpected event and is always sudden. Moreover, the event or occurrence should be something to which a definite time, date and place can be assigned. It must arise in the course of employment in a factory or an industrial establishment. However, self-inflicted injuries or injuries inflicted with the consent of a person cannot be regarded as accidents.

Some employees are more accident prone as compared to others. According to T.W. Harell, “Accident proneness is the continuing tendency of a person to have accidents as a result of his stable and persisting characteristics”. If two individuals are working on similar machines under identical circumstances, one may commit more accidents than the other. The former employee will be called an accident-prone operator.

Accidents are undesirable because of both humanitarian and economic reasons. Even a minor accident may bring down the morale of the workers. Whenever an accident occurs, it leads to wastage of time of the employees involved in the accident and that of the organisation.

If the accident is serious in nature, it might lead to dislocation of production in the organisation. According to T.W. Harell, “Accidents are not only expensive, but they also lower the morale of the workers and in addition result in lower production.”

Due to rapid industrialization, mechanical, electrical, chemical, and radiation hazards have increased at the workplace and industrial workers are exposed to such hazards which result in accidents on and off. The problems of industrial accidents

have drawn attention from such disciplines as sociology, psychology, and engineering.

Sociologists and psychologists have made attempt to solve the problems of accidents in terms of proper selection, training, and education of workers and their socio-psychological factors that make them prone to accidents. Engineers have made attempt in terms of proper designing of mechanical safety devices. These two orientations suggest that safety and accident prevention is multi-dimensional issue and, therefore, requires comprehensive approach.

Lapse of safety and its resultant impact accident may be defined as an unplanned and uncontrolled event which causes injury to a person. It implies that the event is unplanned and uncontrollable by the person immediately before the occurrence of the event.

A legal definition of the accident has been provided by the Factories Act, 1948 which states that "accident is an occurrence in an industrial establishment causing bodily injury to a person which makes him unfit to resume his duties in the next 48 hours."

Industrial Accidents – Meaning and Definitions: Suggested by H. W. Heinrick

Happening of any event which creates the obstacles in the path of smooth conduct of work and the worker is unable to perform his work either temporarily or permanently is called an accident. People think of an accident as an unexpected occurrences resulting in actual physical damage to a living being or to a non-living being.

Some psychologists broadened the scope of accident by including the situations in which actual damage has taken place but the situations in which there was the possibility of such a damage, which was somehow averted. Accident is an

occurrence which interrupts or interferes with the orderly progress of work in an industrial establishment.

According to Indian Factories Act 1948, “Accident is an occurrence in an industrial establishment causing bodily injury to a person, which makes him unfit to resume his duties in next 48 hours.”

According to H. W. Heinrick, “Accident is unplanned and uncontrolled event in which the action or reaction of an object, substance, person, or radiation results in personal injury or the probability thereof”

Therefore, every occurrence which may injure a worker is not an accident. The injury inflicted on the worker should be serious which makes him unfit to perform his job for the minimum period of two days.

In the modern complex technological environment there are many potentially dangerous health hazards that result in accidents. Industrial accidents are extremely costly in both economic and human terms. In addition to the economic and morale considerations, there are also legal obligations to ensure the health, safety and welfare of people at work. Even a minor accident may bring down the morale of workers and in addition result in lower production.

The word “accident” means any unplanned and uncontrolled event which results in damage, whether through injury or disease to an employee.

Under the Factories Act, 1948, an industrial accident has been defined as “an occurrence in an industrial establishment causing bodily injury to a person which makes him unfit to resume his duties in the next 48 hours”.

Some employees are more accident – prone as compared to others. Harell points out that “accident-proneness is the

continuing tendency of a person to have accidents as a result of his stable and persisting characteristics".

In the words of Sikula, accident-proneness is a condition in which a "human being is mentally inclined, strongly disposed, attitudinally addicted or personally destined to become continually involved in an on-going and never-ending series of accidents or injuries".

It is important to detect such accident-prone individuals and give them safety training and education and place them on safe jobs, where the chances of exposure to committing accidents are less.

Industrial Accidents – Nature

The nature of accident in an industrial setting causing injury may show wide variation. It may be just a scratch on any part of the body of a person; it may be in the form of resultant death. In between these two extremes, there may be variations in the disabilities due to accidents.

A minor accident is one which causes injury of a minor nature like a scratch or scratches. A major accident is one which may be either fatal or causes disability. Disability may take the form of a loss of ability to work or move. Such a disability may be either temporary or permanent. Both these types of disabilities may be either total or partial.

A temporary partial disability reduces the earning capacity of the person in the employment in which he was engaged at the time of accident. A permanent partial disability reduces his ability to earn income from any employment which he was capable of undertaking at the time of accident occurred.

In a partial disability, the person concerned is entitled to compensation to the extent to which his ability to earn is reduced. A total disability, either of temporary or permanent nature, incapacitates the person and makes it impossible for

him to engage in any work he was capable of performing at the time of the accident which resulted in that disability. In the case of total disability, the person is entitled for full compensation.

Industrial Accidents – 6 Personal Characteristics Associated with Events Causing Accidents

Various characteristics of an individual may make him accident prone or accident repeater. Accident-proneness is a condition in which a human being is mentally inclined, strongly disposed, attitudinally addicted, or personally destined to become continuously involved in an on-going or never-ending series of accidents or injuries.

Various personnel characteristics can be associated with events causing accidents in the following ways:

1. Untrained and unskilled persons are more prone to accidents than trained and skilled ones.

2. Emotionally maladjusted persons are more prone to accidents than emotionally well-adjusted ones.

3. Persons who take unusual risk are more prone to, accidents than those who take moderate risk.

4. Alcoholic and drug addict persons are more prone to accidents than those who are away from such vices.

5. Persons who work under stress caused by their personal factors are more prone to accidents than those who do not.

6. Male workers are more prone to accidents than female workers because the latter adopt safety measures with more precaution

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Industrial Accidents – 6 Main Causes of Industrial Accidents: Technical, Psychological, Personal, Non Observance and a Few Others

The rapid industrialization, expansion, improvement in the existing factories and establishment of the new industries has increased the industrial hazards and accidents. Accident can take place any time at any place due to little carelessness. A worker is crushed under the heavy wheels or falls in boiled liquid or the chain of crane gets broken and number of worker die under it.

Industrial accidents may take place due to the carelessness of workers, defective machinery, dirty and slippery floors, defective lightening system, inadequate training to workers etc. An accident is no doubt an unpleasant, unexpected and sudden incident, yet it does not just happen, it is caused and therefore it is essential to find out if possible specific cause/causes for each particular incident leading to an accident for its future preventions.

Cause # 1. Technical:

These causes include the following:

(i) Defective and old machines

(ii) Poor maintenance of machines, tools, and implements

(iii) Not using the safety guards while working on the machines

(iv) No fencing of dangerous machines

(v) Lack of good working conditions available to the workers at their work place

(vi) Unguarded and improperly adjusted machines

(vii) Hazardous arrangement of machines i.e., overcrowding machines

(viii) Defective and inadequate safety devices

(ix) Unsuitable tools

(x) Defective tools i.e. dull, damaged and without handle tools

(xi) Inflammable material

(xii) Hot and poisonous material.

Other Technical Causes:

(i) Job Itself – Some jobs are inherently more dangerous and complicated than others, such as the job of crane man in comparison to that of supervisor.

(ii) Work Schedules – The occurrence of accident is also affected by the work schedule. Accidents usually do not occur in the early hours of the work day, but occur late in the day.

(iii) Psychological Climate of Work Place – Psychological climate of the work place also affects the accident rate. According to psychologists, the root causes of accident are psychological, mental, and emotional imbalances.

Cause # 2. Psychological:

The second category includes the psychological causes which lead to the accidents in the industry.

Some of these causes are listed below:

(i) Fatigue

(ii) Over work

(iii) Monotony

(iv) Mental disorder

(v) Emotional imbalance

(vi) High anxiety level

(vii) Fear, nervousness, and impulsiveness

(viii) Carelessness.

Cause # 3. Personal:

The third category of causes of accidents are personal causes which can be listed as follows:

(i) Improper recruitment and selection

(ii) Defective placement

(iii) Personal and social factors

(iv) Carelessness

(v) Ignorance

(vi) Family problems

(vii) Relationships with workers, subordinates, and supervisors

(viii) Age

(ix) Health

(x) Eye Sight

Cause # 4. Non Observance:

Following are the non-observance causes:

(i) Not using safety equipment

(ii) Not observing the measures prescribed under section 21 to 41 of the Factories Act.

Cause # 5. Other:

This category includes the following causes of accidents:

(i) Inability of the workers to grasp the implementation of a process

(ii) Undue haste

(iii) Inadequate lightening arrangements

(iv) Excessive noise

Cause # 6. Unsafe Acts:

Unsafe acts are the result of lack of knowledge/skill on the part of an employee and happen due to:

(i) Operating without authority

(ii) Failing to secure equipment or warning other employees of possible danger.

(iii) Failing to use safe attire or personal protective equipment.

(iv) Throwing materials on the floor carelessly

(v) Operating or working at unsafe speeds, either too fast or too low.

Industrial Accidents – Types

Accidents can be of different types. An employee may fall from a height while engaged on a particular assignment, or he may be caught in a machine while working on it, or he may fall against a machine, or parts of machine having a horizontal protruding motion may strike against him, or explosive used carelessly may explode and injure an employee.

This injury may be internal one, e.g., a bone fracture, muscle pull, etc. or external one which shows clearly the signs of injury. Further, both these kinds of injuries may be major or minor. Minor accident may result in a cut or a scratch, which is not a serious one. Whereas a major accident may be fatal or

non-fatal. In other words, the major accidents may result in death or disablement.

According to the Workmen's Compensation Act, 1923, disablement means loss of capacity to work or to move. Disablement of a workman may result in loss or reduction of his or her earning capacity. In the latter case, he or she may not be able to earn as much as he or she used to earn before his or her disablement.

Disablement may be partial or total. According to Section 2(1)(g) of the Workmen's Compensation Act, 1923, partial disablement means any disablement that reduces the earning capacity of a workman as a result of some accident.

Partial disablement may be- (i) permanent, or (ii) temporary. Temporary partial disablement means any disablement that reduces the earning capacity of a workman in any employment in which he was engaged at the time of accident which results in such disablement.

On the other hand, permanent partial disablement is one, which reduces the earning capacity of a workman in every employment, which he was capable of undertaking at the time of injury.

Finally, total disablement means such disablement, whether of a temporary or permanent nature, as incapacitates a workman for all work which he was capable of performing at the time of the accident resulting in such disablement. In other words, this refers to that condition where a workman becomes unfit for every type of work and is not able to get job anywhere due to that disablement.

Industrial Accidents – 4 Major Effects of Accidents

The age we are passing through is the age of machines. Machines and tools are used right from the actual work of production to the lifting of the material. Accident often takes

place in the factory due to any fault developed in the machines and tools or due to negligence.

There is no doubt that management is trying their best in checking accidents since long but the number of accidents have not decreased. The recent studies and researches made in accidents reveal that the industrial establishment suffers not only in the amount of compensation to be paid by it as a legal liability on account of accidents but also the real loss in many times more than it.

The workers, the consumer, and the society at large are also the sufferers due to the occurrence of accidents.

The losses to be suffered by different sections on account of accidents can be explained as follows:

Effect # 1. Loss to Industry:

These can be explained as follows:

(i) Expenditure to be made on the medical treatment of the worker.

(ii) Wages to be paid to the worker for the period when he is not able to join the work due to the injuries caused to him due to the accident.

(iii) Expenses to be made for the services of machines and tools on which the worker is working.

(iv) Expenses to be made for inspection and repairs of the machines and the tools.

(v) Expenses to be incurred on recruitment and training of new worker who has been employed in place of an injured and deceased worker.

(vi) The cost of the period during which other workers to stop working out of fear or out of sympathy with the worker injured by an accident.

(vii) More wages than the normal ones are to be paid on overtime, in case the production work is held up, for honoring the orders of customer in time.

(viii) An accident has also its effect on the other workers. There is a likelihood of occurrence of other accidents out of fear or nervousness.

So these are the effects of accident on industry. But this is not the total list of cost of industrial accidents. This list shows that the real cost of industrial accident is far more than the expenses of compensation.

Effect # 2. Loss to Workers:

An industry suffers a lot on account of accidents. It affects adversely the worker too. In fact the worker's loss is far more than the loss of others. Beside the economic loss, worker has also to suffer more badly and in case of his death, his family has no one to help. If he is unable to work after the accident, he becomes a burden for his family. Family losses the source of income and also to bear increased expenses of his treatment.

Effect # 3. Loss to Consumer:

The cost of industrial accident is included in the production cost and therefore, the accidents make an increase in the production cost. This again leads to an increase in the prices of commodities and consumer will not be able to buy according to his need which will also affect the standard of living of the consumers.

Effect # 4. Loss to Society:

If the worker dies or is rendered disabled on account of the accident and the worker's family become helpless and the society has to come to its rescue. The family of such worker has to depend upon the aid of the donation given by the different organisations and it is also a burden on the society.

Accidents not only affect the industry but to the worker, consumer and society. So these accidents should be checked and management should try to reduce these accidents.

Industrial Accidents – 2 Parts of Accident Costs: Direct Costs and Indirect Costs

Accidents are generally costly, both to an employee and to an employer. Some losses are direct and some are indirect. Some losses are visible and some are invisible. From a worker's point of view, an accident creates pain for him and his family. From an employer's point of view, it disrupts production and also causes financial loss.

From the employer's context, the accident costs can be divided into two parts:

1. Direct Costs:

These include the following:

(i) Payment of wages to the injured worker during his period of absence due to injury.

(ii) Amount of compensation to be paid on account of death, disablement, etc. The rates are decided as per the provisions of the Workmen's Compensation Act, 1923 or the Employees' State Insurance Act, 1948.

(iii) Cost of medical aid.

(iv) Cost of recruiting and training a substitute worker.

(v) Loss in production and quality due to lack of skill and experience of a newcomer.

(vi) Loss due to waste of raw materials.

2. Indirect Costs:

The indirect costs of accidents are estimated to be two to four times the direct costs.

The indirect costs are the following:

(i) Cost of lost time of injured employee.

(ii) Cost of time lost by other employees who stop work out of curiosity and sympathy, to assist the injured employee, etc.

(iii) Cost of time lost by foremen, supervisors in assisting the injured employee, investigating the cause of the accident, arranging for the injured employee's production to be continued by some other employee, recruitment, selection and training of the new employee, preparing state accident reports or attending hearings before industrial commissioner, etc.

(iv) Cost of time spent on the case by first-aid attendant and hospital staff when this is not covered by insurance.

(v) Cost due to damage to the machine, tools, or other property, or to the material.

(vi) Cost due to interference with production, failure to fill orders on time, loss of bonuses, payments of forfeits and other similar causes.

(vii) Cost under employee welfare and benefit systems.

(viii) Cost in continuing the wages of the injured employees in full, after his return even though the services of the employee (who is not yet fully recovered) may for the time be worth only about half his normal value.

(ix) Cost due to the loss of profit on the injured employee's productivity and on idle machines.

(x) Cost of subsequent injuries that occurs in consequence of the excitement or weakened morale owing to the original accident.

(xi) Overhead cost the expense of light, heat, rent, and other such items—that continues while the injured employee is a non-producer.

Industrial Accidents – Measurement of Industrial Accidents

Two main statistical ratios have been used to gather accident information – the frequency rate and the severity rate.

The frequency rate is the number of time-lost accidents (or injuries which have disabled an employee) per 1,00,000 man-hours worked. The severity rate, on the other hand, is "the total number of days charged or lost because of accidents per 1,00,000 man-hours worked."

The National Security Council of the United States has given the following formulae for the computation of these rates:

$$\text{Accident Frequency Rate} = \frac{\text{Number of disabling work injuries}}{\text{Total number of man-hours worked}} \times 1{,}00{,}000$$

$$\text{Severity} = \frac{\text{Number of mondays lost}}{\text{Total number of man-hours worked}} \times 1{,}00{,}000$$

Industrial Accidents – 2 Important Steps for Preventing Accidents: The Safety Programme and Legal Provisions Regarding Safety of Workers

Many industrial accidents are preventable if necessary preventive steps are taken. Thus, it is essential for all concerned to take the necessary preventing steps.

Following steps are taken for the prevention of accidents:

Step # 1. The Safety Programme:

Once the management develops interest in promoting safety measures, then it should plan the safety programme.

Any particular safety programme could be composed of one or more of the following elements:

(i) Support by Top Management:

Top management's support is essential for the conduct and success of a safety programme. Management's support was characterised by personal attendance at safety meetings,

periodic personal inspections, and insistence on regular safety reports and inclusion of safety figures and achievements on the agenda of the company's board of director's meetings.

(ii) Appointing a Safety Director:

The next step is to appoint a safety director who shall be given the primary responsibility for the installation and maintenance of the safety programme. In case of a small organization then this job can be assigned to any responsible line manager. However, in case of a larger organization, staff safety director/safety engineer is usually appointed.

(iii) Engineering a Safe Plant and Operation:

A sound and forward-looking engineering is an essential requirement for a safety programme. While preparing a safety programme all possible mechanical safety devices and human engineering should be thought of for application. Factory should be kept clean, well-lit, properly ventilated and free from dust. All dangerous parts of machines and equipment should be properly fenced.

(iv) Educating All Employees to Act Safely:

A good safety programme should have proper provision for educating the employees to act, think and work safely.

This can be done through the following:

(a) Educating the new employees at the time of induction.

(b) Giving emphasis on safety points during training periods especially during the off-the-job training.

(c) Making of special efforts by first level supervisor.

(d) Establishment of employee safety committees.

(e) Holding of employee safety meetings.

(f) Use of company periodical, if any.

(g) Use of charts, posters and displays emphasizing the need to act safely.

(v) Record Keeping:

The employer should maintain a proper record showing the number of accidents, occupational illnesses and the number of lost workdays.

(vi) Accident Analysis:

Even after taking all the preventive measures, accidents occur. They should be thoroughly investigated in terms of both costs and causes. All sorts of direct and indirect costs should be listed and the management should take a lesson from this.

(vii) Safety Contests:

Safety contests stimulate employees to think and act safely. These are a form of employee education. It has been observed that accident rate is lower in the pre-contest and during the contest period but once the period of contest is over the accident rates goes up again.

(viii) Enforcement:

A safety programme should be enforced rigorously; only then the desired results can be obtained. Although the basic approach of a safety programme should be positive in nature, yet in some cases the negative approach by way of imposing fines, reprimands, discharge, lay-offs, etc. may also be necessary to enforce discipline in case someone deliberately violates the safety rules and instructions.

Step # 2. Legal Provisions Regarding Safety of Workers:

The Factories Act, 1948 makes detailed provisions in regard to various matters relating to the safety of the worker. These provisions impose upon the occupiers or managers certain obligations to protect workers, who are unwary as well as negligent, from accidents.

Sections 21 to 41 provide the safety provisions, which are absolute and obligatory in their character, and the occupier of every factory is bound to follow them:

(i) Fencing of machinery (Sec. 21) – In every factory, all dangerous parts of each machine shall be properly fenced. Machineries include every moving part of a prime mover and every fly-wheel connected to a prime mover, the headrace and tailrace of every water-wheel and water-turbine, any part of a stock- bar which projects beyond the headstock of a lathe, every part of an electric generator, a motor or rotary converter and every part of transmission machinery.

(ii) Work on or near machinery in motion (Sec. 22) – In any factory, any examination, adjustment or lubrication of any part of operating machinery shall be carried out by trained adult male worker wearing tight fitting clothing. Women and young persons are not allowed to carry the above-said task.

(iii) Employment of young persons on dangerous machines (Sec. 23) – There is a restriction on young persons to work on dangerous machines.

(iv) Striking gear and devices for cutting off power (Sec. 24) – Suitable striking gear to be provided, maintained and used. Also, suitable devices for cutting off power in emergencies from machinery should be provided and maintained in every workroom.

(v) Self-acting machines (Sec. 25) – No traversing part of a self-acting machine in any factory and no material carried thereon shall be allowed to run on its outward or inward traverse within 45 centimeters from any fixed structure which is not part of machine.

(vi) Casing of new machinery (Sec. 26) – All machinery driven by power shall be sunk, encased to guard against danger/accidents.

(vii) Prohibition of employment of women and children near cotton-openers (Sec. 27) – No women or child shall be allowed

in any part of the factory to press cotton when cotton-opener is at work.

(viii) Hoists and lifts (Sec. 28) – Hoists and lifts should be of good mechanical construction and should be properly maintained and examined once in every six months.

(ix) Lifting machines, chains, ropes and lifting tackles (Sec. 29) – Lifting machines, chains, ropes and lifting tackles should be of good construction and should be examined once in every 12 months. Also, cranes and lifting machines should not be loaded beyond safe working load.

(x) Revolving machinery (Sec. 30) – Maximum safe working speed of grindstone or abrasive wheel, etc. should be clearly stated on a notice to be kept near machine.

(xi) Pressure plant (Sec. 31) – The limit of safe working pressure should not be exceeded.

(xii) Floors, stairs and means of access (Sec. 32) – All floors, steps, stairs, passages and gangways should be of sound construction and properly maintained.

(xiii) Pits, sumps, opening in floors, etc. (Sec. 33) – Every pit or opening in the floor should be properly covered or fenced.

(xiv) Excessive weights (Sec. 34) – No person shall be employed in any factory to lift, carry or move any load so heavy as to be likely to cause him or her injury.

(xv) Protection of eyes (Sec. 35) – In every factory, screen or suitable goggles should be provided for the protection of persons who are employed in a work which involves danger or injury to the worker's eyesight.

(xvi) Precautions against dangerous fumes (Sec. 36) – No person shall be allowed to enter any chamber, tank, pit, pipe, etc. in which any gas, dust or fume is likely to be present.

(xvii) Precautions regarding the use of portable electric light (Sec. 36-A) – No portable electric light or any other electric appliance of voltage exceeding 24 volts shall be permitted for

use inside any chamber, tank or pit unless adequate safety devices are provided.

(xviii) Precautions against explosive or inflammable dust, gas, etc. (Sec. 37) – Effective measures should be taken to prevent explosion on ignition of gas, fume, etc.

(xix) Precautions in case of fire (Sec. 38) – Effective measures should be taken to prevent the outbreak of fire and its spread. Workers should be made familiar well in advance with the means of escape in case of fire.

(xx) Power to require specifications of defective parts or tests of stability (Sec. 39) – The inspector of the factory may ask the occupier or the manager or both to furnish drawings and specifications, which may be necessary to determine whether the buildings, ways, machinery or plant can be used with safety.

(xxi) Safety of building and machinery (Sec. 40) – If any building or part of a building or machinery or plant in a factory is in such a condition that it is dangerous to human life or safety, then the inspector may serve on the occupier or the manager or both of the factory an order specifying the measures which in his opinion shall be adopted and requiring them to be carried out.

(xxii) Maintenance of building (Sec. 40-A) – If it appears to the inspector that any building or any part of a building in a factory is in such a state of despair as is likely to lead to conditions detrimental to the health and welfare of the workers, then he may serve on the occupier or the manager or both of the factory an order specifying the measures which should be taken.

(xxiii) Safety officers (Sec. 40-B) – In every factory, (a) wherein 1000 or more workers are employed, or (b) wherein, any manufacturing process or operation is carried on, which involves any risk of bodily injury, poisoning or disease, or any other hazard to health, to the persons employed in the factory, then the occupier shall appoint the required number of safety officers.

Other Voluntary Steps:

In addition to adopt a safety programme and comply with the legal provisions, management can take other voluntary steps also. For example, it can ensure good working conditions with special emphasis on safety measures, pay attention to individual differences of employees, ensure proper speed of work, motivate safety attitudes, encourage safety habits, arrange strong motor tests, emotional stability tests, intelligence tests, etc. Along with this, the workers and trade unions should also take voluntary steps in this regard, e.g. guiding workers on safety measures, arranging lectures, publishing periodicals/ magazines, etc.

Industrial Accidents – Safety Measures: Engineering Approach and Psychological Approach

Industrial accidents occur due to unsafe mechanical causes and unsafe human causes.

Following safety measures should be adopted:

1. Engineering Approach:

These measures are related to the defects of machines and equipment and the defective atmosphere of work in the factory.

To overcome these defects, an engineer can make the following contributions:

(i) To Cover Moving and Dangerous Parts:

An engineer inspects machines and plants of the factory and provides lattice to the moving or rotating parts of the machines. Thus, the workers can be made safe and accidents can be minimised.

(ii) Arrangement of Guards:

Often the workers make an access to the danger zones during operations and get entangled while passing by the machines. In order to avoid some accidents the engineer makes

arrangements of guards around the machine through a framework of metal strips.

(iii) Replacement of Dangerous Machines:

Safety manager has the proper knowledge of new changes as well as the new and safer machines, so he has to make proposal to the manager for replacing the dangerous machines with new and safer machines.

(iv) Arrangement of Safety Devices:

The engineers can guide the workers who are working on dangerous machines to make arrangements for safety devices. Tight fitting clothing for workers working by the side of dangerous machines should be provided.

(v) Improvement in Operations:

The engineer can make an improvement in the operation of the machines by regularly inspecting machines and equipment of the factory.

(vi) Arrangement of Fire Equipment:

There are more chances of breaking out of fire in the factory and sometimes fire in the factory becomes a cause of major and dangerous accidents. Such accidents can be minimized by arranging for fire equipment in the factory.

2. Psychological Approach:

An engineer can only think the ways for improving the machines, equipments, and working conditions. All this reduces only a small part of accidents. Eighty per cent accidents are the result of the human defects.

A psychologist can take the following steps in providing the safety measures:

(i) Proper Selection:

Most of the accidents in the factory are due to the reasons that the workers do not take interest in the work or are afraid of

operating a machine or they do not follow the instructions. Such worker should not be allowed to work in the factory. Only qualified, experienced, and attentive workers should be allowed to work on machine.

(ii) Proper Placement:

Worker should be placed on the job keeping in mind the nature, interest, and experience of the worker regarding the job. Worker should not all be appointed at a place where they don't want to work because if it is done, he will not take interest in his work.

(iii) Convincing of Importance of Safety:

Each and every worker should be provided full and proper knowledge of safety. Worker should know the importance of safety and management must make continuous efforts for motivating workers to do their job with utmost safety. So worker should be fully convinced to work with proper care and attention.

(iv) Training:

Often training is provided to the workers regarding their work in the factory but sometimes workers do not give proper attention, but management should take care of them and only trained workers should be allowed to operate upon machinery.

(v) Motivating Safety Habit:

Management should make continuous efforts for motivating the workers to do their job with utmost safety. Provision should also be made for awarding reward to the workers who make record of safety and make regular use of safety measures to those who make concrete proposal for safety in the factory.

(vi) Strict Rules:

Rules meant for the use of safety methods and for prohibiting the untrained workers from causing any disturbance to the machines in the factory should strictly enforced. And provisions should also be made for the worker who violates

these rules. Safety rules should be strictly enforced in the factory.

Industrial Accidents – Role of Government in Industrial Safety

The Government has set up Factory Advice Service and Labour Institute, Bombay, which functions as an integral body to advise Government, industry and other interests concerned with matters relating to safety, health and welfare of factory workers. It undertakes the enforcement of the laws on safety and health of workers.

The Government has drawn up a "National Program for Co-ordinated Action Plan" for control of hazards, and protection of occupational health and safety workers in dangerous manufacturing processes. The Action Plan lists out the responsibilities of the Government, management and workers' organisations in the field of safety and health in work environment, and includes 'Model Scheme for setting up Full Safety Control System Cell' in hazardous industries and 'Safety and Health Accidents Reduction Action Plan' (SAHARA) in all industries.

National Safety Council:

The National Safety Council was set up in 1966 to promote safety consciousness among workers to prevent accidents, minimise dangers and mitigate human sufferings, conduct programs, lectures and conferences safety. As on 31 March, 2005, the Council's membership of 1,683 consisted of 1,456 corporate members, 141 individual members, 33 trade union members and 53 life members.

The National Safety Day is celebrated on 4th March every year throughout the country to mark the foundation day of the National Safety Council.

National Safety Awards:

To give recognition to good safety performance on the part of industrial undertakings and to stimulate and maintain the interest of both the managements and the workers in accident prevention programs, the Central Government instituted in 1965 the National Safety Awards.

The award schemes were instituted for factories registered under the Factories Act, 1948, but in 1971, separate schemes for factories not covered under the Act and for ports were also introduced. The national Safety Awards for mines were instituted in 1983.