CHAPTER I

INDUSTRIAL SAFETY IN RETROSPECTIVE
Industrial Safety in Retrospective.

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CHAPTER I
INDUSTRIAL SAFETY IN RETROSPECTIVE

1.1. Introduction

1.1.1. One of the most important human activities is managing. Ever since people began forming groups to accomplish aims they could not achieve as individuals, managing has been essential to ensure coordination of individual efforts. As society has begun to rely increasingly on group effort, and many organized groups have become large, the task of managers has been rising in importance.

1.1.2. Managers are charged with the responsibility of taking actions that will make it possible for individuals to make their best contributions to group objectives. Management thus applies to small and large organizations, to profit and not-for-profit enterprises, to manufacturing as well as service industries.

1.1.3. Managerial functions are essentially the same for first-level supervisors, middle level managers, and top level executives. There are considerable variations in the environment, scope of authority, and types of problems in the positions. Yet all managers undertake the same basic functions to obtain results by establishing an environment for effective and efficient performance of individuals working together in groups. In a modern society profitability is an important measure of excellence. Today government, private industries, and universities recognize the urgent need for productivity improvement. Successful companies create surplus through productive operations. Productivity implies effectiveness and efficiency in individual and organizational performance. For acceptable degree of effectiveness and efficiency in an industry an accident-free environment is the prime necessity.
1.1.4. The French industrialist and father of modern management theory Henri Fayol found that activities of an industrial undertaking can be divided into six groups, namely:

(i) Technical (production);
(ii) Commercial (buying, selling, exchanging);
(iii) Financial (search for, and optimum use of, capital);
(iv) Security (protection of property and persons);
(v) Accounting (including statistics); and
(vi) Managerial (planning, organization, command, coordination and control).

These are as shown in the next page.

1.1.5. From the above we understand the importance of industrial safety. Like all other major functions or activities, protection of property and persons play a very important role. Industrial safety by itself aims at achieving accident-free production. In accident-free production we find educated and trained workers, and a safe working environment.

1.1.6. Indian constitution puts it down as a directive that we must provide safe and humane conditions of work for our industrial workers. We should do our utmost to see that those conditions of life for them are adequate and they are well looked after. For this it is a must that there is integration between management and labour. What we must try to do is to prevent accidents as much as possible and encourage education in industrial safety? What exactly required is will determination, effort and dedication?
“OUR OWN CONSTITUTION PUTS IT DOWN AS A DIRECTIVE THAT WE MUST PROVIDE SAFE AND HUMANE CONDITIONS OF WORK FOR OUR INDUSTRIAL WORKERS. WE SHOULD DO OUR UTMOST TO SEE THOSE CONDITIONS OF LIFE FOR THEM ARE ADEQUATE AND THEY ARE WELL LOOKED AFTER. THERE MUST BE INTEGRATION BETWEEN THE MANAGEMENT AND LABOUR.

WHAT WE MUST TRY TO DO IS TO PREVENT ACCIDENTS AS MUCH AS POSSIBLE AND ENCOURAGE EDUCATION IN INDUSTRIAL SAFETY. WHAT EXACTLY IS REQUIRED IS WILL, DETERMINATION, EFFORT AND DEDICATION TO SEE THIS COUNTRY PROSPER AND PROGRESS.”

Dr S RADHAKRISHNAN
FORMER PRESIDENT OF INDIA
1.1.7. Every year a large number of employees get injured due to accidents. Therefore, there is a definite need to implement necessary safety measures in the industrial organizations. The safety requirements vary according to the hazard problems. Even in case of operations, which are not hazardous, some safety planning is very much required as in the case of hazardous operations. Most management has a sincere, humanitarian interest in their employees. For this reason, they not only emphasise on proper safety management in their industrial organizations, but also willingly allocate reasonable amount of money for safety. Where top management supports good safety program on humanitarian grounds, it has been seen that this factor contributes quite an extent towards increase in production, lowered costs and better profits. Well-organized safety management is a necessity in any successful industrial establishment. Therefore industrial safety is an important subject, which needs to be studied in depth and given due importance in any industrial organization.

1.1.8. During earlier days the accidents were said to be the outcome of workman’s carelessness, with management sharing little responsibility. Subsequently through appropriate labour legislation’s like Factories Act 1948, ESI Act 1948, Workman’s Compensation Act 1923, duly amended from time to time the companies set up and introduced many corrections and preventive steps. This led to a sharp decline in accident rates. Safety has been recognized as an integral part of the normal operating procedures and a definite responsibility of all supervisory personnel along with the employees.

1.1.9. Interaction between worker and the environment leads to occupational health hazards. To minimize health hazards, there is a need to monitor the worker's health and also working environment. An industrial hygiene program, effective implementation of which the design engineers, medical experts, supervisors ensure, and workers translate this to action at the shop floor is a necessity. Personal protective equipment or safety equipment should be provided
to the workers in order to enable them to carry out their duties where the hazards involved in the operations cannot be eliminated.

1.1.10. Extensive statutory provisions have been made in India for the prevention of industrial accidents and thus enhancing safety of industrial workers. These provisions are contained in the Central laws and have been further supplemented by the states.

1.2. Industrialisation

1.2.1. With the large-scale industrialisation, the hazards faced by the industrial worker have increased manifold. Therefore the subject of industrial safety has assumed quite a lot of importance. Absence of proper safety measures would invariably lead to avoidable accidents resulting into injuries to persons, damage to equipment and machinery, financial losses both to employers and employees. To quote Mr. RB Blake, "Accidents are expensive. Substantial savings can be achieved by preventing them".

1.2.2. The human angle for providing safety to the industrial workers is no less important, in fact in the present industrial environment; it is one of the major reasons for the management to undertake effective safety programs in their organizations, concerns, and factories. Industrial safety involves not only elimination of agents of injury, but also a reliable control of harm to employees. Common experience shows that injuries continue to occur despite the knowledge of their causes and the recommended controls. Therefore, implementation of the hazard control program becomes critically important.

1.2.3. The government has passed a number of Legislation on the subject. However they are not being followed in letter and spirit. The anomaly needs to be rectified. A good safety program can reduce occupational injury/illness and
the operating costs, which in turn contributes substantially towards increased productivity and improved profits.

1.2.4. In view of the foregoing, it is imperative that the subject of industrial safety is given due care and a proper safety program be evolved and implemented to ensure the safety of workers. In the beginning the accidents were considered to be caused owing to the workman’s carelessness, and management was absolved of its responsibility. Subsequently based on studies carried out by the management expert’s appropriate labour legislation The Workman’s Compensation Act 1923, in tune with the requirement of time was adopted by industrialized nations. Other nations also adopted this Act with the aim of reducing industrial accidents. Later on further studies carried out brought out the exceptions in this Act and labour legislation’s like Factories Act 1948 and ESI Act 1948 were adopted. These acts covered all possible measures. These acts were constantly reviewed for further prevention of industrial accidents and thus enhancing the safety of workers. After the Bhopal gas tragedy, additional provisions to cover hazardous operations were included by legislations as a result of detailed study carried out by management and legal experts.

1.2.5. A study was carried out on the Challenger Space Shuttle accident of 28 January 1986 in which seven people died. This revealed that there were differences between engineers and managers, upper and lower levels managers, and insufficient provision for upward communication outside the chain of command which caused the accident.

1.2.6. Industrialisation has advanced with leaps and bounds in the last few decades. This has helped to raise the per capita income. Employment opportunities and standard of living have improved. However industrialization has brought in several problems in its wake. One such problem is the industrial accident.
1.2.8. With the rapid advancement in industrial process new types of dangers have been introduced in increasing numbers. Mechanical, electrical, chemical and radiation hazards cause lot of problems for safety of the employees in the industry. When the safety planning and safety measures are lacking, industrial operations may not remain under full control, schedules may get disrupted and cost may increase. Mr. R B Blake, the Senior Safety Engineer of the Division of Labour Statistics, US Department of Labour had rightly stated that,

"The main driving force behind the industrial safety movement is the fact accidents are expensive, substantial savings can be made by preventing them".

1.3. The Social Responsibility of Managers

1.3.1. In the early 1900s the mission of business firms was exclusively economic. Today, partly owing to the interdependencies of the many groups in our society, the social involvement of business has increased. There is indeed a question as to what the social responsibility of business really is. Moreover the question of social responsibility, originally associated with business, is now being posed with increasing frequency in regard to government, universities, non profit foundations, charitable organizations and even religious organizations,. Society awakened and vocal with respect to the urgency of social problems is asking managers, particularly those at the top, what they are doing to discharge their social responsibilities and why they are not doing more. The proposed research work is with the aim of analysing the procedures adopted by industries and factories, measures both statutory and non-statutory provided by the government and efficacy of the controlling authorities. These aspects are seen in the light of future environment. Thereupon it is proposed put forward
1.3.2. The effect of all five resources (culture, HRM practices, management, technology, and product/marketing) on both short- and long-term firm performance was studied. Results show that the investment community, both affecting the short-term performance, considers management and technology important. However, analyses of long-term performance suggest that the key role management plays may be due to management’s ability to develop synergies with people who are key to organizational success – both employees and customers.

1.3.3. The research topic relates to industrial safety management, which is dynamic and alive. It will explore the shortcomings if any and reasons thereof. It would attempt to analyze whether concrete steps have been taken in this direction to acknowledge, identify and cover these loopholes or whether they still remain unattended posing as grave security risks. The paper will also analyze industrial safety thinking over the years including the psyche right from ancient times and discuss future options. The study encompasses the safety management at both macro level as well as micro level.

1.4. Meaning and Necessity of Industrial Safety

1.4.1. Importance of industrial safety has increased because of the large scale industrialization in which the workmen/worker is subjected to mechanical, electrical, chemical and biological hazards along with deadly radiation which are endangering human life all throughout. During earlier days the accidents were said to be the outcome of workman’s carelessness, with management sharing
little responsibility. Subsequently based on studies carried out by the management expert’s appropriate labour legislation: The Workman’s Compensation Act 1923, in tune with the requirement of time was adopted by industrialized nations. Other nations also adopted this Act with the aim of reducing industrial accidents. This led to a sharp decline in accident rates. Safety has since been recognized as an integral part of the normal operating procedures and has a definite responsibility of all supervisory personnel along with the employees.

1.4.2. Industrial safety is that condition of enterprise operation in which, by controlling hazards, accident free production is achieved. Accidents are readily recognized when machinery or instruments are damaged, material is spoilt or someone is injured. It is not necessary that all accidents should result in personal injury. In fact, the accidents without personal injury outnumber those, which have resulted in an injury. On each occasion an individual is exposed to an unsafe condition, or, becomes subject to an unsafe act, there is a possibility of an injury. Industrial safety has been described as the only aspect of industrial relations where there is no advantage to either side at the expense of the other. It is free from any of the pressures and expedients, which often decide the provision of any welfare item. Therefore, there is a need for associating safety with welfare to ensure harmony in industrial relations and success of industrial operations.

1.4.3. An industrial accident may be defined as an occurrence, which interrupts or interferes with the orderly progress of work in an industrial establishment. A broad and at the same time generally accepted definition for all purpose, relating to safety of personnel is, “An accident is an unplanned and unexpected event which causes or it is likely to cause an injury”. According to the Factories Act 1948, an 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.
In other words, it is an unexpected event, which is neither anticipated, nor designed to occur. It is always sudden, for, a gradual process does not always constitute an accident. Moreover, the event or occurrence should be something to which a definite time; date or place cannot 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 an accident.

1.4.5. An industrial injury has been defined as a personal injury to an employee, which has been caused by an accident or an occupational disease which arises out of, or in the course of employment and which would entitle such employee compensation under the Workmen’s Compensation Act, 1923.

1.4.6. Industrial safety of an organization is its prime responsibility, because workers are the soul of any progressive organization. Safety and health have great importance in industrial development and productivity. Therefore utmost attention needs to be given to maintain excellent safety and health standards at the places of work of the employees and also off the work. Most of the personnel problems that the employers have to face have the roots in the unhealthy and unsafe conditions or environment and also in unsafe actions of the employees. There is an old adage in safety that says, “Accidents do not happen! They are caused”. Main causes of accidents are unsafe conditions and/or unsafe actions. Whenever an accident occurs it has a direct bearing on the job of an employee and of course on production. Though danger of accidents exists in all walks of life it is more in industries where man and machine work together.

1.4.7. A safety policy should be governed by following principles: -
   1. It is essential to respect human life.
   2. All the accidents and risks to health are preventable.
3. It is the responsibility of the management to ensure that the injuries do not take place.
4. Safe working condition is the right and obligation of each worker.
5. Safety training is essential at all levels.
6. If a company cannot afford safety; it cannot afford to be in business.

1.4.8. Some of the causes, which are identified as common unsafe acts and unsafe, condition are:-
   1. Carelessness.
   2. Over speeding or operating at unsafe speed.
   3. Experimenting new techniques.
   4. Unsafe postures.
   5. Lethargy in implementing safety procedures and using protective equipments.
   6. Non-adherence to rules, regulations and instructions.
   7. Newly inducted persons left unsupervised or under supervised.
   8. Compulsion of engineering a machine without adequate relief maintenance.

1.5. **Fire, Sources & Methods to Combat Fire**

1.5.1. Fire is one of the five elements in this universe. When used properly, under controlled conditions, it is of immense use. Left uncontrolled, it can cause devastation. To understand the remedies available to control and combat fire, it is necessary to understand what “fire” is. For the fire to occur, presence of three things is necessary. They are: -
   1. Fuel.
   3. Oxygen.
1.5.2. These three ingredients are commonly available in industries.

1. Combustible materials, whether solid, liquid or gases burn on ignition. A match, a lighted cigarette, bidi, spark, internal combustion or friction, can cause the ignition. Materials which provide the source for fuel are :-
   (a) LPG.
   (b) Petrol.
   (c) Diesel.
   (d) Kerosene.
   (e) Combustible gases.
   (f) Alcohols.
   (g) Paints.
   (h) Resins.
   (i) Plastics.
   (j) Coal.
   (k) Wood.
   (l) Paper.
   (m) Clothes.
   (n) Polythene.
   (o) Cotton/cotton waste.
   (p) Rubber.

2. Heat is generated by open flames, hot surfaces, sparks and arcs, friction, chemical actions and the sun.

3. A fuel burns at specific temperature in the presence of oxygen. Normal air contains adequate amount of oxygen. Some fuels contain sufficient oxygen within themselves to support their burning.

1.5.3. In order to prevent fire, one of the three necessary ingredients i.e. fuel, oxygen, or heat must be eliminated or controlled. For extinguishing fire, one of these ingredients must be removed.
1.5.4. Fire is categorized into four classes:

1. **Class A.** This type of fire has fuel which comprises of normal combustible materials like paper, wood, fibre etc.
2. **Class B.** In this case the fuel is an inflammable liquid such as gasoline, oil, grease, and alcohol.
3. **Class C.** This type of fire is due to electric short circuits, electrical typewriters, computers, motors, generators and electrical outlets.
4. **Class D.** Fire in this case is caused due to combustible metal, like magnesium etc.

1.5.5. Knowledge of fire makes it easy to report the fire for outside assistance. At times fire may be combination of two or sometimes three types of classes e.g., if a Molotov cocktail is thrown through a window into an office, the resultant fire would involve gasoline and normal combustible materials in the room. Extinguishing such a fire would be quite complex.

**1.5.6. Methods to Combat Fire**

1.5.6.1. The methods to combat fire differ according to the class of the fire because of their typical requirements.

1. **Class A** fire requires saturation by water or water fog. The ignited fuel should be cooled down below the ignition temperature. Water will extinguish the flames and cooling will prevent re-ignition. Carbon-di-oxide extinguishers though less effective may be used. Steams of water should not be used.

2. **Class B** fire requires depriving them of oxygen. Carbon-di-oxide extinguishers, dry chemical extinguishers, though less effective may be used. Steams of water should not be used as inflammable liquids float on water and fire would spread rapidly.
3. Class C fire should be put off using non-conducting agents like carbon-dioxide or dry chemicals. Water may conduct electricity and result in electrocution. Whenever possible, the electric circuits should be switched off.
4. Class D fires are caused by self-combustible materials, which are not in common use. Such fires occur rarely. For this class of fire, dry powder type fire extinguishers are more effective.

1.5.6.2. Fire protection can be divided into two activities, i.e., prevention and suppression. It is important to prevent a fire to avoid its occurrence. Fire hazards in the factory must be identified and reported. Once a fire starts, its quick suppression is critical. If a small fire is extinguished at its early stage, a huge potential loss can be avoided. Suppression includes a response from properly equipped fire fighters or from a factory worker who is able to take a fire extinguisher from a wall and douse the fire. Actually fire extinguishers are useful only in the initial stages. Recommended procedures for fighting at state as well as industrial level are covered in chapter VII.

1.6. Health Hazards in Working Environment

1.6.1. Interaction between worker and work environment leads to occupational health hazards. To minimize health hazards there is a need to monitor the workers health and also working environment. There are five types of factors, which can cause the work hazards in the industry, they are:-

A. Physical factors.
B. Chemical factors.
C. Mechanical factors.
D. Biological factors.
E. Psychological factors.
1.6.2. Out of the above factors industrial hygiene takes into consideration mostly the physical and chemical factors and tries to control them. For this, design engineers, medical experts, supervisors and workers at the shop floor are utilized. These aspects have been dealt in detail in subsequent chapters.

1.7. Personal Protective Equipment

1.7.1. Personal protective equipment or safety equipment is provided for the use of employees in order to enable them to carryout their duties where the hazards involved in such job operation cannot be eliminated. Selection of proper protective equipment as per the need of the job is very important.

1.7.2. Certain safety apparels, which are a must while entering shop floor, are: -
   A. Gas mask.
   B. Safety goggles.
   C. Face shields.
   D. Hand gloves.
   E. Apron and gum boots.
   F. Safety belts.
   G. Helmets.

1.8. Occupational Hazards

1.8.1. Employees in the company are often subjected to certain health hazards and occupational diseases. The normal occupational health hazards may be classified into chemical, environmental and psychological hazards. Chemical gases fumes and dusts raised by production processes may be inhaled by the workers and may cause serious injury or chronic disorder.
1.8.2. Noise, vibrations, shocks and improper atmospheric conditions cause environmental hazards. Vibrations and shocks may cause nerve injury and inflammation of tissues of the joints of the operator’s hands. A very low vibration less than one cycle per second is often encountered in certain vehicle, ships, and airplanes, which often causes motion sickness.

1.9. Nature and Cause of Accidents

1.9.1. Nature of an accident may vary from industry to industry. An employee may fall from a height while engaged in a particular assignment, he may be caught while working on it, he may fall against a machine, or, a part of the machine may strike him, or he may get injured due to explosion caused due to careless handling of explosives. Such accidents may result in disablement or death.

1.9.2. Accidents are usually the result of a combination of factors, each one of which may vary from situation to situation. The cause may be either unsafe actions or unsafe conditions. It is correct to say that “Accidents have a multiplicity of causes, which are closely related. Accidents can be prevented”. They do not just happen when a finger or an eye is lost or a back is strained. The cause could be a badly fitted safety guards, or neglect of the rules about wearing protective glasses, or faulty lifting technique. Every accident has a cause or causes, which can be said to fall in two categories.

A. Human errors or unsafe acts, which include ignorance, stupidity, lack of concentration or foresight, insufficient physical or mental capacity and so on.

B. Environment factors or unsafe conditions such as dangerous machines, dangerous systems of work, dangerous materials and so on.
1.10. Cost of Accidents

1.10.1. The term cost of accidents is a misnomer. Accidents involve disablement and suffering, the cost of which cannot be assessed or computed in terms of currency. One cannot fix a price for a finger or an arm lost or for the feelings of a child awaiting the return of his father from work. Looking from this angle the words ‘accident cost’, is meaningless. However this term is commonly used for denoting financial loss to the management arising out of accidents at work.

1.11. Research Work

1.11.1. The proposed research work is with the aim of analyzing the procedures adopted by industries and factories, measures both statutory and non statutory provided by the government and efficacy of the controlling authorities. These aspects are to be seen in the light of future environment. Focus of the study is systems and procedures adopted by factories, its critical evaluation and futuristic appraisal. It is important to analyse as to why this study is being undertaken and how the study is going to add/contribute? What contemporary relevance the study is going to hold?

1.11.2. The research topic relates to industrial safety management, which is dynamic and alive. It will explore the shortcomings if any and reasons thereof. It would attempt to analyze whether concrete steps have been taken in this direction to acknowledge, identify and cover these loopholes or whether they still remain unattended posing as grave security risks. The paper will also analyse industrial safety thinking over the years including the psyche right from ancient times and discuss future options.

1.11.3. The study encompasses the safety management at both macro level as well as micro level. The industrial safety takes a new serious turn with the
'chemical, biological, nuclear dimension and global terrorism being added to it. Such issues do invite public debate with advent of better technologies of media and mass communication.

1.12. Summary

1.12.1. Today government, private industries, and universities recognize the urgent need for productivity improvement. What we must try to do is to prevent accidents as much as possible and encourage education in industrial safety. Every year a large number of employees get injured due to accidents. Therefore, there is a definite need to implement necessary safety measures in the industrial organizations. The safety requirements vary according to the hazard problems. Well-organized safety management is a necessity in any successful industrial establishment. Therefore industrial safety is an important subject, which needs to be studied in depth and given due importance in any industrial organization.

1.12.2. Safety has been recognised as an integral part of the normal operating procedures and a definite responsibility of all supervisory personnel along with the employees. Interaction between worker and the environment leads to occupational health hazards. To minimize health hazards, there is a need to monitor the worker’s health and also working environment. Extensive statutory provisions have been made in India for prevention of industrial accidents and thus enhancing safety of industrial workers. With the large-scale industrialization, the hazards faced by the industrial worker have increased manifold. Therefore the subject of industrial safety has assumed quite an importance. Absence of proper safety measures would invariably lead to avoidable accidents resulting into injuries to persons, damage to equipment and machinery, financial losses both to employers and employees. The human angle for providing safety to the industrial workers is no less important, in fact in the present industrial environment; it is one of the major reasons for the management to undertake
effective safety programs in their organizations, concerns, and factories. Industrial safety involves not only elimination of agents of injury, but also a reliable control of harm to employees.

1.12.3. A good safety program can reduce occupational injury/illness and the operating costs, which in turn contributes substantially towards increased productivity and improved profits. In view of the foregoing, it is imperative that the subject of industrial safety is given due care and a proper safety program be evolved and implemented to ensure the safety of workers.

1.12.4. In earlier days the accidents were said to be the outcome of workman’s carelessness, with management sharing little responsibility. Subsequently based on studies carried out by the management experts’ appropriate labour legislations, in tune with the requirement of time was adopted by industrialized nations. Other nations also adopted this Act with the aim of reducing industrial accidents.

1.12.5. With the rapid advancement in industrial process new types of dangers have been introduced in increasing numbers. Mechanical, electrical, chemical and radiation hazards cause lot of problems for safety of the employees in the industry. When the safety planning and safety measures are lacking, industrial operations may not remain under full control, schedules may get disrupted and cost may increase.

1.12.6. Fire hazards in the factory must be identified and reported. Interaction between worker and work environment leads to occupational health hazards. To minimize health hazards there is a need to monitor the workers health and also working environment. There are five types of factors, which can cause the work hazards in the industry.
1.12.7. Industrial safety is that condition of enterprise operation in which, by controlling hazards, accident free production is achieved. It is not necessary that all accidents should result in personal injury. In fact, the accidents without personal injury outnumber those, which have resulted in an injury. Industrial safety has been described as the only aspect of industrial relations where there is no advantage to either side at the expense of the other. An industrial accident may be defined as an occurrence, which interrupts or interferes with the orderly progress of work in an industrial establishment. It must arise in the course of employment in a factory or an industrial establishment. An industrial injury has been defined as a personal injury to an employee, which has been caused by an accident or an occupational disease which arises out of, or in the course of employment and which would entitle such employee compensation under the Workmen’s Compensation Act, 1923.

1.12.8. Industrial safety of an organization is its prime responsibility, because workers are the soul of any progressive organization. Safety and health have great importance in industrial development and productivity. Therefore utmost attention needs to be given to maintain excellent safety and health standards at the places of work of the employees and also off the work. There is an old adage in safety that says, “Accidents do not happen! Main causes of accidents are unsafe conditions and/or unsafe actions. Though danger of accidents exists in all walks of life it is more in industries where man and machine work together”.

1.12.9. A safety policy should be governed by following principles; Safe working condition is the right and obligation of each worker and safety training is essential at all levels. If a company cannot afford safety; it cannot afford to be in business. Lethargy in implementing safety procedures and using protective equipment’s increases chances of industrial accidents.
1.12.10. The proposed research work is undertaken with the aim of analyzing the procedures adopted by industries and factories, measures both statutory and non-statutory provided by the government and efficacy of the controlling authorities. The research topic relates to industrial safety management, which is dynamic and alive. The paper will also analyze industrial safety thinking over years including the psyche right from ancient times and discuss the future options. The study encompasses the safety management at both macro level as well as micro level.

1.12.11. Nature of an accident may vary from industry to industry. But it is reasonable to say that accidents can be prevented. Accidents involve suffering hence the term cost of accidents is a misnomer. Accidents are caused due to unsafe acts or unsafe conditions.
**MANAGERIAL ACTIVITIES**

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Table 1.1.4: Social responsibility of managers