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INDUSTRIAL SAFETY

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CHAPTER - IV

INDUSTRIAL SAFETY

INTRODUCTION AND DEFINITION :

The twentieth century has been characterised as the age of common man. Whether this is true or not, it is certainly true to say that there has been an increasing appreciation of the importance of human needs both industrially and socially. There is a widespread recognition both at the level of the Government and of industry to improve the working and living conditions of workers engaged in the productive process. The Trade Unions have been equally enthusiastic in securing for the workers improvement in their working and living conditions.

Another significant phenomenon has been that, during the past few decades industry has moved through a series of amazing discoveries. It is found that engineering could prevent accidents. It also found that workers could be reached through educational techniques and brought to a greater awareness of the problems and the methods of combating the same. Through trial and error it has also discovered that safety rules could be established and enforced. In this discovery of what is called the three 'E's of safety, Engineering, Education and Enforcement, industry has found the means to make a drastic improvement in the prevention of accidents and measures.

The advantage to all parties of sound safety and health programmes in industry is now increasingly recognised in all progressive countries. Though a Workmen's Compensation Act and Safety and Health Laws exist in India also, correct ideas about industrial health, safety and welfare have not yet spread fully amongst the general industrialists and workers. A more rigorous enforcement of the existing laws must be undertaken by the Govt. On the other hand, recognition of mutual interest on the part of employers and workers will carry the parties all the way to effective programmes. Employers should, therefore, pay greater attention to this problem. On the part of workers, more active interest in observing safety and health practices is called for.

Definition :

Safety is defined as " protection of the physical health of people in the organisation and prevention of work-related injuries and accidents."

1] NEED FOR SAFETY :

Industrialisation has brought within its wake several problems. One such is industrial accidents. With rapid advances in industrial processes, newer types of dangers to life, limb and health are being increasingly introduced. Mechanical, electrical, chemical and radiation hazards beset us on all sides. Yearly, several lakhs of employees are

injured in factories due to accidents. The number of accidents reportable under the Factories Act alone exceed 2.8 lakhs during 1973. Of these, 663 accidents resulted in fatalities. Many more are disabled for life.¹

These accidents represent a social loss of great magnitude in the form of pain, loss of earning capacity and cost due to disturbance to economic efficiency. The pain and suffering of the injured as well as the emotional loss to the victims of the fatalities and accidents causing permanent disfigurements or disabilities are impossible to be summed up or evaluated. The economic costs are more tangible of being computed, though practically, no figures are available in terms of the total cost of accidents in our factories. To the management, it is the direct costs for meeting medical expenses, compensation or disablement benefits to the injured or their families and also the various other indirect costs due to the interference caused by accidents which are generally taken roughly as four times the direct costs. To the society, the economic cost is in terms of loss of productive capacity and the cost of maintenance of the injured and their families through social security schemes or through public or private charities.

In the absence of data relating to total economic losses due to accidents, a very approximate idea can be had by making use of the figures published by the Labour Bureau, Simla of claims paid by the Employees State Insurance Act.

1. M. N. Rudrabasavaraj, 'Dynamic Personnel Administration' Himalaya Publishing House, Bombay P. 350.

The total cost of payments for temporary and permanent disablements and dependents benefits during the year 1973-74 for 311,227 accident cases which included 527 fatalities was Rs.64,616,000/-. This forms only one part of the direct costs, in as much as the cost of providing medical care has not been included. No figures are available in respect of the latter. All the same, for our purpose, it can be indicated by using the multiplication factor suggested by Heinrich (Indirect Costs = 4 times direct costs) that the total cost of these 3.11 lakhs accidents compensated by the Employees State Insurance Scheme alone would far exceed Rs.32.3 Crores.

Yet it is the human consequences of accidents that in the last analysis, are most important and should be most real to us. When we quote accident statistics, we should remember that we are not just talking about figures but about individual men and women, boys and girls with their own aims and aspirations in life, to whom society owes its firm responsibilities.

To ensure that safety saves sorrow, it offers security and brings sufficiency, we need to keep four objectives in view :-

- 1] The desire to increase production as a means to higher standard of living.
- 2] Reducing cost - because of increasing export and a spiral rising of prices.

- 3] The shortage of skilled labour and the need to conserve and make the best use of labour available.
- 4] Humanitarian motives - the desire to reduce needless suffering and human wastage.

The above four objectives are a clear pointer to the fact that if safety is not practised and sufferings are allowed to continue, we will :--

- 1] Reduce Production : by withdrawing injured workers from their productive function; delay the work of others; damage the machinery and plant; require untrained people to take over as substitutes for those injured, etc.
- 2] Increase Cost of Production : by Workmen's Compensation claims and Employees State Insurance Payments, Cost of medical treatment, cost of First-Aid attention, supervisory time, extra overheads, wasted materials, damaged machinery and tools etc.
- 3] Waste Labour Resources: Besides those temporarily diverted from their jobs, many people are killed or permanently maimed, so that their skills are lost to them and to the society.
- 4] Cause Human Sufferings : The fundamental motive in ensuring safety in humanitarian. Work accidents cause a great deal of needless pain and sufferings.

Viewing in this perspective, one can confidently say that accidents cause a great deal of human, industrial and social loss, much of which is preventable.

2] APPROACHES AND ESSENTIALS FOR SAFETY :

To ensure safe performance and constantly lower accident figures, two aspects have become important.

First of all, the works or plant must be engineered for safety. This implies that all new plants and process should be examined closely from the safety point of view before being put into operation and must be constantly observed to see that every thing is done when the plant is operating, to minimise the possibility of employees being injured by such equipment. This calls for training in safety as well as other technical skills.

The second aspect is that of educating the workers and emphasising to supervisors their vital role in preventing accidents, avoiding break-downs and hampering of production which could be accomplished by a simple instruction. As such, it is a long-drawn-out process requiring a steady and well - arranged campaign to ensure that every employee is trained in safety, the very day he starts work, as well as in the other skills necessary for his particular job.

ESSENTIALS FOR SAFETY:

Knowing what makes people tick will uncover many accident causes and it is not too hard a thing to know. Safety is factor which deals with the influencing of an employee's mind resulting in a proper attitude that governs his behaviour at work.

When a new employee reports for work, he brings with him certain abilities and mental attitudes, either latent or more or less fully developed; these have a positive influence on the manner in which the worker performs his job and the way he responds to suggestion for improvement in his work methods.

Once this man has been hired and reports for work, checking his performance including practices affecting his own safety and that of others, becomes the responsibility of his supervisor. Just as the supervisor has always been the keyman in production, so is he the keyman in safety work and in applying safety training and education.

By intimate contact, the supervisor comes to know the likes and dislikes of each of his men. He may gain knowledge of such outside factors as domestic relations, financial troubles, background and environment which have a bearing on the employee's frame of mind. He learns by experience the best method of getting each employee to respond to orders and suggestions.

First impressions are important. If a man walks into a shop which is dirty and disorderly and he sees unguarded,

hazardous machinery or notices employees working on machines with guards not in place, he is not likely to take seriously any suggestions he may receive as to safe work methods.

Disorderly and unsafe conditions likewise make it difficult for the supervisor to convince the employees that he is serious in his campaign for safety. If he really wants to obtain his men's co-operation in the safety effort, he must do his utmost to maintain good housekeeping and to see that all machinery is guarded and that guards are in place.

No two persons are exactly alike in physical or mental characteristics; experience has shown that approximately 20 percent of the group will be above average, 60 % average, and 20 percent below average. Leaders and Superior performers will be found among the top 20 % while safety-indifferent and other problem cases will come for the most part from the below average 20 %. The remaining 60 percent, the normal behaviour group, will respond satisfactorily to a reasonably well-conceived and well-planned program of safety education and training.

Some men respond readily to an appeal for pride, others only react slightly to this stimulus. Some with imagination and feelings are deeply influenced by a portrayal of the harm an unsafe act might cause to themselves or to an innocent worker.

If we can understand human behaviour and through effective leadership get across the main ideas of safety psychology among the workers not only will improve their morale, but correspondingly it will be reflected in a smoother working of the industrial organization.

The key to successful safety programme in any small or large plant is leadership by the management and their guidance and help to the supervisors. In turn, supervisors have to do the same for their men. They should adopt and practise safe habits and ensure that safety and security of those with whom their work is constantly maintained.

4) ORGANISATION'S INTEREST IN SAFETY :

Today every industry, in order to exist, has to be concerned with the value of its services. The value of a particular activity in any industry may be indicated in a variety of ways, but the most effective, usually, is increased or decreased costs.

Safety, in relation to cost, stands in a peculiar position, because for every industrial operation some element of safety is essential. If this is lacking, operations do not remain under control and schedules and unit costs can not be counted upon. Breakdowns, involving costs and sometimes substantial costs, become frequent. Compensation amounts go up; supply of skilled people with right attitudes and motivation becomes difficult; labour relations become strained and efficiency and productivity stand impaired.

Statistical analysis of accidents in industrially advanced countries such as U.K. & U.S.A. shows that in the course of a year, roughly one worker in every ten, loses working time through an accident and manual workers in certain occupations run a much greater risk of injury than this average suggests. The victim of an accident may be lucky and may be back to work in a few days, but thousands each year lose a limb or an eye or are disabled in some other way some lose their lives and many are no longer able to follow their vocation. Often an injured worker has to undergo a long and painful period of readjustment and rehabilitation and for him and his family there is distress and financial worry, relieved only partially by compensation claims.

To the employer, an accident cost can be serious : It may be the loss of a key worker for a long period, damage to plant, waste of materials or breach of delivery commitments, due to interruptions to work. Similarly, disorganisation and other events that follow accidents may depress efficiency and add substantially to production costs.

Managements must seek efficient operation, if it is to manage at all. The following statements made by R.P. Blake (senior safety Engineer of the Division of Labour Standards, U.S. Department of Labour) explains the position :--

The use of cost data does not stop with the acceptance by management of the principle that organised safety work is desirable. Some one has to make decisions as to how much

money will be allocated to this work and what actions will be required by the higher levels of management as compared to those on the operating levels.

Under modern conditions of work where industries have to compete both in the national and international markets, to cost aspect which has a direct bearing on time lost in accidents has become a matter of considerable importance for the progress of the industry.

a) Supervisor and Safety :

Well-planned, careful induction and training greatly expedite the process of getting a new man to production and making him a member of the work team. This becomes important particularly in relation to safety, because accident analysis and investigation go to prove that in every kind of work and every place of employment new men are injured far more than experienced men. Most accidents are the result of ignorance. Turnover and accidents have therefore a twin relation--each makes the other worse. Turnover brings in a steady flow of new men who are more likely to get hurt than trained men. Accidents lay off men and new men have to be engaged to fill their places. Every accident tends to frighten other men in the plant into seeking less dangerous work elsewhere.

"New men mean accidents, Accidents mean new men. So the vicious circle goes. The remedy lies in breaking the circle by safe methods and ensuring high productive efficiency."

Often a specialised safety effort is required when the workers are already trained and yet jobs produce good many accidents or a few very serious ones. In a situation like this the job breakdown will have to be more biased towards discovering hazards and correcting the worker. Another special aspect of supervisory attention has to be in preparing a job safety breakdown sheet which should have three columns rather than two, indicating :

1. Job Step.
2. Hazards.
3. Remedies.

Having ensured these basic requirements, the next major concern of the supervision should be the elimination of hazards by guarding the operators and protecting the worker, through proper instruction and training.

b) Safety and the Worker :

Worker's attitude to industrial safety is dependent on a whole array of factors, ranging from the social and environmental background to his own circumstances and character. It must be said that usually workers themselves are not the driving force in safety. Even in technically advanced countries, where workers are relatively well off, tremendous efforts are required to make workers safety-minded. This seems to show that workers are seldom spontaneously interested in safety, even though their lives

may be at stake. No doubt, individual workers have made excellent contribution to safety as members of a safety committee or in some other capacity, but on the whole, improvements in safety cannot be said to have originated from within the workers, since they appear to be more interested in questions of wages, hours of work, holdings, compensation, etc., than in questions of safety. There is also the fact that workers are accustomed to their working environment and its risks. Under estimation of these risks and a false feeling of immunity from them tends to make workers relatively indifferent towards safety matters.

In developing countries, however, workers are often ignorant of the risks to which they are exposed. Many are peasants recruited from the villages and remain only for a short period in industry. They are often illiterate. It is, therefore, not surprising that they show little interest in safety. Moreover, workers generally have a very limited interest in accident prevention. How can this situation be improved, keeping in view the fact that efforts made to arouse and intensify their interests have met only with partial success ? Even though this situation can not be overcome rapidly, there can be little doubt that, in the long run safety education in its various forms will pay good dividends.

The organised strength demonstrated by the workers in times of struggle has to manifest itself in the field of safety as well. Every worker has a duty and a

responsibility to protect his fellow workers from accidents. He must not stand aside when he sees a fellow worker taking serious risks, for this would be a grave breach of duty.

Accident frequency rate is usually high among workers. Some times it is due to insufficient knowledge of risks, but more often due to unnecessary actions motivated by a desire to do more than is absolutely necessary, to satisfy curiosity, or to demonstrate personal chivalry. In this sphere supervisors and experienced workers have a major responsibility to give guidance and direction. The number of accidents in which young workers are involved can be reduced considerably if this responsibility is more cautiously exercised.

One well-known cause of accidents to young workers is pressure from their superiors to step up production. Here the older workers have to demonstrate greater responsibility, for they are not merely refraining from eliminating a risk but actually adding to it.

Some idea of the things, workers can do to promote safety, can be had from the following provisions detailed in the " Model Code of Safety Regulations for Industrial Establishments. I.L.O. Regulation 5 (obligations of Employees)."

- 1] Every employee shall co-operate with the employer in carrying out the provisions of this code,
- 2] Every employee shall forthwith report to the employer or the foreman any defect that he may discover in the

industrial establishment or the appliances used therein.

- 3] Every employee shall make proper use of all safeguards, safety devices and other appliances furnished in accordance with this code for his protection or the protection of others and shall obey all safety instructions made or approved by the competent authority, pertaining to his work.
- 4] No employee shall interfere with, remove, displace, damage or destroy any safety devices or other appliances furnished for his protection or the protection of others or interfere with any method or process adopted with a view to minimising occupational hazards.
- 5] All employees shall comply, in regard to their conduct, with the requirements of this code.

Some of the practical, every day tasks covered by these five provisions include keeping gangways clear, cleaning up spilled oil, replacing guards that have to be removed for any purpose, keeping inflammable waste in closed metal containers and refraining from smoking in prohibited areas and from misusing machines or tools.

The attitude of workers towards safety is dependent on a whole array of factors, extending from social psychological to individual factors.

5) Safety Training and Safety Campaigns:

The purpose of any organised safety training is to eliminate accidents and exposures that result in injuries to workers by removing the hazards and promoting safe practices. The effect of this can be gauged by the fact that well - training and careful employees are able to avoid injury on dangerous work and that untrained and careless men may be injured under the safest possible conditions. Whatever the form that safety training takes it is of paramount importance that it is supervisor who is in the best position to convey the message to the individual worker and to interpret it in 'Shop' language. It can be said with justification that if the supervisor is thoroughly 'sold' on safety, he in turn will be able to 'sell' to the employees whose work he directs.

The need for safety training in the industries is justified primarily because employees are not informed or because they do not know how to apply their knowledge. Safety training, therefore, is primarily the process of imparting knowledge of safe and unsafe mechanical conditions, safe and unsafe personal practices and of remedial measures.

To accomplish this, a three-step action becomes necessary :

1. Creating and maintaining interest.
2. Fact - finding.
3. Corrective action, i.e. carrying out safety training, preparing safety rules, posters and literature and

ensuring successfully other phases of accident prevention.

The United States steel company with its " 3 C's of SAFETY" and ' Single Objective Safety ' was successful in its efforts to reduce accidents.²

Total program involved four steps :

- (a) get the facts known,
- (b) Spot the critical situations from the facts,
- (c) Single out objective and determine what correction is needed ;
- (d) and take action.

This is coupled with the "3 C's of SAFETY", which emphasizes a Comprehension of the possibilities of injurious Contact and their Control.

In this way, the best hope of accident prevention is through continual safety training, enlistment of the active participation of rank-and-file employees and safer equipment design. Selection of safe employees is at a lower priority. A well developed safety campaign making employees safety conscious is often effective. In order to be successful this training must make the purpose of each procedure understood.

2. Thomas W. Harrell - " Industrial Psychology "

Oxford and IBH Publishing Co.,

New Delhi (3rd Ed.) pp.226-227.

SAFETY POSTERS:

As it is stated earlier that the use of posters and campaigns aimed at stimulating safe behavior is a common practice in industrial organisations. Normally posters which convey a general message, particularly in negative terms, probably do little good. Posters should, therefore, carry a simple, reasonable and constructive message in positive terms. Statements like the following, placed in appropriate places are examples of positive and informative poster material :

Wear Hard Hats Here.

Deposit Cigarette Butts in This Container.

Cross at This Point.

Lower Safety Guard Before Starting Machine.

Thus, poster material should be used which attracts the maximum amount of attention. Legibility and proper use of color are attention-getting determinants. Locating the poster so that it will be readily seen is obviously important and there should not be so many posters that they clutter up the working landscape. A poster which is unique or different, catches the workers' attention most quickly. If posters are everywhere, people cease paying attention to them.

Safety campaigns and contests in which workers strive for a safety record over a certain period of time tend to

sensitize the worker to be safety conscious. The best kind of safety campaign is that which never, really ends. Rewards of some kind should be given the individual who has a good safety record. Not only this but a man's accident record should be a permanent part of his personnel life to be used in determining his fitness for promotion job transfer or increase in pay.

6) ORGANIZATION OF THE SAFETY FUNCTION:

The relative hazard of the work influences the location of the safety function. The safety function is an important one in many industries and the responsible functional officer should report to an important official such as the director of personnel, plant superintendent or general manager. In smaller organizations that can not support a full-time safety director, this function may be delegated to the plant superintendent, employment officer, general foreman, or some other responsible executive. The primary responsibility for safe operations rests squarely upon the line officers the director of safety, safety engineer and first line supervisors.

For safety work to be effective, it must be carried to the point of operations where accidents occur. The planning of a safety program can be done in an office, but it must be carried out on the job where people are at work. The Police and Fire protection may logically come under the safety department. The medical department, with its first-aid

stations, may come under the safety department. Even though the medical dept., and police and fire depts are not directly under the safety department, there must be close-co-operation between these departments if each is to discharge its responsibility most effectively.

NOTE: The typical chart of the SAFETY Department is attached here.

7) ' MOTIVATING PEOPLE FOR SAFETY '

The term 'accident' commonly is descriptive of unplanned events producing injuries and/or property damage. To many, the word 'accident' implies that something - unexpected and unpleasant occurred and that it could not be helped; it was inevitable and could have happened to any one it was unforeseen and thus uncontrollable and it was not our responsibility and we are therefore not to be blamed. A realistic appraisal of accident data would, however, show that few events labelled as accidents really are accidents in the sense that they are purely chance events. Frequently, accidents are not unforeseeable because most of them are not chance occurrences but rather reflect inefficiencies for the system. It has been well recognised that human error frequently underlies the cause for accidents.

Two of the most important reasons for human errors are lack of knowledge or skill and incorrect attitude. Safety education and training of employees and adopting appropriate measures for motivating them thus become key

activities in any accident prevention programme.

JOB CLIMATE AND ITS EFFECT ON ATTITUDE :

Building safe attitude amongst employees would require at first the removal of factors of the job climate that affect the important emotional components of attitude.

A few of the factors are listed below :-

1. Lack of effective job training.
2. Incompetent, untrained supervisors.
3. Lack of clearly stated company policies and procedures including safety policies.
4. Departments at odds with one another.
5. Display of favoritism.
6. Inattention to grievances.
7. Poor working conditions.
8. Political promotions.

The said factors or dissatisfiers need to be brought upto a level of 'content'. When this reached the task of motivating employees to adopt safe attitude would be easier.

MOTIVATION FOR SAFE ATTITUDE:

For the development of safe attitude it is necessary that sustained attention or interest in safety is created amongst employees. Here motivation is the key. Safety organization is in itself a method of creating and maintaining interest. Safety organisation includes the moral and educational affect of accident investigation, publicity,

posting and distribution of educational literature, the showing of films and slides, contests, prizes and awards and meetings, These activities are devised to interest employees as a group. Interest of individual persons may be aroused by appealing to one or more of his stronger senses or desires. Those of chief significance are listed below and commented upon later.

1. Self preservation (fear of personal injury)
2. Personal and Material Gain (desire for reward)
3. Loyalty (desire to co operate)
4. Responsibility (recognition of obligations)
5. Pride (Self Satisfactories and the desire for Praise)
6. Conformity (fear of being thought different from others)
7. Rivalry (desire to compete)
7. Leadership (desire to be outstanding)

(1) Self Preservation :

One of the strongest and most common of all qualities or characteristics is that of self preservation. In the case of certain individuals having under developed mentalities, this characteristics is often the only one that may be appealed to successfully. Some of the more common methods, of creating and maintaining interest through knowledge of this characteristic are by featuring injury and its consequences through posters, slides, films, discussions and lectures.

(2) Personal and Material Gain :

Many persons are more than ordinarily desirous of financial on other forms of material and personal gains. It is often true, therefore, that interest in safety may be created by associating a reward of some kind with recognition of outstanding safety performance³. Here are a few ways in which this could be done are through award of safety bonuses, vacations with pay, excursion trips, personal gifts, dinner party, etc. These may be explained as :-

(a) Rewards: Monetary rewards may be given for good safety records in some good organizations, in giving promotion to supervisors their safety record is given due consideration.

(b) Safety Observation trips may be offered:

These help to maintain interest in the job and also provide opportunity for obtaining safety instructions.

(c) Interest in a planned safety programme or contest can be stimulated by awards of small personal gift.

(d) Picnics: This is a convenient method of rewarding groups of employees for good record and has the added advantage of improving morale.

It is generally agreed that best results are secured when employees practice Safety's sake, and not primarily for

3. B. Von Haller Gilmer, 'Industrial and Organisational Psychology', Mc Graw-Hill, Kogakush Ltd.,

gain. Thus when awards are given it has been found desirable to impress on the employees the point of view that prizes are given not only to reward past safety performance but also to encourage and stimulate future active interest in the elimination of mechanical hazards and unsafe personal practices.

(3) Loyalty:

A well developed sense of loyalty plus an understanding and approval of safety rules usually ensures observance of safe practices. The effect of accident occurrence on the foreman's record, employer's overhead cost, quality of product or on fellow employees could create and maintain interest in safety on employees whose sense of loyalty is well developed.

(4) Responsibility:

The sense of responsibility, both to self and to others is an attribute that is found to a considerable degree in a great majority of persons and is capable of being utilised to promote interest. This tract of character can be utilised by assigning additional duties in safety work.

(5) Conformity:

Certain patterns of living are productive of the greatest degree of happiness, material well being and social harmony. Conformity with these patterns is necessary to the maintenance of any well ordered civilization. A person who habitually flannets these conventions stands to be shunned on redicule. Many realise this and are willing to abide by established rules and customs.

(6) Leadership:

The desire for leadership is strong in many persons and may be used to advantage in safety work. Every worker who knows correct safety work and safety procedures can exercise his liking for leadership by tactfully pointing out to careless or uninformed fellow employees, the accident potentialities of their unsafe practices and showing them the correct way to do things.

Employees in whom leadership is an outstanding trait may be interested in safety by such means as appointment on safety committees assigning organisational talks etc.

DISCIPLINE AND PUNISHMENT IN MOTIVATION :

Discipline and punishment are two means of motivation which can have either positive or negative effect. When they are given arbitrarily to satisfy the one applying them, they raise fear and anxiety two highly negative emotions. When these are given solely in the interest of the persons being motivated, positive results can be achieved.

The human factor operates at all levels in the industry and is perhaps the most potent factor for success or failure of safety programme. Despite great differences in people, the basic needs are common to all. It is upon these needs that management and others in the position of leadership in industry can capitalise to most effectively promote safety.