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**TITLE: IMPACT OF INDUSTRIAL AND LABOR LAWS ON INDUSTRIAL SAFETY IN INDIA**

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**ABSTRACT**

**Purpose**

The proposed research work is with the aim of analyzing the impact of Industrial and Labor Laws on Industrial Safety procedures adopted by industries and factories, measures both statutory and non-statutory provided by the government and efficacy of the controlling authorities.

**Methodology**

Testing of hypothesis is carried out using 'z' test.

**Findings**

Labor legislation is based on certain fundamental principles namely; Social Justice, Social Equity, Ensuring fair wage standards and provision of social security, Adequate enforcement of legislation, and Enhancing the status of workers in the industry. The terms Industrial law and Labor law are considered as synonyms. Labor legislation is necessary because the factory system had inherent evils to which factory workers were exposed. The theory of workmen's compensation is that "*the cost of product should bear the blood of workmen.*" In addition to industrial accidents compensation is also given for certain occupational diseases. Working conditions in factories are regulated by the Factories Act 1948, which provides for the health, safety and welfare of workers and precautions to be taken in case of hazardous process. The scope of coverage under the Employees' State Insurance Act, 1948 is much wider. While carrying out state-wise analysis of non-fatal and fatal injuries it was inferred that the intervention by the State has contributed to better safety standards.

**Research implications**

The findings give an insight on to the relevance of industrial and labour laws on industrial safety.

**Value**

The findings may serve as input in formulating a research agenda to align scholars' focus and practitioner's problems.

Key words: Accidents, industrial disasters, labor policy, fatal injuries, safety standards



## **1. Introduction**

1.1. Accidents do not happen, they are caused. When an industrial accident cause great damage, injury or loss of life we term it as industrial disaster. Studies carried out and findings of the commission of enquiry indicate that all catastrophic industrial disasters have been caused by faux pas, laxity or ineptitude. How do we classify the Great Chicago Fire of 1871? Here heavy concentration of lumber industries, wooden houses, fuel and other chemicals in a small area made the incident a disaster, hence can also be considered as an industrial disaster. Take the case of Banqiao Dam in China in 1975 where 250000 people lost their life. We may claim that it was a dam built during the 'great leap forward' and a result of typhoon, but then what about Bhopal Gas Tragedy in 1984 where leakage of MIC gas resulted in death of almost 20,000 people and impairment of another one hundred thousand. Between 1917 and 2014 we can identify 11 major industrial disasters, which alone claimed more than three hundred thousand lives.

1.2. Imagine the plight of that little girl waiting at the door steps of her house waiting for father or mother finding a body covered in a white cloth. No compensation can reclaim the lost future she will have. Hence it is apt to say that 'financial effect' of an accident is a misnomer. Factory inspectors may assign that the factory inspector ratio is 223 which is reasonably high, but do they see to it that during inspection safety whether system, health and hygiene of the worker is optimum. The Convention on the Transboundary Effects of Industrial Accidents is designed to protect people and environment from industrial accidents. It aims to prevent accidents from occurring, reduce their frequency, severity, and mitigate their effects. The conference addresses primarily industrial accidents in one country that affect the population of another country. [1]

1.3. Any responsible state would take interest in the conduct of industry and superimpose statutory obligations mostly on the employers and the workers. These steps are taken in order to maintain good industrial relations and secure good working conditions. Labor has a vital role in increasing productivity and management has to create conditions in which workers can make maximum contribution. Labor legislation is based on certain fundamental principles which are social justice, social equity, international uniformity and national economy. This means that in an industrial setup there is utmost requirement of equitable distribution of profits and protection to workers against harmful effects to their health, safety and morality. [2] It is also necessary that legislation should have international uniformity and be based on social justice which fixes a definite standard for adoption for the future, taking into consideration the events and circumstances of the past and present. It is also obligatory that while framing labor legislation, the general economic situation of the country has to be borne in mind lest the very objective is defeated. [3] After the colonialist's left India's industrial scenario changed considerably which was been witnessed during the last 75 years. "The main postulates of labor policy operating are recognition of the State as the custodian of the interest of the community, catalyst of 'change', initiator of welfare programs, encourages mutual settlement, collective bargaining and voluntary arbitration". [4]



## **2. Literature Review**

2.1. Objective of this study is analyzing the contemporary phenomena of industrial safety management. The subject matter is impact of industrial and labor legislations on industrial safety consequent to the espousal of globalization world all over, with specific interest on employee safety. For the literature review, in order to exclude duplicity and incorporate contemporary thoughts endeavor was made to carry out bibliometric analysis taking a sample of 110 SSCI-indexed journals which were available. The period covered was from 1991-2018, wherein result of liberalization was felt world all over and transformed production operations from local to a global phenomenon. A total of 184 items published in these journals over the period were taken as sample with industrial safety as the sphere of influence. As the study progressed it was understandable that there has been a rush forward in the attempt to address the topic of industrial safety. Despite that, what was nonconforming is that the line of attack adopted was little bit biased on to the theoretical aspects of limited areas. In this discreet analysis the important topics which have been till now attempted are types of industrial accidents and theories on the basis of which laws have been enacted, emotional contagion, environmental challenges on industrial safety and functions of responsible managers. Hence it was noticeable that the correlation between industrial safety and legal enactments has not been attempted whole heartedly.

2.2. Stodgill (1950) highlighted leadership as one of the world's oldest concerns, caused by this there is a growing awareness on managers and leaders' responsibilities on worker safety [5]. This would be supported by the observation that corporate and managerial approachability have been under public scrutiny more than ever before [6]. Leadership can be considered as "the process of influencing the activities of an organized group in its efforts toward goal setting and goal achievement". [7] We are all conscious of the fact that in this context safety is an imperative characteristic and all stakeholders are striving to address mutually supporting attributes of the complex society, increasing consciousness, public interest, industrial safety and concern in financial crises. An added view on industrial safety considers it as a process in which Government, employers and employees appreciate the procedural aspects. General idea is that industrial safety is moreover a concept of transformational leadership which invigorates interactional relationships between the stakeholders, attitudes, values and other personal and professional stimulus, which is of utmost importance in industrial safety [8]. This presupposes that workers progress as professionals and persons, through the influencing dexterity of leaders [9]. Since globalization, dependable social interpretation has been indicating the transformation to industrial safety, which is why it has caught considerable attention, initially implicit as "a social-relational and ethical phenomenon, occurring as social processes of interaction".[10] For accomplishing this challenging objective, it is necessary to maintain an ethical perspective, while assuring the requisites for efficiency and efficacy. [11]



### 3. Methodology.

3.1. Research topic relates to industrial safety management, which is dynamic and alive. The study encompasses the safety management at both macro level as well as micro level. By formulating a working hypothesis considerable data is collected. Based on the focus of study hypothesis *“Has the government intervention in the field of industrial safety by enacting laws been able to effectively implement the idea of industrial safety, if yes, has it been able to translate in to ground realities in the industries by reducing the accidents by 10%”* was formulated. After analyzing the data the researcher was in a position to test the hypothesis. The hypothesis was tested through z-test. The research is inductive which can also be categorized as a case study design. The study is being made to analyze the impact of industrial and labor laws on industrial safety in the current perspective so as to reduce industrial accidents. [12] It was carried out in selected industries, which are major industrial units in India. This being a hypothesis testing research the aim was analyzing the casual relationships between variables. Steps adopted in this research include selecting factories and within selected factories analyze the industrial safety aspects, select the sampling units which are major industrial units, preparing the sources list, specifying the sampling unit and selecting the sampling procedure. Within the framework of cluster sampling, multi-stage sampling has been used.

3.2. To test hypothesis means to tell on the basis of data collected, whether or not the hypothesis seems to be valid. In hypothesis testing the main question is whether or not to accept the null hypothesis? With the assumption that  $H_0$  is true, we formulate a test statistic. A 10% level of significance was adopted for this research. Hypothesis testing determines the validity of the assumption (technically described as null hypothesis) with a view to choose between two conflicting hypotheses about the value of a population parameter. Hypothesis testing helps to decide on the basis of a sample data and whether a hypothesis about the population is likely to be true or false. [13]

### 4. National Policy on safety, health and environment at workplace

4.1. Indian Constitution enshrines detailed provisions on the rights of the citizens and other persons. For the principles to be followed by the States in the governance of the country labeled as “Directive Principles of State Policy”, additional stipulations have been given. These are for securing the health of workers, preventing abuse of children, provide just and humane conditions of work and maternity relief. It has also directed the government to take steps by suitable legislation or in any other way, to secure the participation of workers in the management of undertakings engaged in any industry. She is committed to regulate all economic activities among the several states and with foreign nations for management of occupational safety and health risks. It also endeavors to provide measures for protection of national assets and safe and healthy working condition.[14] Formulation of policy, priorities and strategies in occupational safety, health and environment at work places, is not



undertaken by national authorities alone but in some form of consultation with the social partners i.e. employees' organization, employers organization, autonomous & voluntary organizations, public etc.

4.2. It is true that new safety hazards and health risks will be appearing along with the transfer and adoption of new technologies. In addition, many of the well known conventional hazards will continue to be present at the workplace till the risks arising from exposure to these hazards are brought under adequate control. Particular attention needs to be paid to the hazardous occupations and of workers in precarious conditions such as migrant workers and various vulnerable groups of workers. The increasing use of chemicals and biological agents with hazard potential unknown to people by the indiscriminate use of agro-chemicals including pesticides, may pose serious safety and health risks. In addition major accident risks, effects of computer controlled technologies and alarming influence of stress at work in many modern jobs are also contributing factors. Work related hazards and occupational diseases in small-scale industries and agriculture are likely to increase as the occupational safety and health services are out of reach of workers in these occupations.

4.3. The fundamental purpose of this National Policy on Health, Safety and Environment at workplace is to reduce the incidence of work-related injuries, diseases and fatalities. It seeks to bring the national objectives into focus as a step towards improvement in occupational safety and health performance. [15] Objectives are to achieve continuous annual reduction in the incidence of work related injuries, fatalities and diseases. It also aims at increasing community awareness regarding occupational safety and health related areas. Formulation of such a policy integrating it into the national economic plan under the collaboration of the government, employers' and workers' organizations will ensure the action with the commitment of all social partners. A key for the success will be the formulation of a practical national policy, which could be implemented as suitable to local conditions in phases. For the purpose of achieving the above referred objectives and goals, Government draws out the action program by providing an effective enforcement program, which includes a prohibition against giving advance notice of any inspection and sanctions for any individual violating this prohibition. It is complemented by effectively enforcing all applicable laws and regulations concerning safety, health and environment in all economic activities with such technical variations as may be necessary for which there shall be adequate and qualified inspection services. Further on it develops standards, codes of practices on safety, health and environment for uniformity at the nation level in all economic activities consistent with international standards and ensuring implementation by the stakeholders in true spirit. It also encourages the States to assume the fullest responsibility for the administration and enforcement of occupational safety and health laws by providing grants to the States to assist in identifying their needs and responsibilities in the area of occupational safety and health. These programs also provides for training programs to increase the number and competence of personnel engaged in the field of occupational safety and health. Another step in this





direction is by reinforcing and sharing of national occupational safety, health and environment at work place information amongst different stake holders through a national network system on OSH. Finally, implementing the decisions of Courts of Law or other tribunals on matters of safety, health and environment at work is also undertaken. Thus it is envisaged that through dedicated and concerted efforts, industry will, certainly and steadily, march towards economic prosperity consistent with the requirements of safety, health and environment at work place thereby improving the standard of living of the people.

## **5. Industrial and Labor Law**

5.1. The terms Industrial law and Labor law are considered as synonyms, but the fact is that the scope of the term industrial law is much wider. Broadly speaking, Industrial law covers all the statutes and case laws pertaining to the industry, whereas Labor law covers aspects covering laws which are primarily concerned with labor. The fundamental rights and directive principles of state policy enshrined in the constitution of the country need a special mention in view of the supreme importance it has given in directing and influencing the labor legislation in the country. Article 42 of the constitution lays down for the provision for securing just and humane conditions of work and for maternity relief. [16] It is the aim of all social security legislations is to provide an environment where there is freedom from economic fear. An ideal welfare state must provide every citizen an opportunity to earn his living and freedom from fear – fear especially of economic ruin. A community should protect by common endeavors any individual member from the physical distress consequent on illness and economic distress inevitable on reduction or loss of earning due to illness, disablement, maternity, old age, unemployment, or death of a working member. Neither the Government nor the Law Court took notice of the labor problem seriously, as they believed in the policy of non- interference in industrial relations, because of which the situation eventually became worse and the society was adversely affected that the Government was forced to take some measures to solve their problems. Initially the workers and trade unions tried to salvage, but the Government later on realized the importance of the problem and could not be a silent spectator as the workers formed a large section of the society. Therefore the Government had to intervene to settle the disputes in the interest of national economy and welfare of people at large. [17] Thus there were two basic concepts on which the labor legislation was framed. These were ensuring well-being of workers by securing them share of profits in production and providing workers share in the gains of economic development. Labor legislation is necessary as the factory system had inherent evils to which factory workers were exposed. Workers were financially weak and had little or no bargaining power. They were prone to accidents due to improper machines and working conditions. It was also seen that children and women were taking to work under hazardous conditions of work and at odd hours.

5.2. We can classify Industrial and Labor laws as those relating to conditions of work in factories and establishments, specific Laws which are applicable to specific industries and



relating to specific matters relating to wages, social security, welfare, housing, leave etc. There are certain others which relate to association of workers, children and women, social insurance. Modern industrialization and economic growth envisaged in our planning would, of necessity call for increased use of legislation not only for tackling the social and economic problems existing in the industrial society but also for creating such conditions as would be conducive for establishing a social order. The foundation on which the more than 165 current laws rest was laid before 1947. They were carried on for over half a century. Safety and health at work is governed by variety of statutes in the state depending on the nature of work place and manufacturing activity. Some of the important statutes are, The Factories Act, 1948 (Amended 1987), Indian Boilers Act, 1923, Dangerous machines (Regulations) Act, Child Labor (Prohibition and Regulations) Act, Manufacture, Storage and Import of Hazardous Chemicals Rules 1989, Indian Electricity Act 1911, Indian Explosives Act and The Petroleum Act. [18] There are different departments of Central Government and State Government entrusted with the responsibility of enforcement of these statutes. Efforts of the enforcement agencies are also supplemented by other organizations such as training and research institutions, employers' associations, employees associations, in promoting occupational safety and health in the country. Some of the Labor Acts are implemented by the Labor Department. These are The Industrial Employment (S.O.) Act, 1946, Workmen's Compensation Act, 1923, Minimum Wages Act, 1948, Equal Remuneration Act, 1976, Payment of Bonus Act, 1965, Trade Union Act, 1926, Payment of Gratuity Act, 1972, Industrial Disputes Act, 1947, Payment of Wages Act, 1936 and Maternity Benefit Act, 1961(to name a few). There are certain other Labor Acts being implemented by other departments. [19]

## **6. The Workmen's Compensation Act, 1923**

6.1. Before passing of the Worker's Compensation Act any workmen who received any injury in the course of employment had to seek the help of the court for determination of the compensation. He had to file suit in the same way as any person injured, establish that the accident was the result of his employment for which the employer was somehow responsible, and state the amount of compensation due to him. This was a lengthy and costly process, and often he found himself in a poorer condition than when he started. Often compensation was not awarded claiming that the accident was caused due to dangers inherent in the employment. A legislation of this kind helped to reduce the inspection, to mitigate the effect of accidents by provision of suitable medical treatment and making industry more attractive to labor. It provides for cheaper and quicker disposal of disputes relating to the compensation through special tribunals. Originally the Act was applicable to workers of certain prescribed industries in case of personal injury caused by accident arising out of and in the course of employment with certain reservations. The amount of compensation was mainly dependent on the incapacity or disability. When the Fatal Accidents Act was not enacted, even when the negligence was proved employer could avoid his liability by putting forward the defenses,



which were; end of personal action with death, doctrine of contributory negligence, assumed risks, common employment, and self inflicted injury. All these made it extremely difficult for the workmen to obtain relief in case of an accident. In order to obviate these, Government passed the Fatal Accidents Act 1855 to avoid the vigor of the rule that *"a person's claim to suit comes to an end with the death of that person."*[20] The statement of objects and reasons at the time of moving the bill for Workmen's Compensation Act was *"The general principles of workmen's compensation command almost universal acceptance and India is now nearly alone amongst civilized countries being without legislation embodying these principles. For a number of years the more generous employers have been in the habit of giving compensation voluntarily, but this practice is by no means general. The growing complexity of industry in this country, with the increasing use of machinery and consequent danger to workmen along with the comparative poverty of the workmen themselves, render it advisable that they should be protected, as far as possible from the hardships arising from accidents."*[21] General principle which is followed is that compensation should ordinarily be given to workmen who sustain personal injuries by accidents arising out of and in the course of their employment including certain occupational diseases. The compensation payable under this Act is not dependent on the negligence on the part of the employer, as it is not a remedy for the employer's negligence but an insurance of the workmen against risks of accident. So any rash or negligent action on the part of the workmen is not a bar to any compensation so long as it is within the scope of his duty as an employee [22]. The Act thus provides social security to workmen and is a humanitarian measure. [23] *"The purpose intended to be accomplished by this recent legislation is fair and just distribution of the burdens or losses which result from accident to an employee while regularly engaged in an effort to produce something which will serve a purpose or fill a demand. The workman who is disabled through accident arising out of his employment is, so far as the final result of the community is concerned much in the same attitude as a disabled machine in the shop, and the loss and misfortune in each case are and should be charged to absorb by the business. If it takes a man and a machine a given time to produce a given number of pair of shoes, and the machine becomes broken or worn out, the cost of the repairs is charged to the business as one of the elements entering into the cost of production, just as the price of a day's labor, or price of a material, is borne by the ultimate consumer. This is eminently fair and just. If that be granted, is the man who operates the machine, and who while in the regular course of his employment, is disabled through accident which arises from the nature of the business is entitled to be treated with less consideration and generosity."*[24] The principles of payment of compensation to workers is *"When a machine is injured in the course of its use, the owner bears the cost of injury and charges it to the expenses of its production for which he receives payment as he sells his goods. When, a workman is injured in the course of his employment, the cost of injury comes upon him, who can ill afford to bear it; and if his injury is serious, resulting in long term incapacity for work or in death, his family is drafted into that great army of dependants that is a reproach to civilization."*[25]





6.2. Amendment 1933 enabled provision of compensation for injuries resulting in employment more than seven days instead of ten days. Two important changes were made in 1938, [26] which were; a list of occupational diseases were added to schedule II and the liability of present employer in case of compressed air illness even if the workman had served not more than six months was included. Later on in 1958 the distinction between adult and minor was removed and waiting period for receiving compensation was reduced to three days. In case of disablement period more than 28 days, the compensation was to be paid from the date of disablement. The Act was further amended in 1975 to increase the wage limit, and twenty years later included adopted son/daughter/child in the dependents definition of workmen in certain other categories of persons. The main purpose of the Act is to provide special machinery to deal with the cases of compensation in case of accidents and to make arrangements for some prompt compensation to the injured workmen who cannot afford to go to the Court. [27] The employers are under obligation to pay compensation to those employees who are entitled to claim benefits under this Act. The workmen lose his right to compensation if an accident is due to influence of drinks or drugs or caused with willful disobedience of rules or orders or disregard of safety devices. In case of fatal accidents all such cases are to be brought to the notice of Commissioner. Certain important provisions included liability of an employer and personal injury to the workman which meant that injury must have been caused by an accident that has arisen out of and in the course of employment. The employer was not liable to make payment in case the injury does not result in total or partial disablement for a period exceeding three days, directly attributable to influence of drinks or drugs, willful disobedience of rules, removal or disregard to safety or any other device. [28]

6.3. This Act has helped to streamline procedure for injured workmen and has proved of immense utility to both the workmen and the employers which have resulted in bringing about better relations among them. An injured workman may either file a civil suit for damages against the employer or claim compensation under the Workmen's Compensation Act, 1923. He has to make a choice between the two reliefs'. A claim under the Workmen's Compensation Act is safe and less costly.[27]The Workmen's Compensation Act, 1923 is sometimes described as a dying legislation because it is being replaced by the Employees' State Insurance Act, 1948 as the benefits provided under the latter are much more liberal.

## **7. Factories Act 1948**

7.1. Working conditions in factories are regulated by the Factories Act 1948, which provides for the health, safety, welfare of workers and precautions to be taken in case of hazardous process. Minimum standards of lighting ventilation, safety, health and welfare services, which the employers must provide in the factories, have also been laid down. The State Government enforces the Act through factory inspectors. It also empowers the State Governments to frame rules so that the local conditions prevailing in the state are appropriately reflected in enforcement. After the amendment in 1976, there has been



substantial modernization and innovation in the industrial field. Several chemical industries have come up which deal with hazardous and toxic substances, which brought along with it the problems of industrial safety and occupational hazards. Consequent to the Bhopal gas tragedy this Act was amended in 1987 to cater for provisions relating to handling of hazardous substances by the occupiers and laying down emergency standards and measures. The amendments also include procedures for location of hazardous industries to ensure that hazardous and polluting industries are not set up in areas where they can cause adverse effects on the general public. Provision has also been made for the workers participation in safety management. Opportunity has also been availed of to make punishments provided in the Act stringer. [29] The first Factories Act was passed in 1881 which was purely designed to protect the children and to provide for some health and safety measures. Act of 1934 was passed to implement the recommendations of the Royal Commission on Labor in India and the conventions of International Labor Organization. The experience of the working of this Act revealed a number of defects and weaknesses, which hampered effective administration. Provisions regarding safety, health, and welfare of workers were also found to be inadequate and unsatisfactory. It was, therefore felt that in view of the large and growing industrial activities in the country a radical overhauling of the laws relating to the factory was necessary. Hence Factories Act of 1948 came about. [30]

7.2. Safety provisions contained in Secs.21 to 41 are absolute and obligatory in their character and the occupier of every factory is bound to follow them. These include provisions for dangerous parts of machinery, employment of young person's on dangerous machines, prohibition of employment of women and children near cotton openers, certain restrictions on entry into any chamber, tank, vat, pit, pipe where any gas, fume etc. is present, safety of building, machinery, prohibiting its use when danger is imminent, maintenance of buildings, appointment of safety officers and hazardous process. [31] As the technological advancement has set a rapid pace in industry as a whole, it is felt that some sort of redundancy has been set in implementing these provisions.

**8. The Employees' State Insurance Act, 1948.** Object of this Act is to introduce social insurance by providing for certain benefits to employees in case of sickness, maternity, employment injury, and funeral expenses of an insured person. It is applicable to all factories including those belonging to the Government other than seasonal factories. Provisions of the Act was initially applicable to the parental factories using power and employing 20 or more persons, but later on included others. It is a piece of social security legislation conceived as a means of extinction of the evils of society, namely, disease, dirt, ignorance and indigence. The Act is constantly amended. Rate of contribution from the monthly income of each contributor has also been increased to 4.75 and 1.75 from 4.5 and 1.5 percent respectively. Till the 1980s labor was protected in the labor markets and employers were protected in the product markets. During the 1980s and 1990s "economic reforms" and shift in industrialization strategy took place after which both started feeling less protected or



unprotected. There is a perception that the existing laws give unions in the organized sector virtually a veto power to block changes, labor legislation has paved the way for multiplicity of unions, growth in union rivalry, exacerbation of industrial strife and excessive intervention by the state in industrial relations.

## **9. Analysis**

9.1. Labor legislation is necessary as the factory system had inherent evils to which factory workers were exposed in the bargaining. Modern industrialization and economic growth envisaged in our planning would, of necessity call for increased use of legislation not only for tackling the social and economic problems existing in the industrial society but also for creating such conditions as would be conducive for establishing a social order. Workmen's compensation Act is a landmark legislation considering that prior to the enactment of this Act all cases of injury had to seek the intervention of the court for compensation. The Act has proved of immense utility to both the workmen and the employers which resulted in bringing about better relations among them. It provides a simple, cheap and prompt procedure for the recovery of compensation and relieves the parties of unnecessary litigation. However it appears to have certain aspects, which are either not covered or the provisions do not permit smooth translation of compensation to the workmen. Any person whose employment is of casual nature and otherwise for the employer's trade or business has been not been considered as a workman. The Act pays little or no attention towards unorganized sector and casual labor. Jurisdiction of civil court to entertain the suit is barred by section 19(2). Some employers affect insurance against their legal liability to compensation under the Workmen's compensation Act. In the cases of insolvency and the liability of the insurers is less than the liability of the employer to the workman the latter has to prove for the balance in the insolvency proceeding or liquidation. Where any contract of the employer with the insurer is void or voidable because of non-compliance by the employer with any terms and conditions of the contract the insurer is liable to the workmen if the employer becomes insolvent. Penalties imposed are too lenient or does not have any real deterrent effect. In Schedule III, occupational diseases should include those relating to radiation hazards, excessive heat, and stress disorders. Under the Section 11, an employer can drag on the proceeding on some pretext or the other [32]. The Act deals only with cases of 'contract of service'. Only those manual workers falling within the definition of workman are entitled to compensation.

9.2. Aim of the Factories Act 1948 is to protect workers employed in factories against industrial, occupational hazards and for ensuring safe and healthy conditions of work. It makes detailed provisions regarding health, safety and welfare of workers. As the technological advancement has set a rapid pace in industry as a whole, it is felt that some sort of redundancy has been set in implementing the provisions. The scope of factory in the definition is too narrow. The provisions of the safety aspects should be applicable as per categories of factories, which mean that in a man power intensive country quantification may become an impediment and it may not be possible to implement all these provisions in small



units. Hence the minimum number of workers to be considered should be raised to 30 and non-power units should be kept out of section 22, 25, 31. Quarry has not been brought under the scope the Act which needs to be done. Provisions are intended to benefit only workers in factory and for the field workers it is left to interpretation. Unorganized sector has not been brought under the provisions of the Act, which is a major lacuna keeping in mind the fact that their number is quite large and unprotected. The clause 'manufacturing process' leaves out risk involving work like transportation of fuel, oil, their distribution out of the scope of Factories Act. Section 4 permits different departments to be separate factories, and the discretion is left to the occupier and State government, which is quite heavily balanced towards the occupier. Hence the trade unions should also have a say in this case. As regards approval, licensing and registration of factories Chief inspector or the State government should be held culpable for not acting within one month of receipt of application. In the duties of occupier social responsibility should be included and culpability added. The power of the state government to exempt any person or class of persons from the provisions of section 10 should be considered to be reviewed. Section 22 prohibits examination or clean, lubricate or adjust any part of machinery in motion but Section 23 provides avenues for employment of young person's on dangerous machines. Section 38 regarding precautions in case of fire needs to be amplified. There is a case for incorporating uniform procedures in certain factories, special procedures in the case of sensitive factories, and additional procedures in the case of factories situated near thickly populated areas or at places where collateral damage is a possibility. Safety officers should be employed by the state for a particular type of factories or geographical area. The present arrangement somehow defeats the purpose of the appointment as for survival he toys the line of the occupier.

9.3. Employees' State Insurance Act, 1948 with its amendments is a social security legislation aimed at introducing social insurance by providing certain benefits for employees in case of sickness, maternity and employment injury. The act is definitely an improvement on the existing acts, but certain aspects which confer benefit on the employees against sickness, maternity, and other disabilities require further deliberation. Provisions of the act therefore, are construed in technical, narrow or restricted sense. Scope of Employees' State Insurance Act, 1948 is much wider than the Workmen's Compensation Act, 1923.

9.4. For the accident analysis industries selected were Indian tools manufacturers, Zenith Ltd of Birla Group of Industries, Satpur, and Aurangabad. [33][34] Industrial regions chosen for the industrial safety analysis were, Uttar Pradesh, Maharashtra and NCT of Delhi. For wider analysis the country-wide data was taken which included state-wise factories and inspectors, inspections carried out, industrial accidents, frequency rate, and incidence rates for a period of five years, fatal, non-fatal accidents, employment in factories, availability of inspector and industry-wise accidents. For the present analysis we take the all India data first and thereafter industry-wise data. Here the data has been collected is keeping in mind the industrial development and technological advancement in Indian industries. The takeoff point is 1994, when industrial revolution II started showing its effect in India. As we want to test the

hypothesis which is that 'the impact of industrial and labor legislation has reduced the average No of accidents by 10%', we can write it mathematically as;

$$H_0: P_0 < 0.10$$

$$H_a: P_a \Rightarrow 0.10$$

As  $H_0$  is one sided we shall use the one tailed test (because  $H_a$  is of more than type) at 10% level for finding the standard deviate (z) 1.645 and the corresponding area of the normal curve .4500.

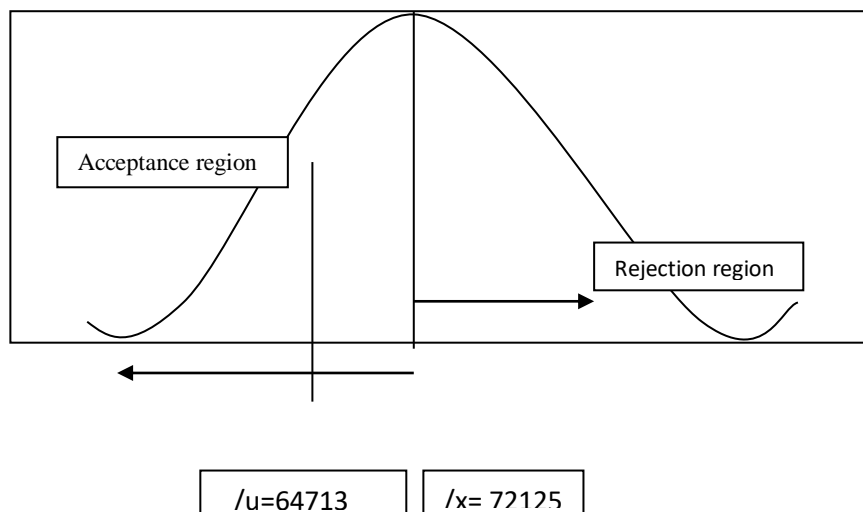
Accept  $H_0$  if  $\bar{x}$  is  $< 68000 + 1.645(SE)$

$$< 68000 + 1.645(2508.08)$$

$$< 72125$$

At 10% level of significance otherwise accept  $H_a$ .

The sample average is 64713, which comes within the acceptable region. We therefore accept  $H_0$  and conclude that the average No of industrial injuries has decreased. For finding the power of the test, we calculate  $\beta$  and then subtract it from one. Since  $\beta$  is a conditional probability which depends upon the value of mean, we take it as 64713. We can now write  $\beta = p$  (Accept  $H_0: \bar{u} \leq 72125 | \bar{u} = 64713$ ). Since we have already worked out that  $H_0$  is accepted if mean is  $\leq 72125$  (at 10% level of significance), therefore  $\beta = p$  ( $\bar{x} \leq 72125 | \bar{u} = 64713$ ) which can be depicted as follows;





We can find the probability of area that lies between 64713 and 72125 in the above curve by finding  $z$  and then using the area table for this purpose. In the given case;

$$z = (\bar{x} - \mu) / (\sigma / \sqrt{n}) = (72125 - 64713) / 2508 = 2.96$$

Corresponding to which the area is 0.4985, hence  $\beta = 0.5000 - 0.4985 = 0.0015$  and the power of the test is  $1 - \beta = 0.9985$  for  $\mu = 64713$

However true this may be, we find a contrasting situation in the case of fatalities. Keeping the assumption for testing hypothesis to be same as in the case of total industrial injuries, we can find that the limit of  $\bar{x}$  for accepting  $H_0$  is as under;

$$\text{Accept } H_0 \text{ if } \bar{x} \leq 696 \pm 1.645(\text{SE})$$

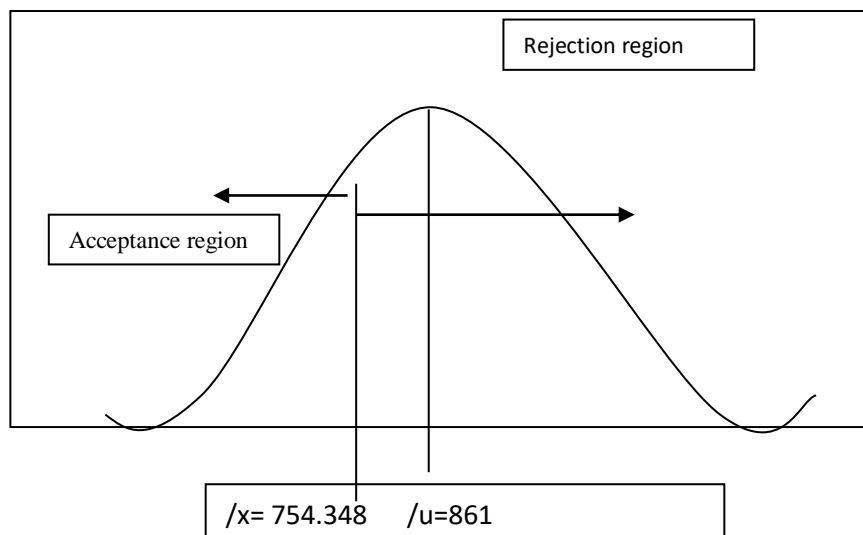
$$\leq 754.348$$

At 10% significance, otherwise accept  $H_a$ . But the sample mean (fatalities) is 851, which does not come in the acceptable region. We therefore reject  $H_0$  and conclude that the average No of fatal accidents has increased.

$$z = (\bar{x} - \mu) / (\sigma / \sqrt{n})$$

$$= (754.348 - 851) / 35.47 = 2.72$$

Corresponding to which area is 0.4967, hence  $\beta = 0.5000 - 0.4967 = 0.0023$ , and the power of the test is  $= (1 - \beta) = 0.9967$  for  $\mu = 861$ . This is as shown below:-





*As far as industries are concerned, no clear-cut pattern emerges. The incidence rate is quite high in all types of textile factories. A gradual reduction has been noticed over years due to industrial development, technological up gradation and better implementation of industrial safety procedures by law enforcing agencies. The highest figures have been observed in metal & alloy industries. Manufacturing of machinery and machine tools & parts industries had the minimum of industrial accidents. These nine groups accounted for more than 50% of accidents in 1994, which rose to 82% in 1998 and account for more than 66% of the total accidents in the industries. Effect of industrial development in India consequent to liberalization was emerging in industrial zones from 1994 and became the focus of attention. Therefore attempt was made to analyse the data pertaining to industrial injuries from 1994. When the details pertaining to these years were compared with that of 1994, it was observed that there was a reduction in industrial injuries by 3%, 19%, 29%, 23%, -5%, 8% and 46% respectively. Definitely this pattern is encouraging, and is in tune with our formal question. It does lead us to believe that enactment and effective implementation of industrial and labor laws has contributed positively towards improving industrial safety. Whereas this may be true in the case of industrial injuries, but when we consider the data pertaining to fatalities, the emerging trend is dissimilar. It was observed that there has been an increase in fatalities. It is reasonable to deduce that this may be attributed to inadequacy of training which has resulted in incompatibility between the technological advancement and the worker.*

9.6.. When we consider this pattern state-wise, it is seen that these are in tune with All India figures, except for the states like Gujarat and Maharashtra where for the year 1998 there has been an increase from 1997, but an overall decrease when compared with the base figure. As we wanted to test the hypothesis, we can write it mathematically as;

$$H_0: /u < 0.10$$

$$H_a: /u \Rightarrow 0.10$$

As  $H_0$  is one sided we shall use the one tailed test (because  $H_a$  is of more than type) at 10% level for finding the corresponding area of the normal curve which is .4495. From this we can find the limit of  $/u$  for accepting  $H_0$  as under:

$$\text{Accept } H_0 \text{ if } /x \leq 75556 + 1.645(SE) \leq 79013.660$$

At 10% level of significance otherwise accept  $H_a$ .

But the sample average is 64618, which comes within the acceptable region. We therefore accept  $H_0$ .



9.7. While analysing the data tabulated above, an attempt was made to study the pattern of accidents from 1994, the year in which the impact of globalization and liberalization started to have its impact on Indian economy.

	Fatal	Total
Calculated mean	860	64618
SD	88.89	5708
SE	39.75	2552.7
Calculated z	(-) 2.531	(-)0.228
Critical value of z at 10% level of significance	1.645	1.645
Accept	Ha	Ho

With these calculations we can proceed to make a meaningful interpretation that the claim of progressively reducing the accidents in Indian industries during the years under consideration due to the implementation of industrial and labor laws is acceptable.

## 10. Conclusion

10.1. Every year a large number of employees get injured due to accidents. Therefore, there is a definite need to implement necessary safety measures in industrial organizations. 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. In earlier days the accidents were said to be the outcome of workman's carelessness, with management sharing little responsibility. Subsequently through appropriate labor legislations like Factories Act 1948, ESI Act 1948, Workman's Compensation Act 1923, duly amended from time to time companies set up and introduced many corrections and preventive steps. [35] 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. 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. [36] Labor legislation is necessary because factory system had inherent evils to which factory workers were exposed in the bargaining. The theory of workmen's compensation is that "*the cost of product should bear the blood of workmen.*" A claim under the Workmen's Compensation Act is safe and less costly. [37] Working conditions in factories are regulated by the Factories Act 1948, which provides for the health, safety, welfare of workers and precautions to be taken in case of hazardous process. Employees' State Insurance Act, 1948, is social security legislation is applicable to all factories including those belonging to the Government other than seasonal factories. With its amendments including Amendment rules 1991, aims at introducing social insurance by



providing certain benefits for employees in case of sickness, maternity and employment injury. [38] Over 165 industrial and labor laws enacted and effectively implemented has been able to bring down industrial injuries and disasters substantially.

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