



## An empirical Study of Occupational Safety and Health with Special Reference to Certification of Employees

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### Abstract

*Occupational safety and health is an important area of concern for the organizations. This issue needs to be addressed carefully by the organization. The increasing numbers of incidents and accidents related to safety have eventually drawn the attention of various stakeholders towards making Occupational Safety and Health an integral part of the organizations. This research paper attempts to gain an insight into the various factors pertaining to safety which are instrumental to strengthen the safety mechanisms in the organizations. The paper also addresses the issues related to safety practices and tries to gauge importance of certifications.*

*A self-developed 29 items scale was used to determine the safety perception of employees. The research highlights the importance of safety related certifications and points out that how the safety perception of employees with lesser age is different from employees in higher age groups.*

**Keywords:** Occupational Safety and Health, ANOVA.

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### Introduction

Safety management refers to the systematic and planned activity driven by top management which aims at controlling the health and safety hazards in the organization (Booth and Lee, 1995). The main aim of the process is to intervene in the cause that leads to accidents. Safety management just not only related to the above but also entails planning and implementation of all activities related to safety. Typically, it includes hazard identification, risk analysis, making proper arrangement for safety management, promotion of safety in the organizations and assessing human reliability. In an effective safety management system, these activities are assigned to all the different hierarchical levels of the organization (Booth and Lee, 1995; Grimaldi and Simmonds, 1997)

Safety management gained prominence and due attention in India only after the Bhopal gas tragedy in 1984. Gupta (2002) researched that the major causes of accident are Indifferent attitude of management towards safety, and lack of implementation of the already existing rules and regulations by the regulatory bodies. After the tragedy, a separate chapter on Occupational Safety and Health has been included in the Factories Act and the outlook of the organizations towards safety also changed dramatically

### Literature Review

The economic integration of globe is changing the competitive spirit in which the businesses operate, requiring an expansion strategy to impact long term growth and survival in a positive manner (Karagozoglou and Lindell, 1998).

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According to Sridhar (2006), the small sector is emerging as one of the most important sector for positively impacting the growth of national economies. Inherently, there are many disadvantages being faced by Small and Medium Enterprises as they are transiting into the international environment. (Chen and Huang, 2004).

In the manufacturing organisation, employees are often faced with a lot of risk related to safety and health. These risks directly and indirectly affect business operations. Consequently, for a company to grow and prosper, it is pertinent that risks are effectively managed, because the organisational health, assets and opportunities can be better taken advantage of, if they are taken care of (Fuller, 1997). According to Husain (2010), Occupational Safety is an important element of social responsibility. He defines Safety as freedom from danger and injury, insuring against hurt and other dangers of risk.

According to Terry E. Sween (2003) unsafe work behaviour takes place as a result of the physical factors which have a bearing in pursuit of existing business.

It has been reported that in 2011-12, the number of fatal accident reported per lakh man days worked in India were 1083. (Report of Labour bureau, 2012). This rate is alarming and calls for existence of safety culture in the organisation.

Safety culture can be defined as "Assembly of characteristics and attitudes in an organization and individuals, which establishes that, as an overriding plant safety issues receive attention warranted by their significance (International Atomic Energy Authority (IAEA), 1986).

Safety culture is an enduring feature of the organization and forms an integral part of organization culture. (Kennedy and Kirwan, 1998)

Zohar emphasized the importance of safety culture by stating that it encourages employees to follow safety behaviour and it leads to the development of safety attitude.

To understand the state of organization with respect to safety, often safety surveys are employed as they can be best viewed as ideally predicting the state of safety performance of an organization. It has been suggested that safety climate surveys are good predictors of state of organizational safety performance as it doesn't suffer from traditional biases of reporting and post hoc analysis. Safety culture in particular is a relatively enduring characteristic of organization.

Ojanen et al. (1988) recommended that safety attitude determination should form an important aspect to understand the real safety level of the organization clubbed with other safety surveys. They claimed that changes in the safety behaviour of the employees in the organization can be indicated well through measuring safety climate, which can further be useful in evaluating the programs and drive related to safety in the organization. Davies et al (2001) described safety climate as current variation or nuances of long term culture as the tangible outputs of an organization's health and safety culture, as perceived by individuals or work groups, at some point in time .

Safety climate in the organization can be evaluated typically using employee questionnaires to assess the attitude. Various researchers have emphasized on different aspect of safety to assess the safety level in the organisations.

According to Prakash (2010), Safety training is a safety measure to enable workers to handle unforeseen hazards.

Richter et al (2004) indicated that employee involvement is also important by defining it as the shared and learned meaning, experiences and interpretation of work and safety, expressed symbolically and which guides people. Husain (2010) reinstated in his study that employee

involvement is a behaviour-oriented technique involved in the employees in the upward communication flow and decision making process of the organization. In a study by Fleming(2001), four factors were found to be having a positive impact on how people perceive safety and they are valuing their subordinates, frequently visiting worksites, safety communication and participation of workers in management

Guest et al (1994)in his study found that communication is an important issue to reinforce safety culture.Mearns et al (1998) pinpointed that likelihood of accident is more in absence of job communication and thus it supported the view that safety communication is important for reducing risk of safety and for ensuring safety culture. Reason (1997)studied the importance of safety reporting in the organization. The study by Guest et al (1994) indicated the existence of “macho” attitude among the workers towards safety and studied the importance of involvement and participation of staff. Thus, for the assessing the safety level of employees in the organization, the various parameters can be used.

## **Structure of Occupational Safety and Health in India**

### **The Role of Government**

Occupational Safety and Health comes under the purview of Ministry of Labour and Employment under Government of India. The Industrial Safety and Health branch of ministry is entrusted with the responsibilities to take up the matters related to policy decision and also formulating and implementation of the guidelines for adoption of the rules and regulations related to safety, health and welfare of the employees.

The ministry also takes up the task of piloting the bills through Parliament after consulting with the other ministries and the state government and also the employees and employers' organizations. Liaisoning with International Labor Organization and other countries is carried out by Ministry (Ministry of Labour and employment, 2012)

Factories in India fall within the purview of Directorate General, Factory advice service and Labor institute (DGFASLI), which is the technical organization of the ministry of labor and takes care of Occupational Safety and Health and other issues of Factory workers. It provides training for Factory Inspectors and coordinates. A few medical colleges hold Graduate and Post graduate diplomas and degrees for OCCUPATIONAL Health Training. A statutorily approved certificate course for a period of 3 months. In Industrial Health is offered by Central Labor Institute which is a part of DGFASLI. (DGFASLI, 2010)

There are five Regional Labor Institutes RLIs. They are responsible to carry out responsibility for carrying out research related to industrial safety and health. Till recently only Central Labor Institute was there to provide for certification and statutory training.

National Institute of Occupational Health is one of the prime institutes of the Indian Council of Medical Research [ICMR] and has two Regional Occupational Health Centers (ROHC) at Bangalore (1977) and Calcutta (1980) for catering to regional needs. The major task of this institute is to carry out extensive research in the area of Occupational Safety and Health. The institute also provides short term training modules for industrial medical officers, factory inspectors and trade unions as well. The Institute also puts forth its recommendation to the Ministry of Health, Ministry of Labor, Ministry of Environment and Ministry of Commerce on issues related to occupational health, safety and environment. (Saiyed H.N, Tiwari 2004)

Central Board of Worker's education, National Institute of Occupational Health and National Safety Council are among the few councils of repute. The assistance to Ministry of Labour and employment in operating the various awards as that of National Safety Awards, Vishwakarma

National Awards and Prime Minister's Shram award is also provided by it. These awards are primarily meant for promoting safety culture in the organization( National Policy on Safety, Health and Environment at Workplace)

### **Legislative Framework for Safety and Health in Manufacturing Sector in India**

Legislative framework exists in India for safety, health and welfare of employees for long but its implementation is in slipshod. The formal units falling under it comprise of only 10%of the total units.

Occupational Safety and Health fall under the purview of the following Acts:

- 1. Factories Act 1948:** This Act contains 120 sections, and is divided into Chapters concerning inspection staff, health, safety, hazardous processes, welfare, working hours of adults, employment of young persons, annual leave with wage, and penalties and procedures. This act has the provisions for Safety, Health and Welfare and special chapters on Hazardous processes added after the catastrophic Bhopal Gas Tragedy, which took away lot many lives. This Act places talks about formation of safety committees with equal number of representatives from management and workers and consultation with employees for framing Occupational Safety and Health Policy.
- 2. Worker's Compensation Act:** It is an act to provide for payment by certain classes of employers to their workmen of compensation for injury.It's an Act meant to protect the rights of injured workers. It aims at securing the right of injured workers so that they get appropriate medical care, necessary training and rehabilitation. If the workers die due to injury at work, the family is entitled for compensation.
- 3. Employees' State Insurance Act (ESIC Act):** This Act deals with protection of workers in case of sickness, maternity, injuries and loss of wages due to work.

Besides this, keeping in the view the urgent and unavoidable need of Occupational Safety and Health, in February 2009, The Government of India has declared **National Policy on Safety, Health and Environment** at Work place and has set to build and maintain national preventive and safety & health culture, as a goal. In order to achieve the aforesaid goal in the national agenda, government has stressed to promote inclusion of safety, health and environment improvement at the workplace as an important component for quality of working life. (Fuller,1997)

The main focus of National Policy on Safety and Health at workplace is placed on Compliance, awareness, Occupational Safety and Health, skill capacity building and research. The national policy on OSH has the following objectives:

- Continuous reduction in incidence of work related injuries, fatalities, diseases, disasters and loss of national assets.
- Maintain comprehensive database of the above for better performance and monitoring.
- Continuous enhancement of community awareness on Safety, Health and Environment (SHE) issues at work related areas.
- Improving SHE at workplace by creation of green jobs contributing to sustainable development. (Health and Safety Executive 2000)

### **Some Important Certification and Standards for Safety and Health**

**There are a number of international certifications and standards** framed on Occupational Safety and Health which are gaining prominence in the recent times. Some of them are here below.

1. **OHSAS 18001:** It is a British standard for Occupational Safety and Health Management systems. The main reason why it exists is to help all kinds of organisations to put in place demonstrably sound Occupational Safety and Health performance. It puts special focus on forming OSH objectives to help organisations develop policies and objectives keeping into account legal requirements and information about Occupational Safety and Health risks. It was updated in the year 2007 and new specifications are more closely aligned with structured ISO 9000 and 14000 so that organisations can more easily align with existing management systems.
2. **Integrated Management systems:** These are written generally so that they can be applied to all kinds and all types of organisations. Its major focus is on Environment Health and Safety elements that the organisations can reasonably be expected to control. The basic elements which it includes are environmental aspects, hazard identification, risk assessment, objective formulation, performance measurement and monitoring
3. **IS-18001:** It is standard of Bureau of Indian Standards started with an aim to maintain and continuously improving the Occupational Safety and Health Management Systems. It does not state the criteria for Objective setting as such but its unique feature is the stipulation of initial OSH review, design and engineering, purchasing and critical incident recovery plan which are considered to be critical for the success of OSHMS.

Besides these standards, International Labour Organisation (ILO) and Health Safety Executive (HSE) provide the guidelines on this critical and very important issue. Some notable points are as mentioned below:

1. **HSG65:** It is a popular guide of Health and Safety executive, mainly developed for line managers, leaders and owners who want to oversee their organisations Health and Safety arrangement. It extends guidelines to enable organisations strike a balance between systems and behavioural aspects of OSH.
2. **ILO Guidelines :** These guidelines on Occupational Safety and Health exist to provide a unique international model which is compatible with other management systems, standards and guidelines at national levels and international levels.

### **Objectives of The Study**

1. To determine that whether there is any significant difference in the perception of employees towards the factors of safety management based on age.
2. To determine that whether there is any significant difference in the safety perception level of employees based on the certification status of the organization.
3. To gauge into the underlying reasons and motivations for adopting certification among the employees and organizations.
4. To gain an insight into the safety awareness levels of employees.

### **Hypotheses of the Study**

**H<sub>1o</sub>:** There is no significant difference in the perception of employees regarding various factors of Safety between groups based on age.

**H<sub>2o</sub>:** There is no significant difference in the perception of employees regarding Safety levels between different groups based on certification status of employees

**Research Design**

The research was descriptive in nature and the population considered for the purpose of study was employees working in shop floor of select medium scale manufacturing organizations in Sitarganj area of SIDCUL (State Infrastructure Development Corporation of Uttarakhand) in India. The size of sample was 202 such employees. The respondents varied from 25 to 55 years of age. Some of the organizations chosen were certified by some safety standards whereas some were not certified. During the course of the study, several safety managers were interviewed to gain an insight into the safety phenomena into practice.

A self-developed scale comprising of 29 items clubbed into 8 factors was used to determine the safety perception level of employees on 5 point Likert scale. This questionnaire was the result of extensive literature review conducted. In the process of literature review, 8 factors were identified for determining the safety perception of employees. In the scale, 1 meant Strongly disagree, 2 meant Disagree, 3 meant Neutral, 4 meant Agree, 5 meant Strongly agree. The process of data collection took a period of over 5 months. Participation of workers in the survey was voluntary. Safety perception of employees was measured using a self-developed 29 item scale with 8 factors of safety ie. Safety Training and Supervision, Involvement of Staff, Work procedures, Safety reporting culture, Management commitment towards safety, Injury Management, Communication and safety leadership. Reliability analysis was performed on the instrument used for the study by using Cronbach alpha test and the score came out to be more than .7 which indicated that the statements are internally consistent. Cronbach's alpha is the most common measure of internal consistency ("reliability"). One way ANOVA was used to examine the difference in the mean perception of employees towards different factors of safety based on age of employees and certification status of the organizations. The precondition of applying one way ANOVA is to test the normality of the data and it was done using Shapiro Wilk's test.

**Data Analysis**

Table 1 shows the mean and standard deviation of responses obtained from the respondents on 29 items scale put into 8 factors of safety. The self developed scale aimed at finding the level of safety perception of employees with respect to various factors responsible for ensuring safety in the organisation. The factors with their mean scores and standard deviations are as follows.

**Table 1: Analysis of Variance**

Factor Name	Upto 40 YRS (N=112)		More than 40 YRS (N=90)		OVERALL		F value	P value
	Mean	SD	Mean	SD	Mean	SD		
Safety training and supervision	4.31	.58	3.29	.57	4.31	.56	.56	.57
Involvement of Staff	4.24	.67	3.15	.83	3.75	.73	.17	.04**
Work Procedures	4.19	.56	2.18	.72	3.18	.61	.25	.007*
Reporting safety	4.20	.68	4.27	.58	4.23	.64	.77	.46
Management Commitment	2.52	.57	2.79	.60	2.60	.58	4.72	.01*
Injury Management	2.70	.88	3.00	.86	2.75	.89	8.32	.00*
Communication	4.24	.70	4.15	.73	4.23	.71	1.07	.34
Safety Leadership	4.35	.63	4.24	.84	4.34	.70	4.48	.01*

\*significant at .01 level

\*\*significant at .05 level

Every organization is required to follow some practices with respect to Safety of the employees. The various factors related to Safety of employees were identified by carrying out extensive literature review and in order to examine the safety related practices being followed in the organization, employees were asked to rate various statements related to different parameters of safety. The Table 1 shows the result of Analysis of variance of various factors pertaining to safety based on the age of employees. For this purpose, the employees from different organisations were categorized into two age group ie Below 40 years and above 40 years.

It is clear from the Table that at overall level, employees strongly agreed that there is a mechanism of safety training and supervision( mean score= 4.3), involvement of staff (mean score=3.75), safe work procedures(mean score =3.18), reporting unsafe practices culture (mean score = 4.23), Communication (mean score= 4.23), safety leadership(mean score = 4.34 ) whereas they showed slight disagreement on the practices related to injury management(mean score= 2.75) and management commitment to safety(mean score= 2.6 )

Further One-way ANOVA was applied to examine the difference between mean scores of various factors influencing the employees' perception about safety with respect to age. The result of one way ANOVA indicates that difference in mean score is significant at .01 levels for 5 factors viz. Injury management, safety leadership, work procedure, involvement of employees and management commitment to safety for which the F values are 4.42, 8.32 and 4.48 respectively. However, the F value turns insignificant for remaining factors viz. Safety training and supervision, reporting safety, safety communication. Hence, it can be concluded that with respect to age, there is a significant difference in safety levels of employees when it comes to involvement of the staff, work procedures, management commitment to safety, safety leadership and injury management. Hence it could be inferred that employees below the age of 40 years have a better perception towards safety in the organization.

**Table 2: Table showing various factors pertaining to Safety management and difference in perception based on certification status using Analysis of Variance**

Factor Name	Certified organization		Non certified organizations		F value	P Value
	Mean	(SD)	Mean	(SD)		
Safety training and supervision	4.17	.49	3.39	.80	3.81	.03
Involvement of staff	4.86	.89	4.38	.88	4.03	.00 *
Work Procedures	4.33	.64	3.21	.76	.612	.03
Reporting safety	3.84	.65	2.10	.80	7.54	.00*
Management Commitment	4.70	.63	2.70	.68	4.096	.001*
Injury Management	3.97	1.08	2.75	.87	2.26	.05**
Communication	4.70	.75	2.10	.97	4.22	.001*
Safety Leadership	4.86	.78	2.29	.78	3.45	.00*

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The results showed that there is a significant difference in the perception of employees based on the certification. It is apparent that there is a significant difference in the perception of employees regarding safety training and supervision. The difference in the mean clearly states that in certified organizations, the employees have better perception for safety training and supervision which implies that certified organizations put due emphasis on the training of employees as compared to the non-certified organizations.

**Involvement of staff in the safety practices:** During the research, it was observed that staff involvement in the safety can really carve the way for ensuring better safety culture. For ensuring such culture organizations have started working on collaborative approaches to foster cohesiveness in the organizations. Many of the organizations have started working towards suggestion of employees in management and their involvement in the accident analysis as well.

**Work procedures:** There is a significant difference in the perception of employees towards safe work procedures based on certification of employees. The employees working in certified organizations tend to be more safety oriented in their work mechanism. It was also established that due to streamlined and systematic standard operating procedures in the organization, the tracking mechanism for discrepancy also becomes easy.

**Reporting safety:** The culture of reporting the accidents and anomalies was though seen to be moderate in even certified organizations, yet there was significant difference was found between them based on their certification status.

**Management commitment towards safety:** During the course of research, it was established (based on interviews) that safety equipments' needs in India is showing an increasing trend as compared to earlier. The relation of the same could be drawn with seriousness of Government towards safety concerns which is compelling organizations to ensure safety. As a result of it, more organizations are going for certifications and definitely safety culture cannot be ensured without the commitment of top management.

**Communication:** Safety communication in the form of safety policy and objection was found to be the prominent feature of the organizations which are certified and the employees' perception towards the same was also seen to be very high. The employees were randomly asked about safety mechanism and route for cordoning off and they were found to be highly aware of various safety mechanism.

**Safety leadership:** It was established that perception of employees towards safety leadership was much higher in safety certified companies as compared to non-certified organizations.

**Some EXCERPTS from the interview of safety managers and professionals.**

On discussion with managers in the organization, it was established that a lot of conscious efforts are being put by the organizations to promote safety culture in the organization and they place emphasis on health of the workers and welfare of the workers as well. The following points were found to be important from the discussion.

- A. On interviewing safety and health managers, it was established that "Though Employees had a very casual attitude towards safety at the workplace, yet management was successful to constantly reinforce the safety practices by the management for safety of employees and to make them lend ears to the safety awareness Health and safety training is imparted to the employees at frequent intervals i.e. Twice a year or quarterly "and evaluation of training effectiveness is done on continuous basis

- B. Nearly half of the small and medium enterprises reported that they are certified by some safety quality certifications like OHSAS 18001, ISO45001 and comply with the standards of safety and health. On being questioned that why do they go for certification, they answered that it is not only the requirement of the management but also the requirement of the client organization. They say that it's the pre-requisite of client organizations for signing the contract because they don't want to compromise with the quality.
- C. The safety managers firmly believed that it's the culture which needs to be made an integral part of the organization and top to bottom approach needs to be followed in this regard. Assuming safety and health as the prime responsibility by each and every employee can only create difference. For cultivating this practice, safety champions can be identified who may be assigned the task of proactively working for promoting safety culture and nurturing the culture of safety.
- D. Safety certified organizations were found to be proactively involved in spreading awareness through posters, leaflets, video conferences, safety and health camps
- E. The employees are not only incentivized for the same but effort is made to make them set safety and health as a priority to other aspects.
- F. Risk assessment was found to be an important issue during the discussion and most of the organizations claimed that they are following it as a regular practice.
- G. One of the managers interviewed who belonged to safety equipment manufacturing concerns pointed out that there is increasing demand of safety equipment these days due to growing awareness and more strictness towards safety.
- H. There are regular third party safety inspections especially by different certified organizations.

### Recommendations

1. Organizations need to pay special emphasis on raising the motivation level of employees with higher age group to improve the safety mechanisms in the organizations.
2. It was inferred from the research that certifications improve the safety culture of the organization. Therefore, safety related certifications should be obtained by the organizations as they streamline the safety process implementation
3. Safety champions can be identified and may be assigned the task of proactively working for promoting safety culture and nurturing the culture of safety.
4. Accident analysis and integrating the safety mechanism with Information technology can act as a catalyst in improving the injury rates and preventing the loss
5. Safety policies should be formulated and communicated to the employees by displaying it prominently on the notice boards.

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