

Sharing of Safety Culture at workplace measures to reduce industrial risks & hazards

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Abstract— Environment, Safety, Health, and Welfare of people are intimately related with the measures taken towards effective safety culture at workplace in industries. Adopting and sharing of safety culture is a crucial component of an effective occupational safety and health practices in industries for reducing risks & hazard, preventing recurrences, improving safety by taking corrective measures and others as reducing costs, complying with regulations, protecting reputation, meeting insurance requirements and making information available for litigation in due course of time etc. It is important for the stakeholders such as workers, employers, governments, and the society at large. Researchers are also emphasized the needs to adopt sharing of safety culture as a measure to reduce risks & hazards as the cases of occupational diseases or accidents in industries are increasing now a days. The study is aimed to assess the adoption for sharing of safety culture at the workplace in Hindustan Copper Limited as a measure to reduce associated risks & hazards towards the effective occupational safety and health practices in industries. The study suggests the ways to control the occupational diseases or industrial accidents by adopting safety culture as a measure and its sharing among working population at workplace ensure prevention to reduce the associated risks & hazards.

Index Terms— Safety Culture, Preventive measures for associated risks & hazards in industries, Safety Performance, Occupational safety & health practices.

I. INTRODUCTION

As per Chib S & Kanetkar (2014) Safety culture reflects the attitudes, beliefs, perceptions and values that employees' share in relation to safety. Safety culture is often seen as a subset of organizational culture and distinction of these concepts as well as safety climate is not clear. Safety culture is a multidimensional concept. The constituent factors are management responsibility, job satisfaction,

individual responsibility, leadership style and communication, risk awareness and risk taking. Safety culture refers to the set of shared beliefs, perceptions, attitudes, and behaviours that influence how workplace safety is managed and sustained. It's emphasized in how employees think and act regarding industrial risks & hazards, as well as in the decisions made at the highest levels of management – decisions that must consider the human, organizational, and technical aspects of workplace safety. It's based on voluntary adherence, collective dynamics, and a shared sense of responsibility. Such culture marks a shift from safety that's "imposed from above" to safety that's "supported by all." Leadership is in general given great importance for safety culture. Ek (2006) states that the safety culture in organization could be said to be influenced by two important components: a) the type of work that is conducted and b) the leadership and management system. Flin (2003) further concludes that management commitment is one of the major factors in managing of an organization safety where the others are open communication & reporting, continuous training & education, employee engagement and integration with daily operations. A positive safety culture transforms safety from a compliance requirement into a shared, daily responsibility. Safety culture at the workplace in industry is to be truly ensured by full & honest dedications on Commitment, Communication, Cooperation/ Collaboration, and Competence to reduce industrial risk(a situation involving exposure to hazard or danger, a relative term) and hazard (a condition prevailing at the workplace having potential to cause damage to health, life and property).

II. LITERATURE REVIEW

To make the eco-friendly and healthy working environment by establishing a good safety culture, study of related literature review carried out as per the available sources of information on websites and gains the knowledge and understands the background of the topic or subject being studied. Kumar V & Bhasi (2010) explained to analyze the measures taken towards occupational and industrial safety management with influence of safety engineering and management practices in selected industry in Kerala as collected efforts and proper thoughts in the direction of controlling work-related hazards and accidents as unstable as no safety culture factors across industries and lack of study & to identify the critical safety. Md Saifullah N & Ismail (2011) while studying to identify the occupational safety & health elements as the safety culture as to analyses the measures towards industrial safety as it contributes to numbers of incidents and fatality to the construction players and public. Viscusi W. Kip (1986) expressed the OSHA's impact on workplace with the magnitude of the effect is modest, and the effect is not robust with respect to different risk variables on safety culture as to analyses the measures. Nielsen in E (1994) in his study on to review the knowledge in the fields of occupational exposure and health problems related to waste collection. The aims are to highlight the knowledge to put forward hypotheses on causal links between exposures and health effects on safety culture as to analyses the measures. López-Valcárcel A (2001) while studying the hazardous occupation in construction industry, all economic sectors considered on safety culture as to analyses the measures. Smallwood J & Ehrlich (2001) while analysing the first look at health hazards and associated OH and hygiene services for safety culture needs as the risk of traumatic injuries, Musculoskeletal strain, Regional pain syndromes, exposed to noise and Respiratory irritation from dusts, fumes and gases. Viscusi W. Kip (2006) in his study to analyze the determinants of health & safety investment and industrial injury rates and opined as conceptual analysis indicated that the effect of job hazard hinges critically on the economic incentives created and the policy makers have to pay little attention both to the potential desirability and economic mechanisms considered on safety culture. Janocha J A & Smith (2008) while analysing the safety culture as to analyses

the measures in a workplace safety & health to develop means to reduce future injuries, illnesses, and fatal occupational injuries to workers with the assessment for larger proportion of the fatal injuries occurred. Kumar V & Bhasi (2008) on their study to determine the safety culture and the personal attributes of participants to improve any specific abnormalities after comparing with the benchmarked scores and considered on safety culture as to analyses the measures towards industrial safety. Lekka C, Webster & Corbett (2010) while studying on key health & safety risks and control measures at major sporting events towards the planning and management risks towards the potential risks to health & safety during and after major sporting events as well as HSE or other bodies/ organisations do to prevent or mitigate potential/foreseeable risks considered on safety culture as to analyses measures towards industrial safety. Feng Prasad, Xiaohua Jin, Saha & Hardie (2013) while ascertaining factors influencing the effective implementation of safety management system having difficulties includes the contractor and client's attitude towards the consideration on safety culture as to analyses the measures towards industrial safety. Subramani T & Lordsonmillar (2014) recommended for a focused dedication towards safety culture to eliminate injury or loss of property. Schofield E S, Gerberich & Ryan (2015) in their study emerged as an outside perception of management commitment which is to be wholly indicative of risk of injury within a company, but may be predicative for some construction trades or potentially in combination with other measures considered on safety culture as to analyses the measures towards industrial safety. Zahoor H, Chan, Masood, Rafiq. Choudhry, Javed & Utama (2016) expressed concern towards stakeholders' perspective that in absence of a regulatory authority, lack of commitment of management towards safety and overall safety unawareness have caused slackness in employees' safety culture as to analyses the measures towards industrial safety which should not be resulted in an exacerbated accident rate and their findings came out as "lack of compliance with OSH" resulted a relatively higher construction accident rate in developing countries. Divya P, Bhavsar & Pitroda (2017) on a critical review in construction projects on safety management to utilize descriptive analysis for benchmark safety performance of construction

contractors and client as Workers, Environmental and organizational are the factors affecting safety performance. Workers Factors are Human, Historical and Psychological. Natural and workings are the environmental factor whereas Incentive & project budget, policy & procedure and incentives are the organizational factors on safety culture as to analyses the measures towards industrial safety. Martha L. Ríosa, Sharealjazb, Ruotsalainen, Breslinf, Guessing & Verbeekb (2018) studied for identifying preventive occupational safety & health interventions to protect young workers from hazards at work while considering their ongoing physical and mental maturation towards safety culture as to analyses the measures towards industrial safety. Christopher A H (2020) expressed concern in a global perspective to provide insights on safety culture as to analyses the measures towards industrial safety.

III. RESEARCH GAP

Reviewed the literatures in context to the measures to be taken for reducing risks & hazards at the workplace and assessed that sharing of safety culture is not fully explored and also the aligned preventive measures are not properly explained as a result sharing of Safety

Culture at workplace is very much effective to reduce risks & hazards in industries as per the norms.

IV. OBJECTIVE OF THE STUDY

The aim of the study is to know the measures to be taken at the workplace for reducing industrial risks & hazards. It further aims to prevent associated risks & hazards at workplace by sharing culture of safety among the working population in industrial perspectives.

V. RESEARCH METHODOLOGY

Primary and secondary data both were used for the study. Developed the questionnaires by referring past research papers. Used Five-point Likert scale in questionnaire. The survey was conducted among the working populations in copper industry Hindustan Copper Limited in Jharkhand. The secondary data was collected from the articles published in journals, companies' manuals etc. Considered sample size of 100 for this study. Randomly selected the working employees of Hindustan Copper Limited in Jharkhand to collect the data.

VI. DISCUSSIONS AND ANALYSIS

The opinion of the employees was collected on occupational safety and health practices in industries. The factor suggested by Prasad K (2023) from the Title "Occupational health and safety strategies".

(i)	I am aware of my building evacuation plan.
(ii)	The personal protective equipment is upgraded whenever required.
(iii)	There are proper fire mock drills and other safety-related drills conducted & we also know the location of my building emergency utensils (such as fire extinguishers for first aid kits, sand etc).
(iv)	The safety committee conducts formal safety audits at regular intervals, are a normal part of a business.
(v)	The organisation follows the safety health policies and practices to deal with hazards at work, which is improving safety culture.
(vi)	All incidents are investigated quickly to improve safety at workplace as soon as possible.
(vii)	Safety is a high priority for our company hence first aid treatment is given to every injury however small.
(viii)	The safety information and rules are consistently & fairly enforced.
(ix)	We always do a risk assessment when we start a new process or when a process is changed.
(x)	There is enough collaboration within and across team so that everyone collaborates to improve safety in the company.
(xi)	Workplace health and safety are considered to be at least as important as production and quality.
(xii)	The training given us to make us feel to more confident to work safely even when we are doing the job for the first time.
(xiii)	Post-accident investigations are done in a proper time frame and learned from to improve the condition later to make all feel safe at work.

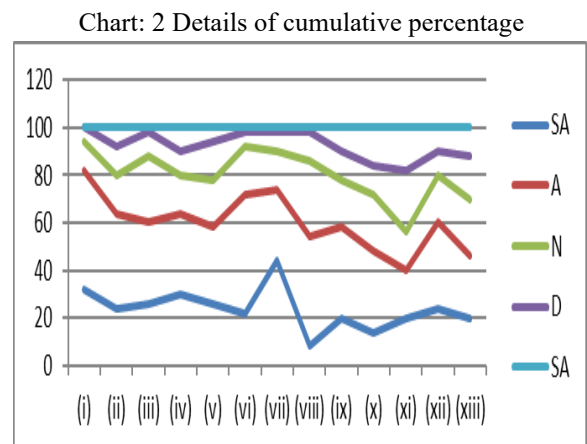
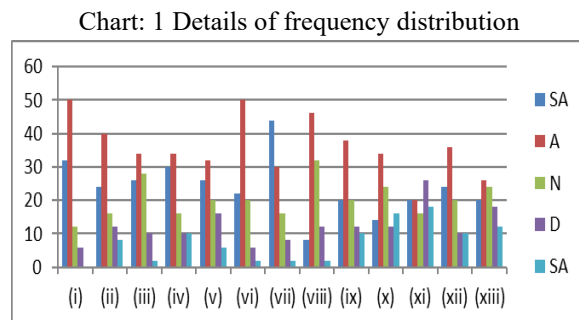
The five points of Likert Scale were: Strongly Agreed (SA) as 1, Agreed (A) as 2, Neutral (N) as 3, Disagreed (D) as 4, and Strongly Disagreed (SD) as 5. The data collected has been tabulated in Table 1. The value of standard deviation and weighted average calculated. Remarks on the perception of respondents for each statement were given based on the value of weighted

average. The Cronbach's Alpha value of the scale used in the present study is 0.7857 (using ANOVA: Two Factor without replication on MS Excel and also using formula $\alpha = 1 - \text{MSE/MSR}$) i.e. > 0.7, which states that the internal consistency of the scale is acceptable and the questionnaires are deemed to be reliable for the present research.

Table1: Perceptions on accident causation & its remedial measures for effective occupational safety& Health.

Sl.No.	Frequency and Percentage					Mean	Standard Deviatio	Weighted Average	Remarks/ Perception
	SA	A	N	D	SD				
(i)	32 (32%)	50 (50%)	12 (12%)	6 (6%)	0 (0%)	1.92	1.12	2.43	Low Perception
(ii)	24 (24%)	40 (40%)	16 (16%)	12 (12%)	8 (8%)	2.40	1.23		Low Perception
(iii)	26 (26%)	34 (34%)	28 (28%)	10 (10%)	2 (2%)	2.28	1.04		Low Perception
(iv)	30 (30%)	34 (34%)	16 (16%)	10 (10%)	10 (10%)	2.36	1.01		Low Perception
(v)	26 (26%)	32 (32%)	20 (20%)	16 (16%)	6 (6%)	2.44	1.32		High Perception
(vi)	22 (22%)	50 (50%)	20 (20%)	6 (6%)	2 (2%)	2.16	1.17		Low Perception
(vii)	44 (44%)	30 (30%)	16 (16%)	8 (8%)	2 (2%)	1.94	0.93		Low Perception
(viii)	8 (8%)	46 (46%)	32 (32%)	12 (12%)	2 (2%)	2.54	1.07		High Perception
(ix)	20 (20%)	38 (38%)	20 (20%)	12 (12%)	10 (10%)	2.54	0.88		High Perception
(x)	14 (14%)	34 (34%)	24 (24%)	12 (12%)	16 (16%)	2.82	1.13		High Perception
(xi)	20 (20%)	20 (20%)	16 (16%)	26 (26%)	18 (18%)	3.02	1.29		High Perception
(xii)	24 (24%)	36 (36%)	20 (20%)	10 (10%)	10 (10%)	2.46	1.01		High Perception
(xiii)	20 (20%)	26 (26%)	24 (24%)	18 (18%)	12 (12%)	2.76	1.21		High Perception

Histogram analysis for the frequency distribution and cumulative percentage option wise and question wise depicts that majority of respondents rather more than 60% responded the option strongly agree (SA) or agree (A) which supports the topic in favour. Details of charts for the frequency distribution and cumulative percentage are as under.



H0: There is no impact of sharing of safety culture at workplace to reduce risks & hazards in industries. For analysing the data single test ANOVA using MS Excel was applied.

Table: 2 Outcome of analysis

Anova: Single Factor						
SUMMARY						
Groups	Count	Sum	Average	Variance		
2	99	190	1.919191919	0.687280973		
4	99	236	2.383838384	1.443001443		
3	99	225	2.272727273	1.057513915		
2	99	234	2.363636364	1.662337662		
2	99	242	2.444444444	1.473922902		
3	99	213	2.151515152	0.823747681		
3	99	191	1.929292929	1.107194393		
3	99	251	2.535353535	0.781900639		
3	99	251	2.535353535	1.516594517		
2	99	280	2.828282828	1.653885797		
3	99	299	3.02020202	2.019995877		
2	99	244	2.464646465	1.557410843		
4	99	272	2.747474747	1.680478252		
ANOVA						
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	124	12	10.32750583	7.687119352	6.43358E-14	1.759763559
Within Groups	1712	1274	1.343481915			
Total	1836	1286				

At 5% significance level, the null hypothesis rejected. Therefore, there is a significant impact of sharing of safety culture at workplace to reduce industrial risks & hazards. With reference to the data collected, the respondents accepted that industrial risks & hazards are sensibly getting reduced by sharing safety culture at the workplaces. It was also accepted that the unsafe act or behaviour & physical working conditions as well as resilient management strategy on safety is the main issues responsible for dangerous occurrences and risks & hazards at workplace in industries which could be controlled or rather reduced by sharing of safety culture at the workplace among the employees and other stakeholders employer, public living in the surrounding and society at large which could be established by strict OSH strategy by management as they are accountable towards OSH for their employees.

Majority of the respondents accepted that sharing safety culture at workplace is effectively preventing risks & hazards. This may be in the form of wearing required PPE, Lockout/ Tag out procedures, reporting hazards immediately, never bypassing safety devices, staying trained and authorized for equipment, maintaining good housekeeping, and stopping work if unsafe, safety training, safety talk, safety campaign & propaganda, safety demonstration, mock drills, risks assessment, hazards analysis, create awareness to follow safety rules, regulations, guidelines & SOPs, use safety appliances & protective equipments etc which ignorance will certainly invite dangerous occurrences as industrial accidents and occupational illness by the workers. Resilient motives, ignoring

attitude, less attention and defer for later are the lapses by the managements towards safety culture and lack of practice for non- using safety appliances is a major concern for occurring accidents / incidents at work places.

Sharing of safety culture is the pillar that upholds a culture of protection, where every individual is empowered to prioritize their well-being and that of others. Optimal safety and safe working conditions are the priorities of the management in industries as the safety & health are their responsibilities. A strong safety culture in industries integrates shared beliefs, attitudes, and behaviours that prioritize safety as a core value rather than just a set of rules. It requires top-management commitment, open communication, and employee empowerment to identify hazards and stop unsafe work, ultimately reducing accidents, improving morale, and enhancing productivity. The industry is always aiming to achieve “Zero Harm/ Damage/ Loss” and committed to continue sustainable growth and reputation by diligently adhering the ‘Sustainable Development Framework’. In a line of sharing of safety culture, formal standards for behavioural changes, attitudes to act by workers and maintaining proper & safe workplace, resources to meet/exceed standards, a system of measurement, effective consequences, appropriate application and continual evaluation of the system may reduce or rather control the industrial risks & hazards. The importance of creating an effective safety culture is a matter related to human, economic and organizational and its overall performance is to demonstrate a successful safety culture, marked by consistency, shared commitment,

and proactive risk management. By building a work environment where safety performance is a shared priority through which industry may reduce unforeseen issues, streamline team collaboration and accountability, and increase production rates.

The method of research includes surveys and fact-finding enquires of different kinds through questionnaires to understand their perception about the awareness of safety culture among the working employees towards occupational health & safety in industries and the preventive measures taken by the management for controlling or rather reducing the dangerous occurrences and associated risks & hazards in industries.

Based on the analysis of the study, it is suggested that industries should strengthen the systematic sharing of safety culture across all organizational levels. Management must demonstrate visible and consistent commitment to occupational safety and health by allocating adequate resources, conducting regular safety audits, and ensuring strict compliance with statutory regulations. Safety should be integrated into daily operational planning rather than treated as a separate activity. Regular and structured safety training programs, refresher courses, and mock drills should be conducted to enhance employees' awareness and confidence in handling hazardous situations. Behavioral safety programs should be introduced to address unsafe acts and attitudes, encouraging workers to report hazards without fear of punishment.

VII. CONCLUSION

The study concludes that industries are performing or rather maintaining their image or reputations effectively at the cost on due consideration of safety and health of their workforce. However, discussing best practices, asking questions, and learning from each other helps to improve safety and to prevent loss of life and this may be happened to the ground only by sharing of safety culture at the workplace in industries. The purpose is to explain the necessity for developing and implementing effective and efficient safety training and education for the workers. Following five essential elements for creating a strong safety culture as per study of HSE Guide for Risk Assessment as measure to reduce associated risks & hazards in industries are most effective tool.

- Continually Updating Safety Precautions.

- Internal Safety Training for All Employees.
- External Training from Your Partner in Safety.
- Bringing Employees Together to Form a Safety Culture.
- Holding Each Other Accountable to Safety Standards.

Sharing of safety culture among the workers about risks & hazards in industries is the key for the prevention of industrial accidents as well as occupational hazards and subsequently it is easy to protect rather to prevent the industrial injury/ harm/ loss/ damage. It is important to recognize work-related diseases in the early stages by promoting the development of occupational health services, including the training of doctors. It is also recommended that industries adopt advanced risk assessment tools and digital monitoring systems to track safety performance indicators more effectively. Establishing an active safety committee with representation from workers and management can improve communication and collaboration.

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