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WORKPLACE SAFETY – AN INTEGRAL PART OF TOTAL QUALITY MANAGEMENT

Engineering

KEYWORDS: Safety, TQM, Workplace, Occupational, Deming, Management, Legislation, Behaviour, Health

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ABSTRACT

The paper focuses on various aspects of workplace safety and its relationship with Total Quality Management (TQM). The paper emphasizes that safety starts from home. Need of safety and positive outcomes of safe workplace have also been discussed. Various legal provisions related to safety and health, both at international level and national level have been briefly discussed. In addition to legal provisions, concept of behaviour based safety has also been highlighted. Finally, it is concluded that safety is the joint responsibility of employer and employee and both must strive together for accident free workplace. Emphasis has been laid on applying TQM principles and tools in safety related provisions.

INTRODUCTION

Term "Workplace" has been defined in number of ways. According to Oxford dictionary, "Workplace is a place where people work, such as an office or factory ". As per your dictionary.com, "Workplace is the location where you are employed and where you go to work every day ". But these definitions do not completely explain the term work place. The workplace is the physical location where someone works. Such a place can range from a home, office to a large office building or factory. The workplace is one of the most important social spaces other than the home, constituting "a central concept for several entities: the worker and his/her family, the employing organization, the customers of the organization, and the society as a whole"[1]. For women, who are not going out for any job, their own home is the workplace.

According to Oxford dictionary ," Safety is the condition of being protected from or unlikely to cause danger, risk, or injury." Safety is the state of being "safe" , the condition of being protected against physical, social, spiritual, financial, political, emotional, occupational, psychological, educational or other types or consequences of failure, damage, error, accidents, harm or any other event which could be considered non-desirable. Safety can also be defined to be the control of recognized hazards to achieve an acceptable level of risk. This can take the form of being protected from the event or from exposure to something that causes health or economical losses. Safety is the condition of a "steady state" of an organization or place doing what it is supposed to do. "What it is supposed to do" is defined in terms of public codes and standards, associated architectural and engineering designs, corporate vision and mission statements, and operational plans and personnel policies. For any organization, place, or function, large or small, safety is a normative concept. It complies with situation-specific definitions of what is expected and acceptable [2].

TOTAL QUALITY MANAGEMENT

TQM has been defined as a comprehensive company-wide approach for meeting or exceeding the requirements and expectations of customers that entails the participation of everyone in the organization in using quantitative techniques to continually improve the products, services, and processes of the company [3]. Top management leadership plays a fundamental role in introducing and facilitating the implementation of TQM strategy by creating a learning and cooperative environment that leads to customer satisfaction, continuous improvement and employee involvement [4]. TQM must ensure economically achieving quality which satisfies customer's needs. TQM principles can be applied to manufacturing as well as service sector. TQM approach is a scientific and logic based methodology for achieving excellence with a view to satisfy all the stakeholders. It is based on participative principle, which is a good fit with Indian culture and psyche. To understand the concept of TQM, Implementation process of TQM program was studied in Mahindra and Mahindra (Swaraj Division) in detail. Here, TQM was chosen as transformation approach for improving manufacturing performance. Since the starting of concept of TQM in1980s, many organizations throughout the world have embraced it. Just like TPM pillar formation, Pillar formation was done for successful implementation of TQM. Pillar structure of TQM in Mahindra and Mahindra (Swaraj Division) has been shown in Fig. 1.

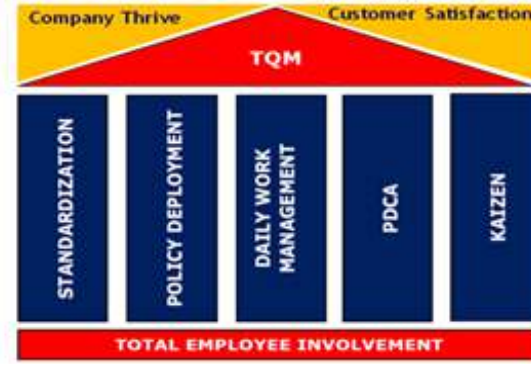

Fig. 1 TQM Structure at Mahindra & Mahindra (Swaraj Division)

NEED OF SAFETY AT WORKPLACE:

Safety measures result in improving the conditions under which the human beings are employed and work. It improves not only their physical efficiency, but also provides protection to their life and limb. Inadequate provision of safety at workplace may lead to increase in number of accidents. Human failure due to carelessness, ignorance, inadequate skill, and improper supervision has also contributed to accidents, and the consequent need for safety measures. Other factors giving rise to the need for safety measures are:

- Rapid industrialization with its complexities in manufacturing process and layout;
- Expansion or modifications in existing factories;
- Setting up of new industries involving hazards not known earlier;
- Lack of safety consciousness on the part of both workers and management;
- Inadequate realisation of the financial implications of accidents.

There is close relationship between safety measures and efficient of human workers. Efficiency results in increasing the average output per person. It results in increased productivity. Indian workers are generally considered to be less efficient as compared to other countries. Such a statement does not reflect any inherent deficiency on the part of workers. Longer hours of work, low wages, poor living con-

ditions and poor standard health and safety measures in workplace contribute to lower efficiency.

In today's scenario, performance of any workplace is measured in term of six parameters, which are listed as below:

- Productivity: To achieve planned production.
- Quality: To improve product/process quality.
- Cost: To reduce cost.
- Delivery: To meet delivery targets.
- Safety: To maintain safety.
- Morale: To maintain morale.

Of all these parameters, safety is of utmost importance. As if the workplace is safe to work, all other parameters bound to increase exponentially.

Safety starts at home:
It is well known fact that chances of getting hurt at home are higher than at workplace. Leading causes of injuries or accidents at home are slips, falls, cuts, poisoning, fires and burns, choking, drowning, electricity. Floors should be kept free of things that can be tripped over or slipped on. Stairs should be kept in good shape and home should be well lighted. We must poison proof our home as potential dangers exist at all rooms. Dangerous product must be kept out of children's reach. Smoke detectors must be installed at homes and fire safety plans must be discussed with children. We should keep an eye on young children while eating at playing and children should never be left alone in bath tub. In addition to this, we must use seat belts while in four wheelers and use safety helmets while sitting on two wheelers. Speed limits must be strictly adhered to and mobile must not be used while driving.

SAFETY AND TQM:
Now the question arises whether safety is an integral part of TQM philosophy or is it different? In the study of pillar formation in Mahindra and Mahindra for TQM implementation, various pillars shown in Fig. 1 do not explicitly show safety as separate pillar. Various pillars shown are Standardization, Policy deployment, Daily work management, Plan-Do-Check-Act (PDCA) and Kaizen. Total Employee Involvement has been shown as base of TQM pillar formation. One aspect of this approach may be that concern on safety is altogether ignored , while other approach can be that safety is integral part of all the pillars. This is a debatable issue in all the organizations where TQM is implemented. Safety management shares many techniques and methodologies with TQM but there are set of factors which do not overlap.

The concept of safety has now changed altogether. Now we talk about occupational health and safety. This is basically providing secure working conditions for employees. Safety can be considered at both individual as well as organisational level. Concept of safety has now expanded from individual level to organizational level. Organisational safety is the set of complete safety efforts and implementations throughout the whole organization taking both internal and external environments into account. The reason for this is that there are complexity of events , equipments , working conditions , stiff competition , hard targets and their complex inter relationships. Employees will perform to their optimum level in the organization, if they feel that they are safe. This obviously indicates the importance of total occupational health and safety where the word "total" means that safety issues to be considered at every level of the organization and in all activities without disregarding any organizational and production orservice related issues. This clearly indicates that the organizations especially industrial companies need to manage all activities as compact as possible to create products with good quality in safety conditions and to sustain customer satisfaction.

In Indian Perspective, there was no focus on safety in earlier times. The total period till now in India can be classified in following five periods:

- Pre-Independence Era.
- Era of Deaths.
- Era of Engineering.
- Era of Legislation.
- Era of behaviour based safety.

It was in 1881 that under the pressure of British mill owners that British government ruling India then, enacted law related to factories in India. The British Mill Owners argued to provide them fair and equal conditions for business, as the British mills were supposed to follow provisions of Factory Act enacted in 1833 while for the Indian mill owners there were no legal provisions to follow. First mill in India was set up in Mumbai in 1854. First strike was reported in 1877 in Empress Mill, Nagpur. Bombay Mill Hands Association was established by Narayan Lokhande in 1890 which demanded for weekly leave on Sunday for textile mill workers [5].

After Independence, There was era of deaths. Focus was on industrial revolution and to make India self sufficient. Although, Factory Act came into existence but focus on safety was lacking in reality. During era of engineering, help of technology was taken to avoid and reduce accidents. Many safety devices such as limit switches, micro switches, handrails and machine guardings were incorporated. All these periods had some overlapping activities.

As safety and health go hand in hand, provisions related to safety and health are incorporated almost together in various laws. There are legislations both at international and national level. Various safety and health related legislations at international level [6] are:

- Universal Declaration on Human Rights (UN, 1948.
- International Covenant on Economic, Social and Cultural Rights,(UN, 1976).
- ILO Constitution, (1919).
- ILO Declaration of Philadelphia, (1944).
- ILO Conventions and Recommendations.
- The Occupational Safety and Health Convention, 1981 (No. 155).
- The Promotional Framework for Occupational Safety and Health Convention, 2006 (No. 187).
- Seoul Declaration on Safety and Health at Work, (2008).
- ILO /WHO Committee on Occupational Heath, (1995).
- WHO Global Strategy for Occupational Health for all 1994-2000.

SAFETY AND HEALTH RELATED LEGISLATIONS AT NATIONAL LEVEL:
As there are number of provisions related to safety and health at international level, we have various legislations related to health and safety at National level to implement safety related provisions in all the organizations some of these provisions are;

- **Factory Act , 1948 [7]:**

This act is basically based on British factory act. This Act has been amended in 1954, 1970, 1976 and in 1987. The revision of 1987 came after the Bhopal gas tragedy. . The amendment demanded a shift away from dealing with disaster (or disease) to prevention of its occurrence. Provisions related to safety are given in sections 17, 21, 23, 24, 28, 32, 34, 35, 36, 38 and 45. in Factory Act are listed below;

- **Mines Act 1952 [8]:**

This act is related to persons work in mines or related work. This has many provisions related to health and safety of persons employed there. This act was amended in 1983.This act was also amended in 2011 and penalties for violation were increased.

- Dock Workers (Safety, Health and Welfare) Act, 1986
- Plantation Labour Act, 1951
- Explosives Act, 1884
- Petroleum Act, 1934
- Insecticide Act, 1968
- Indian Boilers Act, 1923
- Indian Electricity Act, 1910

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- Dangerous Machines (Regulations) Act, 1983
- Indian Atomic Energy Act, 1962
- Radiological Protection Rules, 1971
- Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989
- The Beedi and cigar workers (Conditions of employment) Act, 1966
- The Building and other Construction workers (Regulation of employment and conditions of service) Act, 1996

Despite having so many legal provisions we observe that accidents are are still happening . So, Law in itself is not self sufficient for implementation of safety provisions. This gave rise to further phase of safety .

ERA OF BEHAVIOUR BASED SAFETY:

Safety at workplace is a combination of three measurable components : the person , their environment and their behaviour. Only when these three elements are combined can workplace accidents be eliminated. The person component consists of physical capabilities, experience and training of employees. The work environment represents engineering controls, equipment, job task, work culture and adherence to legal provisions. The final , most often overlooked component is behaviour- what the person does on job? Behaviour is basically the way we do the things which is observable and measurable. Behaviour is how people act. It can be seen, measured and managed. A change in behaviour leads to change in attitude. A change in attitude leads in shaping safety culture. A behavior based safety is based on four key components;

- A behavioural observation and feedback process
- A formal review of observation data
- Improvement goals
- Reinforcement for improvement and goal attainment.

Behavioural observations provide direct, measurable information on employee's safe work practices. The data is then analysed to determine the employee's improvement in safe behaviours. The improvement between observations can be graphed and displayed for employees to view. Various type of goals can be set and worked upon.

Mr. H.W. Heinrich mooted the idea of safety triangle, which explained illustration of type of employee injuries. The safety triangle has been shown in Fig. 2. Various researchers have worked and analysed data based on injuries. By focusing on behaviours, we identify potential causes of injuries before they occur. This theory implies that, number of reportable accidents are less, but once there is change in behavior from risky behavior to risk free behavior , accidents can be eliminated altogether.

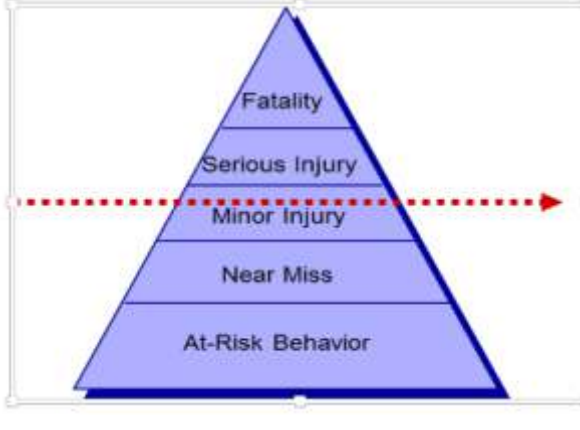

Fig. 2 Heinrich Safety triangle concept

IMPLEMENTATION OF SAFETY AS INTEGRAL PART OF TQM:

Safety has to be integral part of TQM philosophy. We must devise the the ways and methods to practically implement this. Normally, whenever we are making a product, goals are set and performance is measured against these goals. These goals must incorporate targets related to safety. Safety failures are normally not easily and readily observable. We may gather statistics of injuries, but taking measures after failures is not sufficient. Damage has already been done. Just monitoring safety failures and taking corrective actions will not lead to safe working environment. We must work on proactive strategy under the ambit of TQM . We must make note of unsafe conditions, unsafe behaviours, near miss cases and minor injuries. Intensive observation of behaviour has a firmer foundation in that unsafe behaviour has clear links with incidents and accidents so that it should be possible to determine a distribution function for unsafe acts and extrapolate it to accidents given some basis for the extrapolation. "Deming's work was rooted in engineering discipline and process control while safety grew out of the human resources function. This seemingly inconsequential difference has much to do with the state of safety in the world and why it needs to change." [9]. Safety is neither a priority nor a goal; instead it is a criterion by which manufacturers measure the efficacy of its efforts to be successful. Safety is a strategic business element that needs to be managed as scrupulously as quality, delivery, cost and morale. All the fourteen points of Deming's must be studied in detail and interpreted in terms of safety provisions too. FMEAs and other predictive tools should be used to identify areas of greatest risk and efforts should be made to reduce the risk of injuries to the lowest practical level. The true benefit in this point is the belief that it is possible and the disappointment we feel anytime we aren't successful in prevention. Preventing injuries is more efficient than reacting to them . Compliance with the government regulations is important and tends to correlate to a process that is in control. But we can never mistake being compliant with being safe. We must work on Plan-Do-Check-Act for safety incidents. Special focus must be given on safety Kaizens. We must work on developing Poke-Yoke, so that accidents do not recur.

ISSUES IN IMPLEMENTATION OF SAFETY PROVISIONS IN TQM:

Many companies claim to be having implemented TQM but that is not true if occupational health and safety are not integral part of TQM philosophy. There are clear cut and well defined metrics for productivity and quality but no clear cut safety and health objectives are set. As , existing safety and health objectives are inadequate. Senior management fails to recognise the importance of health and safety policy formulation. Expenditure on safety measures is considered as wastage. Human mindset is to take risk and save money on safety. Incompetent persons are deputed on unsafe jobs. Hazard and risk assessment is not done in proper way. Policies, plans and procedures already in existence are not implemented. Effective measurement systems to measure performance on safety parameters are ignored. Seen from a narrow production standpoint an accident is considered as an unplanned event which disturbs production and consequently results in a loss. This mindset need to be changed. Even legal provisions are ignored and compliance is shown just for the purpose of certification. Safety equipments are kept just in showcases. There is provision of safety officers and safety committee in organizations, but it hardly works.

CONCLUSIONS AND SUGGESTIONS:

Various aspects of safety have been discussed in the paper. All these aspects are related to formal sector. Despite having so many legal provisions, accidents still happen. Legal provisions should be implemented in true spirit. True data on accidents is normally not disclosed, which acts as a cause of increase in accidents. We must follow reactive as well proactive approach for preventing accidents under umbrella of TQM. TQM is an excellent philosophy which focuses on systems , improvements and data analysis. TQM tools must be applied in safety incidents Employees should be observed performing their routine task. Safe as well as unsafe behaviours must be noted and employee must be given positive feedback on the safe behaviours and non-threatening feedback on unsafe behaviours. Unsafe/Risky behaviours must be eliminated and risky behaviours must be changed into risk-free habits. Most workers in India (90%) work in the vast informal sector. The variable and insecure nature of

the work means that more and more workers are pushed into taking up hazardous and precarious employment both in the informal economy as well as informal work in the formal sector.

We must create awareness of safety at workplace. This can be done in different ways e.g. by providing training to employees, Display of safe work instructions, providing personal protective equipments to employees, writing safety slogans at different places and by conducting competition of safety slogans /posters.

Safety is a collective responsibility of employer and employee.

REFERENCE

[1]Paul Jackson, Reima Suomi, e-Business and Workplace Redesign (2004), p. 37|[2]Charles G. Oakes, PhD, Blue Ember Technologies, LLC. "Safety versus Security in Fire Protection Planning,"The American Institute of Architects: Knowledge Communities, May 2009. Retrieved on June 22, 2011|[3]Psychogios, A., & Priporas, C. (2007). Understanding Total Quality Management in Context: Qualitative Research on Managers' Awareness of TQM Aspects in the Greek Service Industry. The Qualitative Report.|[4]Anderson, J. C., Rungtusathan, M., & Schroeder, R. (1994). A theory of quality management underlying the Deming management method. Academy of Management Review, 19(3), 472–509|[5]http://www.lawisgreek.com/trade-union-history-of-trade-union-in-in|[6]Publication of International Labour Organisation , 'Health and life at work-A basic human right" , ISBN 978-92-2-122175-3|[7]Factory Act,1948|[8]Mines Act , 1952 |[9]http://www.fabricatingandmetalworking.com/2012/09/the-14-points-of-workplace-safety/2/