

# Safety in Indian Construction

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**Abstract**— This document depicts the current scenario of Indian labours working the construction industry in terms of health and safety issues. It gives a comparison on the safety principle vs the ground realities happening daily at site. Indicating clearly the need of the professionals to take the responsibility in getting acknowledge the various safety and health rules, regulations, acts and principle at the same time creating the awareness among the each other and train the industry for the betterment of the projects and humanity.

**Keywords**—*Safety Principle Safety norm and regulation, PPE, Construction, National Safety Day*

## I. INTRODUCTION

Being as unorganized sector, the fatal injury rate for the construction industry is higher than the national average in this category for all industries. A variety of hazards exist in the construction sites. Construction is an industry that requires working at ever-changing locations and work environments. Nearly 6.5 million people work at approximately 2, 52,000 construction sites across the nation on any given day (**The Hindu, Sept. 9, 2006**). Construction is one of the important economic activities in India. It offers employment opportunities to all categories of people right from highly skilled to totally unskilled laborer. In urban sector increasing numbers of workers have taken up construction work as a means of immediate employment, which provides cash earnings at the end of the day. The rural masses also migrate towards urban areas in search of job and being involved in this 2nd largest occupation. In metropolitan cities, the construction work is predominantly a male dominated economic activity due to the arduous nature of work to be performed by the workers.

Construction Industry in India is highly prone to hazards related to site activities and construction projects engage large number of contractual workers. These workers come from varied trades especially from rural areas and agricultural background who do not have proper training in construction safety also are not literate enough to forecast the unknown dangers. During execution at site, these workers are exposed to various risks involved in construction works and other occupational diseases and health hazards which cause injuries and illnesses. As a result, the construction projects get delayed due to loss of working hours and other legal hassles. This ultimately accounts for cost and time overrun. Therefore, it is essential for any construction project to have certain safety guidelines and procedure to be followed for site activities and to create awareness among the workers, site supervisor and engineers.

## II. HEALTH AND SAFETY ISSUES FOR CONSTRUCTION WORKERS

Some key health issues that construction industry workers are facing today are,

- a) Pain or injury from physical overexertion.
- b) Repetitive manual tasks, or working in awkward postures.
- c) Exposure to moulds, fungi or rodent droppings.
- d) Exposure to lead, wood dust, asbestos, paints, solvents, and other toxic chemicals or materials.
- e) Working in extreme temperatures and UV radiations.
- f) Working with hand tools, powered tools and heavy powered equipment.
- g) Excess vibration of hands, arms or body from powered tools or equipment.
- h) Stress, shift work or extended work days.
- i) Working in low illumination or at night without proper lightning arrangement.

The best way to protect workers against hazards is to control problems at the source. OSHA stated that workers must have PPE (Personal Protective equipment) that fits properly. Poorly fitted PPE may cause additional hazards. Construction safety (the intermediate phase between a finished design and a completed building) is largely the responsibility of the contractors and other site professionals. Hazard can be defined as a physical or chemical characteristic that has the potential to cause harm to people, property and to the environment. To prevent health hazards at work, all possible sources should be identified before commencement of construction work. Hazards at a construction site may come from hazardous substances used on site, and/ also environmental variables may create additional risks as heat and noise. Most construction accidents result from basic root causes such as lack of proper training, deficient enforcement of safety, unsafe equipment, unsafe methods or sequencing, unsafe site conditions, not using the safety equipment that was provided, and a poor attitude towards safety.

## III. SAFETY PRINCIPLES VS. GROUND REALITIES

*Safety Principle:* Ensuring safety at construction sites is mandatory requirement as it is directly related to welfare of staffs and contractors' workers.

*Ground Reality:* Many sites don't have the necessary safety equipment such as safety harness vest while working at heights.

*Safety Principle:* All accidents and occurrences of near-misses can be avoided by proper planning and thorough implementation of safe practices at work place.

*Ground Reality:* Planning is generally done by the labors or less experience supervisors as per their suitability and ease, without considering the risk involved.

*Safety Principle:* To increase the safety consciousness of the workforce and the supervisory staffs through continuous training and motivation towards safe practices.

*Ground Reality:* It is only reputed builders and contractors that have adopted such practices.

*Safety Principle:* Regular monitoring, inspections and safety audits will form an integral part of the safety programs at the worksite.

*Ground Reality:* Many sites do not follow such audits and monitoring to avoid the extra cost and effort.

#### IV. SAFETY RULES AND REGULATION

Construction safety in India is still in its early years because safety laws are not strictly enforced. The contractors ignore many basic safety rules and regulations from the start of any work. Although, to improve working conditions, the government has enacted specific legislations like the Minimum Wages Act, the Workmen's Compensation Act of 1923 (modified in 1962), and the Contract Labour (Regulation and abolition) Act of 1970, of which only a small amount scope and procedures are put into practice. National Building Code of India, 2005 provides guidelines for regulating construction activities for a building; across the country along with many IS codes of Bureau of Indian Standards (BIS), such as, SP70-Handbook on Construction Safety Practices for site engineers, Project Managers, and engineers-in-charge of buildings and civil works. Even then, worker's safety in the Indian construction industry is frequently pushed to the bottom in the priority list of most of the builders, contractors, and engineers while many are unaware of any such norms and regulation.

In developing countries, safety rules usually do not exist, even if it exists; regulatory authorities are unable to implement such rules effectively. Therefore, it is up to the construction professional to inculcate and concrete these safety norms in their working and ultimately setting up a desired standard. This can definitely reduce accidents that directly or indirectly reduce project cost and ultimately the delays. In India efforts should be made to raise the level of awareness among the workers and the employers about the importance of health and safety-related issues.

#### V. CONSTRUCTION ACCIDENTS

Accidents in the construction industry are costly in human and financial terms. The economic cost is not the only basis on which a contractor should consider construction safety. The

reasons for considering safety are humanitarian concerns, economic reasons, laws and regulations, and organizational image. Cost of safety is paid by the organization either through the uncontrolled cost of accidents or through the controlled cost of safety program. The uncontrolled cost of accidents includes the loss of productivity, administrative time for investigations, disruption of schedules, wages paid to the injured workers, adverse publicity, liability claims, and equipment damage. The controlled cost of safety program consists of salaries of safety, medical, and clinical personnel, expenses for safety meetings, inspections of tools and equipment, orientation sessions, site inspections, personal protective equipment, and health programs. The identification of root causes of accidents is a complex process. Accident mitigation requires a comprehensive understanding of construction process.

With increasing population and expansion of urbanization, many projects are therefore, carried in congested spaces of cities, like Mumbai, Pune, Delhi, Chennai, etc., where, not only the safety of the workers inside the site needs to be ensured but also the safety of people passing and residing in the adjacent. Still every month accidents, such as, adjoining residents being killed in mishaps, pieces of reinforcement falling and piercing in someone's body, dusty environments as a result of construction activities resulting health hazards, etc., come up which can bring a legal stay over the project and thus making errands of walks to court which instead could have been prevented if precautionary measures would have been taken.

##### A. Accident statistics

In the economic point of view, the construction industry plays a vital role as it typically contributes 10 per cent of a developing country's GNP. It is also very hazardous with almost six times as many fatalities and twice as many injuries per hour worked relative to a manufacturing industry. Helander analyze 739 construction fatalities that occurred in the UK. He found that fifty two per cent occurred due to falls from roofs, scaffolds and ladders. Falling objects and material were involved in 19.4 per cent of the deaths, and transportation equipment, (e.g. excavators and dumpers) were involved in 18.5 per cent. Helander also found that 5 per cent of construction accidents occur during excavation work. The categories used for classifying fatal accidents were:

- a) Falls
- b) Falling material and objects
- c) Electrical hazards
- d) Transport and mobile plants
- e) Other

Most of the accidents that involved falls occur during work on roofs, scaffolds and ladders. Moreover, collapses of structures and falling materials also contribute for a large proportion of victims. Many of the safety hazards are particular to the different trades, and usually construction workers underestimate the hazards in their own work which affects the motivation for adopting safe work procedures. The establishment and use of procedures and regulations to

enhance safety can avoid a large proportion of these accidents. There are also forceful monetary incentives in construction safety as it is estimated that construction accidents amount to about six per cent of total building costs; this should encourage the industry as well as the regulatory agencies to invest in construction safety.

## VI. EFFORTS IN INDIA

Efforts are taken by government by setting up, National Safety Council (NSC) which generates, develops and sustains a voluntary movement on Safety, Health and Environment (SHE) at the national level. It carries out various activities such as specialized training courses, conferences, seminars & workshops; conducting consultancy services such as safety audits, hazard evaluation & risk assessment; designing and developing HSE promotional materials & publications; facilitating organizations in celebrating various campaigns e.g. Safety Day, Fire Service Week, World Environment Day i.e. 4th March, in India, is celebrated as National Safety Day/Week every year, during which various campaigns are organized in promotion of Safety, Health and Environment (SHE) movement to different parts of the country. Apart from this, the BIS (Bureau of Indian Standards) have taken intensive researches and studies to publish many SP and IS codes, for bringing standardization, marking and quality certification of goods and for matters connected therewith or incidental thereto, acting as guidelines for construction, manufacturing, processing etc.

With increase in market competition, many construction giants are taking up modern trends and technique, such as, ISO certification, under which they are to undertake the safety of their workers, set up safety organization, issue safety policy, safety checklist, safety manuals, etc. These giants have understood the importance of safety after having gone through the adverse side effects of non-safe acts. The cost of accidents can go anywhere from low cost to tremendous high cost, which not only affects the current projects but also the upcoming project of the company. Now companies define standards for every project, for health and safety guideline. Regular health and fitness checkup for every member is carried out. Gammon India holds the record of *Twelve Million* hours of accident-free work at Kalpakkam.

## VII. CONCLUSION

Owing to increase in complexity of operations, the construction industry has become more dangerous than ever before. Construction organizations are faced with the challenge of having to closely monitor their safety

management systems to minimize occupational hazards, while simultaneously trying to sustain profits in a competitive marketplace. In the United States, government agencies such as Occupational Safety and Health Administration (OSHA) have done their part to promote a ZERO injury environment. However, in India effective safety construction management is not available. Moreover, the key to proper safety execution is not necessarily through strict guidelines and standards, but through an effective total safety management initiative, first supported by an organizations senior management, then integrated via specific safety management implementation tools/ systems, and finally by continuous follow up and monitoring to ensure quality and continuous improvement. It is the attitude of the senior management and proprietary contractors to take the initiative and start giving importance to health & safety of workers and engineers at site. Construction organizations interested in maximizing safety and competitiveness must look to Total Quality Management (TQM) initiatives for inspiration. Quality focus, total commitment, and continual improvement must be the mantra of choice. Only those companies that take on an aggressive safety management approach will sustain profit margins and achieve world-class competitiveness.

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