A REVIEW OF LABOUR SAFETY ON CONSTRUCTION SITE

[1]Shubham R. Agrahari, [2]Rajesh S. Sambhari, [3]Arpit Vyas, [4]Anuj Pawar
[1]Under Graduate 3rd year Student, [2]Under Graduate 3rd year Student, [3]Assistant Professor, [4]Assistant Professor
[1] Department of Civil Engineering,
[1] Thakur College of Engineering and Technology, Mumbai, India

Abstract: Safety on construction site is one of primary aspect to be considered in construction process of any system. Ignorance regarding safety may lead to serious injuries or fatality which may negatively impact the work environment. Protocols made to improve the safety of any worker on site in an industry are not completely followed by the workers because of some reasons which we will discuss in this paper. Casual attitude towards safety of workers on the site may increase the chances of injuries and even fatalities. Accidents occurring on construction site may be due carelessness, stress, and work pressure to meet the dead lines, due to lack of supervision or lack of safety training. In this paper, we argue that safety work is primarily a performance rather than goal-directed, thus the paper will conclude by providing a set of recommendations and strategies to contractors for improving their safety performance. The factors affecting site safety majorly comprises of the workers attitude towards safety, interlink between coworker and worker safety through safety climate, Materials and equipments causing hazard to human health, how the role of leadership involves in practices of constructions site safety, Posture and position of worker on site. The mapping of factors increases the dimension of analysis and can give much more accurate and relative to real life situation which intensify the approach for better outcome.

***IndexTerms*- Construction, Labour, Safety behavior, Accident.**

I. INTRODUCTION

In India, after farmer, the maximum number of employment is in construction industry. The number of labours working in Indian construction industry is 8.5% which is total world labour force and it contributes to 20.4% of fatal global occupational accidents, a fatality is five times more likely than in a manufacturing industry. The International Labour Organization (ILO) says that out of every 1,200 workers, 185 got injured on the construction site. To perform safety work in an organization, the safety model can be classified in four types of safety work which improve safety of work. Safety work is the body in an organization does the work to reduce safety risk management, new safety improvement methods and everything which promotes safety of a worker and structure. Whereas safety of work is the inculcating of the safety culture in the construction work which is the basic outcome of the safety work body.

Definitions

- **Safety work:** The activities which anticipate in achieving any goal through safety.
- **Safety of work:** Any activity or work which is done with achieving safety.
- **Social safety**: promoting safety as important aspect as to maintain safety as a value.
- **Demonstrated safety**: making sure that the safety practices are followed just to show the stakeholders and clients the safety of workers, showing that the organization is meeting its safety obligations.
- **Administrative safety:** is work related to increase safety measures on theoretical level, providing a mechanism for safety concerns to influence operational work.
- **Physical safety**: is work that directly affects the working interest of safety.

It is seen that the social safety just built a positive attitude and makes to think of basic approach towards safety but does not improve the safety as whole. Whereas the demonstrated safety is to make sure that the formalities regarding the safety work are satisfied and fulfilled just as a compulsory requirement for further proceedings of project from higher authority and to sustain the business even though some of the practices are not followed to maintain safety. Demonstrated safety is just to fulfill the requirements of stakeholders. Administrative safety is the enactment of controllable, repeatable and measurable safety routines. It is institutional structure which converts the goals into rigid and concrete plan. Physical safety is final stage of safety at which safety measures are implemented, which results in anticipation of safety of work.

Link between Social, Demonstrated, Administrative, Physical safety.

It is seen that the there is missing of proper link or association between each of the safety works explained above. It is seen that the social safety remains as thought in people mind but makes no use in execution of safety work. It has no direct relation with demonstrated, administrative or physical safety as in terms of formulating, screening, implementation of safety protocols as whole. Therefore it is understood that to achieve safety of work or operational safety there is need of bridging the gap between safety work and safety of work in an organization.

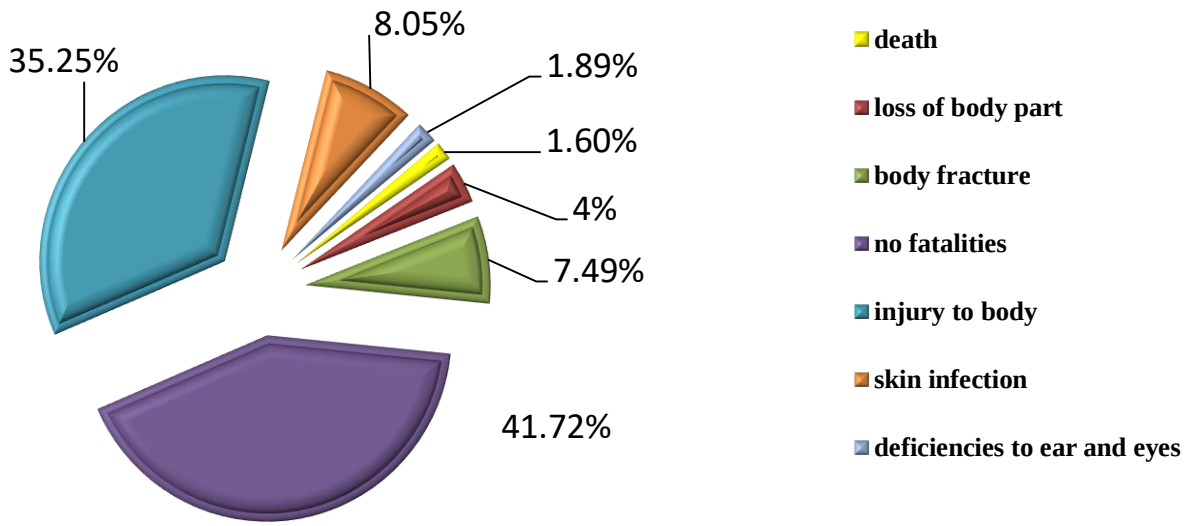

Fig 1. Average number of accidents in construction sites

II. FACTORS AFFECTING SAFETY ON SITE

2.1 Workers attitude towards safety:

Providing the sample (worker, contractor, engineer, etc) with General construction induction training (GIT).The following survey was used to find the attitude behavioral change before and after providing them with safety induction. Surveying the demographic sample (age, gender, education, experience, previous safety training) by questioning before and after the GIT (general construction induction training) based on affective, cognitive, behavioral components of attitude. The results shows that there is only 3.87% increase in following of safety protocols. It induced the positive attitude towards safety and getting more aware about safety risk and safety behavior but not caring about safety. Emotional aspect is one which creates bond between the workers in neglected to enhance in the safety training.

2.2 Safety Climate (Environment):

A work, full of positive environment converts a difficult situation into a workable, joyful and promotes safety. It also helps in understanding of positive and negative outcomes of safety initiatives. Safety climate contribute the major part in safety behavior of workers 'psychological contract' which is assumed as a consequence of social exchange theory can be introduced to capture the momentum between supervisors and workers to explore their relationships in terms of safety. Through the examination of PCS scale, both the managers and supervisors can identify how these obligations are fulfilled and how the level of fulfillment impacts the safety behavior of workers, and their behavior influences other worker's behavior, since they are working in a group. If the behavior of co-worker is aligned with the expected behavior of supervisors, then psychological contract will mediate the relationship positively.

2.3 Safety leadership practices of constructions site:

Leadership behaviors among site supervisor associated with the improved performance. Establishing effective communication positive leader–member exchanges; planning for routine/non-routine work tasks and executing effective team building; monitoring and responding to employee stress levels; directing worker tasks and responsibilities; executing disciplinary procedures and conflict resolution; managing, planning and organizing work flow; and implementing methods of safety promotion. Safety leadership can be defined as specific leader behaviors that motivate employees to achieve safety goals.

2.4 Posture and position of worker on site:

An indoor experiment was performed, wherein three volunteers are made to perform various construction activities and these activates were recorded on motion based sensors, video recorders and motion tracking devices. The various postures and position with different risk levels are assigned respectively.

- **Posture based safety risk evaluation:**

As there is difference in postures therefore it can be easily identified and recognize the risk level, but human activities are series of continues postures. Therefore it fails to give the actual result with respective ground conditions.

- **Position based safety risk :**

Position of a worker gives the accurate relation safety risk level because it is mainly relied to spatial information. For example that a worker working on the edge of the platform or at a height is more risky than working on ground level.

- **Fusion of posture and position based safety risk evaluation:**

Fusion of position posture safety risk level gives a much clearer picture of risk of working. If a worker is working on a platform but standing still whereas the if he try to reach by stretching or standing in uncomfortable or unsafe posture to complete his work is in more prone to higher risk level. Therefore the combined study of posture and position provide with proper relation between the safety risk levels than finding the risk levels of position or posture alone.

2.5 Materials and Equipments causing hazard:

Health hazards cause due to Physical injury hazards caused, such as scaffolds, power access equipment, ladders, plant and machinery for excavation, roof work, chemicals and other materials used in construction .mechanical energy such as noise, vibration, radiation and temperature extremes due to heavy equipment and machines can also cause physical injury hazards. Chemical hazards found in construction work include asbestos; welding fumes, spray paints, cutting oil mists, solvents and chemicals.

- **Chronic hazards:** This can cause death if the worker works in same condition for longer time period.
- **Acute hazards:** These not affect much to the human health. (Refer Table 1).

Table 1: Health hazard and their effects

Chronic hazards	Chronic health effect	Acute hazards	Acute health effects
Asbestos	Lung cancer	Ladder	Minor Fracture
Whole body Vibrations(WBV)	hyperventilation, increased heart rate	Roof Work	Falling from height
Ionizing radiation	skin and deep tissue burns	Caring or moving heavy tools	It may fall on other as well as on us leading major fracture
Welding fumes, grinding, blasting, etc.	Deficiencies to eyes, ears	Harmful Chemicals	Itchiness ,irritation, skin infections

III. LAWS AND REGULATION:

In India, the head of Chief Labour Commissioner deals the occupational health and safety issues under the department of Ministry of labour and Employment. Technical support in drafting model rules, carrying out surveys, and conducting training program in construction sector is provided by Directorate General Factory Advise Service Labour Institute (DGFASLI).Some of the Labour laws engaged at construction sites are as follows:

- Contract labour (regulation & operative) act, 1970,
- Minimum wages act, 1948,
- Payment of wages act, 1936,
- equal remuneration act, 1976,
- inter-state migrant workmen (regulation of employment and condition of services) act, 1979
- The building and other construction workers act, 1996.

IV. DISCUSSION

This paper approaches various steps taken by the organization or construction industry for any incident or accidents at the construction sites. By comparing safety of worker at site in different studies, it can be seen that in many cases the death or injuries are due to falling from height or inadequate safety awareness of labour and even sometimes due to the fault of the site engineer in causing incident on the construction site. This all behavior of labour, management unit, engineer, contractor and site engineer discussed in paper so that we can easily identify and avoid harm to any human life. In order to avoid the fatality, full time officers for safety can be appointed. 2-3 safety officers for site more than 50,000 m^2 would be a good approach or annual safety audit programs, awareness campaigns through various methods to make aware the workers and to get the interest of the workers some incentives will be a good choice. Test of alcohol and drugs before hands should be done. Personal Protective Equipment should be provided to each and every person visiting the site. All the campaigns and programs increases bond between workers and psychological contract will be formed which increase the level of fulfillment between the workers and higher authorities. If some new technique is introduced, then the workers need to be trained beforehand of implementing it. Use of safety harnesses training

should be conducted. Also while using pulling and plug method using iron chains to connect truck with the thrust causes breakage of chains instead we can use rope which will absorb the thrust better and prevent accidents. Roof rails can be installed instead of scissors lifts and mobile scaffolds which are faster and safer.

V. CONCLUSION

This review attempts to identify how the construction site safety can be achieved by the proper execution of safety work in any project. The study has provided possible methods to improve construction safety were identified by reviewing previous studies and summarized about the factors affecting site safety which majorly comprises of the workers attitude towards safety, interlink between coworker and worker safety through safety climate, Materials and equipments causing hazard to human health, how the role of leadership involves in practices of constructions site safety, Posture and position of worker on site. These factors may be when independently surveyed gave some results which are as follows:

- The average number of accident is 39.9%.
- At most of the site the working time is comfortable.
- From the demographic data we found that the average age of worker on site is 32 years.
- Migrant workers are ready to work for low wages.
- Safety of workers in all construction is to be improved.

The paper also conclude that only24% of worker get systematic training on safety and also, only 65% workers get occasional training and 11% are trained very rarely. It also concludes that documented safety manuals are not present at almost 60% Construction organizations. The safety training must be more of increasing bond with the subject, interactive and some practices must be carried out to increase the bond. The mapping of factors increases the dimension of analysis and can give much more accurate and relative result to real life situation which intensify the approach for better outcome.

VI. LIMITATION OF THIS STUDY

Interviews and questionnaire surveys are based on studies on the pervious professional or statistical data collected from organizations. But for making the good of the self and organization the interviewed person maybe can give false statement. So, the true responses might not reflect their actual motives and actions. Many methods are regarding safety of workers but more effective method should be finding developed to overcome this limitation. As so it is necessary to visit the construction sites and get the views of the person personally.

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