Global Scientific JOURNALS

GSJ: Volume 8, Issue 1, January 2020, Online: ISSN 2320-9186

www.globalscientificjournal.com

A Review On The Procedure For Safety Measures In Construction

[1]Majeed Ullah Khan and [2]Adeed Khan
[1,2] Iqra National University (INU), Department of Civil Engineering,
Peshawar, Pakistan.

ABSTRACT

The policy of an Agency is to make available a safe and healthful work atmosphere for all the workers whether they are permanent or temporary. The construction industry has a high fatality rate and causes various tragedies and human injuries that remains for a very long time and disorganizes the construction process. Despite advancement and improvements in safety, the construction business is still far from achieving a zero-injury goal. Construction damages will continuously have wide-ranging and adverse influence, which comprises the personal suffering of the injured/hurt laborers, construction postponements and productivity harms sustained by the construction supplier, higher workers insurance premiums that result from costly injuries. Their deterrence and even marginal saving in their cost will have significant human and financial effect. The amount of injuries and fatalities can be condensed by cheering and strengthening behavioral change. In this modern society where there is a magnificent advancement in construction industry, these fatalities are unacceptable and it makes it incompetent, with days lost due to injuries or fatalities. This review paper demonstrates the procedure for safety measures and shows that the high accidents rate is due to Five challenges or factor that significantly prevails in site safety.

Keywords: *Safety Management System(SMS), Construction Industry, Safety Performance/Routine, Accident, Construction, Health and Safety, Employee, Injury, construction workplace, contractor.*

INTRODUCTION

Construction industry is considered as one of the maximum perilous ventures among various other industry and the need for improving safety execution and well-being is a prevailing issue among professionals and analysts. From the perspective of safety and wellbeing the conditions ordinarily looked in the development business doesn't loan themselves to the level of control, Possible in different ventures where increasingly stable conditions are largely acquired. The development business is generally exceptionally enormous, complex, and unique in relation to different ventures. Subsequently it is inclined to various wellbeing dangers (Lordsonmillar and Subramani, 2014). The construction/development business has progressed quickly in the previous hardly any decades which positively affects human lives. Anyway a similar development has followed an expanded hazard for human prosperity.

The work mishaps that happen at site is a major issue for the business itself and not only for the laborers. Not just the lives and strength of the laborers are affected yet in addition there are circuitous expenses related with the development mishaps, for example, lost time expense for harmed laborers, losing of profitability, cost of supervision, decline in worker assurance, and damage to gear (Roth & Smith, 1991).Injury remuneration payment that construction laborers get is about twofold the sum that laborers in different enterprises get (Georgine et al., 1997). Despite the fact that fatalities and wounds in construction are high contrasted with different enterprises (Leigh and Robbin, 2004). Yet the death toll and injuries estimates are rarely accessible. (Waehrer et al.,2007). In spite of fact that different analysts appraises the expense of mishaps distinctively anyway all in all, construction mishap costs increases from actual cost which is 7.9% to 15%. (Everett & Jr,1996).

LITERATURE REVIEW

The writing surveys give a hypothetical foundation about Safety/welfare measures in development. Notwithstanding the noteworthy advancement since the Occupational Safety and Health Act 1970, laborers still suffers high damages and casualties in contrast with different ventures (Bureau of Labor Statistics, 2015). A survey was conducted which showed a high number of fatalities as high as 60,000 in construction industry around the globe. According to United Kingdom Health & Safety Executive (HSE, 1999), accident/ mishap is "any spontaneous occasion that outcomes in damage and harm as well as misfortune". (Heinrich & Granniss, 1959) have characterized mishap/accident as an unplanned, unexpected and uncontrolled occasion which results in damage to goods, objects and cause personal injury, loss of life or the probability thereof". The accidents in construction are very complex and somehow unpredictable. The Degree of security in this chose part of the economy isn't shown by a solitary mishap however by a lot of mishaps that have happened inside a predefined time interim (Sanchez et al., 2017). There are various health & safety guidelines available such as (OSHA) which has an exceptionally profound impact on the construction business. The physical agony,

mental pressure, and possible monetary hardship that harmed, sick, or handicapped workers and their families experience are reason enough to propel the Safety the executive's framework. Extra purposes behind overseeing security are to retain a distance from immediate and roundabout expenses brought about by business related wounds, diseases, and property harms. Strengthening behavioral change can reduce the number of injuries and death toll to a large extent. In this advanced society where there is extraordinary advancement in development industry such high fatalities rate is inadmissible, which makes it wasteful, with days lost due to disturbance. This exploration shows that the high paces of mishaps are because of a few hazardous acts in the construction industry. In order to reduce the fatalities and injuries in construction, professionals and researchers have introduced Safety management system.

(Rikhardsson & Impgaard,2004) have categorized each accident cost into three types.

Variable cost: It is the cost which the company has to pay for the lost wages.it depends on the number of days lost.

Fixed cost: This is the price that the company pays for administration and communication for days lost due to the accident.

Disturbance cost: Disturbance cost depends upon the person's status and role in company. Greater the role and responsibility of injured or deceased person in the project greater will be the cost.

Safety Management System

There are numerous definitions of safety management system (SMS) and all the organizations and other agencies have no disagreement over the definition of SMS. (Robson et al., 2007). Safety Management International Collaboration Group (SMIC) characterize safety management system/framework as "a progression of characterized, association wide procedure that accommodates successful hazard based basic leadership identified with your everyday business. (ICAO, 2007) has characterized SMS as deliberate way to deal with overseeing safety including the vital hierarchical structures, accountabilities, approaches and strategies.

Scientists have tried to present models which causes various accident, and some models have been made to prevent mishaps and spread awareness in construction regarding safety. Scientists have not just attempted to savvy accidents causation but also to discover relationship between the causation and the factors that prevails during accident which leads to fatalities and personal injuries. There are different components that adds to the degree of safety at site. For example, Human Factors. Equipment Factor, Environment Factor; Management Factor and Technical Factor. The human factor in construction mishaps is very important to understand and therefore it has been investigated broadly. It is regularly recognized that perilous

conduct triggers accident at construction site. This shows that the laborers are either clueless of the significance of safety practices or they prefer not to use defensive riggings as they think of it as an impedance in the ease of working and also working efficiency. Likewise, it was also observed that the site executives appeared not so keen on stressing the need of work force safety.

Choudhry and Fang (2008) directed research over the purposes behind risky conduct and a progression of meetings were made inside the Hong Kong development industry. Their discoveries included absence of worry for safety, inability to pursue safety systems, and absence of safety awareness. In particular, lack of engagement in safety procedures was considered as a fundamental explanation of inability to recognize perilous conditions, absence of aptitude or preparing, risky work conditions, and not wearing individual defensive hardware (PPE). It is significant that despite the fact that laborers' conduct is frequently associated with work mishaps, it is once in a while the main source. In fact, risky conduct is regularly clarified by fundamental issues, for example, inordinate outstanding task at hand, fatigue, poor work plan, poor preparing and so on.

It also include some other aspects such as the size of Construction Company, safety policy, project coordination, Economic pressure and safety culture.

Unsafe acts in construction

- Ear guard not worn (when noisy equipment and machinery is used i.e. Hilti, grinder, cutter.)
- Not wearing appropriate cloths, w.r.t work and weather condition on site.
- Lack of use of Guardrails and safety harness on high platforms.
- Not properly storing different tools or other small machinery.
- Leaving main holes uncovered or unguarded.
- Not using Air Purifying Respirators (in dusty environments).
- Absence of Safety helmets at site.
- Lack of use of Hand Gloves at site while using sharp or hot materials.
- Absence of Goggles or eye protectors while using cutting and welding equipment.
- Not wearing Protective work traction boots
- Nails left in timbers, lying here and there.

Many books, journals and articles have been published regarding safety in construction which have promoted the negative side of this industry and left an impression among the people that very less has been done to reduce the human suffering. But that is not the whole picture. There is much that has been done to improve safety management system.The UK record is an example to others in Europe, and, less obviously, in America.(Holt & Lampl, 2001).

Safety Attitudes in the construction industry are changing. This has given rise to a new vision known as '*The goal of zero injuries'*. This idea emerged because many individuals in the industry do not believe in the legend that accidents are part of the construction industry and are not predictable. The ISSA "International social security Association" is making efforts in Health & Safety worldwide. The Vision Zero activity means to decrease word related mishaps and malady with the point of arriving at zero mischief (Wustemann, 2017).

The construction accidents/mishap in early ages were quite more as compared to present era where safety is considered as an integral part of this industry and "Safety First" is the main priority. Whereas in the early ages fatalities were actually considered in the cost estimates. The contractor would assume one fatality for every half mile construction of a tunnel, or for every million dollars of money consumed by construction work, or for every two floors of building constructed.

In The days of yore there were individuals who had made up their minds that accidents are part of the construction industry and nothing can be done with it. In those early days there must have been many contractors who felt that there was nothing to be done to change these circumstances. Yet there were others who had a different vision; contractors who believed that they had a moral obligation to their employees to have a safe job and keeping their team safe and functioning (Samelson & Levitt, 1993).

PROCEDURE FOR SAFETY MEASURES IN CONSTRUCTION

A. EFFECTIVE SAFETY PLANS

Safety plan is a written document which is your framework for keeping workers safe. The safety plan should be adapted easily for specific safety need of any project. It is a detailed document and contains an injury prevention program, company safety policy, how to use (PPE) personal protective equipment, guide for how to use power equipment and other tools, emergency measures, safety responsibilities, general guidance for unexpected and unpredictable hazards, steps to be taken during an accident i.e. what to do when accident happens, how to do it, who to call etc. The objective of the policy should state that the company will take any steps necessary for protecting its workers from any hazardous condition at workplace. Many construction companies gather their activity specific safety plans into a single manual. This archive must be made accessible to each laborer taking a shot at site. The duty of safety staff is to draw up a security plan, set out rules and make any change in accordance with the arrangement, ensure compelling dissemination and upholding security using any and all means. An ever increasing number of agreements are being granted to those organizations that not exclusively can take the

necessary steps, however it do securely. This implies you must be readied. You need a "safety plan."

B. SAFETY TRAINING AND MEETINGS

Security preparing is a basic piece of any wellbeing and wellbeing program. Security faculty and site laborers ought to be prepared to perceive and control danger, and to empower safe practices so they can work all the more cautiously and be increasingly gainful. New representatives must be advised on security issues before heading off to the worksite. All representatives ought to be given with individual defensive hardware (PPE), prepared in appropriate utilization of PPE, and acquainted with those circumstances that require its utilization. Moreover the workers or employee should be encouraged to bring forth into the consideration of the management about any issue regarding safety. Each and every accident should be reported to the site in charge no matter how small or minor it may seem. The workers should be educated about what steps were to be taken when accident happens, who will investigate the accident and how he can be informed.

It is not necessary to educate the workers in a classroom setting, effective training can also be provided in daily toolbox discussions, peer-to-peer training, worksite demos and on-job training. The training time should be properly managed. If the meeting is held once a week, keep it short as much as 20mins, if once a month then keep it 45min max. The safety meeting in construction work are usually informal and lasts for 10-15mins. The workers should be trained in their native language or which they can easily understand.

C. FIRSTAID AND MEDICAL ARRANGEMENTS

First aid is provided in case of an injury which is the initial medical respond for treatment and is provided immediately. The person providing the first aid is known is first aider. First aider is a person who has accomplished safety course or training and has health and safety executive HSE certificate. At least one First aider is required for every 50 employees at construction site. The gear in the First aid includes first aid box and other apparatus such as foil blankets, hemostatic dressings, tourniquets, disposable aprons and individually wrapped moist wipes. The facilities needed for directing first aid are rooms for treatment, supply of clean drinking water and health facilitation center. It can help prevent further worsening of an injury. Clearly, making the right first aid response when incidents happen is very important. It could literally save worker’s life. It should be noted that first aid does not include tablets and medicines. Only aspirin is allowed for the reason to tackle any heart attack. The employer is responsible for providing first aid facility at site all the time. These medical facilities must be provided regardless the size of the project.

(H&S)Health and Safety (First Aid) Regulations 1981 concluded that all construction sites must have:

- A medical aid box with enough hardware to deal with the number of laborers on location;
- An individual who is medically trained to take responsibility in case medical aid is required when accident happens.
- The laborers must have information regarding the first aider name, contact number and where to find him.

D. MANAGEMENT POLICY

The Safety & health policy should be effective in such a way that sets strict and clear directions for the company to follow. The management policy or obligation towards safety at workplace is very important for the deterrence of accident. It is the responsibility of the management to issue an effective safety plan for the ongoing construction project and provide the workers with personal protective equipment at site. The safe working environment can be improved by giving rewards and incentives to the workers for maintaining safety order at site. These policies will help in improving construction safety and also contribute to the improvement of business performance. An effective management structure and arrangements should be put in place for delivering the policy. All of these accident protective measures and many more are required to efficiently avoid or reduce the incidence of accident on sites and to encourage and enforce a safe environment for all the workers and employees.

Based on the Research study there are five significant factors that are related to construction safety. They are as follows,

I. Human Factor

(1) Attitude of laborers towards wellbeing
(2) Safety preparation of laborers.
(3) Safety conduct of laborers.
(4) Experience and abilities of laborer.
(5) Education degree of laborers.
(6) Safety experience and abilities of contractual workers and managers.
(7) Safety disposition of temporary workers and administrators.
(8) Safety training and learning of Contractors and administrators.
(9) Effective correspondence and participation.
(10) Number of laborers on building locales.
(11) Movement of laborers on building locales.

II. Equipment Factor

(1) Personal protective equipment (PPE).
(2) The available choice of working equipment
(3) Maintenance rule for all equipment and plants
(4) Fitting and disassembling of plant and other equipment.

III. Management Factor

(1) The health care file.
(2) Arrange Safety meeting.
(3) Safety management obligation/ assurance.
(4) Enforcing Safety rules and regulations.
(5) Safety fines and incentives.
(6) Safety inspection, guidance and safety manual.
(7) Distribution of safety responsibility.

IV. Environment Factor

(1) Complication of geology and hydrology of area.
(2) Rate of recurrence of adverse weather.
(3) Tight Timetable and cost pressures.
(4) Complexity of surrounding environment.

V. Technical Factor

(1) Identifying and analyzing safety risks.
(2) First aid and emergency awareness.
(3) Type and technique of construction.

RESEARCH METHODOLOGY

A literature search of publications was performed using general, engineering and other related search engines.45 journals and articles were found, among which 25 articles were on safety, 15 articles were on safety and quality and 5 articles were regarding quality in construction.

Collectively all the literatures support the use of construction safety management and practices, its application, the scope of work and the construction industry itself.

CONCLUSION

The study reveals that the construction industries are more hazardous than other industries and has a potential for high fatality and accident rate. These accidents are due to various significant and prevailing factors which effect safety in the construction business. The study also reveals that coincidences are caused due to some unsafe acts which include not wearing of hand gloves, ear defender, safety boots and eye protector etc. Therefore dedication is required to promote and enhance safety level in this industry. These accidents can be reduced by reinforcing safety behavior and understanding safety culture. The stakeholders can also play a vital role in promoting procedure for safety measures in its management system. The safety measure include safety plan, safety training, first aid facility and management policy. The study shows that the construction accidents not just consumes workers life but it has a direct and indirect cost to it. This include price of lost time for wounded labors, damage of production, managerial time loss, reduction in laborer confidence and cost of equipment loss. By educating the workers regarding safety and rewarding the worker for every month passing with zero injury can also aid to the level of accident reduction.

World day of safety and health in construction is celebrated on April 25, 2018.

References

Bureau of Labor Statistics (BLS). (2015). Census of Fatal Occupational Injuries (2003–2014). ⟨http://www.bls.gov/⟩ (15/3/2015).

Choudhry R. M. and D. Fang (2008). Why operatives engage in unsafe work behavior. Investigating factors on construction sites. *Safety Science* 46(4): 566–584.

Everett, J. G. and P. B. F. Jr (1996). Costs of accidents and injuries to the construction industry. *Journal of construction engineering management. 122*(2): 158-164.

Georgine, R., et al. (1997). Construction Chart Book, The United states Construction Industry and its Workers. The Center to Protect Worker Rights, Washington, DC.

Health & Safety Executive (HSE) (1994). The Construction (Design & Management) Regulations 1994, HMSO, London.

Holt, A.S.J., F. Lampl (2001). Principles of construction safety. Blackwell Science Ltd, Southampton, England. *Wiley Online Library* 1-5. ISBN-10: 1-4051-3446-1.

Heinrich, H. W. and E. Granniss (1959). "Industrial accident prevention."
ICAO, S. (2007). Safety Management Manual. ICAO. Geneva.

Lordsonmillar, R and T. Surbramani, (2014). Safety management analysis in construction industry. *Journal of Engineering Research and Applications* 4(5): 117-120. ISSN: 2248-9622

Leigh, J. and J. A. Robbins (2004). Occupational disease and workers compensation.
costs, coverage and consequences. Milbank Quarterly 82(4): 689-721.

Ms. Saman Khalil. Importance of occupational health and safety management practices.

Nancy, M. Samelson and Raymond E Levitt, (1993). How Safety Save Lives and Money, Construction safety management, *2nd Edition, john wiley & sons.inc,* 1-5. *ISBN* 0-471-59933-6

Rikhardsson, P. M. and M. Impgaard (2004). Corporate cost of occupational accidents: an activity-based analysis. *Accident Analysis & Prevention 36*(2): 173-182.

Robson, L. S., et al. (2007). Effectiveness of occupational health & safety management system interventions. Systematic review. *Safety Science* 45(3): 329-353.

Roth, R. D and G. R. Smith. (1991). Safety programs and construction manager, *Journal of Construction Engineering and Management* 117(2): 360– 371

Safety Management International Collaboration (SMIC, 2010).

Sanchez, F. A. S., Pelaez, G. I. C. and J. C. Alis, (2017). Occupational safety & health in construction: a review of applications and trends. *Industrial Health* 55: 210-218.

Waehrer, G. M., et al. (2007). Costs of occupational injuries in construction in US. *Accident Analysis & Prevention* 39(6): 1258-1266.

Wustemann, L. (2017). First global Occupational Safety and Health (OSH) campaign. IOSH Magazine

Safety, Health and Wellbeing in the world of work.

https://www.ioshmagazine.com/article/first-global-osh-campaign-focuses-zero-harm