

## ASSESSMENT AND ANALYSIS OF SAFETY MANAGEMENT IN THE CONSTRUCTION INDUSTRY

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### ABSTRACT

*The world has witnessed a major development in the construction world, including skyscrapers, offshore installations, mega factories, and many more, but with these developments. As a result of this increase in construction, the number of workers injured and killed in the construction industry has increased due to a lack of attention to occupational health and safety. Statistics indicate that there are (350,000) deaths and (270 million) injuries each year. Therefore, it was necessary to find a solution to reduce the occurrence of these incidents. Through the Department of Health and Safety in the construction industry, which works to monitor the achievement of occupational health and safety in the construction industry through the establishment of educational courses for workers on how to avoid accidents and what are the measures to reduce them, also each participant in the project will be discussed to know their roles related to health and safety, as will be discussing site safety requirements, this paper aims to study and analysis the causes of accidents at the construction site and provide solutions to manage these causes and reduce the accident rate.*

**Keywords:** Health and safety, management, construction industry, fatalities in construction industry.

### INTRODUCTION

The construction industry is one of the most common industries where workers are injured and death, as this industry includes a lot of dangerous work including building skyscrapers, an offshore platform and many others. From this standpoint, the Occupational Health and Safety management is the goal that must be cared for.

The construction industry has a good reputation as a result of businesses and mega installations, but it remains one of the most dangerous industries. Incidence and death rates are high worldwide, in 2015 there were 985 deaths, the cause of the high rate of accidents and the death rate in the construction industry it was necessary to analyze and discuss the causes of these accidents and work to reduce them in order to preserve the health and safety of workers by training workers to avoid these accidents, in addition to training each person for his specialized work in it.

Since the beginning of the year 2001, the number of OSH publications related to occupational health and safety has increased, and this study indicates that there are methods to reduce accidents in the construction industry. The problems are, first problem is lies in determining the causes that result from these accidents in addition to classifying them, as it became clear that the causes of accidents and deaths in the construction industry, and the second problem is

how to reduce these accidents, and how to organize the work and of the project so that the workers can build a business plan compatible with the health and safety awareness of the construction industry.

## **METHODOLOGY**

There are many causes that lead to accidents in the construction industry, most notably what is mentioned in the chart below. These reasons will be discussed and attributed to each of them in 2015, also the solution to reduce the percentage of this causes.

### **Fall to lower level**

As it's mentioned in the chart [Figure 1] there is two types of falling, the first one to lower level which has a percentage of 35.8% of total death accidents, the second type is falling to the same level which has a percentage of 1.4%. There are many reasons that causes fallings accidents in the construction sites such as leakage of self-caring for labors, missing the training courses for labors of how to follow the safety rules while working in a high rise environment, missing the safety officer checking, and a lot of another reasons but this is the major causes. Anna Smolarz., (2019).

### **Transportation**

The percentage of transportation accidents in 2015 as shown in the chart was 26.7%, it's meant by transportation in the construction site is moving the labors and construction material. The main cause of this type of accidents is using an old equipment for transporting labor and materials. Fan Zhang et al. (2018).

### **Contact with objects**

As it's showing in the chart the percentage of contact with objects accidents in 2015 was 16.9%, this type is the impact of equipment on workers or the process of stumbling up workers with equipment on the ground, resulting in injury to the worker. Ulubeyli, S. et al. (2014).

### **Exposure**

The percentage of exposure accidents in 2015 was 14.1% this type of accidents it is the deaths of labors causes by electric shock while extending the electrical power at the construction site, Mechanical injuries examples when using cutting and welding equipment and labors are exposed to dangerous chemicals that cause great harm to workers. Vitharana, V.H.P. et al., (2015).

### **Other**

The percentage of this type was 5.1% this type it is like the death of labors because of a healthy symptom for example and every different causes because of reasons other than the previous reasons. Naujalis, J. (2009).

## **CAUSES OF INJURY AND DEATH IN THE CONSTRUCTION INDUSTRY, AND THE SOLUTIONS**

### **Accidents (laws of Occupational health and safety).**

#### ***Causes of injury and death in the construction industry***

There are many causes that cause accidents in construction work, but there are two main reasons, The first is the lack of knowledge that workers need about the importance of health and safety and avoiding accidents, and the second reason is the lack of responsibility of workers on the one hand and those responsible for monitoring workers if they work according

to the public professional job on the other hand, health and safety conditions, and therefore lack of responsibility, may expose many Injury and death in the construction industry, because a mistake in an industry such as the construction industry may lead to catastrophic results. In addition to the mentioned reasons, there are many causes that lead to accidents, including Abdul Rahim Abdul Hamid et al. (2008), International Labour Organization (2005):

- i. Using equipment and machines that are not working (any defect often leads to injury or death to the crew, especially large equipment such as cranes and bulldozers).
- ii. Forcing workers to workers outside their jurisdiction.
- iii. The absence of a special area far from the construction site for chemicals and flammable materials.
- iv. Lack of safety guidelines that help workers know that there is a risk in the location of safety guidelines.

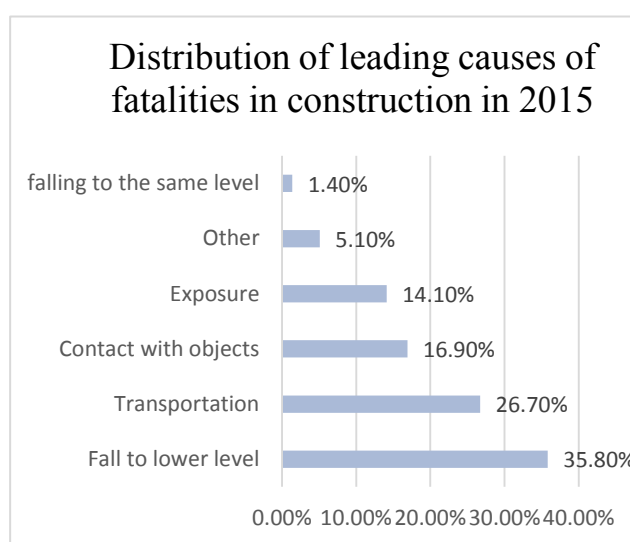


Figure 1. Distribution of leading causes of fatalities in construction in 2015.

### Solutions to reduce accidents (laws of Occupational health and safety)

There are many laws related to health and safety, which in turn work to reduce the incidence of accidents, including Helen Lingard. (2013):

- i. Conducting medical examinations for new workers to ensure that they enjoy good physical and mental health in addition to periodic medical examinations for all workers, engineers and officials to reduce the spread of infectious diseases.
- ii. Establish a place far from the workplace to prepare and provide food for workers.
- iii. First aid courses so that the staff can provide assistance to anyone who is injured while ensuring the validity of the medical materials used.
- iv. Providing a special area away from the workplace for chemicals and flammable materials. In the event of an accident in this area, the workers are safe.
- v. Learning courses for workers and officials to avoid accidents and deal with them.
- vi. A constant reminder to workers and to everyone about the importance of following general OSH laws and the conditions. Titas DE et al. (2013), Titas, D. (2013).

## **Health and safety duties and roles**

### ***General duties***

A safety designer or contractual worker delegated to take a shot at a venture must have what it takes, information and experience. On the off chance that they are an association, the authoritative ability is important to satisfy the job that they are delegated to attempt, in a way that makes sure about the safety and security of any individual influenced by the venture. Additionally, it's significant that the individual with an obligation or capacity under these Regulations must help out some other individual chipping away at or comparable to a venture, at the equivalent or a bordering building site, to the degree important to empower any individual with an obligation to satisfy that obligation. In a similar time, an individual taking a shot at a venture heavily influenced by another must answer to that individual anything they know about according to the undertaking which is probably going to imperil their own safety or security or that of others. It's imperative to make reference to that any individual who is required by these Regulations to give data or guidance must guarantee the data or guidance is conceivable and given when is practicable. Baxendale, T., & Jones, O. (2000).

### ***Client duties related to health and safety***

The client should ensure that all the development work should be possible without dangers to the wellbeing or security of any work influenced by the task and the offices prerequisites gave, in regard of any individual doing development work while thinking about the wellbeing as a central matter while picking. The customer likewise should ensure that the chief planner readies a wellbeing and security document for the undertaking which follows prerequisites and guidelines. Choudhry, R. et al. (2008).

### ***Consultant duties related to health and safety in the pre-construction phase***

The Consultant must arrangement, oversee and screen the pre-development stage and organize matters identifying with safety and security to guarantee that the task is completed without dangers to safety or security. The important planner must liaise with the primary temporary worker for the span of the chief creator's arrangement and offer with the main contractual worker data pertinent to the arranging, the board and observing of the development stage and the coordination of safety and security matters during the development stage.

### ***Duties of a main contractor related to health and safety at the construction phase***

The main contractor must arrange, supervise and examine the development stage and organize matters that determine safety and security during the development phase to ensure that the development work is completed without health and safety risks. The main contractor should contact the main engineer for the duration of the project and the consultant and provide it with the vital data of the originator applied to the executives, note the pre-construction phase and coordinate safety and security affairs during the pre-construction phase. The main contractor must facilitate implementation by temporary workers with legitimate preconditions related to safety and security, and ensure that companies to secure workers, likewise, the main contractor must ensure that a reasonable site is accepted, security measures are taken to prevent unauthorized persons from reaching the construction site. Toole, T. M. (2002).

### ***Main contractor's duties to consult and engage with workers***

The main contractor must take action paths that would enable the main contractor and workers involved in development work to collaborate effectively in creating and verifying the

feasibility of measures to ensure safety and security and government assistance to workers and advisors of these workers or their agents at issues related to the mission that may affect Their safety and health, to the extent that they or their delegates have not been relatively advised by their companies, likewise, it is important to ensure that these workers can investigate any data held by the main contract-based operator or take hard copies Originally from them to insure their rights, or that these regulations require submission to the main contractor, which determines the health or safety of workers or government assistance on site. Mitropoulos, P.; Memarian, B. (2012).

### **Plan in construction phase, health and safety file**

At the pre-development stage, and before starting up a building site, the main contractor must draw up a development stage plan, or make courses of action for a development stage intend to be drawn up. At the development eliminate plan must set the safety and security plans and site rules considering, where fundamental of the mechanical exercises occurring on the building site and where material. The consultant should have contact with the main contractor to set up the development stage plan by giving to the main contractual worker all data the important architect holds that is pertinent to the development stage plan including a pre-development data got from the consultant and any data got from client, Throughout the undertaking the principal contractor must guarantee that the development stage plan is suitably looked into, refreshed and re-examined every once in a while so it keeps on being adequate to guarantee that development work is completed without dangers to safety and health to the workers. During the pre-development stage, the consultant needs to set up a safety and security record suitable to the attributes of the undertaking which must consist of data identifying with the venture which is probably going to be required during any consequent task to guarantee the safety and security of any individual and must guarantee that the health and safety document is properly inspected, refreshed and reconsidered every once in a while to assess the work and any progressions that have happened.

At the task time, the main contractor should let the consultant aware of any data in the main contractor ownership applicable to the safety and security record, for incorporation in the safety and security document. Dawson, S. et al. (1985).

### **General requirements for all construction sites**

A contractor completing development work must agree to the necessities influences the temporary worker or any specialist heavily influenced by the contractor or identify with issues inside the contractor's control. [16]

### **Safe places of construction work**

The spot of construction should be reasonable and adequate safe access to and departure from each building site to each other spot accommodated the utilization of any individual while grinding away, and each spot development work is being completed to each other spot to which laborers approach inside a building site. A building site must be made and remained careful for, and without dangers to the strength of an individual grinding away there. In addition to that, the site must have adequate working area and be under control so it is reasonable for any individual who is working there, assessing any fundamental working tools to be utilized there.

### **Material order and site security**

Each piece of a building site must be maintained in acceptable control and those parts in which development work is being completed must be kept in a sensible condition of tidiness. Additionally, it is important in light of a legitimate concern for safety and security, a building

site must and as per the degree of hazard presented, conform to its border distinguished by reasonable signs and be organized with the goal that its degree is promptly recognizable or to be fenced off. No timber or other material with anticipating nails or comparative sharp item should be utilized in any development work, or be permitted to stay in wherever, in light of the fact that the nails or comparable sharp article might be a wellspring of peril to any individual.

### **Structure stability**

Every practicable advance must be taken, where important to forestall threat to any individual, to guarantee that any new or existing structure doesn't crumple if, because of the completing of development work, it might get precarious. structure must be of such plan and introduced and kept up to withstand any predictable burdens which might be forced on it, and just be utilized for the reasons for which it was planned and introduced and is kept up, the structure must not be so stacked as to render it risky to any individual.

### **Demolition or dismantling**

The destruction of any structure or part of it should be arranged and done in such a way as to forestall peril to decrease risk to the lowest level as is sensibly practicable. The plans for doing such destruction should be recorded as a hard copy before the destruction work starts.

### **Excavations**

Every practicable advance must be taken to forestall risk to any individual, Suitable and adequate advances must be taken to forestall any individual, work gear, or any collection of material from free falling over any uncovering or over-burden by work hardware or material. Additionally, it ought to be viewed as the individual who did the investigation is fulfilled that development work can be securely completed there. Where the individual doing a review educates the individual for whose sake the investigation is completed of any issue about which they are not fulfilled, development work must not be done in the unearthing until the issue has been acceptably cured.

### **Roads and Traffic routes**

One of the reasons that may lead to accidents in the workplace is traffic and the intended destination is the movement of mechanisms on the one hand and workers on the one hand. In most cases, in the absence of traffic regulation, the rate of accidents increases, and for this reason health and safety officials must organize traffic.

Traffic is by specifying paths so that roads are separated and divided into two parts, one for workers and the other for vehicles and construction equipment.

### **Emergency routes and exits**

Risks and accidents at the construction industry exist and cannot be ignored, but it is possible to reduce its percentage and risks. One of the most important measures that must be taken and implemented and secure are the emergency exits. In the event of an accident in the workplace, workers can cross into the safe area by using these exits.

The emergency exits are considered one of the most important principles and conditions of the Occupational Health and Safety management. The presence of these exits works to protect the lives of many workers and prevent a catastrophe due to the large number of workers in most projects.



### **Fire detection and fire-fighting**

As previously mentioned, the occurrence of accidents in the workplace cannot be ignored, but what is possible is to reduce its percentage, among the types of accidents that are very well known in the construction industry are fires, and it is one of the most dangerous types that may cause massive damage to material and human beings and in most cases it is the cause of a great fire a small spark Here, the Health and Safety management lies at the construction industry. It is a simple solution that works to reduce the prevalence of what is tampon and the distribution of special equipment for extinguishing fires and the distribution of this equipment must include the entire project perimeter while taking into account the work of periodic checks for this equipment to ensure that it works in a manner Good and can be Use in the event of any fire.

### **Temperature and weather protection**

Most of the time, workers work in difficult environmental conditions such as very high and very low temperatures. In addition to working in places where there is little air, these conditions often lead to diseases that may be permanent in some cases, and sometimes they may lead to the death of some workers. For these reasons, environmental conditions must be studied prior to commencing work and working to reduce work hours in order to preserve the lives of these workers in terms of high or low temperatures. Either in the absence of sufficient and fresh air, a pump must be used to pump air to the workers 'location in this way the workers are protected. From any damage may it is caused by these conditions.

There are many reasons that may lead to accidents, in addition to the reasons previously mentioned. The important thing is to highlight the necessity of having a dedicated team in the Occupational Health and Safety management special for each project and its main task is to secure and monitor appropriate working conditions to achieve health and safety and reduce accidents.

### **CONCLUSION**

One of the most important goals in health and safety management that must be achieved before and during work is to analyse the risks that may cause accidents in the construction industry and work to manage them. Therefore the solution to manage the health and safety accidents and reducing their percentage to preserve the health and safety of all project workers in the construction industry is following the general OSH laws and health and safety duties and roles that allows all of the employees that there are responsible for project implementation to know their responsibilities on health and safety.

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