

## Amelioration of safety management in infrastructure projects

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### ABSTRACT

Accidents are a major public health concern, resulting in an estimated 1.2 million deaths and 50 million injuries worldwide each year specifically, the relationships between drivers' characteristics and road accidents are not fully understood. Many factors are involved in the accident occurrence at construction site. Some important elements that create a significant portion of accidents include: safety management error, poor training programs, human element, act of god, outdated procedure and no clear monitoring policy. Although some of these items are inevitable, but the occurrence of the largest part can be prevented. Therefore, for ameliorating the safety in a project each of these items should be analyzed and a practical approach introduced. In general, near miss, incident and accident are three dependent levels that mainly lead to injury. Risk and hazard are allocated in first level which means near miss, therefore, no on-time identification of hazard and risk causes to create incident and preventing accident in incident stage is unavoidable.

**Keywords-** Accidents, Continuous amelioration, Health ,Safety execution, Safety,

### I. INTRODUCTION

Construction work covers many activities, techniques, materials and hazards and it is this diversity that increases the probability of accidents' occurring. The higher rate of accidents and fatalities in the construction industry could be due to the nature of the work. Nonetheless, factors such as poor planning, inadequate safety training, lack of supervision, lack of safety incentives, and insufficient incident investigation are likely to amplify the problem. Health and safety is relevant to all branches of industry. It is particularly important for the construction industry which is among the most exposed sectors when it comes to occupational accidents. The construction workers are one of the most vulnerable members in a project and are faced with a wide variety of hazards during their work. A common approach for prevention of construction accident is to predict the upcoming event under given circumstances. The accuracy of such predictions is based on knowledge about past accidents. It has been proved that the main reasons for accidents in the construction industry are resulted from the unique nature of the industry, human behavior, difficult work-site conditions, and poor safety management which result in unsafe work methods and procedures

### II. MAIN FACTORS CONTRIBUTING IN SAFETY DEVELOPMENT

In general there are several items which influence the safety performance that should be analyzed and specified in design and pre-

construction stage in order to increase safety. In their research the impacts of the historical, economical, technical, procedural, organizational and environmental subjects are recognized in terms of how these items are connected to the level of site safety. Study conducted by Evelyn, Florence and Adrian (2005) [3], the results of a postal survey of contractors in Singapore discussed. The obtained results of this research showed that site accidents take place when there are insufficient company policies, unsafe procedures, poor attitudes of construction personnel, low efficiency in management commitment and inadequate safety knowledge and training of staff. The study recommended that project managers must pay more attention regarding the factors determined above to enhance safety performance on construction sites and alleviate the frequency of accidents. From the above investigation, it can be understood that having the right policies in conjunction with safety management associated in design and pre-construction phase can greatly reduce accidents. One way that an owner should apply is to hire contractors who have proved a record of good safety execution. In the following section we will discuss on the main elements of amelioration safety in construction project.

#### 2.1 RISK CONCERNS

This approach will be applied by assessing the relationship among the stakeholders, The public, the final users of the facilities and the environment. This strategy will concentrate what can happen, how and

why it can happen in the implementation of the tasks. It will also focus on separating acceptable risks from the risk of dangerous activities. It will also focus on separating acceptable risks from the risk of dangerous activities. Moreover, the level of risk will be classified by comparing the severity and probability. Therefore, they can be ranked for further analysis. Finally, a wide range of options for treating risk will be determined which aim to reduce, eliminate or omit the risk.

## 2.2 TRAINING STRATEGY

In order to improve the quality of safety and health in a large scale, the management level should consider a systematic and comprehensive safety approach at construction site. This approach should be clearly explained by specific procedure for each hazardous activity which has been identified in design stage. The process should be clear and understandable for everyone. Moreover, the organization should hold safety and health training program for new employees. Workers who are properly trained would make a correct decision in deal with incidents associated with their workplace.

## 2.3 REWARD POLICY

The safety based on incentive program reinforces the reporting of accidents. The policy within the organization should be based on the prevention of accident, not punishment after any accident take place. The rewarding system can be monetary (economic type) or job promotion.

## 2.4 MANAGEMENT COMMITMENT TO THE IMPLEMENTATION OF SAFETY CULTURE

The policy selected by manager in relation to safety issues is effective in the development of safety level within an organization. Defining clear procedures and providing safety standards such as the Occupational Safety and Health Act 1970 (OSHA) will help to run process properly.

## 2.5 CONTRACTOR COMPLY WITH SAFETY REGULATION

While hiring contractors we/ client must check with a record of good safety performance during the bidding process is prioritized by client. Contractor attitudes toward safety range from minimal compliance to total commitment, so concerned owners should consider past safety performance of contractors during the bidding process and when awarding the contract. Owners must make sure that Contractors recognize their contractual responsibility to perform safely. Owners can implement following strategies to achieve better safety performance such As

- Discuss about safety issue at regular meetings between owner and contractor.
- Develop safety monitoring during construction.
- Providing a permit system regarding the potentially hazardous tasks.
- Force the contractor to allocate an accountable supervisor to coordinate safety on the site.
- Identify safety rules and guidelines that the contractor must comply.

## 2.6 PROVIDING SAFE EQUIPMENT AND TOOLS

Use of safe machinery and facilities is essential to maintain the health and safety of site personnel. By the advent of technology in the construction industry. Although this approach has reduced the large number of accidents, but at the same time it causes new type of accident. For instance, new workers who are not familiar very well with the technology of plants and facilities cause accident in construction projects. To overcome this problem new control techniques has been emerged in the form of emergency switch operated by workers to control the operation. With proper arrangement of machinery and exact implementation a large percentage of hazards will be omitted. In a construction project the issues of re-design and re-engineering the work station altogether will help to eliminate dangerous incidents.

## 2.7 PERSONNEL SELECTION

Some employees are more accident prone than others while some other employees have a preventive attitude toward accident such as due to personal mismatch, social deviance, impulsive behavior, family stability, alcohol and drug test that should be examined and analyzed in finding prospective employees.

## 2.8 DEVELOPMENT OF SAFETY EXECUTION

- Creating safety and health regulation
- Identify hazard
- Assess and evaluation risk
- Decide precautions

## III. CONSTRUCTION SAFETY RULES 3.1 CREATING SAFETY AND HEALTH REGULATION

- Safety policy is contained some notification that exhibit responsibilities are as below
- Emphasize to use suitable clothe and safety equipment

- Assign personnel according to their ability and skills
- Create compulsory entrance regulation to site for regular people
- Provide reliable method and procedure for doing work
- Provide needed information, training, and instruction regarding to site condition and type of the construction project
- Provide safe tools and equipment

### 3.2 IDENTIFY THE HAZARD

Hazard can cause different injuries to the workers and sometimes can cause death. Therefore, identifying the hazard is important to control risk and decreasing accident in site. In site all the materials, equipment, machineries, and also work activity can cause hazard. Therefore, we have to evaluate work place and work activities to identify hazards or find the resource of hazards. Hazards can be physical, healthy, chemical, biological, and humanitarian. All the employees must be informed about the hazards that can existence in the site regarding type of work. Record of previews accident, experience of the expert people, and different kind of standards can assist employees to determine the resource of hazard. Furthermore, we can use professional people to provide safety statement and identify hazards but the advisor is required to know about the situation, kind of work and must have an adequate experience.

### 3.3 RISK ASSESSMENT

Risk assessment must be done by own employees in the work therefore, if the experience and expertise of the worker is not enough; the company must provide the competent person to assist them. There are different quantitative and qualitative risk assessments that we have to choose suitable one regarding to the project and site condition

### 3.4 DECIDE WHAT PRECAUTIONS ARE REQUIRED

- Enough training for worker
- Provide reliable inspection
- Availability of emergency aid
- Availability of protective equipment
- Using safeguard in high level
- Using skilled worker

Most of the times ameliorating safety and start to protect from the hazard is no so expensive but it is creativity, for example using non slip material in

slipper surface or sometimes change the method and procedure to do the work can be useful.

## IV. AUXILIARY CONSTRUCTION SAFETY RULES

All of our safety rules must be obeyed. Failure to do so will result in strict disciplinary action being taken.

- Keep your mind on your work at all times. No horseplay on the job. Injury or termination or both can be the result.
- Personal safety equipment must be worn as prescribed for each job, such as: safety glasses for eye protection, hard hats at all times within the confines of the construction area where there is a potential for falling materials or tools, gloves when handling materials, and safety shoes are necessary for protection against foot injuries.
- Precautions are necessary to prevent sunburn and to protect against burns from hot materials.
- If any part of your body should come in contact with an acid or caustic substance, rush to the nearest water available and flush the affected part. Secure medical aid immediately.
- Watch where you are walking. Don't run.
- The use of illegal drugs or alcohol or being under the influence of the same on the project shall be cause for termination. Inform your supervisor if taking strong prescription drugs that warn against driving or using machinery.
- Do not distract the attention of fellow workers. Do not engage in any act which would endanger another employee.
- Sanitation facilities have been or will be provided for your use. Defacing or damaging these facilities is forbidden.
- A good job is a clean job, and a clean job is the start of a safe job. So keep your working area free from rubbish and debris.
- Do not use a compressor to blow dust or dirt from your clothes, hair, or hands.
- Never work aloft if you are afraid to do so, if you are subject to dizzy spells, or if you are apt to be nervous or sick.
- Never move an injured person unless it is absolutely necessary. Further injury may result. Keep the injured as comfortable as possible and utilize job site first-aid equipment until an ambulance arrives.
- Do not enter an area which has been barricaded.
- Defective ladders must be properly tagged and removed from service.

- Open fires are prohibited.
- Never throw anything "overboard." Someone passing below may be seriously injured. Know what emergency procedures have been established for your job site. (Location of emergency phone, first aid kit, stretcher location, fire extinguisher locations, evacuation plan, etc.)

## V. FUTURE WORK AND APPLICATIONS

Due to the fact that complexity and extension of construction projects are increasing, we require to

Study causes of accident in more detail in near future. This objective is obtained when management and experts consider the following in the construction workplace:

- Providing new methods in construction and planning such as Building Information Modeling Methodology and IBS technology.
- Providing a high level of safety training for employees.
- Avoiding the use of outdated equipment and plants during construction stages.
- Improvement of site condition

## VI. CONCLUSIONS

Overall, the employer is responsible for health and safety at any work location, and may designate a supervisor or manager to coordinate those efforts. They are the ones responsible for following safety guidelines and providing the right safety equipments and PPE or personal protective equipments. But workers too have a responsibility in managing their own and their co workers health and safety.

It is clear that enhancing safety execution in construction site is not easy but possible. In this paper we mentioned different elements and strategies to improve construction safety execution such as risk analysis and assessment in design stage, training strategy and management Commitment, etc. In all these strategies the important attitude for increasing safety performance and declining risk is to identify the root causes of construction hazard and accident and also manipulating proper precaution tool and equipment related to kind of construction

project and site condition. Therefore, we tried to introduce continuous safety development. Increasing safety execution and creating safer condition in construction projects need more attention to find hazard and kind of risk that can cause any damage to the properties and humans.

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