

# SAFE PRACTICE GUIDELINES AND RISK ASSESSMENT FOR RAFT AND PEDESTAL

**Manish kumar<sup>1</sup>, S. Saravanakumar<sup>2</sup>, P. Nithyanand<sup>3</sup>, B. Surender<sup>4</sup>**

<sup>1</sup>Student, ME Industrial Safety Engineering, Excel College of Engineering and Technology, Tamil Nadu, India

<sup>2</sup>Assistant Professor, Department of Safety and Fire Engineering, Excel Engineering College, Tamilnadu, India.

<sup>3</sup>Assistant Professor, Department of mechanical Engineering, Excel Engineering College, Tamilnadu, India.

<sup>4</sup>Assistant Professor, Department o Safety and Fire Engineering f, Excel Engineering College, Tamilnadu, India.

**Abstract:** The construction industry forms an important part of the economies of all countries, employing a substantial workforce. It is also one of the most hazardous industries in the world. Some construction site jobs include: building houses, roads, tree forts, workplaces and repair and maintain infrastructures. Major safety hazards for construction workers include working at heights, in excavations and tunnels, on highways and in confined spaces; exposure to electricity, construction machinery, noise, dust, power tools and equipment, etc. The leading safety hazards on construction sites include falls, being caught between objects, electrocutions, and being struck by objects. These hazards have caused injuries and deaths on construction sites throughout the world. Failures in hazard identification are often due to limited or improper training and supervision of workers. Areas where there is limited training include tasks in design for safety, safety inspection, and monitoring safety. Most incidents can be prevented by taking simple measures or adopting proper working procedures. This handbook is intended to outline important issues on safety and health that should be paid attention to on construction sites for easy reference by the workers. If we work carefully and take appropriate safety measures, there will definitely be fewer work injury cases, and our sites will become a safe and secure place to work in. Other legislation applicable to construction sites includes the Factories and Industrial Undertakings Ordinance and its subsidiary legislation, particularly the Construction Sites (Safety) Regulations. Employees should cooperate with their employers and other persons in complying with the safety legislation and guidelines, and should not do anything to endanger themselves and other persons.

**Keywords:** construction industry, hazard identification, safety inspection, and monitoring safety

## INTRODUCTION

In Construction many incidents takes place which causes human tragedies and disorganize the construction process. Construction injuries will always have broad and adverse impact, which includes the personal suffering of the injured workers, construction delays and productivity losses incurred by the construction contractor, higher insurance premiums that result from costly injuries and possible liability suits for all parties involved in the project. Their prevention and even marginal reduction in their cost will have significant human and financial impact. The number of injuries and fatalities can be reduced by encouraging and reinforcing behavioral change.

Occupational Safety and Health Act (OSHA) with its regulations has had a profound impact on the construction industry. Prevention of construction accidents requires predicting future accidents and their nature in given circumstances. Making such predictions must be based on knowledge about past accidents and can be estimated using about various decision support tools. In construction projects, the management team needs to conceptualize the management of safety in order to foster a strong culture.

The aim is to investigate what constitutes project management personal's conceptual skill and how this skill can be developed and applied in the context of construction safety. Construction organization recognizes the importance of project management personal's conceptual skill for managing construction safety and provides relevant training opportunities for them to improve the skill and develop the system for realistic implementation to reduce accidents.

## 2. LITERATURE SURVEY

A constant throughout this discussion is recognition that workers in the construction industry are involved in a dangerous trade. Construction work-related risks are well understood, but it remains a leader for raised injury, illness and fatality rates; and associated costs to business, society and families. It is unconscionable that construction remains hazardous, while resources over decades - statistics, causal factors, and control measures to reduce risk. The CHASTE approach represents a progressive way to evaluate risks in construction. It confronts the difficulties and unique hazards

of the construction industry by considering likelihood of loss-of-control events and exposure of potential victims to their consequences separately. The CJSA method provides a mechanism for collecting the extensive knowledge of the likelihood of loss-of-control events in construction that is needed for implementation of the CHASTE approach. The CJSA method is loosely based on the standard JSA approach to safety planning in manufacturing. The CJSA method described was implemented for the construction activities and methods typical of the Israeli building construction industry, and a comprehensive analysis was conducted of its results.

This study demonstrates the importance of safety and health in construction and highlights the factors affecting safety on construction projects. The benefits of safety and health improvement include: reduced accident costs, increased productivity, improved human relations and enhanced firms image. Age and experience have an impact on the level of safety on construction sites. Safety and health should be included as a project parameter, which means it should be considered during all phases of a project. Safety and health should be considered as a prerequisite for productivity and quality. Accidents result in increased project costs and human suffering. Legislation should be evolved that engenders prioritization of health and safety by all stakeholders. Procurement systems should be evaluated in terms of their impact on safety and health prior to their selection for projects. Prospective contractors should not be placed on tender lists unless they can show competence in the management of safety and health. The management of safety and health should be an integral part of the management process. Developing the safety program and policies for contract document requirements should be a responsibility of the design team during the design phase. The contract documents should clearly indicate special safety provisions and identify the authority of personnel relative to safety. Managers need to give full safety training to all employees; good training of site managers and operatives can lead to improved safety on site.

In this paper helps to reduce the construction accidents and injuries by using the sensor based technology. It has been identified that safety management is the most important area in a construction work which ensures sound health of the workers in the construction site and also prevents occurrence of different types of hazards and accidents in a construction site. In this project, the major parameters which are considered in the safety management were discussed. The different stages of safety management have been observed and analyzed. Various accidents which are occurring in a construction site were observed and remedies that are to be taken in order to prevent these accidents were sorted out. The study shows that implementation of safety measures is more important than safety planning and training. In order to ensure safety, a safety engineer or officer should always be present at the construction site to inspect the implementation of safety in the sites. The management should make safety equipment's mandatory. All the workers should be provided with personnel protection equipment's to ensure their own safety. Proper remedies and measures should be taken in every construction site to prevent any chance of occurrence of any kind of accidents.

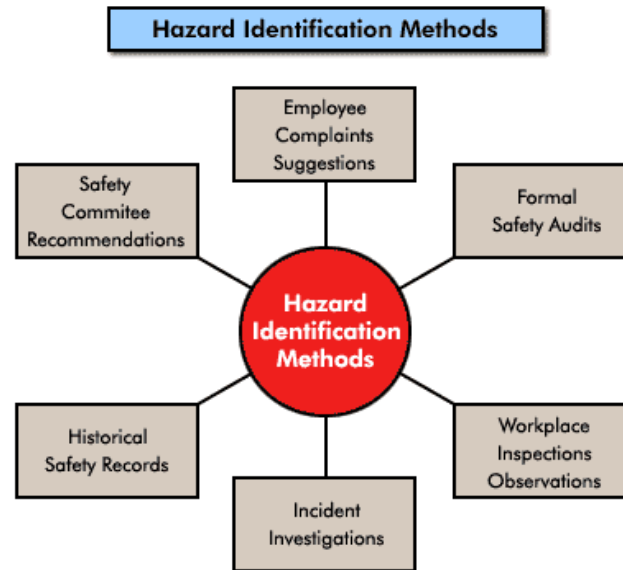
### **3. PROBLEM IDENTIFICATION**

The wind turbine erection sector involves more number of activities such as civil, mechanical, electrical and commissioning. Each activity involves more number of unsafe act and unsafe condition which leads to hazards. In the case of excavation, bar binding, raft and pedestal casting works the main hazards associated with it are fall of person or material from height. The degree of injury depends upon the fall and height of the work respectively. It also includes injuries such as cut injury, fall of objects and health related issues during cleaning of shutters. During raft and pedestal casting all four leg member will be casted to complete the task so more number of man power, vehicle and equipment must be used. And more number crossing each other will be takes place. Proper clearance must be obtained for all material and vehicle crossing each other. The next major problem is the improper route map of the equipment. Improper selection and improper usage of tools and safety devices also creates hazards.

### **4.HAZARD IDENTIFICATION AND RISK ASSESSMENT**

#### **4.1 Hazard Identification**

Hazard is defined as any real or potential condition that can cause injury, illness, or death to personnel, damage to or loss of a system, equipment or property or damage to the environment.

**Figure.4. Hazard Identification Methods**

Hazards have the potential to cause human injury or ill health. Hazards therefore need to be identified before the risks associated with these hazards can be assessed and, if no controls exist or existing controls are inadequate, effective controls should be implemented according to the hierarchy of controls. The organization shall document and keep the results of identification of hazards, risk assessment and determined control up to date.

The organization shall establish, implement and maintain a procedure for the ongoing hazard identification, risk assessment, and determination of necessary controls. The procedures for hazard identification and risk assessment shall take into account:

- Routine and non-routine activities
- Activities of all persons having access to workplace including contractors and visitors
- Human behaviour, capabilities and other human factors.
- Identified hazards originating outside the workplace capable of adversely affecting the health and safety of persons under the control of the organization within the workplace.
- Hazards created in the vicinity of the workplace by work-related activities under the Control of the organization.
- Infrastructure, equipment and materials at the workplace, whether provided by the Organization or others.
- Modifications to the OH and S management system, including temporary changes, and their impacts on operations, processes, and activities.
- Any applicable legal obligations relating to risk assessment and implementation of necessary controls.
- The design of work area processes. Installations, machinery or equipment, operating procedures and work organization, including their adaptation to human capabilities.

#### 4.1 Risk Assessment

A risk assessment is an important step in protecting your workers and your business, as well as complying with the law. It helps you focus on the risks that really matter in your workplace the ones with the potential to cause real harm. In many instances, straightforward measures can readily control risks, for example ensuring spillages are cleaned up promptly so people do not slip, or cupboard drawers are kept closed to ensure people do not trip. This involves looking at the chance or likelihood of a hazard occurring and, if it does, the Extent of any injury or harm that is the consequences. It is a way of deciding which hazards need to be addressed first, that is where there is the highest risk of injury or harm.

The hazards from bits of moving, rotating or reciprocating machinery, the risk assessment is primarily concerned with assessing the likelihood of a worker getting caught, entangled or nipped and determining the severity of injuries. This form may be adapted for other activities relevant to machines in the workplace, such as purchase, installation, maintenance or work processes. A risk assessment is simply a careful examination of what, in your work, could cause harm to people, so that you can weigh up whether you have taken enough precautions or should do more to prevent harm. Workers and others have a right to be protected from harm caused by a failure to take reasonable control measures.

Following the five steps is classified for Risk Assessment

Step 1: Identify the hazards.

Step 2: Decide who might be harmed and how.

Step 3: Evaluate the risks and decide on precautions.

Step 4: Record your findings and implement them.

Step 5: Review your assessment and update if necessary.

## 5. METHODOLOGY

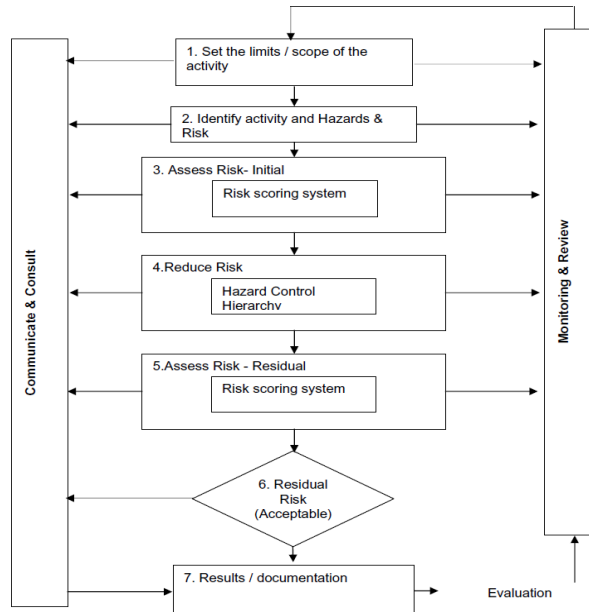


Figure.5. Methodology For Risk Assessment

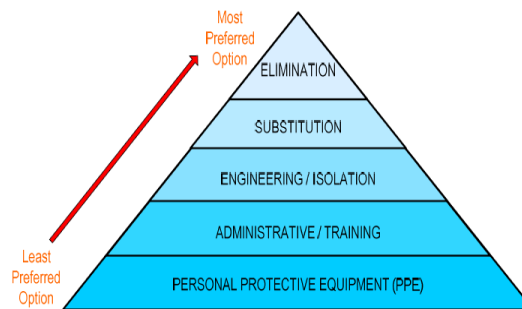
Risk rating matrix					
		Determine Health & Safety Consequences			
		S1 = Negligible	S2 = Marginal	S3 = Critical	S4 = Catastrophic
		No Injuries or minor First Aid required)	Moderate injury. Minor Medical treatment required	Severe injury. Extensive Medical treatment required	Single or multiple Fatalities
Step 2 Determine Likelihood	P4 = Frequent	Significant	Significant	Critical	Critical
	P3 = Occasional	Insignificant	Significant	Critical	Critical
	P2 = Remote	Insignificant	Significant	Significant	Critical
	P1 = Very Rare / Almost impossible	Insignificant	Insignificant	Insignificant	Critical
Legal/ Policy/ Other	----	Policy/ performance standard aspiration.	Potential breach of regulations.	Actual breach of regulations.	
Reputation	----	Potential for internal complaint/ non conformance.	Potential for external complaint.	Because of breach actual serious complaint etc.	
Risk	Risk Response Criteria				
Insignificant	Accept the risk with no particular management control required.				
Significant	Mitigate the risks by imposing existing or additional management controls and actions at the functional level to reduce the risk.				
Critical	Risk is not acceptable without specific and immediate management response.				

Note: The likelihood P1 to P4 shall be clearly defined and established by individual units.

Figure.5.1.Risk Rating Matrix

### 5.1 Control Methods

When determining controls, or considering changes to existing controls, consideration shall be given to reducing the risks according to the following hierarchy:

**Figure.5.1 Hierarchy of Control Options**

- Elimination of hazards must be done at the source or installation
- Substitution of process or methods can be implemented to avoid hazards
- Engineering controls such as guarding and isolation can be done
- Training must be provided to workers regarding the safe working
- Appropriate PPE's should be provided to the employees

### CONCLUSION

This paper is mainly focused to identify all possible hazards in construction of raft and pedestal works and to carry out risk assessment to mitigate the hazards. Proper operational control procedure and work instruction has to be framed to avoid hazards which in turn results in accidents. Awareness among workers must be created by implementing training programs and effective implementation of safe operating procedures.

Incidents in workplaces are unplanned and unwanted occurrences involving movement or fall of persons, objects or materials which may result in injury, damage or loss to property or people. The majority of incidents happen when employees disregard safety rules (Unsafe acts) and management ignore the presence of unsafe conditions. Therefore unsafe acts and unsafe conditions are the immediate (direct) causes of incidents. Managers and supervisors can reduce risks at construction workplaces.

On the other hand, physical and mental condition of the person as well as environmental forces and supervisory safety performance are the contributory (indirect) causes of incidents. Training and education of workers is required in order to develop competencies and safety awareness. However there is a fundamental dilemma which is the different interpretations of risk, safety and the extent of risk which needs to be reduced to be acceptable. People are likely to believe that once an action is executed in response to a hazard, the situation is safe or safe enough.

A number of incidents can be prevented if the safety management system reflects both natural degradation and these intrinsic threats. The initial step in developing such system is preparing a model which shows the interaction between the incident likelihood and organizational tasks and activities in the presence of these hazards.

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