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FALL PROTECTION SYSTEM BY USING MADULAR SAFETY SCREEN

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ABSTRACT

Generally, fall protection can be provided through the use of guardrail systems, safety net systems, or personal fall arrest systems. OSHA refers to these systems as conventional fall protection. Other systems and methods of fall protection may be used when performing certain activities. As personal fall arrest systems evolved, the introduction of self-retracting lifelines contributed to reducing fall distances, slowing speed of falls, and preventing injuries. Other engineering advances contributing to the history of fall protection includes development of vertical lifeline systems to provide those who perform vertical climbing tasks with a safe and reliable personal fall arrest system. A fall protection plan is a site-specific plan that provides a systematic approach towards eliminating or reducing the risk of falling from height by ensuring that all reasonable fall protection measures and methods are being taken prior to the commencement of the work. This project aims to address this critical issue by investigating and implementing effective strategies to elimination falling Hazard for protecting employees/employer's safety. The project work, which is carried out in one of the Commercials building which located in Chennai is an attempt to study falling hazard during Construction activities.

KEYWORDS: Hazard, Employers Safety, OSHA and Industries.

1.INTRODUCTION

According to OSHA, a fall hazard is "anything at worksite that could cause a worker to lose his balance or lose bodily support and result in a fall Almost any walking or working surface at a construction site has the potential of being a fall hazard, especially when it is elevated four feet or higher off of the ground.

Unsafe portable ladders - Employers have an obligation to provide workers with the tools and equipment they need to do their jobs safely. When workers perform jobs at heights, this includes providing equipment that reduces the risk of a fall. What constitutes adequate fall protection depends on the type of work and the equipment used.

Safety nets - These safety measures must meet regulations set by OSHA. For example, guardrails on enclosed platforms must be a minimum of 42 inches (three and a half feet) high and fully surround the surface where workers walk. Unfortunately, the majority of falls on construction sites occur because workers do not have the protective equipment, they need to prevent falls. Several common situations arise in accidents involving inadequate fall protection. Any surface on a construction site can quickly become crowded with tools, materials, workers, and more. The likelihood of a fall increases significantly when workers have limited room to move and hazards dot the walkway. Slips and trips can end in tragedy when workers lose their footing at heights. A simple mistake (such as spilling paint or leaving a hammer where someone can step on it) may result in a fall from scaffolding, an aerial lift, or another elevated work surface. Workers may also fall from heights due to poor construction of scaffolding and other platforms. Loose boards, nails and bolts that stick up, and other hazards can cause workers to trip. These issues, in combination with inadequate fall protection, can lead to devastating accidents on the job site.

2. OBJECTIVES

To assessing falling hazard during construction activities to eliminate hazard fall from height.
To study the control measures implemented to fall protection system by using safety screen.

3. LITERATURE REVIEW

CAUSES OF FALL HAZARDS IN CONSTRUCTION SITE MANAGEMENT - CHONG HUI LIY1 SITI HALIPAH IBRAHIM2 ROHAIDA AFFANDI3NOR AZALINA ROSLI4 MOHD NASRUN MOHD NAWI ISSN: 2146-4405

The construction sector is the most hazardous industries. The workers that work on construction site have a high rate of being killed at work. Normally accidents occur at construction sites is a result of the unawareness of the safety and health in construction sites. The other factors that lead to accidents are unsafe method, human element, unsafe equipment, job site conditions, management, and unique nature of the industry. In order to prevent accidents, one must know the causes of accident, more specifically the root cause of accidents and the approaches to reduce the falls This study aims to investigate the root causes of fall hazards in construction site.

CHOOSING FALL PROTECTION SYSTEMS IN CONSTRUCTION SITES: COPING WITH COMPLEX RATHER THAN COMPLICATED SYSTEMS, POST-GRADUATE PROGRAM IN CIVIL ENGINEERING: CONSTRUCTION AND INFRASTRUCTURE, UNIVERSIDAD FEDERAL DO RIO GRANDE DO SUL, AV. OSVALDO ARANHA, 99, PORTO ALEGRE, RS CEP 90035-190, BRAZIL.

Falls from height are a leading source of fatal accidents in construction sites, both in developed and developing countries. Although statistics from different countries may not be directly comparable, the importance of the problem is clear: in the that type of accident corresponded to 49% of the total fatalities in construction (HSE, 2019), while it was 33.5%. There are multiple contributing factors to falls from height. Nadhim et al. (2016) concluded that the main factors are related to risky construction activities, individual characteristics of workers (e.g., age), inclement weather, and the use of improvised FPSs that do not fulfil legal requirements. In turn, Wong et al. (2016) stressed the role played by inadequate construction planning, violations of basic safety rules by workers and managers as well as incapable staffing.

NATURE OF FALL ACCIDENTS IN CONSTRUCTION INDUSTRY: AN INDIAN SCENARIOM.ENGG, CONSTRUCTION ENGINEERING AND MANAGEMENT, K.L. N COLLEGE OF INFORMATION TECHNOLOGY, MADURAI PUBLISHED BY C. VIGNESHKUMAR

Fall accidents in construction projects, particularly building works, are the most frequent accidents. Those accidents may result in death and serious injuries of workers involved and other consequences such as loss of work days and the industry bad image. Robust accident prevention is required through improving continuously health and safety in construction. Therefore, understanding triggering events and their factors leading to fall accidents are of important input. The objective of this paper is to findings of triggering events based past fall accident cases in India. The fall accident cases were retrieved from accident reports provided by ADSI 2012 and Indian statistical report 2012. In this paper, current profile of accident records of India is presented. This paper also presents the nature of fall accidents. The event area and their potential active failures leading to fall of accidents are described. It is expected the knowledge shared in this paper assist all people involved in construction projects to plan an accident prevention strategy properly.

FALLS FROM HEIGHT IN THE CONSTRUCTION INDUSTRY: A CRITICAL REVIEW OF THE SCIENTIFIC LITERATURE EVAN A. NADHIM

The construction industry has grown over the last decades and resulted in improvements in company profits, financial accessibility and increased commodities demand in Australia, as it has in the United States and in other countries. Despite its importance, it has long been identified as one of the most hazardous industries in many parts of the world. Construction projects are described as dynamic and complex because of their sites and manpower. They are also characterized as temporary and transitory. For example, the workforce for construction firms is usually temporary employees. Because construction crews spend most of their time at construction sites, they are exposed to a higher probability of injury or death [6]. Occupational accidents in the construction industry are frequent, and may lead to permanent disabilities and a high rate of fatalities. Slipping, tripping and falling incidents in construction have received significant attention and have been widely researched due to their severity and frequency. However, falls from height (FFH) still consistently have the highest rates amongst construction accidents compared with others types of accidents (e.g., vehicle collisions, hits by moving or falling objects,

being trapped between stationary and moving objects and contact with electricity) and when compared to other industries' accidents.

RISK FACTORS AND EMERGING TECHNOLOGIES FOR PREVENTING FALLS FROM HEIGHTS AT CONSTRUCTION SITES MUHAMMAD KHAN A, CHUKWUMA NNAJI A

Falls at construction sites account for approximately 50% of all accidents reported in the US annually, making them the leading cause of injuries and fatalities. Although there have been several studies characterizing fall-related hazards and emerging technologies, a systematic review of literature examining the intersection of fall from height (FFH) risk factors and emerging technological solutions is missing. This paper addresses this gap by conducting a systematic literature review to investigate FFH risk factors and the use of technologies to prevent falls from heights on construction sites. The review analyzed 94 research articles published between 2002 and
2022 and identified the most common FFH hazards, including missing guardrails, lack of personal protective equipment, lack of knowledge and training, loss of balance and unsafe behavior, violation of safety rules, and poor site management. The review also revealed that individual technologies are insufficient to address most fall hazards, and there is a need for an integrated system of various technologies to improve fall prevention on construction sites.

4.METHOD

Modular Safety Screen system is perimeter protection climbing screen system designed as a full area enclosure of the work floor to safeguard site personnel against fall from height and to protect from all climatic conditions. Fire retardant fabric perforated sheet is used as a screen. Two level working platforms are provided beyond the slab edge for the site personnel movement & working. Standard width of the Safety screen is max 4.5m and height is 9.4m. Safety screen will be lifted by using Tower Crane. The total weight of a screen unit will be 2.0MT Max.

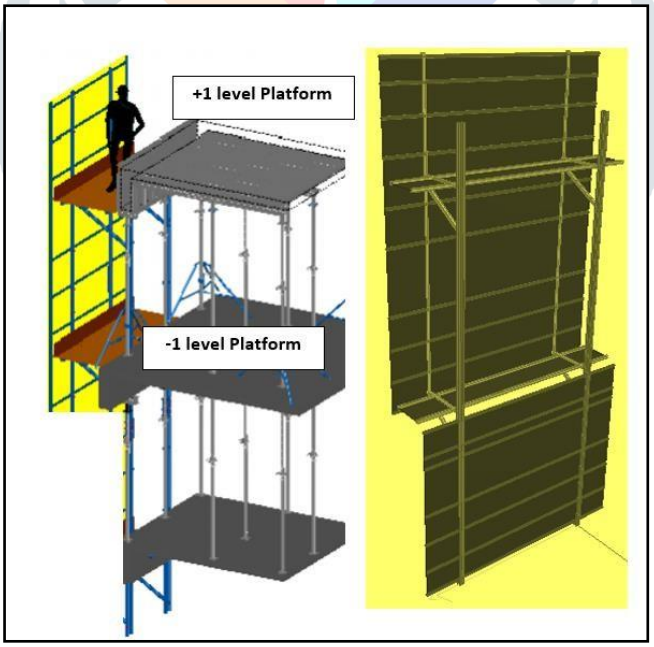

Fig-1: Typical Section & Isometric View of safety screen

Safe working load on the platform is 150 kg/Sqm.

Screen should be lifted after achieving 10Mpa of concrete strength of newly casted slab.

Fix the Fire-retardant fabric perforated sheet over the pipe purlins with HD cable ties & 4mm PP rope as specified spacing in the drawing.

Fix the platform member purlins/channels above platform base at two level with bolt & Nuts.

Fix the 18mm thick marine plywood above platform member with counter sunk bolt.

Fix the end with 50x25mm rectangle tube at both the sides of the safety screen unit.

4.1 ERECTION & OPERATION PROCEDURE

Fixing and erection of modular safety screen unit shall be carried out, only when wind speed is less than 35 KMPH.

Fix the universal climbing cone along with cone screw bolt as mentioned in the scheme drawing above slab/wall.

After casting the wall/slab, remove the cone screw bolt from cone & fix the slab shoe above the slab firmly with help of cone screw bolt and super plate as shown in drawing.

Repeat the same above procedure at 2nd level slab to fix the universal climb-ing cone in wall/slab before casting.

After casting 2nd level of slab casting. We shall start the erection.

Lift the assembled safety screen as a unit using tower crane and support it over the shoe as shown in drawing.

Fix the assembled screen with slab shoe adaptor.

Ensure that the vertical guide member locking plate is rested above shoe adaptor 25mm dia pin.

Fix the universal climbing cone along with cone screw bolt as mentioned in the scheme drawing above slab/wall at 3rd level slab.

Upon concreting, remove the cone screw bolt from cone & fix the slab shoe above the slab firmly with help of cone screw bolt and super plate as shown in drawing.

Fix the tower crane slings with platform base at +1 level platform.

Lift the safety screen assembly unit by tower crane. Ensure the vertical guide member is passing through the ISMC 75 flange plate in main guide member.

Repeat the Safety screen universal climbing cone fixing, safety screen lifting procedure as stated above for the next consecutive level operations.

4.2 LOWERING SAFETY SCREEN AFTER COMPLETION

Demarcate the area for stocking the Safety screen units.

Lowering of safety screen system should be carried out when wind speed is less than 35 KMPH.

Remove the unwanted & loose material from the platforms before lowering.

Tie the slings to the platform base at +1 level platform. Ensure that D- Shackle/bolt is secured enough & need to be checked with competent person. Hold the safety screen system with tower crane.

Confirm that all connections between the shoe & structure is free from the safety screen, upon getting the confirmation from safety/component engineer, lift the safety screen using tower crane and lower it to the ground level safely.

Stock the safety screen in the demarcated area.

Repeat the same for all other safety screens lowering.

5. RESULTS

Complete Perimeter Seal You Can Have Peace Of Mind Knowing Your Workers Are Safe Behind The Perimeter Seal And Nothing Will Fall On A Passerby, Pre-Assembly And Nested Deliveries Maximize On Site Productivity Innovative Design Ensures Maximum Number Of Screens Are Delivered Preassembled, Reducing The Time Required On Site For Assembly And Minimal Deliveries,Screen Sheeting Can Be Printed To Any Many Opportunities For Self-Promotion On Site, Or Even External Marketing Opportunities. Choice of Sheeting Available to Suit Local Market Conditions Choice of Sheeting Available for Hot Climates That Provides Ventilation, Or for Cold Climates That Can Protect from Wind and Rain. Technical Details: The Frame Is Made Up From SHS, ISMC & ISA. Anti-Skid Platforms Are Used as Walking Platforms Which Enables People to Work Freely and Provide Safety. 600mm to 1200mm Clear Working Area Can Be Given.

6.CONCLUSION

Modular and Can Be Assembled at Site,85% Reusability of Components for Further Projects. Solution Can Be Customized to Suit the Shape Yet Reusable, Hence Can Be Treated as An Asset Rather Than Loading on Single Project 3 Levels of Working Platform for Easy Movement of Personal and Shifting of Materials from Floor to Floor. Minimum Time (3 To 4 Mins. Per Unit) For Relocation by Crane Using Spreader Beam & Only Vertical Movement.

7.REFERENCE

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