Research Paper Engineering

Safety Measurement of High-Rise Building

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ABSTRACT

The Construction industry is one of the major industries in world. It gives tremendous boost to country's economy. It have registered significant amount of growth recent years. In india construction sector employs second best after agriculture. Thus the rate of fatal accident is very high as unorganized labour exposed to serious OHS Hazards. The aim of this paper is to study the attitude of our construction companies towards the awareness of safety on construction site, and to establish whether there is any relationship between safety provisions for worker and worker productivity on site.

Keywords : Safety, Construction, High-Rise, hazards, worker.

I. Introduction

The Construction industry is one of the major industries throughout the world. Its achievement in rebuilding areas divided by both natural and man-made disasters, and in providing power, services and communications to meet the rising needs and expectations of people throughout the world, has conferred great benefits on the human race.

Construction Sector is very essential and an integral part of infrastructure development which gives tremendous boost to our country's economy. The construction industry has registered enormous growth worldwide in recent years. Although the development of technology is rapid in most of the sectors, construction work is still labour intensive, In India the construction sector employs around 33 million people, which is next to agriculture.

Modern architectural ideas are soaring to new heights and cities are growing unbelievably taller and taller, rapidly raising new security concerns for its occupants and posing new challenges which demand new responses. The issue of making human lives secure remains central, as it is the human being for whom all these modern cities are being created. What type of norms and regulations will define safety standards, what technology will protect people living and working at such enormous heights? Again and again we are faced with fire at high rise buildings resulting in enormous loss of valuable lives, documents and properties. While approving high rise buildings, which are a necessity in growing metropolis short of space, the issue of overall safety measures has not been adequately addressed. It is high time that all stakeholders put their heads together to find realistic and implementable solutions to make living, working and safekeeping of documents absolutely safe and free from any type of fear. The improvement of safety levels in high rise buildings is in the interest of everyone and requires combined efforts of government officials, private security agencies, professionals and every member of the society. Therefore, it is very important to establish a networking platform through PPP model for building proper structures, providing dependable equipment, training all concerned and for speedy information exchange among all stakeholders, dealing with, working and living in high rise buildings.

There is also a serious potential of fires due to the storage and use of flammable substances and a potential for disasters due to collapse of the structures and subsidence of the soil on which the construction activity is being carried out. Numerous questions have arisen as to the safety of occupants in high-rise buildings following the World Trade Center aircraft collision, fire and collapse.

II. Key Issues

- Current Security Scenario & Its Implications
- Architectural perspectives on High Rise Building
- High Rise Building - Global & National Trends and experiences
- Safety Issues in High Rise Buildings
- Key issues and challenges for Disaster Management Authority
- Disaster Management - an emphasis on the measures of preparedness, prevention and mitigation.
- Corporate Resilience and Preparedness for Disaster Management
- Role of Private Security establishments in assisting Govt. agencies in Disaster Management
- Role of Emergency Medical Services play in responding to disasters and the scope for Public-Private Partnerships
- Role of Telecommunication & Risk Transfer through Techno Financial Strategies

III. Objective

The primary goal for the high-rise safety program is to provide protection for occupants and to reduce damage or destruction to the building and its contents. The following objectives need to be developed:

I. Investigate construction companies' attitude towards safety provision for their workers on site.
II. To create awareness on safety programmers in order to reduce the number of workers compensation claims and cost due to accident.
III. Determine (if any) the benefits associated with adequate safety for workers.
IV. To examine government safety regulations on construction companies and their compliance for the benefit of their workers.

The high incidence of falling from heights in construction accident statist led to a focus, particularly in the site observations and operatives 'questionnaire, on factors associated with falling from heights.

Objectives are established to provide more detail about the intended safety performance. Stakeholder objectives are written in language that is easily understood by people who are not engineers. However, stakeholder objectives are more quantitative in their description of tolerable losses. These tolerable losses might be stated in terms of life loss, property loss, or other measures.

IV. Literature history of construction fatality

The number of fatalities at work in the construction sector remains a matter of serious concern for the Government, employers.

Statistics on fatalities generally places the construction sector as the second highest industry, only surpassed by the agricultural sector. Among the most common sources of fatalities in construction, falls from heights is the category that accounts for the highest proportion of deaths. A brief comment of some statistics will be given below, especially for Northern Ireland and the Republic. Some international figures for falls from heights will also be reproduced as an example of the relatively high percentage of fatalities in this category reported in the literature.

A. Construction Fatality Rate:

Country	Year	Fatality Rate per 100,000 workers
Europe	**1996**	**13.3**
Germany	1996	15.4
Italy	1996	14.4
France	1996	12.1
RoI	1996	8.0
UK	1996	5.6
Spain	1996	4.2

Approximately fifty percent of construction fatalities have been attributed, in a wide range of studies, to falls from heights. Furthermore, scaffolds, roofers, steel and structural trades have a high risk of fatal accident, though fatalities occur across a wide range of construction occupations. The statistics also show that fatalities are spread across housing construction and general contracting, large and small companies (though much of the industry is made up of small subcontractors) and in both urban and rural regions.

V. SAFETY

Safety is the state of being “safe”. the condition of being protected against physical, social, spiritual, financial, political, emotional, occupational, psychological, educational or other types or consequences of failure, damage, error, accident, harm or any other event which could be considered non-desirable. Safety can also be defined to be the control of recognized hazards to achieve an acceptable level of risk. This can take the form of being protected from the event or from exposure to something that causes health or economic losses. It can include protection of people or of possessions.

VI. SAFETY AT WORKPLACE

1. General provisions

- To ensure that all workplaces are safe and without risk of injury to the safety and health of workers.
- To protect persons present at or in the vicinity of a construction site from all risks this may arise from such site.
- All openings and other areas likely to pose danger to workers should be clearly indicated.

2. Means of access and egress

- Adequate and safe means of access to and egress from all workplaces should be provided, indicated where appropriate and maintained in a safe condition.

3. Housekeeping

- A suitable housekeeping program should be established and continuously implemented on each construction site.
- The proper storage of materials and equipment.
- The removal of scrap, waste and debris at appropriate intervals.
- Loose materials which are not required for use should not be placed or allowed to accumulate on the site so as to obstruct means of access to and egress from workplaces and passageways.

4. Precautions against the fall of materials and persons, and collapse of structures

- Adequate precautions should be taken such as the provision of fencing, look-out men or barriers to protect any person who might be injured by the fall of materials, or tools or equipment being raised or lowered.
- Where necessary to prevent danger, guys, stays or supports should be used or other effective precautions should be taken to prevent the collapse of structures or Safety of workplaces parts of structures that are being erected, maintained, repaired, dismantled or demolished.
- All openings through which workers are liable to fall should be kept effectively covered or fenced and indicated in the most appropriate manner.

5. Prevention of unauthorized entry

- Construction sites in built-up areas and alongside vehicular and pedestrian traffic routes should be fenced to prevent the entry of unauthorized persons.
- Visitors should not be allowed access to construction sites unless authorized by a competent person and provided with the appropriate protective equipment.

6. Fire prevention and fire fighting

- Avoid the risk of fire
- Control quickly and efficiently any outbreak of fire.
- ring about a quick and safe evacuation of persons
- Secure storage areas should be provided for flammable liquids, solids and gases such as liquefied petroleum gas cylinders, paints.
- moking should be prohibited and “No Smoking” notices be prominently displayed in all places containing readily combustible or flammable materials.
- Regular inspections should be made of places where there are fire risks. These include the vicinity of heating appliances, electrical installations and conductors, stores of flammable and combustible materials, hot welding and cutting operations.
- Welding, flame cutting and other hot work should only be done on the orders of a competent supervisor after appropriate precautions, as required, are taken to reduce the risk of fire.
- All supervisors and a sufficient number of workers should be trained in the use of fire-extinguishing equipment, so that adequate trained personnel are readily available during all working periods.

VII. CAUSES OF ACCIDENTS

There are so many other reasons of causing the accident on high-rising building. Apart from the obvious reasons there are so many minor reasons which can create a big accident. Overall we can divide it in two section as Unsafe Act and Unsafe condition.

1. Unsafe Act

- Use of defective equipment
- Failure to use personal protective equipment
- Unsafe material handling
- Failure to follow safety procedures
- Poor housekeeping
- Attitude problems (horseplay, macho, etc.)

2. Unsafe Condition

- Improper guarding of equipment, platform
- Improper illumination, ventilation
- Hazardous chemicals, explosives, etc.
- Improper dress
- Poor site layout, housekeeping
- Defective tools and equipment
- Poor tag-out and lock-out practices

- Poor maintenance
- Unsanitary conditions
- Unsafe design and construction

One of the passive reasons of Unsafe Manmade Act and Condition is corruption.

Below is some of the stat of fatal accident

VIII. ECONOMIC IMPACT OF ACCIDENT

There is a very big impact on economy with such a fatal accident occur due to no safety provided to the workers. As construction is the widest industry all over the world such accident can be the reason of shutdown of work and that is the big loss to the economy. Still the main impact is that the skill workers get lost in such accidents.

Many owners and contractors still believe the myth that safety concerns will lead to greater cost and reduced productivity. The reality is that safety evaluation and control save money. The delays and total expenses following an accident are usually much higher than the original cost of establishing and maintaining safety standards. The costs associated with accidents and fatalities are as follows:

1. Direct Costs (Insured):

- Human ill-health, injury, death
- Transportation for first aid, and for medical treatment
- Liability insurance costs (after workers compensation
- Medical and hospital expenses
- Property damage, destruction
- Repair and replacement expenses

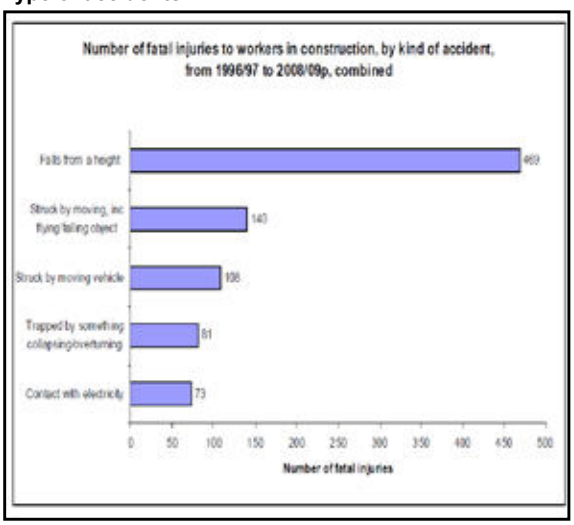
2. Administrative Costs:

- Equipment and supplies
- Safety director / coordinator
- Time (meetings, inspections, etc.)

3. Indirect Costs (Uninsured):

- mpact on public, neighborhood
- Wages to injured worker for time not worked
- Training new/substitute worker
- Rescheduling work
- Construction authority and civil fines
- Delay due to accidents, investigations
- Loss of crew efficiency
- Clean-up, equipment repair, stand-by
- Post-accident extra safety supervision
- Legal fees
- Reputation of government

Type of accidents



IX. Broad approach to constructiTon safety

Accident or failure can be prevented by the following approach:

1. Knowledge: All the employee of the high rise should be trained with the expected disaster manmade or nature situation. Still we can't control the natural disaster but prevention is better than cure.
2. Competence: there should be a team who takes care of all the instruments and facilities design for safety. There should be regular checking of those all safety instruments as well all the instruments should be previously checked with the standards.
3. Care: There should be ERT(Emergency Rescue Team) team on each department each floor of the high rise building who takes care of the all the employee in emergency rescue.
4. Separate budget for Safety: There should be separate budget for safety which can be used only with safety related issue. Need to change the safety related instruments when those are outdated.
5. Government Polices: there should be government policy which should define that the safety of high rise is required and which can force the constructor to change make the plan with respect to all the safety issues.

One final caution that may be mentioned is this: If and when someone, anyone, mentions some misgiving or reports some untoward happening about anything, higher ups should take them seriously. All too often, what appears to be a minor hitch turns out to be a deadly disaster.

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