Measures to Prevent Accident at Construction Site

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Abstract

It is the right of every worker to work in a safe and healthy environment. Every worker must protect his or her own health and safety by working in compliance with the Occupational Health and Safety Act and applicable Regulations and safe work practices and procedures established by his company, its clients, and the general contractor(s). It is the responsibility of every worker to assist in maintaining a safe work environment. So this paper shows some main factor behind accident at sites and measure to prevent them.

Key words: *accident, safety, worker.*

1. Introduction

Construction is one of the most dangerous ways to make a living. For the past few years, a number of fatal accidents took place while working at site. It attracts the public attention and expects the Government to do something to prevent the accident or improve the situation. This paper tries to analyse the causes of accidents, to propose preventive measures against these fatal accidents and finally making recommendations on how to control and monitor the safety issues for workers working at height. The writer is of the opinion that the major cause of the accident is the human factor and job factor. The only way to stop the occurrence of fatal accident of persons is to amend the law in such a way that every party involve has to bear the legal responsibility, both criminal and civil if negligence is found in his part. The legal deterrent is the only way to save life. Its equipment or lack of, subcontractors, and other involved third par ties fail to provide basic safety. The accidents will not be fatal if the workers had properly use the personal protective equipment. This paper has tried to sort out the causes of the accidents and have proposed some immediate measures to minimize the risk of the accident.

2. What is Accident?

An "accident" is an unplanned, undesired event which may or may not result in injury or property damage that interferes with the completion of an assigned task. A "near miss" is a form of an accident that does not result in injury or property damage. The causes of accidents can be broken down into two basic components, **unsafe conditions and unsafe acts**.

Unsafe conditions are hazardous conditions or circumstances that could lead directly to an accident. An **unsafe act** occurs when a worker ignores or is not aware of a standard operating procedure or safe work practice designed to protect the worker and prevent accidents.

Table 1. Summary of unsafe acts and conditions

Unsafe act	Unsafe condition
Operating equipment or machinery without permission	Lack of guarding on machinery
Defeating safety devices	Defective tools or equipment
Using defective equipment	Crowding workers into one area
Using the wrong tool for the job	Inadequate alarm systems
Not using personal protective equipment	Fires & explosions
Incorrect lifting techniques	Poor housekeeping
Working while intoxicated	Hazardous atmospheres

Horseplay	Excessive noise

3. Causes of the fatal accident

Besides the quantitative analysis of the accident itself, the causes of the fatal accidents in the construction industry can be perceived in different points of view vis: the personal factor, and the job factor. All these causes are discussed below in tabular form:

Table 2. Personal and job factor

Personal factors	Job factors
Lack of knowledge or skills due to inadequate training	Non-existent or poorly developed work standards
Improper motivation	Substandard equipment design
Physical limitations of the worker	Poor equipment maintenance
Distractions which interfere with the worker's ability to concentrate on their job	Purchase of substandard equipment, tools, and materials
	Unusual increases in equipment usage

4. Hazard assessment

The subject of hazard recognition is enormous. It is limitless. It is immense. A condition on one day would not be a hazard, but on the next day it might cause a fatal accident. A construction site changes daily. The first step in recognizing hazards is to understand what causes accidents. A safety hazard is something that has the potential to cause an injury. All accidents or incidents, whether incurring injury or not, should be investigated to determine the cause, so that the necessary corrective action may be taken to prevent a similar occurrence and/or to prevent a near miss of becoming a real injury. Good hazard recognition automatically leads to good accident prevention.

Safety hazards can be controlled by using the three main components of safe work procedures:
• A step by step description by your supervisor of how to do the task.
• A set of guidelines describing the principles involved in doing the work safely.
• A specific standard of work place behaviour.

The following is a brief outline of some of the situations where a supervisor and worker should be alert and on the lookout for potential hazards.

• When a worker or sub-contractor arrives on site, he must park his vehicle in the properly assigned area. He must know all the rules for smoking, lunch eating, alarms to evacuate the area, etc. On the job he must practice good housekeeping, clean up messes, and ensure that nails and screws are not protruding from lumber and plywood, etc. He must diligently be on the lookout for unsafe conditions around the site and report them to his supervisor immediately.

• Alcohol and drugs are zero tolerance. If any worker, regardless of who his employer might be, is noticed to be under any influence, this must be reported to your supervisor immediately.

• When a task is explained to the workers, any potential hazards are to be discussed - such as power lines, fall arrest, confined space, heavy loads requiring handling by two persons, high noise levels requiring hearing protection, and working near roof openings, stairs, etc.

• The correct tool is to be selected for the job. If electric, connect to Ground Fault Interceptor (GFI) where needed. If gas, propane or diesel, the space must be properly vented. (Also, if propane, the worker must have a valid propane handling certificate.)

• Weather conditions affect the execution of a task. For example if snow and ice are present, sanding may be required. Windy conditions may limit the use of ladders, (the object that the worker is carrying may be blown over by the wind and the worker with it). Rain and snow may cause floors to be slippery and create fall hazards.

• When cutting, burning and welding are involved, fully charged and unexpired fire extinguishers must be present. Ascertain whether hot work permits or fire watches are necessary.

• When working on mechanical lifts, scaffolding, roofs, or near wall and flooring openings, fall arrest equipment is mandatory. Safety lines and lanyards must not be frayed or damaged. When climbing ladders, use 3-point contact at all times - do not unhitch your first connection unless the second is connected.

• When erecting or dismantling scaffolding, determine if it is sufficient size or height to require engineering. Determine if the ground is frozen, if feet are on proper mudsills, where railings or kick plates

are required, etc. If scaffold planks are damaged, split or otherwise unserviceable, advise your supervisor to have them discarded. The workers must be tied off as they build the scaffold.

• When using motorized equipment, the operator must do a walk about inspection for damaged or worn parts. Check to make sure the backup alarms are operative, tires are properly inflated and in good condition, and the brakes work well, etc. It is imperative that the operator shuts off equipment before re-fuelling, comes to a full stop at intersections and blind corners, and runs the equipment at safe speeds, taking into consideration other workers in the area and weather conditions.

• When using cranes, forklifts and boom trucks, ascertain that the load is not too heavy for the lifting device. Establish that the outriggers are being installed on firm ground and not on loose topsoil or near the edges of excavations and banks. Make sure all slings are in good condition and are properly sized for the load. Safety hooks are mandatory.

5. Accident prevention

Accident prevention involves the identification and elimination of causes before an accident occurs. Accident reaction is what most supervisors practice, that is, investigating the accident to determine the causes and then implementing corrective actions to avoid reoccurrence. This helps eliminate future accidents from a specific cause, but does nothing to address avoiding the accident that just occurred.

One method of accident prevention that can be used by the supervisor is the **Job Safety Analysis (JSA)**. A JSA takes a specific job and identifies the following:

1. Sequence of basic job steps.
2. Potential hazards at each step.
3. Recommended action or procedure to correct the potential hazards.

JSA's are most thorough when conducted by the supervisor and a worker skilled at the job. This also provides the worker with a sense of involvement and control over how their assignments are completed. Jobs which have the most accidents, including injuries, property damage, and near misses, should receive the highest priority.

Planned Job Observations (PJO) provide the supervisor with an opportunity to validate the JSA. A PJO is a procedure used by supervisors to determine if a worker is completing a job with maximum efficiency and quality. While many supervisors informally observe work on a daily basis, interruptions, distractions, and a lack of planning prevent the supervisor from gathering the information necessary to properly evaluate the worker's performance. The PJO is performed by following these steps:

I) Worker and Job Selection

Workers should be selected for PJO based on the following priority:
- New Workers
- Poor Performers
- Risk Takers
- Good Performers

Selecting jobs for PJO should focus on jobs with an accident history, jobs with the potential for serious injury or significant property damage, and jobs with a high probability of occurrence.

II) Preparation

The supervisor must make a commitment to be prepared for the PJO. The supervisor should review the JSA and other work procedures for that specific job.

III) Job Observation

When observing the worker, the guidelines listed below should be followed:
- Stay out of the way!
- Do not distract the worker.
- Do not interrupt the worker.
- Do not allow others to interrupt your observation of the worker.
- Have a copy of the JSA with you to follow the job process step by step.

IV) Follow-Up

Follow-up includes making changes to procedures or JSA's as appropriate to your observation, retraining on job performance, or additional training not previously provided. Ensure that you follow-up with the worker or the value of the PJO will be lost.

6. Accident control

In the event that an accident does occur, Supervisors will be instrumental in the control of the accident. Accident control can be broken down into three phases:

i) Accident response
ii) Accident investigation
iii) Corrective actions

i) Accident response

As a supervisor who witnesses an accident, your first priority is to safeguard workers, visitors, and yourself. Evacuate personnel to a safe area and tend to injured personnel immediately. Initiate the appropriate level of response for the accident. Secure the accident scene as soon as safely possible. This ensures that unauthorized personnel will not wonder into the accident scene and possibly be injured or exposed.

Control of property damage can be addressed after attending to personnel issues and initiating the emergency response system. Whenever possible, supervisors should attempt to preserve evidence associated with the accident. This can be critical to determining the cause of an accident. It is best to prevent unauthorized personnel from entering the accident scene and disturbing the evidence. The evidence can be collected once the investigation team has been assembled and the investigation begun.

ii) Accident investigation

The investigation of an accident involves more than just completing a form. While forms are necessary for the documentation of the accident, supervisors should consider taking photographs or videotape of the accident scene. This level of documentation will be helpful at a later date when discussing the accident and can be used for training purposes. Supervisors should begin interviewing witnesses as soon as practical after the accident. It is best to interview witnesses alone and while the accident is still fresh in their mind. Here are some suggestions concerning interviewing.

- Create a relaxed atmosphere with the interviewee. Try to put them at ease.
- Interview at the accident scene when possible. This will allow the interviewee to point to various areas or equipment at the accident scene to illustrate what they are trying to communicate.
- Interview each witness separately. This prevents witnesses from being swayed or intimidated by other workers. Each witnesses account of the accident can then be compared objectively to try to develop an accurate description of the accident.
- Getting the witnesses objective account is critical. Avoid biasing the witness by leading them to a conclusion with your questions or by making judgmental remarks.
- End the interview in a positive manner and let the witness know how important their participation in the accident investigation is to the prevention of future accidents.

One tool commonly used in accident investigations is to re-enact the accident. This can provide insight as to the conditions faced by personnel during the accidents and what options were available for response. The re-enactment must be done under strict controls to ensure that no one is injured during the re-enactment.

iii) Corrective Actions

Corrective actions are actions taken to prevent the reoccurrence of an accident. Corrective actions can be identified after the root cause(s) of the accident have been identified. Corrective actions should be included on the accident investigation report.

Corrective actions need to:

- Address the causes of the accident.
- Prevent those causes from reoccurring.
- Be achievable with the available resources.
- Be readily implemented without disrupting production.
- Be understood by the management and staff.

Once corrective actions have been implemented, the work area supervisor must monitor and evaluate their effectiveness with regard to eliminating the causes of the accident. Failure to evaluate the corrective actions could result in the reoccurrence of the accident.

7. Conclusion

There seems to be no other choice but impose a tighter control over the quality of work. Unprofessional practice and unqualified sub-contractor & workers should be reframed from engaging in this kind of high risk work. Various approaches have been discussed above. Finally it is of the opinion that with the support from the Government in this direction, the main contractor, reputable developers & the interest parties as a team, the objective of preventing fatal accident in this respect can be achieved.

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