



Causes and Effects of Accidents on Construction Site

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Abstract:

The purpose of this study is to find out the most possible factor which causes accidents in the construction industry and thus affecting the safety management in the construction firm. It also includes identifying the effects of accidents in construction industry. A questionnaire was framed, in which a total of 44 causes and 11 effects of accidents were included and then a respondent of 30 construction firm was received. The major causes of accidents were grouped into five groups; the groups of causes of accidents were unsafe act, unsafe working condition, communication barrier, management commitment, and training. Therefore, for improving the safety in a project each of these items should be analyzed and a practical approach introduced to finding the most possible factor which causes accident in the construction industry. The most possible factor that causes accident in the firm were failure to follow safety rules, ignorance of PPE (Personal Protective Equipment), space congestion, improper use of safety items, improper equipment. Then the most possible effects of accidents in the construction industry were cost of medical expenses, time loss of project execution, productivity loss, distrust of firm, cost of training given to new workers.

Key words: Accidents, Causes of Accidents, Effects of Accidents, Safety, Construction.

1. INTRODUCTION

Construction industry mainly relies on human control and their effectiveness makes the project a successful one. Without human factor construction industry becomes questionable. Therefore, to enrich the construction industry the management or construction firm should ensure their safety in their working environment. Accidents are unexpected events that occur at any circumstances even when the firm was in safer conditions, the aim to be minimize or control the accidents. The safety just not handles the safety of the workers itself, it ensures the workers to trust on the firm and also if the workers feel that they are working in a safer environment the productivity and effectiveness of the workers gets higher to the project. There might be several factors which affects the construction safety directly or indirectly. In the rate of accident and fatalities in construction industry is the highest. There are at least 60,000 fatal accidents in a construction site annually around the world and the fatality rate for construction industry is almost higher than the national average among industries worldwide. Most of the accidents are caused by human error. The human error is considered as an undesirable human decision or action that reduces the effectiveness of safety or system performance. Examples are misuse of equipment and tools and misconduct of workers. However, there are other factors that cause accident for example, mentioned that inappropriate ergonomic design, such as inadequate light, exceeding noise and vibration of equipment could cause accident. Moreover, quality of material, equipment technology and personal protective equipment (PPE) could also be the cause of hazard. This research study, therefore, focuses on identifying the root causes of accidents from a human/non-human errors perspective. A safety officer or Project manager should develop a safety plan for the firm and should inspect the safety regulations that are following in the project regularly.

1.1 OBJECTIVES OF THE STUDY

- To find out the major causes and effects of accidents in the construction industry.

- To predict the causes based on different respondents.
- Suggesting general methods and techniques to minimize the accidents in the construction industry.

2. PROBLEM IDENTIFICATION

In general there are several items which influence the safety performance. Accidents are the direct results of unsafe activities and conditions, both of which can be controlled by management. **There are three main root causes of accidents** failure to identify an unsafe condition that exists before or after the start of an activity, carry on a work in unsafe condition, and decide to perform regardless unsafe site conditions. Construction accidents happen due to unsafe acts and conditions. According to accidents are caused due to poor safety awareness, lack of training, lack of organizational commitment, poor technical supervision, uncontrolled operation, unwillingness to input resources for safety, shortage of skilled labor, unsafe equipment, lack of first aid facilities, lack of safety regulations, lack of personal protective equipment, lack of innovative technology, and poor information system. Unsafe conditions (missing guardrails, defective tools, hazardous conditions, excessive noise, and lack of sufficient light) and unsafe behaviors (smoking at workplace, improper use of equipment, work without safety appliances, not to use protective equipment, and being in an unsafe place) are the immediate or the primary causes of accidents. Unsafe conditions and unsafe behaviors are the responsibility of management as these are developed due to the failure of management to anticipate issues like training, maintenance, instruction, and not having safe systems at workplace.

3. CAUSES OF ACCIDENTS IN CONSTRUCTION SITE

3.1 CAUSES OF ACCIDENTS

- Causes of accidents classified by two types
- i) Causes of accident by human errors

ii) Causes of accident by Non-human errors

3.2 CAUSES OF ACCIDENT BY HUMAN ERRORS

Injuries to person the following table shows the fatal injuries, major injuries with different causes at construction site this table shows result of statistic of great Britain employees injuries in year 2013-2016. This data shows major accident is happened by handling and lifting of object as it fall the object from height and it follow the slip ,trips. The injuries by accident having different types by seriousness of injuries.

Table .3.1Reported injuries to employees in Great Britain by kind of accident, severity of injury and main industry classification.

S. No	Causes of accidents	Fatal injuries in construction site	Major or Specified injuries in construction	Over 7 days injuries in construction site
1	Contact with moving machinery	3	92	190
2	Struck by moving, including flying/falling, object	2	250	364
3	Struck by moving vehicle	3	55	53
4	Strike against something fixed or stationary	1	49	77
5	Injured while handling, lifting or carrying	-	170	992
6	Slips, trips or falls on same level	-	52	681
7	Falls from a height	11	583	373
8	Trapped by something collapsing/overturning	1	9	24
9	Exposure to, or contact with, A harmful substance	-	9	37
10	Exposure to fire	-	5	13
11	Exposure to an explosion	-	3	1
12	Contact with electricity or electrical discharge	1	16	9
13	Injured by an animal	-	2	7
14	Acts of violence	-	10	12
15	Other kind of accident	6	129	450
Total		28	1900	3293

Table 3.2 Factors Needed to Prevent Root Causes of Construction Accidents

S.No	Root cause	Factors needed to prevent root cause
1	Lack of proper training	Have expertise in task; have expertise in training requirements; able to interview; test; or observe employee; have access to prior training records
2	Deficient enforcement of safety	Able to monitor work on frequent basis; know safety requirements for task; able to enforce safety
3	Lack of safety equipment	Know what safety equipment is required for task; able to provide and enforce use of equipment; know inspection and maintenance history of equipment being used
4	Unsafe methods or sequencing	Know standard methods and sequencing for task; able to observe actual methods and sequencing; able to control methods or sequencing
5	Unsafe site conditions	Know proper site conditions; able to observe actual site conditions; able to control site conditions
6	Not using provided safety equipment	Able to observe employee constantly; able to influence behavior through evaluations; and soon
7	Poor attitude toward safety	Interact with worker frequently; able to influence attitude through evaluations; and so forth
8	Isolated freak accident	Cannot predict or prevent unless employee's emotional or physical condition contributed and this condition was obvious to other

3.3 CLASSIFICATION OF ACCIDENT ON CONSTRUCTION SITE

3.3.1 Falls from High Heights or Scaffolding

Fall hazards are present at most worksites and many workers are exposed to these hazards on a daily basis. A fall hazard is anything at your worksite that could cause you to lose your balance or lose bodily support and result in a fall. Any walking or working surface can be a potential fall hazard. Any time you are working at a height of four feet or more, you are at risk. OSHA generally requires that fall protection be provided at four feet in general industry, five feet in maritime and six feet in construction. However, regardless of the fall distance, fall protection must be provided when working over dangerous equipment and machinery. The importance of fall protection cannot be stressed enough. Fall hazard incidents are injuries produced by impact between the injured person and the source of injury when the motion producing contact was generated by gravity.



Figure .3.1 fall from High Heights or Scaffolding Causes

A construction worker was working from a carpenters' wall bracket scaffold without fall protection. The worker fell 19 feet to the ground, sustained blunt trauma to the head and later died. Construction workers are often required to work at very high heights, on scaffolding and ladders, in windows and on roofs. A fall is categorized when a person is injured after falling or jumping from a ladder, scaffold, building, roof, or other elevated place or working area landing, with impact, on the ground or surface below According to the Bureau of Labor Statistics, these accidents account for 34 percent of all on-the-job deaths of construction workers.

- Unprotected roof edges, roof and floor openings, structural steel and leading edges, etc.
- Improper scaffold construction
- Unsafe portable ladders
- A safe system of work for scaffold dismantling was not provided
- The tubular scaffold was not horizontally and securely erected on the inclined floor
- The worker overstretched his body from the working platform resulting in the imbalance of the tubular scaffold
- The steel plate underneath the tubular scaffold failed to balance and secure the scaffold
- The overall structure of the boatswain's chair was unsafe The whole structure was not inspected by a competent examiner before use
- The fall arrestor and independent lifeline were not properly installed, thus failing to prevent the worker from falling

Injuries type

Skull fracture, Intra-thoracic injury, Fracture of the long bones, Pelvic fracture, vertebral fracture, Fracture in lower limb, elbow fracture

Statics :- 28 %

3.3.2 Slips, Trip and falls

From stray tools and materials to uneven ground or holes, there are many hazards on a construction site that could lead to a dangerous slip, trip, or fall. Slips happen when there isn't enough friction or traction between your feet and the surface you're walking on. Common causes of slips include wet or oily floors, spills, loose or unanchored mats, and flooring that lacks the same degree of traction in all areas, CCOHS states. Trips happen when your foot strikes an object, causing you to lose your balance.

To help prevent slips and trips, CCOHS recommends the following:

- Clean up spills immediately. If a spill can't be cleaned up right away, place "wet floor" warning signs for workers.

- Keeps walkways and hallways free of debris, clutter and obstacles.
- Keep filing cabinets and desk drawers shut when not in use.
- Cover cables or cords in walkways.
- Replace burnt-out light bulbs promptly.
- Consider installing abrasive floor mats or replacing worn flooring.
- Encourage workers to wear comfortable, properly fitted shoes.

Falls

The Centers for Disease Control and Prevention states that falls can happen in all occupational settings, and "circumstances associated with fall incidents in the work environment frequently involve slippery, cluttered or unstable walking/working surfaces; unprotected edges; floor holes and wall openings; unsafely positioned ladders; and misused fall protection."To reduce the risk of falling at work, CCOHS recommends paying attention to your surroundings and walking at a pace that's suitable for the surface you're on and the task you're performing. Additionally, walk with your feet pointed slightly outward, make wide turns when walking around corners and use the handrails on stairs.

IMPACT OF SLIPS, TRIPS & FALLS



Figure 3.2 Slips, Trip and falls

Causes

- spills of liquid or solid material
- wind-driven rain or snow through doorways
- change from wet to dry surface
- dusty and sandy surfaces
- the incline of a ramp low light levels
- use of unsuitable footwear , with wet, muddy, greasy or oily soles
- Wet or greasy floors, Loose flooring, carpeting or mats
- Uneven walking surfaces
- Missing or uneven floor tiles and bricks
- Damaged or irregular steps; no handrails
- Electrical cords or cables
- Ramps and gang planks without skid-resistant surfaces
- Metal surfaces – dock plates, construction plates

Injuries type

Musculoskeletal injuries, cuts, bruises, fractures and dislocations of bones but more serious injuries can also occur

Statics: - 15 %.

3.3.3 Electrocutions

Due to the fact that construction sites are a work in progress, there is often exposed wiring, power lines, and unfinished electrical systems around. Coming in contact with these could

lead to electrocution or shock. In many of the electrocutions, electrical workers and other construction workers touched metal objects that had become energized through contact with live electrical equipment and wiring or with overhead power lines. Thus, 42 (12%) of the electrocutions of electrical workers and 88 (32%) of those of other construction workers that involved electrical wiring and equipment involved these contacts. The most common contacts were with metal ladders, metal pipes, metal wires that were deliberately cut or stripped or were accidentally cut by electric drills or other tools, wires that were energized by contact with live wires, and energized trucks and other vehicles. In many of the electrocutions, electrical workers and other construction workers touched metal objects that had become energized through contact with live electrical equipment and wiring or with overhead power lines. Thus, 42 (12%) of the electrocutions of electrical workers and 88 (32%) of those of other construction workers that involved electrical wiring and equipment involved these contacts. The most common contacts were with metal ladders, metal pipes, metal wires that were deliberately cut or stripped or were accidentally cut by electric drills or other tools, wires that were energized by contact with live wires, and energized trucks and other vehicles.



Figure 3.3 electrocutions in construction site

3.3.4 Falling Debris, Materials or Objects

A construction worker injured by falling debris, materials, or objects at a construction site should call an experienced personal injury lawyer for a free consultation. When mandatory construction site safety rules are followed such “accidents” do not generally happen. On construction sites, objects do not fall from the sky absent negligence. On projects with multiple levels, it is common for falling tools, building materials, or beams to strike workers below.

- A metal bar falling from height
- Bricks falling from height
- Metal pipes falling during lifting operation
- Formwork panels being knocked over
- Toppling over of precast concrete building unit



Figure 3.4 Falling Debris, Materials or Objects

Causes

- The metal bar was liable to fall as it was placed at the window edge on an upper floor
- The falling of the metal bar might be inadvertently caused by someone at work
- No secure fenders/bracings had been installed at the external wall of the building near the podium
- The concrete bricks were neither properly stacked nor securely tied
- The platform of the hoist was not installed with any enclosures to prevent loose materials from falling during lifting
- The frame of the hoist was unfenced
- The metal pipes were not properly tied before lifting
- The materials were lifted past an area where workers were working
- The lifting operation was carried out despite insufficient communication between the crane operator and signaller

The vertically placed panels lacked sufficient support and proper storage to prevent them from toppling over by accident.

Injuries type

Lacerations Bruises Broken bones Neck and back injuries Concussions Traumatic brain injury Paralysis Permanent Disabilities.

Statics: - Nearly 8.6% of all deaths result from Falling debris, materials or objects.

3.3.5 Getting Caught In-Between Objects or Materials

According to OSHA, caught-in hazards collectively are one of the four deadliest dangers found on a construction site. Although it seems like common sense to never place yourself between a piece of heavy equipment and an immovable object, when you’re concentrating on the job at hand sometimes you find yourself in unexpected danger. Here are some tips to prevent becoming a victim of caught-in/between accidents

Construction sites are filled with heavy machinery, tools, and materials. Often, workers find themselves stuck in between immovable objects, machinery, or fallen debris.

- Trapped During Lift Maintenance
- Caught between a vehicle and another object,
- Pinched between equipment and the rig’s substructure, and
- Crushed between a load of pipe that fell off a trailer and forklift.



Figure 3.5 Getting Caught In-Between Objects or Materials

3.3.6 Fires and Explosions: Because of unfinished piping, leaking gases, and incomplete electrical systems, fires and explosions are a common occurrence on construction sites.



Figure 3.6 Fires and Explosions in construction Site

Data from the Occupational Health & Safety Administration (OSHA) indicate that there are on average 36 fire and explosion deaths per year in the construction industry. From underground gas lines to temporary heating devices to electrical systems, construction sites in South Carolina are full of hazards that can turn a day's work from routine to explosive in an instant.

3.3.7 Overexertion

Hours of hard labor, often in extremely hot or humid conditions, can cause workers to overexert themselves and even fall victim to heat stroke accidents. The condition can lead to dehydration, exhaustion and reduced mental clarity. Simple mistakes can lead to devastating accidents that can quickly end the lives of one or more individuals. Overexertion is a major cause of construction accidents, and is possibly involved in far more accidents than has been reported. Recognizing and handling overexertion when it occurs is extremely important to avoiding serious accidents. Some of the signs of overexertion include fatigue, dizziness, significant sweating, chest pain, weakness, and sore muscles, tightening of muscles, a burning sensation, nausea and excessive thirst. Overexertion is the No. 1 cause of non-fatal injuries according to a study carried out by The Center for Construction Research and Training overexertion creates stress on the joints and muscles in the body. Other ways overexertion injuries happen is because of repeated bending at Take the time to position your body correctly before you lift or move anything. It only takes a few seconds to position yourself correctly in order to prevent an overexertion injury form occurring.



Figure 3.7 Overexertion in construction Industry Causes

- Reaching over the worker's head;
- Working in small spaces;
- Reaching and leaning to pick up objects;
- Shoveling dirt, rocks, or other materials; and
- Bending over to grasp objects.
- Overexertion occurs when the load, whether lifted, carried, pushed, pulled or otherwise handled, exceeds the limits of the human joint system doing the work

3.4 CAUSES OF ACCIDENT BY NON-HUMAN ERRORS

3.4.1 Light (LHT)



Figure 3.8 Light causes in construction site

- Light linked to visibility related accident in workplace.

3.4.2 Weather (WTH)

Working environment and variety of natural phenomenon can cause fatalities on site, as most of these are unpredictable. This includes rain, wind, earthquake, flooding and landslides.



Figure 3.9 weather causes in construction site

3.4.3 Sunlight (SUN)

Working under direct sunlight for a long period of time may cause heat rashes, heat exhaustion, and heat stroke. This could lead to a more serious health-related issues, and accident.



Figure 3.10 Sunlight causes in construction site

3.4.4 Ventilation (VEN)

Working in an enclosed space with no ventilation making it hard to breathe.



Figure 3.11 Ventilation causes in construction site

3.4.5 Dust (DUS)

Dust that builds up when cutting, drilling or grinding material on the construction site can cause serious effects inside the body if exposed to for a long period of time.



Figure 3.12 Dust causes in construction site

3.4.6 Noise (NOS)

Frequent exposure to high level of noises either from the environment or from equipment can cause hearing damage.



Figure 3.13 Noise causes in construction site

3.4.7 Layout (LAY)

Inadequate space or difficult entry to perform a certain tasks was recognized as 15% of the accident studied therefore leading this to one of the major case whereby the delivery vehicle partially overturned due to the lack of sufficient room to extend the stabilizers.



Figure 3.14 Layout causes in construction site

3.4.8 Electrical hazard (ELC)

Electrical hazard causes 44% of all fatal electrical accidents from all industry. Mismanagement and poor protection of electrical system leads to fatalities.



Figure 3.15 Electrical Hazards causes in construction site

3.4.9 Vibration (VIB)

Working with operating machine or equipment that vibrates at a high frequency could cause workers to become exhausted and stagnant.



Figure 3.16 Vibration causes in construction site

4 EFFECTS OF ACCIDENTS IN CONSTRUCTION SITE

4.1 EFFECTS OF CONSTRUCTION ACCIDENTS

1. Time loss of project execution
2. Reputation of firm
3. Mental illness of workers
4. Cost of medical expenses
5. Cost of recruiting new worker
6. Cost of training given to new worker
7. Compensation Cost
8. Repairs
9. Additional Supervision cost
10. Productivity loss
11. Cost of accident investigation time

5 PREVENTIVE MEASURE ACTIONS

5.1 PREVENTIVE MEASURE ACTIONS IN CONSTRUCTION INDUSTRY

1. Falls from High Heights or Scaffolding
2. Slips, Trip and falls
3. Electrocutions
4. Struck By Object
5. Falling Debris, Materials or Objects
6. Getting Caught In-Between Objects or Materials
7. Fires and Explosions
8. Overexertion
9. Machinery accidents
10. Trench Collapses

5.1.1 Falls from High Heights or Scaffolding

- Falls from less than 3 meters in height (particularly ladders and scaffolding),
- codes and standards in all construction sites
- Emphasis on the importance of health and safety training for staff, both
 - generally and for specific sites Ensuring the different people with duties under the Health and Safety in
 - Employment Act 1992 are aware of their duties and what they need to do to fulfil those obligations Ensuring people working within a contracting environment are adequately
 - protected Awareness of an increased risk of fatality when working over 3 meters in
 - height Awareness about testing the structural integrity of permanent and
 - temporary structures Awareness of correct use and maintenance of safety equipment designed to prevent falls
 - When erecting a mobile tubular scaffold on an inclined floor, suitable mats should be used to keep the scaffold in a level position

5.1.2 Slips, Trip and falls

- Create Good Housekeeping Practices
- Reduce Wet or Slippery Surfaces
- Avoid Creating Obstacles in Aisles and Walkways
- Create and Maintain Proper Lighting
- Wear Proper Shoes
- Control Individual Behavior

5.1.3 Getting Caught In-Between Objects or Materials

- Ensuring all safety measures are in place after any equipment or machinery has been overhauled.
- Avoiding misbehaviour while at work.
- The wheels of machines or equipment should be wedged properly to prevent movement.
- Concentrating on the task at hand and the people around the work area.
- Avoid working with equipment or machines braced with jacks.
- Switching off equipment and machines before
- Being extra cautious while working with machines or equipment with gears, cables, straps, pulleys, or drive shafts.
- Escape route should be defined to avoid getting sandwiched between two objects.

5.1.4 Fires and Explosions

- Provide access to firefighting equipment at all times, and regularly inspect firefighting equipment
- Provide a water supply of sufficient volume, duration, and pressure to operate fire fighting equipment
- Where underground water mains are to be provided, they must be installed and available for use as soon as practicable during the construction process, and if a building includes a sprinkler system, it must be installed as soon as possible
- There must be at least one fire extinguisher on every floor and enough fire extinguishers present that workers do not have to go more than 100 feet to retrieve one when needed (but sometime a hose may substitute)
- Fire walls and exit stairways shall be given construction priority over other jobs
- Fire alarm systems are required

5.1.5 Overexertion

- Walk in a straight line and if possible avoid twisting your legs or torso to the side. Keep all parts of your body facing the same direction at all times.
- Have a plan before you lift. Know exactly where you are going and the route you are planning to take. Make sure there are no tripping hazards on your way and that the area you area heading to is clean.
- Keeping the object as close to your body as possible will help to greatly reduce the stress on your muscles.
- When reaching for something try to stand as close as possible. This will reduce the injuries that could occur such as stretching a tendon to far.

5.1.6 Machinery accidents

- provide the correct type of work equipment which is suitable and safe for the job
- properly maintain and safety inspect work equipment
- provide proper training and information to any employee using equipment at work
- ensure that the work equipment is fitted with suitable safety features (for example emergency stop controls, guards, warning signs etc)

➤ Employers have a duty to take adequate steps to prevent injuries when using work equipment. Risks from work equipment can be reduced in a number of ways:

1. Risk assessments:

Before any work equipment or machinery is used or installed a risk assessment must be carried out to identify the hazards and risk of injury that may arise when using the work equipment and to identify ways in which the hazards and risk may be eliminated or reduced.

2. Remove the hazard:

The best method is to arrange the system of work so that dangerous or hazardous equipment does not need to be used. If this is not possible other methods of reducing risks must be considered.

3. Safety design and controls:

It is important that all work equipment has proper safety controls built-in to the design.

4. Well-designed work equipment should:

Guards on work equipment and machinery where hazards from equipment cannot be avoided employers should ensure that equipment has proper guards to prevent access to moving or dangerous parts.

5. Regular maintenance and inspection of work equipment:

Is important to ensure that the work equipment is free from faults or damaged and working correctly and safely.

6. A safe work environment:

The work place in which work equipment is used must be safe and suitable for the use of the equipment. There should be sufficient room to the use the equipment safely and adequate lighting. Floors should be free from any trip hazard which could cause a person to fall whilst using work equipment.

7. Safe working practice:

Any work equipment must be used within a safe system of work and in accordance with manufacturer's instructions and recommendations. Staff must be properly supervised to ensure that safety instructions and procedures are followed. Safety procedures for work equipment will depend upon the nature of the work and the equipment used but could include.

6 DEVELOPMENT OF SAFETY PERFORMANCE

6.1 DEVELOPMENT OF SAFETY PERFORMANCE

We required preventing accident because of 3 reasons as mentioned in below:

- 1) Humanitarian Reason: to ensure that people are safe and healthy at work and nobody suffers from accident due to the work activity.
- 2) Legal Reason: to comply with provisions of law which, specify standards to ensure safety and health at work.
- 3) Economic Reason: to prevent losses due to accident in term of expenses on medical, compensation, property damage, downtime, etc.

6.1.1 Step 1: (Creating safety and health regulation)

Safety policy is contained some notification that exhibit responsibilities, commitments, culture, behavior and requirement to ensure that a workplace is safe, healthy and acceptable. So this statement will encourage all the employees

and other people in the site that are affected by the site condition to pay attention to these notifications to increase safety performance. The responsibility of this policy is as below:

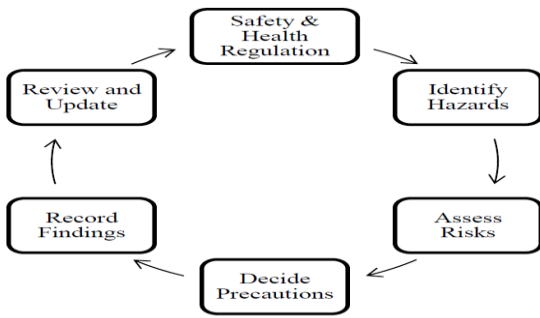


Figure 6.1 Guidelines on Risk Assessment and Continuous Safety Improvement

- Create a condition to ensure that workers are operating in safe and healthy environment
- Decline the situation that cause to create risk
- Provide safe tools and equipment
- Provide reliable method and procedure for doing work
- Provide needed information, training, and instruction regarding to site condition and type of the construction project
- 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

6.1.2 Step 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. Some regular causes of physical hazard are falling from scaffold, moving heavy burden manually, cutting by machine, burning by firing materials, straining, injury by another person and etc. while chemical hazards are related to chemical materials that are utilized in a project such as glues and correction fluids to industrial solvents, dyes, and acids. Regulation is required for using chemical materials by workers. This regulation should create according to effect of chemical materials on skin that is initial problem and also examine long term effect of these materials. Biological hazards contain every kind of viruses and bacteria that may lead infection and substances from animals that can cause health problems. Therefore, biological regulation for more protection and increase safety is required. Human factors are related to the mental and physical capacity of the worker. Workers must have the ability to do their duty and work place and system should be comfortable and without stress. For instance, pregnant women, people with disabilities, older worker, or young worker with no experience have higher accident rate. 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.

6.1.3 Step 3: (Assessment and evaluation of risk)

Possibility of harm to the people by hazard is risk that has different severity and frequency. Risk is also related to the number of people who will be affected by hazard. The magnitude and serious of the harm and also the number of the worker that are affected is important for assessing risk. 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 is different quantitative and qualitative risk assessment that we have to choose suitable one regarding to the project and site condition.

6.1.4 Step 4: (Decide What Precautions Are Required)

You have to use proper method and tools regarding the situation to preventing risk. Law requirement is one of the important strategies that must be followed by all the employers. Law is going to make a guideline on how evaluate the risk and increase safety. Most of the times improving 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 and effective. Some of the precaution is as below:

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

6.1.5 Step 5: (Record Finding)

All the finding of the risk assessment must be record in safety statement. It means mention more hazard and dangerous situation that can affect employees in workplace. Therefore, company rule, manufacturing instruction, and choosing appropriate attitude is related to these records. This finding must be update and related to the work position because of increasing safety and also decline risk. Some documents that can assist us to add several useful notifications to the safety policy which is utilized in the organization are according to the following:

- Manual instruction of materials and plants.
- Company regulations.
- Operating instructions.
- Manufacturers’ instructions.
- Company safety and health procedures.

6.1.6 Step 6: (Review and Update)

Using safety statement should be one of the important parts of the work and everyday this statement should be available for inspection in the workplace. This statement should be obvious and relevant to the work. Significant change in workplace or kind of the work that can add new hazard to the employee cause to provide new statement related to these hazards. Employees are responsible to amend safety statement if necessary. Sometimes employee cannot do it and should take help from professional persons. Employee should consider some important issues to revise safety statement as below:

- Safety statement must be related to the work condition
- Examine hazards, risks, risk assessment and identify essential safety protector
- Use practical methods to implement in site
- All the notification should be according safety and health performance standard
- Consider all the humanitarian, legal, and economical reason for preventing hazard and risk

Examine how can improve safety and health performance as mentioned this guideline are going to assist the employer to manage safety and health in working places.

7 CONCLUSION

Construction work is dangerous without know safety problem sand fatal of injuries caused by it. Generally, the production of construction products is a risky, complex and lengthy process. Cost, time, quality and safety are important characteristic of every project. Adherence to safety requirements has led to increased exposure of workmen and the general public to risky situation at construction sites resulting in a high chance of occurrence of accidents. Accidents resulted direct physical injury to persons or damage to property, but also short and long term effects to the company. The aim of this review to know safety problems causes of accidents and injuries on construction site The cause of accidents in the construction industry like workers' negligence, failure of workers to obey work procedures, work at high elevation, operating equipment without safety devices, poor site management, harsh work operation, low knowledge and skill level of workers, attitude about safety. All organizations and individuals involved in construction projects should be actively concerned with the safety of the workers performing the actual construction on-site. Establishing realistic, shared expectations about the safety role that each entity can play will reduce the current uncertainty within the design and construction community, allowing entities to better focus on the roles they can realistically assume. Ultimately, shared expectations will help prevent some accidents from occurring and improve the overall level of safety on construction sites.

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