

# Safety Problems and Injuries on Construction Site: A Review

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## Abstract:

The construction industry involves risky and unhealthy operations which result in many human tragedies, to lose enthusiasm of workers, disrupt construction, delay progress, and adversely affect cost, productivity, and reputation. The complex nature of construction and hazards it has occupational health and safety in construction work should design table and continue throughout the construction phases until the safety and health of every end users is ensured. Safety is a major concern for construction companies, as it is a source of substantial direct and indirect costs. In some countries, the rate of total workplace injuries from construction activities can be as high as at least 50%. This is undoubtedly a serious matter warranting urgent attention. This paper reviewed that the safety problems at construction site with fetal injuries caused by it with help of different graphical data of agencies .It gives detailed information regarding about the injuries type and physical loss of human from this. This study also revealed that the importance of safety in construction should pay more attention as the injuries loss the human life and also delay in completion of project

**Keywords - Safety, Hazards Injuries**

## 1. Introduction

Management and planning is one way to avoid unplanned events. Since accidents are unplanned events, an effective safety management can help avoid job injuries. Safety management must be through, and it must be applicable to all aspects of the job, from the estimating phase of the project until the last worker has left the premise at the completion of the project. All parties to a construction project must be included in some way in the safety program every party is responsible. The construction industry continues to be one of the most physically demanding and dangerous industries in the India. The Construction activities in developing countries, such as Pakistan, China and India, are more labour intensive than in the developed areas of the globe, involving 2.5-10 times as many workers per activity [1]. Typically workers tend to be unskilled and migrate in a group, with or without their families, throughout the country in search of employment. In fact, they are usually divided into various factions. Communication problems related to difference in language, relation and culture tend to inhibit safety on the work site.

Construction safety in India is still in its early years because safety laws are not strictly enforced. The contractors ignore basic safety rules and regulations. Although, to improve working conditions, the government has enacted specific legislation like the *Minimum Wages Act*, the *Workmen's Compensation Act of 1923* (modified in 1962), and the *Contract Labour(Regulation and abolition) Act of 1970*, very little of

these are put into practice. *National Building Code of India 2005* provides guidelines for regulating construction activities across the country NBC [2]. Even then, workers' safety in the Indian construction industry is frequently pushed to the bottom stage of priorities by builders, contractors, and engineers. In developing countries, safety rules usually do not exist, if exist; regulatory authorities are unable to implement such rules effectively. Therefore, effective safety knowledge among construction professionals can reduce accidents that directly or indirectly reduce project cost. Especially in developing countries like India, efforts should be made to raise the level of awareness among the workers and the employers about the importance of health and safety-related issues. Therefore, objective behind this paper was to create awareness among construction workers about the safety problems and injuries in the construction industry. The safety knowledge available on the subject has been categorized and discussed in subsequent sections

## 2. Safety problems on construction site

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 [4]. 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. [5] Construction accidents happen due to unsafe acts and conditions.[6]

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 labour, unsafe equipment, lack of first aid facilities, lack of safety regulations, lack of personal protective equipment, lack of innovative technology, and poor information system.[7]

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 [7] 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

The accident causation theories are tools for accident prevention programs. Several theories like *Domino theory*, *Multiple Causation theory*, and *Human Factor theory* explain the occurrence of accidents.[4] The *Domino theory* stated that an accident results from sequence of five dominoes (factors) standing on an edge in a line close to one another, when the first domino falls it strikes second which in turn knocks down third and so on. Removal of any one of first four will break the sequence and avoid the accident. *Multi Causation theory* stated that the contributing causes together in a random fashion result an accident. The *Human Factors theory* attributes accidents to a series of events caused by human error [5].

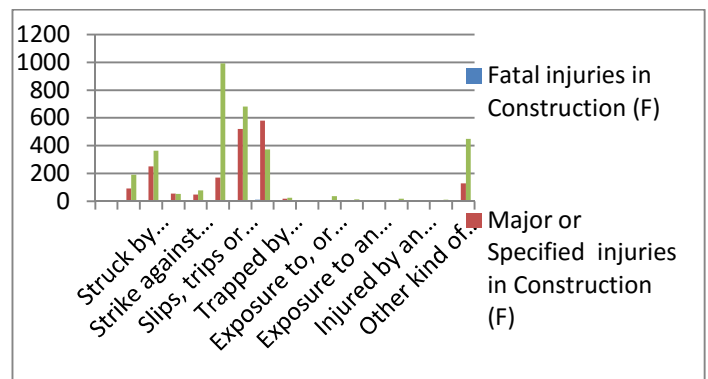
Management is responsible for the creation of the working environment, into which workers fit and interact. Proper site management reduce hazards and accidents [8]. Many accidents can be prevented if appropriate information is available at right time and place. [7].

**3.Causes of accidents**

Different causes of accident related to different numbers of the injuries to person the following table no 1 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 2013-2014 [9] the graphical representation of table is in figure no 1. 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 no . 3.1** Reported injuries to employees in Great Britain by kind of accident, severity of injury and main industry classification, 2013/14p

Causes of accident	Fatal injuries in Construction	Major or Specified injuries in Construction	Over-7-day injuries in Construction
Contact with moving machinery	3	92	190
Struck by moving, including flying/falling, object	2	250	364
Struck by moving vehicle	3	55	53
Strike against something fixed or stationary	1	49	77
Injured while handling, lifting or carrying	-	170	992
Slips, trips or falls on same level	-	520	681
Falls from a height	11	581	373
Trapped by something collapsing/overturning	1	19	24
Exposure to, or contact with, a harmful substance	-	9	37
Exposure to fire	-	5	13
Exposure to an explosion	-	3	1
Contact with electricity or electrical discharge	1	6	19
Injured by an animal	-	2	7
Acts of violence	-	10	12
Other kind of accident	6	129	450
<b>Total</b>	<b>28</b>	<b>1 900</b>	<b>3 293</b>



**Fig.no 3.1** . Reported injuries to employees in Great Britain by kind of accident, severity of injury and main industry classification, 2013/14p

**Table no 3.2 Factors Needed to Prevent Root Causes of Construction Accidents**

Root cause	Factors needed to prevent root cause
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
Deficient enforcement of safety	Able to monitor work on frequent basis; know safety requirements for task; able to enforce safety
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
Unsafe methods or sequencing	Know standard methods and sequencing for task; able to observe actual methods and sequencing; able to control methods or sequencing
Unsafe site conditions	Know proper site conditions; able to observe actual site conditions; able to control site conditions
Not using provided safety equipment	Able to observe employee constantly; able to influence behavior through evaluations; and so on
Poor attitude toward safety	Interact with worker frequently; able to influence attitude through evaluations; and so forth
Isolated freak accident	Cannot predict or prevent unless employee's emotional or physical condition contributed and this condition was obvious to other

**3.2 Classification of Accident on construction site**

**1. Falls from high heights or scaffolding** <sup>[10,12]</sup>

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.

**Causes**

- 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 %**

**Preventive measure actions**

- 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 fulfill 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

**2. Slips and falls** <sup>[11,14]</sup>

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.

**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
- **Preventive measure actions**
- 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

**Statics: - 15 %**

### 3. **Electrocutions**<sup>[11,15,16]</sup>

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.

- Electrocution when Using Hand Tool
- Electrocution when Carrying Out Electrical Works

#### **Causes**

- The workplace was damp and with water pools
- The electric saw was not properly earthed
- The power socket was not fitted with any residual current device (commonly known as earth leakage circuit breaker)
- There was leakage current from the electric saw
- The power supply had not been disconnected before the works were carried out
- The insulations of some of the wires had been damaged

#### **Injuries type**

Shock ,Burns, Falls due to contact with electricity, Electrocution (death)

**Statics :-** Nearly 9% of all deaths result from electrocutions

#### **Preventive measure actions**

- Provide Personal Protective Equipment
- To Inspect Tools and Cords
- Make sure you are trained in electrical safety for the work you will be doing
- Ensure machinery and power tools are properly grounded or double insulated
- Check all extension and power cords for wear and tear before use Disconnect the plug on any power tool or machinery before inspecting or repairing
- Keep at least 10 feet from live overhead power lines.
- Keep metal objects away from live electrical circuits/parts.

### 4. **Struck by object**<sup>[10,11,19]</sup>

Struck-by injuries are produced by forcible contact or impact between the injured person and an object or piece of equipment. Having said that, it is important to point out that in construction, struck-by hazards can resemble caught-in or –between hazards.

- Struck-by flying object
- Struck-by falling object
- Struck-by swinging object
- Stuck-by rolling object

#### **Causes**

- The catastrophic failure of equipment on the oil rig
- Objects falling off the rig’s superstructure, the tops of tanks, building roofs, scaffolding, aerial lifts, cranes and forklifts can strike employees working nearby
- tripping pipe in and out, the derrickman or the floor hands
- Semi-tractor trailers, crew trucks, service vehicles, end loaders, excavators and forklifts can pose

#### **Injuries type**

**Statics :-** Nearly 8% of all deaths result from Struck by object

#### **Preventive measure actions**

- Inspecting equipment connections, checking pressure gauges, using proper lubrication, and replacing defective chain and wire rope.
- Use appropriate personal protective equipment (PPE)
- use appropriate toe boards, identifying and barricading the areas below work zones, and requiring PPE

- Train new employees in the operation of the drill rig and where to safely stand when
- Protect employees by barricading the swing radius of cranes and excavators.
- Display signage on cranes that identifies swing hazard areas.
- Protect employees on the ground by instructing equipment operators to be aware of employees working around the equipment.
- Workers on the ground should stay alert and be aware of equipment moving nearby.

#### **5. Falling debris, materials or objects**<sup>[10,11,19]</sup>

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

##### **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

##### **Preventive measure actions**

- Use a suspended working platform instead of a boatswain's chair
- Inspect, examine and test the suspended working platform before use
- Use the safety harness and independent lifeline properly
- Materials are properly stacked and securely tied
- The platform is enclosed
- The frame of the hoist is securely fenced
- The crane operator should take a safe lifting route with the assistance of a signaller
- Adopt a standard set of hand signals or use other effective means of communication, such as walkie-talkies, for lifting operation
- Use secured guy ropes or supporting frames to fix the precast building unit in position
- Wearing protective gear, such as helmets, goggles and hard hats, at all times while on the job
- Staying clear of areas with posted warning signs
- Staying away from barricaded hazard areas
- Not walking under ladders or scaffolds
- Using the right equipment for job or tasks at hand
- Not stacking materials or objects too high
- Securing tools and equipment when doing overhead work
- Not exceeding the lifting capacity of a crane, lift or hoist

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

#### **6. Getting caught in-between objects or materials**<sup>[10,11,17]</sup>

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.

##### **Causes**

- The stopping switch in the machine room as well as the emergency stop switch and the maintenance switch on

top of the lift car were not activated before carrying out the maintenance work

- No warning sign was posted to warn other people not to use the lift
- work involving moving equipment
- inadequate training or preparation
- completing a task under physical or mental pressure
- being absent-minded
- working with unreliable machinery

#### **Injuries type**

wounds, contusions, and scratches broken bones different kinds of injuries involving internal organs amputations

#### **Preventive measure actions**

- Ensuring all safety measures are in place after any equipment or machinery has been overhauled.
- Avoiding misbehavior 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 checking and fixing them.
- Being attentive to individuals carrying materials that obstruct their view of other employees or where they are going.
- Maintaining a safe distance from the equipment to ensure the operator can see the employee when machines or equipment are fastened or unfastened.
- 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.

**Statics** :- Nearly 4 % of all deaths result from Getting caught in-between objects or materials

#### **7. Fires and explosions**<sup>[11,18]</sup>

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

##### **Causes**

- The use of flammable liquids
- Welding or abrasive cutting techniques used in places not specially prepared for such works
- Liquid gases used with an open flame;
- Flammable and combustible materials (e.g. petroleum, timber and packaging).
- Gas leaks;
- Chemical leaks;
- Electric sparks/malfunction;
- Welding;
- Static electricity;
- Combustible dust;
- Lack of training/negligence;

#### **Injuries type**

Burns, Death, Disfigurement, Lung damage, and Smoke inhalation.

#### **Preventive measure actions**

- Develop a fire protection program
- 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 firefighting 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

**Statics** :- Nearly % of all deaths result from Fires and explosions

#### **8. 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.

Overexertion can contribute to serious construction 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, 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 from occurring.

- Bend at the knees when lifting. These will reduce the strain that is put on you back when lifting heavy objects. the waist and poor posture. These strains happen and can result in stretched or torn muscles. Construction workers are very susceptible to this type of overexertion, especially when they work outside on days that are hot and humid. Overexertion can be avoided, by taking breaks, staying hydrated, and using proper lifting and other techniques to reduce body stress.

#### **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

#### **Injuries type**

Fatigue, Dizziness, Significant sweating, Irregular heartbeat, Chest pain, Weakness, Painful/sore muscles Sudden tightening of muscles ,Burning sensations,

Nausea, Twitching, Loss of mobility, Tenderness Excessive thirst

#### **Preventive measure actions**

- 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.
- If your company uses large shelves try to avoid pushing products all the way to the back. The closer it is to the front of the shelf the less you will have to strain to remove it when needed.
- If you feel the object is to heavy to lift alone you should immediately ask for help.
- Mobile lifts are a great way to get product on high shelves. They will help prevent you from lifting over your head which can be extremely dangerous.
- You can reduce the need to bend by storing boxes on elevated platforms.

**Staticcs** :- Nearly 25 % of all deaths result from Overexertion

#### **9. Machinery accidents**

Construction workers use a lot of heavy machinery in their work. From cranes and bulldozers to jackhammers and nail guns, an error or accident with these tools can be very dangerous. Making a single mistake while operating construction machinery can result in a very serious injury or even death. Some of the worst construction accidents are caused by heavy machinery malfunctions. The most catastrophic construction accidents involving machinery often result in life-changing injuries such as amputations, traumatic brain injuries and even death. Surviving family members who've lost a loved one due to a machinery accident at a construction site may be able file a wrongful death lawsuit against whoever was responsible for making sure this type of accident does not occur.

#### Causes

- accidents and injuries caused by faulty or unsafe work equipment –
- falls from height due to defective or unsuitable ladders, working platforms or scaffolding
- injuries caused by sharp edges or broken parts on work equipment
- injuries sustained whilst using work equipment without proper protection –
- work accidents and injuries caused by lack of proper training to use work equipment
- injuries caused by the unsafe use of work equipment
- workplace injuries caused as a result of unsuitable work equipment

#### Injuries type

amputations, traumatic brain injuries, hand and bone fracture

#### Preventive measure actions

- 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)
- provide suitable protective equipment for employees using work equipment - such as safety footwear, safety goggles, ear protectors, safety helmets, protective gloves 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:
- **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.
- **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.

- **Safety design and controls:** it is important that all work equipment has proper safety controls built-in to the design.
- **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.
- **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.
- **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.
- **Safe working practice:** any work equipment must be used within a safe system of work and in accordance with manufacturers 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:
  - ensuring that staff do not wear loose clothing or jewellery which may become caught in a machine
  - banning the consumption of alcohol and drugs by staff operating machinery
  - ensuring that only properly trained workers use work equipment
  - warning workers against tampering with any machine guards or other safety device
  - ensuring that workers maintain a clean and tidy workplace around machinery
  - instructing staff to report any faults or defects in work equipment

#### 10. Trench collapses

Trenches are often a necessity on construction sites. If a trench collapses while a worker is inside, it could cause them to be hit with tools, machinery, or materials or bury them in the surrounding dirt.



**Causes**

Moving machinery near the edge of a job site excavation can cause a collapse of a wall within the excavation.

A rainstorm or flooding from a broken water main could increase the risk for injury.

Improper shoring or bracing can cause catastrophic injury to workers.

contact or sever underground utility lines.

- Flooding;
- Improper shoring;
- Equipment defects;
  - Machinery resting dangerously close to the trench;
  - Inadequate safety equipment; and
  - Poor digging.

**Injuries type**

Broken wrists, Broken ankles, Spinal injuries, Hip and knee problems, Nerve damage Traumatic brain injuries, Neck injuries, Cartilage tears, Broken pelvis, Broken back, Rotator cuff tears

**Preventive measure actions**

- work is planned so it can be done safely, including determining appropriate engulfment protection and site security requirements •
- a safe work method statement (SWMS) is developed for high risk work that involves mobile plant or if the trench depth is 1.5m or more •
- an emergency response plan (ERP) is developed to deal with potential incidents (eg worker rescue, ground slip or flood). When undertaking trenching work, ensure: •
- a competent person, experienced in trenching works, supervises and monitors the work
- workers are instructed on the ERP and SWMS (and it is followed)
- workers never work ahead of the protection or remove it prematurely if protection is being progressively installed
- materials, spoil and plant are kept away from the edge of the trench
- workers not involved with the work and the public can't access the trench and works area
- Workers must be protected while undertaking any work where they are required to enter a trench and there is a risk of engulfment. When appropriately

used, the following methods can provide the required protection:

- batter the walls to a safe angle.
- bench the walls to form one or a series of steps. •
- shore up the walls to support the sides.
- work inside trench shields.. A safe method to enter and exit the trench or shield must also be provided (eg a sufficiently long, secured ladder and landing platform)

**4. Injuries on construction site**

There are several injuries which happen at construction site with major and specified one . the table no 3 gives injuries number of employee in year 2013-2014 **RIDDOR** - Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013 of Health and safety in construction in Great Britain, 2014 [17] . The figure no 3 shows number of injures person in Great Britain in construction

Table no. 3 kinds of major/specified injuries in construction

**Figure 3 Number and rate of major/specified injuries**

Kind of injury to employees	Major/specified injuries in construction 2013/14p	Percentage of total of major/specified injuries in construction
Fall from height	581	31%
Slip, trip, fall same level	520	27%
Struck by object	250	13%
Lifting and handling injuries	170	9%



to employee in construction (RIDDOR)

**Types of Medical Conditions Caused by Construction Injuries**

**a. Amputations in Construction Accidents**

About 5 percent of those accidents occur on construction sites. Accidents victims who suffer the amputation of one or more limbs face a lifetime of challenges, both physical and psychological. Traumatic amputations (the accidental severing of some or all of a part of a limb) in on-the-job accidents are frequently amputation complications including: Chronic neuroma (pain and/or tenderness in the amputation area), Poor wound cover and healing, Infection of the wound and surrounding tissues, Stiffness related to injury or rehab issues, Sympathetic dystrophy syndrome caused by Non-secured scaffolding, inadequate machinery guards, improper repairs, improper equipment training, falls, falling objects unsafe work conditions. In each of these cases, the combustible combination of heavy machinery and user error can quickly lead to a catastrophic construction site amputation. Many construction workers who lose a limb will be unable to return to their jobs and might have to settle for lower-paid work.

#### **b. Burns**

Unfortunately, many construction workers are burned on the job each year. According to the U.S. Bureau of Labor Statistics, 920 workers sustained heat burns on construction sites in 2009. While burns are sometimes minor and can be treated with simple home remedies, construction workers or bystanders suffer from severe burns that are life threatening, and even fatal. When burn accidents happen at construction sites, it's important to investigate whether proper safety procedures were in place at the time of the incident or whether someone else's negligence contributed to the injuries. Burn injuries caused by electrical accidents (electrical shock and electrocution), toxic exposures and explosions. Work zones are brimming with potential hazards, (including gas lines, open flames, heavy machinery, overheating equipment, pipes), chemicals that can cause serious burns to construction workers, cement or hot water,

#### **c. Eye Injuries, Vision Loss and Construction Accidents**

The eye is a sensitive part of the body and is prone to great damage from even a relatively minor irritant. When you are working at a New York City construction site, many different physical and chemical hazards exist that can cause damage to your eyes or permanent vision loss, changing your life forever.

##### **Cause of Eye Injuries**

According to the Centers for Disease Control, contact with equipment or an object 70 percent and while exposure to harmful chemicals or fumes caused 26 percent of eye injuries. Scrap, waste and debris were responsible for 34 percent of work-related eye injuries, Chemicals or chemical products were responsible for 14 percent, Persons, plants, animals and minerals were responsible for 9 percent, Welding torches were responsible for 6 percent.

#### **d. Fracture Injuries and Construction Accidents**

Construction accidents frequently cause broken bones and multiple-fracture injuries. Labor statistics show that 10,380 construction workers in the United States sustained fractures from on-the-job accidents in 2009. That's down from the 13,470 construction employees who suffered broken bones the previous year.

Cause of Fracture Injuries - Falls are a leading cause of skeletal fractures, machinery accidents, machinery accidents, falling objects, machinery accidents, explosions, malfunctioning power tools. Sometimes fracture injuries occur on construction sites even when all precautions are in place.

##### **About Fractures on Construction Sites**

Fractures occur when excessive force is applied to a bone, causing it to break. The location and severity of the broken bone dictates how long it will take to heal. While construction injuries can harm the knees of anyone on a construction site, individuals in certain trades are more prone to knee injuries. Carpet layers, for instance, are at special risk. Other construction workers with a high risk of knee injuries and ankle injuries include masons, plumbers, carpenters, framers, roofers, insulators and tile setters. Anyone who performs tasks that involve frequent stopping, kneeling or squatting is at special risk for knee injuries.

#### **e. Paralysis and Construction Accidents**

That's not necessarily a surprise – nearly all types of new or renovated structures require the use of hefty materials, large machinery, power tools, electricity and chemicals during the construction process. A single misstep, fall or mechanical failure could cause life-altering on-the-job injuries. Paralysis is one of them.

Paralysis refers to the loss or impairment of the ability to move a body part as a result of damage to its nerve supply. Those individuals became paralyzed due to a spinal cord injury that occurred in the workplace. But other times, construction workers suffer on-the-job injuries and become paralyzed because someone acted negligently. In those cases, injured workers may have the right to file claims against the responsible party to help compensate for their physical, emotional and monetary losses.

Sometimes, the paralysis is temporary and impacts only a small part of the body (or permanent) paralysis, which impacts entire regions of the body. Then there's the psychological pain caused by paralysis.

#### **f. Shoulder Injuries and Construction Accidents**

Shoulders are some of the hardest working joints in the body, and construction workers rely on them every day to get the job done. When a shoulder injury happens on the jobsite, it can result in a long rehabilitation process or can even mean the end of a career.

According to the Bureau of Labor Statistics, accidents that damage the shoulders are among the most common of workplace injuries. In the most recent statistics, almost 87,000 workers suffered shoulder injuries on the job in 2009. Shoulders can be injured at construction site from either a traumatic blow or from constant overuse. In some circumstances, you could be entitled to damages if you suffered a shoulder injury while working at a construction site.

#### **g. Spinal Cord Injuries and Construction Accidents**

It's no secret that construction work on site is physically demanding. Thousands of able-bodied men and women head to busy construction sites every day, doing dangerous jobs that often require bending, lifting, climbing, operating heavy equipment and excavating. Sadly, some of them leave with spinal cord injuries.

Workplace accidents – particularly those involving construction workers – are among the leading causes of spinal cord injuries today. A spinal cord injury is serious and can cause permanent paralysis, quadriplegia / tetraplegia, paraplegia, hemiplegia and other life-threatening complications. The spinal cord is a bundle of nerves stemming from the brain and extending throughout the body's vertebral column. The spinal cord controls motor and

sensory functions and is responsible for transmitting nerve impulses to and from the brain. Damage to the spinal cord interrupts these vital signals, causing temporary or permanent problems below the level of the injury.

#### **h. Traumatic Brain Injury**

Traumatic brain injuries and traumatic head injuries occur when a sudden blow causes damage, such as a concussion, to the brain. TBIs may arise in the workplace from violent trauma to the head or when it is struck by a foreign object that pierces the brain tissue. Common causes of TBIs on construction sites include falls, hitting a stationary or moving object, vehicle and machinery accidents, scaffolding collapses, crane and forklift accidents, explosions, toxic exposure, nail gun accidents and trench, roof or wall collapses, among others.

For many people, recovery from a traumatic brain injury is a never-ending journey. The brain is the organ responsible for sending out all of the body's signals for thinking, sensation, language and emotion. When those signals are interrupted due to a traumatic brain injury, any number of complications can arise; some are a direct result of the injury and others arise secondarily. These include:

Brain swelling; Seizures; Strokes ;Blood clots ;Cranial nerve injuries; Paralysis; Skull fractures ;Cerebrospinal fluid leaks; Ventricular enlargement; Multiple organ failure ;Infections; Hypermetabolism; Muscle atrophy; Speech problems; Short-term or long-term memory loss; Behavioral problems; Personality changes; Cognitive deficits (thinking, reasoning, problem-solving abilities);Sensory problems (particularly with vision and hand-eye coordination);Chronic pain; Increased risk for dementia, Alzheimer's disease and Parkinson's disease

### **5. Conclusion**

Construction work is dangerous without know safety problems and 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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