LODHA

BUILDING A BETTER LIFE

Environment Health & Safety

HANDBOOK ON SITE SAFETY PROCESS



By

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INTRODUCTION

Accidents cause pain and suffering to victims and anxiety to their families. In order to prevent accidents to persons and property, total involvement by all levels of management, as well as each individual is necessary.

This site safety handbook has been written in practical terms and non-legal language, and is mainly in the form of checklists.

It is intended to be used as a “dip-in” volume, so that the reader can refer to whatever sections are appropriate to the work that has to be done. The contents list will help you find the particular section required.

If you are supervising others, the check list set out the points you need to explain, and the lines that your supervision should take. If you are an operative, the check lists will give you guidance on what you should do to help create and maintain safe working conditions for yourself and workmates.

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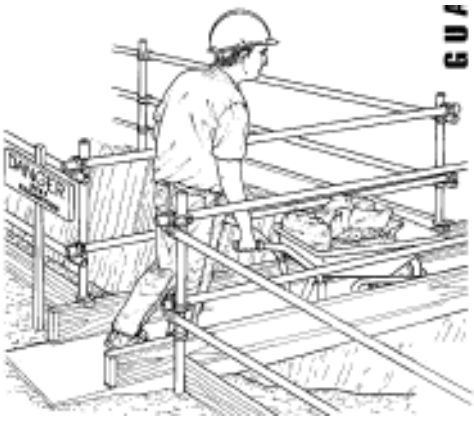
1.1. Access to Workplace

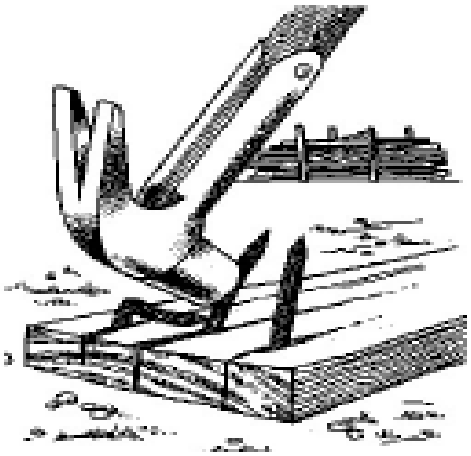
1.1.1. General

More than 50% of the accidents that causes absence from work involve fall or collisions of people with materials or with vehicles. It is most important, therefore, that proper access from place to place is created and kept safe.

Everyone working on building sites can assist in achieving this objective by ensuring that:-

- Safe access is provided for all concerned to reach allotted workplace. This should include good roadways, gangways, hoists, staircases, ladders and scaffolding.
- All walkways are level and free from obstruction.
- Edge protection is provided, or other preventative measures applied in cases where persons or materials can fall from an open side.
- Any holes or openings in floors are covered with securely fixed covers or, alternatively, fenced off.
- Adequate artificial lighting is available when work has to continue after dark.
- Site is tidy and materials are stored in safe positions.
- All projecting nails in timber are hammered down flat or removed.





1.1.2. Site Tidiness

Tidiness is one of the foundation stones of safety. Many accidents are caused through people tripping, slipping and falling over materials and equipment which should not have been left lying around.

This is an area where all site employees can make a significant contribution to safety by merely applying the following:-

- Do not leave rubbish lying about – clean up as you go.
- Do not obstruct gangways aisles or stairways with tools or materials.
- Make sure that spilled oil, grease or liquids is cleaned from floors.
- Gather up all off-cuts of tubings, reinforcing bars, and any other material.
- When clearing up make sure the refuse disposal point is in a safe position.

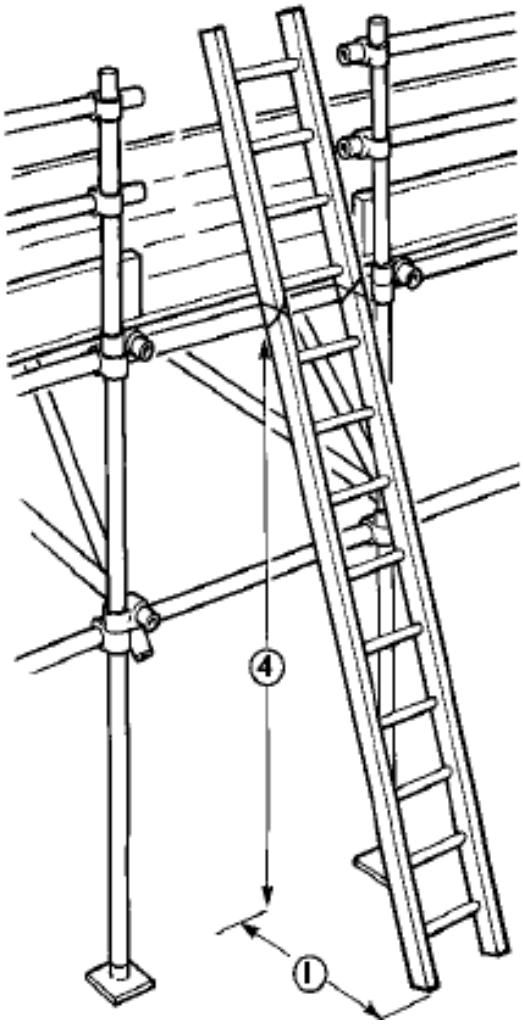


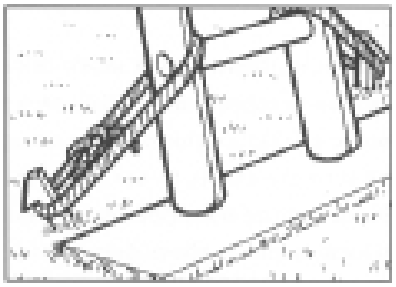
1.1.3. Ladders

Ladders are a main means of access on construction sites – especially in relation to building. They are frequently involved in accidents, often because of misuse.

The following are the main points to check when using a ladder:-

- Make sure it is in good condition and free from obvious defects.
- See that it is properly secured near the top, even if it is only used for short periods.
- If it cannot be secured near the top, it should be secured near the bottom, weighted or footed.
- Ensure that ladder rises at least 1.05 m above the landing, unless there is adequate handhold at the place of landing.
- Make sure the ladder is properly positioned for safe access.
- Set the ladder at the correct angle: 1m out for every 4m height.
- When handling and using ladders, make sure that no overhead power lines are in the vicinity.





1.2. Scaffolding

Falling is the most frequent cause of death in the building industry, and a large number of such fatalities are falls from scaffolding.

1.2.1. Erection of Scaffolding

Make Sure that:

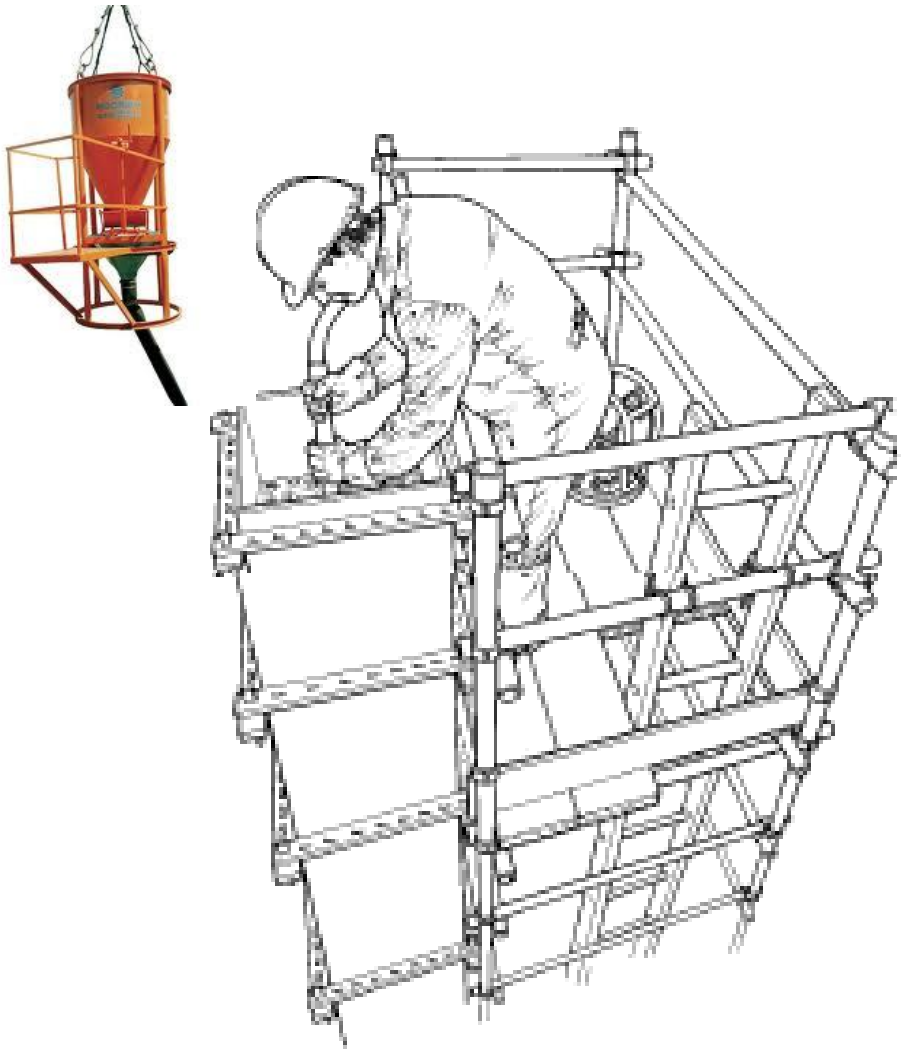
- You have sufficient material for the job and that it has been inspected and found to be in good condition.
- Timber sole plates are used, of adequate dimensions to provide safe bearing.
- Metal base plates are used on all standards.
- Scaffold boards are in good condition.
- Standards are upright and set out in accordance with the drawings or sketches provided.
- The scaffold is adequately tied to the structure.
- Working platforms are fully boarded complete with guard rails and toe boards.
- That there is a safe way to get on and off the scaffold, such as a ladder(without climbing on crossbraces).
- It has a minimum of 4-1 safety factor.
- It meets (where applicable) electrical safety clearance distances.



1.2.2. Working on Scaffolds

When working on scaffolds, it is in everyone's interest to follow the rules indicated below:

- Do not remove or interfere with the scaffolding – especially ties, guard rails, toe boards and ladders. Alterations to scaffolding must only be made by authorised persons.
- Do not use a scaffold while it is being erected or dismantled or is in any way incomplete.
- Report to your immediate superior any scaffolding which appears defective.
- When stacking materials, leave a gangway at least two boards wide.
- Before loading materials check the safe load capacity of the working platform. Load materials as near to standards as possible.
- See that materials are properly stacked and cannot be accidentally knocked off the working platform. Use brick guards or other suitable protection if necessary.
- Do not leave materials lying about on working platforms.
- Never throw, tip or drop materials from heights. They should always be lowered by suitable tackle or disposed of through a properly constructed rubbish chute.
- Never climb up or down the scaffolding; use the ladders or stairs provided.

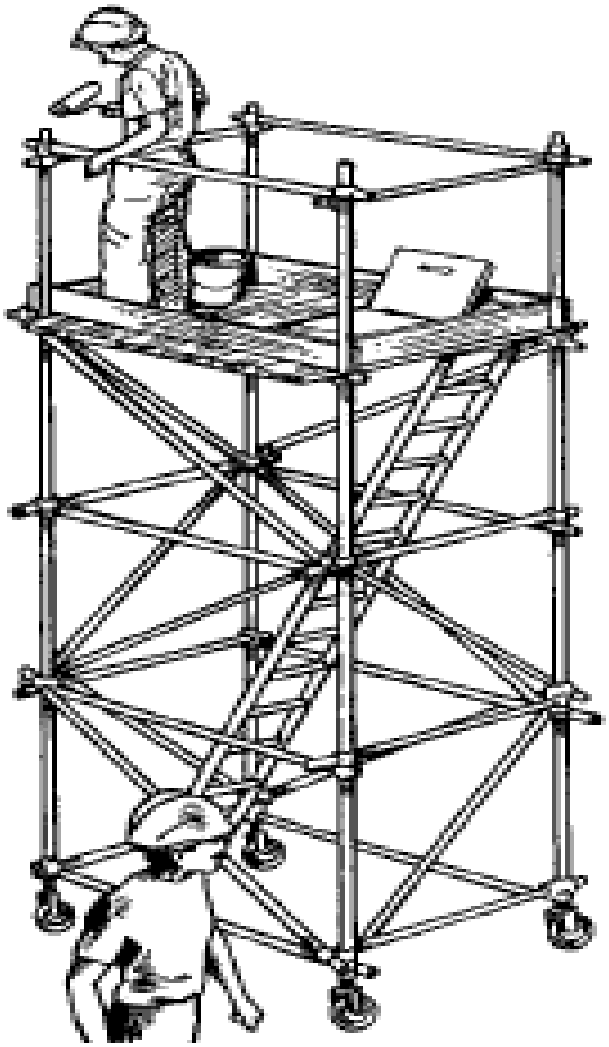


1.2.3. Mobile Scaffold Towers

Mobile scaffolds can readily be moved from place to place, and are convenient for painters and other trades – men whose work entails frequent moving.

In order to use a mobile tower in safety, it is important to follow certain rules:

- No – one should work on a mobile scaffold unless they are sure it is safe.
- For outside use, maximum height of tower should not be more than three times the shortest base, and 3½ times for inside use. If these heightto- base ratios have to be exceeded, outriggers must be used.
- Guard rails and toe boards must be fitted when the tower height is greater than 2m.
- Towers must only be used on firm level ground.
- Wheels must be locked before climbing a tower.
- Never move a tower if there are persons or materials on the platform.
- When moving a tower, it should be kept well clear of electric cable and equipment, and careful attention given to any overhead cables.
- Adequate means of access to the working platform should be provided in the shape of a ladder within the tower.
- The recommended load should never be exceeded.
- Other contractor's towers should not be used without permission.

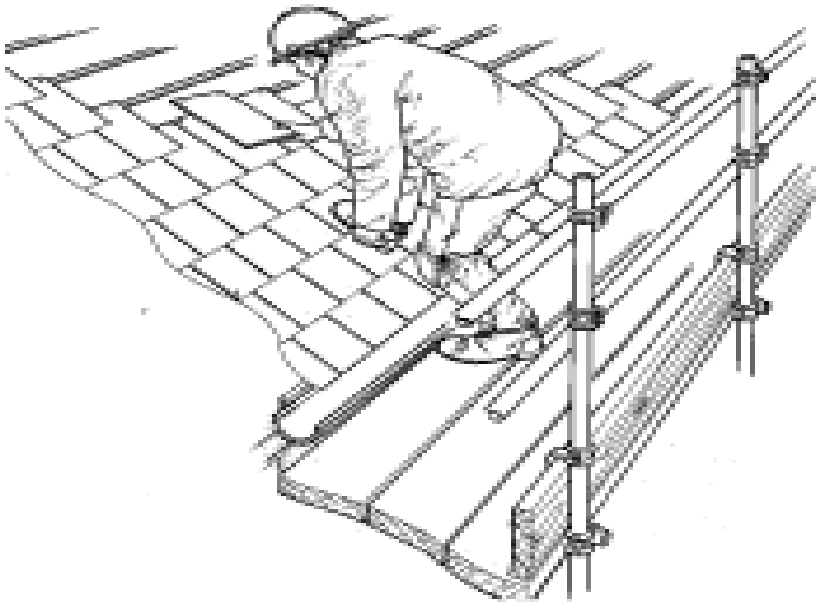


1.3. Working on Roofs

Working on roofs carries a high risk of accidents unless proper procedures are followed. Before working on any type of roof you should know the rules set out below and follow them:

1.3.1. General

- For work on a roof at a height from which men or material can fall more than 2m, guard rails and toe boards securely fixed in position and of adequate strength, must be provided along exposed roof edge.
- Use of safety harnesses may sometimes be the only safe way of working – such a decision will have to be made by management who should ensure that they are used in the condition specified
- All opening in roof must be securely covered or suitably guarded by guardrails and toe boards. Any cover provided should either be securely fixed in position or clearly marked to indicate its purpose.
- Access to the roof must be checked before use to see that it is safe.



1.3.2. Fragile Roofs

Fragile roofs can be defined as those roofs which are made of materials such as corrugated steel sheeting, corrugated plastics, wired glass etc. Before working on this type of roof, take full account of the type and condition of material and the proper safety precautions as outlined below:

- Use of ladders, crawling or duck boards is a must on these types of fragile roofs.
- Guard rails or suitable coverings are in position to prevent anyone falling through.
- Ladders and boards must be of sound construction.

1.4. Working over Water

Falling into the water and being drowned or carried away by currents is an ever present danger when working over or adjacent to water. Even though workers may be good swimmers, the following precautions should always be followed:

- Make sure that the working platform is secure and has no tripping hazards wire, timber etc. Slippery surfaces should be treated immediately.
- Check that guard rails and toe boards are firmly fixed in place.
- Check that access ladders are securely lashed to prevent movement.
- Ensure that life jackets are provided and worn.
- When required, ensure that safety nets or safety harnesses are provided.
- Check that lifebuoys are ready to hand for immediate use.
- Make sure that the safety boat is manned while men are working above open water.
- Ensure that a procedure for rescuing and raising an alarm has been developed and all concerned are fully aware of the procedure.
- No one should work alone over water.

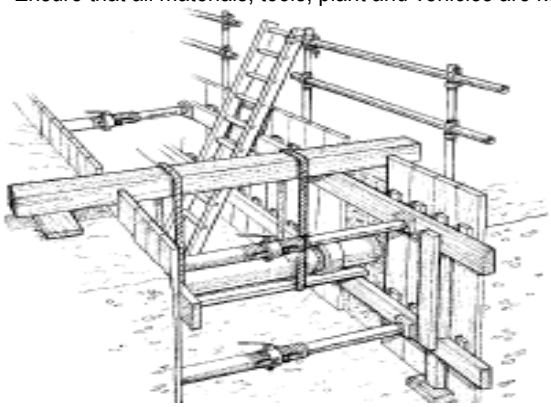
1.5. Excavations

Almost any excavated ground will collapse, under certain conditions, unless it is temporarily supported, is safely battered back, or is geologically stable rock.

If the sides of an excavation collapse, there may be no escape. Death by crushing or suffocation, or disabling injuries to the pelvis and legs, are common to accidents in excavations.

For all excavation work, the following guidelines should be followed to achieve and maintain a safe working place:

- No one should enter an excavation unless it has been inspected and considered safe to do so by the supervisor.
- Ensure that there is a safe access and egress to and from all excavations.
- Beware of slipping when using ladders in excavations in wet or greasy conditions.
- Safety Helmets should be worn by everyone working in excavations.
- Never interfere with any support system or barriers in excavations or trenches unless authorised to do so.
- Do not stand on struts.
- Use proper gangways for crossing trenches – never jump across.
- If dumpers or lorries are used to tip back-filling materials into trenches, make sure that stop blocks are provided and secured.
- See that spoil heaps from excavation are kept at least 1m away from the edge
- Ensure that all materials, tools, plant and vehicles are kept away from the edge of the excavation.



1.6. Hazardous Atmospheres / Confined Spaces

1.6.1. General

Every year there are a number of fatal and serious accidents caused by persons being allowed to enter live foul sewers, manholes, bored piles trenches and so on, without the necessary tests being carried out or the correct safety/ rescue equipment being provided.

Many of these accidents could have been avoided if supervisory staff and operatives had been properly trained and the work carried out on a “Permit to Work”.

The following checklist is a reminder:

- Under no circumstances should anyone enter a confined space without instructions from the supervisor.
- Equipment for monitoring the atmosphere at frequent intervals must be provided and atmosphere continually monitored whilst working in the confined space.
- Dangerous atmospheres can arise when there is a lack of oxygen or when toxic or flammable gases are present.
- Adequate fresh air ventilation must be provided in appropriate circumstances.
- All necessary safety and rescue equipment must be available on site at the actual location. Check that it is so.
- It is essential that no less than two persons work on a confined space operation. (it is important to ensure that assistance is readily available in the event of an accident).
- When working at a manhole in the road or public area, ensure that barriers are provided and the appropriate traffic signs displayed.
- If proper procedures for rescue in an emergency has been laid down with specific jobs for specific persons, ensure that all workers clearly understand what they have to do.
- Ensure that all people have been properly trained in the use of the safety and rescue equipment detailed below”

Remember - a deficiency of oxygen can render someone unconscious, toxic fumes can cause dizziness and a feeling of sickness, and gases can be flammable or explosive.



1.6.2. Safety / Rescue Equipment.

Should include:

- Properly calibrated Gas Monitor cable of detecting as a minimum – low oxygen, hydrogen sulphide and flammable gas.
- Two safety harnesses with adequate length of rope.
- Intrinsically safe hand torches or cap lamps.
- At least one set of suitable breathing apparatus and emergency breathing pack.
- First aid equipment.
- Audible alarm for summoning help.
- Resuscitation equipment
- Means of communicating with surface observers.



1.7. Refurbishing Contracts

Refurbishing existing properties is a rapidly expanding section of the building industry, and has given rise to new safety problems, In some cases the situation is made more difficult by the property remaining occupied whilst refurbishing is carried out.

For everyone's safety on refurbishing contractsit is important to follow the rules given below:

- Before starting any activity check that utilities such as – gas, electricity, water and so on, have been disconnected.
- Never assume that the basic structure is sound, and do not attempt any kind of demolition unless instructed by a competent person.
- Make sure that any temporary support used for shoring the structure is carried out in accordance with the drawings or sketches provided.
- Demolition materials should be removed immediately from the building through properly devised rubbish chutes or similar means.
- Prevent the possibility of materials being accidentally knocked into stair wells in blocks or flat.
- Check that adequate fire extinguishers are available. The fire hazard is greater in this type of work.
- Make sure there is adequate lighting especially in stairwells, both to see what you are doing and to avoid tripping.

1.7.1. If Premises are occupied, ensure the following:

- Do not block fire escape routes.
- In blocks and flats, If services will have to remain connected, beware of live electrical terminals temporarily uncovered.
- Don't leave ladders in such a way that children can gain access to scaffolds.
- Never leave work unguarded at the end of the day - it is likely to be a danger for the tenant.
- At all times treat the occupants and their homes with respect.

1.8. TEMPORARY ELECTRICAL SUPPLIES & LIGHTING

Adequate lighting – either natural or artificial – is essential to site safety. It is also important that any temporary electrical installations are put in by a trained electrician with equipment and voltage suitable for use in the temporary environment.

Tools and plant operating on 110V system is the safer option, but if this is not practicable, Residual Current Devices (RCD) should be used and these to be properly maintained.

Both Management and workers should follow the rules below for safe use:

- Management must ensure that all temporary installations are safe and meet the required standards.
- Unless you are a qualified electrician, do not interfere with the installation in any way.
- When using portable inspection lamps do not drag the cable over the ground or round corners.
- If extension cables are used, make sure that splash proof plugs and sockets are fitted.
- Do not let trailing cables or connections come in contact with wet or damp conditions.
- Never take a risk and insert bare live wires into sockets
- Do not overload sockets as this can lead to a fire.
- Always remember to treat electricity with respect.

if you don't, it could Kill You.



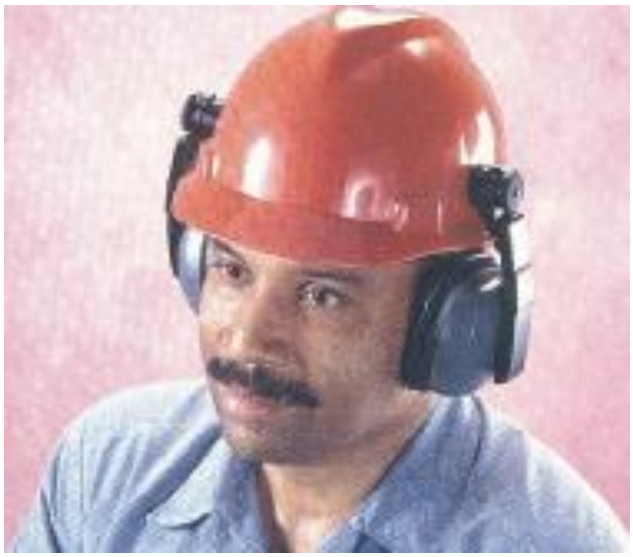
1.9. Noise

Excessive noise emitted from plant, processes and tools can cause, over a period of time, progressive and irreversible loss of hearing. It can cause a ringing or rushing noise in the ears which will not disappear.

Hearing loss can also make communication difficult, which in turn may lead to accidents through instructions either not being heard, or being mis – heard.

Take proper precautions to protect your hearing, and before working with noisy plant or in a noisy environment, study the following items:

- If it is necessary to shout to be heard by someone about 1m away, it is likely that there is a noise problem requiring action.
- Where noise levels are shown to be excessive, personal ear protection must be worn at all times.
- Different types of noise demand the use of different types of ear protectors. Check that the protection supplied is suitable.
- Ear protectors should be regularly inspected to make sure they are undamaged.



1.9.1. Noise Control

- Are exhausts fitted with silencers or mufflers?
- Are cover panels and inspection hatches rigid, and clamped in place?
- Are all sound reducing devices being used effectively?
- Is the equipment in good working order, or does it vibrate and rattle?
- Are sound insulating screens installed to reduce the noise reaching the operative from static plant

1.10. Fire Precaustions

Fires on building sites arise from the misuse of compressed gases and highly flammable liquids, from the ignition of waste materials, wood shavings and cellular plastics materials, and from failure to recognise that adhesives and some floor and wall coatings are also highly flammable.

Every individual on site should be aware of the fire risk, and know the precautions to prevent a fire and the action to be taken if a fire does break out.

Always keep in mind the following rules:

- Where the fire fighting appliances are kept and the correct type of extinguisher for specific types of fire.
- If fire breaks out get someone to call Civil Defence. Do Not continue trying to fight the blaze yourself if large quantities of fumes are being emitted in a closed space. Get out as fast as possible.
- Do not leave dried clothing in prolonged contact with heat.
- Make sure all lights are extinguished and all plant switched off at the end of each working day.
- Rubbish provides a good starting point for fire. Keep your work area clean and tidy and do not allow rubbish of any kind to accumulate.
- If you have to use blow lamps or similar equipment in the course of your work, first make sure that there is no fire risk adjacent to materials.



No. 02 Hand Tools – Safe use & Handling

2.1. Storage

Many accidents occur through hand tools falling from heights, being tripped over, or placed in such a position that the cutting edges cause injury. When not in use, make sure that any hand tools are stored in a manner unlikely to be a hazard to others:

- Use boxes or other suitable containers
- Where appropriate, hang tools from rack.
- Do not lay tools down so that they can fall, roll, or be knocked over.
- Make sure all cutting edges, teeth etc, are adequately sheathed or otherwise protected.
- Do not leave tools lying in walkways or any place where they could be tripped over.
- For longer term storage, use lock up boxes provided.

2.2. Electrically operated Tools

Every year there are fatalities and injuries on building sites from electricity. Electricity gives no advance warning of danger, it can kill instantaneously. Employers have a duty to ensure that, before using electrically operated hand tools, all employees have been properly trained in the correct use of each tool.

The following are the main points that hand tool users have to remember before, and when using electrically operated hand tools.

- Check for any sign of damage to the tool itself, damage to wires or cables. If there is any damage, report immediately and do not use the tool.
- Management should arrange for defective equipment be kept where it cannot be used until repaired.
- 220V supply, or RCCB protection provided on all plugs/sockets should always be used on temporary wiring installations.
- Make sure that all tools are properly earthed and have the correct fuses.
- All connections to socket outlets or wire – to – wire must be made by proper electrical plugs – NOT by bare cable ends
- Do not allow cables or wires to come into contact with moisture.
- Do not carry or drag a tool by its cable.
- Disconnect tools from mains when they are not in use and before changing blades, discs and drill bits.
- Regular maintenance of electrically operated tools is essential. It must be done by someone who is properly trained. Temporary repairs by amateurs can be very dangerous.

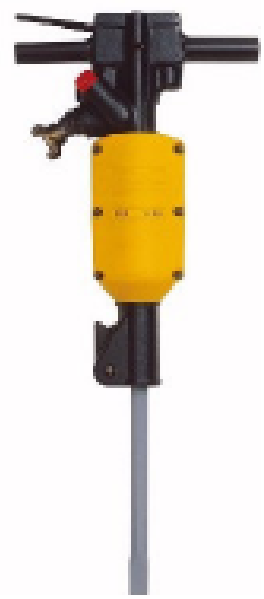


2.3. Air Operated Tools

"Compressed Air" may not sound very dangerous, but the air itself, the hoses which carry it and the tools it operates can all be lethal if mishandled. People who are required to use air operated equipment must have been instructed in its use by a competent person, and compliance with the rules given below will avoid accidents to both the operator and others:

- Quite low pressures of compressed air have been known to cause serious injuries or fatalities. (Treat it with respect)
- Before starting work, check that hoses and pipes have no leaks.
- Keep hoses short as possible and keep traffic away from them, if necessary by barriers or ramps.
- Do not bend or restrict hoses in any way to reduce power. The extra pressure on couplings can make the hose whip and twist at high speed.
- Never direct the air jet at yourself or another person. Compressed air in the bloodstream, eyes, ears or nose can be fatal.

- Do not use an open line for blowing out shutters, etc. A restrictor to the air flow or lance must be used
- Do not blow dust, swarf etc. off your clothing with an air line.
- Never try to change tools without turning off the air supply. Tools must be disconnected from the air supply for inspection and cleaning/maintenance or when not in use.
- Ear protection, goggles, gloves and/or safety footwear must be worn when using air operated tools.



2.4. Catridge Assisted Tools

Cartridge assisted tools are potential lethal weapons and must be treated with the same respect as any gun or pistol. No-one should use a cartridge assisted tool without first having been checked for colour blindness and having undergone appropriate training and authorised to use such tools.

Operators should study the list below to make sure that they have not forgotten any important safety measures:

- Always remember that the risk in cartridge assisted tools are primarily in relation to your workmates.
- You should have signed for the tool and for the number and type of cartridge issued to you.
- Check immediately that it is not loaded.
- When inserting a cartridge, always point the barrel in a safe direction, that is – pointing it away from yourself or any other person.
- NEVER walk about the site with a loaded tool. Always load it at the workplace.
- Hold the tool at right angles to the job when firing.
- You must wear a safety helmet, eye and ear protection when using the tool. When using pins for fixing through pre-drilled holes, make sure that a special adaptor is used which will ensure that the pin is guided safely to its place.
- Tool must not be fired in a place where flammable vapour or dust create the risk of an explosion.
- After use, ensure that the tool is cleaned and oiled.

2.4.1. In the event of a misfire

- Wait one minute before unloading. You must only extract the cartridge in accordance with the manufacturer's instructions.
- Misfired cartridges should be immersed in water to render them harmless.

REMEMBER – cartridge assisted tools can be dangerous if misused. Ensure that they are never used in a careless fashion.

2.5. Power Saws

Portable hand held power saws can be defined as any sawing machine to be fitted with one or more circular blades, and can include chain sawing machines, hand held circular saws and abrasive wheels.

If you are required to use such machines, you must:

- Have been sufficiently trained for the work being done at or on the machines in question.
- Have been sufficiently instructed in the dangers and precautions. The guards and other safety devices connected with that machine.Chain saws.
- Ensure that only a saw which incorporates anti-vibration mountings is used.
- Maintain the guide bar and chain frequently and ensure that cutters are sharpened in accordance with the manufacturer's specification.
- Check that the chain remains stationary when the saw engine is idling.
- Ensure that guard between the front handle and the chain is correctly positioned and secured.
- Check the ON/OFF switch functions effectively.
- Do not attempt to saw using the tip of the guide bar, a kick back will occur.
- Maintain a firm grip on both handles when cutting to reduce the effect of a kick back.
- Heavy duty ear muffs and a full mesh face shield should always be worn when the saw is in use.

2.5.1. Hand held circular saws

Before using the saw ensure that:

- The blade is of the correct type for the material to be cut.
- It is in good condition, with no cracks or damage, and if it is toothed, that the teeth are sharp.
- It will rotate in the correct direction: the sharp edge of the tooth must cut upwards from bottom to top of the material when the saw is in use.
- The depth of the cut is adjusted so that the saw blade only just projects through the underside of the material being cut.
- The guard which covers the saw blade below the shoe is operating properly and retracts as the blade enters the material.
- Never tie back the saw blade or render it inoperative.
- Never adjust guards while the saw is in motion or the machine connected to the power supply.
- Never operate the machine with a defective ON/OFF switch and never secure the switch in the ON position.
- Always ensure that the supply cable is sufficiently long and so restrained that it cannot be damaged by the saw before starting to cut.
- Whenever possible, cut to a fence or guide to minimise the risk of the saw binding in the cut.
- Wear eye protection at all times when using the saw.



2.6. Abrasive Wheels

Abrasive wheels can cause fatal and serious accidents due to misuse, mishandling or failure to select the correct wheel (or disc) for a particular operation. Management should ensure that all persons who mount and use abrasive wheels are properly trained, authorised and a record kept of their training. However well trained an operator may be, it is useful to have a checklist to remind them of the things they need to do to keep the operation safe. The following lists the key issues:

- Disconnect from the mains before changing wheels and discs.
- Check all wheels for cracks and other damage before mounting.
- Check machine speeds against approved operating speed of the wheel.
- Make sure that the wheel hole, or threaded joints fits the machine arbour properly and that flanges are clean, flat, and of the proper type for the wheel you are mounting.
- Do not use excessive pressure when mounting the wheel between flanges. Tighten nut only enough to hold the wheel firmly.
- Use paper washers supplied with the wheel.
- Do not use relieved or recessed flanges with threaded hole wheels, cones or plugs.
- Do not mount more than one wheel on a single arbour.
- Do not use a grinding wheel that has a rated speed less than the speed of the grinder.



2.6.1. Operating:

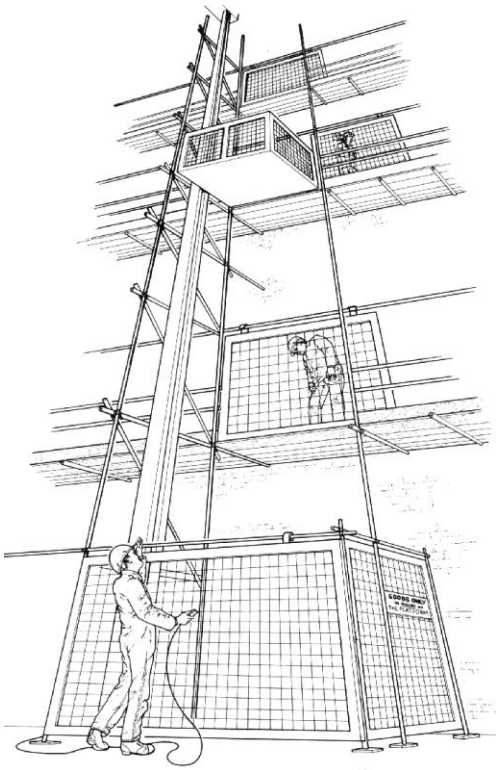
- Always run the wheel in a protected area at least one minute before grinding.
- Always use the wheel guards provided with the machine and ensure that they are properly fitted.
- Always wear either goggles or a full face shield.
- Do not use wheels which have been dropped or damaged in any way.
- When using portable grinding equipment, keep clear of obstruction.

No. 3 Working with Plant

3.1. Good Hoists

Each year, there are many accidents involving goods hoists arising from faulty erection or inadequate maintenance, but many more are caused by the misuse of hoists and failing to observe safe systems of work. Hoists operators must be properly trained and over 18 years of age, but however well trained they may be, they should always comply with the following check points:

- Only authorised persons may operate a hoist.
- Hoist must not be operated if there is any defects present in the safety device, or in the fencing or gates. Any such defect should be reported immediately.
- Hoist will only be operated from one position. This must be located so that there is a clear view of the platform throughout its travel and a clear view of each landing space.
- Passengers must not be carried on the platform.
- All gates to the hoist way must be kept closed when access to stationary platform is required.
- Hoist operator must have a clear and distinct communication system with persons using the hoist.



3.2. Working with Small Dumpers

Accidents with dumpers are continuing to rise on building sites. Many of these are caused wholly or partly by driver error.

Dumper drivers must receive proper training, be over the age of 18 years and hold a current heavy driving licence.

All dumper drivers should note the following:

- Before operating check that tyre pressure, oil and water level are correct, and brakes efficient.
- Report all defects immediately
- Drive the machine with due consideration for others on site, especially those working with you.
- Never carry passengers unless there are seats provided for this purpose.
- Ensure that loads are secure and evenly distributed and within the load capacity of the machine.
- Stack loads so that forward vision is not impaired.
- Make sure the skip safety catch is engaged before moving off or when the dumper is left unattended,
- Before tipping, make sure that no person or obstruction is in the way.
- When tipping into excavations the wheels should be choked to avoid any possible danger of the machine falling in.
- On down gradients use lower gears.
- At the end of the normal working hours the machine should be effectively immobilised – seek advice or instructions if necessary.

3.3. Working with Cranes

Many fatalities and serious injuries occur each year as a result of crane accidents. Many of these result from human error on the part of the driver. Any work in association with a crane can be a source of hazard.

3.3.1 Crane Driver

Crane drivers should meet the following requirements:-

- Must be at least 18 years of age and should be sufficiently mature to undertake the duties involved.
- Possess a valid driving license.
- Be medically fit for the purpose, with particular emphasis on eyesight, hearing and reflexes, and have a head for heights. (Periodic medical examinations are advised).
- Have an aptitude for judging distance, height, speed and perspective.
- Be physically capable of operating the controls efficiently without undue fatigue.
- Trained in the general principles of crane operation and specifically in the type of machine he is required to operate.
- Trained sufficiently in the mechanics of his machine to be able to carry out routine maintenance if required by his employer and to identify and report defects.
- Trained in the approved hand-signalling system.

3.3.2. Banksman / Riggers

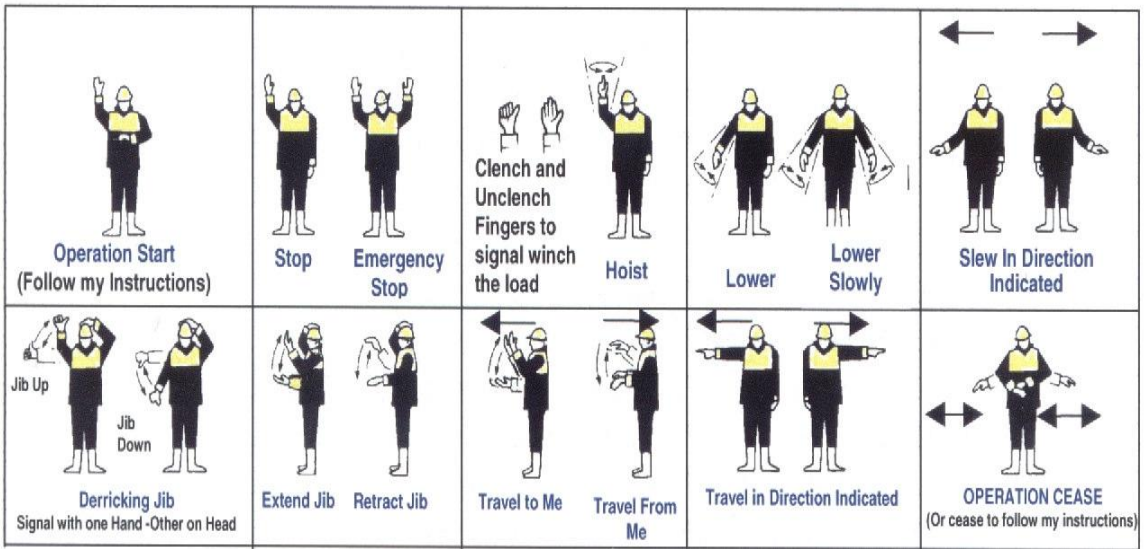
A signaller/rigger should be appointed by management to ensure clear and precise commands are given to the crane driver so that no doubt can exist as to who is controlling the lifting sequences.

banksmen/riggers should meet the following requirements:

- Must be at least 18 years of age.
- Be medically fit for the purpose with particular emphasis on eyesight, hearing, and reflexes.
- Have an aptitude for judging distance, height and clearance.
- Be agile and strong enough to handle lifting gear.
- Be trained in the general techniques of slinging.
- Be capable of selecting lifting gear suitable for the loads to be lifted, and to identify defects.
- Have a sensible knowledge of the safe working loads at the various radii of the crane.
- Be capable of directing the safe movement of the crane and its load to maintain the safety of all personnel.
- Be thoroughly trained in a hand-signalling system. be capable, where necessary, of giving clear and distinct instructions over radio or similar signalling systems.

3.3.3 Banksman/Rigger (Main Precautions)

- Only you as the official banksman should give instructions to the driver.
- Beware of the crane's tail radius at ground level and the possibility of being trapped between the crane and any adjacent obstruction.
- Do not deliberately swing loads to try and increase the radius of load deposit/pick up.
- When assessing the weight of loads for lifting, remember the weight of the lifting gear must be added.
- Make sure that the lifting gear used is appropriate to the situation.
- When guiding a mobile or crawler cranes from one location to another watch out for:
    - back filled trenches which may settle under the crane load and cause it to topple over.
    - large obstruction on the ground.
    - overhead obstruction.
- Make sure that no obstruction exists when slewing the crane – particularly electric cables of all types.
- If at any time in the work cycle you cannot see the driver, call for assistance unless radio communication is used.



3.3.4. Slinging Operations

Slinging loads on building sites using cranes can be a very dangerous, and sometimes disastrous unless it is carried out by properly trained riggers The following are the main points for riggers to consider when using lifting gear:

- Correct sling must be used for the load to be lifted.
- Slings and chains must be padded when passing over sharp edges.
- Shackles must have the correct pin fitted.
- Pull of shackle must always be from ring to eye and not from side to side.
- Hook points must always be outwards when using multiple leg slings.

Never:

- lift with the point of a hook.
- use nuts and bolts to join a broken chain.
- use a chain in which links are locked or stretched.
- use corroded, worn or excessively pitted chains.
- drag a sling from under a load.
- cross, twist, kink or knot slings.
- join sling by threading the eyes.
- drop any item of lifting gear from a height
- exceed the SWL marked on the lifting equipment being used.

3.4. Working with Excavators

When carrying out work associated with excavators, you can be subject to hazards which often arise without any warning.

Always observe the following rules:

- Remember that, with modern hydraulic machines, all motions – dig, slew, raise boom, etc. are much faster than non hydraulic equipment.
- The tail swing and the boom can be sudden and lethal if you are in the way. Stand well clear of both the operating boom and the tail swing.
- If you drive a lorry or dumper being loaded by an excavator, you must not remain on the vehicle while loading takes place. Stand well clear.
- Always face excavating machinery – never turn your back on it. This is particularly important if you are bottoming up in a supported trench and the excavator is removing the loose material.
- Excavators are allowed to work as cranes only when handling materials associated with excavation work. When working the excavator as a crane make sure that suitable slings and fixing points are used and that the slinging method has been carried out properly. Check what is the laid down capacity of the machine is; it must not be exceeded.
- Never stand under a load when using excavator as a crane,
- If more than one person is working with an excavator, agree with the driver who will be responsible for signals and instructions.

3.5. Compressors

The main risk associated with compressors are being trapped and injured in the V-belt pulley drive, explosions of the air receiver and accidents due to misuse of air lines. Persons in charge of

compressors must have been properly instructed in the correct operational and maintenance procedure, and the precautionary measures.

3.5.1. Starting up

When starting up a compressor the following check list should be used:

- Is the air receiver fitted with a safety valve, pressure gauge, drain cock and manhole? Are they in working order?
- Have all the necessary maintenance checks been completed?
- Is the air receiver marked with its safe working pressure and distinguishing number?
- Is the compressor site on level ground in a well ventilated location with no risk of exhaust fumes sinking into excavations or enclosed spaces nearby?

3.5.2. Operating

When operating a compressor ensure that you and others working it comply with the check list below:

- Avoid causing any damage to gauges and pressure relief device. If damage occurs, shut the compressor down and report damage immediately.
- Pressure gauges must be kept clean and functioning correctly. If the safe working pressure is seen to be exceeded at any time, shut down the equipment and report the fact at once.
- V-belt drive guards and those other parts of the compressor must be firmly fixed in position whenever the compressor is running.
- Never use flammable liquids to clean any part of a compressor.

3.6. ROUGH TERRAIN FORK LIFTS AND TELESCOPIC HANDLERS

Rough terrain fork lift and telescopic handlers require a thorough understanding of their individual characteristics if they are to be operated safely – especially the stability factors.

- Drivers of rough terrain fork lift and telescopic handlers must be over 18 years of age, hold a valid driving licence, be medically fit with good eyesight, hearing and reflexes.
- Have been adequately trained in the safe operation of the type that he is authorised to drive.
- Have sufficient knowledge of the working of the machine.

Once trained, drivers should use the following checklist to remind them of the key points in maintaining safe working practices:

- Only operate the machine(s) for which you have received training and authorisation.
- Carry out laid-down daily maintenance, and test overall serviceability before use. In particular, check water ballasting – where used.
- Never allow passengers to ride on any part of the fork lift or handler.
- Fully understand the limits of your machine, both loaded and unloaded Never exceed the maximum weight for the base machine or whatever authorised attachment is employed.
- Always load with the mast vertical or tilted back slightly.
- To give maximum stability to load, adjust forks to the widest spacing possible in relation to the load to be lifted, try to ensure that the load does not obscure your view. If this cannot be avoided, either travel in reverse or use a banksman to guide you.
- When manoeuvring and travelling beware of other people in the vicinity. Make use of your horn when necessary to warn others of your approach.
- Always travel with the load in the lowest practicable position. Do not raise it while travelling - wait until the offloading position has been reached.

- Deposit all loads carefully onto storage areas or loading platforms and avoid dragging the load when extracting the forks.
- Travel your machine at a steady speed consistent with the site conditions and the loads being carried.
- When driving on slopes, see that the load is always facing uphill.
- Always check that there is enough clearance overhead for the mast when extended.
- When parking the machine, lower the forks to the ground, remove ignition key and apply handbrake.
- Report all defects immediately.

3.7. Wood Working Machine

Because of the frightening injury potential of woodworking machines, strict rules are required to ensure these are fitted with appropriate safety devices, operated and maintained to the correct standard.

3.7.1. Operators

- Must have been sufficiently trained for the work being done at or on the machine in question.
- Has been sufficiently instructed in the dangers and precautions, the guards and other safety devices connected with that machine.
- Is at least 18 years old and has successfully completed an approved training course.
- Concentrate at all times. Distraction can be deadly.

As a reminder of instructions given during training, the following checklist should be used regularly:

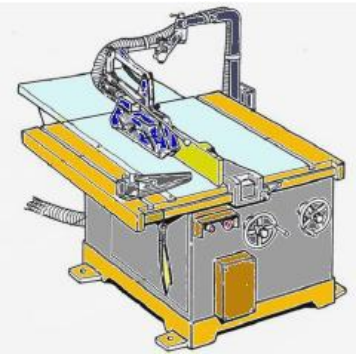
- Make use of all guards and see that they are properly adjusted
- Keep cutters and blades sharp, check that they are the right size for the machine and they are properly and securely fixed.
- Do not feed timber into a circular saw without using a push stick
- Support free ends of long work pieces on trestle, tables extension etc.
- Check that you can easily reach the emergency stop control.

3.7.2 Exhaust extraction

Extraction equipment should be provided for planers and other specified machines to convey chips and particles from cutters into suitable receptacles.

3.7.3 Maintenance

- saw blades must not be cleaned while in motion
- All machines must be of good construction, sound material, and properly maintained.
- unless hand-held, they must be level, and fixed securely to a substantial structure which ensures their stability.



3.7.4 Controls

Every machine must be fitted with start and stop controls which can be quickly and easily controlled by the operator.

3.7.5 Guarding cutters

Cutters can include saw blades, chain cutters, knives, boring tools, detachable cutters and solid cutters, and the following are the main safety points to consider:-

- Must be guarded to the greatest practicable extent, having due regard to the work being done.
- Guards to be of substantial construction, properly secured and adjusted, and constantly in position while cutters are in motion.
- No adjustment may be made to any guard while cutters are in motion, unless safe means (i.e. mechanical adjusters) are provided.
- Allowance can be made for the development of alternative safeguards for cutters providing these are effective.

3.7.6 Riving knife (splitter or spreader)

Must be:

- Securely fixed below machine table level, behind and in line with saw blade.
- Must be strong, rigid, smooth and easily adjustable.
- Radius of knife not to exceed radius of largest saw blade for which machine is designed.
- Adjusted as close as practicable to saw blade; gap between knife and blade not to exceed 12 mm at table level.
- In the case of a parallel plate saw blade, the knife must be thicker (usually about 10%) than the plate of the saw blade.
- Where the diameter of the saw blade is less than 600mm, the top of the knife should not be more than 25mm below the top of the blade and extend at least 225mm above the table.

3.7.7 Top guard (crown guard)

- Guard to be strong and easily adjustable
- Adjusted to extend from top of riving knife to a point as close as practicable to the surface of the material being cut; or to a point not more than 12mm above the material being cut where squared stock is being hand fed.
- Should have flanges on either side of the blade and be adjusted so that these extend beyond the roots of saw teeth. Where the guard has an adjustable front extension piece, it must be flanged on the side remote from the fence, and adjusted to extend beyond the roots of saw blade teeth.

3.7.8 Size of saw blade

- Saw benches with a one-speed spindle must not use a saw blade less than 60% of the diameter of the largest saw blade the bench is designed to use.
- 1n the case of saw benches with more than one spindle speed, the blade must not be less than 60% of the diameter of the largest blade the machine is designed to use at fastest spindle speed.

3.7.9 Push sticks

Be available for use on every hand-fed circular saw, and used to:

- Feed material throughout any cut of 300mm or less.
- Feed material during the last 300mm of any cut more than 300mm in length.
- Remove cut material from between the saw blade and the fence.

3.8 CONCRETE MIXERS

These items of plant are common features of the building site, and are frequently operated by unskilled personnel selected from the site labour force.

Management must ensure that all operator have been given adequate instruction and training to safely operate this equipment, and operators should ensure that they follow the basic rules given below:

- Check that all moving parts have proper guards securely fixed in place.
- Make sure that the mixer is properly set up – level, on firm ground or on a specially provided support system.
- Keep mixer and associated equipment in a clean and serviceable condition at all times.
- Make sure that the wheels are securely choked to prevent movement.
- If the plant is driven by an internal combustion engine, make sure that exhaust fumes are well ventilated and cannot sink into excavation or other confined spaces where operatives are working.
- If mechanical loading is used, barriers should be provided to keep others away from danger.

No. 4 Demolition

Demolition can be one of the most dramatic operations in the building industry, it can also, by its very nature, be one of the most dangerous. Demolition operations should only be carried out by experienced personnel under the supervision of a foreman who has personal experience of the work.

The basic rules given below should always be followed by those carrying out demolition operations:

- The precise methods to be adopted, the timing and sequence should have been decided before any work commences.
- Management must ensure that all those involved have been properly instructed in these items, and never deviate from the sequence laid down.
- Before work starts, check that all services have been cut off and there is no risk of flooding or electric shock, or of explosion from leakage or accumulation of gas
- Plan of work must include such precautions as are necessary to prevent inadvertent collapse during demolition. Be aware of the need for shoring or temporary support at any stage of the work.
- Never remove any part of a structure unless you have been instructed to do so.
- Do not enter obstinate parts of a structure which refuse to collapse – they may do so unexpectedly.
- Always wear your safety helmet and safety boots – and any other safety equipment that may be specified by management.

- Never try to take chances or short cuts.

No. 5 Overhead Power Lines

5.1 OVERHEAD POWER LINES

- Accidental contact with overhead power lines causes many serious accidents and some fatalities. Such accident are particularly related to cranes working or travelling near or under overhead cables.
- In order to prevent contact with overhead power cables, the following basic rules should be observed by all concerned:
- Treat all overhead lines as “live” unless you have been specifically instructed otherwise.
- Get to know any maximum clearance requirements by municlipality.
- Do not try to circumvent “goalposts” or barriers or other warnings.
- Banksmen and plant operators should always keep overhead lines in view when giving directions, and only pass under where “goalposts” are provided.
- If scaffolding is being erected adjacent to overhead lines, make sure that poles are handled a safe distance away.
- Never stack materials or tip under overhead lines.
- If work has to be carried out under overhead wires, special precautions will be laid down by Municipality.
- When working near power lines, check that crane jibs, for example, cannot encroach on the safe clearance specified. Barriers should have been provided at an adequate distance to prevent this.

5.2 UNDERGROUND CABLES

Damage to underground cables is a frequent occurrence which can result in fatal or serious injuries. In addition the interruption of supplies may have both damaging and expensive consequences.

5.2.1 Checking for buried services

Before commencing any excavation, check that enquiries have been made with the Electricity Department to see if there are any cables in the vicinity. If so, remember that the location shown on a plan may not necessarily be accurate.

The following are the main points to be considered:

- Any service said to exist, should be clearly marked on the site plans.
- When looking at plans, it should be borne in mind that reference points may have been moved, surfaces may have been re-graded, services moved without authority or consent, and that not all service connections or private services are shown.
- Plans must be interpreted with care; a pencil on a map may cover a width equivalent to a metre on the ground.
- Where appropriate the route, when established, should be identified with paint, tape or markers - not steel spikes which might penetrate a cable or pipe.
- A line on a plan does not mean a pipe or cable is located exactly in the position marked. It only indicates that it is roughly in that location.
- The exact position will only be known when the buried service is found, as in many cases, there is no indication above the ground that a buried service exists. They may be found almost anywhere and at any depth from immediately beneath the surface of the pavement, or tarmac, to 1.5 metres or more.

- Indications that buried services do exist include the presence of lamp posts, illuminated traffic signs, telephone boxes, concrete or steel manhole covers, hydrant and valve pit covers, etc.
- Small concrete indicator posts, usually on the verge, or plaques on walls have this specific function. Indicator posts belonging to water authorities often give the size of the pipe and its distance from the post.
- The absence of posts or covers must not be taken as evidence that there are no buried services. Access covers can be a substantial distance apart.
- Cables or pipes may be laid loose in the ground, run in earthenware, concrete, metal, asbestos or plastic ducts, or be buried in cementbound sand, loose sand, fine backfill or material dissimilar from the surrounding ground.
- Plastic marker tape, tracer wire, boards, tiles or slabs may have been laid above the service to indicate that there is something below. These may, however, have been removed or damaged in the past; they are also liable to be laterally displaced by ground water or movement and thus no longer indicate the true location of the service.
- It is now becoming a widespread practice for brightly coloured polythene tape or expanded plastic mesh, sometimes incorporating metallic tracer wire, to be placed in the backfill above the pipe or service.
- A text on the tape usually identifies the service below. When uncovered, these tapes indicate the presence of a pipe or cable.

No. 6 Roadworks

6.1 SAFETY ZONES (Figure 1)

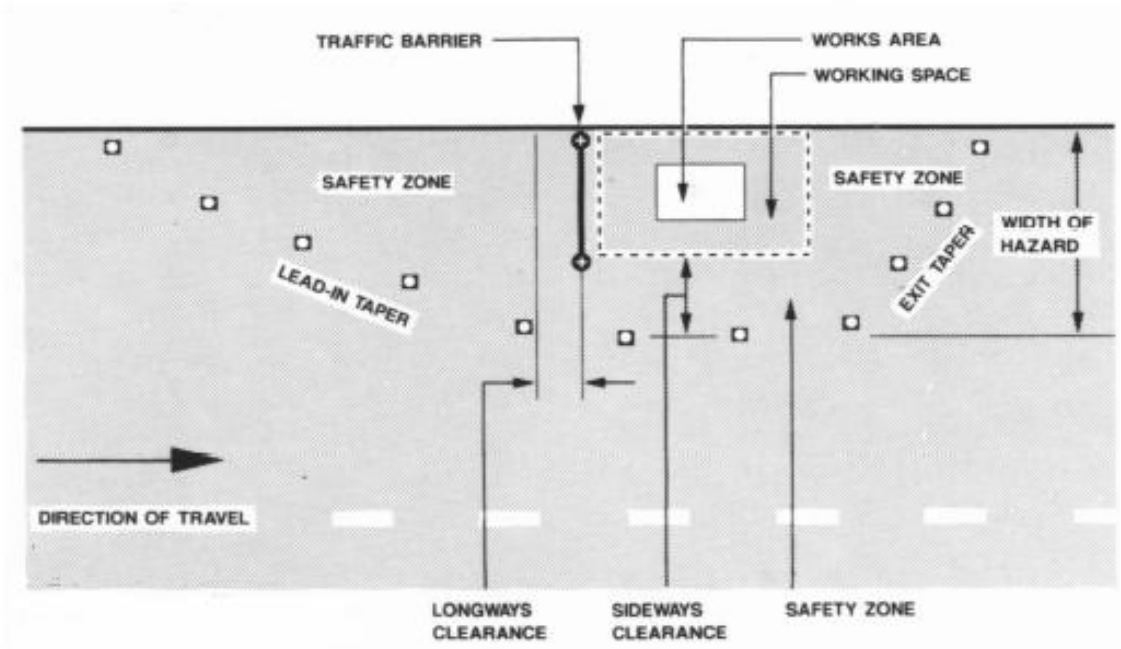
- On any roadwork site, a space must be provided around the works for the storage of spoil, tools, plant and equipment and to allow the safe movement and operation of plant.
- A safety zone, delineated by cones and lamps should be provided to protect operatives from the traffic and to protect traffic from the road works.
- Plant must not be allowed to encroach on to the safety zone, nor must operatives be allowed to enter it other than to maintain the cones or safety signs.

6.1.1 A safety zone comprises:

- A lead-in taper of cones (T), which will vary with the speed limit and width of the works. (see Table 1)
- A sideways clearance between the working space and moving traffic, which must be at least 0.5 metres on roads with speeds up to 80 km/h and at least 1.2 metres on roads with speeds of 80 km/h and over.
- An exit taper which is always at 45$_{o}$ to the kerbside or road edge, and
- A traffic barrier, facing oncoming traffic, positioned within the coned-off area to show the width of the works site. (This barrier may not be necessary if a conspicuous vehicle is present).

N.B For roads with a speed limit of 80 km/h or more, an additional traffic barrier is required at the end of the lead-in taper.

FIGURE 1 – example safety zone



6.1.2 Buffer zones

- On high-speed roads such as motorways, a practice has been developed to provide buffer zones, to segregate opposing traffic flows.
- The width of such buffer zones is preferably a full lane width of 3.65 metres, but should be at least 1 metre.
- Barriers should be used to delineate buffer zones. The ideal types in this case are traffic cones, cats eye bollards or simple red and white coloured plastic pendant markers, all of which are relatively harmless if hit by a vehicle.

6.1.3 Traffic barriers

Traffic barriers should be continuous concrete, used to indicate the road works and segregate the traffic from the works. They should not cause a further hazard if hit by a moving vehicle, be of a conspicuous colour (e.g red or yellow stripes) and kept clean.

6.2 ADVANCE SIGNS (shown below)

- 'road works ahead' signs shall be placed in advance of the road works and shall be the first signs to be seen by the driver, as indicated in Table 1 (D).





6.3 AHEAD SIGNS (shown below)

- ‘road Narrows Ahead’ signs shall be placed midway between the ‘Road Works Ahead' signs and the beginning of the taper of traffic cones.
- ‘keep right’ or ‘keep left’ signs shall be placed at the beginning and end of the lead in taper of cones.
- On roads with speed limits of 80km/h or more, all “ahead” signs should have the distance to the works in meters printed on them as shown in Figure 2.



6.4 ROADWORKS CHECKLIST (See Figure 2 & Table 1)

6.4.1 For operatives

- Have you planned how you will sign and guard the works and set up of safety zones?
- Have all the appropriate authorities been notified?
- Have you considered working during light traffic flows?
- Is everyone on the site wearing high-visibility clothing?
- Are persons vacating vehicles from the kerb side?
- Position and type of first warning sign?
- What other signs are needed approaching the works?
- What signs are needed at the works?
- What length of coned taper is required?
- How many lamps and cones will be needed?
- What width of carriageway can be kept open and will it be enough for two-way traffic?
- What width of footway can be kept open and will it be enough?
- Have any misleading permanent signs been covered?

6.4.2 When work is in progress

- If circumstances change, have you altered the signs, cones and lamps to suit?
- Are signs, cones and lamps being regularly cleaned, maintained or replaced?
- Has authorisation been obtained to accommodate any changed circumstances?
- Are traffic control arrangements reviewed and changed to reduce delays as works change?
- Are the works adequately signed, guarded and lit for the nightime?
- Have you cleared away any spoil, etc. which may have spread onto the surrounding road or footway?

6.4.3 When work is complete and before you leave

- Have all signs, cones and lamps been removed?

- Have all permanent signs been restored?
- Have appropriate authorities been notified that work is complete?

FIGURE 2 – example traffic diversion diagram

Works on an 80km/h dual carriageway road - left hand lane closed:

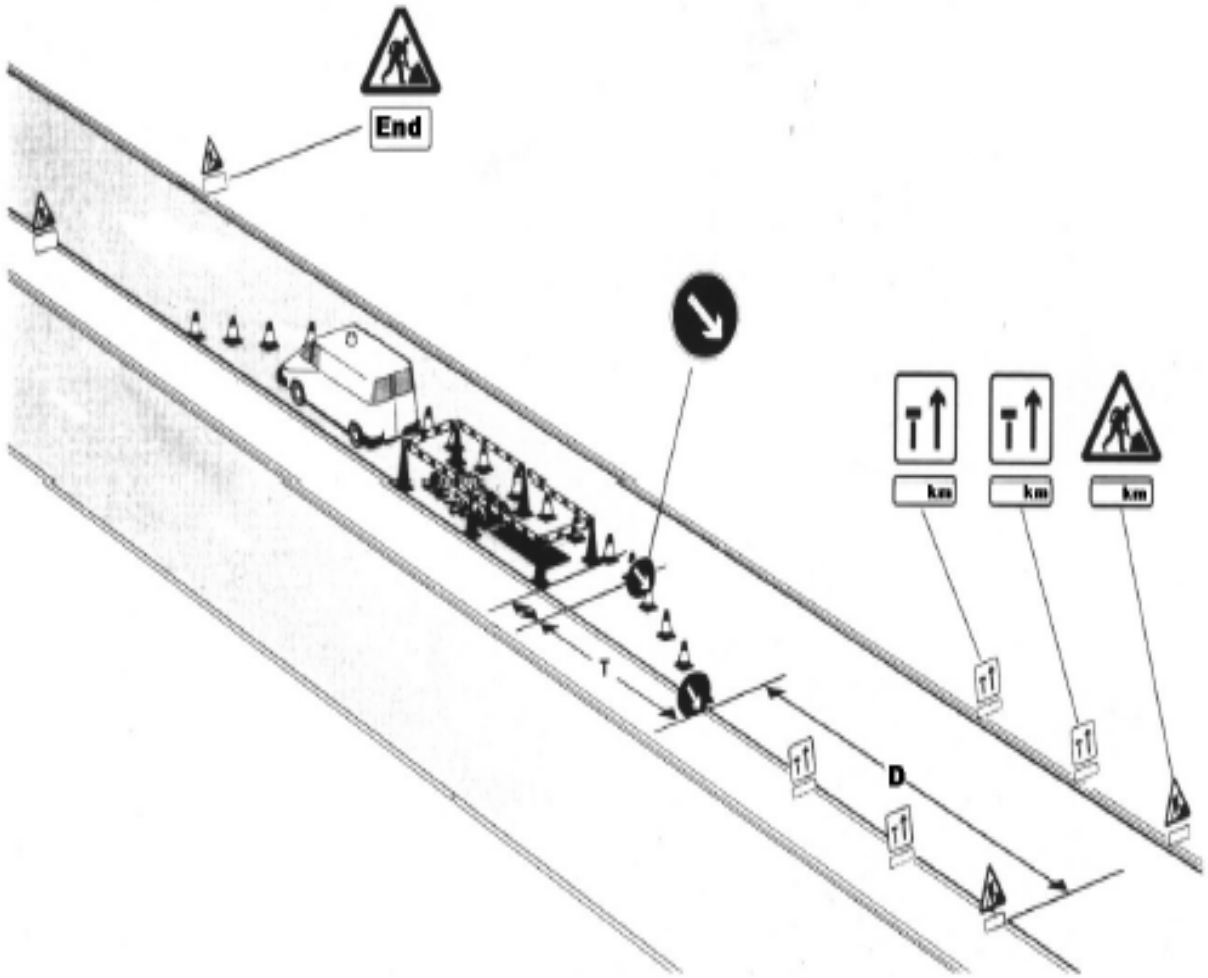


TABLE 1 - positioning of signs and cones

Type of road	Minimum siting distance (D) of first sign in advance of works (metres)	Minimum clear visibility to first sign (metres)	Minimum size of signs (mm)	Minimum height of cones (mm)	Details of lead-in cone tapers	Width of hazard (metres)						
						1	2	3	4	5	6	7
Single carriageway road, restricted to 40km/h or less	20 to 45	60	600	450	Length of taper (T) in metres	13	26	39	52	65	78	91
					Min. No. of cones	4	4	6	7	9	10	12
					Min. No. of lamps at night	3	3	5	6	8	9	11
Single carriageway road, restricted of speeds 41km/h to 60km/h	45 to 110	60	750	450	Length of taper (T) in metres	20	40	60	80	100	120	140
					Min. No. of cones	4	6	8	10	13	15	17
					Min. No. of lamps at night	3	5	7	9	12	14	16
All-purpose dual carriageway road, restricted to 40km/h or less	110 to 275	60	750	450	Length of taper (T) in metres	25	50	75	100	125	150	175
					Min. No. of cones	4	7	10	13	15	18	21
					Min. No. of lamps at night	3	6	9	12	14	17	20
Single carriageway road, with speed limit 80km/h or more	275 to 450	75	750	450	Length of taper (T) in metres	25	50	75	100	125	150	175
					Min. No. of cones	4	7	10	13	15	18	21
					Min. No. of lamps at night	3	6	9	12	14	17	20
All-purpose dual carriageway road, with speed limit 80km/h or more	725 to 1600	105	1200	750	Length of taper (T) in metres	32	64	96	128	160	192	224
					Min. No. of cones	5	9	12	16	19	23	26
					Min. No. of lamps at night	4	8	11	15	18	22	25

No. 7 Liquified Petroleum Gases (LPG) and Highly Inflammable Liquids

Each year serious accidents on building sites result from the unsafe storage and use of LPG and highly flammable liquids. Fire and explosion are not the only hazards – many of these materials are highly toxic (poisonous).

7.1 HIGHLY FLAMMABLE LIQUIDS

When exposed to the atmosphere, such liquids give off vapours which are flammable and toxic, and being heavier than air they are difficult to disperse. The precautions are designed to prevent accidental ignition or explosion of the materials or inhalation of the vapour. All their containers are marked with warning symbols.

7.2 STORAGE

On building sites, highly flammable liquids are not normally stored in fixed tanks. The following details relate to the facilities necessary for safe storage of adhesives, paint, solvents etc. in drums up to 225 litres (50 gals') capacity.



7.3 IN OPEN AIR

- Store should be formed on a concrete paving or other impervious surface.

- Containers should be protected from direct sunlight by a roof of light fire resistant material. The distance between the store and any adjacent building, workplace or boundary fence should not be less than 4m.
- Drums should be stored so that their contents can be identified and where, in the event of leakage, they are accessible for removal.
- Gangways should be of sufficient width to allow easy handling
- Store should be marked 'Highly Flammable' or specify flammability, e.g. 'Flash point below 32°C, in clear bold letters.
- Where this is impracticable, display 'Highly Flammable Liquids' sign as near to store as possible
- naked flames, smoking or means of ignition should be prohibited in the area of the store. Lighting should be of the approved flameproof type.

7.4 INSIDE BUILDINGS

- Separate building should normally be provided and used solely for the storage of highly flammable liquids where security and protection from weather is required.
- Should be located in a safe position, i.e. the distance between the outside wall of the store and any adjacent buildings or boundary fence should not be less than 4m.

7.5 HANDLING OF HIGHLY FLAMMABLE LIQUIDS

- Bulk delivery of HFL should be made directly into the store and not offloaded and left till removed to the store.
- Decanting of HFL should be carried out either in the open air or in a separate room of fire resisting construction. Containers should be checked for leaks, sealed or contents transferred as necessary. Small ready-to-use containers should be marked 'Highly Flammable' and capped.
- Funnels should be used to minimise spillage and trays to contain any unavoidable spillage.
- Filling of small containers from larger drums should not be carried out in the store but in a well-ventilated place, preferably in the open air.

No. 8 Personal Protective Equipment (PPE)

Many accidents occur because workmen on site do not pay sufficient attention to their own health and safety. All workmen can do a great deal to protect themselves simply by knowing what is available, wearing the correct clothing and using the PPE appropriate to their job. The following main items of PPE when circumstances demand their use:-

- Suitable PPE for all outdoor working
- Eye protectors or shields – for specified processes
- Respirators – to avoid breathing injurious dust or fumes.
- Full body harnesses where it is not practicable to provide standard working platforms.
- Ear protectors where it is not practicable to reduce noise levels.
- Head protection where there is a danger from falling objects.
- Slider fall arrester for external activities and activities inside the shaft

Workmen are also required by law to wear such clothing and equipment where circumstances demand it.

8.1 HANDS

Suitable hand protection should be used when, for example:-

- Handling objects with sharp or rough edges, bricks, paving slabs etc.
- Handling wire rope etc. with could have broken strands.
- Unpacking banded loads where the bands can be very sharp.
- Work in dirty or contaminated areas.
- Using chemicals and other hazardous substances.

8.2 EYES

Suitable eye protection should be worn when carrying out the following:

- Cutting bricks or blocks.
- Using cartridge fixing tools.
- Using an abrasive wheel
- Striking of masonry nails.
- Cutting concrete sections with chisels, hammers etc



8.3 SAFETY HELMETS

The head is particularly vulnerable to injury, and accidents to the head are often fatal or involve very serious injuries such as brain damage or fracture. Safety helmets should be worn in all areas on site where there is a risk of falling objects, and to ensure that the helmet will provide the necessary protection, the following points must be observed:-

- Adjust headband to suit your head size.
- Check that the outer shell and harness are in good condition.
- Never paint the shell, as some paints weaken the plastics used.
- Chin straps to be used to avoid helmet falling off when bending down.
- Holes must not be punched into the shell for attaching unauthorised equipment.
- Helmet should be replaced if it sustains a heavy impact.



8.4 EAR PROTECTION

Excessive noise at work can cause serious damage to your hearing and once this happens it is irreversible. It is therefore imperative that you wear the hearing protection provided wherever and whenever it is considered necessary to safeguard your hearing.

The following are the most obvious types of operations where it will always be necessary to wear hearing protection:-

- Using jackhammers to break concrete etc.
- Working near noisy plant such as compressors etc.
- Using chain saws.
- Using cartridge operated tools.



8.5 RESPIRATORY PROTECTION

Many of the jobs that are involved in the building industry produce dust and others involve the use of substances which give off fumes. Many of these substances are injurious to health, it is therefore in your own interest to wear the equipment and make sure that it is properly maintained.

In especially you should always wear a suitable respirator when:

- Using any type of adhesives and/or solvents.
- Polishing and finishing off concrete surfaces.
- Working in gaseous atmospheres
- Handling chemicals
- Any process which gives off dust



8.6 SAFETY BOOTS

Injuries to the feet through treading on sharp objects such as nails or having heavy items dropped on the feet are always high on the annual figures for building sites accidents. Safety footwear is essential on building sites and will protect the feet from serious injury in most of the common type of site accidents.



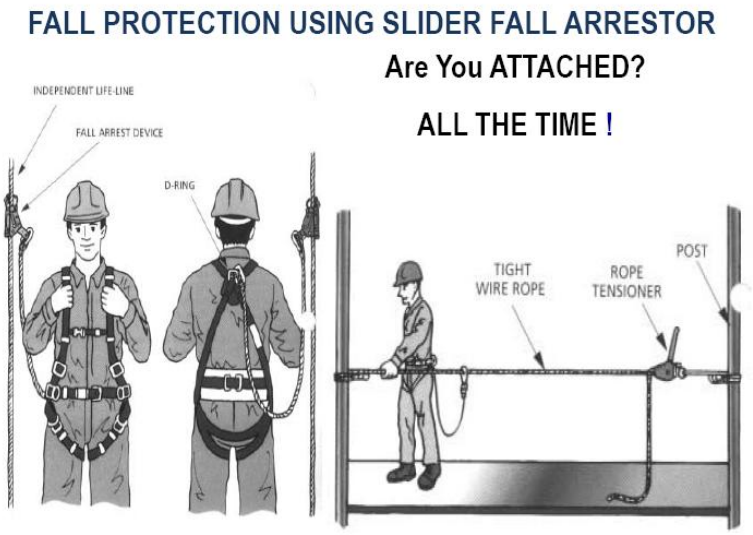
8.7 Working at Height / External Activities / Working Inside Shafts – Usage of Sliding Fall Arrester

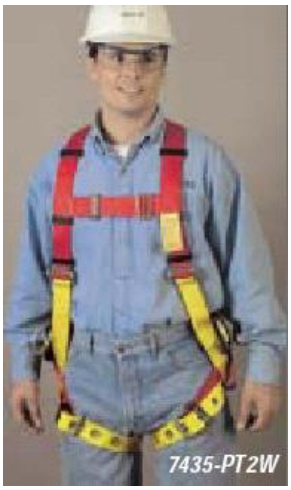
Working at height is most dangerous activity while an individual is working on a height above 1.8Mtr especially in high raise buildings. There is always a risk of person falling from height while working on external scaffolds, in shafts (especially on bamboo scaffold) which don't have any working platform, clear access apart from chance of collaps due to any material defect or any other adverse situations arise. In Indian construction scenario considering monsoon affect and lack of adequate training to the workforce the task becomes more risky.

While a worker need to shift himself from a anchored position to another level down or up normally worker removes his anchored full body harness then moves clmbing vertical bamboo which is very dangerous. The climatic adversity, tiredness, illness or any such situation where the worker may loose his grip or strength will lead to Major or fatal accident. In any case there are possibilities for collaps of a scaffold on various reasons. If sliding fall arrester hooked on polyamide rope connected to full body harness of the worker can prevent the person hooked on affected by any such adverse situation. One end of the polyamide rope need to be anchored on permamant structure rigidly on top and the other end need to be suspended alongside the worker without any obstruction. There should not be any knot or any damage to the vertically freely suspended polyamide rope. In case of any fall of the worker, the sliding fall arrester will arrest the fall on the polyamide rope hence the worker will be safe. The worker can use the hinges provided on sliding fall arrester to reach safely, slowly to ground or a safe level.

Activities related

- All External Activities on scaffold and using cradles.
- Activities inside the shaft.
- Activities related to plastering, facade, glass, gypsum, painting etc..





Working on Scaffolds **Working on Platform** **Full Body Harness**

No. 9 Manual Handling

Almost a quarter of all injuries at work are caused by accidents during manual handling. Most of the injuries are to hands, feet, legs and back. Some of the back injuries, in particular, result in permanent damage.

Take care of yourself by following the guidance given below:-

- If mechanical handling equipment is available and you are trained and authorised to use it, do so.
- Wear the right equipment for the job e.g. safety boots, gloves, overalls etc..
- Know your physical capabilities and only tackle jobs you can reasonably handle.

9.1 THINK THE JOB THROUGH

- Can the load be handled on your own?
- Is there a clear properly lighted walkway to the work location?
- Is there a safe stacking area?
- Seek advice on height restriction for stacks.

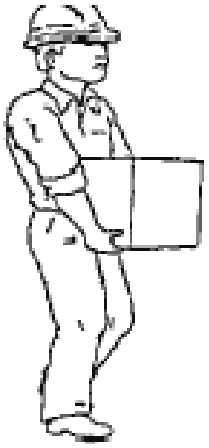
9.2 ALWAYS CHECK THE LOAD BEFORE LIFTING

- Is the weight marked on it?
- If it is a container, check the weight of the contents and any hazards associated with it.
- If it is a long load, e.g. scaffold tubes or steel rods, beware of overhead electric lines or moving vehicles.
- If the load is beyond you capabilities or awkward to handle, get help.
- Remove loose objects which are liable to fall whilst moving the load.

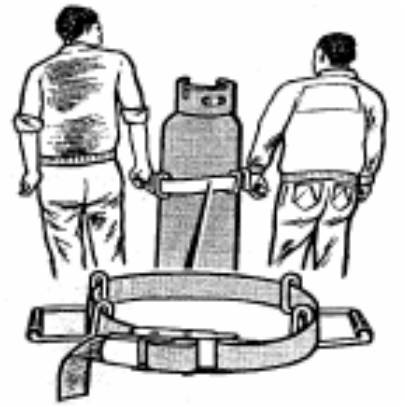
9.3 TO LIFT A LOAD SAFELY

- Stand reasonably close to the load, be sure footing is firm and feet are about 300mm apart
- Squat down by bending the knees keeping back as straight as you can.
- Place hands where they will not slip and grip firmly.
- Breathe in before lifting – inflating the lungs help support the spine.
- Straighten up with the legs, keeping the back as straight as you can.
- Hold the load firmly and close to the body.
- Ensure view is not impeded by the load whilst walking with it.
- Lift slowly and smoothly, avoid jerking motions.





- When two or more persons lift a load, one of the team must be nominated to give instruction in order to ensure that each person lifts an equal share and the team work together.



No. 10 Accident Reporting

The prompt reporting of an accident may well result in saving the life, or at least minimising the suffering of one of your workmates – or even your own. Your co-operation is therefore very important. If there is an accident at your workplace, help by:-

- Being familiar with you Company procedure for reporting of accidents and always follow these.

- Making sure that first aid assistance is called immediately.
- Seeing that it is reported without delay to your immediate supervisor.
- Ensuring that in the case of a serious personal injury that the accident site is left undisturbed until clearance is given by your supervisor or safety officer.
- Ensuring that any items which may assist in the accident investigation (e.g. damaged slings, broken abrasive wheels) are retained and passed on to your supervisor.

No. 11 Welfare Facilities

Employers must ensure that a safe means of access and egress be provided to all facilities covered in this section, and the facilities themselves must, as far as is reasonably practicable, be maintained so that they are safe to use.

11.1 DRINKING WATER

- Chilled drinking water must be provided at suitable points and marked “drinking water” using the applicable languages required.
- Adopt a procedure for ensuring filtered water is available by maintaining water supply lines with filters, ensuring that filters are replaced and records are kept.
- Adopt a procedure for ensuring water storage tanks are cleaned and maintained.

11.2 WASHING FACILITIES

- Every site where anyone is employed for more than four consecutive hours, must have washing facilities.
- Rooms containing washing facilities should be sufficiently ventilated and lit.
- On sites where a contractor employs more than 20 persons or where the work will last more than 6 weeks, washing facilities must include:
  - troughs, basins or buckets
  - soap and towels
  - hot and cold water
- On sites where the contractor employs more than 100 persons and the work will last more than 12 months, washing facilities must include:
  - washbasins plus 1 extra for every additional 35 persons
  - soap and towels
  - hot and cold water

11.3 SANITARY CONVENIENCES

- Rooms containing sanitary conveniences must be adequately ventilated and lit and not open directly into work or living space.
- Must be under cover, partitioned from each other and have doors with fastenings.
- Urinals must be suitably screened.
- On sites where the contractor employs up to 25 persons sanitary facilities must include:
  - at least one suitable sanitary convenience (not a urinal)
  - sufficient urinals
- On sites where the contractor employs more than 100 persons sanitary facilities must include:
  - suitable sanitary conveniences (not a urinal) plus 1 extra for every additional 35 persons.

- ❖ sufficient urinals.

11.4 FACILITIES FOR SHELTER, CLOTHING AND TAKING MEALS

- Provide sufficient and conveniently accessible shelters for protection against bad weather and for keeping personal clothing.
- Provide accommodation for keeping protective clothing used at work, with arrangements, as far as reasonably practicable, for drying such clothing.
- Provide accommodation for taking meals, with tables and seats or benches (see fire section regarding cooking facilities).
- Accommodation must be kept clean and must not be used to store tools, materials etc.

11.5 COOKING

- Cooking facilities must be suitably positioned outside temporary buildings and in their own enclosure. Cooking appliances must be properly installed and adequate ventilation provided (There will be no cooking in camp rooms).
- The use of gas rings should be actively discouraged, as electrical or gas cookers are preferable.
- Provide a fire blanket at each cooking location.

No. 12 First Aid

12.1 FIRST AIDERS

- For every site where the number of employees exceeds 50, there should be at least one fully trained First Aider present provided by the Contractor. Where the number of employees at work is over 150, the Contractor should provide an additional First Aider.
- First Aiders should have completed an approved course of training such as those organised by the Red Crescent or any other Internationally approved Society, They should thereafter undertake a refresher course every year and will require re-certification after three years.
- Where there are less than 50 employees there is no statutory duty to have a fully trained First Aider, but the employer must ensure that a person is trained to 'appointed persons' standard and should take charge if a serious injury or illness occurs. This person will also be responsible for looking after any First Aid Equipment.

12.2 FIRST AID EQUIPMENT

- First aid boxes, clearly marked with a red crescent on a white background, or white cross on a green background should be placed at suitable locations.
- The contents of first aid boxes and first aid kits should be regularly checked and supplies replenished.

12.3 EMERGENCY FIRST AID TREATMENT

First Aid is defined as the initial assistance given for any injury, the following are basic guidance given in respect of general First Aid treatment:-

ALWAYS:

- Know who your First Aiders are.
- Where the First Aid box is kept.

12.3.1 Treating Minor Injuries

- Notify the nearest First Aider.
- Assist as required.

12.3.2 Treating Serious Injuries

- Contact the office and request them for the Ambulance.
- Notify the nearest First Aider and assist as required.
- Keep the person calm and loosen any restrictive clothing.
- Keep the person warm and covered.

NEVER:

- Panic
- Move injured person unless location is life threatening
- Give food, drink or cigarettes

12.3.3 Bleeding

- Firmly apply direct pressure to the injured part.
- Apply dressing and raise the affected limb above the heart.

12.3.4 Burns

- Cool the skin with cold running water for at least 10 minutes.
- Apply a clean dressing.

No. 13 Housekeeping

"Housekeeping" generally indicate towards the arrangement of Men, Material, Machinery and infrastructure in an organized manner by which all the activities within the premises possess a disciplined appearance and effective use in all manner at all the time. The waste disposal, site arrangements, site organization and method of housekeeping is now directly proportional to the production cycle and completion status of the building.

The subject has a wide range scope in the existing working environment of construction, as the construction of high rising buildings has become the fashion of the day. The tough competition in early completion and immediate handing over to the client has changed the construction site into a war front. A study on the fatal accidents and permanent disability occurred during last three years has proved that, the poor housekeeping is the direct cause in 95 % of such cases. Example:-

- A carpenter fell from a height of just 3.2 M but dead on spot when he fell down on steel scrap scattering on the ground and one steel rode penetrated in to his scull. There was no any injury to his entire body other than this.
- 45% of the serious accidents were because of trips/slips etc due to poor housekeeping.
- Most of the sites turned into lavatories during construction as there is no availability or plan for toilets and other facilities in place which leads to health hazards and a very negative sense on our product and goodwill

13.1. Logistics Management

The first and most important step towards a good housekeeping thus safety is the proper planning that of basic infrastructure/ resources as under:

- Make a sketch of available space for the project
- Plan and discuss with concerned departments for arranging infrastructure in view of cost, space, transportation, storing, access, security and safety of the same.
- Where a generator should be? How many required? Distance from the main building? Access for refueling? Cables over head or under ground? Any possible disturbance for proposed excavations? Whether properly protected from rain/sunlight? Maintenance access is easy or what? Sound pollution /fume nearby offices or walk ways what? In emergencies whether it can be lifted or shifted easily? Is it wastes too much space? Like wise for :
    - Water Tank
    - Septic Tank
    - Vehical access and walkways
    - Steel yard
    - Cement
    - Block
    - Laydown area (steel yard etc..)
    - Workers / Staff facilities
    - Cable management
    - Waste accumulation and removal area
    - Site entrance and all the access inside

- How many persons required? What should be their uniform? How they are educated about the site behavior? Where they have to take rest? Where they have to take food? Where they have to drink water? How they have to use the facilities hygienic? When and where they have to meet higher authorities? What is their timing for rest and office needs? How they have to wait for a bus? Where they have to wait? Where they have to assemble? Etc….

  Such a planning automatically puts things arranged and 50% of housekeeping and safety automatically remains forever.

13.2. Important Locations of Housekeeping

We can classify certain locations as Z category in view of its direct effect on the site appearance as:

- Main roads along with site entrances.
- Main office of the site
- Main access to the site
- Main access to various levels
- Facilities (Lavatories, water/dining area/rest area)
- Fencing
- Fuel dump/ Generator Area
- Canteen area
- Labour accommodation
- External appearance and edges of the site

This Z category area must be clean round the clock so that the general appearance of the site will remain smart as what we are doing in our homes.

13.3. GENERAL HOUSEKEEPING & WORKMANSHIP

General housekeeping of a site is directly proportional to the workmanship of an engineer involved in any particular task. This site engineer is responsible for the proper stacking of material under his responsibility. When any material is stacked properly, automatically the wastage decreases as the availability, accountability and surplus stock can be identified easily. If a site engineer is efficient to control things under his jurisdiction with proper instructions to his foreman/charge hands, we can ensure proper stacking of material. The heavy quantity of steel going in scrap is because of this improper stacking everywhere. Example:

- Instruct the foreman where to stack cement and how. Don't allow open bags scattering every where.
- Don't allow to pull over loaded "Wheel barrows" of sand by which entire access may get damaged.
- Don't allow any incomplete work as the engineer needs 15 ply woods of 18mm, He asks foreman to de shutter the bottom of any floor for 15 ply woods, now the partial work will give a bad appearance of the bottom/materials scattered on the ground apart from hanging safety threats. Instead of which he should ask to remove complete bottom and to stack material properly so that he can easily shift it in view of next schedule. The incomplete /improper work practice is spoiling all the efforts for housekeeping in a site
- Don't allow any material stacking where access or offices are disturbed by it or on edges.
- Assembly point and its importance are to be maintained while stacking material or parking vehicles
- The speed of any a work is directly proportional to the system involved in it, if there is a system exists then we have to just follow it and then we can think about further improvements. Such qualities are part of training those posses and their efficiency as a team player. What they can contribute to the betterment of the team work is more important than how much an individual is qualified or experienced in a particular field.
- Immediately cleaning the area after breaking work, block work, grinder work, concreting etc
- Removal of unwanted scaffoldings/jacks/tables after use.

13.4. Checklist for Housekeeping

- How a project manager/ construction manager has organized the infrastructure?
- The roads and access to the site are clean or what?
- The office premises including facilities are good or what?
- The workers facilities are adequate and clean or what?
- Machineries including vehicles used in the site are clean/protected or what?
- The labors working in the site are educated about usage of facilities or what?
- The site engineers are showing responsibilities to control misuse, scattering and improper stacking of materials or what?
- Unwanted tables/scaffoldings Jacks are timely removed or what?
- Useless cables and damaged materials/machineries are stocked or what?
- The material at any point is properly stacked or what?
- Any where in the site the wastes water/drinking water is flooding or what?
- Electrical cables are properly laid or what? (Free from water/damage by materials over crowded etc...)
- Loading/lifting platforms are free of material or what?
- Basement of cranes, surroundings of generator is clean or what?
- Proper instructions to keep site clean and tidy is displayed as necessary or what?
- Wearing of uniform by workers are proper or what?
- The behavior at any reception point is pleasant or what?
- Proper implementation of suggestions by safety department is ensured or what?
- The construction team has team spirit towards housekeeping or what?
- Concrete debris/ wood pieces are timely removed or what?
- De shuttering/repairs and snagging on external part of the building perfect or what?

- All the boards and hoardings are professionally maintained or what?
- Parking of vehicles are arranged or what?
- The fencing/ relations with neighboring site are smooth or what?
- The approach and attitude towards valid suggestions are positive or what?

Though the subject has far reaching impact on every aspect of the construction like cost control, time saving and healthy environment, the first step towards strict implementation of the system has already delayed in construction sites. The reasons for poor housekeeping are as follows:-

- Involvement of inexperienced persons in responsible jobs like a supervisor become contractor without updating himself
- Inadequate training and poor attitude towards professional training and management
- Limited knowledge of the real goal and sticking to temporary benefits and immature masteries
- Less knowledge about site administration and its benefits
- Giving more importance to self than that the system and the organization
- Forgetting the site immediately after the break and lack of spirit that of 'desire home'
- Inefficiency in forecasting events in advance

Be humble and neat when we are on the path of growth, attract others towards us to boost our growth, be stable, worthy and healthy when we are right on top.

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