



HEALTH AND SAFETY
AUTHORITY

SAFE SYSTEM OF WORK PLAN (SSWP)



CIVIL ENGINEERING PICTOGRAMS



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CIVIL ENGINEERING

PICTOGRAMS

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Start Up and Ongoing Site & Planning Requirements

SUPERVISION



Supervision, generally by the person in charge (eg, the foreman), is essential to ensure the activity is completed as planned, and to a safe system of work.

SAFE PASS



As identified in the Construction Regulations, all people engaged in construction work must possess a current Safe Pass card, having successfully completed the one-day safe-pass training. Safe Pass cards must be renewed as appropriate. Proof of such training should be available on site.

PLANT/EQUIPMENT CERTIFICATION



It is a legal requirement that most construction plant is tested and examined on a regular basis, in particular all lifting appliances and lifting gear. The Certificates relating to these must be kept up to date.

CSCS



The Construction Skills Certification Scheme, as prescribed in the Construction Regulations, identifies certain skills on construction sites that require mandatory training. On successful completion of this training, persons are given a CSCS card. CSCS cards must be renewed as appropriate. Proof of such training should be available on site.

INDUCTION



Every new contractor or new employee on a site should undergo an induction when they first arrive on site. This induction should inform the attendees about: site rules and procedures, the arrangements for their safety and welfare on site, who the key duty holders are.

Emergency plans/procedures should be explained at inductions (they must also be available in writing), so that, if an incident occurs on site the risk of injury to workers and people in the vicinity is minimised. These measures must also deal with rescue. When developing the emergency plans, it may be necessary to liaise with the local emergency services.

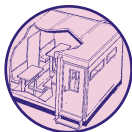
Communication: Timely and good communication is essential at all times. Clear communication helps to ensure that tasks are understood and completed in a safe manner.

WC & WASHING



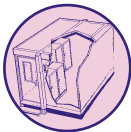
Toilets and a hand-washing facility must be provided on all sites. The facility must include a sufficient supply of hot or warm and cold running water, toilet tissue, soap and towels. The facility must be conveniently accessible and be kept clean and hygienic.

CANTEEN



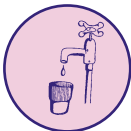
A facility must be provided for workers to take breaks in. Minimum requirements include: a facility for boiling water, tables with impermeable surfaces, chairs with backs. It must be properly ventilated, have adequate light, be kept in a clean, hygienic condition and should not be used for storing building materials or plant.

DRYING/CHANGING



An area, separate from the canteen facility, must be provided where workers can change and dry clothes.

DRINKING WATER



An adequate supply of wholesome drinking water must be provided at a convenient point (or points).

FIRST AID



First-aid equipment must be provided and maintained, and be easily accessible. At least one first aider should be available if the site-specific Safety Statement risk assessment shows that this is necessary. A trained first aider should generally be available to all construction workers.

SMOKING CONTROL



Smoking is prohibited in enclosed work places.

GENERAL ACTIVITY



This section identifies the general set of controls that are likely to be required for most activities covered by this form. This row of controls must be reviewed for all activities before any hazard specific controls are identified.

DRAWINGS



All planned work will generally be accompanied by a set of drawings. In most cases where drawings have not been provided (eg, for alterations or rework), drawings should be sought from the designers responsible. These drawings should normally identify the sequence and final position of constructed or installed equipment, components and materials, along with all other necessary information. It is also recommended that construction drawings identify notes about any relevant safety procedures/methods.

RISK ASSESSMENT



Each activity on site needs to be risk-assessed, to identify potential hazards (eg, working with live electricity, hazardous chemicals or at height, manual handling, etc). If there is risk of injury, appropriate controls must be put in place. If the hazard cannot be eliminated, the risk must be reduced as far as possible.

METHOD STATEMENT



Because construction work is hazardous, detailed method statements/procedures that describe the safe system of work, step by step, must be developed for high-risk activities. Such activities need to be suitably planned, organised and controlled. These procedures must be in writing and be communicated to all workers in language that all can understand. The method statement should include at least the following: a) the schedule of responsibilities; b) details of selected work methods; c) details of equipment to be used; d) details of ancillary equipment; e) the name of appointed duty holders; and f) a complete plan setting out the sequence of the operation (from site preparation, arrival of equipment on site, any necessary erection, positioning of equipment, lifting and placing of load(s), and dismantling of equipment, to moving off site). The plan must take account of all structural and related surveys and drawings, etc.

HOUSEKEEPING



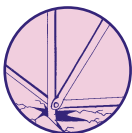
All slip, trip and fall hazards must be removed so that people can get safely to their place of work. A good housekeeping system must be adopted, so that everything has a place and is in its place. Excessive amounts of dust can cause eye and respiratory irritation. Dust and muck are a nuisance for both workers and others in the vicinity. All traffic routes in public areas near construction works should be kept clear of muck. During dry periods the routes should be dampened to keep dust down.

ACCESS ROUTE



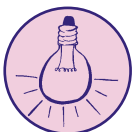
There must be safe routes to and from the place of work.

GROUND CONDITIONS



Before scaffolding is erected, or where other external access equipment is used, the ground must be prepared so that it can support the safe use of such equipment and any other loads applied.

LIGHTING



People who need to go to or work in darkened areas must have adequate lighting so they do not slip, trip or fall, or collide with projecting objects.

WARNING SIGNS



Warning signs must be used across the site to alert workers or others when they are approaching high-risk areas (eg, leading edges, excavations, and exclusion zones). Signs should also be used to convey safety information (eg, scaffold unsafe to use). Signs must be placed at an appropriate location, and be clear and in a language that all workers and people on site can understand. Signs should always be complied with.

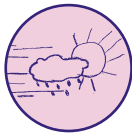
Members of the public approaching construction work must be given advance warning, particularly where specific hazards exist. Warning signs must be erected where necessary, giving clear, unambiguous directions to passing people.

FIRE CONTROL/ASSEMBLY

The risk of fire is generally ever present on construction sites. Fire prevention has to be considered at the various level of construction planning. Consideration should be given to providing means of escape and installing temporary fire-detection, emergency lighting and alarm systems.

Bar heaters should not be used on site, and use of all naked flames must be tightly controlled. Flammable materials must be stored separately in a well-ventilated lockable location, away from any likely ignition sources, and such liquids should be removed from site when no longer required. After hot works have taken place, the area should be revisited to ensure that fires have not developed. Sand and fire blankets can be used in certain cases, such as a small smouldering fire to eliminate the chances of fire developing.

- o To prevent injury from fire all employees must be instructed what to do in the event of a fire, what the approved escape route is, and where the assembly points are located. Fire drills should be held regularly.
- o Fire Extinguishers: people need to be trained how to operate them. They should only be used for small fires. Water fire extinguishers are used only to put out fires involving cloth, paper and wood. Foam extinguishers are suitable for most fires involving flammable liquids. Carbon dioxide extinguishers can be used on fires involving flammable liquids or electrical apparatus. Dry-powder extinguishers can be used on most fires including electrical fires.
- o There should be no bonfires on site.

WEATHER

Bad weather can lead to unsafe working conditions. In high winds or icy weather, it may be necessary to cease work at height in exposed areas. Also in high winds, loose materials may need to be removed or tied down, to prevent them blowing or falling. Cranes must not be operated in wind speeds that are in excess of those specified by the crane manufacturer. In hot sunny weather, sun protection must be considered, as well as the provision of drinking water to prevent dehydration.

SERVICES (including electricity, gas, sewage)

Before any construction work, it is necessary to ensure that existing services such as gas, electricity, water, and sewers are secured, so that they do not pose a risk to workers or people in the vicinity due to the works being undertaken. Adequate measures must be taken to protect workers.

SERVICE SUPPLIER e.g. ESB, Bord Gais, Local Authority etc

Where construction work is to begin, and services are unknown the relevant utility company must be contacted to obtain drawings and advice on the position of underground and overhead services.

DIVERT/OFF

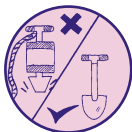
Before work near overhead, underground cables, gas services or other underground services begins, the relevant utility company must be asked to divert the service away from the work zone, or if necessary to switch off or stop the service temporarily to allow work to proceed safely.

DETECTOR AND MARK

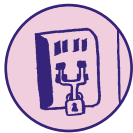
Before the ground is broken, the area should be scanned with a detector to verify the position of any services. Any variations should be noted on the drawings. The position of the service should be carefully marked, to ensure that subsequent work does not come into contact with it.

PERMIT TO WORK

To ensure that appropriate controls are rigidly adhered to when high-risk work (eg, working with live electricity or biological agents) is being carried out, a permit-to-work system should be used. This ensures that works do not begin until all the safety and environmental controls are in place, and signed off.

HAND DIG

Mechanical cutting or digging at or close to underground services is generally not permitted except in limited circumstances and only under strict supervision. Such services are normally uncovered or made visible by controlled hand digging, to minimise the risk of cutting or puncturing the service. However, care should be taken during hand digging, as this can also result in cutting services and exposing live conductors. Normally only when all lines are clearly visible should mechanical digging commence. Consideration may also be given to having a representative of the relevant utility company present when work takes place close to underground services.

ISOLATION/LOCK OUT

Where electrical power remains live, and subsequent work is required including live work, isolation and tagging-off systems, including permit-to-work systems should be used. All electrical work must be closely supervised by trained and competent electricians. The Electricity Regulations and the ETCI rules must be fully complied with.

BARRIERS

Where services have been uncovered or made visible, and remain visible or are insufficiently backfilled, suitable barriers should be erected at a sufficient distance around the service area to protect and warn drivers of plant and others of the danger.

NO FLAMES

Gas is highly flammable. Flame or any sources of ignition (sparks, static electricity, etc) must be kept away from live gas.

GAS BOTTLE STORAGE

Gas bottles must always be stored upright and chained to prevent inadvertent falling.

PLANT AND EQUIPMENT, LIFTING OPERATIONS**SELECTION/SUITABILITY**

Before any piece of plant is selected and used to carry out an activity, it must be checked for its suitability for the task (eg, safe working load, accessories available, reach capability, etc). When plant such as dumpers and bulldozers are being bought or used, the potential risks to workers from vibration emissions must be considered.

PILE DRIVING

Pile driving is the process of driving or casting a column-like structural member of concrete, steel or timber into the ground to support a superstructure. The pile driver is a machine, a hoist and leaders used to drive piles. The pile driver and auger rigs are usually top-heavy machine; the ground must be suitable to support the safe driving of the piles. Pile driving and auger rigs may also be lifting appliances, and thus must be certified, examined and tested as required under legislation. These machines must only be operated by competent and trained employees.

180 EXCAVATOR

Operators must possess the appropriate training certification. The machine must be set up safely for digging; the hand brake must be engaged; direction levers must be in neutral, and all wheels must be off the ground.

VEHICLE RECOVERY



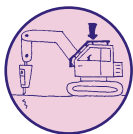
If any vehicle gets into difficulty on site, excavator booms, back actors, and lifting arms, etc, should not be used to pull the vehicle free (unless this might prevent injury or death). Only appropriate plant should be used to rescue vehicles, and this should be done from an approved towing point.

360 EXCAVATOR



Excavators can be used as cranes when lifting gear is attached to the machine to a specifically designed locating point. To carry out such tasks, the excavator will normally have check valves fitted to the main boom and dipper arm's lifting cylinders. The SWL for the excavator-lifting gear configuration should be the same at all radii, and should not exceed the load which the machine is designed to lift in its least stable configuration. Before the excavator is first used as a crane, a competent person must prepare a certificate.

ROCK BREAKER



Rock breaking involves applying heavy blows to a point either hydraulically or pneumatically. To prevent flying debris entering the cab it is recommended that the cab be fitted with a protective cage. When this method is used, regular inspections must be carried out to ensure that vibration has not caused a deterioration in stability in the surrounding areas. Prior to use, the assembled machine must be inspected by a competent person, to ensure that the attachment is secure and that all connections are fitted correctly and free from defects.

BULLDOZER

Due to the operator's seat position, visibility – particularly to the rear – can be difficult. Side mirrors, centre mirrors, flashing beacons and audible reversing alarms should be fitted. CCTV to the rear may also be required to give the driver adequate vision. All drivers must be fully trained and possess the necessary certificate.

DUMPER

All dumper trucks should possess side mirrors, flashing beacons and audible reversing alarms. Most articulated dumpers will require CCTV to the rear.

ROLL-OVER PROTECTION/NO PASSENGERS

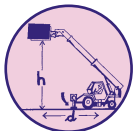
All drivers or operators of construction plant must be protected, according to the law. Where plant (such as dump trucks, tractors and mini excavators) might overturn, roll-over protection is required. Generally, only the person who controls the vehicle should occupy construction and demolition plant. One seat, one person. Such plant must not be used to give lifts about the site to others.

ROAD PLANER

Road planers and all other civil engineering plant such as slip kerb machines with built-in conveyors can be hazardous. Such plant require on-going maintenance to ensure they are in a safe working condition. Pinch, entrapment, fall points and any areas where materials can be ejected must always be protected by guarding to prevent injury to users or people nearby. Ladders, walkways and

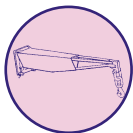
safety rails should be maintained in good condition to eliminate the risk of falls. Personnel operating such plant must receive training in their use.

TELEPORTER



The teleporter must be suitable for the task. Before use, check that it has been appropriately certified and that it is fit for use. Teleporters should be serviced regularly.

FORKS CLAMP/EXTENSION



Chains and slings must not be wrapped around the forks of a teleporter when lifting a load. When required to lift loads with a teleporter, the forks should be removed and a crane extension with hook or shackle used. Alternatively suitable fork clamps can be used, with the chain or sling suspended from a suitable hook or shackle.

LOCKING ATTACHMENTS



Ancillary equipment used in connection with any construction plant must at all time be secured (eg, quick hitch with bucket or rock breaker to excavator, etc). This may require the insertion of locking pins, to prevent inadvertent dropping of the attachment.

CONCRETE PUMP



Concrete pumping rigs must be maintained and serviced regularly (this includes checks on outriggers, etc). Special care must be taken when working in the vicinity of overhead lines.

PUMP CONNECTIONS



Each pipe connection on the pumping rig must be secured with the correct clip. The manufacturer's recommendations should be followed.

GRAB LORRY



Grab lorries and lorry loaders are increasingly used on construction sites. Typically the position of the operator working the controls of the crane can be standing on a platform directly behind the cab, or standing on the ground at the side of the lorry between the cab and the lorry body. Block delivery lorries are often operated from a high chair at the rear of the lorry. Many controls are fitted to safeguard the operator, including stabiliser feet, emergency stops, and fixed guarding place about the crane's control levels to prevent inadvertent operations. Sensors may also be fitted to prevent the bucket with load coming into the working area of the operator. Before lifting operations, all controls should be checked to ensure that they are in place. Lorry loaders must always stand on firm level ground. Working on sloping ground should be avoided. Grab lorries must only be used to lift bulk materials such as earth, sand and gravel. Lift gear must not be attached unless certified and tested lifting points are provided. All crane drivers must be fully trained.

Particular attention must be paid to overhead lines when operating grabs or lifting equipment mounted on lorries.

ROAD SWEEPER

Road sweepers must be maintained fully to ensure that all functions work as required.

VEHICLE MOVEMENT

Movement of heavy plant about civil engineering sites is an everyday event. Plant should be moved on appropriate low loaders. The decision on how to pull the low loader – with a tracked vehicle, tractor or lorry cab – should be based on a risk assessment, taking into account the condition of the haul road, etc. Irrespective of the method of movement, all transported plant must be firmly secured to the low loader to prevent serious risk.

WATER BOWSER

Particularly in dry conditions, dust on sites is a common problem and a health irritant. To reduce the effects of air-borne dust, water spraying is recommended. Water bowsers drawn by tractors are often used.

PTO GUARD & ACCESS STEPS

Agricultural tractors are often used on site. Where the power-take-off (pto) shaft is used to transmit power to a towed accessory, the joining pto shaft must be fully guarded. The operating cabs of most construction plant are in a raised position. Where access is by a series of steps, with handhold points, such steps should be kept in good condition. For example, a build-up of dirt and debris could cause tripping. Where damaged, steps should be repaired without delay.

DELIVERY/TRANSPORT

Site transportation and site deliveries (eg, transport of large structural components and large vehicle movements) must be carefully planned to avoid site congestion and prevent injury to site personnel or members of the public.

REVERSE WARNING DEVICES

With plant that has restricted visibility, and particularly during reversing operations, suitable warning devices or sight-seeing devices — such as CCTV, flashing beacons, convex mirrors, audible warning, etc – must be fitted.

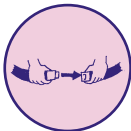
TRAFFIC/SPEED CONTROL

Traffic-control plans must be prepared to help control traffic movement, especially at the entrance to any construction site. Measures to control traffic may include: use of warning signs, bollards, stop-go systems, ramps, temporary traffic lights, flagmen and stop-go men. Liaison with local gardaí may also be necessary. The Department of the Environment's Traffic Signs Manual should be referred to.

Vehicular speeds must be controlled on construction sites. Signs must be erected and displayed appropriately to advise drivers of permitted speeds.

DEAD MAN'S HANDLE

If a 'dead man's handle' is fitted to a piece of plant, it must be maintained in good working order.

SEAT BELTS

Where seat belts are fitted they must be worn. In the event of an overturn they can save lives.

SAFE DRIVING

Driving and using construction plant safely requires operators who are competent and trained for the task. Any lapse in concentration could cause an accident. Drivers and operators must not be distracted from their task; thus anyone operating plant should not use a mobile phone. Similarly, where a seat with seat belt is provided for safe operation of plant, drivers should not drive or operate the plant from a standing position. Operators should only operate plant as trained and as specified by the manufacturers.

PRIVATE PARKING

Non-construction-related vehicles must be parked in designated areas away from site traffic.

COMPOUND/PLANT SECURITY

A designated area should be fenced off for storing construction plant and materials and for parking vehicles. At the end of the day the compound must be secured to prevent unauthorised access. Where plant is remote from a secured compound, alternative measures must be put in place to prevent unauthorised access.

SELECTION OF CRANE TYPE



Selecting the correct type of crane for the task is crucial. Many factors must be considered, including: the number of lifts required, the size and weight of the lifts (SWL), the lift distance (reach capability), and the ground conditions. The crane must be properly certified.

CRANE COORDINATION



To ensure that the safe system of work is implemented, one person should be appointed to have overall control of the crane operation(s). This person should have the necessary training and experience to fulfil this role. The coordinator's duties include: planning, ensuring that ground supports are adequate, selecting cranes and lifting gear, and preparing any method statements required. Crane coordination is particularly important where two or more cranes are working in close proximity. In such cases, strict controls must be implemented and documented to ensure that the cranes or their loads do not come into contact.

SWL (SAFE WORKING LOAD)/PLAN LIFT



Lifting appliances and lifting gear should never be used to lift beyond their stated safe working load. This, as assessed by a competent person, is the maximum load that an item of lifting equipment may raise, lower or suspend under the particular service conditions. All lifting operations should be planned to ensure that they are carried out in a safe manner. Generally a method statement should be prepared in advance of the operation.

BANKSMAN



A banksman (a trained slinger and signaller) must always be used where loads are lifted and safe direction is given to operators of lifting appliances. The banksman directing a crane's movements should be easily identifiable to the crane driver (eg, by the wearing of uniquely identifiable high-visibility clothing, and/or the use of radio call signs).

EXCLUSION ZONE



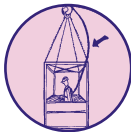
As a general rule, persons should not be working under an area where loads are being lifted or within the working radius of the jib. People should be kept a safe distance from working plant; barriers should be used where possible.

CHECKING OF LIFTING GEAR



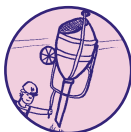
Lifting gear means any gear or cable by which a load can be attached to a lifting appliance. It includes chain sling, rope sling, hook, shackle or eye bolt. Before lifting gear is used it must be examined to check for safe working load (SWL) and so that defects, which may reduce its capacity to function safely, are repaired. Lifting gear must be appropriately certified prior to use.

MAN CRADLE



Where normal working platforms (such as scaffolding or MEWPs) cannot be erected, man cradles suspended from cranes may be used to give access to difficult areas at height. Such cradles must be rigged by competent persons. The cradle, lifting gear and crane must all be certified as appropriate for the task. Cradles should only be used to carry personnel, their tools and sufficient materials to do the job. They should not be used for transporting bulk materials. Cranes with free-fall systems engaged must not be used when someone is being lifted in a cradle. Fall-arrest gear should be worn by each person carried, with the lanyard secured to the hook block on the crane.

CONCRETE SKIPS



When concrete is discharged from concrete skips, care must be taken to use the appropriate discharge handle, and hands must be kept away from any other moving or pinch points. Ride-on concrete skips are not recommended, and should only be used if providing a safe working platform is not practicable. When ride-on concrete skips are used, extreme care must be taken to prevent the operator being thrown out of the skip due to recoil of the crane's jib after the load is discharged, etc. Operators must use a fall arrest system that is secured to a certified anchor point.

PALLETS/SECURE LOADS



Whatever the lift (teleporter or crane), loads must always be secured. Where possible, materials should be kept on pallets, or in bales with adequate strapping to ensure that materials do not fall while being lifted into place.

PEDESTRIAN ROUTES



All pedestrians – whether workers or members of the public – should be kept away from construction plant operations. Dedicated and clearly identified pedestrian routes should be used.

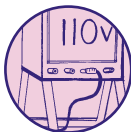
EXAMINATION & INSPECTION



A competent person is required to examine and inspect statutory plant and equipment. Defects must be noted and, if defective, plant should be repaired immediately, or be replaced. A report of the inspection/examination should be recorded on the approved form.

HAND-HELD EQUIPMENT**SELECTION/SUITABILITY**

Before any electrically powered hand tool or other hand-held equipment is selected and used, it must be checked for its suitability to the task (eg, voltage rating, size and condition, etc). When hand-operated power tools such as grinders, saws and drills are being bought or used, consideration must be given to the potential risks to workers from vibration emissions.

VOLTAGE

All portable electric tools rated below two kilowatts that are used on construction sites must be rated at 110V.

CHECK CABLE

Before any electric appliance (including transformers and extension reels) is used on site, the cables and connectors attached must be examined to ensure that they are not damaged.

Trailing electric cables which risk being damaged because of their position must be protected from such damage, or else they should be placed in a safe location.

GUARDS

Many hand/portable tools have rotating shafts and components. Others emit fragments, dust and sparks. Such tools must have suitable guards fitted (eg, circular saw guards, power-take-off shaft guards, etc).

GENERATORS OUTSIDE

To avoid the silent killer, petrol and diesel-driven generators must always be used outdoors to avoid the deadly effects of the build-up of carbon monoxide from exhaust gases.

COMPRESSOR & WHIP CHECKS

Compressors must be maintained and serviced regularly. All connections and flexible hosing must be in good condition and replaced if damaged. All guards must be secured before starting, so that no rotating pulleys or belts are exposed. 'Whip checks' (safety clips) should be used at connections on all pneumatic hose lines. This control prevents the hose from 'whipping around' in the event of the connection failing. The safety clips must all be inspected prior to the compressor being turned on. Alternatively, automatic cut-off valves may be used.

JACK HAMMER/KANGO

To reduce and eliminate the risk of ill health due to vibration, jack hammers and kangos must be serviced regularly and maintained in good condition. Jack hammers should not be used for long periods. Workers may be rotated to other tasks to reduce exposure time and prevent vibration-related ill health. Workers using jack hammers and kangos and anyone likely to remain in the immediate vicinity should wear ear defenders

DUST SUPPRESSION

Tools and equipment that generate dust clouds should be fitted with extraction or wetting aids.

HOT WORKS

Welders and flame cutters must only be used by competent, qualified persons. Suitable PPE (personal protective equipment) must be provided and used. A fire extinguisher and sand bucket along with appropriate screens should be readily available during cutting and welding. For welding, local exhaust systems should be considered to remove fume from the breathing zone. If the welding is carried out in a confined space or if the welding zone becomes a confined space because of the set-up, extra controls are required (see section dealing with Confined Space below).

In many situations where hot working is used, a permit-to-work system will apply to prevent the risk of fire and explosion.

Gas bottles must always be stored upright, and chained to prevent inadvertent falling. Flash-back arresters must be used on gas bottles. All flexible hosing and connections should be checked daily, and any damaged parts replaced prior to use.

CHAIN SAW



Whether as part of enabling works or landscaping, etc, various types of appliances are used on site to cut trees, wooden posts and other wood products. Chain saws must only be used by trained people. The saws must be regularly maintained and kept in good working order. The many safety features such as guards and chain brake should be checked before each use. All guards must be in place at all times. Appropriate PPE must be used.

Other tree and hedge cutters may also be used, such as circular saws mounted on the rear of tractors. Drivers must be trained. It is of utmost importance that an exclusion zone is strictly maintained around the working machine until the machine is parked up and the rotating blade has come to a stop.

OTHER

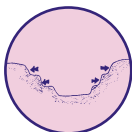


All construction equipment should undergo regular service and maintenance checks, to ensure continued fitness for use. It is good practice to keep written records of such maintenance checks.

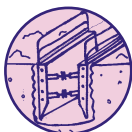
All equipment should be checked before use, and any damaged parts must be replaced before work begins.

EXCAVATION

Excavations and trenches more than 1.25m deep can cause serious accidents in the event of one or both of its sides collapsing. This can result in burial or crushing of workers.

BATTERING BACK

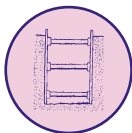
Battering back means that the sides of the trench are sloped back to a safe angle. This makes stable the sides of the excavation and prevents collapse.

TRENCH BOX

A trench box is a proprietary support system. Trench supports can be put in place without people having to enter the excavation. When it is in place, people can work safely inside the trench box.

SHEET PILING

Steel sheet piles are widely used for both temporary works (eg, excavations and cofferdams) and permanent works (supporting ground or water loads by use in retaining, quay and river walls). Designed to resist lateral loading, they are normally driven to form a set of interlocking piles in a panel. Pile driving and pile extraction are both hazardous. Only competent and experienced contractors should undertake such work. Specialist hammers used must be inspected before use, and be maintained in good order. Sheet piles are used particularly for deep excavations where space is restricted (eg, on or close to streets and busy roads).

SHORING

Shoring gives temporary support to the walls of a trench. Sheeting is placed along the walls of the trench; both vertical and horizontal props support the length of the excavation exposed. Several types of proprietary shoring systems are available, including hydraulic waling frames, manhole shores, trench/drag boxes (see above), and slide-rail systems. Traditional ground-support systems – timber boards supported by timber waling and struts or by steel trench sheeting, or sheet piling (see above) supported by timber or steel walings and struts – can also be used. Only a competent person, who has completed a thorough risk assessment, should choose the system to use.

BACK FILL

Back filling is the re-instatement and making safe of the excavation. It must be carried out immediately after the support systems are removed. Stop blocks should be used to alert drivers of vehicles (teleporters, dumpers and lorries, etc) when they are approaching the side of the excavation. If such vehicles come too close to the excavation, they could roll into it or undermine its bank.

SPOIL BACK

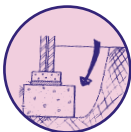
All material removed from an excavation should be stored away from the excavation to prevent loose materials falling back in.

CHOCK

A chock is a block that prevents a vehicle from approaching too close to the side of an excavation which could cause the sides of the excavation to collapse or lead to the vehicle rolling into the excavation.

NO UNDERMINING

Before excavating, the adjacent area should be checked to ensure that the excavation work will not cause other structures to become unstable or collapse. Underpinning and propping may be required to stabilise such structures before excavation work begins.

UNDERPINNING

Underpinning is the process of introducing support under an existing structure. Whether the purpose is facade retention or protection from other wall collapse, an assessment of foundations – focusing especially on the risk of subsidence – must be considered at the planning and design stage. If structures are or might be unstable, underpinning may be necessary. The risk assessment for underpinning excavations must also address the risk of collapse of the overhead structure. Because of lack of space during excavating for underpinning, supports will often have to consist of timbering to suit the size of excavation. Only a competent specialist should design and undertake underpinning.

LADDER ACCESS



Workers must be able to get in and out of excavations safely. Generally ladder access is used. Landing areas should be kept free of obstruction. All ladders should be secured to prevent slipping or sliding, and must allow for safe access and egress.

EXCLUSION ZONE



As a general rule, people should not work within the working radius of an excavator boom. They should be kept at a safe distance from working plant. Barriers should be used where possible.

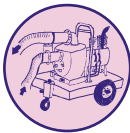
BARRIERS/COVERS



Suitable barriers should be placed around excavations when work is in progress. At the end of each day, these barriers should completely surround the excavation and be strong and high enough to prevent people falling into the excavation.

Alternatively or in combination with barriers, covers should be placed over excavations. These should be strong enough to prevent persons from falling through.

PUMPING



Water build-up in excavations should be removed with pumps to prevent flooding. Such pumps must be maintained in good working order, and be sited on firm ground at a safe distance from the crown of the excavation. This is so they will not undermine the banks of the excavation, or put the person operating the pump at risk from falling into the excavation.

ENVIRONMENTAL RISK ASSESSMENT



If rain water, contaminated water, sewage or any contamination has to be removed from an excavation or similar, an Environmental Risk Assessment should be carried out to ensure that, during the pumping process, untreated or contaminated material does not re-enter the ground water. This assessment should assess the likelihood of such harmful emissions or discharges so that suitable controls may be implemented to eliminate the risk.

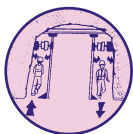
SAFE STACKING



Pipes and other materials should be stacked in a safe manner, with wedges, to prevent pipes and other materials from falling or rolling on to people. Large circular sections (such as manhole sections) should be stored on the flat and not on their circular sides.

PROPPING

Tunnels should be adequately propped to prevent the collapse of the walls or ceiling of the tunnel.

ACCESS/EGRESS

Designated pedestrian walkways must be in place to separate site traffic from people entering or leaving tunnels.

AIR SUPPLY

During tunnelling, a supply of fresh air may be required. Competent advice should be sought.

EXAMINATION & INSPECTION

A competent person should inspect excavations at least once a day. The support systems and ground conditions should be examined and any remedial work should take place immediately. A report of the inspection should be recorded on the approved form.

FALLS AND FALLING OBJECTS



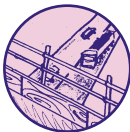
SCAFFOLDING/WORKING PLATFORM



Scaffold platforms should where possible be used as working platforms for all work at height and in particular for all works above two metres. The scaffold platform must be designed, planned and erected by trained personnel, in accordance with all relevant legislation, codes of practice and manufacturer's instructions. Scaffolds should include dedicated ladder access bays, and where required, properly constructed loading bays. Hand-Over Certificates and the use of relevant signage (eg, capacity of loading bays) are recommended.

A working platform is a location for carrying out construction work at height safely. It is taken to mean a work area that provides protection and prevents a worker from falling to a lower level. Generally it is used to refer to scaffold platforms but, where scaffolds cannot be erected, it can also refer to other safe platforms such as MEWPs and scaffold towers.

EDGE PROTECTION



All people must be protected from falling off edges, through hazardous openings or off stairs. Protection measures include handrails, barriers, mid-rails and toe boards, etc.

OPEN HOLES



All ground and manhole openings, etc, as soon as they are created, must be guarded to prevent falls. Usually the opening is surrounded with visible guard rails and toe boards that are anchored and fixed securely.

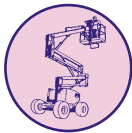
Where openings are covered, the covers (eg, manhole covers) must be of adequate strength and size and be firmly fixed in position. These covers may also identify what they are covering (eg, a floor opening) so they will not be inadvertently removed.

Excavated openings should be backfilled as soon as possible.

SAFE LADDER



All ladder access must be erected by competent people who will ensure: adequate length of ladder, tying and footing, and lack of defects. Access onto and egress off ladders must be such that workers do not have to cross large gaps through which they could fall before they have a firm handhold on the ladder. Ladders should be controlled and checked frequently to ensure fitness for use.

MEWP (Mobile Elevating Work Platforms)

A boom hoist, which has an extendable folding boom with cage attached, can be used for work at height if ground conditions are suitable. Boom hoists can also be used to enable access to remote areas. Selection must be based on suitability for the task. Particular attention should be given to ground conditions. It should be possible to follow fully the manufacturer's guidelines for safe use. Only competent and trained operators should control the movement of these hoists. Other vehicles should be strictly controlled in the vicinity of hoists.

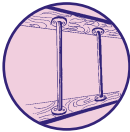
Scissors lifts that can extend to significant heights, using hydraulic scissors movement, may be used where scaffold platforms are not possible. Selection must be based on suitability for the task. Particular attention should be given to ground conditions. It should be possible to follow fully the manufacturer's guidelines for safe use. Only competent and trained operators should control their movement.

MOBILE SCAFFOLD

Mobile scaffolds or tower scaffolds must be carefully planned and erected by trained personnel and in accordance with manufacturer's instructions. The spread of the out-riggers fitted to each corner of the scaffold depends on the height of the tower. When in use the tower must be secured, and each wheel brake locked. The platform must be fully boarded, and be complete with mid rails and top guardrails. Before the platform is moved to another location, workers

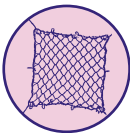
must descend from the tower. They must not resume work until it has been secured in its new position. The mobile scaffold must be inspected before use to ensure it is in good working order (eg, the wheel brakes) and that all components are in place.

PROPPING



Propping is required during the construction stages of a project to give temporary support to prevent collapse due to overloading of structural components (eg, when installing precast slabs and stairs, etc). The contractor must ensure that the number and location of the props – as specified by the designer (generally a structural engineer) – are correct and that the units are supported as indicated on the construction drawings. Normally a temporary works coordinator should be appointed to ensure that correct propping procedures are followed and operations are carried out safely.

NETS/BEAN BAGS



People carrying out roofwork or other work at height that is over or close to internal openings (eg, portal framed structures) can be protected by the use of safety nets. Safety nets, bean bags and air bags should also be considered for other roof work applications where there is a risk of falls. Before use, these safety nets and bags should be tested, inspected and certified. They must be installed by competent, trained people.

STRUCTURES (In-Situ, Precast, Steel Work)

This section highlights the main controls covering high-risk activities associated with constructing superstructures, concrete work, precast and steel-work erection.

STEEL FIXING

Where possible, steel fixing should be organised to prevent back and manual handling injuries, e.g. can the work be done at waist height on tables or raised platforms such that continuous bending is not needed? Where possible, the work should be pre-assembled at ground level and then lifted into position. Slips, trips and puncture injuries are risks. Walking across steel mesh can be difficult and can result in injury. Storage areas should be set up and walkways created. Ply decking over steel mesh may assist safe access. To prevent hand and eye injuries, goggles and gloves must always be worn.

REBAR

Exposed rebar, particularly on access routes or close to work areas, must be removed fully by cutting, or be bent away or capped with plastic mushroom caps, so that they do not risk causing a trip or puncture injury.

LIFTING REBAR

Rebar is often supplied in bundles held by narrow binding wire. Rebar should not be lifted by the binding wire. A secure choke hitch, with the certified chain leg double-wrapped around the bundle, should be used. A two-leg chain is normally used.

PROPRIETARY WORKING PLATFORM



The manufacturers of the many types of proprietary falsework systems also supply associated working platforms, complete with safe ladder access, guard rails and toe boards, to help prevent falls from height. When proprietary systems are used, the associated designed working platform must also be used. These platforms must be erected by fully trained personnel in accordance with the manufacturer's recommendations. No contractor should erect the system in a way that deviates from the manufacturer's recommendations unless the manufacturer or a competent designer has given approval.

Where non-proprietary systems are used and work is carried out at height, workers must be protected by properly designed fall protection systems such as working platforms complete with safe ladder access, scaffolds or mobile towers. Only as a last resort should individual fall-protection measures be used.

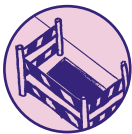
PROPRIETARY EDGE PROTECTION



Manufacturers of decking systems or form tables also supply associated edge-protection systems. These usually consist of uprights which clamp onto beams, along with guard rails and toe boards. When these proprietary systems are used, the associated edge-protection systems must also be used. These systems must be erected by fully trained personnel in accordance with the manufacturer's recommendations.

Where non-proprietary systems are used and work is carried out at height, workers must be protected by properly designed edge and fall-protection systems such as working platforms complete with safe ladder access, scaffolds or mobile towers. Only as a last resort should individual fall-protection measures be used.

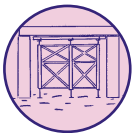
GUARD ALL OPES



All floor openings, as soon as they are created, must be covered or guarded to prevent falls. Normally this means surrounding the opening with visible guardrails and toe boards that are anchored and fixed securely.

Where openings are covered, the covers must be of adequate strength and size and be firmly fixed in position. These covers should identify what they are covering so that they are not inadvertently removed.

TEMPORARY WORKS



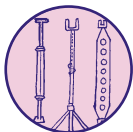
Temporary works refer to any site installations needed to facilitate the construction of permanent works but which do not remain as part of the permanent works. In this section, we are particularly referring to falsework (ie, scaffolding or other temporary structural support for concrete formwork). Temporary works generally require formal design, and an appointed competent temporary works coordinator will normally oversee, coordinate and manage the process of temporary works.

BEARINGS AND FIXINGS



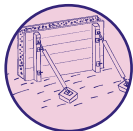
When large beams are being landed on columns, it is crucial that the correct bearing is installed properly and that the required temporary works are in place. Selection of the bearing and temporary works should be decided at the planning stage, and be detailed on the drawing. The erection of such beams can be hazardous. Only a competent and experienced contractor should carry out the work. A temporary works coordinator should normally be appointed to oversee and manage the erection and dismantling of the temporary works.

TYPES OF PROP



Whether it is propping to support formwork, or the support of large steel or concrete component, selecting the appropriate props is crucial. Competent structural engineering advice is necessary. Proprietary propping systems should not be mixed for the one application. Only locking/locating pins that are recommended by the prop manufacturer should be used.

PROP SUPPORTS



Care must be taken in selecting the appropriate method for propping formwork. Calculations and decisions need to take account of such parameters as materials used, size, weight, space and location of the formwork, etc. Structural engineering advice is normally required. Formwork and related propping must only be carried out in full compliance with the approved design.

CONCRETE POUR



Working with wet cement and concrete can result in dermatitis. To prevent skin coming into contact with wet cement, overalls, gloves, high boots and goggles should be used.

TAG LINES

When lifting long loads, particularly in confined spaces, slingers should attach a rope or 'tag line' to one or both ends of the load so that rotational movement may be controlled.

SAFE ACCESS

To facilitate the safe erection of steel work at height, safe access must be provided. This generally requires the use of mobile elevating work platforms (MEWP), where the operators fully control the movement of the MEWP. People working from these platforms should keep their feet firmly on the floor of the platform. It is recommended that harness and lanyard be worn and attached to an approved anchor point in the platform.

FALL ARREST AND RESCUE

Fall-arrest systems should be used in conjunction with a rescue plan. Safety harnesses with a fall-arrest system (including other components such as lanyard, shock absorber and anchors) are used to prevent a person from hitting the ground in the event of a fall. Safety harnesses and personal fall-arrest equipment are not a substitute for working platforms or collective protection such as safety nets. Each component in the fall-arrest system must be inspected before use. It is recommended that a competent person examine the system formally at regular intervals (depending on a Risk Assessment) and at least every three months.

ROAD WORKS



This section deals with road works as they occur in association with major civil engineering projects. The controls covered are not exhaustive. Each activity undertaken should be risk-assessed and relevant controls (which may not be identified here) should be implemented.

ERECTING TRAFFIC-CONTROL SIGNS



Before road works or road-related activity is undertaken, traffic-control signs should be erected. These should alert the public to the works ahead, any change of road layout or diversions. The signage work (erecting a single movable sign, constructing a base and installation, commissioning of large signs, etc) must be carefully planned. Detailed risk assessments should be carried out to ensure that adequate controls are implemented (eg, so that passing vehicles do not pose a risk to workers).

SURVEYING



Before any surveying or related type of work is undertaken on live roadways, detailed risk assessments must be prepared to ensure that adequate controls are implemented (eg, so that passing vehicles do not pose a risk to workers). Suitable warning signs and the use of flagmen should be considered. Appropriate PPE must be used.

BURNERS/BOILERS



Many road coatings and materials such as bitumen, asphalt and macadam must be heated or boiled before application. Care must be taken to avoid breathing in the fumes released during the working of hot bitumen, asphalt and macadam. Prolonged exposure to these fumes may damage health. Safety Data Sheets (SDSs) for the LPG and the coating materials (eg, bitumen, asphalt and line-marking materials, etc) should be available to each coatings crew. Handling and storage precautions outlined in these SDSs must be adhered to. Workers should be provided with coveralls, protective gauntlets and goggles to protect their eyes, skin and clothing from splatter. Boots worn should be resistant to bitumen penetration.

The burners/boilers are normally vehicle-mounted, many on special-purpose vehicle carriers (eg, for laying a hot-rolled asphalt-wearing course). The boilers and LPG cylinders must at all times be secured. All associated pipework, valves, controls and gas-burner heating units should be regularly inspected and maintained in good working order. Only one person should be permitted to operate the spray bar during operations. The gas system on bitumen sprayers should have a built-in flame failure device to ensure that gas is automatically cut off if the flame is extinguished. Bitumen boilers should be kept at least three metres from the cylinders. A suitable fire extinguisher must be available on each machine.

The sprayer driver and spray-bar operator should be aware of how to cut off the gas supply in the event of an emergency. Smoking must be prohibited in the working area. Lance operators, particularly in windy conditions, should wear face protection.

Operators involved in burning off road markings must wear the appropriate PPE for the task. Measures must be put in place to ensure that all vehicles are diverted from this work.

OVERHEAD LINES/NO TIPPING



The operation and movement of plant and equipment close to overhead lines can be dangerous. Warning goal posts should be erected a safe distance either side of the lines. Any passing plant must only access under the lines via the goal posts. The exposed lengths of the overhead lines must be guarded from unapproved access. (See ESB Guidelines for further information.)

The operators of tipping vehicles and high-reach machines must pay particular attention to overhead lines, and always remain at a safe distance from them. Warning goal posts should be used for traversing plant.

TRAFFIC MANAGEMENT

This section deals with some of the key controls associated with managing and controlling traffic flow to safeguard workers and members of the public from civil engineering works. When any road-related work activity is being planned, traffic management must be considered as part of the detailed Risk Assessment. As part of this assessment where other controls are identified, these must also be planned for and implemented.

LIAISON

Infrastructural development resulting in changes to road junctions or road layout, lane or road closures, or road diversions may impact on the safety of road users such as the emergency services, local residents, farmers and traders. These should all be made aware of how the works may affect them. Such arrangements should form part of the site's traffic management plan.

DIVERSION

A road diversion may be needed so that members of the public and related traffic do not come close to civil engineering works. This control should first be considered during the design process in conjunction with the relevant local authority and the Garda. A road diversion may solve some problems but care needs to be taken to ensure that it does not create greater problems. Road diversions need to be meticulously planned to ensure that the volume and size of traffic diverted can safely navigate the alternative road.

Possible issues include bridge clearances, road width, road surfaces, road markings and safe public/local access. Adequate warning signs and road markings, etc, should be provided. Arrangements for road diversions should be detailed in the site's traffic management plan.

ROAD SIGNAGE



The Department of the Environment's Traffic Signs Manual should be referred to. This manual provides the guiding principles for the use of signs, signals and markings for a variety of roadwork scenarios. The guidelines should be implemented sensibly, with account taken of special issues at each work site (eg, prevailing sight lines).

FLAGMAN/STOP-GO MAN



Where construction activity requires the managing of traffic or pedestrians in nearby public areas, trained flagmen (to slow down traffic) or trained stop-go men (to halt traffic) are used to ensure safety. Stop-go men and flagmen must wear high-visibility vests and use approved stop/go signs or flags. Where two stop-go men are required, they must be able to see each other clearly or be able to communicate with each other by voice e.g. use of 2 way radio etc.

VEHICLE CRASH BARRIERS



Where everyday transport moves close to construction traffic, careful segregation must be planned, including the use of vehicle crash barriers, bollards, guardrails and signs. The choice of the appropriate vehicle crash barrier must be based on a risk assessment. This should take into account the type and extent of work activity including location, construction plant in use, lines of sight, width of road, traffic volumes, road surface, duration of works, etc.

TRAFFIC/SPEED CONTROL



Traffic-control plans must be prepared to help plan and control traffic movement, especially at the entrance to any construction site. Measures to control traffic may include: warning signs, bollards, stop-go systems, ramps, temporary traffic lights, stop-go men and flagmen. Liaison with local gardaí may be necessary.

Vehicular speeds must be controlled on construction sites. Speed signs advising drivers of permitted speeds must be erected and displayed appropriately.

Road surfaces must be considered when appropriate speeds are decided upon.

ROCK BLASTING



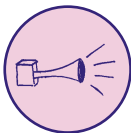
The planning and use of explosives for controlled rock blasting requires competent, trained and authorised people. The blasting operation should be under the control of a trained shot-firer. Careful blast design is essential, and should take into account blast location, utility services tests, blast analysis, an adequate safety exclusion zone, etc. Before any work starts, a detailed method statement and shot-firing rules, based on the blast design and associated risks, should be prepared. A contingency plan should be included in the method statement. Before work commences, the appropriate bodies and people likely to be affected by the work should be notified.

COMPETENCE



Standards governing the handling and use of explosives are available and must be used, together with any relevant codes of practice. Relevant laws must be complied with. Only shot-firers who can demonstrate that they have the necessary qualifications, training and experience for the specific blasting operation should be employed.

WARNING/SEQUENCE



All workers in the vicinity of rock blasting must be made aware of the sequence leading up to and including the blast itself, so that the area can be fully evacuated at the time of the blast. The blast area must not be re entered until the shot-firer gives the all clear. A communication system such as a Klaxton will normally be used to alert workers that the blast sequence has commenced and to clear the area.

EXCLUSION ZONE (DANGER ZONE)

Rock blasting, which is very hazardous, should only be commenced when sufficient measures are in place to ensure that workers and members of the public are not at risk of injury. Calculation of the danger zone depends on many technical factors and should be determined by the shot-firer.

When trench blasting or blasts close to private property are undertaken, protection must be laid in the blast area to contain the force of the blast and to prevent projection of rock.

WORKING CLOSE TO THE PUBLIC

Where work activity is carried out close to members of the public, measures should be taken to protect them.

LIAISON

Subject to risk assessment, the safe coordination of site-related and public traffic requires direct communication between the relevant contractor and local authorities, and where necessary the emergency services and Garda. This liaison in most cases continues for the duration of the works so that any changes can be highlighted and knock-on safety effects can be dealt with in advance. The site's traffic management plan should include these arrangements.

FENCING/HOARDING

Construction activity should not present an undue risk to members of the public, especially to children. Suitable fencing must be used to secure sites.

Particularly on streetside works, adequately designed and constructed hoarding should be erected to secure the site work. Arrangements must be put in place to ensure that normal pedestrian and public vehicular traffic is not put at undue risk as a result of any changes made.

BARRIERS

All ongoing works – in particular street-related activities, open excavations, exposed manholes, etc – must be protected with barriers and identified with warning signs.

PEDESTRIAN ROUTES

Where members of the public have to access close to, or around construction work, suitable safe routes must be provided to protect them. Consideration must also be given to people with disabilities. Construction debris must be kept clear from such public areas. Muck, dust, trip hazards, protruding puncture objects and objects likely to fall, etc, must be removed. Where reinstatement is required, it must be completed without delay.

SECURITY

Only authorised people should be allowed onto construction sites. Trained security personnel can help to control access.

TRAFFIC CONTROL

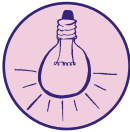
Traffic-control plans must be prepared, to help control traffic movement, especially at the entrance and exit of any construction site. These may include warning signs, bollards, stop-go systems, ramps, temporary traffic lights, stop-go men and flagmen. Liaison with local gardaí may also be necessary. The Department of the Environment's Traffic Signs Manual should be referred to.

FLAGMAN/STOP-GO MAN

Where construction activity requires the managing of traffic or pedestrians in nearby public areas, trained flagmen (to slow down traffic) or trained stop-go men (to halt traffic) are used to ensure safety. Stop-go men and flagmen must wear high-visibility vests and use approved Stop/Go signs or flags. Where two stop-go men are required, they must be able to see each other clearly or be able to communicate with each other by voice e.g. using 2 way radio etc.

BANKSMAN

A banksman (a trained slinger and signaller) must always be used where loads are lifted and safe direction is given to operators of lifting appliances.

LIGHTING

Adequate lighting must be provided in darkened areas to prevent people from slipping, tripping, falling or being hit by projecting objects.

DUST/MUCK

Excessive amounts of dust can cause eye and respiratory irritation. In general, dust and muck are a nuisance for both workers and others in the vicinity. All traffic routes in public areas near construction works should be kept clear of muck. During dry periods the routes should be dampened to keep dust down.

WORKING CLOSE TO WATER**PERSONAL FLOTATION DEVICE**

Anyone working close to or over water should wear personal flotation devices such as an inflatable life jacket. Such devices should be properly stored, inspected and serviced.

LIFE RING

If work takes place near water, workable life rings must be available at the water's edge.

BOAT



A rescue boat should be readily available if work over water takes place.

EDGE PROTECTION



Suitable handrails must be provided where appropriate if work close to water takes place.

SAFETY LINE/GRAB LINE



Workers who need to go close to the edge of water may be attached to a safety line.

Safety ropes and lines may be erected close to the shore and downstream so that if anyone falls into the water he or she can grab the line and pull himself or herself to the shore.

FALL ARREST & RESCUE



Fall-arrest harnesses with lanyards or retractable reel systems used with suitable anchorages may help protect workers who go over or close to water. A rescue plan must accompany any use of fall-arrest equipment.

DIVING



Diving at work covers a wide range of activities including: deep saturation diving in the offshore oil and gas industry; to diving instruction by a professional instructor; underwater inspection or repair (eg, harbour works, laying pipelines or cables). Divers may perform a variety of tasks including cutting, welding, guniting and carpentry. Diving is a high-hazard activity but the risk can be significantly reduced if regulations are adhered to and good work practices are adopted.

Divers and the diving crew must be fully competent, by way of recognised training, to undertake particular work activities. Divers should have a suitable commercial diving qualification and current diving medical certificate. All associated equipment must be regularly inspected, tested and maintained, to strict schedules. Standards governing diving and diving equipment must be used, together with any relevant codes of practice. Relevant laws must be complied with.

Recognised diving controls include: having the appropriate dive team, dive plan, voice communication, lifeline, full face mask, secondary supply of breathing air, availability of medical oxygen and adequate emergency plans.

COFFERDAM

A cofferdam is a temporary dam formed using sheet piles, which enables construction on the dry side below water level. For work below 10 metres a caisson may be needed.

PONTOON & CRANE

A pontoon is a floating vessel, usually flat-bottomed, used as a working platform on water. All plant and equipment carried on pontoons must be adequately secured, to prevent inadvertent movement. A crane should have its tracks securely lashed with chains or equivalent. At the end of a shift the crane's jib should be dropped and lashed. As a working platform it must be completed with edge protection and adequate welfare facilities, etc.

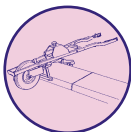
DREDGER

A Dredger is a floating vessel capable of excavating below water level (eg, to deepen harbours or create navigation channels). All plant and equipment carried on pontoons must be adequately secured, to prevent inadvertent movement. As a working platform it must be completed with edge protection and adequate welfare facilities, etc.

MANUAL HANDLING

Manual handling means more than just lifting or carrying something. It describes a range of activities including lifting, lowering, pushing, pulling, carrying, moving, supporting or holding an object or person. Up to one-third of all work injuries are injuries due to manual handling activity.

The manual handling regulations require that manual handling activities should be assessed taking account of risk factors (unfavorable ergonomic conditions) and that appropriate control measures should be put in place to avoid or reduce the risk of injury.

MECHANICAL AIDS

Mechanical aids are devices used to lift, pull or push objects, which either eliminate the need to manually handle the object or reduce the manual handling required.

WORK ORGANISATION

Work organisation requires that the method of physical work be assessed to see whether it can be organised in such a way as to minimise or eliminate the need for manual handling.

TRAINING

Manual-handling training is a legal requirement for anyone required to carry out manual-handling operations at work. Workers are trained how to move loads so that they do not risk injury.

HEALTH**BIOLOGICAL AGENTS**

Exposure to micro-organisms such as bacteria, viruses, parasites and fungi may cause an infection, allergy, poisoning or toxic effect. If it is suspected that biological agents are present, a controlled thorough examination of the area must be carried out to identify these agents. It will be necessary to seek medical advice, and to vaccinate those likely to be exposed (eg, for Hepatitis A, Hepatitis B and tetanus). Weil's disease is a risk for anyone working close to sewers and waterways. Appropriate PPE should be worn.

A permit-to-work system should be considered to ensure that a safe system of work is in place for activities where the biological agents are present and to ensure that only authorised people enter the work area.

HARMFUL GASES & DUSTS

Harmful gases and dusts can cause harm if inhaled or if they come in contact with skin. All work activity should be planned to prevent exposure to them. Excessive dust can cause eye and respiratory irritation or injury if someone is exposed to large concentrations over a short period or lower concentrations over a long period.

The following measures should be considered:

- Survey: If it is suspected that harmful gases or dusts are present, the area should be evacuated immediately and a controlled thorough examination of the area be carried out to identify what gases or dusts are present.
- Permit-to-work system: This process ensures that a safe system of work is in place for activities in the area where harmful gases or dusts are present and that only authorised and appropriately protected people can enter the area.
- Appropriate ventilation to allow enough fresh dust-free air into the work area.
- Local exhaust systems, to remove dust.
- Wetting and damping down prevents dust from being dispersed in the air.
- Where necessary, expert advice should be sought.

CONFINED SPACE



'Confined space' refers to any place – including a vessel, tank, container, pit, bund, chamber, cellar or similar space – which, by virtue of its enclosed nature, creates conditions that could cause an accident, harm or injury that would require emergency action.

SURVEY



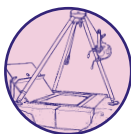
Before entry to a confined space to carry out work, a full survey of the work area must be carried out to identify any hazards, particularly the presence of harmful gases.

PERMIT-TO-WORK

This system ensures that a safe system of work is in place. It is generally used for activities with high levels of risk. Only authorised people can enter the work area, under controlled conditions.

DETECTION

Where harmful gases are likely to exist, gas detectors must be used to give an alert if a harmful level is approached.

TRIPOD

A tripod is a standard piece of rescue equipment for people working in confined space. With a tripod, an employee can be lowered into the confined space by a 'buddy' and, more importantly, be raised out of it.

COMMUNICATION

Anyone inside the confined space must at all times be in verbal contact with those outside. It is crucial that the equipment used to communicate is spark-free, to prevent it from providing a source of ignition.

PPE (personal protective equipment)

Personal protective equipment protects individuals from harm when all other methods have been employed to eliminate risk. PPE is a last resort. It should be maintained at all times in good working order. The PPE listed below must conform to the relevant Irish Standard.

SAFETY HELMET/BOOT/HI-VIS



Safety helmets/hard hats are used to protect the head from falling objects and from striking the head off objects. They should be replaced periodically.

Workers using safety harnesses should wear a helmet with a secure chin strap to keep it on the head in the event of a fall.

Safety boots are required on all building sites. They should have steel toecaps and sole protection to prevent the toes from being crushed and any object from penetrating the sole.

Hi-visibility vests help to ensure that a worker can be seen by drivers and operators of plant and other vehicles.

EYE PROTECTION



Eye protection in the form of glasses/goggles or visors protects the eyes from flying objects, dust and splashes (eg, when grinding and cutting).

SAFETY GLOVES



Safety gloves protect the hands from cuts and from contact with harmful substances, sharp objects, etc.

EAR PROTECTION



Ear protectors help to protect hearing from loud sudden noise or from continuous loud noise. There are two action levels. Where noise exposure is at or exceeds 80 dBA (decibels), individual hearing protectors must be made available. Where noise exposure is at or exceeds 85 dBA, individual hearing protectors must be made available and must be used. There is also a limit value set at 87 dBA which must not be exceeded. The limit value takes account of the attenuation provided by hearing protectors worn by the worker. The action values do not take account of the effect of such protectors. Where risk assessment reveals a risk to the worker's health as a result of noise exposure, audiometric testing (hearing check) will have to be made available.

In dirty and dusty environments, earmuffs are the recommended form of ear protection.

DUST MASKS



Dust masks protect workers from inhaling harmful dusts.

RESPIRATORY EQUIPMENT



Respiratory equipment protects workers by filtering out harmful substances from the air breathed in. To work effectively, they must be well maintained.

FACE PROTECTION



Face-protection visors protect the face from flying objects, sparks and splashes from hot or harmful substances.

SAFETY HARNESS



Safety harnesses with a fall-arrest system (including other parts such as lanyard, shock absorber and suitable anchors) prevent people from hitting the ground if they fall from a height. Fall-arrest systems should be used in conjunction with a rescue plan. Safety harnesses and personal fall-arrest equipment are not a substitute for safe working platforms or collective protection such as safety nets.

SAFETY OVERALLS



Safety overalls protect the body from coming into contact with harmful substances.

ABBREVIATIONS

CCTV	Closed-circuit television
CE	Refers to European Community. Is marked on products and machines which comply with essential safety requirements of any relevant standards which are set down by the CEN, a European standard-setting body.
CSCS	Construction Skills Certification Scheme
ESB	Electricity Supply Board
ETCI	Electro-Technical Council of Ireland
MEWP	Mobile Elevating Work Platform
PPE	Personal Protective Equipment
RPE	Respiratory Protection Equipment
RSJ	Rolled Steel Joist
SDS	Safety Data Sheet
SWL	Safe working load: the maximum load which an item of lifting equipment may raise, lower or suspend under the particular service conditions.

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SAFE SYSTEM OF WORK PLAN (SSWP) GUIDELINES

The Safe System of Work Plan (SSWP) complements the Safety Statement required under the Safety, Health and Welfare at Work Act, although it does not replace the requirement for such a Safety Statement. Specific Guidelines on Safety Statements are available from the Health and Safety Authority.

This guidance, which is particularly relevant to contractors, self-employed persons and employees, deals with the completion of SSWP for Construction.

The SSWP will help users to complete construction work activity in a safe manner.

Completing and using the SSWP will also help you to meet some of the legal obligations placed on you by health and safety legislation.

The Safe System of Work Plan (SSWP)

The primary objective of the SSWP is to identify the major hazards associated with your work activities and to ensure that appropriate controls are in place before work commences.

The SSWP achieves many other objectives, including:

- Links the implementation of the Safety Statement directly to the work activity.
- Focusing on safety for a particular task. The SSWP is completed at the start of each activity, and can be reviewed at any time during the work.
- Increasing awareness. It encourages the users to consider a range of options to deal with the risks. The users will become familiar with the various controls available.
- Communicating through the use of pictograms so that the meaning can be understood by persons who possess little or no English.
- Being user friendly: just tick the hazards and controls.

The Safe System of Work Plan (SSWP) should be used as a final check to ensure that the identified controls for a specific construction work activity are available and in place. However safety starts long before any specific construction activity takes place. Hazard identification, risk assessment, the elimination and control of identified hazards must take place through all stages of construction from the planning stage, through the design process, the tendering process and on to the construction stage so that each specific construction activity will have had safety built in.

SAFE SYSTEM OF WORK PLAN (SSWP) GUIDELINES - cont'd

The SSWP: A 3-part process:

- Part 1: Planning the activity
- Part 2: Hazard Identification, and Control Identifier
- Part 3: Sign off

PART 1

This part will be completed by the person planning the activity. Normally this will be carried out by the supervisor/foreman and/or self-employed person prior to work starting. Where a site safety officer is employed they should be involved in the process.

- Identify who the employer/self-employed person is, e.g. *Acme Pipe Laying Ltd*
- Name of the Supervisor for the activity, e.g. *A. McSample*
- Identify the number of workers in the team, e.g. *3*
- Identify the specific location of the activity, e.g. *gridline x to gridline y*
- Describe the specific activity, e.g. *pipelaying*
- When the work is to start, the date, e.g. *Tuesday, 1st June*
- What skills are required, e.g. *360 excavator driver, banksman, pipelayer, flag man*
- Plant and Equipment required, e.g. *Fiat Hitachi EX200, Sling, Shackle*
- Hazardous Materials, if used, e.g. *Acme Bondex XXX, R45*
- Contact Names & Tel No. in the event of an emergency, e.g. *Site Foreman, Safety Officer*
- Name of the First Aider, and the location of the nearest First Aid Box
- Are Permits to Work required? Tick type
- The final section of this part: list requirements that are identified in the Construction Regulations and other Legislation as mandatory.

Note: For sites where more than 20 persons are normally employed at any one time, a site safety representative should be appointed.

PART 2

This part of the SSWP form deals with hazard identification, risk assessment, and risk control. Normally this will be carried out by the supervisor/foreman and/or self-employed person prior to work starting. Where a site safety officer is employed they should be involved in the process.

SAFE SYSTEM OF WORK PLAN (SSWP) GUIDELINES - cont'd



The **Hazards** should first be identified by **ticking the square boxes in the "Select Hazard" column.**

The appropriate **Controls** to eliminate the hazard or reduce the risk should be identified by **ticking the square boxes in the "Select Control" column.**



When controls are in place **tick the round box.** This must be done in conjunction with the workers at the specific work location prior to the work taking place.



Similarly, the Personal Protective Equipment (PPE) and Fire Equipment required, should be selected by **ticking the square boxes in the PPE/Fire sections, and when acquired by ticking the round box.**

NOTE: The list of Hazards and Controls depicted in each form is not exhaustive.

Part 2 of the form may also contain several blank hazard triangles, each labelled with the word "identify", and several blank control boxes, each labelled with the word "other". As the list of hazards depicted is not exhaustive, where other hazards are identified, these can be written into the blank hazard triangles. Similarly, as the list of controls depicted is not exhaustive, where other controls are identified, these can be written into the blank control boxes.

PART 3

This part deals with the signing off of the SSWP. The purpose of signing off is to identify the person who has prepared the SSWP, and also to confirm that the completed SSWP has been brought to the attention of all those to whom the SSWP applies.

Note 1: The completed SSWP must remain at the specific location of the work with the persons carrying out the work activity.

Note 2: A new SSWP must be completed when (1) a new hazard is identified, (2) the task changes, or (3) the environment changes.

Optional: A record sheet is available inside the back cover.

REMEMBER "IF IT'S NOT SAFE DON'T DO IT, AND INFORM SITE MANAGEMENT"

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Safe System of Work Plan (SSWP) Civil Engineering

*Achieving a
Healthy
and Safe
Working Life
-Together*

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