



SAFE SYSTEM OF WORK PLAN (SSWP)

WORKING ON ROADS

PICTOGRAMS

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Pictograms Explained

Before Work Starts the Following Must Be in Place per the Key Pictures document

SUPERVISION



Supervision, generally by the person in charge (e.g. the General Services Supervisor/Town 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 for most construction plants to be tested and examined regularly, 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.

COMMUNICATION/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; and who the key responsible persons (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.

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



Arrangements must be made to provide toilets and hand-washing facilities on all sites. The facility must include a sufficient supply of hot or warm water and cold running water, toilet tissue, soap and towels. The facility must be conveniently accessible and be kept clean and hygienic. In addition, it is recommended that anti-bacterial wipes be provided on all sites.

For exceptionally short duration work (3 days or less), a nearby convenient facility must be identified and the location communicated to the personnel on site. Such facilities may include: local depot; mobile welfare unit (under the control of the contractor); use of public toilets where it is

impractical to return to other facilities; and – in limited circumstances – pre-arranged (preferably in writing) use of private facilities. Where public and private toilets are used they need to be readily accessible to the site, be open at all relevant times, be at no cost to the employee, be of an acceptable standard in terms of cleanliness and be provided with hand-washing facilities. Depending on the number of persons at the work place and the duration and nature of the work activity, further arrangements may apply as prescribed in the Construction Regulations.

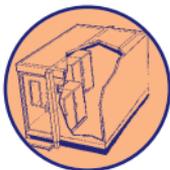
CANTEEN & SHELTER



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

Depending on the number of persons at the work place and the nature of the work activity further arrangements may apply as prescribed in the Construction Regulations.

DRYING/CHANGING



Arrangements must be made to provide an area, separate from the canteen facility, where workers can change and dry clothes.

Depending on the number of persons at the work place and the nature of the work activity further arrangements may apply as prescribed in the Construction Regulations.

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 Risk Assessment shows that this is necessary. A trained first aider should generally be available to all road workers.

PPE



The primary means of protecting the safety and health of employees must be measures to eliminate work place risks at source: firstly by technical means; secondly by organisational provision; and thirdly by collective protection measures. Where these measures are not sufficient, Personal Protective Equipment (additional protection to the individual) must be used to protect against hazards which are unavoidable.

LIVE TRAFFIC



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 road works. When any work activity near or on a public road is being planned, traffic and pedestrian (members of the public) 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/GARDAÍ



All road activity resulting in road diversions or lane or road closures or changes to road junctions or road layout may impact on the safety of road users such as the emergency services, local residents, farmers and traders. All of these should be made aware of how the works may affect them. In particular the Gardaí must be fully informed of any intended changes to traffic flows etc. All arrangements should form part of the site's traffic management plan.

Similarly, in urban areas where construction-related activity is being carried out on or near existing street furniture or street lighting, including activity in connection with pavements etc, the relevant Local Authority, utility company or responsible company must be made aware of the works. Detailed risk assessments – taking account of the proximity of live traffic, of associated services, and of instability and foundations, etc – must be carried out. Work permits outlining necessary safety controls to be used may also be required.

DIVERSION



A road diversion may be needed so that members of the public and related traffic do not come close to the road works. This control should first be considered during the design process in conjunction with the Gardaí. 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, safe public/local access, road markings, road surfaces and road width. Adequate road markings, warning signs, etc, should be provided. Arrangements for road diversions should be detailed in the site's traffic management plan.

ROAD SIGNAGE



Chapter 8 of the Department of Transport's *Traffic Signs Manual* must be referred to. This manual provides the guiding principles on the use of cones, lane tapering, lane widths, markings, safety zones, signals, signs, etc, for a variety of roadwork scenarios. The guidelines should be implemented sensibly, taking account of special issues at each work site (e.g. prevailing sight lines, road surfaces, etc). It is required that the signing, lighting and guarding-works be supervised by a competent person who has been issued with a valid CSCS card.

FLAGMAN/STOP-GO MAN



Where roadwork activities require the managing of traffic or pedestrians in nearby public areas, trained flagmen (to slow down traffic) or trained stop-go men (to halt traffic) can be 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 and as necessary with the appointed works contact man, e.g. use of two-way radio etc.

TRAFFIC MANAGEMENT PLAN



When planning any roadwork activity on or near a public road, traffic and pedestrian 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.

All works on public roads have the potential to involve a high degree of risk: therefore an appropriate Traffic Management Plan is essential. Where a Traffic Management Plan has been prepared, the controls detailed in the Plan must be implemented and monitored, e.g. guarding, lighting and signage.

In preparing the Plan, Chapter 8 of the Department of Transport's *Traffic Signs Manual* must be referred to.

TRAFFIC/SPEED CONTROL



Traffic-control plans must be prepared to help plan and control traffic movement. Measures to control traffic may include: bollards, flagmen, ramps, stop-go men, stop-go systems, temporary traffic lights and warning signs. Liaison with local Gardaí may be necessary.

The activity of installing and removing cones, signs and traffic-control systems, should be planned with the same care and attention as other aspects of road works. In carrying out these activities, it is essential to ensure that you can see the traffic and the traffic can see you.

Vehicular speeds must be controlled when passing through or in the vicinity of roadwork activities. Speed signs advising drivers of permitted speeds must be erected and displayed appropriately. Road surfaces and prevailing sight lines must be considered when deciding appropriate speeds.

VEHICLE CRASH BARRIERS



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

CRASH CUSHION LORRY



Where everyday public transport moves close to road works, construction personnel and traffic, careful segregation must be planned. The option of using a Crash Cushion Lorry should be considered as part of the Risk Assessment. This Risk Assessment should take into account the type and extent of work activity, including construction plant in use, duration of works, lines of sight, location, road surface, traffic speed, traffic volumes, width of road, etc.

SITE/PRIVATE PARKING



Vehicles unrelated to construction must be parked in designated areas away from site traffic.

ERECTING TRAFFIC-CONTROL SIGNS



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

The activity of installing and removing cones, signs and traffic-control systems should be planned with the same care and attention as other aspects of road works. In carrying out these activities, it is essential to ensure that you can see the traffic and the traffic can see you.

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 (e.g. 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.

EXAMINATION & INSPECTION



A competent person is required to regularly examine and inspect the effectiveness of the controls associated with managing and controlling traffic flows to safeguard workers and members of the public at road works. If defects are identified or selected controls deemed inadequate, they must be noted and any resulting remedial work take place immediately.

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 Gardaí. 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 street-side works, adequately designed and constructed hoardings should be erected to secure the site work. Arrangements must be put in place to ensure that normal pedestrian and public vehicular traffic are not put at undue risk as a result of any changes made.

BARRIERS



All ongoing works – in particular exposed manholes, street-related activities, open excavations, 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. Dust, muck, objects likely to fall, protruding puncture objects, trip hazards, etc, must be removed. Where reinstatement is required, it must be completed without delay. Chapter 8 of the Department of Transport's *Traffic Signs Manual* should be referred to.

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. The controls required may include the use of: bollards, flagmen, ramps, stop-go men, stop-go systems, temporary traffic lights and warning signs. Liaison with local Gardaí may also be necessary. The Department of Transport's *Traffic Signs Manual* must 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) can be 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 and where necessary with the appointed works contact man, e.g. using two-way radio etc.

VEHICLE/PLANT CONTROLLER



Where safe direction is required to be given to operators of construction and road vehicles, operatives must be appropriately trained, wear the appropriate PPE so that they are readily identifiable and as required use only approved flags, hand signals, signs, etc.

LIGHTING



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

DUST/MUCK

Excessive amounts of dust can cause eye and respiratory irritation, especially in dry conditions. In general, dust and muck represent a nuisance to both workers and others in the vicinity. All traffic routes in public areas near construction works should be kept clear of muck. To reduce the effects of air-borne dust, water spraying is recommended. Where water bowsers drawn by tractors are used, a power-take-off (PTO) guard must be fitted.

PEDESTRIAN CONTROLLER

When pedestrians are required to pass adjacent to roadwork activities, the public should be accompanied or escorted in a safe manner by a competent person wearing the appropriate PPE through the site works to a safe area off site.

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 (e.g. accessories available, reach capability, safe working load (SWL), etc).

PLAN LIFT/SWL



Lifting appliances and lifting gear should never be used to lift beyond their stated safe working load (SWL). 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.

LORRY-MOUNTED CRANE/GRAB



Grab lorries and lorry loaders are increasingly used on construction sites. Typically the operator working the controls of the crane will 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. Many controls are fitted to safeguard the operator, including emergency stops, stabiliser feet and a 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. Should any control be malfunctioning or where the controls, including actuators, do not follow the manufacturer's specification, the machine must not be used. 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, gravel and sand. Lift gear must not be attached unless certified and tested lifting points are provided. All crane operators must be fully trained.

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

SLINGER & SIGNALLER



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

CHECK 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.

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.

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 must be recorded. Refer to the Safety Health and Welfare at Work (General Application) Regulations.

PLANT & EQUIPMENT**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, e.g. accessories available, boom length, reach capability, safe working loads (SWLs), etc.

VIBRATION CONTROLS/SERVICE/DURATION

When construction plant such as bulldozers, dumpers, rollers, etc are being bought or used, consideration must be given to the potential risks to workers from vibration emissions. Whole-body vibration means that type of mechanical machine vibration which, when transmitted to the whole body, entails risk to the safety and health of employees – in particular lower-back morbidity and trauma of the spine. Where there is or there is likely to be exposure to mechanical vibration a suitable and appropriate Risk Assessment must be carried out. Measures that may be taken to reduce such exposure might include: provision of auxiliary equipment (handles, seats etc); clothing to protect against cold and damp; selection of alternative equipment and methods; equipment maintenance programmes; information; training; limitation of duration; rest periods; and work design.

REVERSE WARNING DEVICES



With plant that has restricted visibility, and particularly during reversing operations, suitable warning devices or sight-seeing devices – such as an audible warning, CCTV, convex mirrors, flashing beacons, etc – must be fitted in compliance with current legislation, typically to allow vision from the driver's seat of all points more than 1 metre high and 1 metre from the machine at each side and to the rear of the driver.

LOCKING ATTACHMENTS



Ancillary equipment used in connection with any construction plant must be secured at all times (e.g. 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.

ROLL OVER PROTECTION/NO PASSENGERS



A Roll Over Protection System (ROPS) is designed to reduce the possibility of a seat-belted operator being crushed should the machine roll over. Failure to provide a ROPS on earth-moving machinery can lead to serious injury or death for the operator. All roll over protection must be manufactured to the recognised European Standard, with the Standard number clearly marked and prominently located on the roll-over bars. This label should be of a permanent type and permanently attached to the structure. The label should hold the following details: name and address of ROPS manufacturer;

ROPS Identification number (if any); Machine Make/Model that ROPS is suited to; Machine Mass that ROPS is designed for; and other information as deemed appropriate. If your ROPS does not have this label and information attached you should contact the supplier immediately.

Generally, only the person who controls the vehicle should occupy construction plant, i.e. one seat fitted by the manufacturer, one person. Such plant must not be used to give lifts about the site to others.

SEAT BELTS



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

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 and its couplings 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 (e.g. a build-up of dirt and debris could cause tripping). Where damaged, steps should be repaired without delay.

HEDGE/GRASS CUTTING



This describes the cutting of hedges and grass. Hedge cutting may be done using a tractor-mounted trimmer, an electric hand trimmer or a manual shears. The hazards associated with each method differ and the controls put in place with each must be appropriate to the method used and the location where the trimming is being done (e.g. on a narrow winding road with no verge or in a public park). Grass cutting may also be undertaken with a variety of equipment, including an electric trimmer, an ordinary lawnmower, a ride-on mower or a tractor with a mower attachment, and again the controls must reflect the equipment being used and the specific location.

All cutting equipment and accessories must be attached by competent persons, must be free from defects and must be suitable for their purpose. All moving parts and blades must be suitably guarded. Persons must be excluded from the cutting and debris fly area. Warning signs and, as required, traffic and pedestrian management measures must be implemented.

SAFE PARKING



All construction plant and equipment should be parked in a safe area when not in use. The hand parking brake must always be engaged when the cab of any site vehicle, including those of cement mixers, delivery lorries, etc, is vacated. Buckets, lifting gear, loads, etc should also be lowered to the ground and keys should be removed from the ignition and stored safely. If you have to park on a slope, additional precautions may be required, such as chocking the wheels.

TRAFFIC/SPEED CONTROL



Traffic-control plans must be prepared to help plan, control and manage site traffic movement. Measures to control traffic may include: bollards, cordoning/taping off, flagmen, ramps, segregation, stop-go men, stop-go systems, temporary traffic lights and warning signs.

The activity of installing and removing cones, signs, and traffic-control systems should be planned with the same care and attention as other aspects of road works. In carrying out these activities it is essential to ensure that you can see the traffic and the traffic can see you.

Site vehicle speeds must be controlled, especially in the vicinity of other vehicles and pedestrians. Speed signs advising drivers of permitted speeds must be erected and displayed appropriately.

For additional information refer to Chapter 8 of the Department of Transport's *Traffic Signs Manual*.

PEDESTRIAN ROUTE



All pedestrians – whether they are workers on site or members of the public – should be kept away from construction plant operations. Dedicated and clearly identified pedestrian routes should be used where necessary and this measure should form part of the site's traffic management plan.

Chapter 8 of the Department of Transport's *Traffic Signs Manual* should be referred to.

ROAD PLANER



Road Planers and all other civil engineering plant with built-in elevated equipment that includes conveyors can be hazardous. Such plants 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. When operating Planers close to overhead lines, precautions must be taken to ensure that no part of the Planer or any person on the Planer comes within the arcing distance. Personnel operating such plant must receive training in their use.

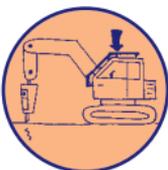
KERBING MACHINE



Slip kerbing machines with built-in conveyors can be hazardous. Such plants 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. All such vehicles must be fitted with adequate lights and appropriate emergency stop buttons. Personnel operating such plant must receive training in their use.

DUMPER

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

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 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 are free from defects.

360 EXCAVATOR

Excavators can be used as cranes when lifting gear is attached to the machine at a specifically designed locating point. To carry out such tasks, the excavator will normally have check valves (non-return valves) fitted to the main boom and dipper arm's lifting cylinders. This is to ensure that in the event of a hydraulic or motor failure no part of the equipment will suddenly fall. 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.

Inspect all quick-disconnect systems for buckets etc to ensure that all locking pins are in place. Prior to initial use and at least once a day thereafter check that all machine systems and operating controls are functioning correctly.

Where the operator's visibility is restricted appropriate auxiliary devices, which may include CCTV, convex mirrors, flashing beacon and movement alarm, must be fitted.

180 EXCAVATOR



Operators must possess the appropriate training certification as prescribed in the Construction Regulations. The machine must be set up safely when digging: the hand parking brake must be engaged, direction levers must be in neutral, front bucket lowered, machine level, stabilizers dropped appropriately to the ground and all wheels must be off the ground.

Where the operator's visibility is restricted appropriate auxiliary devices, which may include convex mirrors, flashing beacon and reversing alarm, must be fitted.

VEHICLE RECOVERY



If any vehicle gets into difficulty on site, back actors, excavator booms, 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 it should be done from an approved towing point.

PROXIMITY TO PUBLIC

Construction operations must not interfere with, or obstruct, members of the public. Secure fencing (e.g. hoarding), and where necessary security personnel, should be used.

ATV (ALL TERRAIN VEHICLES)

All drivers of ATVs should be provided with adequate training. Training should emphasise the fact that the ATV is a piece of work equipment, and stress the importance of driver care and concentration, awareness of dangerous driving conditions and the factors that affect vehicle stability. Operators must take note of manufacturer's instructions regarding the use of ATV's both on and off road, particularly those relating to turning at speed as well as driving on slopes and rough terrain. Plan the use of ATVs carefully and take particular note of variations in ground conditions and gradient. Head protection meeting the appropriate European Standard (open-face motorcycle/ATV helmet with half visor) should be worn by the operator. Remember that increasing the ATV road speed increases vehicle instability and the risk of the ATV overturning.

EXCLUSION ZONE

As a general rule, persons should not be working within the working radius of an excavator boom. People should be kept a safe distance away from working plant and barriers should be used where possible.

NO TIPPING/OH LINES (OVERHEAD LINES)



The operation and movement of plant and equipment under and close to overhead lines can be dangerous. Where the cables are live, suitable and appropriate measures must be put in place to ensure that construction plant or loads do not touch or come within the arcing distance of the overhead lines. Typically, warning goal posts with associated signs 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.

In circumstances where the erection of goal posts is not feasible, other equivalent measures based on detailed specific written Risk Assessment carried out by a competent person must be implemented. These measures may include a combination of: electronic or electromechanical limiters; line diversion; line insulation; line switch-out; No-Tip zones; warning notices; clear instruction of plant drivers in parallel with supervision by a competent signaller, etc. Refer to the 'Code of Practice for Avoiding Danger from Overhead Electricity Lines' 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.

STRIMMING

The area to be strimmed must be risk assessed prior to the work starting, taking into account all hazards present such as proximity to falls, services, traffic, trenches, water, etc. Slope of any banks to provide adequate foot hold needs to be considered. The work area should be restricted so that only authorised persons, wearing adequate PPE are present. Adequate lighting must be provided and appropriate advance warning signs displayed.

BURNERS/BOILERS

Many road coatings and materials such as asphalt, bitumen 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 asphalt, bitumen and macadam. Prolonged exposure to these fumes may damage health. Safety Data Sheets (SDSs) for Liquid Petroleum Gas (LPG) and the coating materials (e.g. asphalt, bitumen, 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 clothing, skin and eyes from splatter. Boots worn should be resistant to bitumen penetration.

The burners/boilers are normally vehicle-mounted, many on special-purpose vehicle carriers (e.g. for laying a hot-rolled asphalt-wearing course). The boilers and LPG cylinders must at all times be secured. All associated controls, pipework, valves 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. High pressure water jetting may be considered as an alternative to Hot Compressed Air Lance for line removal.

Measures must be put in place to ensure that all vehicles not involved in the work activity are kept a safe distance from this work.

HOT COMPRESSED AIR LANCE

Persons operating this equipment must be fully trained and be familiar with its operation and the potential hazards. When in operation these units maintain very high temperatures, so extreme caution must be used as severe burns can result if used improperly. The Lance must not be left unattended or left running and must not be set down or placed on flammable materials until it has cooled down. Regular checks must be carried out to ensure that the units are assembled correctly and maintained regularly. Because of the heat and noise of the hot air lance, eye and hearing protection are advised.

SLINGER & SIGNALLER

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

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.

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.

NUCLEAR DENSITY TESTING



The Nuclear Density Test is used in the quality control of road building and road repair, and measures the moisture and density of the materials used. Prior to using the gauge you must assess the risks of exposure to ionizing radiation both to employees and other people: this is to ensure that all radiation exposure is kept within the limits allowable. Establish a controlled area in which to carry out the test. Ensure all users are adequately trained in the use of the gauge. It is also important to ensure that the gauge and its features are properly maintained and tested as appropriate. After use, the gauge should be stored in a secure location.

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. Refer to the Safety Health and Welfare at Work (General Application) Regulations.

HAND TOOLS**SELECTION/SUITABILITY**

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

VOLTAGE

All portable electric tools must be rated at 110V or less, unless its rating exceeds 2 kilovolt amperes.

CABLE CHECK/PROTECTION

Before using any electric appliance on site, including use of transformers and extension reels, the cables and connectors attached must be examined to ensure that such components are not damaged as regards conductance, insulation, mechanical strength, protection, etc, so as to prevent danger.

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

GUARDS



Many hand/portable tools have rotating shafts and components, while because of their application others will emit fragments, including dust and sparks. Such tools must have suitable guards fitted, e.g. circular saw guards, PTO shaft guards etc.

GENERATORS OUTSIDE



Carbon monoxide (CO) is a colourless, odourless, toxic gas which interferes with the oxygen-carrying capacity of the blood; it is non-irritating and can overcome persons without warning.

Many people die from CO poisoning while using generators in buildings or semi-enclosed spaces without adequate ventilation. 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 CO from exhaust gases, e.g. in site offices and depots. Ensure the generator has at least 1 metre of clear space on all sides and 1 metre above it to ensure adequate ventilation. If you experience symptoms of CO poisoning get to fresh air right away and seek immediate medical attention. Also, all other petrol and diesel driven vehicles must not be allowed to run in enclosed spaces. Similarly, it is recommended that flame heaters, e.g. Superser-type gas heaters, should not be used on site.

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/VIBRATION CONTROLS



Hand-arm vibration means that type of mechanical vibration which, when transmitted to the human hand-arm system, entails risk to the health of employees, in particular of vascular, joint, neurological or muscular disorders. Where there is or there is likely to be exposure to mechanical vibration from compactor plates, jack hammers, kangos, etc, a suitable and appropriate Risk Assessment must be carried out. Measures that may be taken to reduce such exposure may include selection of clothing to protect against cold and damp, alternative equipment and methods, equipment maintenance programmes, information, limitation of duration, rest periods, training and work design.

DUST SUPPRESSION



Tools and equipment which generate dust or fume clouds should be fitted with appropriate extraction and/or wetting aids.

CHAIN SAW

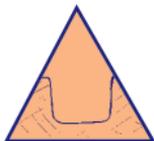


Chain saws must only be used by trained people. The saws must be regularly maintained and kept in good working order. The many safety features such as guards and chain brake should be checked before each use. All guards must be in place at all times. Appropriate PPE must be used.

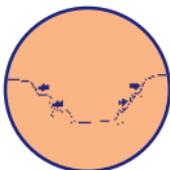
CON SAW/ABRASIVE WHEELS



Only trained persons must use abrasive wheels such as con saws and road saws. Before use, a visual check on the machine or tool should be carried out, the guard must be properly adjusted and the appropriate PPE must be used. The maximum operating speed marked on the wheel must not be exceeded. Only a trained and appropriately nominated person can change wheels.

EXCAVATION

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

BATTER BACK

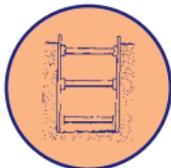
'Battering back' means that the sides of the trench are sloped back to a safe angle. This makes the sides of the excavation stable and prevents collapse.

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 (e.g. excavations and cofferdams) and permanent works (e.g. 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 (e.g. on or close to streets and busy roads).

SHORING

Shoring gives temporary support to the walls of a trench. Sheet piling 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, slide-rail systems and trench/drag boxes (see above). 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.

ENVIRONMENTAL RISK ASSESS

If contaminated water, sewage or any other 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.

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 (dumpers, lorries, teleporters, 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 or a stop block is a block (e.g. sleeper) that prevents a vehicle from approaching too close to the side of an excavation, which otherwise could cause the sides of the excavation to collapse or itself roll 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.

The relevant Local Authority, utility company or responsible company must be made aware of the works, particularly in urban areas where excavation related activity is being carried out on or near existing street furniture, street lighting or boundary walls, including activity in relation to the maintenance and upgrading of pavements

etc. Detailed risk assessments, taking account of the proximity of any anchoring, foundations, structural instability, etc, must be carried out. Resulting controls may include: getting detailed drawings from the utility company or Local Authority to include services; using props and supports; segregating the street furniture from the site and the public; ensuring that working plant is kept away from the protected structure, etc.

LADDERS/ACCESS/EGRESS



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 must be secured to prevent slipping or sliding, and must allow for safe access and egress.

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

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



Suitable barriers should be placed around excavations when work is in progress; typically, the barrier should be set and secured a safe distance from the crown (leading edge) of the excavation, e.g. 2 metres (decided on by a competent person). 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.

COVERS



Generally in combination with barriers, covers (e.g. steel plates) should be placed over excavations. These should be appropriately secured and strong enough to prevent persons from falling through.

PUMPING



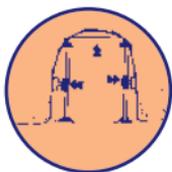
Water build-up in excavations should be removed with pumps to prevent flooding. Such pumps must be maintained in good working order, and be sited on firm ground at a safe distance from the crown of the excavation, so that they will not undermine the banks of the excavation or put the person operating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

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



Excavations should be adequately propped to prevent the collapse of the walls or ceiling of the excavation.

LIGHTING



Adequate lighting must be afforded to persons accessing and working in darkened areas to prevent workers falling, slipping, tripping, or being hit by projecting objects.

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 must be recorded and subsequently stored.

FALLS & FALLING OBJECTS



RISK ASSESS



Every work activity on site needs to be risk assessed, to identify potential hazards (e.g. work at height, work 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.

SCAFFOLDING



Where it is possible, scaffold platforms should be used as working platforms for all work at height. The scaffold platform must be designed, planned and subsequently erected by fully 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 (e.g. capacity of loading bays), are recommended.

WORKING PLATFORM



Working platforms are locations and areas for carrying out construction at height safely. It is taken to mean a work area that provides protection and prevents the worker falling to a lower level. Generally, the term 'working platform' is used to refer to scaffold platforms, but where scaffolds cannot be erected, it can also refer to other safe platforms such as Mobile Elevating Work Platforms (MEWPs), scaffold towers etc.

In considering whether a platform is suitable for work at height, employers need to ensure that it is: wide enough to allow safe passage and safe use of equipment and materials; free from trip hazards or gaps through which persons or materials could fall; fitted with suitable toe-boards and handrails unless it is not reasonably practicable to use them and the risk of injury from a fall is low; kept clean and tidy (e.g. do not allow mortar and debris to build up on platforms); and not loaded so as to give rise to a risk of collapse or to any deformation that could affect its safe use. This is particularly relevant to blockwork loaded on trestles: erect on firm level ground to ensure equipment remains stable during use.

TRESTLE PLATFORM



Trestle platforms are work platforms generally used for work at lower levels than scaffolds. While taking into account the scope and duration of low level works, to prevent falls from trestle platforms likely to result in personal injury, measures must be put in place to avoid such falls.

Generally, such measures will include: secure defect free structure; firm, level footings; fully boarded, handrails, mid-rails and toe-boards; safe access/egress; no overloading; and reasonable standards of cleanliness and tidiness. Other measures include the requirement of competent persons to erect them and the training and instruction of users.

Trestle platforms should not be used close to leading edges or to span open holes.

EDGE PROTECTION



Persons must not be at risk from falling through openings or over edges. All persons accessing or working at or close to openings that could lead to such falls must be protected and guarded from falls, including protection from falling off stairs. Such measures must include barriers, handrails, mid-rails, toe-boards, etc.

MEWP (Mobile Elevating Work Platform)



A boom hoist, which has an extendable folding boom with cage attached, can be used for work at height if the 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. The manufacturer's guidelines for safe use must be followed fully. 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, which 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, with particular attention given to the ground conditions and the assessment by a competent person that manufacturer's guidelines for safe use can be followed fully. Only competent and trained operators should operate them.

SAFE LADDER



All ladders, including step ladders, must be: carefully selected for each task; carefully tied; of correct length; free from patent defects; set at the correct angle; and, where necessary, footed. Ladders must be controlled and checked frequently to ensure they are fit to use.

TIE LADDER



All ladders must be tied or footed so that, when in use, they will not slip or slide.

OPEN HOLES



All ground openings, 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 (e.g. manhole covers) must be of adequate strength

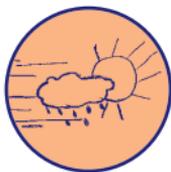
and size and be firmly fixed in position. These covers may also identify what they are covering (e.g. a floor opening) so they will not be inadvertently removed. Excavated openings should be backfilled as soon as possible.

PROPPING



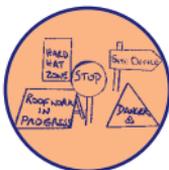
Propping is any temporary structure used to support a permanent structure while it is not self-supporting. Propping is required during the construction stages of a project to give temporary support to prevent collapse due to overloading of structural components during the building and installation works. The responsible contractor must ensure that the correct number of props is installed and each correctly done, and that the units are supported as indicated on the construction drawings. Load bearing connections, including use of angle brackets and bolts, must be as specified by the design with regard to the manufacturer's specifications, and bolts must be of suitable size and inserted to the required depth to the designed centre distances.

WEATHER



Adverse weather, such as high winds and ice, 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 wind conditions loose materials may need to be removed or tied down, to prevent them blowing or falling. In hot sunny weather, sun protection must be considered, as well as the provision of drinking water to prevent dehydration.

WARNING SIGNS



Warning signboards must be used across the site to alert workers or others when they are approaching high-risk areas (e.g. exclusion zones, leading edges and openings). Supplementary signboards should also be used to convey safety information (e.g. deep excavation). Signs must be placed at an appropriate location, and be as sufficiently clear and unambiguous as to make it possible for all workers and people on site to understand them. Signs should always be complied with. Members of the public approaching construction work must be given advance warning, particularly where specific hazards exist. Refer to the Safety Health and Welfare at Work (General Application) Regulations.

SEWERS/CULVERTS/MAINS ELECTRICITY & GAS



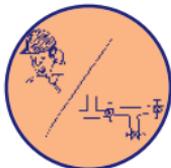
Before any road works commence, it is necessary to ensure that existing services such as sewers, electricity and gas are secured, so that they do not pose a risk to workers or people in the vicinity as a consequence of the works being undertaken. Adequate measures must be taken to protect workers.

SERVICE SUPPLIER (e.g. ESB, Bord Gáis)



Where road works are 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 begins near overhead lines, underground cables, gas services or other underground services, 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.

SURVEY MAP



Before work is to commence, a drawing of the underground services should be procured and their positions then marked out to identify them to personnel on the road works.

DETECT & MARK



Before the ground is broken, the area should be scanned with a detector to verify the position of any services. Any variations identified should be noted on the drawings. The position of the service must 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 (e.g. entering confined spaces) 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.

OVERHEAD LINES



The operation and movement of plant and equipment under and close to overhead lines can be dangerous. Overhead conductors should always be considered to be live unless there is both written and physical proof to the contrary. Where the cables are live, suitable and appropriate measures must be put in place to ensure that construction plant or loads do not touch or come within the arcing distance of the overhead lines. Typically, warning goal posts with associated signs 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. In circumstances where the erection of goal posts is not feasible, other equivalent measures based on detailed specific written Risk Assessment carried

out by a competent person must be implemented. Only a competent person can decide on these measures, which may include a combination of: electronic or electromechanical limiters; line diversion; line insulation; line switch-out; No-Tip zones; warning notices; clear instruction of plant drivers in parallel with supervision by a competent signaller, etc. Refer to the 'Code of Practice for Avoiding Danger from Overhead Electricity Lines' 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.

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.

WORKING CLOSE TO WATER



EDGE PROTECTION



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

WORKING PLATFORM



When work is taking place in or over water, a suitable working platform must be provided. Such platforms must be secured, be fully boarded, have edge protection and safe means of access and egress.

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.

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.

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: diving instruction by a professional instructor; deep saturation diving in the offshore oil and gas industry; and underwater inspection or repair (e.g. harbour works, laying pipelines or cables). Divers may perform a variety of tasks including: carpentering, cleaning, cutting, guniting, repairing and welding work. 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 plan, dive team, adequate emergency plans (incorporating access to recompression facilities), full face mask, lifeline, availability of medical oxygen, secondary supply of breathing air and voice communication.

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. Detailed method statements and risk assessments must be prepared and communicated to all workers involved.

PLATFORM & CRANE (PONTOON)



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.

SUBSTANCES



STORAGE/LABELS



Dangerous substances are used on a daily basis in construction work and come in many forms (e.g. fuels, weedkillers etc). Some of these substances are more toxic than others, but all of them, if mishandled, consumed or crossed into the body will cause harm, serious illness or worse. Safety information is contained on the label of dangerous substances. It is important to read the label. If you cannot understand the language used, ensure that the relevant safety information is fully explained to you.

When transferring chemicals from one container to another, it is very important to ensure that both containers are labelled correctly, stating what is in it. This ensures that the next person who picks up the container is fully aware of what it contains.

Dangerous substances should not be left unlabelled, lying around or exposed, but must be secured correctly in appropriately labelled, approved containers and immediately stored in controlled storage lock ups, in accordance with manufacturer's instructions (storage information on the Safety Data Sheet (SDS)).

Appropriate PPE must be worn when handling dangerous substances.

SAFETY DATA SHEET



A Safety Data Sheet (SDS) must be made available by the manufacturer/supplier of a dangerous substance or preparation of any professional user. The SDS contains prescribed and detailed information relating to a chemical product in an internationally recognised and uniform layout. It must list the following properties of the particular substance: identification of the substance; composition/ingredients; physical/chemical properties; stability and reactivity; first-aid measures; spillage measures; fire-fighting measures; exposure controls/PPE; storage and handling; ecological information; toxicological information; transport information; disposal considerations and supply and labelling information.

All persons using or handling a dangerous substance must be familiar with and aware of the relevant contents of its SDS.

HAND WASH



Hand washing is a vital control in reducing the risk of infection, ingestion and cross contamination, especially after handling or using any chemical product.

Use of substances such as degreasers, thinners, etc can cause skin disorders.

Generally, appropriate gloves must be worn.

NO EATING

Work activity may involve possible exposure to chemical, bacterial and viral risks (e.g. spray-painting, work with contaminated ground, working close to sewers, culverts and drains etc). Persons involved in such activities should only eat, drink or smoke after thoroughly cleaning their hands and must not eat food whilst working as infection can very easily pass from the hands to food whilst eating.

BIOLOGICAL AGENTS

Exposure to micro-organisms such as bacteria, viruses, parasites and fungi may cause an allergy, infection, 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 (e.g. for Hepatitis A, Hepatitis B and tetanus). Weil's disease is a severe form of leptospirosis with fever, jaundice and muscle pain, transmitted by rats via contaminated water and is a potential risk for anyone working close to sewers and waterways. Appropriate PPE should be worn.

SURVEY/RISK ASSESS

Prior to entering a confined space to carry out work activity, a full survey of the work area must be carried out in advance, to identify all the hazards that may exist within, particularly the presence of biological agents and harmful gases.

Based on the identification of the hazards, a full assessment of the associated risks must be carried out in writing with all the necessary controls identified and be communicated to the relevant persons who could be exposed to such risks. These controls may include the need for air monitoring owing to the presence of air-borne exposures (e.g. biological agents, chemicals, dust, etc).

PERMIT TO WORK



A Permit to Work is a system used to ensure that a safe system of work is in place. Generally, they are only used for activities where high levels of risk exist and to ensure that only authorised persons can enter the work area under very controlled conditions that are very clearly defined and supervised. An example of the circumstances requiring a Permit to Work would be entering a confined space. Only persons trained in the procedures for which the Permit to Work is to be used may prepare and sign off on the permit, and only personnel who have received specialised training may enter the work space covered by the permit.

LITTER PICKER



Litter picking is defined as the collection of loose waste and litter from an area or from the side of a roadway. It is generally carried out by one person using a long grab and a plastic bag for the collection of litter. Personnel involved in litter picking must wear safety gloves and boots in order to avoid cuts and puncture wounds such as needle-

stick injuries. They must also wear a high-visibility vest and ensure that all open cuts are covered. Used syringes should be disposed of in the appropriate manner using designated containers.

COVER CUTS



Exposure to micro-organisms such as bacteria or viruses through open cuts is one of the most common routes of infection for many common and serious diseases. It is essential therefore that all personnel properly cover all open cuts with waterproof bandages prior to commencing work. This requirement is in addition to the normal requirement to wear safety gloves and standard work cloths. Hands should be thoroughly washed prior to removing and replacing any bandages.

WASH HANDS



Washing hands is the thorough cleaning of one's hands. This is normally achieved using soap and running water. In remote short-term locations an alternative method is the use of biological hand wash solutions in accordance with the manufacturer's instructions. It is critically important that all personnel understand the importance of thoroughly washing their hands prior to eating, drinking or smoking so as to avoid infecting themselves with any bacteria or viruses that their hands may have come in contact with during the course of their work.

ASBESTOS CEMENT WATER PIPES



Asbestos is a hazardous material. Work involving asbestos-containing materials may expose workers to asbestos fibres that can cause harm by inhalation. Prior to work commencing it will be necessary to survey the works to assess whether such health hazards exist. Where health hazards are identified, adequate controls must be put in place to protect workers and others in the vicinity, including: air monitoring and waste removal, permit-to-work systems, meticulous planning, use of appropriate PPE, surveys and ventilation.

IDENTIFY/SURVEY



Prior to any work on asbestos-containing materials, whether altering, cutting, drilling, repairing or removing, etc, it is vital to identify the location, the extent and types of asbestos present in advance of the works, so that all appropriate controls can be implemented. Three types of survey can be undertaken:

Asbestos Survey Type 1

A very basic survey where asbestos-containing materials may be located and identified. When a material cannot be confirmed as asbestos-free, it is presumed to be an asbestos-containing material. This type of survey is also known as a 'location and assessment survey' or 'presumptive survey'.

Asbestos Survey Type 2

A more detailed survey which involves the collection of representative samples from the structure in order to carry out laboratory analysis

so that the location and quantity of the most readily accessible asbestos-containing materials can be determined.

Asbestos Survey Type 3

Survey performed where the possibility exists that asbestos-containing materials may be present in a building due for demolition or major refurbishment. In line with current best practice it is a requirement that all asbestos-containing materials be removed from a building or structure, as far as reasonably practicable, before such works commence. Type 3 is the most detailed and thorough of all the surveys. This type of survey is used to locate, describe and quantify, so far as is reasonably practicable, all asbestos-containing materials in the building, and will usually involve destructive inspection so that all areas may be accessed, even those that may be difficult to reach. A full sampling programme must also be carried out so that all possible asbestos-containing materials in the building are identified, located and quantified. This information is necessary so that the appropriate removal techniques may be selected and implemented.

Each of the above survey types must be carried out in accordance with a recognised standard such as Methods for the Determination of Hazardous Substance: surveying, sampling and assessment of asbestos-containing materials (MDHS 100) or other suitable equivalent.

RISK ASSESS



Based on the identification of the hazards, a full documented Risk Assessment must be carried out which identifies all necessary control measures. The assessment must be communicated to the relevant persons who could be exposed to such risks.

REMOVAL PROCEDURES



The method of removal of asbestos or asbestos-containing materials depends on the type of material being removed and the risk associated with the asbestos-containing materials. This information must be based on an adequate survey conducted by a competent person in accordance with a recognised standard (such as MDHS 100). It is essential that, depending on the nature of the materials present, adequate precautions are taken to ensure that personnel are not exposed to asbestos fibres during such activities. The general precautions to minimise exposure and control the spread of asbestos fibres are:

- Where possible remove the asbestos-containing materials intact.
- Keep the material dampened when working on it.
- Do not use power tools as they generate dust which could contain asbestos fibres.
- Remove waste and debris from the site as soon as possible to minimise the risk of it being crushed or broken.

DUST/WETTING



Wetting/damping down areas prevents dust from being dispersed into the air.

WASTE REMOVAL



Prior to the removal of any asbestos-containing materials, a suitable facility for waste disposal must be identified. Asbestos waste is a hazardous waste which must be disposed of properly. In Ireland, asbestos cement waste can only be disposed of at a waste facility licensed by the Environmental Protection Agency. Asbestos cement waste can also be accepted at a hazardous waste transfer station licensed by the Environmental Protection Agency. Hazardous waste transfer stations accept asbestos waste and then arrange to have the waste disposed of at an appropriate facility either in Ireland or abroad. Asbestos cement waste must only be surrendered to local authority waste collectors or to a waste collection permit holder authorised under the relevant Waste Management (Collection Permit) Regulations to collect this type of waste. All asbestos-containing waste materials must be double bagged using high gauge polyethylene and be clearly labelled as asbestos waste. Contact the Environmental Protection Agency for further information on waste legislation and the disposal of asbestos-containing materials.

EXAMINATION & INSPECTION

A competent person is required to examine and inspect the effectiveness of the controls associated with removing any asbestos-containing materials. In circumstances where, based on risk assessment, air monitoring is required, this should be conducted by a competent person using specialised equipment. It may be required for one or more of the following reasons:

- a) to confirm that airborne concentrations of asbestos fibres are as low as reasonably practicable and that the correct choice of Respiratory Protective Equipment has been made
- b) to confirm that there has been no measurable spread of airborne fibres to areas adjacent to where work with asbestos cement has taken place
- c) to confirm that the work area has been adequately cleared of asbestos, so that where necessary a Clearance Certificate can be issued before normal work can be resumed.

CONFINED SPACE

'Confined space' refers to any place – including bund, cellar, chamber, container, pit, tank, vessel 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.

RISK ASSESS

Based on the identification of the hazards, a full Risk Assessment must be carried out in writing with all the necessary controls identified and be communicated to the relevant persons who could be exposed to such risks.

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.

DETECT/MONITOR



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, a person 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.

OTHER ITEMS**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. Measures should include keeping access ways and passage ways clear of rubbish and materials; putting rubbish into designated bins; removing protruding nails in wood; storing materials safely; etc.

Excessive amounts of dust can cause eye and respiratory irritation. Dust and muck present a nuisance to 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.

LIGHTING

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

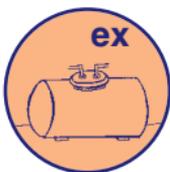
GROUND CONDITIONS



The ground area close to or over underground services/ducts and surrounding excavations should be inspected to ensure that it is capable of taking the weight of any load applied, such as plant or equipment.

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.

DEGASSING/PURGING



Decommissioning, removal or any work involving the dismantling of storage tanks may involve the purging of such tanks to remove any trace of residual gases and/or hazardous liquids, so that the risk of fire or explosion is eliminated. This work can be a specialised activity and will require the assistance of a competent specialised contractor.

STREET STRUCTURES



Particularly in urban areas where paving or excavation related activity is to be carried out on or near existing street furniture, street lighting or boundary walls, including activity in relation to the maintenance and upgrading of pavements etc, the relevant Local Authority, utility company or responsible company must be made aware of the works. Detailed risk assessments, taking account of the proximity of any anchoring, foundations, structural instability, etc, must be carried out. Resulting controls may include; getting detailed

drawings from the utility company or Local Authority to include services; using props and supports; segregating the street furniture from the site and the public; ensuring that working plant is kept away from the protected structure; etc.

FIRE CONTROL/ASSEMBLY



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

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.

Fire Extinguishers: people need to be trained how to operate them. They should only be used for small fires. The following types maybe used:

Water fire extinguishers: suitable only to put out fires involving cloth, paper and wood.

Foam extinguishers: suitable for most fires involving flammable liquids.

Carbon-dioxide extinguishers: suitable for fires involving flammable liquids or electrical apparatus.

Dry-powder extinguishers: suitable for use on most fires, including electrical fires.

There should be no bonfires on site.

EMERGENCY PROCEDURES



In the event of an unplanned event occurring involving risk to persons or property the written emergency response procedures must be followed immediately. These procedures will normally deal with: area evacuation; notifying the appropriate emergency services; ensuring safe access route for emergency services (may involve the use of two-way radio system); provision of first aid; staying out of the area unless you've been assigned; training and properly dressing for a response activity (emergency response and rescue team); removing ignition source; (where chemicals are involved) keeping spilled materials out of drains and water supply; when it is safe to return to normal work activity; etc.

HEALTH**ASSESS HEALTH EFFECTS**

Any work activity involving or likely to involve possible exposure to biological, chemical or physical agents must be risk assessed prior to the work commencing. In deciding on the controls to be implemented the Principles of Prevention should be applied, particularly to the materials and processes used, to identify whether safer alternatives can be found. Biological agents and chemicals can enter the body in several different ways: through eyes or skin; in inhaling and swallowing. This exposure may result in conditions that include: allergies; asphyxiation; burns; dermatitis; nausea; occupational asthma; poisoning; zoonoses (infections such as leptospirosis transmitted from animals); etc. Measures to protect from biological, chemical and physical hazards include: air sampling, use of alternative materials, information and training, PPE, use of processes and equipment that reduce dust and vapours, ventilation, etc.

HEALTH SURVEILLANCE

Health surveillance appropriate to the health risks that may occur at the work place and as identified in the Risk Assessment must be made available to employees. Health surveillance can take many forms, including: audiometry; completion of questionnaires; measuring hand/arm vibration; spirometry; etc.

MANUAL HANDLING



Manual handling means more than just lifting or carrying something. It describes a range of activities, including carrying, holding, lifting, lowering, moving, pushing, pulling or supporting an object or person. Up to one-third of all work injuries are caused by manual handling activity. The manual handling regulations require that manual handling activities should be assessed, taking account of risk factors (unfavourable ergonomic conditions), and that appropriate control measures should be put in place to avoid or reduce the risk of injury.

RISK ASSESS



Each activity on site needs to be risk assessed to identify whether there is a manual handling hazard. If there is an identified risk of injury then appropriate controls must be put in place to eliminate the risk. If the hazard cannot be eliminated then the risk must be reduced to as low a level as possible by means of mechanical aids, team lifting and individual safe manual handling practices.

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 physical work method be assessed to see whether the work 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. This training involves learning how to move loads in a manner which will lessen the risk of injury.

PPE (Personal Protective Equipment)

Personal Protective Equipment protects individuals from harm when all other methods employed to eliminate risk have failed to do so completely. PPE is a last resort. PPE acts as a barrier between individuals and potentially hazardous chemicals, machines, tools and processes. To be effective, PPE must be carefully selected to protect against the particular hazards individual's face. When workers use the right PPE – and use it properly – they greatly reduce the risk of job related injury and illness. PPE should be maintained at all times in good working order. The PPE listed below must conform to the relevant Irish Standard.

SAFETY HELMET



Safety helmets/hard hats are used to protect the head from falling objects and to prevent the head from striking 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 BOOT/HI-VIS



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

High-visibility vests and high-visibility jackets 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/visors protects the eyes from dust, flying objects, and splashes (e.g. when cutting and grinding).

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.

WORKING ON ROADS INDEX

WORKING ON ROADS INDEX (cont'd)

WORKING ON ROADS INDEX (cont'd)

