HEALTH AND SAFETY ADVICE FOR PLANT OPERATORS

CITB constructionskills
NORTHERN IRELAND

Where there are unsafe acts illustrated in the photographs - the scenarios were re-created for illustration purposes and no one was put at risk at any time.

Contents

Introduction	4
Plant Operator	6
Health and Safety Law	7
Health and Safety On Site	10
Health and Safety Training	11
Supervisors and Managers	14
Training of Plant Operators	19
Planning	21
Review and Monitoring	22
Site Conditions	22
Unauthorised use of plant	23
Visibility	24
Maintenance and Inspection	28
Overhead power lines	35
Lorry Loaders (HIAB)	36
Passengers on Mobile Machinery	37
Forward Tipping Dumper (Site Dumper)	38
Roll Over Protective Structures (ROPS)	41
Selection of Attachments	42
Plant Operator Frequently Asked Questions.	46
Cranes	48
Skip Handler	52
Low Loaders	57

360 Excavators (Diggers)	60
180 Backhoe Loaders (Digger Loader)	66
Loading Shovels	67
Skid Steer Loaders	68
Trenchers	70
Graders	71
Bulldozers (Crawler tractors)	72
Scrapers	73
Mobile Elevated Working Platforms (MEWP)	75
Forklift Trucks	78
Telescopic Handler	78
Working platforms on Forklift Trucks	84
Dump Trucks	86
Demolition Machines	87
Piling Rigs	89
Concrete Pumps	91
Slinging and Load Handling	93
Machine Recovery	94
Road Building plant and equipment	96
Crushers and Screeners	100
Drilling Equipment	102
General Health & Safety	103
Health, Hygiene and Welfare Facilities	103
Chemicals / Dermatitis	104

Work Related Asthma 106
Dust and Flying Particles 107
Asbestos 108
Manual Handling 109
Power and Hand Tools 111
Hand-arm Vibration Syndrome (Havs) 112
Noise 114
Electricity 115
Struck or Crushed By Moving Vehicles on Site 117
Sun Exposure 118
Working at Heights 119
Access Equipment & Working Platforms 120
Step Ladders 121
Tower Scaffolds 123
Safety Critical Work 125
Safety in Confined Spaces 129
Safety in and Working Around Excavations 131
Personal Protective Equipment 135
Fire 136
First Aid 137
CITB-ConstructionSkills NI 138

INTRODUCTION

This booklet is part of a range that have been produced by CITB-ConstructionSkills NI to provide advice and guidance on Health and Safety & training issues relating to persons working in the Construction Industry such as Bricklayers, Joiners, Roofers, Plasterers, Painters & Decorators, Construction Operatives, Scaffolders, and Insulation Installers, with the aim of helping to eliminate and reduce the risk of, accidents, injury and ill-health.

The booklets are in an easy to use pocket-size format and will be a good reference point to both existing and new entrants working in the industry and will also provide advice to supervisors, managers and directors to help improve health and safety performance on site.
As there is a wide and ever increasing variety of mechanical plant and equipment in use in the construction Industry, all operators must be competent to perform their duties.

Manufacturers and suppliers of mechanical Plant and equipment have a duty under Health and Safety Legislation to provide information on any hazards associated with their products and advise on their safe use. Users should ensure they are in possession of this information, and make certain that the drivers and operators are instructed accordingly. Employers should establish a procedure designed to ensure that only authorised drivers and operators use their plant and equipment. It is recommended that drivers and operators should he issued with Certificates of Authorisation by their employers.

Drivers should be in possession of an appropriate driving licence if machines are operated or driven on the public highway, e.g. Group H for track laying vehicles and group G for Road Rollers.

Unless proper provision has been made to carry passengers on a machine, or on any trailer being towed, the driver must be instructed not to carry passengers. Drivers must be aware that mobile plant should be parked on firm, level ground when unattended, with the

engine stopped, brakes on, and any load or attachment lowered to the ground.

Some health and safety risks you may face on site include:

- Exposure to electricity. Overhead and underground cables
- Falls from height
- Proximity to flammable or combustible materials
- Climbing steps and working platforms
- Risk of vehicle overturning
- Risk of eye injury from flying particles and dust.
- Cancer risk from Exposure to asbestos
- Slips trips and falls due to untidy work area
- Manual handling activities
- Using various types of machinery and tools.
- Moulds, fungi and bacteria.
- Dermatitis
- Cuts and abrasions
- Struck my machinery
- Loss of fingers/limbs
- Risk of pain or injury from performing repetitive tasks.
- Exposure to noise
- Struck by falling objects
- Vibration white finger
- Hand and foot injury
- Sun exposure

Working in the construction industry is both rewarding and satisfying but as the above list shows you could be exposed to various risks if the correct safe methods of work as described in this booklet are not followed.

Think about the various Health & Safety risks that could be found on your site, speak to your supervisor or person/s in charge about ways of eliminating or reducing those risks and stay healthy and safe.

PLANT OPERATOR

As a construction plant operator, you provide a valuable service to the construction industry. You can be working on all types of construction projects, including housing, factories, offices, roads, bridges, airports and many others. As a plant operator you could be operating one type of machine or a variety of machines during your lifetime such as earthmoving, lifting, processing, access and road construction equipment.

The following list gives a flavor of the potential diverse tasks you could be involved in.

- Prepare building sites
- Digging shallow holes and trenches
- Digging Foundations
- Loading dumpers and trucks
- Stock pilling materials
- Demolition of buildings
- Lifting steel work and other products
- Lifting and placing pallets and mortar tubs
- Lifting roof trusses
- Clearing ground and levelling
- Cut and fill work
- Compaction of materials
- Laying of materials
- Transporting equipment
- Slinging loads
- Crushing and screening materials
- Accessing work at height
- Using hand and power tools

As stated your role provides a valuable service to the construction industry but in order to sustain this valuable service you will need to have received adequate training specific to your work to ensure that you work safely and without risk to yourself and others, training also keeps you up to date with current Health & Safety to ensure you follow proper recognised procedures on site.

Your health, safety and welfare at work are protected by law, your employer has a duty to protect you and keep you informed about health and safety and provide adequate information, instruction, training and supervision to enable you to carry out your work in a safe manner.
You have legal duties too as follows.

- Take reasonable care for your own health and safety and of others who may be affected by your work such as other workers or members of the public
- Comply with instructions or control measures such as the wearing of personal protective equipment.
- Co-operate with your employer on health and safety and training requirements.
- Correctly use and report any defects on work equipment provided by your employer this could be machinery, tools or personal protective equipment
- Do not interfere with or misuse anything provided for your health, safety or welfare.

Self-employed persons also have duties under the law in relation to their own Health and Safety and ensure that their work does not put others at risk.

If you think there is a health and safety problem on your site you should first discuss it with your supervisor, H & S adviser or person in charge.

Legal Requirements in relation to Plant

Several pieces of legislation apply when it comes to the use of plant, and employers and operators need to be aware of the relevant legislation from the following:

Health and Safety at Work NI Order

The Health and Safety at Work Order places duties on everyone, and states that Information, Instruction, Training and Supervision must be provided.

Provision and Use of Work Equipment Regulations

The Provision and Use of Work Equipment Regulations (PUWER) cover the selection, maintenance, general use and training aspects of all work equipment.

The Lifting Operations and Lifting Equipment Regulations

The Lifting Operations and Lifting Equipment Regulations (LOLER) deal with the actual lifting operation being carried out as opposed to the selection etc. of the equipment

Work at Height Regulations

These Regulations require all work at height to be properly planned and organised and the risks controlled. This includes the selection and use of appropriate work equipment for work at height. The Regulations maintain existing standards with regard to the control of work at height and reiterate the provisions of PUWER and LOLER.

The Construction (Design and Management) Regulations (Northern Ireland) CDM

The updated CDM regulations place a responsibility on everyone involved in the construction process, everyone needs to know about these regulations and that includes you.

Workers: roles and responsibilities

All those who work in the construction industry have their part to play looking after their own health and safety and in improving the industry's health and safety record.

Those with legal duties are commonly known as ‘duty-holders’.

Duty-holders under CDM are:

Clients, CDM Co-Ordinators, Designers, Principal (main) Contractor, Contractors and Workers.

- Ensure you only carry out construction work if you are competent
- Report any defect that you think may endanger the health and safety of yourself, other persons or members of the public.
- Co-operate with others and co-ordinate work so as to ensure your own health and safety and others who may be affected by the work.
- Follow site health and safety rules and procedures

Contractors: roles and responsibilities

On all projects contractors will need to:

- Plan, manage and monitor their work and that of workers
- Check the competence of all their appointees and workers
- Train their own employees
- Provide information to their workers
- Ensure all workers have site inductions and any further information and training needed for the work
- Ensure that there are adequate welfare facilities for their workers

The CDM regs are supported by an Approved Code of Practice (ACoP).

HEALTH AND SAFETY ON SITE

A number of initiatives have been launched to promote and improve good practice and by reducing accidents and ill health such as BuildHealth.

BuildHealth was launched to improve the health of construction workers in Northern Ireland by: preventing work related ill health: supporting and rehabilitating ill workers and using the workplace as a setting in which to improve health.

You have a part to play in this process by working safely, staying healthy, preventing injury to yourself and others and not being complacent.

Always inspect equipment that you have been given and report any defects, if you see any defects in scaffolding, ladders and mobile towers this could cause serious injury or death, report immediately, only repair if authorized to do so by your employer or person in charge, and only if trained and competent.

If an accident should happen it must be reported to your supervisor, manager or a responsible person and a record should be kept, most employers have a no-blame-culture, and encourage reporting of any problems that you see that could prevent an accident from happening in the first place or its reoccurrence.

Information gained from reported accidents can be used to improve health and safety on site. Remember accidents are preventable, by following safe systems of work you can help to improve the standards of Health and Safety on your site.

HEALTH AND SAFETY TRAINING

The following is a list of possible training that you may need depending on your specific area of work. The list is not exhaustive or definitive.

- Induction training
- Tool box talks
- Plant safety awareness
- Plant operator training
- Training on specific equipment
- Attachment training
- Training on machinery carriers - low-loaders
- Working at Heights
- Ladders
- Fall Arrest
- Excavations
- Power & Hand Tools
- Safe use of Abrasive Wheels
- Fitting Abrasive Wheels
- Confined Spaces
- Goods hoist
- Cable Avoidance Tool
- Aluminium Mobile Towers
- Harness
- Specific manufacture type training
- Health and Hygiene preventing dermatitis
- Manual handling - lifting and handling manual loads
- Dumper/compressor
- Slinger/banksperson
- Crane awareness
- Fire prevention
- Street works
- First aid
- Fire extinguishers
- Defensive driving
- Refresher training
- Conversion training
- Familiarization training

CITB-ConstructionSkills Northern Ireland encourages the adequate training of all those working in the Northern Ireland construction industry and support the industry to qualify their workforce to national standards and to enrol with appropriate Industry Registration Schemes. Training is not a one off event that is refreshed every 4 or 5 years, but it is a requirement that all persons receive training where necessary in order to do their job safely and to a continuing competent standard.

As more and more construction contracts demand a qualified workforce you should look at gaining an NVQ qualification as this will show that you have been assessed as competent.

Having a recognised registration card is a good **starting point** in showing proof of health and safety training but as stated more specific training will be required.

Adequate training can help prevent accidents and ill-health and make for a more motivated and productive workforce, ensure that you have received adequate training required to do your job safely and efficiently.

It is a misconception by some companies to assume that all experienced plant operators are fully qualified in using the various tools and equipment. Some were trained a number of years ago, even then very little or no training was provided. Refresher training, tool box talks and other manufacturer type instruction on the different attachments and products is a must to ensure an adequate standard is maintained.

All construction personnel should adopt the principles and practices stated in this document, where reasonably practicable. This booklet is intended as a good practice health and safety guide and should be supported by relevant training and the HSENI publications.

CITB-ConstructionSkills NI provides an on-site Mobile Training Unit that visits sites on a daily

basis and provides H&S and other training courses such as abrasive wheels, cartridge tools and slinging courses.

CITB-ConstructionSkills NI also publish a Training Directory of grant assisted courses delivered by a network of external training providers, you can view the Training Directory on the CITB website www.citbcsni.org.uk.

SOME EXAMPLES OF ACCIDENTS

Example 1

A 50 year old man was working in a fenced up area outside a dwelling. He was operating an excavator, which had a number of buckets stored on the front of the machine. As he raised the front buckets over the fence, so that they were hanging in mid air over a pavement. He moved the wrong lever, which then caused the buckets to fall on the pavement and killed an 81 year old man.

Example 2

A married man with three children died as a result of a trench he was working in collapsed, a dumper was filling gravel into the trench at the time of the collapse, and the excavator driver had to support the dumper with his bucket to prevent it from following in as the ground gave way.

Example 3

A 20 year old man died as a result of falling 5 metres from a ladder that he was using to attach a sling to a water tank, the ladder slipped as it was not tied or footed.

Example 4

A ground worker was struck by a dump truck and seriously injured as he was talking on his mobile phone; other workers tried in vain to signal to him but could not prevent the accident.

Example 5

A construction worker suffered injury when he was struck by a slewing excavator on site; he needed hospital treatment for broken ribs.

SUPERVISORS AND MANAGERS

This section is also for plant operators but it is essential that your supervisor or manager also read's this section as it may prevent an accident to you or someone working on site.

The safe operation of contractor's plant starts with site management. The decision to buy or provide a specific machine may well have been made as a corporate decision, or the equipment hired in, but it is the site management who are ultimately responsible for it being put into use. The site management must therefore ensure that the operation to be carried out has been effectively planned taking into consideration all the safety issues which can arise.

To ensure that unsafe acts are minimised it is essential that supervision is effective. The supervisor therefore needs to:

- Check that the Method Statement is being worked to;
- Check that the method is as safe as possible;
- Check that people are kept clear of hazardous areas;
- Check that machines are being used correctly;
- Check that tasks are only carried out by authorised people;
- Challenge unsafe practices
- Record and arrange for the repair of any damage they see or have reported to them
- Have the authority and ability to stop a task if they feel it is unsafe
- Report and record unsafe behaviour (including near misses).

Supervisor responsibilities

As an on-going process and following significant changes on site or to the task it is the supervisor's responsibility to re-brief the operator and others on the task and ensure they are put to work safely. The supervisor should take this opportunity to;

- Reinforce the key elements of the safe system of work including:-
- Use of designated traffic routes;

- Strict adherence to exclusion zones;
- Travelling and lifting on slopes;

The correct safe methods when fitting/removing attachments with the quick hitch

Consult the operator and others regarding any issues/comments they have in adhering to or the effectiveness of the safe system of work, and where appropriate instigate changes.

- Check that the operator has undertaken the relevant daily checks
- Check the required maintenance has been undertaken
- Inspection/maintenance log/check sheet has been completed and signed.

The supervisor's signature on the check list/log may be used as verification that they have carried out the check. As part of the supervisor's on-going duties, they must throughout the day monitor that the safe system of work is being adhered to including, maintenance of exclusion zones, and that no one is working below loads etc. at any time.

The supervisor should regularly check that the manufacturer's manual for operating the machine is in the cab, that the next service date by a fitter has not expired and that the machine has a current certificate of thorough examination as required.

Competent Persons carrying out planning of the use of machines should know and understand:

- The principles of machine operation
- What the machine can and cannot be used for
- The hazards associated with machine operation including;
- overturning
- electrocution – contacting overhead power lines
- colliding with pedestrians

- crushes and trapping
- falling loads
- falling from height (when lifting people)
- loss of control
- insecure attachments
- The checks and inspections that are required on a daily and weekly basis;
- What can happen if the machine is poorly maintained;
- How to attach and detach an attachment in the prescribed manner;
- How to carry out checks to ensure the attachment has been correctly engaged;
- That all work must be carried out to a Method Statement and that the Method Statement is a description of the safe system of work developed from a risk assessment of the task to be undertaken
- That accidents and incidents are mainly caused by incorrect planning and use
- The increased risks when machines are being operated in the vicinity of other people and ensure/maintain an exclusion zone wherever possible
- Their responsibilities under the Health and Safety at Work Order.

Competent Persons should be able to:

- Carry out a risk assessment of the work to be carried out;
- Develop a safe system of work based on the outcomes of the risk assessment;
- Record the safe system of work in a Method Statement;
- Carry out an effective observation and know what to look for;
- Communicate effectively with supervisors, operators and line managers;
- Recognise bad practice and unsafe behaviour;
- Develop good working relationships;
- Raise health and safety standards;
- Display consistency and be persistent;
- Raise and address issues confidently and not be afraid of conflict.

Operator Attributes

Operators should know and understand:

- The principles of machine operation
- What the machine can and cannot be used for
- The hazards associated with machine operation including:
- overturning
- electrocution – contacting overhead power lines
- colliding with pedestrians
- crushes and trapping
- falling loads
- falling from height (when lifting people)
- loss of control
- insecure attachments
- What can happen if the machine is poorly maintained
- They must physically leave the cab and check any attachment or quick-hitch before work commences or recommences following fitment
- That they must organise their work in accordance with the Method Statement (generic or task specific), including coordination with others who may be affected, and follow the Method Statement unless it is unsafe to do so, in which case work must stop.
- That they must report all unsafe working practices and faults with their machine to their supervisor
- That poor planning, operation, training, maintenance, supervision or working environment, (or a combination thereof), are major contributory factors to accidents/incidents
- The increased risks when machines are being operated in the vicinity of other people and ensure/maintain an exclusion zone wherever possible
- The organisational procedures and requirements that they need to follow
- The need for familiarisation training before operating new or unfamiliar types of machine and/or attachment
- Their responsibilities under current legislation/regulations
- Their limitations in organising their work or operating the machine in any given environment

Operators should be able to:

- Communicate effectively with other workers and line managers
- Interpret relevant information and follow given instructions
- Organise the work activity or part of the work activity with others
- Select and/or request resources and additional equipment required
- Carry out the checks and pre-use inspections that are required on a daily and/or weekly basis as required
- Attach and detach an attachment in the prescribed manner
- Carry out checks to ensure the attachment has been correctly engaged
- Operate the machine according to manufacturer's requirements and safe working practices.
- Raise and address issues confidently and not be afraid of conflict or of stopping work when necessary to ensure safety

Pre-work reviews / monitoring

Before using a machine, the operator's training and experience must be checked to assess their competency. Training must include adequate familiarisation on the specific equipment to be used.

Formal certification of training together with entries in the operator's log book, countersigned by their supervisor / manager may assist in this assessment.

Observation of a new operator or an operator using new equipment, in a safe location away from other personnel, may also help those making the competency assessment. Before commencing any task for the first time the operator together, with other relevant parties, must receive a safe system of work briefing from the supervisor.

Immediately following this briefing, the operator and others involved should be closely monitored to ensure they understand and are working to the safe system of work.

Familiarisation

Machines come in a variety of shapes and sizes with significant differences in operating controls and characteristics. It is therefore essential that operators and supervisors are given adequate familiarisation on an unfamiliar type or model of machine or attachment before they begin operations. The employer of the machine user is responsible for ensuring that familiarisation is provided.

Training of Plant Operators

In accordance with the Health and Safety legislation, the employer must ensure, so far as is reasonably practicable, that employees receive "such information, instruction, training and supervision as is necessary to ensure" their health and safety at work.

When there is a machine accident the operator is inevitably involved. It is therefore essential that they are given sufficient training and information to enable them to know how to operate and check the safe operation of the machine.

The following must be implemented by companies that hire or use contractor plant in relation to the training of operators.

- All operators of contractors plant must receive adequate basic training
- They should also receive specific job training under supervision in relation to the actual machine/s operated, the products handled by those machines and the environment where the machine/s will be used.
- The operator also needs job familiarisation training to also cover these areas without direct supervision but through observation.
- If the company is satisfied by the standard of the operator to use the equipment then authorisation to drive these machines should be given.

Please note that authorisation should be given for a specific period and should include the make and model of machine that can be operated by the operator, this authorisation should be removed by the company if they are not satisfied by the continuing competence of the operator.

Job specific training should also cover quick hitches, attachments and any other specialist equipment that is required to be used. If an operator has not operated a machine for some time then they may require refresher training or time on the machine to adapt before operating in live situations, this would also apply to operating a different make of machine which may require a form of conversion training or time to read through the operators handbook to familiarise themselves with the machine differences before attempting live work. All authorisations to drive equipment should preferably be in writing.

Those people who are authorised to use equipment should be displayed on a register, issued with keys from a recorded system or machines could be fitted with immobiliser that prevents non authorised driver usage.

Operators or potential operators will require different periods and stages of training depending on experience and machine knowledge.

Companies should also support plant operators in gaining a nationally recognised qualification such as an NVQ Level 2 (QCF) in Plant Operations covering the type of machine/s used as this is the standard now required on most construction sites in the UK and on some construction projects worldwide.

PLANNING

All operations on construction sites should be planned to ensure that they are carried out safely and that all foreseeable risks have been taken into account. Poor planning is one of the major causes of accidents arising from the use of construction plant.

The employer should ensure that they identify a person who is competent to undertake the planning and give them that duty. The planning process should identify the task to be undertaken, identify the hazards associated with that task, carry out a risk assessment, identify control measures, develop the method to be used, record the planning in a method statement, communicate the plan to all those involved in the task and review the plan before the job starts.

Where cranes are lifting suspended loads, additional planning is required by a person competent to undertake the task, the “Competent Person”. Additional planning is also required for other non-standard lifting operations such as unusual loads, or circumstances, loads with large wind areas, confined spaces, and in tight areas where contact with other structures could be hazardous.

REVIEW AND MONITORING

It is important that the use of construction plant is subject to regular review and constant monitoring to ensure that tasks are being carried out as planned, that supervisors and operators have the necessary competences and that planning is effective.

SITE CONDITIONS

Employers have legal obligations to plan and control the operation of construction plant on site. Operators and contractors need to be made aware of site hazards which could affect the safe use and of site rules which limit where they may be used.

Particular attention should be paid to traffic management, sites should be arranged so that wherever possible pedestrians and vehicles are adequately separated by establishing:-

- Pedestrian only areas from which vehicles are completely excluded
- Safe designated pedestrian routes to work locations
- Vehicle only areas, especially where space is limited or traffic is heavy
- Safe vehicle routes around the site.

A sub contracted transport driver delivering timber to site narrowly escaped serious injury when he decided to use a 'parked up' Rough Terrain Masted Forklift Truck to load/unload his own trailer. The driver was not authorised or trained to operate the machine and whilst attempting to unload the timber he drove too close to an open excavation which caused the excavation edge to collapse and the forklift to subsequently overturn. A review of this incident revealed that the driver was not wearing the seatbelt (in accordance with manufacturer's instructions) and that the incident occurred early in the morning when other operatives were not on site.

This incident highlights several issues, primarily unauthorised use of plant, but also site security, safe use of plant and lone working.

The work site should be fully secured to prevent unauthorised access onto it. Parked machines (and their keys) should be secured and immobilised to prevent unauthorised cab access and use of the machine, and also to help prevent plant vandalism and theft.

Only trained and competent operators should operate plant on site. Operators should also receive induction training before they are authorised to operate plant on site. As a minimum requirement, this should include: emergency procedures, traffic management and pedestrian/vehicle segregation, access and egress from site, safe use of a banks person, hazard management, working alone and safety signage.

Transport routes should be positioned at a safe distance from open excavations to prevent excavation collapse and where possible excavations should be suitably supported. Painted timber, concrete baulks, barriers and so forth should be used to keep vehicles at a safe distance away from excavation edges.

Where there are specific hazards, such as open excavations, then the movement of machines should be strictly controlled by competent banks person. The banks person must be excluded from the 'operational area' of the machine and a risk assessment will be required to determine the safe area and distance around the machine – if in any doubt, the plant should be segregated from the banks person and other workers.

Employers have a general duty to carry out a 'specific' risk assessment for 'working alone' and to develop appropriate procedures to control these risks and protect employees. As a minimum requirement, this assessment should consider: whether the work can be done safely by a lone worker; how to deal with foreseeable emergencies, such as illness, injury or acts of violence; an assessment of operator fitness to operate and suitability of the person to work alone; the level of supervision required and how operator contact will be maintained; and specific lone worker training needs.

Restricted visibility from machines can cause accidents especially telescopic handlers when the boom is raised or when large loads are carried, plus poor segregation have been identified as a major cause of accidents involving pedestrians and machines. The great majority of telehandlers feature a side-mounted cab, with the boom mounted centrally or to the right of the machine chassis. The operator's view around the machine, when normally seated is obstructed or 'masked' by the cab pillars and any other part of the structure that is in the way. Certain parts of the loading cycle will place the boom in the operator's line of sight and consequently prevent a clear view. Older designs of telehandler use a high mounting for the rear of the boom, making view

to the right front quarter almost impossible. This led to the practice of driving with the boom raised to allow the operator to see underneath it.

Newer designs of telehandlers have low profile booms that drop below the eye line when in the transport position. Supervisors should always query the practice of driving with the boom raised as it increases the extra risk of instability.

It should not be forgotten that the most effective way of preventing accidents between pedestrians and contractors plant is to segregate vehicle and pedestrians. Operators should always ensure by appropriate means, prior to commencing a task, that personnel are clear of the area immediately adjacent to the machine. This may involve getting out of the cab and walking around the machine as people could be using mobile phones or involved in some other activity and are not aware of your machine. Operator visibility is aided by clean cab windows. Window cleanliness should form part of the operator's pre-use checks.

Selecting Visibility Aids

Where additional or particular risks are present on a site, or following a risk assessment, it may be necessary to add additional visibility aids.

In general users will need to consider the following factors when choosing appropriate visibility aids, *Vehicle speed and stopping performance*, *Site conditions*, *Lighting conditions and Human factors.*

The aids should be selected and fitted to maximise the operator's chances of perceiving danger. Too many aids may confuse an operator and render them ineffective. The positioning of monitors and mirrors should take into account the operators normal operating position for the relevant direction of travel and minimise the number of different locations an operator needs to look.

Where frequent, repetitive operations are performed (such as loading from a stockpile) the risk of the operator failing to use a vision aid

increases and it may be beneficial to provide additional automatic sensing systems. Some additional aids may also be appropriate for ergonomic reasons e.g. to reduce the need for the operator to frequently look over their shoulder.

Wide Angle Convex Mirrors can provide additional visibility along the sides of vehicles and of areas to the rear into which the vehicle can manoeuvre. They are used on telehandlers to view the areas to the sides, rearward of their fixing and if fitted at the pivot point immediately in front of the rear of the vehicle to enable the operator to check that those areas are clear before moving off.

When selecting and mounting convex mirrors, users will need to consider that the image provided by a convex mirror is distorted and that the more convex the mirror the greater the distortion. This may increase estimates of distance, leading to unsafe situations. Images can also be disrupted if vibrations from the vehicle transmitted through the mirror mountings cause excessive shake in a mirror. These two effects can result in a particular mirror installation becoming ineffective.

Closed Circuit Television, CCTV systems, i.e. a CCTV camera and monitor, can be positioned to allow the operator to see into various blind spots. The camera lens is chosen to provide the required angle of view. The camera should be located in a position that reduces the possibility of damage from mud, debris, or collisions. If possible the monitor should be fitted at the same height as, and in line with, the external mirrors without obstructing forward vision. This will reduce the number of different locations that an operator needs to view. The monitor should be on all of the time not just switched on when in the vehicle is reversing. They can be detachable to stop vandalism and theft.

CCTV systems may need to be capable of coping with low, bright and changing light conditions, such as glare which should be assessed e.g. when CCTV is being considered for cabs with large areas of glass. The CCTV system may need automatic adjustment and shielding to prevent

glare and brightness control when it is used at night or additional, or alternative aids, may also be required.

Sensing Aids, Radar systems can either provide an audible and visual warning to the operator or apply the brakes of the machine when an object is detected close to the rear of the vehicle. More sophisticated systems have a two-stage response: warning the operator at a certain distance from the object and automatically applying the brakes at a closer distance. These systems, when fitted to the braking system, have the advantage over CCTV of giving automatic protection to the rear.

Radar systems however, are not failsafe and for this reason users normally fit a warning light to the machine to indicate when the system is switched off. The width and length of the detection zone(s) should be set according to the braking distance of the vehicle and the environment in which they operate. They should also be checked periodically.

These and other similar electronic sensing devices (e.g. ultrasonic systems) can be fitted on vehicles where the operator may not look back when reversing. The system either: stops the machine, sounds an alarm or gives a visual warning when something is in the vehicles path. This is particularly useful where the vehicle moves repeatedly backwards and forwards motions.

An effective sensing system needs to be able to reliably detect an object in the risk area that it covers; the system should not however be prone to being triggered by objects that are not in the risk area or suffer from other “unwanted alarms” as this will tempt operators to de-activate the system. They may therefore be less tolerable on tight and congested sites.

MAINTENANCE AND INSPECTION

Any item of mechanical plant or equipment will remain safe to operate only if it is properly maintained in good condition. A programme of regular, preventative maintenance should be established to ensure that all plant and equipment is systematically inspected, serviced, maintained and repaired as necessary. Responsibility for taking this action should be clearly identified.

A safe system of work must be maintained during all maintenance and repair operations and, where necessary, a permit to work system, (e.g. a lock-off system), should be established to ensure that no part of the machinery is accidentally set into motion whilst work on it is being carried out.

While personnel are carrying out inspection, maintenance or repair tasks, raised attachments bodies, cabs, etc. should be securely propped to prevent accidental lowering.

The appropriate manufacturer's repair and servicing instructions should be made available to all persons responsible for carrying out the work.

In two separate incidents, the basic legal requirements for the maintenance and inspection of machinery were seriously breached.

A semi-automatic quick hitch variant on a hired machine did not have any plate markings to indicate CE conformity or registration mark. Upon further inspection a metal fatigue/crack was apparent on the quick hitch, which at some stage the plant hirer had attempted to repair by a welding operation but this had failed longitudinally through the two welds. Furthermore, the pin made available by the hirer was incompatible with the diameter of the hitch locating hole.

A skip loader truck was found to be using a screwdriver to lock and secure the side of the skip. Because the lorry was bound for the public

highway the consequences of a failure could have been huge in terms of lost life and damage to other vehicles.

Inspection

Every employer shall ensure that work equipment exposed to conditions causing deterioration which is liable to result in dangerous situations is inspected.

At suitable intervals; and each time those exceptional circumstances which are liable to jeopardise the safety of work equipment have occurred, to ensure that health and safety conditions are maintained and that any deterioration can be detected and remedied in good time.

Inspection should be completed whilst undertaking maintenance. The results of scheduled (fixed-time-to) maintenance, operator shift maintenance and inspection activities should be recorded in full and safely stored.

This will include details regarding who conducted the maintenance, when the maintenance occurred (time and date), what parts and consumables were used and the faults found.

An item of plant, equipment or machinery should not leave the depot unless appropriate maintenance and a thorough inspection have been conducted.

The effective maintenance of contractor's plant is an essential part of safe operation. All machines will wear, deteriorate and can suffer damage over time. The maintenance process, including checks and inspections, monitors, prevents and rectifies this deterioration. It is important that the personnel asked to carry out these tasks have the necessary machine-specific training, experience and competence in both periodic and breakdown maintenance.

All plant requires the manufacturer's preventative maintenance instructions to be strictly complied with, if safety is to be maintained in use. Checks and inspections should be carried out taking account of the frequency of use of the machine and the environmental conditions in which it works.

Both the user and owner of a machine, have a responsibility to ensure that they are maintained in a safe working condition including any attachments used with it, If the operator is considered to be competent to carry out routine pre-use and weekly checks, they may be authorised to do so. The employer of the person carrying out these checks should ensure that the machine is taken out of use for the period of time required to carry them out. Also, the employer or authorised person carrying out the checks should ensure that a safe system of work is in place to prevent personnel from being exposed to risk, for example from the inadvertent operation of the equipment.

Basic checks and inspections should be carried out in accordance with company instructions and the manufacturer's recommendations: Daily Pre-use Checks - these are carried out at the start of every shift (or day) and include checks for damage and correct functioning of the machine.

Weekly Inspections - these are additional inspections to the pre-use checks. These checks and inspections should be recorded. If there is a defect that affects the safe operation of the machine it must be reported and the machine taken out of service immediately. If it does not affect the immediate safe operation of the machine the defect should be reported to the supervisor so that repairs may be carried out in a timely manner.

Thorough Examination

The Lifting Operations and Lifting Equipment Regulations (LOLER) require that all lifting equipment is thoroughly examined by a competent person at specified intervals.

Reporting of Defects

There must be provision for the operator(s) of machines to make written reports of defects or observations immediately they are identified. The written report should be to a pre-defined format, (a company pro-forma, and a section on the daily time sheet, etc.), which requests details of the defect or observation and supporting information such as date, time, machine identification, circumstances, etc., and must be reported at least daily. *'Nil Reports'* must also be submitted at least weekly.

All the defect reports, including the *'nil reports'*, should be forwarded to the owner, (or the delegated person), who is in a position to make an informed decision about a planned response to the report. A copy of the original report should be retained by the operator. Once the defect / observation has been responded to and cleared this should then be recorded with supporting information on the original defect report. The machine should have the keys removed and a label or sign fitted warning that the machine should not be used.

Modifications

Contractor's plant should not be modified without the express written permission of the machine manufacturer. Unauthorised modifications will affect the warranty, invalidate the CE marking and may compromise safety.

Scheduled Lubrication

Operators may be required to carry out lubrication of certain items, such as the greasing of sliding parts, at specified intervals. They should only undertake such tasks if they are competent to do so and should be provided with the necessary equipment and instructions to carry this out safely.

Scheduled Maintenance

It is the responsibility of the site management to ensure that all machines are adequately maintained in efficient working order and in a state of good repair.

A scheduled preventative maintenance program helps to meet these requirements. Where a machine is hired out on the basis that the owner is responsible for carrying out maintenance, the owner should inform the hirer, at the start of the hire, that their maintenance staff will require access to the machine at specified intervals. The hirer should be advised of the frequency and length of time required for maintenance operations.

Breakdowns

Breakdowns should be minimised by adequate inspection and preparation of the machine prior to delivery on site. Repairs on site should only be undertaken following a thorough job and site specific risk assessment and the implementation of a safe system of work, including inspection of the work following completion.

Maintenance Records

Comprehensive maintenance records are essential to the safe, efficient and economical operation of all contractors plant. They provide a complete “cradle to grave” history of the individual machine giving the following benefits:-

- evidence of adequate maintenance as part of the management system
- establishing breakdown trends over time and providing information for the review of maintenance frequency.
- identification of component failure trends for feedback to the manufacturer
- evidence of adequate maintenance to the Enforcing Authorities in the event of an incident.
- enabling the performance of the machine to be reviewed over time to inform future purchases.

A Real Life Example of Tyre Issues

A telehandler operator had been checking the tyre pressures on his machine. Having completed the checks, he was walking away from the machine and one of the tyres exploded. Subsequent investigation revealed that the tyre, which had recently been replaced, was 14 ply with a 3.5 tonne load, rating rather than the manufacturer's specification of 16 ply with a 6 tonne rating.

The contractor also found that the tyre had been ordered from their approved supplier by asking for a tyre without any mention of ply or load rating.

Tyre changing

Failure to observe safety precautions, or to follow proper tyre changing procedures, can cause serious injury or death. Persons without proper training and equipment should never attempt the work.

Different designs and sizes of tyres and wheels will require different precautions to be observed. The following are general recommendations only: –

1. Wheels and tyres must never be inflated, deflated, mounted or dismounted without proper tools, equipment and expertise. Manufacturers' recommended procedures must always be followed.
2. When jacking up a machine to remove a wheel, a sound timber must always be used as support for the jack; the jack itself must never be relied on to support the machine. The machine must be supported on substantial timber packing.
3. An inflated tyre is potentially dangerous. Tyres must be deflated before removal by depressing the valve core stem to reduce the pressure, after which the valve core may be safely removed.
4. Before fitting a tyre, the tyre bead must be lubricated with a recommended lubricant to permit easy and proper seating. The maximum inflation pressures specified by the tyre manufacturer must never be exceeded in order to seat the bead.

5. Persons must never stand over, or in front of, a tyre when inflating it. An extension to the air hose should be used, so that persons may stand to one side or, if appropriate, a safety cage should be used.

6. If a tyre is wet or dry ballasted, the machine/tyre manufactures recommended inflating and deflating procedures must be closely followed.

7. Tyre pressures should be marked on vehicles conveniently close to the wheels, so that the information is readily available.

Monitoring by the contractor/principal contractor

Where the organisation directly supervising the works is not the main contractor or, principal contractor, the contractor/principal contractor must undertake suitable monitoring to enforce the safe use of telehandlers. This should include, before a task or individual starts on site, the review of:-

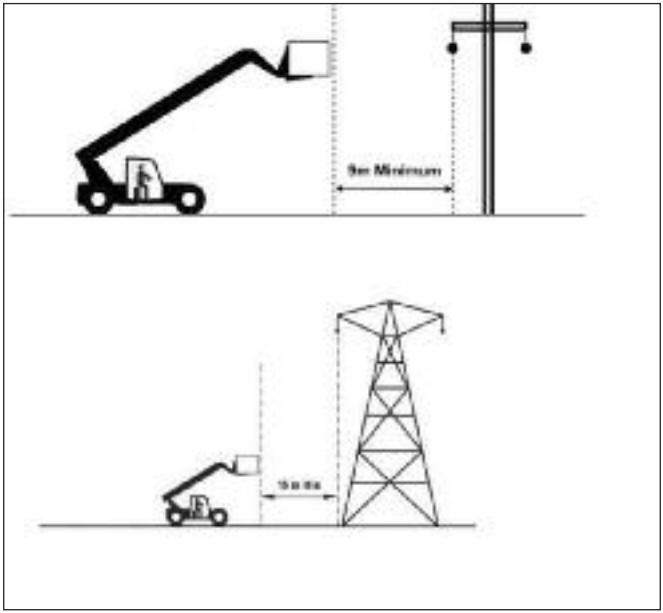
- Any safe systems of work before work commences.
- The training and competency of supervisors and operators.
- A report of thorough examination before the equipment is put to use.

The contractor/principal contractor should also monitor the following, which may be done during normal management site inspections / tours;

- That safe systems of work are being implemented;
- That plant coming onto site is entered into a register to enable the checking and monitoring to be undertaken.
- That only competent and authorised operators are using the equipment.

OVERHEAD POWER LINES

As a general rule, no part of any machine should be brought closer than 15 metres to overhead power lines suspended from steel towers or 9 meters to overhead lines supported on wooden poles, See **Figures 1** & **2**. In case of doubt the electricity supply authority should be consulted. Further advice is given in HSE Publication GS6 - *Avoidance of Danger from Overhead Electric Power Lines*



LORRY LOADERS (HIAB)

These machines are used widely in construction for delivering materials and within utility works with clam shell bucket attachment. They can be used with a crane hook, clam shell bucket, grab etc.

You must be trained and competent before operating these machines and you need to follow the procedures in this booklet in relation to maintenance, slinging and crane use. The following should be remembered;

- Look out for overhead cables and bridges
- Make sure that both stabilisers are deployed and returned to the correct position for travelling.
- Use proper care if work is in a confined space.
- Be aware of children and other persons in the vicinity, they should be told to clear the area
- Make sure that the boom is locked in is lowest position or on the deck of the trailer if an attachment is fitted.
- You must understand the safe working load of your loader in the different positions, the further out you extend the left weight you can lift.
- Machines have overturned whilst lifting loads due to incorrect procedures being followed.
- Look out for danger and drive safely with care at all times.

Passengers on Mobile Machinery

Self-propelled work equipment is often incorrectly used to carry passengers. A recent incident provides an example of this, where two workers were observed riding on a forward tipping site dump truck, designed for one driver and no passengers.

The driver was positioned correctly in the seat provided but the other worker was perched dangerously on the engine compartment with his feet resting on the wheel arch. The temporary road being driven upon was rough and undulating and it was noted that pedestrians were walking alongside the road without any form of vehicle/pedestrian segregation or traffic control.

There was therefore a risk of serious injury or fatality, as the side passenger could have fallen and been run over, or rolled onto, by the machine. The Provision and Use of Work Equipment Regulations (PUWER) states that: Every employer shall ensure that no employee is carried on mobile work equipment unless it has been designed by the manufacturer for such a purpose

When training novice operators, it is permissible to work within close proximity of the machine but a thorough risk assessment must first be completed and this should take into account (amongst other things) the type, size and configuration of machine being operated, falls from height and unexpected movement of the machine.

Because such activity is deemed to be high risk, training should be conducted in a tightly controlled environment and the use of hand free mobile technology (e.g. phones or walkie talkies) should be considered if the risks identified cannot be fully controlled.

FORWARD TIPPING DUMPER (SITE DUMPER)

Forward Tipping Dumpers are used on most sites and can be wheeled or tracked, they look a simple machine but over recent years several incidents have occurred where forward tipping site dumpers (typically under 10 tonnes) have overturned whilst being operated. Certain contributory factors to incidents involving overturning have been identified, for example, operating at excessive speed; overloading the machine, operating on an incline or on uneven / unstable ground conditions; and operating too near to the edge of open excavations or trenches causing their collapse.

Site dumpers should only be driven by fully trained, competent operators who have been authorised to do so and any operation should be accompanied by a suitable risk assessment. Operators should wear appropriate protective equipment, such as safety boots, high-visibility jacket, ear defenders, etc. The site dumper should be fitted with rollover protective structures (ROPS) and a restraint mechanism, such as a seat belt, which should be used during machine operation to keep the driver within the ROPS protected area in case of overturn.

Regular maintenance will ensure that the site dumper is working safely and efficiently and a machine inspection (e.g. of the tyres, brakes, ROPS, etc) should be conducted by the operator at the start of a shift, with an appropriate record of this kept. Any maintenance or inspection undertaken should follow the guidance given by the Original Equipment Manufacturer (OEM).

The site dumper should be suitable for the task to be undertaken, particularly with regards to its load capacity (for instance, overloading a machine beyond its specified load capacity can affect both stability and operator front end visibility) and stability (for example, if working on steep inclines or uneven ground, the use of a larger more stable machine type may be more appropriate).

The site dumper should be operated within its capabilities with regards to handling and braking. This will include: regulating the speed to suit the ground conditions and load being carried; maintaining safe braking distances and never braking suddenly in wet, icy or muddy conditions. Never exceed the maximum stated gradients specified by the OEM; and avoiding turning across gradients.

When being loaded the site dumper should be on level ground with the parking brake on. The operator should dismount and stand clear, whilst ensuring that the skip is not overloaded and that the load is evenly distributed.

When tipping, the site dumper should be stationary, in neutral gear and with the parking brake on. If tipping into an excavation, suitable stop blocks must be used to prevent the machine from falling.

Before operating the site dumper, the ground conditions should be checked to ensure that they are suitable for any load imposed upon them by the machine, its operator and the load. Vehicle routes should avoid significant obstacles, uneven ground and inclines, particularly if across the direction of travel.

Where the route is near to a drop, such as an excavation or embankment, extra support or barriers should be provided for the edge of the route. Pedestrians must be segregated from the 'operational area' of the dumper and its transport routes; these routes should have good clear signage and appropriate traffic control measures.

Drivers should not remain on a vehicle being loaded unless a suitable Falling Object Protection Structure (FOPS) is provided and only then if it is recommended by the manufacturer.

In most cases it is recommended that the operator should stand well clear of loading operations as the driver could make a mistake and strike the machine. A proper risk assessment should be completed to look at all aspects of the operation and a method statement in place and the company should ensure this is followed.

Safe means of access to the cab must be provided and operators should always mount and dismount machines properly. (Operators should never jump from a machine unless in an emergency situation and only by following recommended guidance.

ROLL OVER PROTECTIVE STRUCTURES

There have been many recorded instances over recent years of plant operators using machines that are at risk of roll over without first erecting and securing the unfolded Roll Over Protective Structure (ROPS) fitted. In the incident reported upon here, a forward tipping site dump truck was being used to transport wet concrete to foundations through the middle of a new steel frame building.

The operator was driving the machine under steel beams with the ROPS down and 'ducking' his head up and down as and when required. Various regulations under the Provision and Use of Work Equipment Regulations (PUWER), were contravened.

Despite advise, many operators still appear ignorant of the risks posed by their misuse of this vital safety feature. In the incident here, management were also at fault because machine selection was clearly inappropriate and control of machinery use on site was poor.

When selecting plant or machinery for any given task, a thorough risk assessment must first be undertaken to ensure that the correct type of machinery is chosen. If machines with ROPS fitted cannot be used because of height restrictions then a more suitable alternative should be sought, e.g. in this instance a concrete pump.

Folding ROPS must be in the erect position and secured correctly at all times whilst the machinery is being operated on site. Additional information about the specific ROPS fitted and how this should be used and maintained can be found in the operations and maintenance manual issued by the Original Equipment Manufacturer (OEM).

Site managers must be knowledgeable about safe plant operation and must take an active role in monitoring, controlling and managing all plant operations on site.

SELECTION OF ATTACHMENTS

Attachments for use with machines should be chosen with care to ensure that that the combination of machine and attachment is both safe and productive.

The selection process should at least take into account the following points:-

- Which make and model of machine is the attachment going to be fitted to?
- What task is the attachment required for?
- Which type of attachment is best suited to the application?
- Is the attachment approved for use on that machine?
- Is the attachment compatible with the machine?
- Are load charts and user instructions available for the use of the attachment on the specific machine?
- Is the machine operator both familiar with and competent to operate the attachment?
- Will the operator require additional training and/or familiarisation?
- Who will be carrying out fitting and removal of the attachment and are they competent to do so?
- Are there particular hazards associated with the location and/or the task to be carried out?
- Will the attachment be sourced from the machine manufacturer, from an attachments manufacturer or from a third party?
- Will the attachment be sourced from the machine owner's own stock?

Attachments should be designed for use with a specific machine, CE marked to the Machinery Directive and supplied with an EC Declaration of Conformity as items of “interchangeable equipment”. They should also be supplied with instructions to enable them to be assembled and used safely with the specific machine.

The instructions should specify which machines the attachment can be safely assembled and used with, either by reference to the technical characteristics of the machine or, where necessary, by reference to specific models of machine. It should be noted that where an attachment is not CE marked or supplied with an EC Declaration of Conformity, the person who assembles the machine/attachment combination is responsible for conformity of the new machine with the requirements of the Machinery Directive.

Quick Hitches

Some machines are fitted with “quick hitches” or “quick couplers” which enable attachments to be changed easily and rapidly. They fall into two types:-

Mechanical Quick Hitch

With the mechanical quick hitch, the hitch is engaged with the attachment, using the functions combined with boom movement. Once the quick hitch and attachment are engaged, a locking pin(s) is/are inserted and secured with a retaining pin.

Hydraulic Quick Hitch

The hydraulic quick hitch is engaged in the same manner as the mechanical quick hitch but the locking pin(s) is/are engaged hydraulically using the controls in the machine. Both types of quick hitch can allow the attachment to become detached from the quick hitch if the manual locking pin is left out or the hydraulic locking pin fails to engage fully.

There have been several serious injuries caused by falling attachments and misuse. It is therefore essential that operators get out of the cab to physically ensure that all quick hitches are securely locked before starting work with a newly attached attachment.

A dangerous occurrence involving a tracked excavator fitted with a quick hitch device was recently reported. The machine was being used for breaking concrete and mass excavation works and following the incident an investigation was launched.

The hitch was 'fully automatic' and yet failed to connect to the pins attached to the breaker. The inspection was inconclusive but two possible causes were apparent:

- Either the operator failed to correctly engage the pins before slewing to the point of breakout; or
- Clay and other material prevented the hitch from connecting correctly.

Further investigation also revealed that the retaining bolts (used to hold bucket pins into position) had been sheared off and welding around the pins attached to the impact hammer were severely worn both were unsafe and could have contributed to a further incident.

Guidance

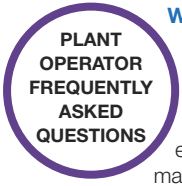
- Although hitches may be manufactured to appropriate standards if abused or neglected by the operator, they can contribute to a dangerous incident.

- All operators (regardless of whether they are hired or employed directly) should check the integrity of components at the start and end of every shift. This information must be recorded by the operator on a daily check sheet or defect report.

- Other workers should be excluded from the operational area of a machine – if they are not there, then they cannot be injured.

- Once an attachment has been fitted to the hitch as per the manufacturer's instructions, it should be tested to ensure that the coupler is connected correctly. Once complete, the machine and attachment should be placed in a safe position, the engine switched off and the attachment checked manually to ensure that it has correctly engaged.

- If in any doubt, then the operator must refer to the machine's operation and maintenance manual (as supplied by the Original Equipment Manufacturer) or the quick hitch manufacturer's information manual/guidance.



What license do I need to operate mobile plant in the workplace?

There are no government issued licenses for vehicles at work; the law requires that each operator is given adequate training by their employer so that they are competent to operate the machinery which they use.

I work for a company which runs its own in house training which is not accredited by any scheme. Is this legal?

As long as the training you are given means that you are competent to operate the machinery you use safely, then there is no absolute legal duty to use the accredited system.

I operate plant & lift trucks, what is the licensing system for that?

There is a legal duty for every employer to ensure that their employers are adequately trained for the machinery they operate, there are many different schemes in operation, each employer should satisfy themselves that training under the schemes they accept means that operators are competent to use each piece of equipment that they will be required to operate.

My employer will not accept my training certificate or card as valid, and is insisting that I retrain to a different scheme. Is this legal?

Employers are entitled to require their plant operators to be trained to any scheme which they think is appropriate to their workplace, as long as completion of the training certificate the company chooses means that employees are competent to operate the mobile plant they will be using.

Do I need a valid UK car driving license in order to operate plant in the workplace?

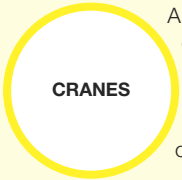
No, driving a car and operating mobile plant are very different tasks, although they use some of the same skills. There is no legal requirement for plant operators to hold a road driving license unless they wish to drive their vehicles on the public highway. All plant driven on the public highway must comply with the appropriate road traffic legislation.

It is over three years since I did my plant training. My employer has refused to send me on refresher training. Is he obliged to provide additional training?

There is no specific requirement to provide refresher training after set intervals, but even trained and experienced operators need to be re-assessed from time to time to ensure that they continue to operate machines safely. In addition to routine safety monitoring, re-assessment might be appropriate where operators have not used machines for some time, are occasional users, appear to have developed unsafe working practices, have had an accident or near miss, or there is a change in their working practices or environment.

I have never had any formal training to drive a machine. What are the legal requirements?

Your employer has a duty under Health and Safety legislation to provide information, instruction, training and supervision to ensure the health and safety of their employees. Under the work equipment regulations employers are required to “ensure that all persons who use work equipment have received adequate training for purposes of health and safety, including training in the methods which may be adopted when using the work equipment, any risks which such use may entail and precautions to be taken.” By not providing you with any training at all, your employer could be breaking the law.



A number of different types and classification of cranes are used in the construction industry, Crawler, Wheeled, Truck-Mounted, Tower Crane which can be fixed or mounted on rails or trucks, Self – Erect Pedestrian Tower Cranes, small hoist cranes, gantry cranes etc.

It would be impossible to cover every type of crane or machine within this booklet but most of the content of this booklet in relation to plant is relevant to other machines such as maintenance information, safety procedures etc.

As a crane operator you must always exercise proper diligence and operate the crane safely. If you have reason to believe that a lift may be dangerous or unsafe report the concern to your supervisor or person in charge and only continue when you know it is safe to do so.
On occasions the crane will need to be shut down due to high winds. You should have an anemometer placed on top of your crane as it will determine wind speed.

You should always give consideration to the risks around you, are you working close to a motorway, road or railway line, employees on the ground and of course pedestrians in the vicinity. Even when it's calm on the ground it may be too dangerous to operate the crane. You should have radio contact with the banks person on the ground through a specific radio frequency as this will reduce distractions whilst you carry out the lifts. At all times you will need to be making judgments and calculations that need your undivided attention.

Self-Erect Tower Cranes (SETC)

The operation of SETCs is frequently carried out by a pedestrian operator at ground level; using remote controls that may be hard wired or use a wireless data transmission system. Whilst pedestrian control provides flexibility with the possible combination of roles there are several potential disadvantages that must be taken into account in planning the lifting operations:-

- The crane operator may well be at risk of tripping and falling when trying to move around the site over uneven ground whilst concentrating on controlling the crane. Pedestrian operated SETCs should only be controlled whilst the operator is stationary;

- The crane operator has no feel for the machine and could, under certain circumstances, be tempted to handle the machine more roughly than if the crane were operated via a cabin control;

- The operator may not have a good view of the load and any obstructions, consequently the operator must always have the crane jib and load in sight at all times;

- Infra-red remote control can be unreliable on SETCs if the receiving sensor rotates with the crane and thus loses alignment with the transmitter.

Wireless Controls

To prevent unauthorized use, the operator of a SETC that is controlled by transmitted signals, such as radio signals, should retain the control station (transmitter) in their physical possession or remove the key from its key-lock switch and, for short periods, retain the key in their possession. For longer periods, or when the crane is not in use, the transmitter should be kept in secure storage.

Mobile Cranes

Machine Transport Routes:

A serious incident recently occurred where a 60 tonne (approximately) mobile all terrain crane veered off a single track road whilst travelling in 'transport mode' from one site to another and overturned. The operator was fortunate not to receive any injuries as a result of this dangerous occurrence. The results of an investigation into the incident were not conclusive but it was thought that the operator could have lost concentration during operations. The small print on the specific hire contract used placed responsibility for the recovery of the vehicle, the damage caused, any pollution and so forth, onto the hirer – the financial loss incurred was considerable.

The mobile crane should be regularly maintained so that it is working safely and efficiently and a machine inspection should be conducted by the operator at the start of each shift, with an appropriate record of this kept. Any maintenance or inspection undertaken should follow guidance as laid out by the Original Equipment Manufacturer (OEM).

Mobile phones, two way radios or other such devices that could distract the operator should not be used during machine operation unless they form part of the safe system of work procedure employed. Transport routes should be regularly maintained and suitable for the task to be undertaken and the type of mobile crane using them, i.e. with respect to size, weight, dimensions and any specific safety

features to be used, for example, outriggers. If a transport route is unsuitable for the mobile crane then an alternative machine, route or method of work should be considered.

Pot holes and ruts appearing in the transport route should receive immediate attention with regards to their repair. Any obstruction or debris must be cleared immediately once reported. Transport routes should not slope against the direction of travel. When travelling across a work site, the site rules should always be observed and if the operator is in any doubt then additional advice and guidance should be sought from site management.

Site travel speeds should always be observed and if in any doubt, travel speeds should be kept to a minimum. When working at the side of an excavation or embankment, suitable edge protection must be used along the transport route.

Pedestrians must be segregated from transport routes and these routes should have good clear signage and appropriate traffic control measures.

Operators of Skip Lorries need to be aware of the risks of “runaway” skip lorries when operated on slopes and vehicle movement when uplifting skips.

Recently a number of skip lorries have “runaway” when operating on slopes. One incident resulted in a fatality when the driver was crushed whilst attempting to re-enter the lorry cab and the second resulted in the vehicle crashing into school grounds. There is also anecdotal evidence from the industry and the police of other instances of “runaways.” 3 Further injuries have occurred on level ground during lifting of skips when operators have been trapped between the vehicle and another fixed object. As the skip is lifted the changing forces result in movement of the vehicle (if unbraked) and can create a trap between the vehicle and a fixed object.

Investigation of the circumstances found a potential common cause of “runaway” on a large number of skip lorries in the UK. Skip lorries are built on various manufacturers chassis (as specified by the purchaser). The conventional skip lorry consists of a frame with lifting arms and stabiliser legs at the rear of the vehicle. These legs are deployed when moving a skip to provide both longitudinal and latitudinal stability to the vehicle whilst lifting. The majority of these legs are fitted with free running roller wheels (used by some operators to drag skips out from enclosed areas). Some vehicles (particularly in the miniskip sector) are fitted with stabilisers with flat plates.

On many skip lorries, the handbrake operates only on the rear wheels. If roller wheeled stabilisers are over-extended the rear wheels of the vehicle can be raised off the ground thus negating the effect of the rear wheel hand brake. If vehicles are not braked in any other way, as the skip is lifted off the ground, the vehicle may “runaway” on the unbraked front wheels and the rollers of the stabiliser legs.

The majority of vehicles are provided with chocks to prevent such "runaways." However, there is the potential for (a) the surge of momentum when the skip is lifted to overcome the chocks and (b) chocks are not being deployed by operators.

Skip lorry owners and operators should carry out risk assessments that address the risks of "runaway" vehicles when operating on slopes and being trapped between the vehicle and another fixed objects.

Skip Handlers False' engagement of tipping hooks on 'builders' skips

This safety advice highlights a potential danger whereby fabrication of the skip can result in a lip on which tipping hooks may 'falsely' engage and provides advice on corrective actions.

Background

It is a common arrangement for skips to be suspended by four chains attached in pairs to two loading arms on the lorry which straddle the skip. The loading arms are hydraulically actuated such that they either rotate forwards to lift the skip onto the lorry or backwards to off-load the skip onto the ground.

To tip-out a skip, the process is similar to off-loading except that a pair of tipping hooks, which are mounted towards the rear of the bed of the lorry, are raised and as the skip is pulled over them they engage on the tipping bar on the end of the skip near its base. As the lifting arms continue to rotate, the hooks hold the front end of the skip such that it begins to rotate and eventually reaches a near vertical position causing the load to slide out of the skip.

There are no nationally established standards (e.g. British Standards) for the manufacture of this type of skip which are generally fabricated from steel plate. Often the base plate extends beyond the end plates producing a lip. A hazardous situation can occur if the tipping hooks fail to engage with the tipping bar but instead 'snag' on the lip. This false engagement of the hooks is not necessarily visible from the operating position and, superficially, will behave like a proper engagement until an angle of tipping is reached whereby the hooks are pushed off the lip. When the skip is no longer restrained it will swing-out over the back of the lorry, the momentum of which could lift the front of the lorry off the ground.

The potential for the lorry to overbalance is increased where there are shortcomings in the deployment, positioning or function of the stabilisers.

The immediate risk is to the operator because of their close proximity due to the controls being typically positioned at one side of the lorry.

Tipping hook snagged on base plate lip

Action required:

- Existing skips should be examined and where a protrusion exists that could give rise to false engagement with the tipping hooks it should be removed from that area and the fabrication made good.
- Driver-operators need to perform a visual check to ensure the proper engagement of the hooks on the catch bar during tipping-out.
- Driver-operators need to routinely check skips and skip loader vehicles and to report any defects.

Every year, moving skips cause death and serious injury. You, your workmates and bystanders are at risk. Before you start work each day, check your vehicle and lifting equipment and report any faults.

- Ensure any load/skip is secure and chains are correctly stowed
- Check you have your safety gear, especially high- visibility clothing and boots
- Minimise reversing - both the amount you do and the distances you travel
- Make sure your reversing area is clear

- Make sure your reversing aids - cameras, mirrors, alarms are in working order
- Look out for bankspersons
- Look out for overhead cables/obstructions
- Beware of pedestrians at all times
- Wear your safety gear. High-visibility clothing is essential
- Ensure no pedestrians are nearby during reversing and loading/unloading
- Avoid trapping between the skip and vehicles/walls
- Sheet/unsheet safely – do it from ground level wherever possible avoid climbing on the vehicle.
- Check before moving the skip that hooks, chains lugs, bars etc to be fully engaged
- Chains should not be twisted or knotted.

It is most important that

1. loads carried on vehicles are adequately secured so there is no likelihood of them moving or falling off,

2. particular attention is paid to the dangers of high loads,

3. the design and construction of the vehicle is suitable for the load(s),

4. the maximum expected floor loading is ascertained in order to ensure that the floor and supporting members are adequate,

5. the load is so arranged not to obstruct the driver's field of vision, including rearward vision through the driving mirrors,

6. if practicable, the load is placed in contact with the headboard,

7. in order to achieve maximum stability, the load is placed so that the centre of gravity is kept as low as practicable, and near to the vehicle's longitudinal centre line,

8. the weight of heavy loads of small dimensions is distributed across the vehicle plat form by use of load spreading devices,

9. the load is checked frequently for security during the journey,

10. equipment used for securing loads is regularly inspected for wear or damage, The machine operator will usually be responsible for the safe loading of the machine (under the directions of the transporter driver) and for the necessary attachment stowage, locking of brakes and machine safety devices.

1. The loading unloading area is large enough to accommodate the movement of the machine without striking obstructions or causing hazards to others.

2. the transporter is on firm level ground and correctly positioned with its brakes on.

3. Any ramps are secure and long enough to keep the ramp angle low, If required. the transporter should he blocked, as a precaution against it tipping during the loading/unloading, making sure that, when loading the packing placed below the transporter is sufficiently thick to prevent tipping, but not so thick that it would jam in position when the machine is loaded.

4. the machine transmission. clutches. brakes, etc. are working correctly. A machine that has broken down will require the assistance of the transporter loading winch.

When loading or off-loading the machine, the machine operator should ensure that:

1. the machine is lined up with the ramps so that the hazardous procedure of turning the machine whilst on the ramps does not become necessary.

2. the loading or unloading is carried out at the slowest possible speed, particularly at any point of balance

3. any necessary movement of the machine whilst it is on the transporter. (e.g. to centralise it), is carefully executed.

When a machine is loaded on to a transporter and positioned to the satisfaction of the transporter driver, every precaution should be taken to ensure that the machine cannot change its position during transit. For example.

1. The brakes are applied

2. The machine is securely tied/lashed

3. Any loose items, spare buckets etc are securely lashed

360⁰ EXCAVATORS (DIGGERS)

Generally there are two types of 360° hydraulic excavators, one being mounted on tracks and the other mounted on wheels (rubber duck). You will also find rope operated excavators (Draglines) which are generally mounted on tracks.

It must always be ensured that when the machine is being operated in confined places or near other site personnel there is clearance of at least 600mm for tail swing, the danger area must be barricaded if necessary.

If it is necessary for anyone to go into the machines working radius whilst it is working then the machine operator must he made aware by signals or other means such as radio before doing so. No person should be permitted at any time to be within the machines working radius without obtaining permission from you the operator.

No excavator bucket or load should he slewed directly over personnel, work huts or vehicle cabins. Vehicles should be loaded over the side or rear and the material should not be dropped from an unnecessary height.

The manufacturer's recommended bucket size must not be exceeded. It may be possible to lift the load with the bucket in close to the machine at ground level but as the load radius and elevation Increases, the lifting capacity of the machine decreases.

Dangerous overhangs must not he created on a high work surface, the wheel, or tracks of the machine should be positioned at 90° to the workface to enable quick withdrawal if necessary. In excavating the type of soil should be taken into account in determining a safe position for the machine.

If operating on a gradient cannot be avoided, it must be ensured that the working cycle is slowed down, that the bucket is not extended too far in the downhill direction and that travel is undertaken with extreme caution.

A large excavator must never be permitted to travel in a confined area, or around people without a banks person to guide the driver, who should have the excavator attachment close to the machine with the bucket just clear of the ground.

On wheeled excavators it is essential that the tyres are in good condition and correctly inflated. If stabilising devices are fitted they should be used when the machine is excavating.

Excavators should only be driven by fully trained, competent operators who have been authorised to do so and any operation should be accompanied by a suitable risk assessment. The nationally recognised qualification for competence within the UK is an NVQ Level 2 in plant operations.

For lifting operations, operators must also provide proof of both training and competence for using excavators as cranes. This will include

knowledge and skills relating to: pre-lift checks; differences between various lifting accessories or machine attachments (e.g. quick hitches); load connection procedures; interpreting the machine's lifting duties limitations at varying radii, over the front, side and rear of the machine travelling with a load; and load disconnection procedures.

Pedestrians must be segregated from the 'operational area' of the excavator and its transport routes; these routes should have good clear signage and appropriate traffic control measures. The use of hands-free mobile technology should be considered to maintain good communication at a safe distance with site management and/or slingers during any lift or carry operations.

Site managers should be knowledgeable with regards to safe lifting operations and must take an active role in planning, monitoring, controlling and managing all lifting operations on site. The lift plan and method statement should be communicated to all operatives involved.

Vehicle routes should avoid significant obstacles, uneven ground and inclines, particularly if across the direction of travel. Where the route is near to a drop, such as an excavation or embankment, extra support or barriers should be provided for the edge of the route.

Before using an excavator as a crane, a thorough risk assessment should be undertaken to determine whether alternative work processes could be used to avoid lifting operations or whether a different item of equipment would represent a safer choice.

The operator has a duty to conduct maintenance and inspection at the start of each working shift (for example, of chains, shackles, hooks and slings) to ensure they are suitable for the lift, clearly marked with a safe working load and in good working condition. A full and complete record of all maintenance and inspection undertaken must be kept and any defective machinery or lifting gear found should not be used under any circumstance.

The excavator must always be operated within its capability and if in any doubt, the operator should consult with the operations and maintenance manual supplied by the Original Equipment Manufacturer (OEM).

Excavators that are used for lifting are subject to a thorough examination and test at least every 12 months. Machines must also be fitted with an audio-visual safe load indicator and lift capacity at various radii should be clearly stated. Lifting eyes should be closed, not open and rated by the OEM.

When travelling, machine stability will be improved by reducing travel speeds, crowding the load into the machine as far as is safe/practicable and keeping the load low to the ground. When placing the load into position, engine revs should be lowered to tortoise mode and the machine's boom and dipper manipulated to move the load into position. At all times, the load must remain freely suspended.

Mini Excavator Stability

In some instances, the operator has escaped with minor injury, while in others, a major injury has been sustained either by the operator or other(s) working near to the machine.

Certain factors have been identified as having contributed to these incidents, for example: operating the machine on an incline; slewing the machine at high revs, which can lead to instability from machine inertia and / or from the rapid change in the machine's centre of gravity; operating on uneven or unstable ground conditions; and the collapse of excavations or trenches under the machine track.

Operators should wear appropriate personal protective equipment. Restraint mechanisms such as seat belts, where provided, must always be used during machine operation.

The mini excavator should be maintained so that it is working safely and efficiently and a machine inspection should be conducted by the operator at the start of each shift, with an appropriate record of this kept. Any maintenance or inspection undertaken should follow guidance as laid out by the Original Equipment Manufacturer (OEM).

Any safety devices fitted to the mini excavator, such as a safe load indicator or buried service detection equipment, must be used and monitored at all times. The lifting capacities for the mini excavator, as issued by the OEM, must always be observed.

The mini excavator should be suitable for the task to be undertaken. For instance, machines with extending tracks may afford greater stability in some circumstances.

All operators and managers should acknowledge that there is no such thing as safe working on an incline. Where this is proposed, other methods of working should first be considered to 'design out' the risks

and where this is not possible, then it may be appropriate to utilise a larger and more stable machine type. The decision taken will depend on the findings of the associated risk assessment.

Site personnel should be excluded from the 'operational area' of the mini excavator. For a static machine operating on firm level ground, this area is deemed to be the maximum reach of the excavator bucket plus at least 2m. If the machine is operating under more extreme conditions, such as on an incline, then a risk assessment may require a greater distance to be maintained.

Before operating the mini excavator, the ground conditions should be checked to ensure that they are suitable for any load imposed upon them by the machine and its operator. Safe paths of machine travel should also be considered, avoiding significant obstacles, weak ground and severe inclines. If, in addition to their own visual inspection and experiential judgment, operators need further information (for example, relating to ground bearing capacity or site topography), then this may be obtained from engineers, local authorities or other statutory bodies.

When assessing ground conditions and machine stability, appropriate consideration should be given to prevailing or expected climatic conditions, such as wind, rain, snow, or ice.

180⁰ BACKHOE LOADERS (DIGGER LOADER)

Generally the precautions applicable to 360⁰ excavators are common to 180⁰ digger loaders. In addition the following should be noted:

- When the front shovel is being deployed, the backhoe attachment should be locked in the travel position
- It is essential that the tyres are in good condition and correctly inflated
- When operating the backhoe in poor ground conditions, the stabilisers tend to sink into the surface of the ground, reducing stability, frequent checks should therefore be made on the stability of the machine
- The loading shovel should always be lowered to the ground to stablise the machine when the backhoe is being used
- Ensure all vehicles are loaded correctly with materials in the centre of the vehicle body to avoid the vehicle being damaged or overturning during unloading.
- Be aware of machine bounce during faster travelling as this can affect the control and stability of the machine.
- Don't carry passengers on the machine or in the bucket, this is bad practice and should be avoided, just say no to persons that ask and report such events to your employer or supervisor.

LOADING SHOVELS

The loading shovel is a versatile machine manufactured in an extremely wide range of types and sizes. The range of work It is capable of performing is equally wide and varied.

The loading shovel can be mounted on wheels or tracks but generally the precautions which apply to one type of loading shovel are common to them all.

In particular the following should be noted:

- On wheeled machines it is essential that the tyres are in good condition and correctly inflated
- To ensure adequate machine stability and operator visibility, the bucket should be carried low while travelling
- When climbing steep inclines with a' full bucket. travel should always be made with the bucket leading
- The speed of travel should always be adjusted to suit site and job conditions
- Harsh braking should be avoided, particularly when the bucket is full.
- Loading shovels spend almost 50% of their working cycle reversing. Operators must look to the rear before and during reversing the machine
- Coasting' machines down inclines is bad practice, and should never be permitted
- Where there is a ROPS cab, seat belts should he used
- Loading vehicles on cross slopes is hazardous and should he discouraged
- Don't carry passengers on the machine or in the bucket, this is bad practice and should be avoided, just say no to persons that ask and report such events to your employer or supervisor.
- Be aware of pedestrians and ensure you know where the lorry driver is at all times.

SKID – STEER LOADER

Employers and employees should be alert to the dangers of operators being crushed by the lift arm of a skid-steer loader. The arms and bucket tilt mechanism on skid-steer loaders present potential crushing and shearing hazards when they are moving. Cab fronts are not necessarily enclosed and often entry/exit is via the cab front. Hence, operators can potentially be exposed to these hazards if they lean out of the cab front or, as they exit the cab on front exit/entry machines. People who approach the machine whilst it is operating or perform maintenance are also at risk from the crushing hazards.

One of the safeguards that skid-steer manufacturers install, to help reduce the risk of crushing, is an interlock to prevent unexpected or inadvertent operation of the arms and tilt mechanism. This is normally achieved by the operator raising some form of restraint bar or arm rest which is linked to the machines hydraulic circuit.

It has been known for these safety features to fail thus leaving the controls active, i.e. the operator could still operate the lifting arm and tilt mechanism using the pedals or controls even though the restraint bar had been raised. This could occur if the foot pedals had not quite returned to their neutral position before the restraint bar was raised. When not in neutral, it was found that the solenoid could not engage with the valve's spool. Two potential causes that would prevent the pedals returning to neutral, as follows:

- Even on an adequately maintained machine, the operator may inadvertently rest their foot on the pedal (foreseeable given the relatively restricted space) thereby holding it off neutral.
- Poor maintenance or a build up of material can increase resistance on moving components of the pedal linkages. This resistance overcomes the spring force needed to return the pedals to neutral.

When using any skid-steer loader it is essential that operators are properly trained and that they operate the loader safely in accordance

with the manufacturer's operating manual. However, if a skid-steer loader is identified as having this particular type of interlock (i.e. direct link to a hydraulic valve), operators also need to be made aware of the potential for it to fail to engage and reminded that they must:

1. Always lower the bucket or attachment so that it is flat on the ground before they (or anyone else) approach the danger zone created by the arms and bucket tilt mechanism.
2. Always ensure that not only is the safety bar raised but that the pedal interlock has actually engaged before anybody approaches the danger zone, i.e. ensure that the pedals are not still active.
3. Daily check the function of the interlock. This will require the operator to:
    - raise the lift arms then partially lower them;
    - release the pedals completely;
    - raise the safety restraint bar;
    - attempt to lower the lift arms keeping the restraint bar raised.

If these pedals are found to be active with the restraint bar raised it is likely that the pedals are not returning to neutral. This is a potentially dangerous fault and the machine must be taken out of service until the fault is rectified.

Those with responsibility for maintenance of skid-steer loaders should identify whether the machine if fitted with this type of direct linked interlock. The maintenance regime must include checking/maintaining the interlock mechanisms. In particular;

- Ensure that the areas around the pedals, pedal linkage, valve block and spool valve are clean
- Ensure that the pedal bearings and pedal shaft are lubricated and check for smooth operation.

Maintenance personnel also need to be made aware of the potential for this interlock to fail to danger and should be reminded that they must exercise greater care when undertaking maintenance which should be done in accordance with the manufacturer's recommendations.

TRENCHERS

The most common hazards involving trenching machines are underground services, electric cables, pipes and gas mains.

It is essential to determine, before digging commences that specific precautions must be taken to ensure safe working. On no account should trenching work be carried out in the known locality of underground services without contacting the respective local authorities for information and position of the services.

Many trenching machines are fitted with a safety – slip clutch on the digging mechanism which halts the drive when an obstruction, e.g. a boulder is encountered.

Should the slip clutch engage it is essential that the driver disengages the digging mechanism before attempting to remove the obstruction so as to prevent the mechanism re-engaging inadvertently, thereby injuring the driver whilst removing the obstruction.

GRADERS

The motor grader is a machine used principally for shaping and finishing rather than digging or transporting. It can form shallow vee ditches, batter shallow banks and camber earth road surfaces; its primary function is usually the maintenance of haul roads, e.g. for dump trucks and scrapers. Its blade can he used as a bulldozer to a limited extent.

A grader is essentially a high speed machine, and its speed of operation must he adjusted to suit site and job conditions. It is important that the operator is alert to other road users, particularly as much of a grader's working cycle is spent in reverse.

Although designed for work on slopes, such work can be hazardous in wet conditions. Many graders are provided with front wheel lean. articulated steering, or wheel offset· steering. These facilities should be used with caution on sloping ground and near excavation edges.

If the grader is working on a road which is used by other traffic. e.g. a scraper haul road, then clearance flags should he fitted on the blade; lights and other warning device, such as "slow moving vehicle" notices may also be required.

When working near the outer edge of a side hill road, the blade should be extended towards the hazard. When scarifying across a slope, the blade should be positioned across the machine to provide some protection against tipping.

BULLDOZERS (CRAWLER TRACTORS)

When fitted with a blade the machine excels in bulk earthmoving. It can he used to clear boulders and large rocks. fell and clear trees and scrub and general clearance and site leveling. It can also serve as a primer mover to pull or push towed or motorised scrapers.

When employed a, a dozer, the machine spends a considerable amount of its working cycle reversing. Being bulky, noisy in operation and with restricted operator vision this calls for the strictest control and supervision of both the machine and nearby site activities.

Crawler tractors are designed to work on sloping and uneven ground, however, such work on wet. rocky or frozen gradients can prove hazardous; the track pads fill and allow the machine to slide out of control downhill regardless of the direction the machine is facing or attempting to move.

Slopes on “soft fill” can be particularly hazardous because the lower track sinks deeper than the upper one.

When employing a dozer to clear material from the top of a ‘soft fill’ tip or stockpile, it must always be ensured that a mound of material is kept above the edge of the tip and that the machine approaches the edge of the tip with extra care. The extra height of material which should be just back from the tip edge provides a safety barrier.

When travelling, the dozer blade should he kept at its lowest possible position to allow maximum operator vision, and machine stability.If a tractor dozer is employed on clearing scrub or felling trees it should he provided with adequate driver protection Falling Object Protection Structure (FOPS) cab.

SCRAPERS

There are a wide range of scraper types and sizes, they may be towed behind crawler tractors, or be self-propelled, the latter being powered by one or two engines.

Generally the precautions and hazards applying to one type are common to all. Motorised scrapers are essentially high speed movers of soil, requiring well maintained haul roads, both for peak efficiency and safety.

A haul road should be sufficiently wide to accommodate the traffic using it. If haul roads cross and the volume of traffic warrants it, crossing' should be manned or controlled by lights.

When two or more scrapers are working on the same Job, a minimum distance should be kept between them.

Although scrapers may he operated safely on gradients work on steep gradients should be avoided if possible. Should such work be unavoidable, then scrapers with minimum overhead structures should be used. Bowls should be carried low at all times and not overfull.

Turns should he made uphill where possible and downhill turns made gradually, preferably with the bowl scraping on the surface of the ground.

Self-propelled scrapers, in most cases are unsprung and should not be' travelled at high speed over uneven ground and they should always be kept in gear (or as stated in manufacturers guidance) when travelling downhill, if an exhaust brake or retarder device is fitted to the machine, it should he used appropriately.

While travelling, with or without a load, the scraper bowl should be high enough to avoid collision with the ground or objects on it. Stability on turns is increased by keeping the bowl low.

Dumping soil material on an embankment or fill is best done in thin layers (appropriate to the material), this provides for better compaction and a more even surface. It is also important that the edge of the embankment or fill is kept higher than the centre reducing the chance of the scraper sliding off the slope.

Servicing and repairing scrapers can be particularly hazardous unless proper precautions, are taken. For example, when changing the cutting edge, both the bowl and the apron should be securely blocked and, if work is to be carried out behind the tailgate (ejector), then it must be blocked against moving back under spring pressure.

MOBILE ELEVATED WORKING PLATFORMS (MEWP)

Also referred to as cherry pickers.

More people die from falls at work than from any other cause. The use of mobile elevating work platforms/powered access equipment has been a major factor in the reduction in falls accidents. For temporary work at height this kind of equipment is often the safest solution. However there are currently under investigation a number of fatal and serious accidents where operators have become trapped between the guardrails or other equipment on the platform and adjacent obstructions.

"It should not be assumed that qualified staff, new staff etc, are competent in the use of such equipment, therefore it is a legal requirement that no one should be allowed to work at any equipment or machinery unless they have received adequate training where necessary and have demonstrated competence".
You could be killed if you work near overhead power lines, treat every power line as live until further controlled information is received, working near overhead power lines refer to H & S document GS6, it states that you keep away 9m from wooden poles and 15m from steel pylons.

- Always inspect machine before use
- log and report faults to your supervisor
- Make sure you are trained and authorised to use the machine
- Wear a harness when using the machine (see reference 'working over water')
- Make sure you have received instruction on wearing a harness
- Read your operators manual for safe use
- Stay clear of overhead power lines
- Do not use in windy conditions use a hand-held anemometer for measuring wind speed (Beaufort scale)
- In windy conditions roof sheets can act like a sail and can seriously affect the stability of the platform resulting in overturning

Beware of a wind funneling effect between buildings.

Beaufort Scale

Description of wind	Specifications for use on land	mph	m/s
D Calm	Calm: smoke rises vertically	0 – 1	0 – 0.2
1 Light air	Direction of wind shown by smoke	1 – 3	0.3 – 1.5
2 Light breeze	Wind felt on face; leaves rustle; ordinary vanes moved by wind	4 – 7	1.6 – 3.3
3 Gentle breeze	Leaves and small twigs inconstant motion; wind extends light flag	8 – 12	3.4 – 5.4
4 Moderate breeze	Raises dust and loose paper; small branches are moved	13 – 18	5.5 – 7.9
5 Fresh breeze	Small trees in leaf begin to sway; crested wavelets form on inland waterways	19 – 24	8.0 – 10.7
6 Strong breeze	Large branches in motion; whistling heard in telephone wires; umbrellas used with difficulty	25 – 31	10.8 – 13.8
7 Near gale	Whole trees in motion, inconvenience felt when walking against wind	32 – 38	13.9 – 17.1
8 Gale	Breaks twigs off trees; generally impedes progress	39 – 46	17.2 – 20.7
9 Strong gale	Slight structural damage occurs (chimney pots and slates removed)	47 – 54	20.8 – 24.4

Users of scissor lifts are being urged to make daily safety checks on their machines after five people were killed in three separate incidents when they overturned.

A safety alert was issued by the Health and Safety Executive to warn construction companies who use, or lease out, specific types of scissor lifts, to ensure that safety critical components are working correctly.

In all three fatal overturn incidents in Europe over the past four years:

- the oscillating axle which allows the machine to be driven on uneven ground with the platform in the transport position failed to lock when the platform was raised.

- the lift/drive interlock system did not work allowing the platform to be elevated above 6.7m without the stabilisers being deployed.

Owners of specific types of scissor lifts are being advised to ensure that the oscillating axle lockout system and the lift/drive cut out switches are checked before the machine is next used and that users complete daily inspections and function testing of both elements.

FORKLIFT TRUCKS

The guidance within this booklet on operator safety applies to all machines including forklift trucks. No person should operator a FLT unless they have received adequate training on the type of machine used and specific training on the loads and work area to ensure a safe system of work is maintained.

Within the construction industry, Telescopic Handlers would be the most widely used but a lot of the safety aspects discussed here can be applied to other machine such as Side-Loaders, Counterbalance Forklifts, Reach Trucks, Rough Terrain Counterbalance etc.

TELESCOPIC HANDLER

Telehandlers are one of the most versatile pieces of construction site equipment, making a significant contribution to the efficient delivery of the construction process. The development of telehandlers in both capacity and reach to the stage where they are able to carry out many of the tasks traditionally undertaken by mobile and tower cranes introduce new challenges. Unfortunately the very versatility that makes them so useful also provides scope for unsafe use; this has led to a significant number of serious accidents, tragically including some fatalities. Not only do these accidents have a terrible cost in terms of human suffering, they also have a significant financial cost for all concerned. Consequently there is a very strong business case for improving safety performance.

As with all lifting equipment, safe operation of telehandlers depends on a number of factors including the selection and maintenance of the telehandler, the planning and supervision of its use, and the competence of the operator. If any of these are deficient, the risk of a serious accident increases significantly and it is therefore essential that site managers ensure that all telehandler operations are planned, supervised and carried out safely by competent people.

Safe Use of Telehandlers

Two of the most significant hazards associated with telehandler operation are lateral stability and visibility.

Lateral stability

As a load on the forks of a telehandler is lifted, the centre of gravity of the whole machine rises. This does not matter if the machine is level: if however the machine is on a cross slope, the centre of gravity will move towards the tipping line as the load is raised with a risk of overturning. This effect is exacerbated when the telehandler is driven with a raised load. Lateral stability is also an issue when lifting and travelling with suspended loads as the load may swing, adding to potential instability.

Visibility

Restricted visibility when the boom is raised or when large loads are carried, plus poor segregation have been identified as a major cause of accidents involving pedestrians and telehandlers. Telehandlers are often fitted with mirrors to improve visibility and the operator's awareness of people in the vicinity of the telehandler. These aids should be in good working order and properly adjusted. It is the operator's responsibility to check the condition of all secondary aids to visibility and **NOT TO USE THE MACHINE** if they are not present or not working correctly. It is the Supervisor's responsibility to fully support the operator in this action.

Whilst the Principal Contractor has the primary responsibility to ensure adequate segregation and the Supervisor must ensure that it is enforced, it is remains the operators responsibility to look around and check for the absence of pedestrians before moving and whilst manoeuvring and travelling. If the operator cannot see clearly, they should seek assistance or leave the cab to look around to confirm it is safe to continue the procedure.

Wherever possible pedestrians should be segregated from moving vehicles, including telehandlers. Visibility aids and operator vigilance are valuable control measures, but segregation should always take priority. Thought should also be given to the operator‘s ability to keep the load

in view at all times, particularly with high reach telehandlers where the operator may have difficulty in judging distance at height.

A 36-year-old man was killed whilst operating a telehandler. It is suspected that the man was leaning through the broken right side window aperture, when he was crushed and fatally injured by the descending boom.

This is the third similar fatal accident in the last 7 years. In the two earlier incidents the operator is thought to have been leaning out of the window aperture and to have also leaned on the boom control joystick inadvertently lowered the boom onto themselves. Once trapped under the boom in this way they were then not able to stop it.

The side window on variable reach trucks is designed as a guard to prevent operator access to the boom. If the glass screen is broken or missing, operators may lean out of the window aperture and can inadvertently lower the boom onto themselves. They may not realise the danger they face, and if the boom does lower onto them, that they may not be able to stop it.

Action required

If this side glass screen is broken or missing the machine should be removed from use until it has been replaced. Machine owners, users and operators should be warned of the dangers of operating their machines with the side screen broken or missing, and the importance of reporting such damage as soon as it occurs.

Users are also reminded of the importance of carrying out daily checks of the condition of their trucks, and that the condition of the cab windows is part of these inspections.

The Effect of Tyres on Stability

Tyres play a vital part in the stability of telehandlers. Stability can be adversely affected by issues such as mixing of tyres from different manufacturers, incorrect ply rating, differences in diameter of tyres on

the same axle due to differential wear, low tyre pressure, high tyre pressure, uneven tyre pressure and poor repairs.

Telehandler Attachments

Telehandlers are very versatile machines which, in addition to lifting of unit loads on forks, can be fitted with a wide range of attachments such as:-

- Sideshift Forks
- Sweepers
- Block Grabs
- Tipping Skips
- Crane Hooks
- Crane Jibs
- Buckets - General purpose and material handling
- Integrated Access Platforms

It is essential that all attachments are compatible with the telehandler with which they are to be used. Where necessary and appropriate, the telehandler manufacturer should be consulted where third party attachments are to be used.

Fitting of Attachments to Telehandlers

When fitting attachments to a telehandler the following points should be observed:-

- The attachment should be compatible and approved for use with the telehandler;
- Particular care should be taken when using fork extensions as these will tend to
- move the load centre out from the fork carriage, altering the rated capacity of the
- machine and increasing the load on the fork carriage levelling system
- The operator should be familiar with the attachment process for the specific make and model of telehandler

- Fitting and removal of attachments should be carried out in a suitable safe area
- Care should be taken to ensure that hydraulic hoses are depressurised before they are disconnected

Before raising the telehandler boom and attachment the operator should ensure that any locking device (this will depend on the type and make of quick hitch) is in place and secure. This will generally involve the operator getting out of the cab, after applying the brake, to physically ensure that the quick hitch is securely locked before starting work with a newly attached attachment.

Rotating Telehandlers

Rotating telehandlers have all of the features of the non rotating type with the addition of a rotating or slewing superstructure on which the boom and operators cab are mounted.

These machines also have outriggers fitted at either end of the chassis which enable the entire chassis to be lifted clear of the ground for maximum stability.

The main advantages of these machines over the non-rotating type is compact chassis size, enhanced lifting height, increased stability and ease of placing loads without moving the chassis.

Familiarisation

Telehandlers and attachments come in a variety of shapes and sizes with significant differences in operating controls and characteristics. It is therefore essential that operators and supervisors are given adequate familiarisation on an unfamiliar type or model of telehandler and/or attachment before they begin operations.

Familiarisation may be carried out by:-

- An experienced person employed by the machine owner or;
- A representative of the machine or attachment manufacturer or supplier or;
- Any other competent and authorised person.

The person giving familiarisation should have been assessed by a suitably trained person to ensure that they are competent to do so.

All familiarisation should be recorded by both the provider and the employer of the operator.

Familiarisation for the operator of any machine should include the following:-

- Layout and use of controls;
- Identification of specific areas of risk whilst using the machine and attachments;
- Machine specific safe working procedures for connection and disconnection of attachments;
- Machine specific visual inspections of the machine or attachment;
- Machine specific “pre start checks” and basic maintenance requirements as recommended by the manufacturer.

Fork mounted platforms

Platforms for use on the fork arms of a truck shall have fork pockets on their underside that will accommodate the fork arms spaced at the widest practicable distance apart without excessive clearance between the pockets and forks.

A positive locking device, e.g. behind the heels of the fork arms, shall be included on the platform to retain it on the truck when in use. Any loose components associated with the locking device shall be secured to the platform so that they cannot be mislaid when the platform is not in use.

The fork pockets shall fully enclose the fork arm along the full length of the platform and they shall be fully enclosed along their underside. The working platform manufacturer or supplier shall provide instructions to allow the platform to be fitted and properly secured.

Preventing access to moving parts

After fitting the working platform to the truck, the user must ensure that the screens or guards on the platform provide adequate protection for people being carried to prevent the risk of trapping and/or crushing by the mechanisms on the truck.

Truck operator

The truck operator shall remain at the controls of the truck while the platform is in an elevated position.

Truck operation

It is essential that the truck/working platform combination shall only be used on firm, well maintained and level surfaces. Gradients and uneven or inconsistent ground conditions can affect the stability of the truck. The parking brake shall be applied whenever the working platform is elevated & where applicable, the transmission placed in neutral before elevating the platform.

Communication

There shall be adequate communication between the truck operator and persons on the platform especially when raising and lowering. Hand held communication devices or a system of recognised signals should be used where communication is difficult.

Training

People expected to work on platforms and truck operators shall be aware of the restricted uses. They should be properly trained and given full instructions on safe systems of working with platforms, including the action to be taken in the event of an emergency and the dangers associated with leaning out of the working platform and overhead cables.

Key points are: Segregation of work, Maintenance, Stability of the truck/working platform combination, Protection from moving parts, Safety harness anchorage points, Rails and toe boards, Self-closing gate that cannot open outwards, Hand holds Warning signs, and Identification plate.

Additional information to be supplied by the platform manufacturer/supplier

Information shall be supplied with the platform to allow the user to identify appropriate trucks that can be safely used with it. Information shall be supplied with the working platform to inform users that when a side shift attachment or tilt mechanism is provided on the truck, to which the working platform is attached, the side shift shall be locked in mid-position and the tilt mechanism locked so that the floor of the platform is horizontal when in use. This may be achieved, for example, by fitting a device that disables the controls to the mechanism or by mechanically locking the controls so that they cannot be inadvertently operated.

DUMP TRUCKS

The following guidance should be implemented in relation to the safe use of Dump Trucks, this would also apply in most cased to tipper lorries and tractors and dump trailers.

- Keep to the vehicles load limits, don't overload
- Turn corners with care as you could overturn
- Give way to loaded vehicles
- Look out for overhead power lines
- Ensure the vehicle or trailer body is lowered before moving
- Keep a safe distance from other vehicles
- Observe speed limits and other vehicles
- Allow more braking distance when fully loaded
- Use brake retarders/exhaust brakes as designed
- Travel at a speed consistent with site conditions
- Obey the signallers instructions
- Do not travel with the body raised unless for shunting forward to clear material from the body.
- Never allow loading to take place over your cab
- Never carry passengers unless there is a proper seat and it is recommended by the vehicle manufacturer
- Never work or allow anyone to work under a raised body or cab unless a proper safety bar is fitted as designed.
- Never reverse unless you are sure it is safe to do so
- Look out for person using mobile phones as they may not see or hear you, look out for other vehicles and persons in the area.
- Do not remain in your cab during loading unless a proper approved overhead protection.

DEMOLITION MACHINES

The guidance in relation to plant should also be applied for demolition plant. Most demolition plant is based on excavator type tracked machines with high or very high reach used with specialist equipment and attachments such as sheers, jaw crushers etc., these machines have replaced the old recking ball that would have been used on rope machines.

Most demolition machines consist of the following:

- High Reach tracked machines
- Tracked Excavators
- Skid Steer Loaders
- MEWP Boom
- Tracked Loading Shovels
- Wheeled Loading Shovels
- Dump Trucks
- Crusher and Screeners

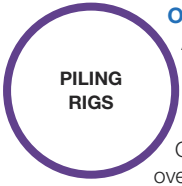
This is not an exhaustive list as other machines may be used as required.

Safety is paramount when using demolition plant especially high reach equipment, accidents happen in most cases due to operators not following safe operating procedures. Machines can be damaged if parts of the building are undermined and materials fall onto the jib or boom of the machines, this can cost high amounts of money to fix the machine as equipment can be twisted, hydraulic hoses bursted not counting the down time and the cost of transporting other machines in to finish the job.

- Look out for overhanging parts of buildings that could collapse onto you or the machine. Use higher equipment or approach from another side if possible.
- Look out for overhead power lines or other services.
- Keep persons clear from the work area as a collapse could be fatal even small materials falling from height can be fatal.

- Look out for children as they are fascinated by large machines and demolition, the site should be secure to prevent this.
- Look out for other machines working on the site such Skid Steer Loaders etc. and warn other machine operators if you sense danger
- Ensure all services such as gas mains, electrical cable or appliances have been deactivated or made safe before work commences.
- Be aware if handling equipment or material as Rats will have been in the area, Rat Urine on the skin can be fatal, so were the correct gloves or hand products as required.
- Don't operate any machine unless you have been trained and authorised by your employer.
- Don't carry passengers on machines unless a proper seat has been provided by the machine manufacturer.

- Watch out for nails and other sharp material when walking over the site.
- Report any near misses or damage to your supervisor
- Follow the recommended guidance in this booklet in relation to machine maintenance and your operator's manual.



Operator requirements

As discussed before the operator must be trained and competent and authorised to drive by his/her employer.

Operators need to be told of the dangers of overhead power lines and other obstructions; hazards below the ground must be intentified before any work takes place.

Operators should work with a banks person were possibly and follow signals as agreed, follow machine inspection guidance as described earlier in this booklet.

Site requirements

The site should be firm, dry, flat and level, and capable of sustaining the load of the piling rigs which typically will weigh up to 35T. Access roads must be suitable for normal delivery vehicles.

Danger zone around Rigs

Everyone working around a working piling rig is in danger. The hazards are so obvious that you might expect that everyone will take extra care but this is not enough and employers must take extra precautions. Accidents involving the rig are usually serious and often fatal.

Good Site Management

There is universal agreement that good site management is the most important factor. What does this mean in terms of rig safety? First and foremost an exclusion zone of at least 20 m should be established around the rig. The zone should be clearly marked. Only people who have to work near the rig should be allowed inside the zone and everyone not essential to the piling operations should be kept outside it.

Use a Banksperson (Banksman)

Many companies with a low accident rate use a banksman to direct all rig movement. The banksman and the driver must work as a team.

Both the driver and the banksman should be properly trained. The rig must never move without instruction from the banksman; but the driver must also take responsibility and should not move if there is any danger to the banksman or any other person. Ideally, the same driver should always work with the same banksman so that they build up trust and understanding.

The authority and visibility of the banksman can be enhanced by providing him with a different coloured high visibility vest - perhaps with the word 'banksman' on it.

Mechanical protection

If there is a possibility that someone might become caught in the auger there MUST be some way to stop the auger from rotating quickly. If there is a possibility that material might fall from the auger a cleaner should be fitted to ensure that all debris is removed at a low level and not carried up the auger where it might fall from height onto people below. Follow proper guidance as discussed in this booklet in relation to working at height.

Visibility Aids

As discussed previously in this booklet some companies have fitted CCTV cameras to the rig so the driver can see people near the machine. Drivers generally like the view that it gives them and a number of companies are very pleased with the results - but it must be noticed that:-

- CCTV is not a substitute for the banksman's instruction - it only provides additional information to the driver and
- the driver has to be trained to *simultaneously* pay attention to the banksman, CCTV and operational requirements.

Less technical and less expensive measures that have been found to be effective (when used with good site management) are:-

- fitting mirrors to the rig (although these must be keep in good order and should not be used to replace the banksman)
- supplying everyone on site with high visibility clothing.

Concrete Pumps

Training of concrete pump operator's should include:

- safety awareness training
- setting the machine up safely in site conditions
- operating the boom safely
- operating within the rated safe working load of the boom
- operating the concrete pump
- cleaning the machine out
- folding the machine up
- working with pipelines
- awareness of the dangers of compressed air
- work adjacent to overhead power lines
- dealing with emergency situations
- working with blockages
- personal health and safety considerations
- pre-driving checks
- driving of the lorry
- necessary daily and weekly checks and maintenance of the machine
- documentation in relation to the job

The training should be to a nationally recognised standard that is measurable. Operator competence can be assessed further by the attainment of a NVQ level 2 in Concrete Pumping.

The concrete pump operator should always be able to show to site management proof of training. The signaller, appointed by the hirer, should be instructed on the use of the code of signals, any communications device supplied and any special risks on the site, e.g. overhead obstructions, etc. The concrete pump operator should be aware of the guidance from experts in relation to the correct height of the boom in relation to the pumping work area as this could have an adverse effect on the concrete strength.

SLINGING AND LOAD HANDLING

Slinging and load handling is perhaps the most vital part of any lifting operation.

Do not get involved in any slinging or elevator operations unless you have been adequately trained and authorised to do so.

Failure to follow this advice could lead to death or injury.

A proper risk assessment must be completed, all slings and equipment must be inspected before use, any faults reported and if damaged removed from service.

Duties include:

- Attaching and detaching the load to and from the base machine
- Using the correct lifting accessories in accordance with the lifting plan or procedure
- Visually checking the lifting accessories for damage before use
- Initiating and directing the movement of the load by giving the appropriate Signals to place the load safely

MACHINE RECOVERY

Due to the nature of the work performed by earthmoving plant, often in unstable ground conditions, it is necessary to consider machine self-recovery (debogging) as part of an operator's duties.

Immediately a machine becomes bogged, the operator should:

- Stop all drive to the tracks or wheels
- Make the machine safe, e.g. if bogged down at an angle, lower attachments towards the "high side"
- Climb off the machine from the high side
- Assess the situation

An operator will worsen the situation by repeatedly driving the machine back and forth until self-recovery is all but impossible. However, most hydraulically powered machines are capable of self-recovery, using the attachments as hydraulic jacks. For example, a tracked hydraulic excavator attachment can he lowered until the track is clear of the ground; the track can then be packed up with timbers or slewed out of all but the worst situation.

If it is necessary to use another machine to push or tow, it is important that the towing point. or the pushing point is chosen carefully: parts which are likely to be damaged by pushing or pulling must never be used.

Machine recovery can be hazardous and the following basic rules must he observed:

- One person only should give instructions (unless an emergency arises)
- All persons must be kept well clear of tow ropes our winch ropes under load
- The recovery vehicle should have a cab to protect the driver from the whiplash of a broken rope
- Persons must never be allowed to work beneath a machine when it is jacked up, either by the machine's own attachment or any other means.
- If a winch is employed, then the winch rope should be at right angles to the drum, and there must always be a minimum of two full turns of rope on the drum or as stated by current guidance
- Tools, not hands, should he used to clear any obstructions
- The load carrying capacity of any chain or wire rope used for towing must he carefully assessed
- Chains or ropes used for towing must not subsequently be used for lifting operations
- A check must be made that all recovery equipment is correctly applied before attempting the recovery

ROAD BUILDING PLANT AND EQUIPMENT

Pavers

It is common practice to spray the machine before laying operations commence. This should be done before the screed heater is ignited.

Tools and equipment should be securely stowed and all working platforms free of obstructions.

It is essential that the machine operator:

- Ensures that nobody is standing on the machine, in the hopper, on the side arms or on the top of the screed before putting the machine into motion
- Never leave the controls while the machine is in motion
- Ensure the hopper is clear except for working material before engaging switches or clutches
- At the end of the working day park the machine so as not to cause an obstruction to road users

It is essential that all persons:

- Stand clear of the screed when it is being raised or lowered
- Stand clear of the hopper sides when they are being raised or lowered
- Never touch or lean on the side arms when the machine is working
- Never enter the hopper when the engine is running
- Never stand in front of the hopper when a vehicle is reversing to discharge its load.

Planers

The operation of planning machines is essentially the removal of old (worn) road surfaces to a controlled depth producing screenings in a granular form which can be recovered and removed from the working site.

It is essential that the planer operator:

- Gives clear warning when he intends to move the planer or put it into operation
- Ensures the way is clear of other persons, vehicles and equipment before putting the machine in motion
- Never leave the machine controls while the machine is in motion
- Co-operates with the screwman , other machinery attendants and the drivers of vehicles removing the screenings from the loading-out conveyor
- Observes and conforms with traffic directional not ices and signs
- Ensures that the doors enclosing the cutters are not opened except when, or until, the cutters are stationery and the engine stopped

It is essential that screwmen and attendants:

- Co-operate with the machine operator and act on any warning or instruction he may give
- Do not walk under the loading-out conveyor whilst the machine is working and discharging into a vehicle
- When passing from one side of the machine to the other, pass always in front of the machine
- Keep their feet clear of the machine while it is planing, particularly at the rear of the drum box
- Wear high visibility jackets, safety helmets and goggles as required
- Supervise drivers reversing their vehicles to below the loading-out conveyor
- Are alert at all times to traffic flow

- Use cones or markers when necessary to preserve a safe working area
- Never remove any machine guard or cover plate unless under the direct instruction of the machine operator

Chipping machines

Chipping machines which operate behind paving machines and in front of road rollers require the following precautions:

- Persons should keep clear of the traversing hopper wheels and track whilst the machine is in motion
- When it is necessary to use the poking tool to reduce blockages or clogging all machinery should be disengaged.

Road rollers

Road rollers include both steel and pneumatic wheeled rollers and vibrating rollers, towed or pedestrian.

Steel and pneumatic wheeled rollers

Before moving, the driver should always ensure that the way is clear of objects and other persons. Rollers spend 50% of their working cycle reversing and drivers must look to the rear during reversing the machine

When a roller attachment is in use. e.g. scarifier, or asphalt cutter, the driver must not give it his whole attention; he must always ensure the way ahead is clear.

Coasting a roller down inclines is dangerous and must never be permitted. If it is not possible to park on level ground then the wheels should be chocked. The hand brake should always be applied when the machine is parked.

Vibrating rollers

Safety footwear should be worn by all operators. When working near kerbs and side-walls operators must beware of impact and collisions.

Where a diversion for pedestrians is necessary it must be properly signed. Pedestrian rollers should be fitted with a “dead man’s handle to prevent crushing injuries.

When unloading/loading from a trailer, the latter must have effective brakes, or be suitably chocked, with legs positioned to prevent tilting.

Be aware of steel drums against a steel low-loader floor as the machine could slide and overturn.

CRUSHERS AND SCREENERS

General

A safe system of work must be established so that blockages can be cleared without the necessity for operatives to climb or lean over guardrails.

All access ways must be fitted with guardrails and adequate working platforms provided. There must be efficient isolation systems.

Operatives should always wear a safety helmet and where for example cleaning of a crusher is necessary a safety harnesses must be worn if the work is at height, the risk assessment must be in place and the method statement followed.

Raw materials are filled into the crusher by excavators, loading shovels, tippers, dumpers, etc. Machines and vehicles should only be permitted to fill the crusher with materials when the area is clear to do so and/or a signal has been given.

All plant attendants working or moving within the area must be alert to the movement of vehicles and aware of the signals.

No persons should enter a hopper to release any blockage unless a proper risk assessment has been done and a method statement in place, a permit to work should be in place and another person should be in attendance outside controlling the operation.

Control of the process is the duty of the crusher attendant or supervisor and he/she should be responsible for giving signals. No person should climb on to any screen or feeder except when the machinery is stopped and an approved system followed as detailed before.

No person must be allowed to ride on a conveyor and adequate steps must be taken to prevent anyone doing so.

If the conveyor is erected on an inclined plane. persons should not walk underneath it and barriers should where practicable be erected to prevent them doing so.

However, where there are good reasons why people have to pass underneath the conveyor, they must be protected from the danger from any falling materials by kicking boards or other suitable barriers, or the installation of safety nets etc.

Guards must be provided at all pulleys, belt nip points and at all idlers where movement of the belt is sufficient to create the risk of trapping.

Belt conveyors should be fitted with emergency trip wires or stop buttons which must be fully operative at all times.

Spillage must be loaded on to a moving conveyor only at a point(s) designated for the purpose.

All spillage from a conveyor must be cleaned up daily.

DRILLING EQUIPMENT

General Information

The working area immediately around the drilling rig should be kept tidy at all times and any working platforms, (e.g. on a vehicle mounted rig) should he uncluttered and free of grease and oil spillage.

Rods casings etc. should he stored in a safe manner, i.e. pegged to prevent collapse and spreading. Hand tools should he kept in a clean and serviceable condition.

The process of connecting and disconnecting rods and casings should be carried out in a manner which avoids the possibility of injury to personnel. The manual lifting of heavy equipment, rods and casings should he carried out in the recommended manner.

Loose attire such as scarves ties and sleeves, and the wearing of wrist watches and jewelry such as rings etc., can lead to serious injury. A risk assessment should look at the possibility of the wearing not being permitted.

The wearing of suitable gloves is essential in the handling of drilling equipment in particular steel wire rope. In the possible presence of toxic material the use of protective barrier cream is recommended.

Safety helmets and ear defenders should be worn as required.

In the presence of rock dust or similar hazards, suitable protection should be taken against inhalation, ingestion, or damage to the eyes.

The wearing of safety footwear at all times is strongly recommended.

GENERAL HEALTH & SAFETY

Health Hygiene and Welfare Facilities

Your employer or the person in control of any site has a legal obligation to ensure that sufficient welfare facilities are provided. These include washing, toilet and rest facilities.

There is also a requirement for facilities to be made available for the storage of clothes that are not worn during working hours, the storage of clothes that are not taken home and for changing clothes when specialist clothing is required to be worn at the work place. Washing facilities on site should include hot and cold water, soap and basins large enough to wash forearms.

Do not abuse these facilities ensure you keep them clean and tidy, and report any vandalism. If you are working with hazardous substances such as asbestos or lead, specialist welfare facilities must be provided.

Hand Hygiene

Hand hygiene is essential. The hands are the most likely part of the body to come into contact with harmful substances. Failure to take basic precautions can lead to skin complaints.

Dirty hands should be cleaned using proper supplied skin cleansing products. **Do not** clean hands with white spirit, thinners, petrol, turpentine etc.

Always ensure that you wash your hands after a visit to the toilet.

Always ensure that your hands are clean before handling food.

Anyone who prepares food for others must have been trained in food hygiene procedures.

Failure to observe basic hygiene precautions could lead to food poisoning, which at worst can be fatal.

CHEMICALS / DERMATITIS

Health problems can occur through inhalation of certain chemicals and ingestion, some areas of the painting & decorating industry can expose workers to skin conditions such as dermatitis, work-induced skin irritation of the hands, arms, face, and lower extremities are the most common affected areas.

The symptoms of Dermatitis are:

- affected skin gets red, sore, itchy, scaly and blisters
- if it gets worse, the skin can crack and bleed and the dermatitis can spread all over the body (it often starts on the hands)

It is a very painful condition but it is not infectious. If left untreated the condition can cause workers to lose their jobs, but it is preventable, and if spotted early it can be cured.

Occupational dermatitis is caused when the skin comes into contact with certain substances at work. Some cause dermatitis by irritating the skin, others cause an allergic reaction. The length of time it takes to develop depends on the substance, its strength and potency, and how long or how often it touches the skin. Once someone has developed an allergic reaction, even the tiniest amount might bring on the dermatitis. The most common substances that cause building workers to contract dermatitis include:

- cement products
- latex rubber
- nickel and chromium
- epoxy and other resins
- oils, soaps and detergents
- some paints and wood preservatives

Employers

- employers must assess the risks of work which could cause dermatitis
- ensure washing facilities are provided
- prevent employees coming into contact with them as far as reasonably practicable
- provide those workers with regular health checks

What you should do:

- ask for health checks to be carried out by the employer under COSHH and ask to see general information about the results
- check all substances you come into contact with for labels identifying potential skin irritation
- insist on substitute products wherever possible
- if substitution is not possible insist on limited exposure
- ensure you receive the necessary training to reduce the risk
- ensure you are provided with proper washing facilities
- insist on free protective clothing from your employer, such as gloves
- ensure all hazardous chemicals are stored safely

WORK-RELATED ASTHMA

Asthma is a distressing and potentially life-threatening disease that can be caused by breathing in chemicals called sensitisers. These are substances that can trigger an irreversible allergic reaction.

Things to watch for in yourself and the people you work with can include:

- coughing,
- wheezing
- tightness of the chest
- constantly runny nose
- watery, prickly eyes.

Substances known to cause asthma:

- wood dusts
- epoxy resins in some glues and resins
- isocyanates in some paints
- formaldehyde in some MDF
- some paints and wood preservatives

Other problems cause by dusts

The relationship between asbestos and cancer is well known as is the link between hardwood dust and nasal cancer. It is common sense that breathing in dust of any type is likely to be harmful and can cause diseases such as bronchitis and emphysema.

Damping surfaces can help to reduce dust as can working with hand tools rather than power tools. Also if you can ‘wet-sand down’ that is preferred to dry sanding.

Always wear the respiratory protective equipment provided.

Training on how to treat exposure should be given by your employer, you must tell your supervisor if you see any early signs of dermatitis.

DUST AND FLYING PARTICLES

Dust can present a serious hazard, particularly on haul roads. Measures should be taken to prevent dust from impairing visibility by use of water spray on roads and, whenever practicable, a one-way system for traffic with speed limits laid down. Employees should, when necessary, wear dust masks and reflective jackets.

As stated earlier in this booklet breathing in dusts has been known to cause development of respiratory ill health, in particular damage to the lung tissue which can result in serious breathing difficulties, depending on the extent of exposure.

Working with certain materials can cause fragments and dust to enter the eye and cause severe eye injuries. Goggles should be worn at all times to prevent dust particles entering the eye, and the correct type of dust mask to prevent dust entering the body.

Proper dust extraction equipment should be used, hire companies can provide details on the latest equipment such as wet systems or methods available to prevent dust exposure.

ASBESTOS

Breathing asbestos dust can cause serious damage to the lungs and cause cancer. There is no known cure for asbestos related diseases.

Many buildings built or refurbished before the mid 1980's contain asbestos. Asbestos containing materials should be indemnified before work commences to prevent inadvertent exposure to asbestos. Asbestos insulation board, asbestos coatings and asbestos insulation should only be removed by a licensed contractor.

If you suspect you have been exposed to asbestos or you have identified it on site tell your supervisor or person in charge immediately.

MANUAL HANDLING

Make sure you have been trained correctly as you could suffer from back injury and long term pain if you regularly lift or carry loads.

- All loads if possible to be transported and lifted to scaffold or work area using lifting equipment such as a telescopic Handler etc
- Provision of lifting/loading bay agreed.
- Materials to be covered with tarpaulin on site to prevent taking up water.
- Trolley to be used if possible for moving loads around the scaffold or work area.
- Check for any loads over 20kg and make lifting arrangements.
- Any loads over 20kg, should be positioned using suitable lifting equipment used by trained persons
- Avoid awkward postures or repetitive tasks, or take frequent breaks
- Learn safe lifting techniques as it is not just the weigh of a load that can cause injury, light loads if not lifted correctly can also cause problems.
- Keep work areas clear of clutter and equipment.
- Use and maintain PPE correctly
- There is a risk of pain or injury from working in awkward positions, performing repetitive tasks, or lifting.

Apply the following to help prevent injury

- Avoid lifting manually where possible; use a lifting aid or device where practical to do so.
- Bend your knees; use the strong leg muscles instead of your back.
- One foot slightly in front of the other use a good stance for stability

- Keep the load close to your body
- Check the load for stability and look out for sharp edges
- Assess the weight of the load and if satisfied lift smoothly.
- Don't twist your body, use your feet to change direction.
- Look out for tripping hazards prior to lifting or carrying a load, plan your route.
- If in doubt don't lift get help or speak to your supervisor.

The wrong way!

Don't lift this way you are risking permanent injury

The right way!

Use mechanical lifting aids whenever possible

POWER AND HAND TOOLS

All hand tools and equipment should be visually checked for faults before use, if using electrical powered equipment a Residual Current Device (RCD) connection should be used or equipment should be 110 volt or battery operated;

Don't use a chisel with a mushroom head as particles can fly off and enter the eye or other parts of the body, always use a hand protection grip and gloves, ensure the mushroomed head is ground off safely by using eye protection and grinding in a safe area.

Ensure tools are used correctly and as intended by the manufacture, don't get involved in horseplay.

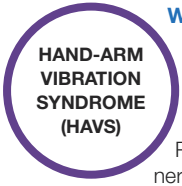
Do not use power tools unless you have been trained and authorised to do so.

Ensure you report any defects and that all equipment is inspected before and after use.

Your employer should ensure that a maintenance record is available and kept up to date, power tools should be pat tested.

✓

✘



What is Hand-Arm Vibration?

Hand-arm vibration is vibration transmitted onto your hands and arms when you use hand-held powered work equipment such as concrete saws.

Prolonged vibration is known to affect blood vessels, nerves, muscles, tendons and other body parts.

The main complaint arising from continued vibration from hand tools is Vibration White Finger (VWF), in which surface blood vessels become damaged, resulting in circulatory problems, pain and in the worse cases gangrene.

When Are You at Risk?

You are at risk if you regularly use hand-held or hand guided power tools and machines such as:

- Chainsaws
- Sanders, grinders.
- Drills.
- Hammers
- Saws

How You Can Help Reduce the Risks

It is your employer's responsibility to protect your welfare, but you should help by asking your employer if your job could be done in a different way without using vibrating tools and machines. If this cannot happen:

- Ask to use suitable low-vibration tools
- Always use the right tool for each job (to do the job more
- quickly and expose you to less hand-arm vibration).
- Check tools before using them to make sure they have been properly maintained and repaired to avoid increased vibration caused by faults or general wear.

- Make sure cutting tools are kept sharp so that they remain efficient.
- Reduce the amount of time you use a tool in one go, by doing other jobs in between.
- Avoid gripping or forcing a tool or work piece more than you have to.
- Store tools so that they do not have very cold handles when next used.

Encourage good blood circulation by:

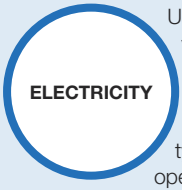
- Keeping warm and dry (when necessary, wear gloves, a hat, waterproofs and use heating pads if available).
- Giving up or cutting down on smoking because smoking reduces blood flow.
- Massaging and exercising your fingers during work breaks.

NOISE

From use of equipment e.g. concrete saws, chain saws, planers, machinery etc. if using this type of equipment or working near others doing so you could suffer hearing loss.

- Machines should be inspected for noise to ensure all panels and guards are correctly fitted and not rattling or vibrating, machines can be sited on noise absorbing materials to reduce noise.
- Other machines should be sited far enough away from each other so as to reduce noise and provide more work space.
- Tell your supervisor if you think that noise is a problem on your site or machine shop.
- Noise assessment to be implemented if noise is a problem

Hearing protection if required should be worn and maintained, noise induced hearing problems, including deafness, are all too common in the construction industry. Very often the attitude has been that it is all part of the job. Report defective machinery, bearings that are not properly greased can increase noise levels; loose panels can also increase noise levels.



Using mechanical plant and any equipment in the vicinity of overhead or buried electrical cables, and underground gas maìns, presents a very serious hazard and special precautions must be taken by all concerned. The reduction of clearance to these types or hazard, due to filling or excavating operations, must not be overlooked.

Mobile plant is often large, powerful and noisy in operation and the drivers may have restricted visibility. For these reasons, non-essential personnel should be kept away from the area of operation and the driver should be provided with a trained banksperson where necessary. Before moving or operating any machine, the operator must first check that it is safe to do so.

Electric shock is a major hazard on a building site, a 240 volt supply is often enough to kill a person, which is way 110 volt supplies are used. If 110 volt supply cannot be used always use a Residual Current Devise.

Don't take chances with electricity cables, treat all cables as live until you know otherwise.

If using powered hand tools make sure that the supply voltage is correct for the equipment.

If using MEWP (cherry pickers), Telescopic Handlers, cranes, excavators and other equipment beware of the danger of death, treat ever cable as live until informed officially otherwise, do not work near overhead power lines with these machines.

Ensure all plugs and leads are in good condition a free from defect. Ensure only correct fuses are used 'no nails'

Don't make any temporary repairs, have those that are trained repair all equipment.

Keep cables off the ground whenever possible; do not let them run through water, wet areas or mud.

If cables have to be on the ground ensure that they are protected from damage and not a trip hazard.

Keep extension leads as short as possible.

Do not use extension leads that are still wound on a reel as the cable can melt due to heat build up.

Do not use insulating tape to cover breaks on a cable, have it repaired, all electrical equipment must be inspected and tested before use.

(RCD) connection, but make sure it is tested.

STRUCK OR CRUSHED BY MOVING VEHICLES ON SITE

You could suffer serious or even fatal injuries from vehicles and machines on site – particularly when they are reversing.

- Make sure that you only walk to your work area on a safe agreed route.
- Report to your supervisor if this route becomes blocked.
- Wear your High visibility vests at all times.
- Never use your mobile phone on or near a route provided for vehicles or plant as you could be struck or run over.

Never approach a machine operator from behind his/her vehicle as you could be crushed. And as a plant operator you need to ensure all round checks before moving or slewing.

Never except a lift or give a lift to someone on an item of plant unless a proper passenger seat has been fitted by the machine manufacture for this purpose

SUN EXPOSURE

Too much sunlight is harmful to your skin.

In the short term, even mild reddening of the skin from sun exposure is a sign of damage. Sunburn can blister the skin and make it peel.

Longer term problems can arise. Too much sun speeds up ageing of the skin, making it leathery, mottled and wrinkled. The most serious effect is an increased chance of developing skin cancer.

What can you do to protect yourself?

- Keep your shirt or top on.
- Wear a hat with a brim or a flap that covers the ears and the back of the neck.
- Stay in the shade whenever possible, during your breaks and especially at lunch time.
- Use a high factor sunscreen of at least SPF15 on any exposed skin.
- Drink plenty of water to avoid dehydration.
- Check your skin regularly for any unusual moles or spots. See a doctor promptly if you find anything that is changing in shape, size or color, itching or bleeding

WORKING AT HEIGHTS

Think before you work

Falls from height is the main cause of death in construction, you need to follow proper procedures before any work at height starts, don't take chances on this issue, 'think' before you start working at height and confirm with your employer that all proper procedures have been followed, don't use a MEWP or working platform unless you have received adequate training and keep a look out for overhead cables. **Do not** start any work at height if cables are near until you have reported and received further instruction, you also have a duty to warn others about the dangers on site and that includes overhead cables.

As stated when working at height serious or even fatal injury could occur, this applies to all work at height.

Make sure that when climbing onto machines that you use hand rails and foot steps, ensure all foot steps are clean and free from mud before climbing.

On tracked machines ensure that tracks are not loose before stepping onto them as they could move and cause a fall. Use harnesses, safety nets, air bags etc, but don't take chances.

Proper risk assessments and method statements prior to any work starting are essential to prevent or control this type of activity.

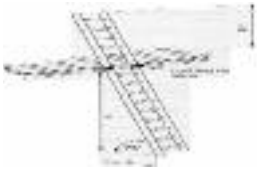
Ensure that persons are not working underneath you or if this is not possible ensure that all precautions have been taken to prevent materials falling onto them.

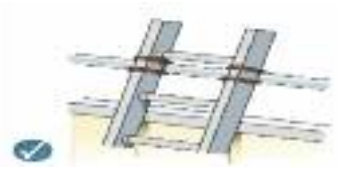
ACCESS EQUIPMENT & WORKING PLATFORMS

LADDERS

The Working at Height Regulations reinforce the hierarchy of fall prevention which means ladders should only be used if it is not reasonably practicable to use other safer forms of access: and it is reasonable to use ladders having regard to:

- The nature and duration of the work task and;
- The risks to the H & S of the users of the ladders.
- The ladder should be angled to minimise the risk of slipping outwards and as a rule of thumb needs to be one metre out for every four up.
- Access ladders should extend about 1m above the working platform. This provides a handhold for people getting on and off.
- Ensure that ladders are tied on both stiles to prevent slipping.
- Ladders should be in good condition and examined regularly to make sure they are free from defects.
- Ladders should not be painted as this can hide defects.
- Ladders used must be in good condition, adequately secured (lashed) and placed on firm surface.
- Do not overreach; if you are working from a ladder, make sure it is long enough and positioned to reach the work safely.
- Do not climb or work off a ladder unless you can maintain 3 points of contact.
- Minimise openings in scaffolds that have been created for ladder access
- Use anti-slip devices or stabilizing units, fixed to the top or bottom of the ladder, but only if considered suitable for the application.





Ladders should be correctly angled; one out for every four up

STEP LADDERS

Step Ladders are not banned but they should only be used for short duration work and used with caution, look at other alternatives but if you use a step ladder follow common-sense rules for using them safely.

Inspect the ladder:

- Take time to check the condition of the ladder both before and after use.
- Check that the ladder is sufficiently robust to support your weight.
- Make sure the steps are free of oil, wet paint, mud, or any other potentially slippery substance.

Erecting the ladder:

- Clear the area around the ladder from any clutter. Make sure that no electrical cords or wire leads are close.
- If the ladder needs to be in front of a door, consider locking the door to prevent surprise openings.
- If the ladder is in a high-traffic area, draw attention to this fact in the house – a hand-written sign would do.
- Make sure the floor is even and stable. Avoid wet or slippery surfaces.
- Always support the ladder at four points

Climbing the ladder:

- Wear suitable shoes – no heels, barefoot is not good, nor are most sandals.
- Never climb onto wet or slippery steps, make sure they are dry.
- Never overstretch – do not climb beyond the last three steps of a ladder.
- Keep your shoulders between the rails and don't over-reach – move the ladder instead.
- Always keep 3 point contact with the ladder.

- Don't let children climb up the ladder: prevent access at the end of the day if you have to, or fold it up after use.
- Be prepared for an unforeseen vertigo attack – don't look down, breath slowly and steadily, and go back down step by step.

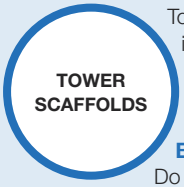
Introduction

Stepladders are widely used as a means for accessing out of reach areas and carrying out a range of work at height tasks. The range of ladders available gives potential falls from just off ground level to approximately 3 metres. Falls may be due to incorrect ladder selection or usage, incorrect positioning of the ladder, failure of the ladder, or a combination of these factors.

Reducing risk of falls

- Avoiding working at height where possible;
- Ensuring that all work at height is properly planned and organised;
- Ensuring that the right equipment is used for work at height, and that this equipment is used safely;
- Stepladders are only used for short duration, low risk tasks, where other work equipment is not more suitable.

The latter point can be addressed through carrying out a thorough risk assessment and ensuring that ladders are the right kit for the job, are used properly, the users are competent and checking the ladder is in good condition before using it.



Tower scaffolds are used widely in the construction industry and a number of accidents happen each year mainly due to the tower not being properly erected or used.

Before Use

Do not erect or inspect tower scaffolds unless you are trained and competent to do so.

Make sure the tower is resting on firm level ground with the wheels or feet properly supported.

Do not use crushable material such as bricks or building blocks to take the weight of any part of the tower.

Some guidance suggests if using steel towers in exposed conditions or outside, the height of the working platform should be no more than three times the minimum base dimension or three and a half times the dimension if used inside, if using alloy towers you should follow the manufacturer's instructions.

Our recommendation is before using any tower scaffold that you first check with the manufacturer about the recommended working height of the platform.

Remember the following as a guide.

- Do not sheet as this could act like a sail and overturn the tower.
- Ensure the tower is on firm level ground.
- Do not load with heavy equipment or materials.
- Do not use to hoist heavy materials or support rubbish chute
- Always use ladder for access, do not climb on the tower.
- Always climb from the inside of the tower
- Use a brick guard where necessary
- Tower should not be moved with anyone remaining in the structure

- Close platform access door to prevent falling through.
- Watch out for overhead power lines before moving.
- Do not use vehicles to push or pull the tower.
- Ensure brakes are applied.
- If fitted, check that outriggers are set correctly and secured.

Some jobs in the construction industry involve activities that can place workers at risk, unless the person has full, unimpaired control of their physical and mental capabilities. These jobs are called 'safety critical' and the people who do them are 'safety-critical workers'.

In particular, your employer will need to focus on health conditions that may involve:

- sudden loss of consciousness (e.g. epilepsy, some heart conditions, diabetes (particularly insulin-dependent diabetes));
- impaired awareness or concentration;
- sudden incapacity;
- impaired balance or coordination;
- restricted mobility; and
- impaired vision or hearing.

Before someone starts safety-critical work, it is good practice for the employer to agree what health checks and/or medical examination are required, and record the agreement.

It is important to be clear which aspects of fitness are relevant to the safety-critical work, and to specify the required level. The employer or self employed need to have clear agreed company policies in place to deal with these issues.

Example: Working at Height
Your employer needs to be sure that you:

- can climb the ladder or platform
- can see well enough (this might mean making sure you use prescription lenses); and
- that you do not suffer from a condition which might cause you to lose consciousness or reduce your ability to concentrate

Medical assessment

Workers who carry out safety-critical tasks need a full medical assessment. Decisions on fitness for work can only be taken by a competent occupational health doctor.

Detailed medical assessments are confidential to the worker and the occupational health practitioner or general practitioner. However, an employer can reasonably expect the occupational health practitioner to provide a general report about individual fitness in terms of:

- fit for work;
- fit for work with restrictions;
- temporarily does not meet the fitness standard; or
- unable to meet the fitness for work to carry out specific jobs.

This is the only information that an employer needs to ensure an appropriate match of worker to job.

Ongoing fitness

Someone's fitness for work will probably change over time. Your employer will need to decide how to check that safety-critical workers are fit enough to continue with their work, e.g. introduce a simple system to recall workers who need ongoing health checks.

Tell your employer about any health changes that occur between checks which may affect your ability to do your job safely. Sickness absence certificates or observations by supervisors and managers may also indicate that a safety-critical worker's health has deteriorated. This might trigger a need to check health.

Medication

Some medication can cause drowsiness and affect concentration. All safety critical workers should be encouraged to ask their general practitioner or pharmacist about the possible side effects of medication. In some cases, it may be necessary for a worker to do other tasks until

the nature and extent of side effects have been established, and are properly controlled.

Drugs and alcohol

You should not do construction work if you are under the influence of drugs or alcohol as you or someone else could suffer serious injury or death, but drug and alcohol testing is a complex area and if your employer decides to carry out testing, they will need to consult with health and safety representatives and employees about the companies policy, position and procedures.

Disability discrimination

If health conditions are properly controlled a worker could be able to do many construction jobs safely.

Disability Discrimination Law protects workers who have a disability. However, the law allows an employer to prevent a person doing a specific task if the discrimination is for reasons that relate to compliance with health and safety legislation, e.g. it would be justifiable to transfer a Roof worker to other duties if he/she could no longer see well enough, even with glasses.

WORK-RELATED STRESS

What is stress?

HSE defines stress as 'an adverse reaction to excessive pressure'. Pressure is often part and parcel of work and helps to keep us motivated. Excess, badly-managed exposure to pressure can lead to stress. Workers who experience stress, anxiety or depression are unlikely to perform effectively and if stress levels are not corrected it can lead to serious problems. In safety-critical industries such as construction it could have serious consequences.

What causes stress?

HSE has identified six aspects of work that can lead to stress. These are:

1. demands: such as workload and pattern, adequacy of the management team, build programme, and the effects of client expectation and contract penalties;
2. control: how much say someone has about the way that they work;
3. support: whether employees receive adequate information and support from managers and colleagues.
4. relationships: the nature of work relationships, including mechanisms to deal with unacceptable behavior such as bullying;
5. role: whether people understand their jobs and have the skills, experience and support to deliver, and whether there is any conflict of responsibilities; and
6. change: how change is managed and communicated in the company, and whether work is secure.

The 'top five' most stressful aspects of work in construction are:

1. having too much work to do in the time available;
2. travelling or commuting;
3. being responsible for the safety of others at work;
4. working long hours; and
5. having a dangerous job.

Remember that factors such as personal relationships, financial concerns, domestic issues and bereavement will affect someone's ability to cope with pressure at work. The importance of these factors is likely to vary over time.

What you should do

Regardless of where your work in safety critical or not, if you think that you are suffering from any of the health & safety issues mentioned above or in this book speak to your supervisor, manager or a suitable person than you can relate your problems to, don't suffer in silence.

Confined spaces include: -

- shafts
- tunnels
- sewers
- cellars and basements
- ceiling voids
- boilers
- deep excavations
- attics

Confined spaces can be a high risk activity and cause death and serious injury if proper control methods are not followed.

Entry into a confined space to carry out work that could be done on the outside should never be allowed.

Where petrol or diesel engines are used in a confined space, there must be adequate ex- traction or ventilation to remove the exhaust fumes.

You should never enter a confined space unless in is absolutely necessary to do so and never unless you have received adequate training.

Never enter a confined space unless a risk assessment has been carried out, emergency procedures are in place and a permit to work has been issued.

If no provision has been put in place to rescue you should anything go wrong do not enter.

Those that could be killed include not only people working in confined spaces but those who try to rescue them without proper training and equipment.

Dangers can arise in confined spaces because of a lack of oxygen. This can occur due to a build up of gases in the space.

As with excavations, do not site petrol or diesel-engined equipment such as generators or compressors in, or near the edge of, a confined space unless fumes can be ducted away or the area can be ventilated.

Confined spaces should only be entered if a permit to work or enter has been issued, ask questions if in doubt, ask about the emergency procedures, has the equipment been inspected have all persons been trained, was the training adequate and provided by a competent person.

Remember an excavation can also be a confined space.

Excavations

Be aware of the dangerous of excavations and stay alert as you could fall into excavations and/or overturn machines and into them.

Every year, people are killed or seriously injured when working in excavations. Excavation work has to be properly planned, managed, supervised and carried out to prevent accidents. This guide provides advice for those involved in excavation work.

The weight of excavated spoil, the weight of materials and the weight of a machine (and the vibration it creates) can cause inadequately supported walls of an excavation to collapse. Spoil, material and machines should be kept away from the edge of unsupported excavations.

Underground Services

The Health and Safety Executive (HSE) has issued a warning to the Utilities Industry to ensure safe working practices are followed when working near buried electrical cables.

A company was prosecuted and fined £10,000, plus £5,000 costs, following a cable strike. A 17-year old worker was using a pneumatic breaker to excavate a posthole when he struck a live 11kV electric cable. He suffered severe burns to his face, arms and neck.
The HSE investigating inspector said: *"This was a preventable accident. Work near underground services, including live electrical cables, is a hazardous activity. Although the company had assessed the risks and drawn up a method statement for carrying out the job, they failed to follow it."*

SAFE SYSTEM OF WORK

When undertaking excavation works near to buried services a safe system of work must be implemented and followed. For hazardous work this will include a permit-to work system. A thorough risk

assessment of the proposed works should be undertaken and a plan of work formed to eliminate or minimize any hazards identified, such as setting up formal emergency procedures, installing traffic management systems and ensuring the public is protected through the use of barriers or other such methods.

OPERATIVES

Only trained and competent operatives should excavate near to underground services and appropriate personal protective equipment should be worn at all times. Operatives should be able to identify the different types of underground service using the colour coding system agreed between the utility supply companies. If in doubt, operatives should always assume that an exposed service is live until they receive confirmation otherwise.

If a service becomes damaged then operatives should stop work straight away, report the damage to a supervisor or appropriate authority and not recommence work until informed by the authority that the work area is safe and any damage has been repaired.

SERVICE LOCATION

Utility providers should be consulted to obtain reliable service location information, such as through location plans and/or site visits to locate and mark the position of their equipment.

Features such as street lighting, drainage access points, roadside cabinets and marker posts can also help identify the presence of nearby services, but it should not be assumed that they are not present if the features cannot be seen.

Cable location equipment should be used to confirm the locations of those underground services known to be present and to check for any that may not appear on utility provider documentation. Hand excavated trial holes should finally be dug to confirm the exact position of the buried services, making regular checks every 0.5m.

EXCAVATION PRACTICES

To minimise the risk of damage, excavating by hand should take place alongside the service, exposing it from the side rather than the top, and any tools or equipment used should be insulated and flat edged (not pointed).

When excavating using mechanical equipment, the work should progress slowly and regular checks be taken at least every 0.5m by the operator and/ or banksman. On board cable location monitoring equipment may be safer than using a banksman in some instances.

Exposed services should never be used as hand-holds, foot supports or for any other kind of physical support. Once any excavation works are completed, reinstatement and backfilling should be carried out carefully to avoid damage to services; marker systems, such as warning tapes or tiles, should be reinstated.

Before anyone enters an excavation they should ask.

- Are the sides protected from collapse, or have they been battered back, do not go into unsupported trenches.
- Remember that even work in shallow trenches can be dangerous. You may be bent down or kneeling in the trench.
- Could materials fall into the excavation or on top of you?
- Could people and/or vehicles fall into the excavation?
- Will you be a safe distance from excavators or other machinery?
- Have walls been undermined, could they collapse.
- How are you going to get in and out safely, has a ladder been provided and secured, do not climb over the sides of the excavation.
- Ask about underground services, has a risk assessment been done.
- Exhaust fumes from machinery can settle in excavations as the fumes are heavier than air, you could be overcome by fumes and collapse
- Do not site petrol or diesel-engined equipment such as generators or compressors in, or near the edge of, an excavation unless fumes can be ducted away or the area can be ventilated.

- Weil's disease from rat's urine can cause health problems and in extreme cases death, always use the correct type of gloves to protect your hands including wet suits and boots.
- Always wear a hard hat just in case.
- Remember an excavation can be classed as working at height as you could fall into the trench
- Ask if the excavation has been inspected, look for evidence as follows.
- Has a competent person inspected the excavation:
- At the start of each shift before work begins.
- After any event likely to have affected the strength or stability of the excavation.
- After any accidental fall of rock, earth or other material.

Remember that a cubic metre of soil weighs over a tonne; A person buried under this amount in a trench would quickly suffocate & die.

PERSONAL PROTECTIVE EQUIPMENT

Make sure you are provided with PPE if it is required, PPE should always be the last resort in preventing accidents as it is always better to remove the risk completely, but where this is not possible PPE should be worn.

PPE could be hard hats for head protection, high visibility vests or jackets, ear protection such as full ear muffs or if suitable plugs, safety boots or shoes, overalls etc.

Always ensure that PPE is cleaned, maintained and replaced when necessary, speak to your supervisor or supplier for further guidance on the replacement of certain PPE such as ear muffs and hard hats.

Stepping on nails and sharp objects

To help prevent foot injuries the following should be implemented

- Safety boots with steel toe caps and mid soles should be provided to all those working on site.
- Waste disposed of in skips.
- Nails clinched or removed from waste or stored timber.
- Supervisor to explain the need to wear safety boots and dispose of waste in skips.

FIRE

Every year there are reports of fires and explosions which severely damage or destroy premises or plant. A potential fire hazard is using a blowlamp or heat gun, misuse can lead to explosion or damage, and you need to follow guidelines relating to the use of blowlamps as materials can be ignited.

If involved in hot works make sure that a risk assessment has been completed and that all approved methods are followed, ensure the correct fire extinguishers are available and that adequate training has been provided where necessary.

Do not put yourself or others at risk, ensure that you or someone calls the fire service and only fight fires if you have been trained to do so, all persons evacuated should make their way to a designated muster point.

There have been numerous fires started due either to badly maintained motors, electric sparks, or due to open wood burning stoves and cigarettes.

Make sure that all equipment is cleaned and that dust is not allowed to accumulate, report any defects you see on equipment.

FIRST AID

First aid provision is all about treating an injured person immediately and contacting the emergency services if need be. In extreme cases it saves lives.

All sites should have a sufficient number of trained first aid persons in keeping with the risks and the numbers employed.

The name of the nominated first aider(s) should be posted in the canteen and other prominent position. Remember the name.
The first aider should be the first person contacted in the event of an injury or health problem on site.

CITB-ConstructionSkills NI

The purpose of CITB-ConstructionSkills NI is to encourage the adequate training of those employed in, or intending to be employed in, the construction industry in NI, by establishing the training needs of the industry, encouraging and advising the industry to train and ensuring the adequate provision and standard of training in the industry.

Through Legislation CITB-ConstructionSkills NI is authorised to raise a levy from the N.I. construction industry to fund its activities and services that aim to encourage adequate training.

The levy is redistributed through grants, and other activities including training advice & support, recruitment & education, research, standards & training provision.

ConstructionSkills is the Sector Skills Council for the industry from professional consultancies to major contractors and SMEs.

Established as a Sector Skills Council in 2003, ConstructionSkills is a partnership between CIC, CITB-ConstructionSkills NI and CITB-ConstructionSkills. All three partners are committed to working together to deliver industry-led skills and training solutions through the Sector Skills Agreement for construction. We work to negotiate the best partnership and funding deals for the construction industry to help raise standards and we develop the skills products and services employers need.

CITB-ConstructionSkills NI

For further information contact us at:

CITB-ConstructionSkills NI
Nutts Corner Training Centre
17 Dundrod Road, Crumlin, Co. Antrim, BT29 4SR
Tel: 028 9082 5466
Fax: 028 9082 5693
Email: info@citbcsni.org.uk
www.citbcsni.org.uk

This booklet is supported by the HSENI.
For information on HSENI's health & safety publications
contact HSENI at:

Advice Helpline: 0800 0320 121

Tel: 028 9024 3249
Fax: 028 9054 6896
Email: hseni@detni.gov.uk

Notes

Alliance Sector Skills Councils

CITB - Construction Skills, CIC and CITB-ConstructionSkills NI are working in partnership as the Sector Skills Council for Construction. Part of the Skills for Business Network of 25 employer led Sector Skills Councils.

CITB construction skills NORTHERN IRELAND