

Use of Mobile Machinery on Construction Sites

Information Sheet

This information sheet provides an overview of the key safety aspects when using mobile machinery on construction sites. It will serve as a valuable guide to all employers, employees and any other person who use's mobile machinery during the course of their work. It can be used as a management tool and training aid. There is one simple rule to remember:

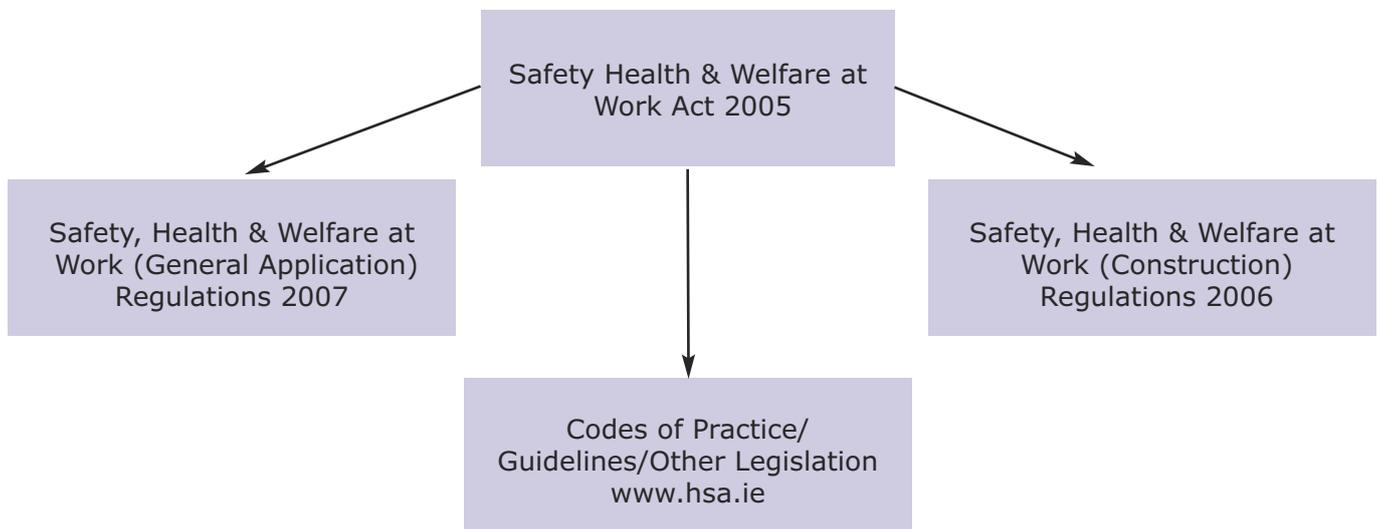
'Keep Machines Clear of People and People Clear of Machines'

Unfortunately the frequency and severity of accidents involving mobile machinery has been steadily increasing resulting in the following easily preventable types of accidents.

- ▲ Operator killed when thrown from a 6t dumper which overturned and crushed him – not wearing seat belt.
- ▲ Groundworker killed when grading bucket detached from quick hitch and struck him – no securing pin in place.
- ▲ Operator killed when struck by an excavator which was tracking backward.
- ▲ Maintenance mechanic killed when a tractor dozer reversed over him.

What Requirements must I comply with?

When selecting mobile machinery for use on construction sites the following legislative requirements must be taken into account.



What is required when planning machinery operations?

Prior to commencing construction work, there is a requirement to ensure that traffic and pedestrian routes are organized and controlled that plant & machinery is maintained and certified and that operators are trained.

The following items identify some key points to be addressed by operators of machinery on site and need to be taken into account when carrying out risk assessment (see overleaf) for mobile machinery operations.

Table 1-Typical control measures which can be introduced where mobile machinery is in use

Plan routes	Identify / eliminate / protect on-site hazards e.g. overhead wires / excavations
Limit the number of vehicles allowed on site	Demarcation of work areas
Set appropriate speed limits and enforce the limits set	Selection of appropriate plant / machinery for the job in hand e.g. Zero tail swing excavators for road works
Minimize reversing activities e.g. use of one-way systems	Provision of appropriate lighting
Provide segregated pedestrian walkways and keep pedestrians and vehicles apart	Use of banksmen / signaller
Provide signage and instructions	Provision and use of high visibility clothing
Use of beacons/reverse alarms/ convex mirrors and reversing cameras	Use of the appropriate Safe System of Work Plan (recommended)

Risk Assessment

What is a Risk Assessment?

A risk assessment is a careful examination of what could cause harm to people as a result of a work activity. It allows you to take the necessary precautions to prevent harm occurring.

How do I do a risk assessment?

There are five steps to a risk assessment:

- 1.** Look at the hazards.
- 2.** Decide who might be harmed and how.
- 3.** Evaluate the risks and decide whether the existing precautions are adequate or whether more should be done.
- 4.** Record your findings.
- 5.** Review your assessment.

What do I need to consider if I am doing a risk assessment?

If you are doing a risk assessment you need to consider the following:

- ▲ the work activity;
- ▲ the equipment to be used;
- ▲ the duration of the work;
- ▲ the location of the work activity i.e. presence of hazards such as excavations, underground services, overhead power lines etc;
- ▲ the working environment, e.g. weather conditions, lighting, location of the public;
- ▲ condition and stability of existing work surfaces;
- ▲ physical capabilities of the workers.

Duties of Owners and Suppliers

When selecting mobile plant & machinery for use on construction sites various persons could be involved in the selection of the equipment required e.g. safety advisors, site manager.

Suppliers must ensure that they provide the purchaser / hirer with information pertaining to its safe use e.g. data sheets, test certification, operation, service and safety manuals. Users must:

- ▲ Ensure the machine is supplied in good working order and is certified where applicable.
- ▲ Ensure that machine is adequately maintained and inspected.
- ▲ Ensure competent trained operators are available.

Safety Devices

Auxiliary Devices / Visual Aids

Where an operator's view is restricted from his position in the driver's seat auxiliary devices / visual aids (as listed below) must be installed unless a risk assessment shows that they are not required. The purpose of these auxiliary devices and visual aids is to allow vision from the driver's seat of all points more than 1 meter high and 1 meter from the machine at each side and at the rear of the driver. Auxiliary devices also give warning to persons who maybe in the vicinity of mobile plant & machinery.

Table 2-Abbreviated Schedule 6

Machine type	Reversing & visual aids required	Machine type	Reversing & visual aids required
Off-road dump trucks (Trailer to rear of driver) > 7 tonnes	Reversing alarm and flashing beacon with CCTV or convex mirrors or a combination of both	Scrapers	Reversing alarm and flashing beacon with CCTV or convex mirrors or a combination of both
Dumpers (front tip) no cab	Reversing alarm and flashing beacon	All tracked type tractors (bulldozers)	Reversing alarm and flashing beacon with CCTV or convex mirrors or a combination of both
Dumpers (front tip) with cab	Convex mirrors; reversing alarm and flashing beacon	Graders	CCTV, convex mirrors, reversing alarm and flashing beacon
Wheel Loaders (loading shovels), including skid steer loaders	Reversing alarm and flashing beacon with CCTV or convex mirrors or a combination of both	Telescopic Handlers	Reversing alarm and flashing beacon with CCTV or convex mirrors or a combination of both
Backhoe Loaders	Convex mirrors; reversing alarm and flashing beacon	Compactors / rollers without cab and seat to rear	Reversing alarm & flashing beacon
All 360° excavators	Movement alarm and flashing beacon with CCTV or convex mirrors or a combination of both to allow vision from drivers seat (without slewing)	Compactors / rollers with cab and seat to rear	Convex mirrors; reversing alarm and flashing beacon

Roll Over Protection Systems (ROPS)



Roll Over Protection System or ROPS are designed and fitted to machinery which on overturning would reduce the possibility of an operator from being crushed, provided the operator was wearing a seat belt. The following points must be taken into account when operating plant with a Roll Over Protection System.

▲ Ensure that seat belts are worn in conjunction with ROPS protection; otherwise there is a risk that the driver may be crushed by the ROPS bar as he or she is thrown from the vehicle.

- ▲ Ensure risk assessment / Safe System of Work is carried out.
- ▲ Ensure operators are trained in the safe use of machine
- ▲ Ensure the ROPS is designed, manufactured and tested to recognized standards (e.g. EN 474-6:2006, BS EN 13510:2000 & BS EN 3471:1994)
- ▲ Ensure the ROPS is clearly labeled / stamped in accordance with the above standards.
- ▲ Ensure that the operator seat belt is regularly inspected and maintained in good working order.

Quick Hitch (Quick Release)



A quick hitch on an excavator enables fitting of different attachments to the dipper arm of a machine. It is a latching device which improves efficiency & productivity by aiding interchangeability of common attachments.

Common causes of fatalities and serious injury have been attributed to attachments inadvertently detaching from the hitch and striking persons in close proximity.



There are three main quick hitch systems on the market; manual, automatic & semi-automatic. Employers or users of this equipment must be familiar with the safe operation and use of the relevant type.

Construction employers and mobile machinery operators should:

- ▲ Ensure a risk assessment / Safe System of Work is carried out for the type of hitch in use;
- ▲ Ensure workers / members of the public do not come in range of the working radius / envelope of a mobile machine;
- ▲ Ensure mechanical locking pins (where required) are fitted to prevent an uncontrolled release of the attachment;
- ▲ Ensure all operators hold a current CSCS card / trained in use;
- ▲ Ensure all operators have received adequate familiarization training in the specific machinery they are operating including the hitch systems and attachments;
- ▲ Ensure manufacturers operating and maintenance manuals for the plant and attachments are kept in the cab or close by.
- ▲ Review operating procedures and standard work instructions to ensure that quick hitch mechanisms are used correctly and in line with the manufacturer's recommendations;
- ▲ Review maintenance and inspection practices to ensure that quick hitch mechanisms are maintained in a clean and fully serviceable condition;
- ▲ Provide supervision, monitoring and checking to ensure compliance with work procedures by workers and plant operatives.

Check-Valves



Hydraulically- operated machines, except for machines with a maximum rated lift capacity of 1000 kg or less, must be fitted with check valves to the cylinders used for lifting.

The purpose of check valves is to prevent a gravity fall of the load in the event of hydraulic failure. An employer must ensure that:



- ▲ Specific safe working loads (SWL) / configuration ratings must be either plainly marked on the machine or a copy of the table relating safe working loads to distance worked is affixed in a clearly visible position in the operator's cab;
- ▲ Machines are not loaded beyond the relevant SWL;
- ▲ Unless the machine is fitted with an automatic safe load indicator or a rated capacity indicator, the SWL is the same for all radii at which a jib or boom is operated and is not greater than the load which the machine in its least stable configuration is designed to lift with that jib or boom.

Inspection & Maintenance

All mobile plant and machinery should be properly maintained, and in particular, safety critical parts should be regularly inspected. All employers shall ensure that:

- ▲ Basic maintenance / inspection is carried out as required;
- ▲ Scheduled preventative maintenance is carried out;
- ▲ Statutory Inspections for lifting equipment (where applicable) are completed and documented. Lifting equipment used on a construction site must also be examined weekly by the user as regards features related to its safe working. A record of these results must be kept in a suitable form e.g. use of form GA2 – Report of Weekly Inspection, and kept available for inspection for a minimum of three months from date of examination;
- ▲ Maintenance work is appropriately planned and risk assessed. Fitters / mechanics working in the field are exposed to increased hazards associated with different environments and conditions.

The list below is an example of some of the areas that may need to be inspected by operators, fitters/mechanics:

Table 3 – Typical items to check when inspecting mobile machinery

Visual, Auxiliary & Audible Aids (Convex Mirror, Camera's etc.)	Tracks
Lights (Beacons, brake lights, indicators etc.)	Cab Protection – Roll Over Protection
Seat Belts	Guarding e.g. Power Take Off
Tyres – condition & pressure	Fire-fighting equipment
Braking systems	Wipers / Windscreen Condition
Interlock Safety Devices	Primary Controls and cab display panels
Cylinder / valve leaks	Pipe chaffing

Training / Competency

The selection of competent drivers / operators is crucial to the safe operation and management of construction machinery. Employers are required to ensure that:

- ▲ Operators have completed CSCS (Construction Skills Certification Scheme) training and are competent in the safe operation of the machinery (table 4). Employers must note that CSCS is the foundation and further specific training may be required;
- ▲ Operators under training are authorised and supervised at all times;
- ▲ CSCS / training records are checked and validated;
- ▲ Operators are given information and training on safety features / equipment fitted to the machine e.g. quick hitch, reversing camera etc;
- ▲ Operators are inducted prior to starting work on site. Induction is an efficient way of communicating information on site conditions and hazards to operators;
- ▲ Persons in control of mobile machinery must not use mobile phones during operation.

List of Current CSCS Courses Involving Mobile Plant & Machinery

Table 4

Tower Crane Operation	Self Erecting Tower Crane
Telescopic Handler	Slinging / Signalling
Tractor / Dozer Operation	Crawler Crane Operation
Articulated Dumper	Site Dumper
180° Excavator Operation	Mini Digger Operation (<6t)
360° Excavator Operation (>6t)	Other tasks as may be prescribed
Mobile Crane	

Remember

'Keep Machines Clear of People and People Clear of Machines'