

Mobile Elevating Work Platform

Study Notes

PL 010

MODULE TWO – SUMMARY OF REGULATIONS

All mobile elevating work platforms are 'work equipment' within the meaning of The Provision and Use of Work Equipment Regulations 1998. The most important points are:

- ⇒ suitability of the equipment for the task to be carried out
- ⇒ operator training
- ⇒ competent supervision

The Provision and Use of Work Equipment Regulations 1998 require that an employer only supplies work equipment that is correct and suitable for the job and ensures that the equipment is maintained and kept in good working order.

Where the use of the equipment involves a specific risk to the health and safety of employees, the use of the equipment must be restricted to specified workers.

The Management of Health and Safety at Work Regulations 1992, place a requirement on every employer to make a suitable and sufficient assessment of every work activity to detect and define any hazard that employees might encounter during their work, or to any other person who might be affected by their operations.

Once those hazards have been identified, it is then his duty to put control measures into place, in order to remove or reduce those hazards as far as is reasonably practicable.

Personal Protective Equipment

The use of safety harnesses and other personal protective equipment is covered by The Personal Protective Equipment at Work Regulations 1992.

The Personal Protective Equipment at Work Regulations 1992 are somewhat more specific, in that they require an employer to make an assessment of the workplace in an attempt to decide which, if any, personal protective equipment should be issued. In deciding which type to issue, the employer must take into account the risk that the PPE is being used for, and that the PPE will fit the wearer and allow them to work comfortably. If more than one task is to be performed, the employer should make sure that the PPE is compatible and of use for every task that is to be undertaken.

Whilst the employer must, as far as possible, ensure that any personal protective equipment supplied must be worn, the employee in turn must ensure that they wear the equipment provided and know the procedures for reporting loss or defect to their employer.

MODULE THREE – TYPES OF MACHINE

All MEWP's can be considered in two parts. First, the carrier or chassis and secondly, the elevating superstructure.

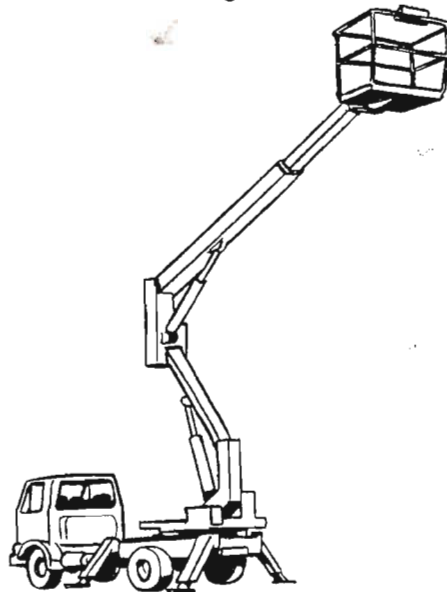
The most common combinations are:-

- ➡ Truck mounted telescopic or articulated booms
- ➡ Trailer mounted telescopic or articulated booms and masts
- ➡ Self propelled telescopic or articulated booms
- ➡ Self propelled scissor units
- ➡ Underbridge units
- ➡ Mast climbing units

Types of Carrier

Road vehicles

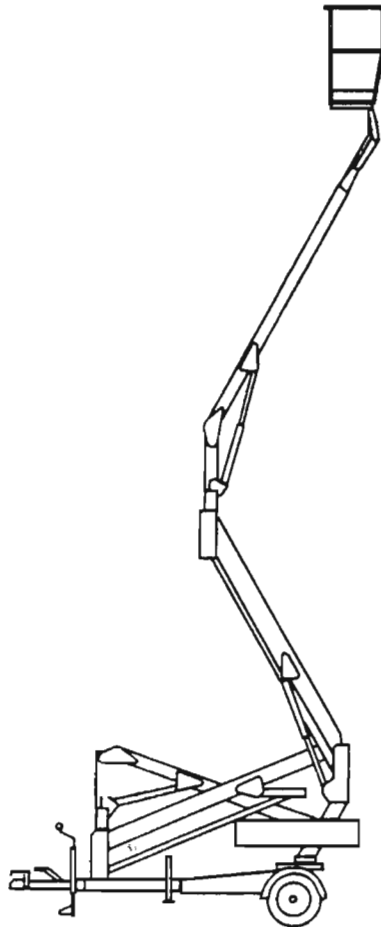
MEWP's are often mounted on standard commercial vehicles with minor modifications usually associated with the mounting arrangements and are able to work within normal vehicle road traffic regulations



Most have hydraulic stabilisers and are stationery when in use.

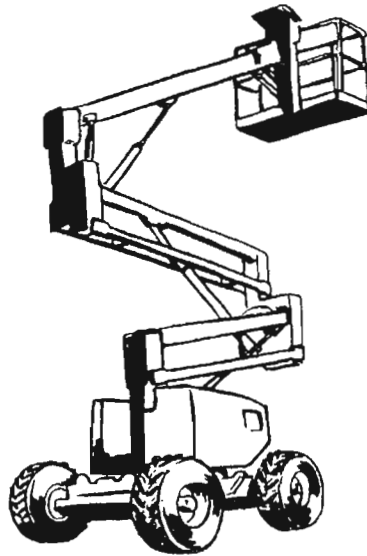
Trailers

These may be mounted on a highway going trailer, designed to be towed on the highway by a conventional coupling to a car or commercial vehicle. These machines usually come within the lower capacity range. Most have manually deployed stabilisers of the screw jack type and are thus stationery when in use.



Self propelled

The superstructure is mounted on a purpose made chassis that is designed to allow the machine to drive at slow speed with the boom and chassis in access-use mode. These machines are operated from the platform.

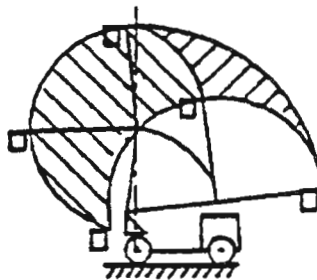


Other types

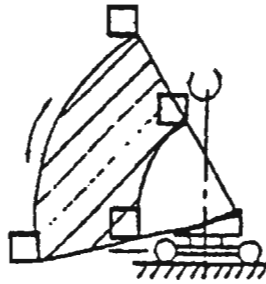
There are many specialist and purpose made small MEWP's mounted on castors or small wheels for use within buildings and confined areas. Mast climbing MEWP's are mounted on purpose built chassis and vary from manufacturer to manufacturer.

Configurations of Elevating Superstructures

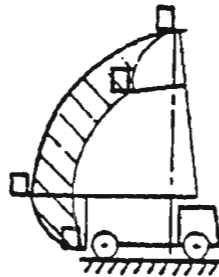
- 1 Articulating. The horizontal reach is approximately half the maximum height. This type has the ability to reach up and over obstructions.



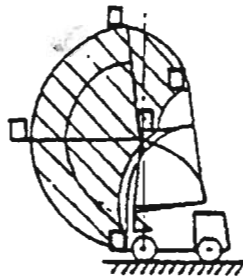
- 2 Telescopic. Gives direct straight line approach to the point of work, but has the limited ability to clear obstructions between vehicle and point of work. The reach is greater than type 1 relative to height. A particular benefit is that the booms project only to one side of the vehicle. Multiple stage telescopic booms have substantially reduced travelling length.



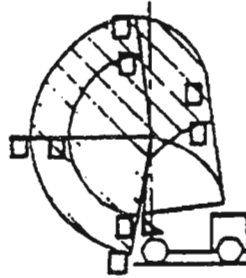
- 3 Articulating jib boom has a range of movement similar to type 2, with the ability of type 1 to reach up and over obstructions, easy access to the basket and the booms project only to one side of the vehicle



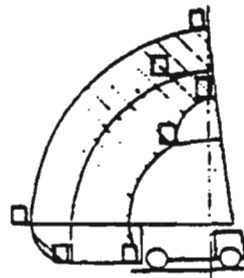
- 4 Three Boom Articulating is a three boom development of type 1, having a substantially reduced travelling length, easy access to the basket and the ability to reach up, over and down.



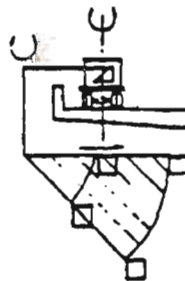
- 5 Combined Articulating and Telescopic is a combination of types 1 and 2, and like 4 has a substantially reduced travelling length and a straight line approach to the point of work of type 2, in addition to the ability to reach up and over obstructions.



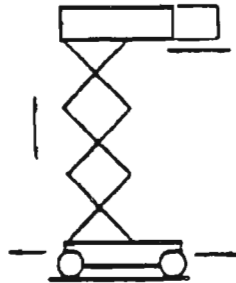
Combined Telescopic and Articulating jib is a combination of types 2 and 3, giving a straight line approach to the point of work of type 2 with the ability to type 3 to reach up and over obstructions.



Underbridge. These units are specifically designed for reaching down and under a structure such as a bridge, pier or embankment, although some units have limited upward reach capabilities. Underbridge MEWP's generally combine telescopic and articulating booms mounted on a road going vehicle.



Scissors. These units generally give a vertical lift only (extending platforms are available on some machines to give extra outreach). Their large work platform area allows some materials to be carried. Most can be driven in the elevated mode. Battery powered versions can be used for indoor use. Scissors generally have a much greater safe working load than other types.



Mast Type. These usually have a large working platform to give access to facades of buildings. They may be raised by telescopic masts or have mast climbing mechanisms. their free standing height is usually around 20 metres. Above this height the mast is tied into the building for support.



MODULE FOUR – POWER UNITS

The Power Unit

How does a diesel engine work?

The fuel used in modern high speed diesel engines, usually gas oil, is a liquid which does not vaporise at ordinary temperatures. It is injected into the cylinders of the engine in a very fine spray.

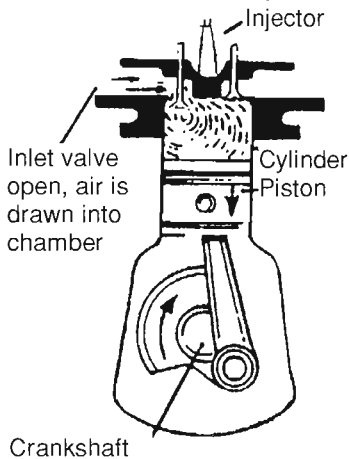
The air necessary for combustion is drawn into the combustion chamber and then compressed by the piston to a high pressure. The compression heats the air sufficiently to ignite the fuel spray spontaneously when the injection takes place.

This process is the characteristic feature of the diesel engine, or as it is otherwise called, the compression ignition engine.

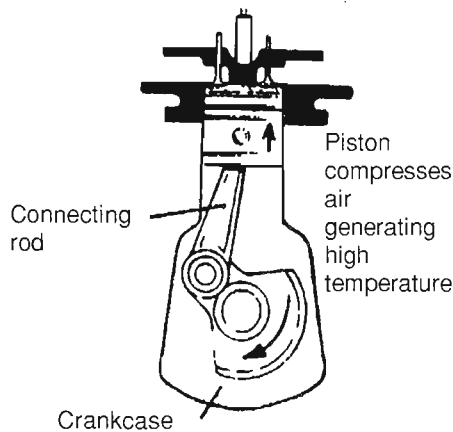
Four-stroke cycle

It is quite simple mechanically. If we consider only the four-stroke engine (a complete movement of the piston, up OR down, is known as a stroke) the working cycle is as follows:

- 1 The piston moves down in the cylinder as the inlet valve opens, and a charge of clean air is drawn in. This is known as the **Induction stroke**. When the piston reaches the bottom of its travel, the inlet valve closes.



1 – Induction stroke

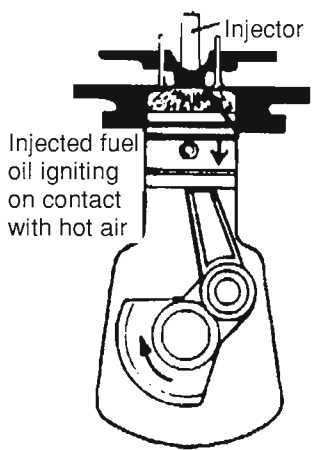


2 – Compression stroke

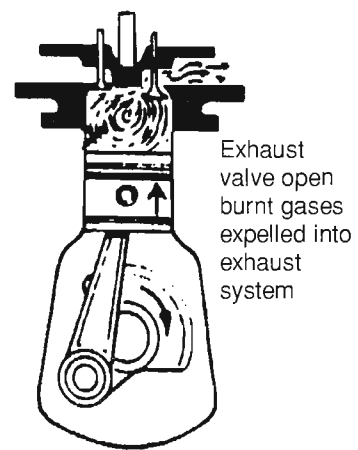
- 2 In the **Compression stroke**, both valves remain closed whilst the piston moves upwards; the charge of air is compressed and its temperature rises steeply. Just before the piston reaches the top of the compression stroke, fuel is injected into the top of the cylinder (combustion chamber) in a very fine spray.
- 3 The fuel is ignited instantly by the heat of the compressed air, and the piston is driven downwards by the rapid expansion of the burning fuel gases. This is known as the **Power stroke**.
- 4 Following the power stroke, the exhaust valve opens as the piston moves upwards, and the waste gases are expelled. This is known as the **Exhaust stroke**.

When the piston reaches the top of its stroke the exhaust valve closes, and this completes one cycle (four strokes).

The cycle repeats itself as long as the engine is supplied with air and fuel.



3 – Power stroke



4 – Exhaust stroke

Air Induction System

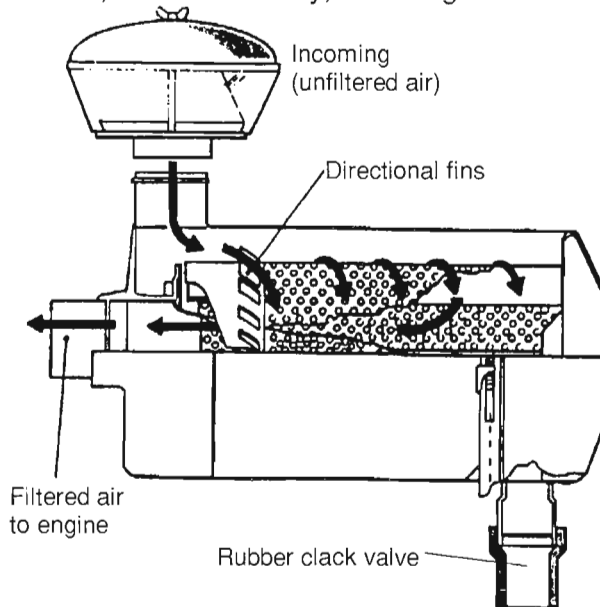
An air cleaner filters the air before it enters the combustion chamber, protecting the engine from dust, water and other foreign matter.

There are two types of air cleaner in general use, the *dry filter* type and *oilbath* type. Both types are usually fitted with a *pre-cleaner*. The pre-cleaner comprises either a cap or bowl shaped so as to create a swirling action which causes the heavier particles of dirt to fly outwards and be deposited either within the casing of the pre-cleaner, or ejected through vents to the atmosphere.

Dry type air filter

This type uses a paper filter element. Air is drawn through the pre-cleaner into the filter housing, then passes through the paper filter and into the engine. Foreign particles are retained by the filter, or else ejected through a rubber clack valve.

Servicing usually consists of gently blowing away the accumulated dust with a LOW pressure air line or, when necessary, renewing the filter.



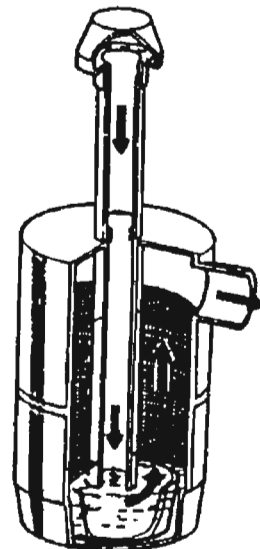
Dry type air filter

Oilbath type air filter

Air is drawn through the pre-cleaner down the inlet tube; then passes through the oil bath, and via a series of wire mesh screens into the engine.

Foreign particles are retained by the oil in the oilbath or collect on the oil-soaked wire mesh screen.

- 1 Both types of filter should be serviced at intervals recommended by the manufacturer. **UNLESS THE CONDITIONS OF WORK ARE IN RAIN OR DUST!** In these bad conditions the filters require more frequent servicing.
- 2 Some dry type filters incorporate a visual indicator which shows when the element requires cleaning or changing.



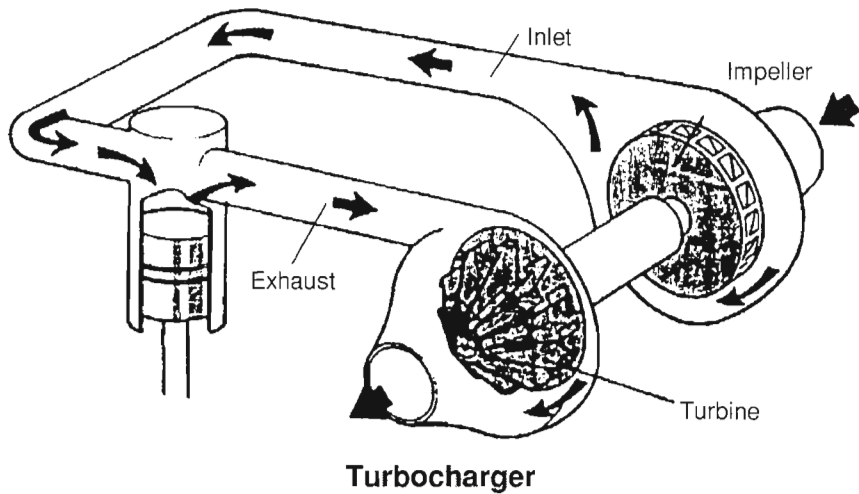
Oilbath type air filter

Turbocharger

Some engines have a turbocharger fitted. Exhaust gases from the engine drive a turbine at very high speed. The turbine is connected to an impeller which forces air under pressure into the induction manifold. The pressurised air increases the efficiency of the engine.

The engine should be run at a high idle speed for one minute before stopping. If this procedure is not complied with, the turbocharger can continue to run for a considerable time after the engine has stopped. As the turbocharger is lubricated from the engine lubrication system, it may then suffer loss of lubrication and seize up.

Note: Turbocharger speeds of 65,000 rpm are common. Special precautions must be taken when stopping a turbocharged engine.



Fuel system

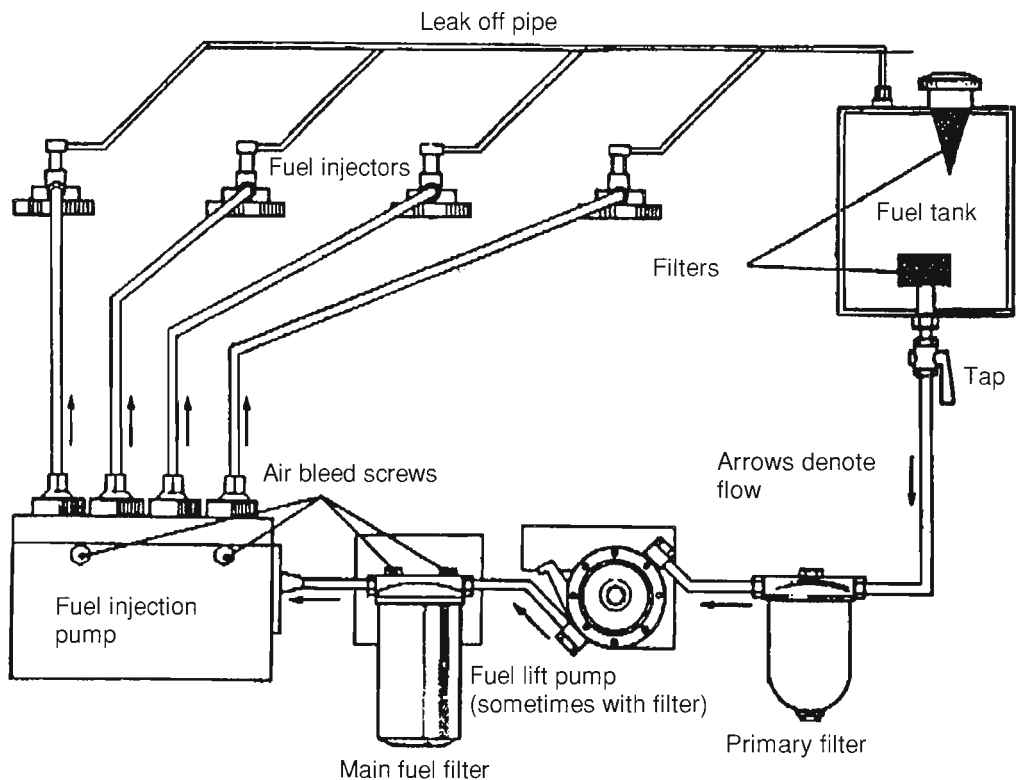
Fuel systems are designed and adapted by manufacturers to suit their particular requirements. Basically, they consist of standard components.

A supply of fuel is contained in the fuel tank. From there it is delivered via the *primary fuel filter*, which filters out coarse grit and foreign matter, and through the *fuel lift pump* to the *main fuel filter* which removes the finer particles. Next it goes to the *injection pump* which measures, pressurises and delivers the fuel to the engine's injectors by way of high pressure pipes, at the correct time. *Excess fuel* is delivered back to the fuel tank.

Diesel fuel is injected either into the cylinders by *direct injection*, or by injection into a *pre-combustion chamber*.

Direct injection takes place through several small atomising orifices, directly into the cylinder, where it is ignited. Multiple orifices, particularly of small size, increase the risk of clogging.

Pre-combustion designs inject through one large orifice into a pre-chamber where the fuel is atomised, and burning begins. The mixture then passes into the cylinder where complete combustion occurs.



Fuel injection system

Bleeding the fuel system

If air has entered the system, through lack of fuel, loose connections, fractured pipe etc. the engine will either stop or badly misfire. After the cause of the entry of air has been rectified, the system must be 'bled' as follows:

Note: This procedure should be carried out by a trained and competent person.

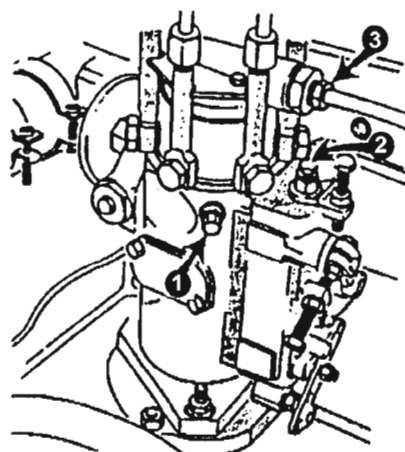
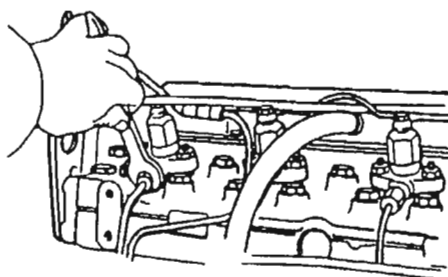
In-line fuel pump

- 1 Check adequate supply of fuel in the tank.
- 2 Check that the fuel cap air vent is clear.
- 3 Open the air bleed screws on the filters and prime by operating the lift pump until fuel flows free of air. Continue pumping whilst tightening the vent screws.
- 4 Carry out procedure (3) at the injection pump and restart the engine.

DPA fuel injection pump

On DPA pumps open the air bleed screws on the main filters, pump body and governor housing. Operate the priming lever and close the bleed screws in the following order: fuel filters, pump body and then governor housing. Also slacken and bleed at pump inlet union.

Note: If the engine still misfires, reopen, bleed and close each screw in turn working from the fuel tank towards engine.



- 1 Hydraulic head locking screw
- 2 Mechanical governor vent screw
- 3 Fuel pump inlet union nut

Set throttle in RUN position and bleed two of the injectors using the engine starter motor. Start engine and check for misfire. If misfire persists repeat process with remaining injectors.

Always take care to observe regulations concerning avoidance of fuel spillage onto site surface causing pollution.

Fuel tank

Only *clean fuel* must enter the tank, through a filter in the filler. Fuel tanks may 'sweat' inside during the night due to condensation and, to prevent this, they should be filled at the end of each day.

Avoid topping up with fuel from the bottom of a storage drum that may be contaminated with dirt or water.

Filters

These must be cleaned at intervals recommended and, where replaceable types are employed, new elements and gaskets fitted. If the presence of dirt or water is suspected then the whole system should be cleaned.

Fuel lift pump filter

This, with the sediment bowl, if fitted, must be cleaned regularly. Care must be taken in refitting so as not to damage the filter and gasket(s).

Fuel injection pump governor

Normally lubricated from its own sump, it must be checked regularly for correct oil level. Drain and refill in accordance with the maker's instructions.

No attempt should be made to tamper with or adjust the governor.

Starting Aids

Ignition of fuel in diesel engines depends upon high temperature of the inducted and compressed air. It is sometimes necessary during cold weather to assist the ignition of the fuel. Two types of device are in general use, an *excess fuel device* and a *glow plug device*.

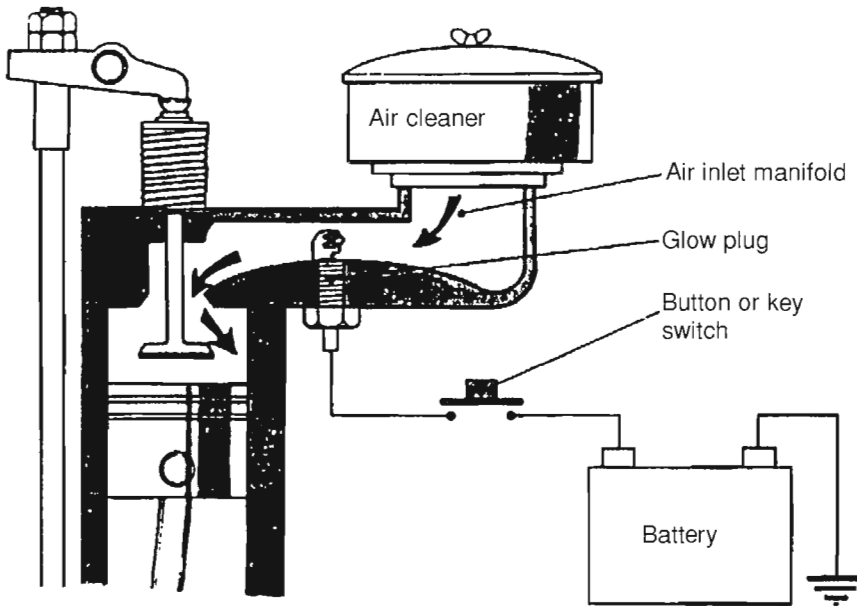
Excess fuel device

This allows delivery of an excess amount of fuel to the combustion chambers. It is normally operated by a control button on the fuel injector pump housing. The throttle must be open *before* setting the button. The device disengages automatically when the engine starts.

Glow plug device

An electric element fitted in the induction manifold (or in some cases, in each pre-combustion chamber) is operated by a control switch. When the starter is engaged, the inducted air flows over the element and is warmed to assist ignition.

Note: A variation, known as the THERMOSTART, injects fuel into the induction manifold where it is ignited by the glow plug to produce a flame to assist ignition.



Glow plug device

Lubricating system

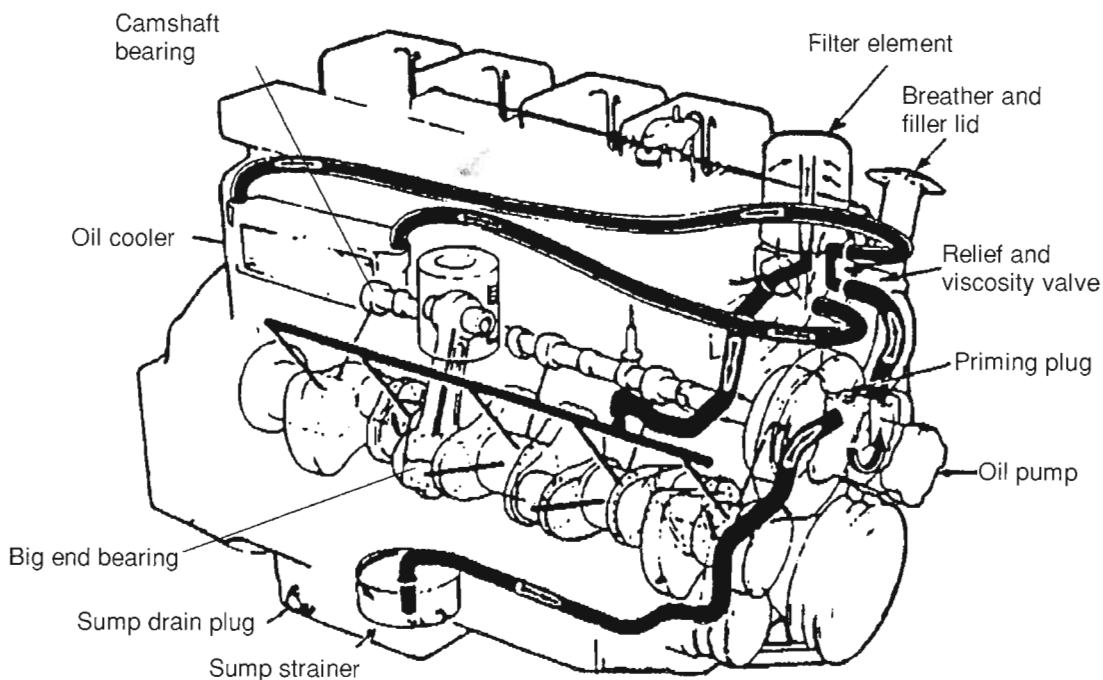
Without oil between the moving parts, wear through friction would be excessive and power would be lost. The heat generated would cause expansion and seizure of the parts.

Oil reaches the main and big-end bearings, camshaft bearings and rocker shaft under pressure. It bleeds out of the rocker shaft bearings and returns to the sump by gravity. The oil is heated by its contact with the moving parts, so this heat is removed by either an oil cooler fitted in the system, or by the movement of air past the surface of the sump. Foreign matter washed from the moving parts and passageways of the engine by the oil, either falls to the sump or is held in suspension by detergent oil and then removed by the filter.

The oil level in the sump should be checked before starting the engine. Remove the engine oil level dipstick, wipe clean and replace in the engine. Remove dipstick again and check the oil level against marks. If the level is low add clean oil until the correct level is obtained. **Do not overfill.**

Immediately after the engine is started, the oil pressure gauge should be checked for the correct pressure reading. A warning light is usually fitted to warn of low oil pressure. This warning light or gauge should be checked occasionally throughout the day for correct reading.

Any excessive oil consumption, unusual noises or vibrations should be noted and reported.

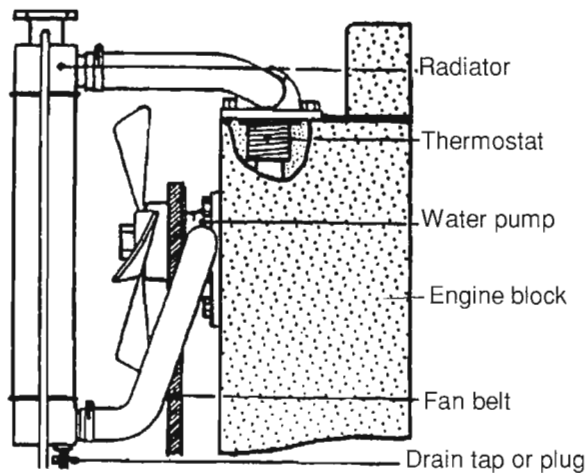


Typical lubricating system

Cooling System

Liquid cooling

The cooling system is designed to dissipate excessive heat. The engine cylinder block and head contain passages to allow circulation of the coolant (water). The system includes a *radiator* which provides a large cooling area and acts as a reservoir, a *fan* to increase the cooling air flow and a *thermostat* to restrict the flow of water to the radiator until correct working temperature is reached.



Radiator and fan

The coolant is circulated by a water pump and by the fact that heated water rises to the top of the radiator through convection.

Most liquid cooling systems are pressurised, using a special *radiator cap*, to allow higher working temperatures. Exercise **extreme caution** to avoid being scalded when removing the pressure cap from a **hot radiator**.

Air cooling

Another method of cooling is to provide each cylinder with finning over which cooling air is blown by a fan (blower). Ducting around the cylinders contains and guides the air down one side of the engine, around the cylinders, and then exhausts to atmosphere.

Maintenance of Cooling System

The system should be checked daily for:

- sufficient and correct type of coolant
- correct fan belt tension and condition
- cleanliness of air passages

During cold weather always be aware of the operating temperature of the engine of the machine. A temperature gauge or warning light is generally fitted for this purpose.

Electrical System

To start the engine, the crankshaft must be revolved. Diesel engines employ an electric starter motor powered from the battery to perform this function. The motor is mounted on the engine and, when the starter switch or button is engaged, the motor turns a small sliding pinion which meshes with a gear ring around the flywheel. The starter motor pinion gear disengages automatically when the engine starts.

The starter motor mounting bolts and connections require occasional checking for security.

The battery, (or more than one battery) is maintained in a charged condition by a *dynamo* or an *alternator*. The batteries also supply electrical current for the lights, horn, windscreen wipers etc.

Batteries

Electrolyte (the acid liquid in batteries) should be checked regularly to ensure that it covers the plates. *Distilled water only* should be used to top it up.

In addition to checking the level of the electrolyte the following regular checks should be made.

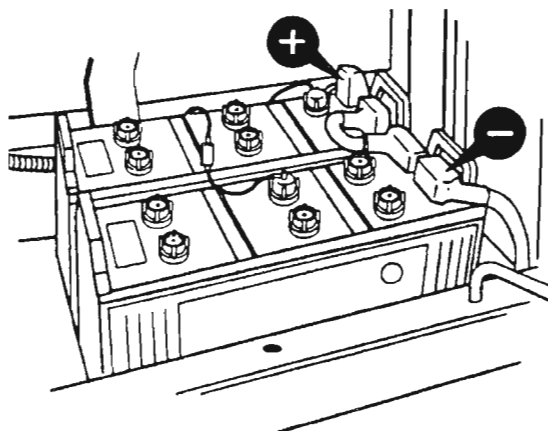
- Battery posts clean and free from corrosion.
- Terminals secure and clean.
- Batteries secure in their mountings.
- Filler caps in position with the air vents kept clear.

For the charging of MEWP's powered by batteries always consult the manufacturers handbook with regard to 110v to 240v charging and the correct and safe procedures for that particular machine.

Note: Due to the presence of flammable gas given off in use, naked lights must not be allowed near batteries.

Ammeter

This is a gauge mounted on the instrument panel. It indicates the amount of charge current the batteries are receiving from the dynamo/alternator, or if a discharge (negative) situation applies. Whilst the engine is running the ammeter will normally indicate a positive charge.



Dynamo or Alternator

The purpose of the dynamo or alternator is to keep the batteries fully charged to enable all electrical circuits, including lights, and to keep them fully operational.

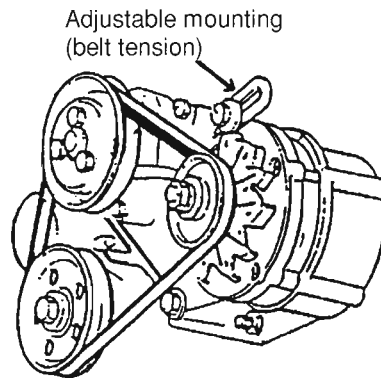
The mountings should be checked at regular intervals for security and, in addition, the end bearings lubricated in accordance with manufacturer's recommendations.

No engine should be run with the batteries disconnected as this may damage the dynamo/alternator internal components.

Note: When a power unit is fitted with an alternator:

It is essential that the alternator is disconnected, to avoid damage to internal components, before any electric arc welding is carried out on either the machine or its attachments.

The ignition switch **must** be in the ON position when the engine is running, and OFF when the engine is **stopped**, or the batteries disconnected.



Alternator

Belt drives

Cooling fan, dynamo, alternator, exhaustor, water pump and compressor are generally driven from the engine crankshaft pulley by means of one or more belt drives.

These belts require regular attention to ensure serviceability and correct drive tension. Usually adjustment is made by moving one pulley closer to, or further away from, another pulley; or by employing a spring-loaded jockey wheel riding on the belt to limit the amount of slack

Always refer to the maker's handbook for the correct belt adjustment.

Multi-belts must always be replaced as a *complete set*. If more than one belt runs on the same set of pulleys, all must be replaced in any fail.

MODULE FIVE – STARTING UP

Checks Before Starting

(as applicable)

- ⇒ Engine oil
- ⇒ Hydraulic oil
- ⇒ Coolant
- ⇒ Fuel - (Petrol, Diesel, Gas)
- ⇒ Battery terminals secure and clean
- ⇒ Battery electrolyte level
- ⇒ Tyre pressures
- ⇒ Wheel nut security
- ⇒ Security of platform/cage locking bar etc.
- ⇒ Usual inspection of machine - lights, horn, warning devices and communication
- ⇒ All decals clean and legible

Note: LPG powered vehicles should not be refuelled in a confined space. Any spillage of fuel will quickly and dramatically expand into a large gas cloud. The gas will the accumulate at the lowest point and create an explosive hazard.

Operational checks

- ⇒ Function of all controls
- ⇒ Limit switches
- ⇒ Emergency lowering devices
- ⇒ Emergency stop buttons

The above checklist is not exhaustive and reference should always be made to the manufacturers operating and maintenance manuals for each machine.

MODULE SIX – OPERATION

Safe Working Load

The safe working load (SWL) specified by the manufacturer, must never be exceeded. The SWL is marked on a plate or decal at the entrance to the basket of platform. The plate or decal should be clean and legible.

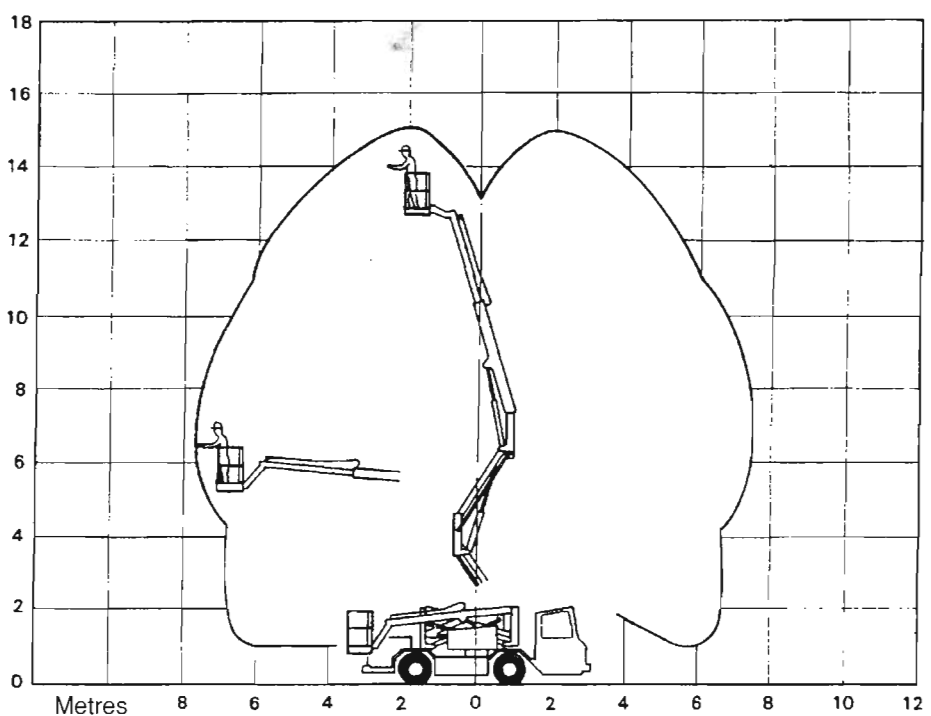
The plate or decal may state the maximum number of persons as well, if it does not, 80-85 kg of the SWL should be allowed for each person.

Care must be taken not to exceed the SWL with tools and equipment or by an accumulation of debris (cement plaster etc.) or the removal and lowering of pipework, window frames etc.

Any tools or equipment should be evenly distributed on the platform.

Operating Envelope

All configurations of mobile elevating work platforms have an operating area or envelope. With scissor lifts, the operating envelope may be just straight up for the width of the platform; with articulated booms, it is a more complex shape. As maximum height and maximum reach are not usually available at the same time, care is needed to ensure that the intended work area is within the machines' operating envelope.



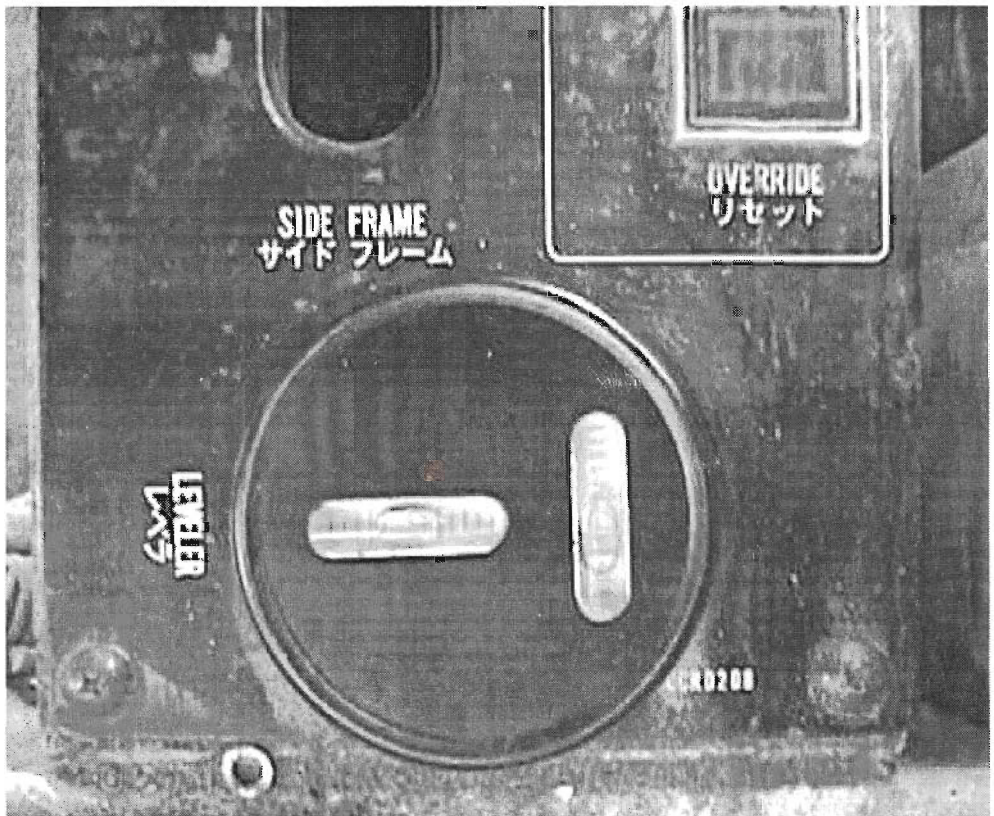
Stabilisers

Some MEWP's are fitted with outriggers or stabilisers these must always be deployed as per the manufacturers instructions.

Attempting to operate the MEWP too close to a wall or building etc. can make it impossible to fully extend the outrigger and therefore unsafe to use.

The ground condition that will support the outrigger must be checked to ensure that it is firm and will support the load with the use of adequate packing if necessary and that there are no manhole covers, cellars, uncompacted backfill etc.

When outrigger or stabilisers are employed the machine must be accurately levelled across both planes. Most MEWP's with outriggers are fitted with an inclinometer, so that the operator can be sure that the machine is level.



Inclinometer

Basket or Platform

The basket or platform will usually have a locking bar or safety gate. Whenever the platform is used the locking bar or safety gate should be securely fastened. Steps, ladders, hop ups or boxes must never be used on the platform to gain

extra height or reach. Do not lean out of the basket and keep your hands clear if operating close to walls etc.

The platform must never be used as a crane or hoist, no loads should ever be suspended from it and it should never be tied into any structure.

It should not be used primarily for the transfer of goods or materials.

The operators safety harness should only be secured to the platform and never to any outside source. If tools or equipment can be dropped from the platform then the area beneath should be cordoned off

Remember. The MEWP is a temporary means of access.

Wind and Wind Speeds

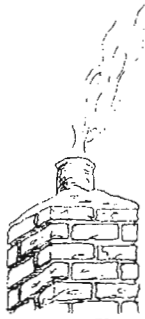
A MEWP must not be used in wind speeds exceeding those specified by the manufacturer. One commonly specified wind speed is that of 30 m.p.h. Beaufort Scale 6 - Strong breeze

Wind force number	Description of wind	Wind effect locally	Speed (mph)	Speed (m/sec)
0	Calm	Calm, smoke rises vertically	1	0-1
1	Light air	Direction of wind shown by smoke drift, but not by wind or weather vanes	1-3	1-2
2	Light breeze	Wind felt on face, leave rustle. Wind or weather vane move	4-7	2-3
3	Gentle breeze	Leaves or small twigs in constant motion. Wind extends light flags	8-12	3-5
4	Moderate breeze	Wind raises dust and loose paper. Small branches move	13-18	5-8
5	Fresh breeze	Small trees in leaf begin to sway. Little crested wavelets form on inland waters	19-24	8-11
6	Strong breeze	Large branches in motion umbrellas used with some difficulty	25-31	11-14
7	Near gale	Whole trees in motion. Becoming difficult to walk	32-38	14-17
8	Gale	Twigs break of trees. Progress in generally impeded	39-46	17-21
9	Strong gale	Chimney pots, slates and tiles may be blown off. Other slight structural damage may be caused	47-57	21-24

Beaufort wind scale for use on land (numbers 1-9)

Light breeze

4 – 7 mph
Breeze felt on
face, leaves
rustle

**Gentle breeze**

8 – 12 mph
Leaves and
twigs move
constantly

**Moderate breeze**

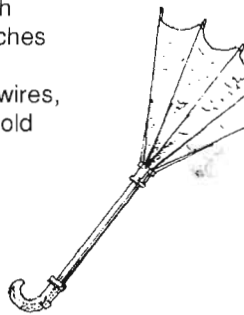
13 – 18 mph
Dust and paper
blown about

**Fresh breeze**

19 – 24 mph
Small trees seen
to sway

**Strong breeze**

25 – 31 mph
Large branches
move, wind
whistles in wires,
difficult to hold
umbrella

**Moderate gale**

32 – 38 mph
Large trees sway,
feel some
resistance when
walking



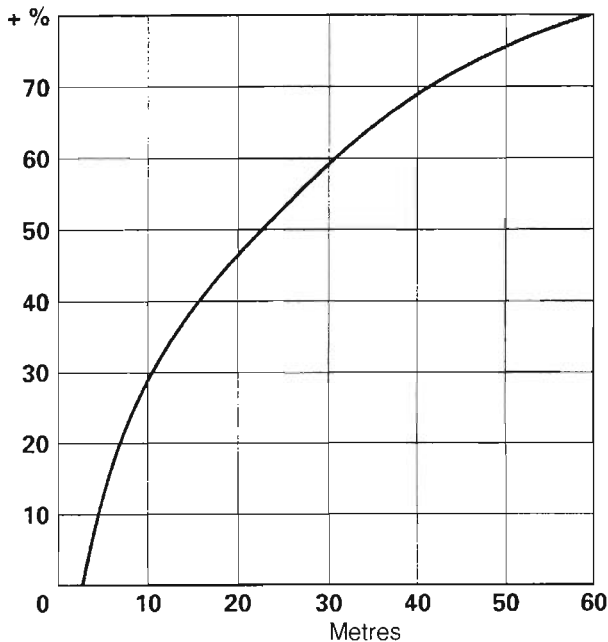
Wind chill factor. On a calm day 10°C is cool but not unpleasant, but with a wind of 20 mph the temperature experienced on the face and hands is 0°C. If the day is very cold, about freezing, the temperature experienced on the skin will be down to - 15°C, making it very difficult for the operator to work safely unless properly clothed and equipped.

Care should be taken when using MEWP's between buildings or on the corners of large flat buildings where the funnelling effect or eddy currents can double the force of wind compared with that measured in open spaces.

The height at which the platform is being used will have an effect on the wind speed.

The table shows the percentage to be added or subtracted to ground level wind speeds for varying heights.

Percentage to be added to ground level windspeed to correct for working height

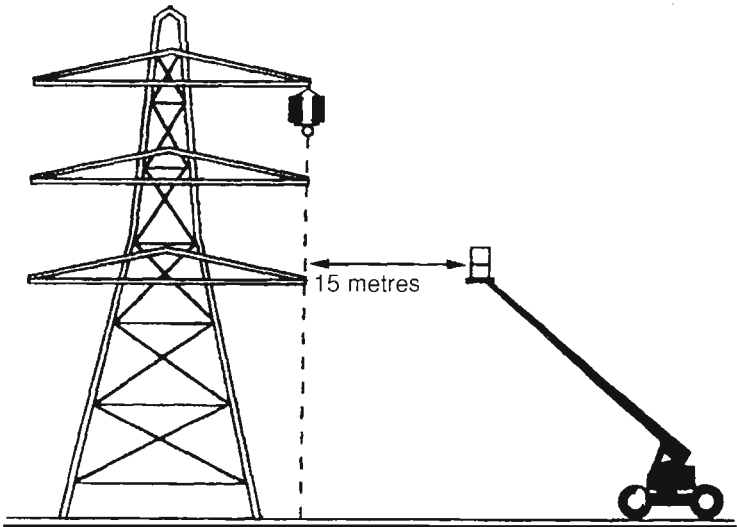


Height above ground at which platform will be used

Overhead Power Cables

Always maintain a safe distance (See HSE guidance note GS6).

The absolute minimum distance from the furthest point of outreach of the machine to the ground level barrier or point directly beneath the outermost conductor must be at least 6 metres but consultation with the regional electricity company is recommended. BS 7121 (Safe Use of Cranes) recommends that no part of the machine should be closer than 15m to any overhead lines on a steel tower (9m on wooden poles)



Travelling in Operational Mode

Travelling with the platform occupied or boom extended should only be undertaken when this mode of operation is within the machine's specified capabilities. Travel must never take place with outrigger or stabilisers extended, unless the machine is designed to function in this way.

Before travelling, a check should be made to ensure:

- ⇒ no ramps, trenches, holes or other ground obstructions lie in the path of travel.
- ⇒ no overhead electrical cables, building projections or other overhead hazards will be encountered.
- ⇒ adequate warning has been given to persons on the ground
- ⇒ a signaller or other responsible person is employed, if necessary
- ⇒ nothing has been left unsecured and liable to fall off
- ⇒ no trailing hoses, cables, wires on the unit or other snagging hazards are in the path of travel

Travelling up and down includes and traversing slopes should only be undertaken within the limits laid down by the manufacturers.

Specially designed units, designated as 'rough terrain' can operate (usually without any stabilisers or outriggers) on construction and other sites where ground conditions may not permit a standard type vehicle to be used.

Tandem Use

No two platforms should be linked together or bridged, unless the requirements specified for this type of use in HS(G)19 are met. Manufacturers can advise on the interlocking of platforms and controls so that one set of controls operates both platforms, allowing directional stability to be maintained at all times.

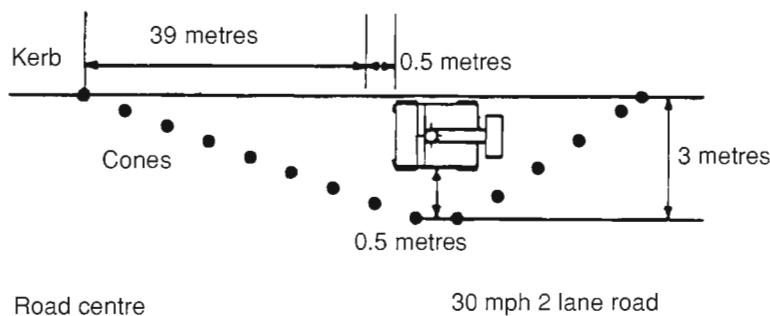
If a unit is being used in conjunction with a crane or some other appliance, a safe system of work must be planned and implemented; it should clearly define individual responsibilities and set out precise arrangements for communication.

Work on or Near a Highway

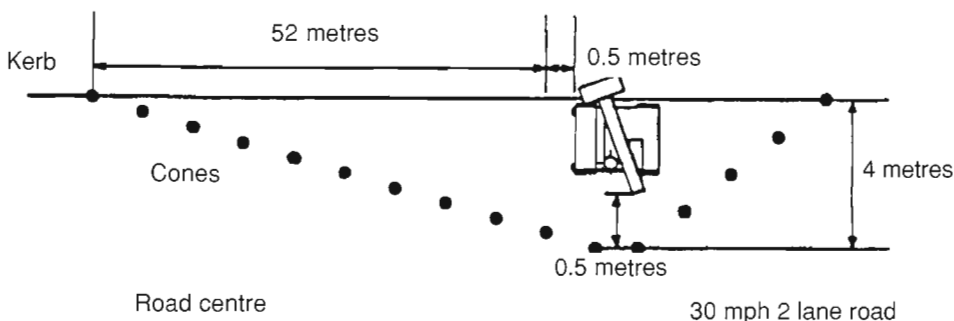
Care should be taken with articulated booms that the elbow does not encroach traffic lanes. Cones and barriers should be set out as defined in the New Roads and Streetworks Act 1991 Sections 65 and 124.

If the work platform is to be used on the road for work over the footway or pedestrian area. The area must be laid out to conform with the Act and the

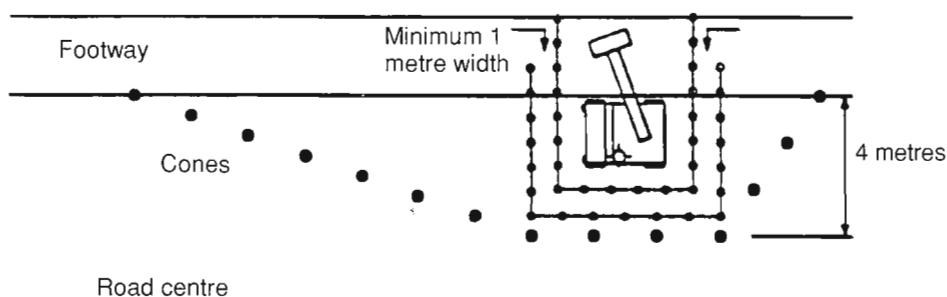
vehicle must have one or more roof mounted beacons operating when on the public highway along with the appropriate signs.



If the boom is articulated and the elbow position is to protrude into the road then this area must also be coned off.



If there is a danger of dropping tools or material onto the footway then it must be made safe with the use of barriers.



It is recommended that before operating a mobile work platform in a public area that the operator should be fully conversant with the. "Safety at Street Works and Road Works" Code of Practice.

Personal Protective Equipment

Operators of MEWP's should wear:

- Harness, securely attached to basket or platform
- Safety helmet with chin strap
- Safety footwear
- Warm clothing if working at heights
- Safety gloves, goggle, ear defenders (dependent on work undertaken)

MODULE SEVEN – MAINTENANCE

Maintenance Programme

All machines are expensive. If users are to obtain a profitable return on plant investment, it is essential that the machine is maintained fully and economically.

An efficient maintenance programme makes use of all available resources. These include the operator, the site mechanic, depot mechanic and various workshop facilities.

The object will be to:

- ⇒ maintain maximum output from the machines
- ⇒ obtain maximum working life between overhauls
- ⇒ as far as possible prevent breakdowns on site

Generally, maintenance can be divided into two categories:

- ⇒ planned
- ⇒ preventative

An effective maintenance programme should be a combination of the two.

Planned maintenance

This is an overall plan designed to ensure that the machines are fully maintained with the minimum number of staff. Aim for an even work load on the maintenance department.

The plan should take into consideration:

- ⇒ company policy
- ⇒ length of time the machine will be retained
- ⇒ type of machine
- ⇒ type of work for which it will be used
- ⇒ expected hours the machine will work by day, week, month etc.

Previous experience, and knowledge obtained from records or other sources or different machine characteristics, can assist greatly in the formulation of such a plan. Regular technical inspections are necessary to allow amendments to the plan as needs arise, also to ensure that operator maintenance is being carried out efficiently. The reports from these should indicate:

- ⇒ the location of the plant
- ⇒ the lubrication and cleanliness state of the machine
- ⇒ the mechanical state of the machine. Show repairs that require immediate action; repairs that should be effected in the very near future; and those that can safely be carried forward to a more convenient date
- ⇒ the total machine hours

Records of field servicing, adjustments and running repairs will assist in amending and updating the overall maintenance plan. The plan must be sufficiently flexible to allow for unforeseen circumstances, such as machine damaged in transit etc.

Preventative maintenance

This is a series of checks and inspections performed at regular intervals. They are designed to extend the working life of the machine, and prevent premature and unexpected failure of components.

The inspection will be of the whole machine to assess general wear and condition of parts, and allow ordering of any replacements. It will also allow the arrangement of machine time so that repairs or replacements can be effected with the least interruption to the work schedule.

The operator's contribution to preventative maintenance is of prime importance. It is essential that adequate time and facilities are given. Supplies of materials (oils, greases etc.) should be always to hand, with suitable provision for storing them.

All maintenance should be carried out in accordance with the machine manufacturer's schedule or as dictated by company policy.

MODULE EIGHT – SAFETY CHECKLIST

Safety checklist

- ⇒ Has the daily inspection been completed?
- ⇒ Are safety harnesses and helmets always worn?
- ⇒ Ensure that the wind speed is not excessive
- ⇒ Are the correct signs and barriers erected?
- ⇒ Ensure that there are no restricted or confined space hazards
- ⇒ Is the operative authorised and fully fit?
- ⇒ Ensure that the safe working load is not exceeded
- ⇒ Ensure that it is all clear overhead
- ⇒ Ensure that the ground conditions are satisfactory
- ⇒ Are all outriggers and stabilisers safely deployed?
- ⇒ Make sure that the machine is level
- ⇒ Ensure as far as possible that there are no cellars or drains beneath the area where you are working
- ⇒ Make sure that all tools and materials are secure
- ⇒ Make sure that the platform is not slippery or obstructed
- ⇒ Ensure that all work is within the specified reach of the unit
- ⇒ If movement is planned ensure that the route is clear and safe

MODULE NINE – TRANSPORTATION

Statutory Requirements

The Road Traffic Act (UK)

In certain cases the minimum age for drivers is 21 years (Motor Vehicles (Driving Licences) Regs. 1995). Vehicles should be registered and taxed in accordance with the Road Traffic Act.

Transportation of Plant

Loading and unloading

Accidents when plant is being loaded or unloaded to and from a transporter are all too common. They are usually the result of too little thought being given to the task.

Before loading or unloading check:

- that the transporter is capable of taking the weight of the machine to be loaded and is in a safe condition
- that the ground is capable of taking the weight of transporter plus load (e.g. transporter wheels will not sink and cause instability)
- that there are no overhead obstructions, e.g. live power lines
- that the transporter is parked in a straight line and its brakes are engaged
- that signals are taken from one person; normally the transporter driver
- that the machine is lined up with the ramps correctly and that the drive on to the ramps is carried out with caution
- that the weight of the machine is transferred smoothly from ramps on to transporter (eased over the point of balance)
- that the position of the plant on the transporter is to the driver's satisfaction (they know the axle loadings)
- that when machine is correctly positioned the brakes are applied; attachments lowered; gears disengaged and the machine secured

Note:

On some semi-low-loaders, jacks should be lowered to support the platform during loading. If jacks are not fitted, other forms of packing such as wooden sleepers or blocks should be used.

If loading or unloading must be carried out on a public highway, or near a public footpath, ensure suitable precautions are taken to protect the public, e.g. use of signaller to control traffic, use of traffic cones.

If the machine is travelled on the public highway ensure that all requirements of the road traffic act are complied with and that:

- ☞ The back end equipment is locked up
- ☞ The independent foot brakes are locked together
- ☞ Nothing is carried in the front bucket other than ancillary equipment

Slow-moving vehicles are required to have an amber flashing beacon if travelling at less than 25 mph on dual carriageways.

If a slow-moving vehicle has a queue of traffic behind it, it is required to pull over if a suitable side road, lay-by etc. can be found, so as to allow vehicles to pass.

MODULE TEN – REGULATIONS

Provision and Use of Work Equipment Regulations 1998

Summary of Regulations, Codes of Practice (L22) and Guidance Notes

Regulation

- 4(1) Work equipment must be suitable for the purpose for which it is used.
- 4(2) When selecting equipment the employer shall have regard for the health and safety of persons affected by its use and the risks posed.
- 5 All work equipment shall be maintained in an efficient state, good working order and in good repair and if the machinery has a maintenance log, it shall be kept up to date.
- 6 Where a risk assessment has identified a significant risk to the operator or other workers from the work equipment, a suitable inspection should be carried out, by a competent person, at a frequency determined by the type of equipment, how it is used and the conditions it is used in.
A record of the results of the inspection shall be kept until the next inspection.
No work equipment shall leave an employer's undertaking or be obtained from another undertaking unless accompanied by a record of the last inspection to be carried out.
- 7 The use of the work equipment is restricted to authorised personnel and that repairs, modifications and maintenance are only carried out by trained, authorised personnel.
- 8 The employer shall ensure that all persons who use work equipment have adequate health and safety information and where appropriate written instructions.
The employer shall also ensure that supervisors and managers of work equipment have adequate health and safety information and where appropriate written instructions.
- 9 The employer shall ensure that persons who use work equipment and persons who supervise and manage the use of work equipment have received adequate training in its use, methods that may be adapted, risks in its use and precautions to be taken.
- 10 This regulation deals with conformity to European community requirements in so much as the machinery meets certain health and safety requirements and is CE marked.

- 11 Regulation 11 deals with dangerous parts of machinery and the fixing of guards, interlocks etc. It also details the need for information, instruction and training where maintenance or adjustments may need to be carried out with the machinery running.
- 12 This regulation deals with specified hazards and the need to prevent them.
Regulation 12(3) states "any article or substance falling or being ejected from work equipment" (*Tools or Equipment falling*)
- 13 This regulation deals with protection of employees from very hot or cold surfaces. (*Exhaust pipes, hot engine etc.*)
- 14-18 These regulations deal with control systems. Start controls, stop controls, emergency stop controls and the marking and signing of controls. All controls should be clearly marked to show their function.
- 20 This regulation deals with stability and states that work equipment must always be used within its limits of stability.
- 21 This regulation deals with suitable and sufficient lighting for operation of work equipment.
- 22 This regulation deals with maintenance operations and the need to shut down the machine or if it needs to be running the precautions that need to be taken to ensure the health and safety of the employees.
- 23/24 These regulations deal with markings and warnings with regard to health and safety. (*Crush zones, Reversing horns, etc.*)
- 25/26 These regulations deal with employees carried on mobile work equipment. The equipment must be suitable for carrying persons and be safe. It needs properly constructed seats and must be driven at safe speeds. If after carrying out a risk assessment there is a danger from falling objects then a falling object protective structure (FOPS) is required and similarly if there is a risk of overturn of more than 90 degrees then a roll over protective structure (ROPS) is required. To prevent injury from sudden movements etc. a suitable restraining system should be fitted, this will generally be a seat belt.
- 27 This regulation deals exclusively with overturning of fork lift trucks and states that if the vertical mast is strong enough to prevent rollover of more than 90 degrees then only suitable restraining systems are required (e.g. seat belts) if the mast is not of sufficient strength or if the machine does not have a vertical mast then a ROPS roll over protective structure and a restraining system must be provided.
- 28 This regulation deals with the drivers field of vision and requires adequate devices to improve the drivers field of vision, e.g. plane, angled and curved mirrors, fresnel lens, radar and cctv. It also deals with emergency braking, the fitting of lights for work in the dark and the fitting of fire extinguishers in mobile plant where escape cannot easily be achieved

Lifting Operations and Lifting Equipment Regulations 1998

Summary of Regulations, Code of Practice (L113) and Guidance Notes

Regulation 3 deals with ensuring that the work equipment is so constructed or adapted as to be suitable for the purpose for which it is intended to be used or be provided. It also states that the employer shall have regard to the working conditions and risks to the health and safety of persons by the use of the work equipment. This takes in the designing of the machine to avoid operator strains and stresses, the safety of materials used in the manufacturing, safe means of access and egress with due regard to protection against slips, trips and falls. It identifies the need for operator protection from the environment and the need for appropriate devices to measure wind speeds, where lifting equipment or its load may be affected by high winds.

Regulation 4 deals with strength and stability. It requires that lifting equipment is of adequate strength and stability for each load and that any part of the load or any equipment used for lifting the load is of adequate strength and stability. Where stability depends on the use of stabilisers the equipment should not be used unless they are in place and operating effectively. Where equipment is dismantled and reassembled it should be ensured that the equipment is stable in all conditions. Particular care should be taken of the ground and other surfaces on which the equipment might be used. Mobile equipment with pneumatic tyres should not be used to lift loads unless the tyres are inflated to the correct pressures, suitable means to check the pressures must be provided.

Where there is a significant risk of overturning and/or overloading from the use of the equipment it should be provided with appropriate devices such as rated capacity indicators or rated capacity limiters.

Timber pallets are examples of items that are part of the load and such should be of adequate strength for the load they are to support.

Regulation 5 deals with lifting equipment used for lifting persons.

It states that the equipment must be such that it prevents a person being crushed, trapped or struck or falling from the carrier. It must have suitable devices to prevent the risk of a carrier falling and that if any person is trapped in a carrier they are not exposed to danger and can be freed.

The guidance states that people should never be lifted on the fork arms or a pallet, but that a properly maintained, purpose built working platform with guard rails and toe boards must be provided and it should be fixed to the machine so as to prevent it being displaced or tipping unduly.

There should be guards or screens to prevent occupants from reaching any dangerous parts of the machinery and they should be protected from overhead hazards. The floor of the carrier should be non slip.

Where persons could become stranded by a malfunction of the machine they must not be exposed to danger and a reliable means of rescue must be available.

Any equipment used for lifting persons should have a safety coefficient of 2:1 as to the strength of the equipment when used for lifting. e.g. derate the equipment by half its safe lifting capacity when lifting persons.

Regulation 6 deals with positioning and installation and states that lifting equipment shall be positioned so as to minimise the need to lift loads over people, and to minimise the risk of crushing people in any configuration.

If lifting suspended loads, then measures must be taken to prevent the freely suspended load from moving in an uncontrolled manner and ensure that all hooks and other similar devices are of the type that reduces the risk of the load becoming displaced.

Regulation 7 deals with the marking of lifting equipment and requires all lifting equipment (machinery and accessories) to be clearly marked to indicate their safe working loads.

Where the safe working load depends on the configuration of the machine, the machine shall be clearly marked to indicate the safe working load for each configuration or the information which indicates the safe working loads for each configuration shall be kept with the machine. All accessories for lifting shall be clearly marked so that it is possible to identify the characteristics necessary for their safe use.

Lifting equipment for lifting persons shall be appropriately and clearly marked to this effect and clearly show the maximum number of persons that can be carried and lifting equipment that is not designed for lifting persons but could be used in error for lifting persons shall be clearly marked to indicate that it is not designed for lifting persons.

All work equipment must be clearly marked with any appropriate markings for reasons of health and safety.

Regulation 8 deals with the organisation of lifting operations and requires that all lifting operations (any operation concerned with the lifting or lowering of a load) are planned by a competent person, that they are appropriately supervised and carried out in a safe manner.

British Standard BS7121 (Safe Use Of Cranes) sets out the procedures that should be followed and adherence to this standard will ensure that you are complying with Regulation 8 of LOLER.

- ⇒ An example of the requirements of a simple lift plan are;
- ⇒ Assess the weight of the load
- ⇒ Select the correct lifting accessories with regard to the size, shape and weight of the load and the environment in which it will be used
- ⇒ Check the anticipated route of the load
- ⇒ Select and check the landing area
- ⇒ Fit the lifting accessories(chains, slings etc.) in a safe and approved manner

- ⇒ Carry out the lift, with a trial lift to check centre of gravity, confirm safe attachment and attach tag lines if necessary
- ⇒ Land the load, on bearers etc. if necessary, and remove slings etc.

Some other factors to take into account that are mentioned in the guidance are:

Plan the lifting operation so as not to lift loads over areas occupied by persons or establish a safe system of work if this is not practicable.

Take adequate precautions where it is necessary to leave loads suspended.

Where the operator cannot see the load during the entire lifting operation ensure that a responsible person has appropriate means of communication to guide the operator.

All lifting accessories should be compatible with the load, only shortened in an approved manner, adequately and safely secured to the load and ensure that the lifting equipment is not operated unless the person attaching the load has given their authorisation to do so or authorisation has been given by some other authorised person.

Lifting operations should be halted when meteorological conditions deteriorate to the point when it could affect the integrity of the lifting equipment or endanger persons. e.g. high winds, sleet, snow etc.

Only use lifting equipment where there is sufficient headroom.

Lifting equipment should not be used in a manner likely to cause it to overturn, inadvertently move or slip and loads should not be dragged if it is likely to cause damage or overload the lifting equipment.

Suitable precautions should be taken to minimise the risks from proximity hazards.

Where appropriate the safe working load of lifting equipment should be reduced to take into account the environment or mode in which it is being used (this is usually referred to as derating).

Where lifting equipment primarily designed to lift loads is being used to lift persons, the control position of the lifting equipment shall be manned at all times and persons being lifted shall have a reliable means of communication with the equipment operator or other responsible person.

No load greater than the safe working load shall be lifted except for the purpose of testing when a competent person requires it.
Employees shall have appropriate instruction and training so that they are able to ensure that lifting equipment is safe to use (Pre use checks)

All lifting accessories shall be stored in conditions that do not lead to damage or deterioration.

Regulation 9 deals with thorough examination and inspection. All lifting equipment shall be thoroughly examined for any defect before it is put into service for the first time unless the equipment has not been used before and an EC declaration of conformity has been received that was made not more than 12 months before or if the equipment has been obtained from another undertaking that it was accompanied by physical evidence that the last thorough examination required by this regulation had been carried out.

Where the safety of lifting equipment relies upon its installation conditions it shall be thoroughly examined before being put into service for the first time and after assembly on a new site or in a new location.

All lifting equipment and accessories for lifting persons shall be thoroughly examined at least every 6 months.

All other lifting equipment shall be thoroughly examined at least every 12 months

If a company draws up an examination scheme the intervals between thorough examinations shall be determined by that scheme and the definitive timings above will not apply. The scheme should take account of the condition of the machine, the environment in which it is being used and the number of lifting operations and types and weights of loads being lifted.

All lifting equipment shall be thoroughly examined each time exceptional circumstances that are liable to jeopardise the safety of the lifting equipment have occurred irrespective of any of the above.

All equipment leaving a persons undertaking or being obtained from another persons undertaking shall be accompanied by physical evidence that the last thorough examination required by these Regulations has been carried out.

Where equipment is already in use a thorough examination as required by these regulations shall be made before the next examination would have been required under the old Regulations.

Testing will be carried out if the competent person decides it is necessary and the nature of the test and appropriate method of carrying out the test will also be determined by the competent person..

Where a risk assessment has identified a significant risk to the operator or other workers from the use of the lifting equipment then a suitable inspection should be carried out by a competent person at a frequency and extent dependent upon the potential risk from the lifting equipment.

Wherever lifting equipment or accessories are used they should be accompanied by physical evidence that they have been thoroughly examined as required by these Regulations.

Regulation 10 deals with reports and defects.

Any person making a thorough examination for an employer shall notify the employer immediately of any defect which in their opinion is or could become a danger to persons. As soon as practicable a report of the thorough examination in writing, authenticated by or for him/her by signature or equally secure means, containing the information required by Schedule 1 (see below) of the Regulations,

shall be given to the employer and any person from whom the equipment has been hired or leased.

Where in their opinion there is a defect involving existing or imminent risk of serious personal injury they shall send a copy of the report as soon as practicable to the relevant enforcing authority.

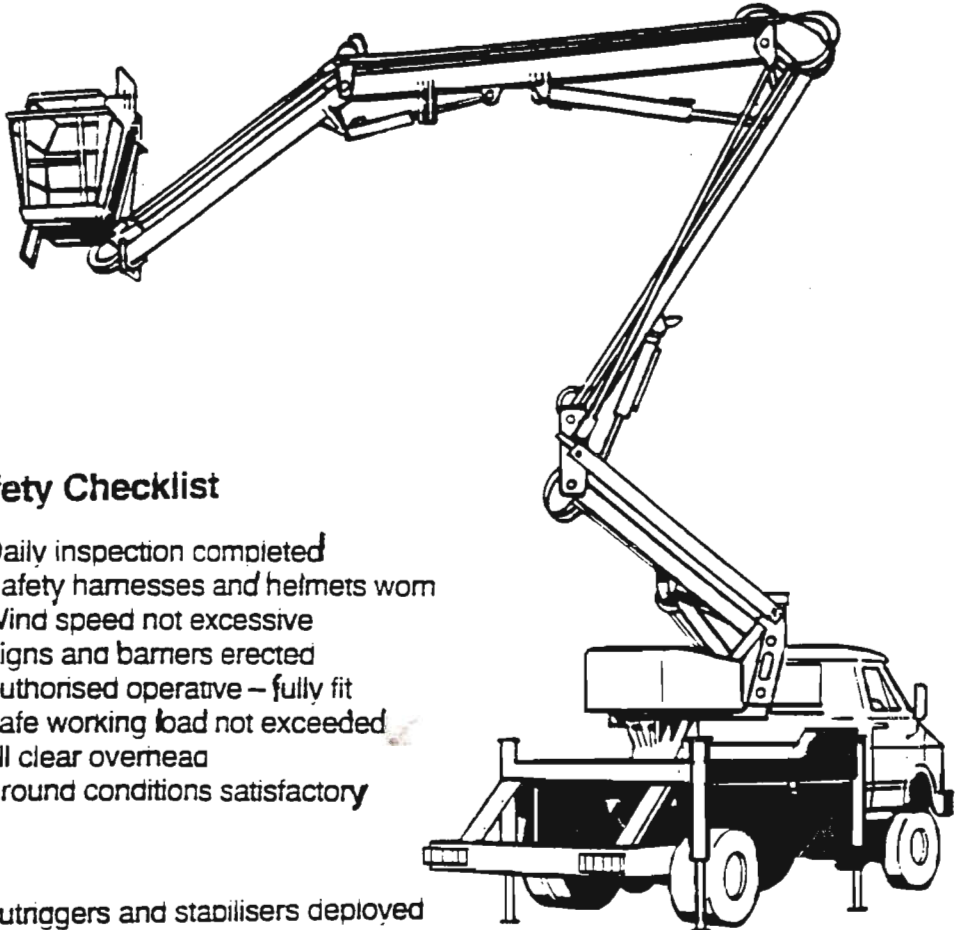
Where defects have been identified the employer shall ensure that the equipment is not used until the defects have been rectified

Information required in a report under Schedule 1.

- Name and address of employer for whom the thorough examination was made
- The address of the premises at which the thorough examination was made
- Particulars sufficient to identify the equipment, including where known the date of manufacture
- The date of the last thorough examination
- The safe working load of the equipment or where the safe working load is dependent on configuration, the safe working load for the configuration at which the equipment was last thoroughly examined
- If it is the first thorough examination after installation or assembly, that it such an examination and that it has been installed/ assembled correctly and would be safe to operate
- Whether it is an examination within
 - A 6 month interval under Regulation 9(3)(a)(i)
 - A 12 month interval under Regulation 9(3)(a)(ii)
 - In accordance with an examination scheme under Regulation 9(3)(a)(iii)
 - After the occurrence of exceptional circumstances under Regulation 9(3)(a)(iv) and if such be the case that the lifting equipment is safe to operate
- Identification of any part found to have a defect which is or could become a danger to persons, and a description of the defect
- Particulars of any repair, renewal or alteration required to remedy a defect found to be a danger to persons
 - In the case of a defect which is not but could become a danger to persons
 - The time by which it could become such a danger
 - Particulars of any repair or renewal required to remedy it
- The latest date by which the next thorough examination must be carried out
- where the thorough examination included any testing, particulars of any test
- The date of the thorough examination
- The name, address and qualifications of the person making the report, that he is self employed or, if employed the name and address of his/her employee
- the name and address of the person signing or authenticating the report on behalf of the author
- The date of the report

NOTES

Mobile Elevating Work Platforms



Safety Checklist

- ★ Daily inspection completed
 - ★ Safety harnesses and helmets worn
 - ★ Wind speed not excessive
 - ★ Signs and barriers erected
 - ★ Authorised operative – fully fit
 - ★ Safe working load not exceeded
 - ★ All clear overhead
 - ★ Ground conditions satisfactory
-
- ★ Outriggers and stabilisers deployed
 - ★ Machine level
 - ★ No cellars or drains beneath
 - ★ Tools and materials secure
 - ★ Platform not slippery or obstructed
 - ★ Work within specified reach of unit
 - ★ If movement planned route clear and safe
 - ★ No restricted or confined space hazards

USE OF SAFETY HARNESSES

**To be worn by everybody
working on a MEWP**

**Harness to be attached
to secure anchorage point
within the platform**

**Never attach safety harness
to anything outside
the platform**

CAUSES OF OVERTURNING

- **Collapse of standing area**
- **Overloading of platform (observe safe working load)**
- **Operating on slopes (keep unit level and stable)**
- **Travelling on unsuitable ground**
- **Attempting to travel with outriggers deployed**
- **Collisions with other vehicles or obstructions**

MAIN DUTIES OF OPERATOR

**Operate machine safely
and without risk**

**Operate machine in compliance
with manufacturers instruction**

**Ensure machine remains stable
and safe when in use**

**Not to abuse, ignore or
override any safety devices**

BASIC TYPES OF MOBILE ELEVATING WORK PLATFORMS

Scissor Lifts

Telescopic Boom or Jib

Articulated and Telescopic Boom

May be either:-

Towable units

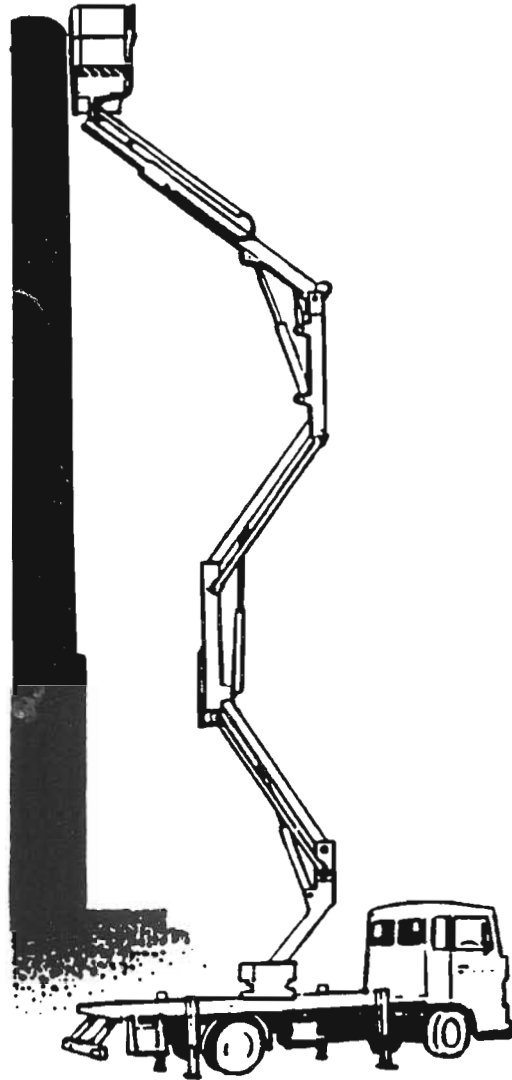
Vehicle-mounted

Self-propelled

Pedestrian-controlled

Articulating and Telescopic Boom

Usually vehicle mounted. Gives a wide range of reach and height, with platform mobility. Nearly always equipped with outriggers. There are specialist types giving, for instance, access to the underside of bridges from above.



CIN 074 - 13/4

HEIGHT AND REACH STEPS, LADDERS ETC.

Steps

Ladders

Hop-ups

or Boxes

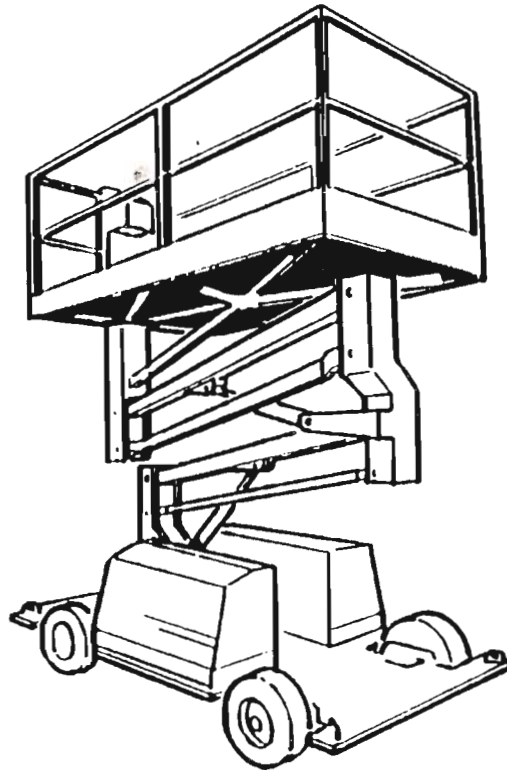
must NEVER be used

on the platform

to gain extra reach or height

Scissor Lifts

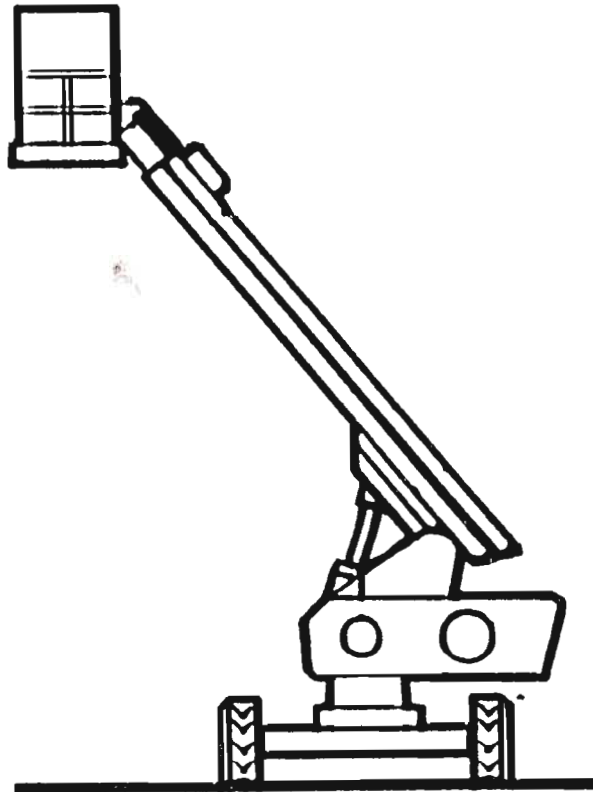
Vertical lift only. May be fitted with outriggers, depending on size and height to which it extends



CIN 074 - 13/2

Telescopic Boom

Gives vertical height and outreach. Platform may also be manoeuvrable



SAFE WORKING LOAD

Specified by manufacturer

Must not be exceeded

**Allow 80 or 85 kg of safe
working load per person**

**Do not allow accumulation
of work materials**

Avoid 'shock' loading

DEPLOYING OUTRIGGERS OR STABILISERS

**Outriggers or stabilisers must be
deployed when fitted to machine**

Before deploying check:-

machine level

ground will support loading

**no sewer, drain, manhole
or anything else that may
collapse is under machine**

WIND AND WIND SPEEDS

Commonly specified maximum wind speed for operation of MEWP

30 mph

(Beaufort Scale 6 - Strong Breeze)

High wind speeds may be created at the corners of large buildings

Wind speed may be 50% greater at 20 m above ground

CIN 074 - 13/10

TRAVELLING IN OPERATIONAL MODE

**Only within machines specified
capabilities**

Before travelling - Check

- **No ramps, trenches, holes etc.
in path**
- **No overhead hazards**
- **Adequate warning given to
others**
- **Signaller used if necessary**
- **Everything secure**
- **No trailing hazards**

PROHIBITED USES

**Mobile elevating work platforms
must not be used as:-**

jacks, props, ties or supports

**primarily for the transfer
of goods or materials**

**as a crane or
lifting appliance**



PLANT OPERATORS

SAFETY

AWARENESS

TRAINING

Instructors Notes

13. Mobile Elevating Work Platforms (MEWP)

13. SAFE USE OF MOBILE ELEVATING WORK PLATFORMS (MEWP)

OBJECTIVES - At the end of the training module.

The trainee should be able to:

1. Identify the basic types of mobile elevating work platforms and the functional differences between them.
2. Understand that safety harnesses and safety helmets should always be worn when working from mobile elevating work platforms, and the correct method of attaching the harness to an anchorage.
3. Be aware of the importance of 'safe working load' limits and the common causes of exceeding the limit.
4. Appreciate that steps, ladders, hop-ups or boxes must never be used on a platform to gain extra reach or height.
5. State the general points to be checked before deploying stabilisers or outriggers, and the checks that should be made before moving a mobile elevating work platform from one place to another.
6. Know what work mobile elevating platforms must not be used for and the common hazards associated with the use of mobile elevating work platforms and how they may be avoided.
7. Understand that only trained and authorised persons may operate mobile elevating work platforms.

13. SAFE USE OF MOBILE ELEVATING WORK PLATFORMS (MEWP) (cont'd.)

Legislation

1. Health and Safety at Work Act 1974 (Sections 2 and 6)
2. Factories Act 1961 (Sections 12 to 14)
3. The Management of Health and Safety at Work Regulations 1992
4. The Provision and Use of Work Equipment Regulations 1992
5. The Personal Protective Equipment at Work Regulations 1992

References

1. BS 5323:1980 Code of Practice for Scissor Lifts
2. BS 6289 Part 1:1982 Work Platforms. Code of Practice for Mobile Scissor-Operated Platforms
3. BS 7171 Specification for Mobile Elevating Work Platforms
4. BS EN 361 Safety Harnesses
5. HS(G)19 Safety in working with Power-Operated Mobile Work Platforms 1982(HSE)
6. GS6 Avoidance of danger from overhead electric lines 1991(HSE).
7. Mobile Elevating Work Platforms: User Safety Guide (Construction Plant Hire Association)
8. Guide to Mobile Elevating Work Platforms (International Powered Access Federation)
9. Report (1985) The Use of Mobile Platforms on Construction Sites (National Economic Development Office)
10. Plant Operator Safety Awareness Training Study Notes - Module 13. Safe Use of "Mobile Elevating Work Platforms".

INTRODUCTION

The term Mobile Elevating Work Platforms (MEWP) covers pedestrian-controlled, self propelled and power operated mobile elevating work and access platforms.

The MEWP is designed to provide a temporary working platform which can be easily moved from one location to another. It is particularly suitable for short duration tasks, where the use of a ladder would be unsafe and the erection of a scaffolding platform time-consuming or impractical in relation to the job to be done. Some units have specialised applications.

The legal duty of the employer in respect of this equipment is to provide, as far as is reasonably practicable, a safe place of work and the necessary training and supervision. The manufacturer or hire company who supply the platform must provide all the information necessary to ensure that the user is not exposed to any risk or danger when the platform is used correctly.

The MEWP is becoming increasingly widely used and more complex. It is essential that no one should be allowed to use the equipment unless they have been instructed and trained by a competent person on the specific type of equipment to be used.

VIEWFOILS

- 13/1 Basic Types of Mobile Elevating Work Platforms.
- 13/2 Scissor Lifts
- 13/3 Telescopic Boom.
- 13/4 Articulating and Telescopic Boom
- 13/5 Use of Safety Harness.
- 13/6 Safe Working Load.
- 13/7 Height and Reach - Prohibition of Use of Steps etc.
- 13/8 Deploying Outriggers or Stabilisers.
- 13/9 Travelling in Operational Mode.
- 13/10 Wind and Wind Speeds.
- 13/11 Prohibited Uses of Main Elevating Work Platforms.
- 13/12 Main Duties of Operator.
- 13/13 Main Causes of Overturning.
- 13/14 Safety Checklist - Mobile Elevating Work Platforms.

- END -

TEXT	REFERENCES/VIEWFOILS
<p>Introduction</p> <p>Term - Mobile Elevating Work Platform</p> <p>Particularly suitable for short duration tasks where:</p> <ul style="list-style-type: none"> Use of ladders unsafe Erection of scaffolding too time-consuming or impracticable <p>Some units have specialist applications</p>	<p>Plant Operator Safety Awareness Notes - Module 13 Page 1</p>
<p>Legal Duty of Employer</p> <p>Provide safe place of work</p> <p>Training and supervision</p> <p>Information from manufacturer or hire company</p> <p>No one to use equipment unless trained</p>	<p>Health and Safety at Work etc. Act 1974 Section 2</p> <p>Section 6</p> <p>Plant Operator Safety Awareness Notes - Module 13 Page 1 and 2</p>
<p>Types of Mobile Elevating Work Platform</p> <p>Basic types</p> <ul style="list-style-type: none"> Scissor lifts Telescopic boom or jib Articulating and telescopic boom 	<p>Plant Operator Safety Awareness Notes - Module 13 Page 2</p> <p>Viewfoil 13/1</p>

TEXT	REFERENCES/VIEWFOILS
<p>May be either:</p> <ul style="list-style-type: none"> Towable units Vehicle-mounted Self-propelled Pedestrian-controlled 	
<p>Scissor Lifts</p> <ul style="list-style-type: none"> Vertical lift only May be fitted with outriggers - depends on size and extended height 	<p>Plant Operator Safety Awareness Notes - Module 13 Page 2, 3 and 4</p> <p>Viewfoil 13/2</p>
<p>Telescopic Boom</p> <ul style="list-style-type: none"> Vertical height and outreach platform may be manoeuvrable 	<p>Viewfoil 13/3</p>
<p>Articulating and Telescopic Boom</p> <ul style="list-style-type: none"> Usually vehicle mounted Wide range of reach and height Platform mobility Fitted with outriggers Specialised types 	<p>Viewfoil 13/4</p>

TEXT	REFERENCES/VIEWFOILS
<p>Sizes</p> <p>Vary considerably from:</p> <p>Small one person platforms - to over 4 m x 2 m platform and SWL in excess of 1000 Kgs</p> <p>Boom heights in excess of 60 metres are available</p> <p>Personal Protective Equipment</p> <p>Safety Harnesses</p> <p>To be worn when working from MEWP:</p> <p>Attached to secure anchorage within platform</p> <p>Will prevent personnel being thrown out of platform</p> <p>Typical causes of persons being catapulted from platform</p> <p>Collision with another vehicle</p> <p>Hitting obstacle</p> <p>Wheel entering pothole</p> <p>Undulating ground</p> <p>Overreaching or overbalancing by operator</p> <p><i>"Safety harness never to be attached to anything outside the platform"</i></p>	<p>Plant Operator Safety Awareness Notes - Module 13 Page 5</p> <p>Plant Operator Safety Awareness Notes - Module 13 Page 5</p> <p>BS 1397</p> <p>Viewfoil 13/5</p>

TEXT	REFERENCES/VIEWFOILS
<p><i>Safety helmets</i> must be worn if danger of overhead obstructions, or falling objects from above</p>	
<p>Chin straps to be worn to prevent helmet slipping off and falling. (Possibly injuring another)</p>	<p>Plant Operator Safety Awareness Notes - Module 13 Page 6</p>
<p>Operation</p>	<p>Plant Operator Safety Awareness notes - Module 13 Page 6</p>
<p>Safe working load</p>	
<p>Specified by manufacturer</p>	
<p>Displayed prominently on machine</p>	
<p>MUST NOT be exceeded</p>	
<p>May also state permitted number of persons, if not 80 to 85 Kg of safe working load allowed per person</p>	<p>Viewfoil 13/6</p>
<p>Care not to exceed SWL with tools and equipment</p>	
<p>Allowance must also be made for accumulation of material</p> <p>Items being lowered on to platform</p> <p>Shock loadings</p>	

TEXT	REFERENCES/VIEWFOILS
<p>Operation (cont'd)</p> <p>Height and Reach</p> <p>Figures given by manufacturer are maximum possible</p> <p>Steps, ladders, boxes and hop-ups <i>must never be used</i> on the platform</p> <p>Operating Envelope</p> <p>All MEWP have an operating area or <i>envelope</i></p> <p>Varies with type of MEWP</p> <p>Maximum height and maximum reach not usually available at same time. Therefore care to ensure intended area of work is within machine's operating envelope</p> <p>Ground Conditions</p> <p>When fitted outriggers or stabilisers must be used</p> <p>Before deploying outriggers or stabilisers, check:</p> <ul style="list-style-type: none"> Machine level Ground firm and will support loading Machine not over cellar, sewer, drain, manhole or uncompacted backfill 	<p>Viewfoil 13/7</p> <p>Plant Operator Safety Awareness Notes - Module 13 Page 7</p> <p>Viewfoil 13/8</p>

TEXT	REFERENCES/VIEWFOILS
<p>Operation (cont'd)</p> <p>If used in conjunction with a crane or some other appliance, safe system of work must be planned and implemented, setting out</p> <p>Individual responsibilities</p> <p>Precise arrangements for communicating</p>	<p>HS(G)19. Safety in working with power operated mobile work platforms (54)</p>
<p>Wind and Wind Speeds</p> <p>Not to be used in wind speeds exceeding that specified by manufacturer</p> <p>Generally accepted maximum wind strength for operator comfort</p>	<p>Plant Operator Safety Awareness Notes - Module 13 Pages 8 and 9</p>
<p>Problems associated with operating in windy conditions</p> <p>Funnelling effects</p> <p>High wind speeds and eddy currents at corners of buildings</p> <p>Effect of height on wind speed</p> <p>Wind chill factor</p> <p>Handling sheet materials</p>	<p>Viewfoil 13/10</p>

TEXT	REFERENCES/VIEWFOILS
<p>Difficulty in estimating wind speeds so hand-held anemometers may be used where necessary</p>	
<p>Beaufort wind scale - discuss</p>	<p>Plant Operator Safety Awareness Notes - Module 13 Appendix B</p>
<p>Prohibited Uses</p>	<p>Plant Operator Safety Awareness Notes - Module 13 Page 7</p>
<p>Driven on roads only by HGV licence holders</p>	
<p>Must not be used</p>	
<p>As jacks, props or supports</p>	<p>Viewfoil 13/11</p>
<p>Primarily for transfer of goods</p>	
<p>As a crane or lifting appliance</p>	
<p>Must NOT be tied to buildings or structures, for support. Operation of controls in these circumstances could create further hazard/accidents</p>	
<p>Operators</p>	
<p>Physical Fitness</p>	<p>Plant Operator Safety Awareness Notes - Module 13 Page 10 and</p>
<p>General requirements for persons nominated to use:</p>	<p>HS(G)19 (9, 10 and 11)</p>
<p>Full physical mobility</p>	
<p>Agile</p>	
<p>Good head for heights</p>	

TEXT	REFERENCES/VIEWFOILS
<p>Operators (cont'd)</p> <p>Good hearing</p> <p>Correct colour vision</p> <p>Ability to accurately judge space and distance</p> <p>Dexterity</p> <p>Good eyesight</p> <p>Stable disposition</p>	
<p>Duties of Operators</p> <p>Main duties are:</p> <p>To operate safely and without risks</p> <p>To operate in accordance with manufacturers instructions</p> <p>Not to abuse, ignore or override any safety device or equipment</p>	<p>Plant Operator Safety Awareness Notes - Module 13 Page 10</p> <p>Viewfoil 13/12</p>
<p>Training</p> <p>Operators trained specifically for the machine in use</p> <p>Test to ensure satisfactory standard of competence achieved</p>	<p>Plant Operate Safety Awareness Notes - Module 13 Pages 10 and 11</p> <p>HS(G)19. Sections 12, 13, 14, 15, 16 and 17</p>

TEXT	REFERENCES/VIEWFOILS
<p>Operators (cont'd)</p> <p>Three main stage of training, apply to all types of unit:</p> <ul style="list-style-type: none"> Basic understanding of operating principles and day-to-day use Practice on type of machine concerned under all operating conditions; properly supervised on-site familiarisation Important operators understand functions of limit switches and interlocks, and dangers of defeating or overriding Manufacturers demonstrations <i>not regarded</i> as sufficient training for operators <p>Other points</p> <ul style="list-style-type: none"> Operators to use <i>only</i> the type of machine they have been trained on, after training an "in-company" certificate issued, and records kept Safety element of training must emphasise safety awareness and recognition of hazards <p>Hazards</p> <p>List below not exhaustive:</p> <p>Work on or near the highway</p> <p>Hazards include:</p> <ul style="list-style-type: none"> Collisions with other vehicles (use barriers, cones etc.) 	<p>Plant Operator Safety Awareness Notes - Module 13 Page 11</p>

TEXT	REFERENCES/VIEWFOILS
<p>Hazards (cont'd)</p> <p>Knuckle or elbow of booms encroaching into traffic lane (ensure adequate space)</p> <p>Overhead power cables</p> <p>Contact or electric arcing could be fatal, therefore always maintain:</p> <p>Safe distance</p> <p>Minimum distance at least 6 metres</p> <p>High winds may cause cables to sway - reducing distance</p> <p>No part of machine should be closer than:</p> <p>15 m of overhead line on steel tower</p> <p>9 m of overhead line if on wooden poles</p> <p>Falls of persons or materials</p> <p>Safety harnesses to be worn</p> <p>No loose materials on platform</p> <p>If necessary prevent pedestrian access beneath</p>	<p>GS 6 Avoidance of danger from overhead electric lines Plant Operator Safety Awareness Notes - Module 13 Page 11</p> <p>Plant Operator Safety Awareness Notes - Module 13 Page 12</p>

TEXT	REFERENCES/VIEWFOILS
<p>Hazards (cont'd)</p> <p>Entrapment of persons</p> <p>Moving parts properly guarded</p> <p>Operators to be aware of dangers</p> <p>Overturning</p> <p>Main causes:</p> <ul style="list-style-type: none"> Collapse of standing area Overloading - observe SWL Operating on slope - keep unit level and stable Travelling on unsuitable ground Attempting to travel with outriggers deployed Collisions with vehicles or other obstructions <p>Restricted or enclosed spaces</p> <p>Extra care needed</p> <p>Exhaust fumes may create hazard</p> <p>Hazard from battery charging, danger of explosion</p> <p>No refuelling of LPG powered vehicles</p>	<p>Plant Operator Safety Awareness Notes - Module 13 Page 12</p> <p>BS 5304 Safety of Machinery deals with mechanical hazards</p> <p>Viewfoil 13/13</p> <p>Plant Operator Safety Awareness Notes - Module 13 Page 12</p>

TEXT	REFERENCES/VIEWFOILS
<p>Hazards (cont'd)</p> <p>Interference with vehicles in public places</p> <p>Means of preventing operation of, or tampering with controls by unauthorised persons or children, may need to fit extra guards, interlocks, etc.</p> <p>Risk of entrapment of people getting too close or underneath</p> <p>Scissor lifts are a particular hazard</p> <p>Other Hazards to avoid:</p> <p>Never use with nearly flat battery, could result in operator stranded aloft;</p> <p>Covering of knuckles, joints and hoses by paint, grit, cement etc.;</p> <p>Sideways thrust from power tools may push platform away from work face, keep platform square to work, wherever possible.</p>	<p>BS 5323;1980 Code of practice for scissor lifts</p> <p>Plant Operator Safety Awareness Notes - Module 13 Page 13</p>

TEXT	REFERENCES/VIEWFOILS
<p>Maintenance and Inspections</p> <p>Fall into 3 categories</p> <p>Daily inspection at start of work, carried out by operator, on:</p> <ul style="list-style-type: none"> Tyres, pressures, and wheel nuts Brakes and Steering (if applicable) Fuel, oil, water, fluids, battery levels Lights, instruments, warning devices and communications Structure for visible defects Operating controls Presence of hydraulic fluid leaks <p>Weekly inspection by maintenance fitter or operator if competent</p> <ul style="list-style-type: none"> Items covered by daily inspection schedule Operational check on all capabilities of unit Visual examination of chassis and structure. Record results of inspection - on an in-house form, or form F91 Part 1 Section C 	<p>Plant Operator Safety Awareness Notes - Module 13 Page 13</p> <p>HS(G)19 Sections 55, 56, 57 and 58</p>

TEXT	REFERENCES/VIEWFOILS
<p>Maintenance and Inspections (cont'd)</p> <p>Six monthly intervals or after 1000 hours operation or as recommended by manufacturer</p> <p>Thorough examination by competent person</p> <p>Written report on examination</p> <p>May be carried out by an insurance company engineer or surveyor</p> <p>Suggested scheme of periodic inspection set out by the Construction Plant Hire Association in publication 'Inspection and Testing of Mobile Elevating Work Platforms'</p> <p>Maintenance Work on Scissor Lifts</p> <p>Extra care needed on this type of unit</p> <p>Scotches or chocks to be used within the stack of a Scissor lift, against possible hazard from hydraulic failure</p> <p>Safety Checklist for MEWPs to be reviewed</p>	<p>Plant Operator Safety Awareness Notes - Module 13 Page 14</p> <p>Plant Operator Safety Awareness Notes - Module 13 Page 13 Appendix A/Viewfoil 13/14</p>
<p style="text-align: center;">DISCUSSION</p> <p style="text-align: center;">- END -</p>	