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mobile elevating work platforms

operators' safety guide

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Notice

This guide provides information about operating MEWPs safely. It doesn't meet the legal requirements for employers training machine operatives and it is not meant as a substitute for accredited training courses.

To meet the legal requirements you should apply for your PAL card (Powered Access Licence) by enrolling in a one-day IPAF (International Powered Access) training course to ensure you have the theory and practical knowledge required to operate MEWPs competently.

For details on Operator Training Courses in your area, or to arrange on site training call **08000 72 55 72** or visit **www.facelift.co.uk**. Faclift Access Hire offers a comprehensive selection of courses for working at height safety.

Contents

Note: Whilst every care has been taken to ensure the accuracy of the material contained in this booklet, no liability is accepted by the Construction Plant-hire Association in respect of the information given.

Acknowledgements: Cartoon drawings are provided by Nationwide Access Plant Limited and have been adapted by the CPA. Copyright is reserved by both organisations.

EPL Plant Access Hire have kindly provided the illustrations in the "Daily Service Checks Section", and the "Corrections to the Standard Beaufort Scale Windspeeds" graph.

Foreword

The “Mobile Elevating Work Platform (MEWP) User Safety Guide was first published by the CPA in May 1985. It was produced with the aim of fostering the safe use of this versatile and widely used equipment.

The guide became widely respected as the best guide for safe operation and use of MEWPs. It has also been used by the CITB as the basis for their training course that was set up within the Plant Operators’ Certificate of Training Achievement (CTA) Scheme.

Time and technology moves on and the CPA, with the assistance of The International Powered Access Federation rewrote large parts of the CPA booklet in 1995 to take into account changes in safe working practices.

The result is a thoroughly practical booklet that has been written as guidance for the operator. His manager or supervisor will also find it useful to help with the interpretation of their own responsibilities for the establishment of safe systems of work on their sites and with their risk assessments.

The writing is clear and unambiguous and is addressed specifically to the operator without unnecessary elaboration.

The Association would like to thank the members of the 1995 Working Party who have contributed to the preparation of this guide.

We would especially like to thank two individuals who were on both the 1985 and 1995 Working Parties. Mr I W C Kiddle for his Chairmanship of both and Mr T Watson for his substantial contributions to both editions.

January 2000

mobile elevating work platforms

operators' safety guide

Introduction

The aim of this safety guide is to supplement the instruction and training that you, as the operator, have been given. It sets out in clear, straightforward language the recommended working practices for the safe operation of mobile elevating work platforms (MEWPs) over a wide range of applications, from initial checks, through transport and positioning on site, to carrying out the required task. The following types of MEWPs are covered by the guide:-

- Vehicle mounted, articulated and telescopic booms
- Self propelled articulated & telescopic booms
- Scissor lift platforms
- Trailer mounted articulated and telescopic booms
- Other combinations of the above.

This guide does not cover the safe operation of Mast Climbing Work Platforms (MCWPs) and other types of fixed elevating work platforms. Nor does it cover fixed cradles suspended from the top of high rise buildings as used by window cleaners. These machines are very different to MEWPS. Although much of this guidance will apply to them, there are areas of safety in the operation of MEWPs that are not touched on at all.

If you should come across a safety problem with your MEWP which you are unsure about and you find that this guide cannot help, you must seek the advice of your Manager, Site Supervisor or Safety Officer.

HSE's Review of accidents

In a recent review of accidents carried out by the Health & Safety Executive, they have listed the causes of 87 accidents which involved MEWPs.

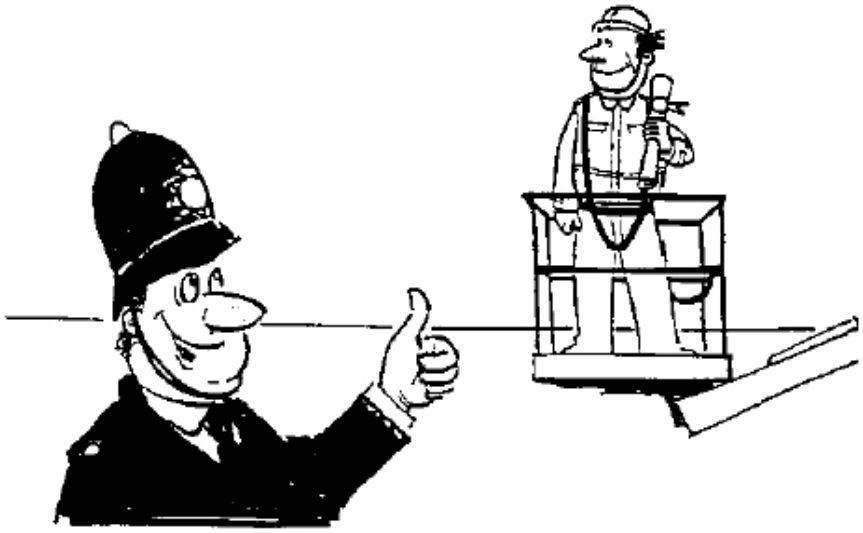
The list cannot be taken as a complete list of all accidents that they have investigated but it gives a good indication of the main causes:-

Overturns due to incorrectly deployed stabilisers/outriggers	25
Overturns due to failure of stabilisers/outriggers	6
Overturns due to adverse ground conditions	6
Overturns due to overload	1
Overturns due to unsatisfactory alterations	1
Overturns - reasons not clear	1
Uncontrolled descent due to component failure	23
Uncontrolled descent - reasons not clear	2
Platform levelling gear failure	9
Crushing between platform and fixed structure	3
Contact with fixed structure causing component failure	3
MEWP struck by another vehicle	4
Trapping between moving parts of structure	1
Cause not clear	2
TOTAL	**87**

The operator's qualifications and responsibilities

Training

As the operator of a MEWP you must be adequately trained in the safe operation of the machine as required by law. It is also advisable to have a certificate as proof of training and to carry your certificate of training with you on the job. Your customer and the HSE inspector may ask to see this certificate.



The operator must be trained

Driving on the public highway

The driving of MEWPs on the public highway is subject to Regulations made under the Road Traffic Acts. The main requirement is that you must be in possession of a current driving licence for that class of vehicle.

Fitness and health

Your job as the operator is demanding in both skill and concentration. You cannot do it properly if you are not medically fit or have problems with your eyesight or hearing, or with alcohol or drugs. Your company will be concerned to ensure that your health does not make you a risk to yourself or to others working with you or near you. If you have any doubts about your fitness, speak to your employer and have a medical examination before operating a MEWP.

If you do not have a good head for heights then you should not operate or work from a MEWP.

Responsibilities of the operator

Your first concern must be for the Safe Operation of the MEWP, the safety of the people working with you and the safety of other persons in your working area.

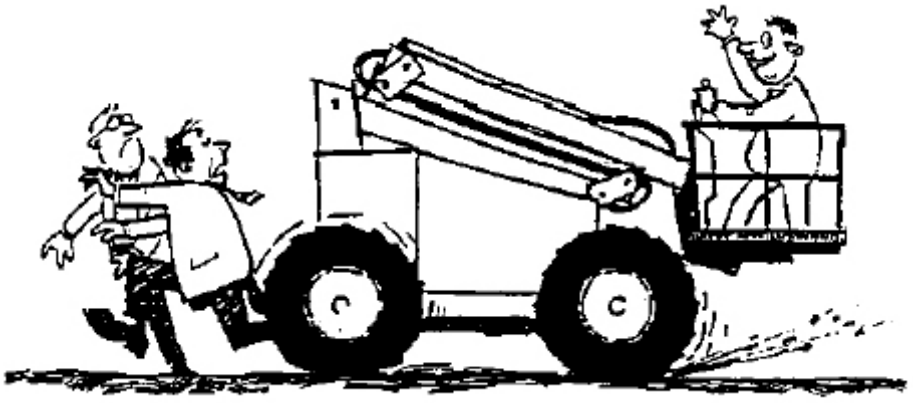
You must follow the manufacturers' instructions and at no time attempt to operate the machine beyond the recommended limits.

The proper care of the MEWP is a major factor in ensuring safety. You must not misuse the machine or ignore or interfere with the devices and equipment which have been provided to maintain safety.

Travelling to the workplace on site

Make sure that your MEWP is suitable for travelling over the ground conditions found on the site.

Before travelling the MEWP on site you should make sure that there are no ramps, trenches, slopes, manhole covers, ground obstructions, overhead cables, building projections or other obstacles which may present a danger.



Make sure there are no persons in the path of the machine

Before travelling, make sure that the platform is in the recommended travel position and that there are no persons in the path of the machine. If applicable, secure the turntable (slew) motion before moving off. Ensure that the outriggers (stabilisers) are retracted and locked as recommended by the manufacturers.

Siting and stability

Ground Conditions

The MEWP can be affected by poor ground conditions, which may cause settlement and lead to the machine being out of level and hence unstable. Consult your immediate Supervisor or the manufacturer's handbook if in doubt.

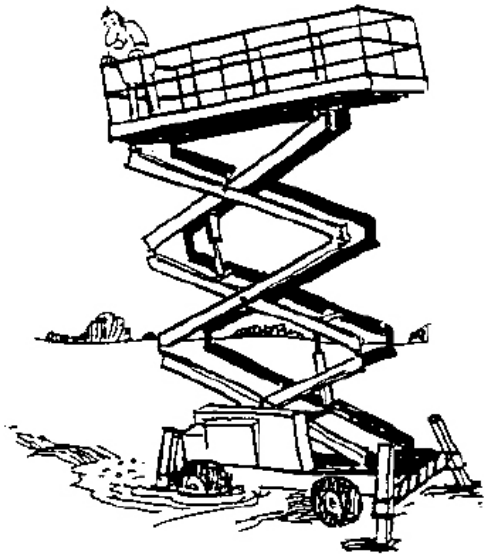
You, personally, and your machine are primarily at risk from poor ground conditions. Typical conditions that you should watch out for are:

- Uncompacted fill - soil or other fill material may be piled along the line of a backfilled trench without being compacted. An indication of uncompacted fill can be the cracking of the ground along the line of the trench.

- Cellars and basements - Many are incapable of bearing the weight of your machine with or without a load, and may collapse without warning.

- Underground services - sewers, drains, manholes, gas and water mains, etc may be damaged by the weight of your machine or may even collapse and cause it to topple.

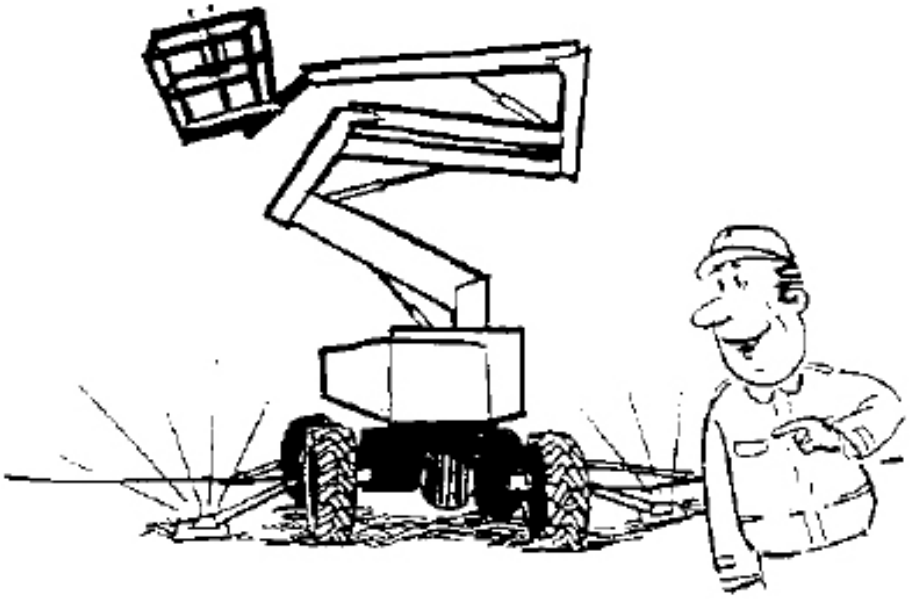
- Weather conditions - heavy or prolonged rain may alter ground conditions and cause sinking. Adjust or check levelling, packing mats, etc if you suspect that the ground is getting softer. A check on the changing ground conditions should be made regularly thereafter. The same regular checks must be made when frozen ground is thawing out. Frozen ground can appear to be much firmer than it actually is.



Make sure there are no persons in the path of the machine

Use of outriggers (stabilisers)

Certain types of MEWPs are fitted with outriggers and/or stabilisers which should be used as recommended by the manufacturers. Use outriggers as recommended by manufacturers.



Make sure there are no persons in the path of the machine

Before raising the platform or cage you should ensure that the machine is levelled within the manufacturers' limits and located on a firm surface. The use of suitable packing should always be considered when it is necessary to spread the load under the outriggers to prevent them from either sinking into the ground or damaging the supporting surface.

You should check that each outrigger and its packing is in full contact with the ground, both before starting work and regularly thereafter.

If you are in doubt about the ground conditions at any time, you must consult the site management.

With some types of machines the full weight must be taken off the tyres before the platform is raised. (Refer to the manufacturers' instructions).

The outriggers, if fitted, must be fully extended horizontally on both sides unless the machine is specifically designed to allow part extension. Never travel the machine with the outriggers in the extended position.

Extending Axles

Extending axles, if fitted, must be fully extended horizontally on both sides unless the machine is specifically designed to allow part extension.

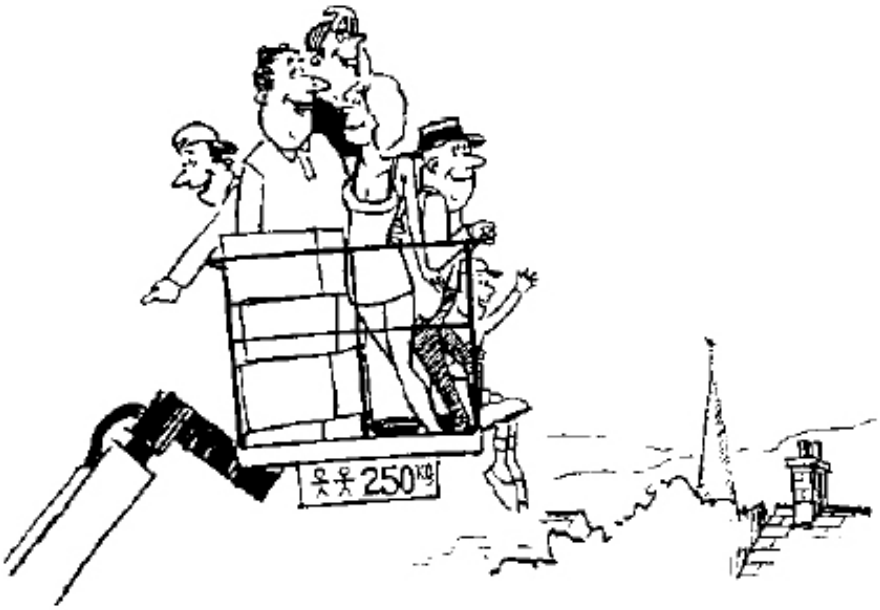
Axles must be retracted when travelling on the road and when travelling to or from the place of work.

The only circumstances where the MEWP can be moved with the axles extended, is when an adjustment to the position of the machine is necessary as part of the work being carried out. *(see p13 - Travelling with the operator on an elevated platform)*

Safe Working Load

The Safe Working Load (SWL) is the maximum load that the MEWP will safely carry. This SWL includes the weight of all persons, tools, equipment, hoses, cables and materials.

Overloading by exceeding the SWL is extremely dangerous and should never take place. Not only will it damage the machine, but it may also cause it to overturn.



Overloading is extremely dangerous

You must ensure that the SWL of the machine is sufficient for themaximum combined weight of persons, tools and equipment before starting the work. An allowance must be made for any additional loads that will need to be carried by the platform during the work.

It should be noted that some manufacturers allow varying SWLs for particular machines. Consult the manufacturers' load chart and manual.

SWLs should always be marked on the machine in a prominent position and shown in kilograms and by diagrams indicating the maximum number of persons.

Other Hazards

Other factors that will reduce the stability of the MEWP and cause overturning or collapse:

- The uneven distribution of the load on the work platform. An unevenly distributed load will reduce stability

An unevenly distributed load will reduce stability

- Using the machine in high winds. The maximum wind speed in which the machine may be safely used will be specified by the manufacturers and marked on the machine *(see Wind, p28-31).*

- Sudden impact (shock) loads from falling objects etc.

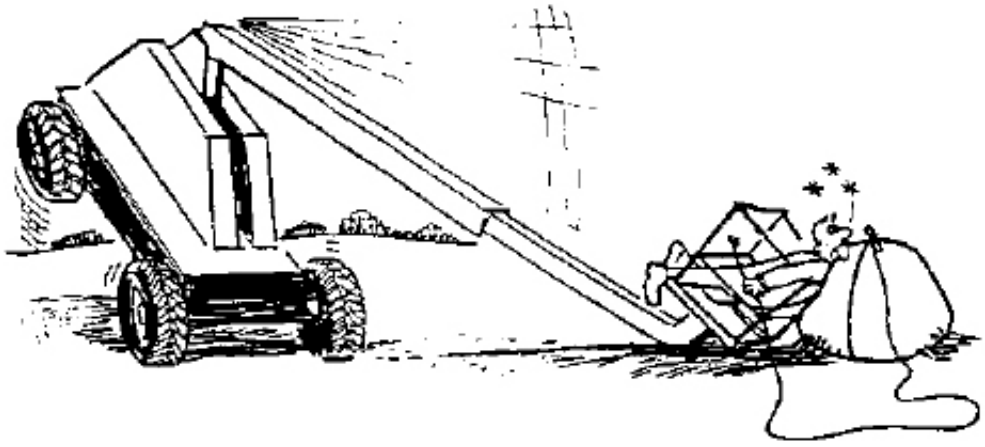
- Pushing or pulling (horizontally) on a structure alongside the platform can cause instability, overturning and damage to the MEWP when the loads are greater than specified by the manufacturers.

Safe working

Proper Use of the MEWP

A MEWP is designed to provide a temporary working platform for persons, their tools and items of equipment, and to give them access to the work place.

It must NOT be used as a crane by suspending a load beneath the platform using slings or any other type of lifting gear. Do not suspend a load beneath the platform



Do not suspend a load beneath the platform

If a MEWP is primarily being used for the transfer of persons or goods from one level to another (and not as a work platform), the machine will be considered to be a hoist or a lift and further regulations will apply. In these circumstances, consult with the site management.

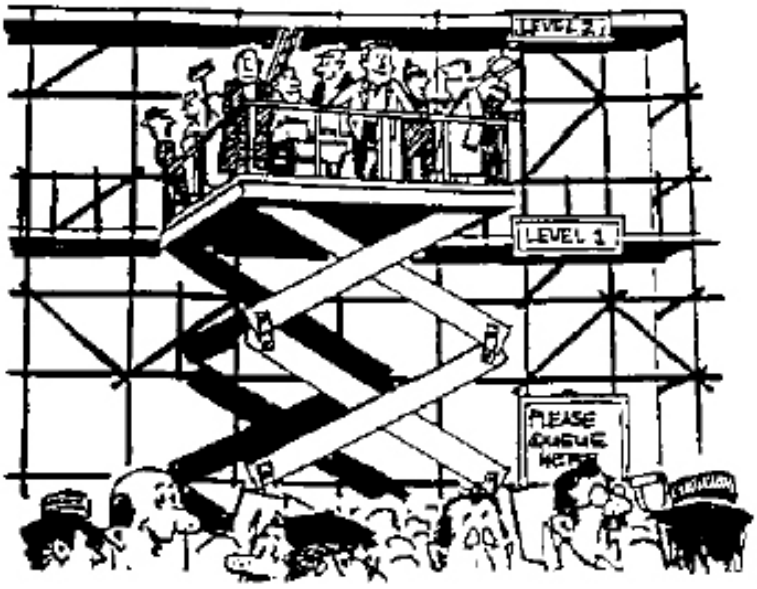
Operation of the platform or cage is your responsibility. You must never allow an unauthorised person to operate or interfere with the controls.

Always engage the controls gently and smoothly.

Always enter and leave the work platform when it is in its fully lowered position, using the steps or walkways designed for that purpose.

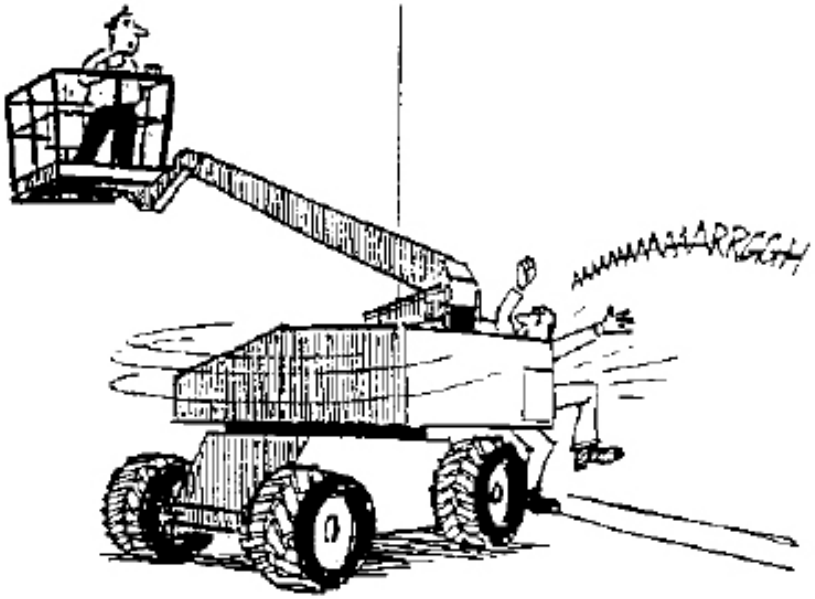
Never attempt to climb the lattices formed by the scissor mechanism of a scissor lift.

A MEWP must not be travelled with the boom extended or platform raised unless it is specifically designed to be used in this way.



Additional regulations will apply if a MEWP is used as a hoist or lift

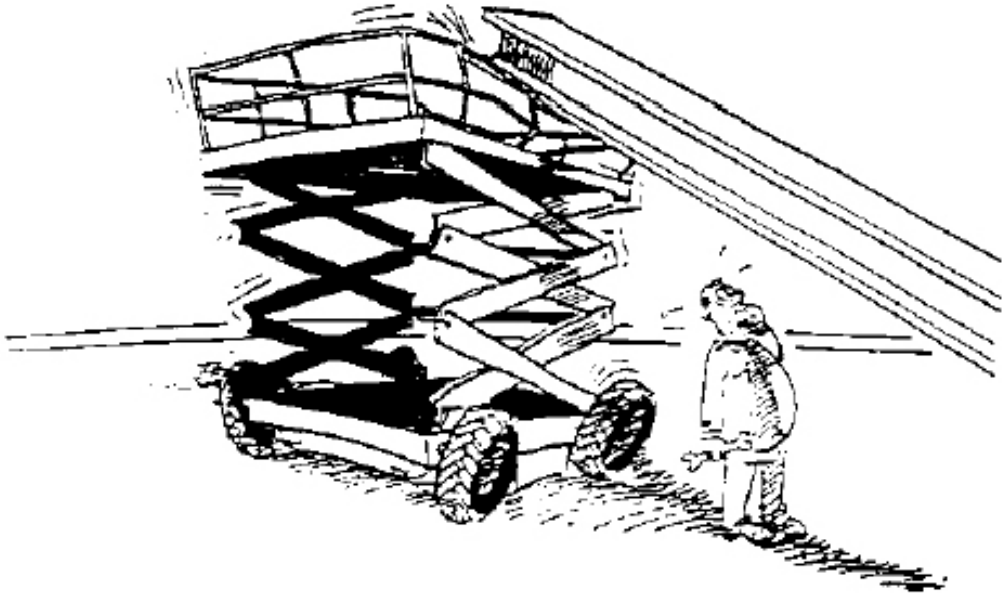
If you are working in an area used by other workers or vehicles, make sure that the whole of your work area is barricaded using cones and warning signs etc. Consult your immediate supervisor if in doubt.



Barricade the work area if other workers are present

Never lean materials or tools against the outside of the platform. If forgotten they will fall when the platform is moved.

The machine must never be used as a jack, prop or a tie to support other structures or machines etc.



Never use the machine as a jack or prop

Never interfere with, wedge or override hydraulic, electrical or mechanical safety devices or controls.

Avoid injury to yourself and damage to the machine from falling materials such as masonry, paint, grit, hot metal from welding etc.

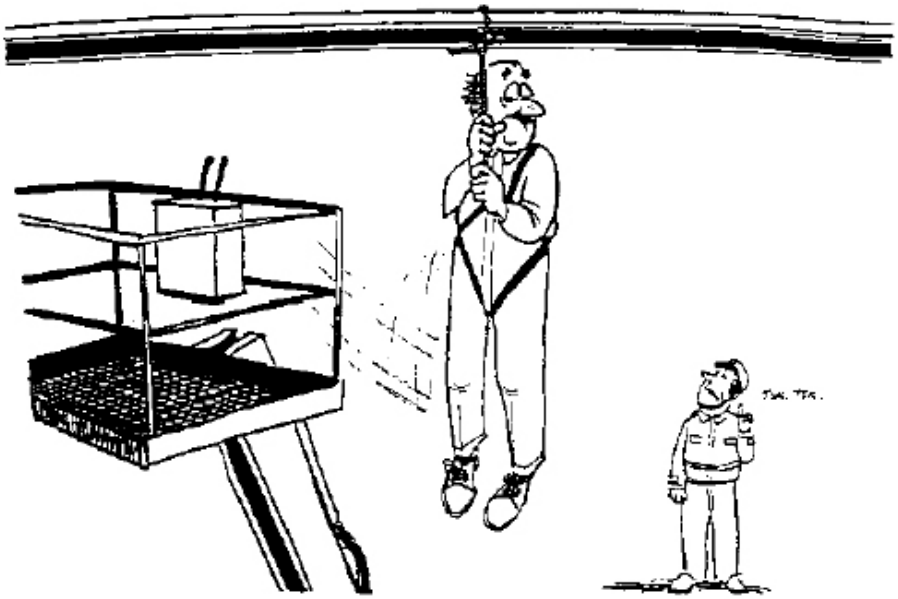
Never use the MEWP for the electrical earth when welding structures alongside it.

Before and during the raising or lowering of the platform, always check for the possibility of hitting obstructions or persons.

When wearing a safety harness or belt it should be attached to the anchorage provided by the manufacturer. Never attach the harness or belt to any object or structure outside the work platform *(see page 19 - Use of safety belts and harnesses).*

You must never use the guard railings, ladders, staging or similar items to extend your reach or height for any purpose. Your feet must be kept firmly on the deck of the cage or platform at all times.

If you are using equipment which has cables or hoses attached, these must never be left hanging free, but should be properly supported. You must always be particularly careful to prevent objects or equipment striking or interfering with the controls of the machine.



Never attach the harness to a structure outside the work platform

Do not use the machine to tow another vehicle unless it is specifically designed and equipped for this purpose.

Self propelled MEWPs should not be towed. This can cause serious mechanical damage to the machine or injury to persons on site. In the event of a breakdown in the travel systems, recovery must only be attempted under the direction of the owner or according to the manufacturers' instructions.

Travelling with the operator on an elevated platform

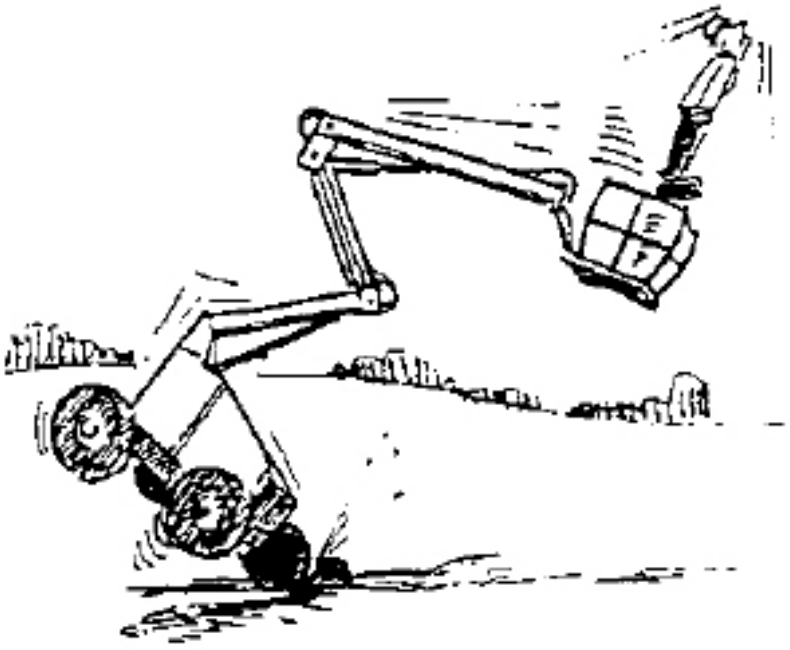
Travelling with the platform of a MEWP occupied and raised should only be undertaken when the machine is specifically designed to be used in this way.

The jolting caused by an uneven surface will be magnified considerably at the platform and may cause instability and danger to any occupants of the cage or platform.

Jolting caused by an uneven surface can be dangerous

Do not travel the machine up or down slopes unless it is specifically designed to do so.

When travelling the machine, it is strongly recommended that you get another person to guide you from ground level.



Another person should guide the machine from ground level

Before travelling, a check should be made to ensure:

- the stabilisers or outriggers are not extended;
- no ramps, trenches, holes or other dangerous conditions lie in the path of travel;
- no overhead cables, building projections or other overhead hazards will obstruct your path;
- adequate warning has been given to persons on the ground;
- nothing has been left unsecured and liable to fall off the work platform;
- hoses, cables, wires etc have not been left hanging or trailing from the machine.

Emergency (auxiliary) controls

Before operating the controls of a MEWP make sure that you know the position function and correct operation of:

- the emergency (auxiliary) lowering controls;
- the emergency stop switch.

Ensure that another responsible person on the site, (who is not working on the platform,) knows how to use the emergency controls.

Never use the emergency controls for purposes other than lowering the platform in an emergency.

Never attempt to climb down the boom or lattice of a MEWP if the emergency lowering control fails to operate.

Overhead high voltage lines

Most overhead electric lines are uninsulated and usually carry high voltage electricity - up to 400,000 volts. (Overhead lines on electrified railways carry 25,000 volts.)

Working from or moving a MEWP in the vicinity of overhead high voltage lines can be extremely dangerous, and essential precautions must be taken.

Guidance on the avoidance of danger from overhead lines is available from the Health & Safety Executive. There may also be special rules established for particular sites.

On controlled sites where MEWPs have to pass under overhead electric lines, ground level barriers will be positioned and ‘goal posts’ erected at the place where your machine may pass under the overhead lines.

If there is no need to pass under the overhead lines, both ground level barriers and high level markers, (usually bunting,) will be placed to keep you at a safe distance.

Not all sites are controlled and the operator must always be aware of the dangers of overhead electric lines.

Many fatal accidents have occurred due to some part of a machine touching or even coming close to overhead lines.

A minimum safe distance must always be kept between the overhead lines and the closest point of the MEWP, with the jib fully extended. This distance is 15m with overhead lines mounted on steel towers and 9m with lines mounted on poles of wood, concrete or steel. These distances are measured horizontally at ground level from a position vertically below the outermost conductor at the tower or pole position *(see Figures 1 and 2).*

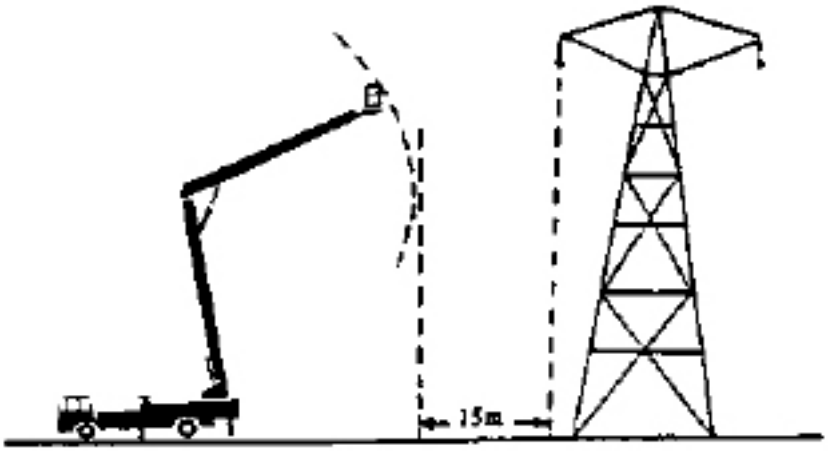


Fig 1 - Minimum safe distance from power lines mounted on steel towers

Fig 2 - Minimum safe distance from power lines mounted on poles

Warnings:

- If you are required to work inside these limits, you should seek further advice before commencing work.
- All overhead lines and other electrical apparatus should be treated as live unless declared ‘dead’ and ‘safe’ by the electricity company (or other line operator).
- Strong winds, may cause overhead electric lines to sway and thus reduce the distance to a point where you are in danger.
- The recommended minimum safe working distance must be rechecked and confirmed if the work platform is moved from the original location.
- You must observe barriers and markers where these are erected to mark safe working distances.
- When moving your machine under or near overhead electric lines, always be guided by an experienced signaller.
- Do not raise any part of the machine when travelling under overhead lines or between two sets of goal posts.
- If in doubt at any time seek further advice.

Emergency drill on contact with a live electric line

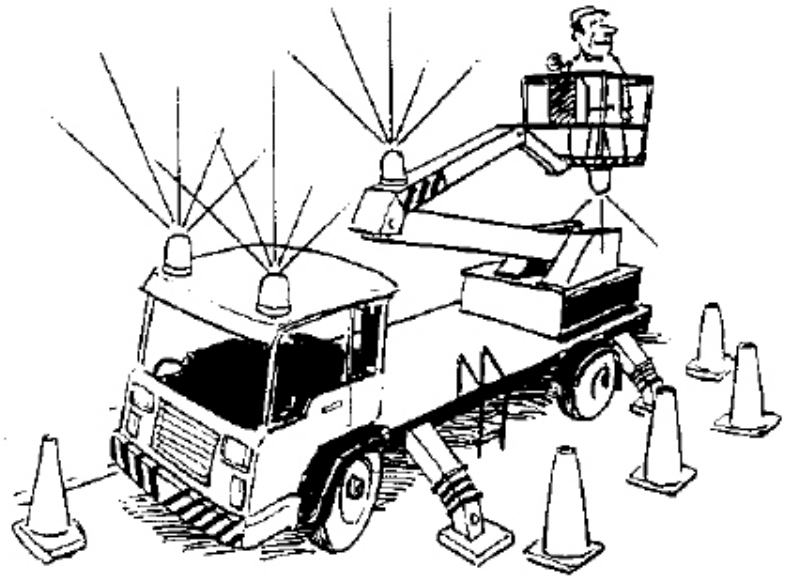
If the MEWP makes contact with a live electric line, observe the following precautions in order to minimise the risk of electrocution:

- Remain on the platform or in the cage.
- Warn all other personnel to keep away from the machine and not to touch any part of it.
- Try, unaided, and without anyone approaching the machine, to move the machine until it is clear of the power line and/or lower the platform to the ground.
- If the machine cannot be moved away, or lowered, remain inside the cage. If possible, get someone to inform the electricity supply authority at once. Take no action until it has been confirmed that conditions are safe.
- Do not touch the machine and the ground at the same time.
- Get someone to inform the site management of the situation immediately and, until assistance is received, ensure that someone stands guard by the machine to warn of the danger.

Devices are available that are designed to be fitted on machines to give warning when the machine comes within a predetermined distance of overhead electric lines. Such devices must not be considered as a substitute for a safe system of work.

Working on the highway

When you are working in an area used by other vehicles or pedestrians, for your own and other people's safety you must make sure that the whole of your operating area is barricaded off using cones, warning notices, flashing yellow beacons etc. Consult the site supervisor.



Working on the Highway

Under no circumstances should you allow any part of a MEWP to extend or swing into a line of traffic.

If arrangements need to be made to divert traffic, using temporary barriers, cones, traffic lights and/or signs, consult the site supervisor who carries the legal responsibility for this.

It is unlawful for anyone other than a properly authorised person to direct traffic on the highway. The advice of the police should be sought.

When operations are to be carried out during the hours of darkness at a location where the public have access, barriers must be provided together with yellow flashing beacons.

If the work platform is to be left at the work site overnight, permission must be obtained from the relevant authority, eg the highway authority or the police.

Use of safety belts and harnesses

If safety belts or harnesses are used you must cheek them to ensure there is no damage or defect before each use.

If you know that the belt or harness has been subject to a shock load or damage, it must be reported to the supervisor and taken out of use.

When the harness is not in use, make sure it is stored in a clean and dry place.

It is current practice to use safety harnesses from MEWPs fitted with booms.

Whether safety belts and harnesses should or should not be used with the MEWP must be agreed with the management of the site who have ultimate responsibility for your safety. It is their job to make an assessment of the hazards specific to the job. Among the factors they will take into account are the following:

For

- If the safety belts or harnesses do not restrict freedom of movement and the ability to work their use can increase overall safety.
- There have been cases of persons falling from the platform due to collisions with other vehicles, overhead cranes, swinging loads on cranes etc.
- Gross overloading or collapse of the ground under the wheels or stabilisers can cause the platform to lurch heavily without warning.
- A mechanical failure of the machine or jerky operation of the controls could tip the operator from the platform when raising/lowering or travelling the machine.
- Belts or harnesses must be used as a last resort when it is not practicable to provide other means for preventing the operator from failing.

Against

- If their use restricts freedom of movement and the ability to work, or requires long safety ropes which themselves could become a hazard, their use may reduce overall safety.
- If the type of machine does not give rise to risks from the movement of the platform, levelling system failure or impact from other vehicles etc.

Operation in conjunction with other equipment

When a MEWP is to be operated in conjunction with a crane or some other appliance, the work must be properly planned and a safe system of work developed which must be clearly understood by all persons who are participating.

Each must also know how to deal with any foreseeable emergencies.

Arrangements should be made for operators to be able to communicate clearly with each other.

Movement by road

Before travelling on the road with a vehicle mounted MEWP, make sure that you know the clearance height and width of the machine which should be marked in the cab.

If the machine is equipped with outriggers, or extending axles, check that these are fully retracted and locked in place. Where appropriate, check that the slewing lock has been applied.

When loading or unloading MEWPs from a transporter, adequate ramps should be used and correctly positioned. The use of the vehicle winch is recommended on certain vehicle types of MEWP.

When negotiating ramps with a self propelled machine with a boom, the manufacturers' instructions must be followed.

When preparing a MEWP for travelling on the road on a transporter, make sure that the driver of the transporter secures the MEWP safely without damage to the machine.

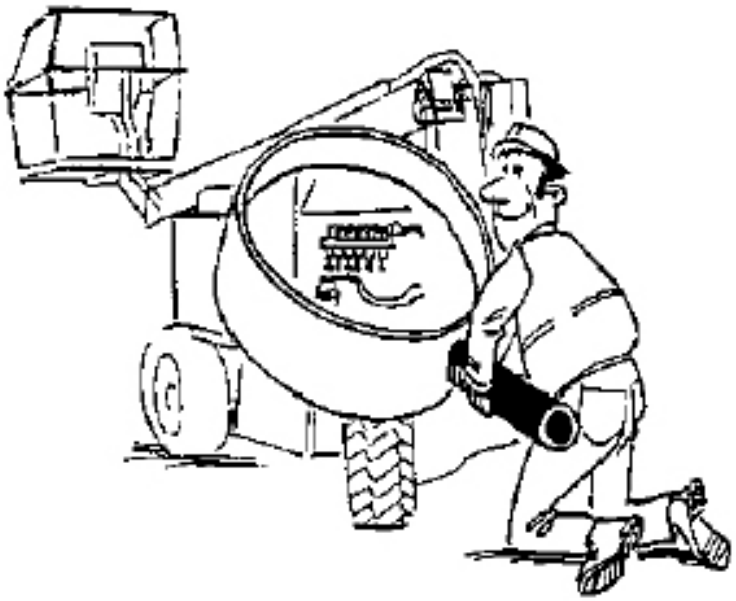
Also ensure that he knows the height and width clearances of the MEWP in order to work out his overall clearances of the MEWP and the transporter.

Routine inspection

The purpose of inspecting MEWPs is to ensure that it is safe, complete, that it works properly and that it is clean. You must inspect the entire machine, that is, the power source, all working parts, the structure and the vehicle mounting (where applicable).

Daily Service Checks

You must carry out a daily service check and inspection both before and after using the work platform in accordance with the manufacturers' instructions.



Daily service checks

This must include the following numbered items *(see Figures 3, 4 and 5)*:

1 The platform, structure and the walkways must be completely clean and free from grease and dirt.

2 All tyres must be free from significant damage and pneumatic tyres, when fitted, must be at the correct pressures.

3 The wheel nuts must be in place and properly tightened.

4 The brakes must be tested to ensure that they are working efficiently.

5 The lights and horn, when fitted, must be in good working order.

6 There should be adequate fuel, water and oil and the batteries should be fully charged.

7 Batteries should be secure, clean, free from corrosion and checked for water level, especially before recharging.

8 All structural parts must be free from cracks and damage.

9 All powered movements for telescoping, raising, lowering, slewing and steering must be in good working order in all positions.

10 The hydraulic system must be free from leaks.

11 Any communication system between the platform and ground level must be in good working order.

12 All emergency systems must be fully functional.

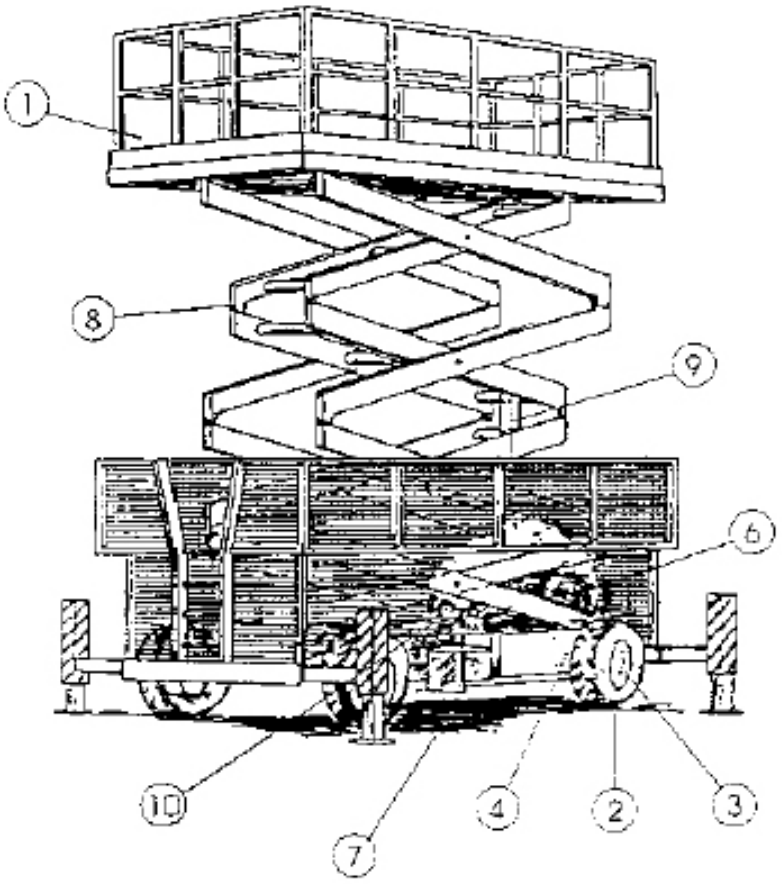


Fig 3

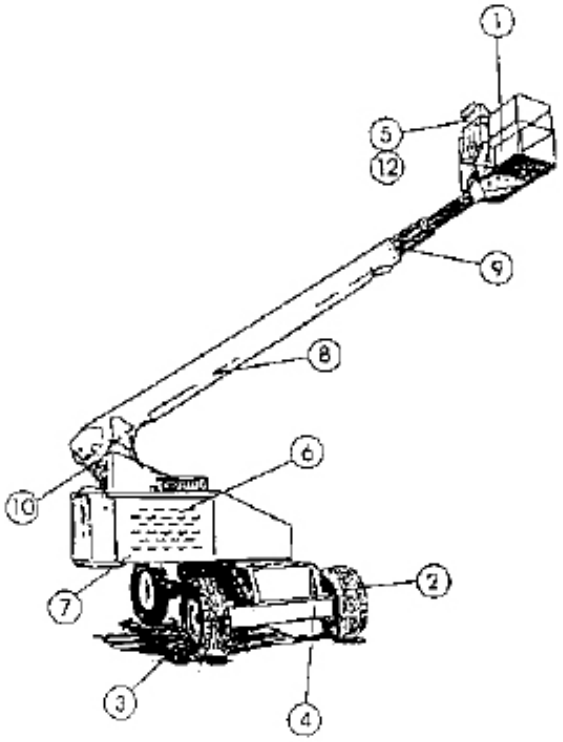


Fig 4

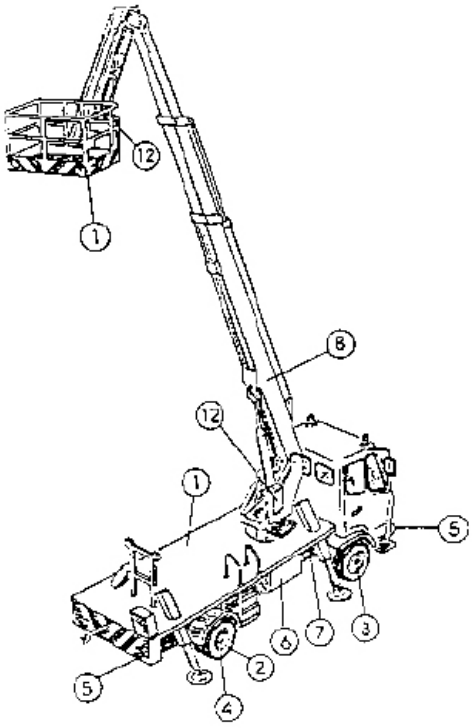


Fig 5

If you discover any defects, report them at once to your supervisor.

Do not attempt repairs or adjustments which you are not authorised to carry out.

When carrying out your inspection do NOT work under a raised boom or platform unless movement has first been prevented by means of blocks, or special locking devices fitted for the purpose.

Power Units

Certain simple precautions need to be observed depending on the type of power unit fitted:

Internal Combustion Engines

When an engine is used inside a building or in a confined space, adequate ventilation must be provided to extract the dangerous exhaust fumes.

Liquefied Petroleum Gas (LPG)

LPG is used as a fuel for certain types of internal combustion engines. When it is necessary to fit a replacement gas bottle this may be carried out within a building, but at least 8 metres from any source of ignition. There must be no smoking when refuelling or changing a gas bottle. LPG is heavier than air and will sink to the lowest part of the worksite. Beware, a lit cigarette or match will cause an explosion if thrown into a pit with LPG at the bottom.

Electric Power Units

The batteries used on electrically powered MEWPs produce explosive hydrogen gas when they are being charged. Charging must only be carried out in an area which is well ventilated. You must not smoke in this area at any time. Battery acid is highly corrosive. Ensure that adequate precautions are taken when topping up a battery or in the event of a spillage.

Accidents, near misses and dangerous occurrences

Your company will inform you of the specific action you should take in the event of an accident or near miss or dangerous occurrence.

Accidents

An accident is defined in the regulations as:

“any unwanted, unscheduled or unplanned event or occurrence that causes an injury or death to any person or damage to any property”.

Near misses

A near miss is an accident which almost happens and could have had severe consequences. Your company could have procedures for reporting such events.

Dangerous Occurrences

The Regulations list a number of dangerous occurrences one of which is : “the collapse of, the overturning of, or the failure of any load-bearing part of: any lift, hoist, crane, derrick or mobile powered access platform....etc”.

Other dangerous occurrences listed in the regulations are the collapse of scaffolding or buildings (which could be connected with the operation of MEWPs in some instances) and contact with overhead power cables.

Note: The law requires that a dangerous occurrence must always be reported to the Health and Safety Executive. They may require that nothing should be moved or disturbed until they have visited the site.

Procedures in the event of an accident, near miss or dangerous occurrence

Your company may have procedures that you must follow but the following general points should also be observed:

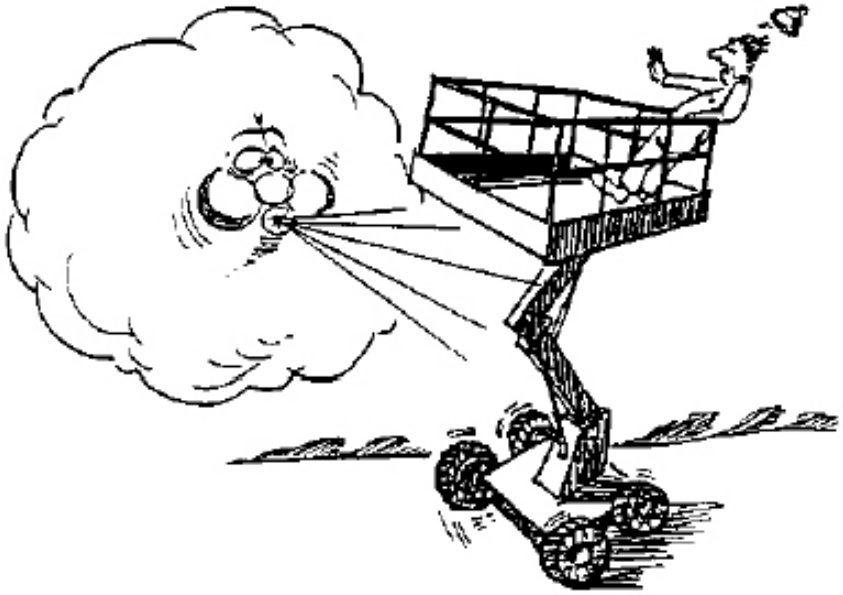
- all accidents, near misses or dangerous occurrences must be reported to your company (employer) immediately.
- following an accident or dangerous occurrence, do not move anything, especially your machine, until authorised to do so by your company.

- follow company procedure and/or site procedure for informing site management.
- report all cases of severe shock loading of your machine to your company.
- do not make any statement, either verbal or written, to anyone, with the exception of the H M Inspector of Health & Safety, unless you have contacted your employer first. This includes the police, the main contractor and the client.

Wind

Effect of Wind Forces

All MEWPs (except those designed specifically for indoor use) are designed to operate in wind speeds up to a maximum which should be marked on the machine. Operation in wind speeds above this maximum may cause instability.



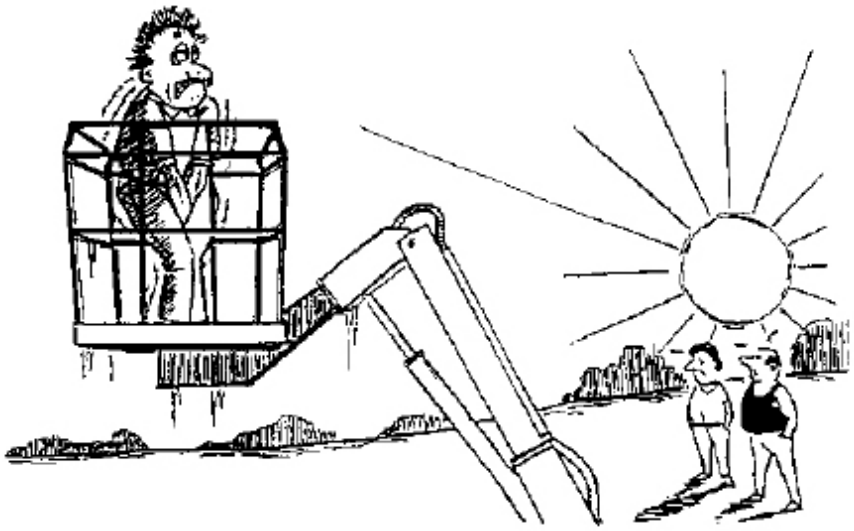
Operating in wind may cause instability

The generally accepted design wind speed, and also the maximum in which an operator can work comfortably, is 12.5m/s (28mph).

Wind speed can be measured from the platform with a hand held anemometer but it is more usual to estimate using the Beaufort Scale of Wind Force *(see page 30)*

It is very important to realise that wind speed increases with height and may be 50% greater at a height of 20 meters above ground level.

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 and at freezing, the temperature - 15°c. This makes it very important to wear warm clothing even though it might feel relatively warm at ground level before starting work.



Wear warm clothing when there is a wind chill

Care must be taken when handling building cladding, sheet materials, panels and other such materials which can act as “sails” and seriously affect the stability of a MEWP, especially in gusty wind conditions.

You should be aware of the shielding and funnelling effects of high buildings which may cause high wind speeds on days when the wind speed in open areas is low.

Other sources of local high wind speed to consider are aircraft slipstreams at airports and high sided vehicles on motorways.

Beaufort Scale

The Beaufort Scale of wind force is accepted internationally and is used when communicating weather conditions. It consists of number 0-17, each representing a certain strength or velocity of wind at 10m (33ft) above ground level in the open.

Beaufort scale

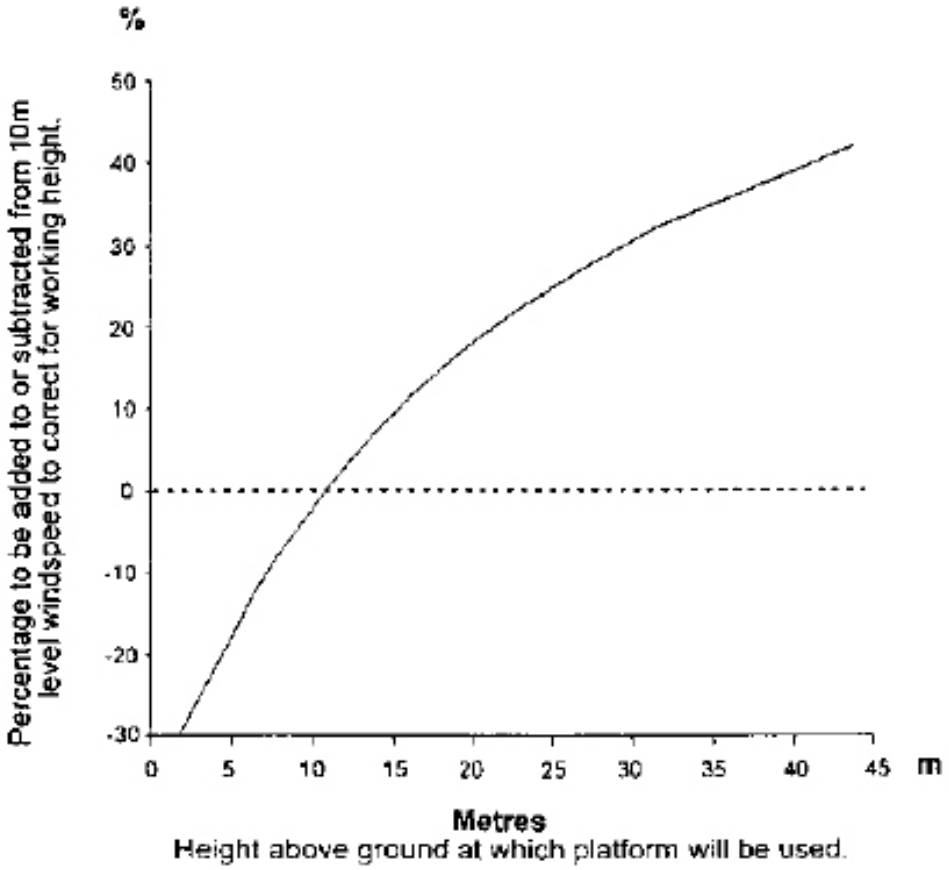
Description of wind		Specifications for use on land	mph	m/s
0	Calm	Calm: smoke rises vertically	0-1	0-0.2
1	Light Air	Direction of wind shown by smoke	1-3	0.3-1.5
2	Light Breeze	Wind felt on face; leaves rustle; ordinary vanes moved by wind	4-7	1.6-3.3
3	Gentle Breeze	Leaves and small twigs in constant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

NB • The design wind speed for MEWPs is based on a three second gust whilst the Beaufort Scale is based on a ten second gust. The use of the Beaufort Scale will therefore produce an under estimate of the design wind which should be corrected by using the next lower Beaufort Scale. As an example, if the maximum wind speed at which the platform can be used is 12.5 m/s (28 mph) then use Beaufort Scale "5" instead of Beaufort Scale "6".

• Beaufort Scale numbers 10-17 are not shown in this table.

Corrections to standard Beaufort Scale windspeeds

Note: Beaufort Scale gives wind velocities at 10m (33ft) above ground level. The following graph give corrections for other heights of the platform.



Safety harnesses in mobile elevating work platforms boom type platforms

It is strongly recommend that a full body harness with an adjustable lanyard (used to provide work restraint and adjusted to be as short as possible) is used when working from a boom type Mobile Elevating Work Platform (MEWP).

This would include:

- Self Propelled Booms (SPB)
- Trailer Push-around (TP)
- Vehicle Mounted Platforms (VMP26 & 100) and (IAD)

Vertical lifts

It is not normally necessary for personnel working from a vertical lift to wear fall protection equipment, other than in exceptional circumstances.

This would include:

- Scissor Lifts (SL) and
- Vertical Personnel Platforms (VPP)

The need for a fall protection system will be the outcome of a job specific risk assessment undertaken prior to work commencing.

Preventing falls from boom-type mobile elevating work platforms

Introduction

This information sheet explains how to prevent falls, not just mitigate the effects once a fall occurs. It also explains how to select suitable fall protection equipment where the risk cannot be adequately controlled. All types of boom (articulated and telescopic) mobile elevating work platforms (MEWPs), commonly known as 'cherry pickers', are covered by this guidance, including ones that are:

- vehicle-mounted;
- self-propelled;
- trailer-mounted.

The guidance is not intended to cover risks associated with work near to (or on) overhead power lines, people climbing out of the MEWP (this is not normally allowed), and the detailed requirements for information, instruction and training associated with the operation of MEWPs.

This information sheet has been produced in consultation with the International Powered Access Federation Ltd and the Construction Plant-hire Association.

Background

Between 1995/96 and 2001/02 five fatal accidents involving MEWPs were reported to HSE's Field Operations Directorate (FOD). The MEWPs involved had been struck by vehicles, suffered a failure or the ground had given way.

An analysis was made of FOD's reported and investigated incidents relating to:

- MEWPs collapsing;
- MEWPs overturning;
- people being thrown from the carrier;
- the carrier being trapped against fixed structures (the carrier is commonly referred to as the basket or cage).

The following primary causes were identified:

- equipment failure;
- ground conditions;
- outriggers (not used or faulty);
- trapping against fixed structure;
- MEWP being struck by vehicle;
- load/unload of MEWP under power;
- overloading a carrier;
- carrier struck by a load.

The risk of falling from a MEWP is from sudden movements caused by an impact, ground movement, failure of a stability critical part, or overreaching. The wearing of appropriate fall protection equipment can provide protection against the residual risk of falling, or being thrown out of the carrier.

In practice, work restraint will often be the most suitable form of personal fall protection (see the 'Types of fall protection equipment' section for a definition).

Assessing the risk

Employers and others responsible for the use of MEWPs must assess the risks of people falling from or being thrown from the carrier, or the MEWP overturning, and take precautions to eliminate or control those risks. The following points should be considered:

- What other vehicles, mobile plant or work equipment (eg overhead cranes) could be close by?
- Could parts protrude beyond the site boundary (eg buses have struck MEWPs)?
- What are/will be the general ground conditions (eg softness, slopes)?
- Are there any localised ground conditions that could be a hazard?
- Has the MEWP been examined, inspected, maintained and daily checks carried out?
- Could the carrier be caught on protruding features (eg steel work, tree branches)?

Controlling the risk

Firstly assess whether risks can be eliminated, for example:

- remove uneven ground or excavations (eg adjusting the phasing of the work);
- remove soft ground by compacting.

If elimination is not reasonably practicable then assess the measures that should be put in place to minimise the risk of falling from or with the carrier.

Examples of control measures are divided into three categories: safe plant; safe site; and safe operator.

Safe plant

- Select the right MEWP for the job (consider ground conditions, working height, the task including the range/sensitivity of movement, the anticipated load, eg people and tools). A MEWP must not be used as a crane.
- Ensure the MEWP has a through examination by a competent person at least once every six months. Inspections may be more frequent depending on the use and operating conditions. Inspection intervals should be stated in the examination scheme. Normally a MEWP has daily checks and a weekly inspection.
- Ensure competent personnel undertake planned maintenance in accordance with the manufacturer's instructions. These are complex pieces of work equipment that need to be maintained. In particular, inadequate lubrication and electrical repairs have caused problems (eg a fault from an electrical repair has caused outriggers to raise while in use).
- After a hydraulic levelling system hose failure, establish whether the carrier tilt will lock when it is brought back to ground level. If it does, people are at risk of being tipped out.

Safe site

- Segregate other site traffic (delivery vehicles, dumpers, etc) from the work area.
- Ensure parts of a MEWP cannot protrude into roads or other transport routes. If this is not possible, you need to use systems of work (eg temporary road closure at quiet times).
- Check the work area for localised features, eg manholes, service ducts, potholes, etc (eg a hole 75 mm deep caused an overturn).

- Check temporary covers are strong enough to withstand the applied pressure.
- Check temporary covers are secured and monitor them. Take similar action for permanent covers.
- Establish the load bearing capacity (general and point loading, eg outriggers) when working inside in a building or on a structure (eg a jetty).
- Ensure there is supervision to ensure safe systems of work are appropriate and being used.
- Have agreed systems of communication (eg between MEWP operators and banksman during steel erection work).
- Check weather conditions have not altered ground conditions (eg heavy or prolonged rain).
- Establish limits for safe operation (eg maximum wind speed). Remember conditions can change internally (eg if roller doors are opened).
- Comply with permit-to-work systems where sites have them (eg chemical plants).
- Ensure you have a rescue plan agreed and in place for a fall. Are trained people and rescue equipment on-site? Do all operatives understand what to do?
- Assess other alternative work methods or equipment before operating near a steep slope or edge. If you must operate near an edge or steep slope, can barriers be provided that will retain the MEWP? If this is not possible, where should a barrier be positioned (you need to know the braking performance)? If this is not possible, how will the work be sequenced so that the MEWP can operate in a safe manner (eg in line with the edge rather than towards it)?

Safe operator

- Ensure you have procedures for loading/unloading during delivery/removal from site. Does this procedure apply to all your MEWPs (eg some do not have braking on all wheels)?
- Ensure operators are trained and familiar with the performance and controls of the MEWP they going to use (eg do they know the types of ground/slope it can operate on or when outriggers will require packing?).
- Ensure operators have any task-specific training (eg use of a chainsaw).
- Ensure daily checks are done (in accordance with the manufacturer's instructions).

- Ensure operators know when further operation would be unsafe. Do they know how to position the MEWP for optimum use?
- Ensure there is a system for recording faults, repairs and maintenance. What types of fault would prevent further use of machine (eg controls not responding correctly)?
- Check if a different make or model of MEWP is delivered to the site. Check that it is suitable for the task. This is important with poor ground-bearing capacities. Control systems can vary, leading to operator errors.

Use of fall protection

If there is still a residual risk of impact or persons falling after you have assessed the risks and put the control measures in place, then the use of fall protection equipment should be considered, for example:

- when working next to or in a live highway (eg street-lighting work or tree-crown lifting) where there is a risk of a vehicle hitting the MEWP;
- when travelling with the carrier in a raised position where it may strike fixed objects in its path (eg branches, steel work);
- when travelling with the carrier in a raised position over uneven ground;
- steel erection where the carrier has to move in and around the steelwork.

The MEWP must be suitable for travelling with the carrier in a raised position. Types of fall protection equipment

There are two types of fall protection that a person can use in the carrier:

- work restraint system (also known as fall restraint and incorrectly referred to as work positioning) - this stops a person falling from the carrier in the first place (unless it is a MEWP overturn).
- fall arrest system - this stops a person after they have fallen from the carrier (unless it is a MEWP overturn).

When deciding, as part of a risk assessment, which system should be used, the following points should be considered.

- Check with the manufacturer that the MEWP can be used as part of a fall arrest system. Does the carrier have suitable anchor points? The majority of anchor points are currently rated for work restraint and not fall arrest. The testing of anchor points is covered in BS EN 795: 1997. 1 Anchor points in the carrier should be marked for work restraint or fall arrest and the number of persons for which they are rated (arresting a fall could also generate enough force to cause an overturn -check the MEWP can absorb this shock load).
- After a fall the MEWP will flex, causing more severe swinging movements than normal (this could lead to a higher risk of striking the MEWP or other nearby structures).
- Could the dynamic impact of a fall arrest cause other occupants, loose materials or tools to be ejected from the carrier?
- The user needs to establish the height the carrier will be working at and select fall arrest equipment that will work within that height. A typical fall arrest system with a full body harness, 2.0 m lanyard and shock-absorbing device requires over 5 m clearance height to deploy and arrest a fall.

Contact the fall arrest equipment supplier to establish the minimum clearance height for the proposed equipment.

- Check that there are no projections (balconies, canopies) that a person could strike during a fall.
- After a person's fall has been arrested, how are you going to rescue them? There should be a rescue plan and people should be practised in this.

Work restraint system

A work restraint system for use on a MEWP should normally be a combination of a full body harness (BS EN 361 2) and a lanyard (BS EN 354 3). It does not normally have shock-absorbing capability. It is becoming a common practice to use retractable lanyards to provide the occupants with maximum freedom of movement, together with immediate restraint in the event of impact or levelling system failure. The use of retractable lanyards for this purpose should only be considered after detailed consultation with the manufacturer as to their suitability and the parameters under which they have been designed and, more importantly, tested. Do not use retractable equipment unless it has been specifically tested in the proposed manner of use.

Lanyard length (of both fixed length and retractable systems) should be carefully selected and matched to the carrier of the specific MEWP that is going to be used. They must be set short enough to prevent a person reaching a position where they could fall.

Working near water

When working next to water, a harness should not be worn due to the risk of drowning if the MEWP falls into the water. Life jackets should be worn.

Instruction in use of fall protection equipment Operators will need instruction in the use of the harness, lanyard, rescue equipment and the procedures for periodic inspection, maintenance and storage of fall protection PPE (especially textile equipment). For further information refer to the HSE leaflet Inspecting fall arrest equipment made from webbing or rope.

The Law

If you own, hire or otherwise operate or control the operation of MEWPs (eg as principal contractor), you have duties under health and safety law. The specific legal provisions are (or will be) contained in the following pieces of legislation:

- Provision and Use of Work Equipment Regulations 1998;
- Lifting Operations and Lifting Equipment Regulations 1998;
- Personal Protective Equipment at Work Regulations 1992;
- Construction (Design and Management Regulations) 1994;
- Construction (Health, Safety and Welfare) Regulations 1996;
- Workplace (Health, Safety and Welfare) Regulations 1992;
- The Work at Height Regulations, due in 2004.

References

1 BS EN 795: 1997 *Personal protective equipment against falls from a height. Anchor Devices – Requirements and testing* British Standards Institution (under revision)
2 BS EN 361: 2002 *Personal protective equipment against fails from a height. Full body harnesses* British Standards Institution
3 BS EN 363: 2002 *Personal protective equipment against falls from a height. Fall arrest systems* British Standards Institution
4 *Inspecting fall arrest equipment made from webbing or rope* Leaflet INDG367 HSE Books 2002 (single copy free or priced packs of 10 ISBN 0 7176 2552 4)

Further reading

BS EN 354: 2002 *Personal protective equipment against falls from a height. Lanyards* British Standards Institution

BS EN 355: 2002 *Personal protective equipment against fails from a height. Energy absorbers* British Standards Institution

BS EN 358: 2000 *Personal protective equipment against falls from a height. Belts for work positioning and restraint and work positioning lanyards* British Standards Institution

BS EN 360: 2002 *Personal protective equipment against falls from height. Retractable type fall arrestors* British Standards Institution

Safe use of work equipment. Provision and Use of Work Equipment Regulations 1998. Approved Code of Practice and guidance L22 (Second edition) HSE Books 1998 ISBN 0 7176 1626 6

Safe use of lifting equipment. Lifting Operations and Lifting Equipment Regulations 1998. Approved Code of Practice and guidance L113 HSE Books 1998 ISBN 0 7176 1628 2

Personal protective equipment at work. Personal Protective Equipment at Work Regulations 1992. Guidance on Regulations L25 HSE Books 1992 ISBN 0 7176 0415 2

Managing health and safety in construction: Construction (Design and Management) Regulations 1994. Approved Code of Practice and guidance HSG224 HSE Books 2001 ISBN 0 7176 2139 1

A guide to the Construction (Health, Safety and Welfare) Regulations 1996 Leaflet INDG220 HSE Books 1996 (single copy free or priced packs of 10 ISBN 0 7176 1161 2)

Safe use of work equipment. Provision and Use of Work Equipment Regulations 1998.Approved Code of Practice and guidance L22 (Second edition) HSE Books 1998 ISBN 0 7176 1626 6

Further information

British Standards are available from BSI Customer Services, 389 Chiswick High Road, London W4 4AL. Tel: 020 8996 9001 Fax: 020 8996 7001. Website: www.bsi-global.com

HSE priced and free publications are available by mail order from HSE Books, PO Box 1999, Sudbury, Suffolk CO10 2WA Tel: 01787 881165 Fax: 01787 313995 Website: www.hsebooks.co.uk (HSE priced publications are also available from bookshops and free leaflets can be downloaded from HSE's website: www.hse.gov.uk.)

For information about health and safety ring HSE's Infoline Tel: 08701 545500 Fax: 02920 859260 e-mail: hseinformationservices@natbrit.com or write to HSE Information Services, Caerphilly Business Park, Caerphilly CF83 3GG.

This leaflet contains notes on good practice which are not compulsory but which you may find helpful in considering what you need to do.