

CONSTRUCTION INDUSTRY



# GOOD PRACTICE GUIDANCE FOR REDUCING TRAPPING/CRUSHING INJURIES TO PEOPLE IN MEWPS



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# Introduction

The use of Mobile Elevating Work Platforms (MEWPs) has increased as the benefits for productivity and safety are recognised. MEWPs are acknowledged to be one of the safest and most efficient means of enabling temporary working at height.

Between 2016 and 2020, incidents entered into the IPAF accident reporting portal from 15 countries identified that 73 people died in entrapment incidents globally. Entrapment injuries to persons in the MEWP platform are usually serious and often fatal. This guidance produced by the MEWP group of the Plant Safety Group (PSG) sets out to inform you of measures to reduce the risk and number of entrapment incidents by providing guidance on planning, risk assessment, MEWP selection, operator training, familiarisation, and rescue.

The purpose of this document is to provide information, and good-practice guidance on means of reducing exposure to trapping and crushing hazards while using a MEWP.

The information and guidance provided is presented in the context of subject matter to be considered when planning, risk assessing and managing work activities involving MEWPs, with an emphasis on avoiding trapping and crushing of occupants in the platform.

## The document is written in two parts:

**Part 1** is aimed at anyone involved in planning and risk assessing work with MEWPs, specifying equipment, managing the work, and organising training for those working with MEWPs.

**Part 2** is aimed at those using and supervising MEWPs and those responsible for rescuing persons trapped or crushed in a MEWP platform. It has been designed to be used in briefings or toolbox talks for supervisors and MEWP operators.

Note: This document is not intended to provide complete guidance on all aspects of MEWP operation and safety, it should be used in conjunction with other relevant regulations, statutory guidelines, industry guidance, and codes of practice e.g. HSE GEIS6 – The selection, management and use of mobile elevated work platforms (1), and BS8460:Code of Practice Safe Use of MEWPs (2).





# Part 1: Guidance for planners, employers, managers, and training bodies

## 1. What is trapping and crushing?

If a MEWP operator or a platform occupant becomes trapped or crushed, it often prevents them from lowering or moving the MEWP safely away from the object and can lead to crushing injuries. This is referred to as entrapment. Persons who are entrapped will often be unable to rectify the situation and may find that any operation of the MEWP controls could make the situation worse; for example, in case of a person being forced on to the control panel.

## 2. Health & safety/legal obligations

The Lifting Operations and Lifting Equipment Regulations (LOLER) 1998 places specific legal duties and obligations on a User selecting a MEWPs for lifting people, to prevent persons from being trapped or crushed when working from a MEWP platform.

This must be achieved by performing a robust, suitable, and sufficient risk assessment and putting in place a Safe System of Work (SSoW) to address the identified entrapment hazards.

Anyone involved in the management, planning or operation of MEWPs needs to understand how to remove/minimise the risks and the importance of having effective rescue procedures in place should such an entrapment incident occur.

## 3. Definitions

**Competent individual/personnel:** An individual who can recognise the risks in operational activities as related to a specific MEWP and then apply the appropriate measures to control and manage those risks, enabling the activity to be performed safely and effectively.

**Entrapment:** A situation in which the operator or occupant of a MEWP becomes trapped or crushed between the MEWP controls or platform guardrails and an immovable object or external structure.

**Hire or rental company:** See Owner.

**Nominated ground rescue person(s):** Person(s) familiar with the ground controls and auxiliary/emergency controls of the MEWP who has practised lowering the MEWP platform for each make and model for which they are responsible.

**Operator:** The person using the MEWP controls. This is not necessarily the same as the User.

**Owner:** Company, firm or person owning the MEWP including those hiring it out to a User.

**Primary guarding:** Function-enable device requires activation prior to any lift or drive movement control being activated. Examples include a foot pedal, a recessed hold-to-run button or trigger.

**User:** Employer, person or organisation that has control of the planning, management and use of the MEWP on site and is responsible for ensuring the MEWP is kept in a safe working condition. This may include the person responsible for the site, location manager, principal contractor, or sub-contractor. This is not necessarily the same as the Operator.

**Secondary guarding:** Device fitted to a MEWP in addition to the primary-guarding systems, to further reduce the risk of entrapment and/or provide an alert that an entrapment situation has occurred.

*Note: Shrouds placed over the controls are not considered as secondary guarding.*

**Site assessment for MEWP selection:** Assessment carried out by a competent person(s) to identify and recommend a suitable MEWP for the intended task. (This is sometimes referred to as a site survey).

**Vehicle marshaller:** A site worker who directs the movement of plant and vehicles on or around a site. Sometimes referred to as a banksman.

**Spotter:** A person nominated by the User, whose operational role during higher risk applications such as those involving entrapment hazards, is to maintain visual/audible contact with occupants of the MEWP platform, to alert them to potential entrapment situations and to raise the alarm and initiate rescue/recovery in the event of an entrapment situation developing.

## 4. Planning considerations

When using a MEWP, planning and supervision is required to carry out the operation safely. This will involve identifying the task to be undertaken, MEWP selection, identification of hazards, risk management and ongoing review of the suitability of plans.

Planning should include consideration of the presence of objects/structures against which persons could become entrapped at any stage of the operation, for example manoeuvring the MEWP around the work location, reaching into the workspace, such as a roof space with existing obstructions (structural supports/services/ducting etc), as well as more general considerations for MEWP control access in the situation where rescue should occur.

In addition, planning should include consideration of appropriate levels of supervision of activities involving MEWPs. The level of supervision should reflect the levels of risks involved in the task. As a minimum, an effective means of communication between the operator and ground staff should be established. In higher risk applications, a spotter should be employed to maintain visual contact with the operator during the work at height activity.

Depending on the MEWP selected for the task, there may be secondary guarding options that can assist in helping reduce a trapping/crushing situation.

The table below provides typical examples of the management of entrapment risks, to be considered during planning and supervision of MEWP activity.

Hazard	Typical causal factors	Examples of control measures
Obstructions in the path of the MEWP while travelling or manoeuvring	Obstructions that come close to the top of the platform while the MEWP is travelling can cause an operator to become trapped between the platform and the obstruction/hazard.  e.g steelwork, ducting, doorways, walls, equipment etc.	Choose an appropriate size and type of MEWP for the access route required.  Where possible, choose a route that avoids overhead obstructions.  Ensure sufficient clearance when travelling under or past overhead obstructions taking account of the platform movements that can occur when travelling.  On MEWPs with platforms controls that can be operated remote from the platform use the remote control rather than squeeze past obstructions and stand sufficiently clear of movement  Always maintain observational awareness of the platform surroundings and any obstacles in the vicinity.
Leaning over the platform guardrails or control panel to view the MEWP base, wheels or tracks while travelling or manoeuvring	This could distract the operators view of obstructions/hazards.	MEWP operators should walk the route prior to travelling.  Routes for travelling should be kept clear of obstructions and free from pedestrians.  Consider a vehicle marshaller to help assist as necessary.  Cordon off safe work areas as necessary.



Hazard	Typical causal factors	Examples of control measures
Losing control and trapping persons against the platform controls or guardrails while the MEWP is manoeuvring	Trapping of the operator against the platform controls while the MEWP is travelling prevents the operator from controlling MEWP movements and increases the likelihood of serious injury in an entrapment incident.	<p>Do not lean over the platform controls while moving.</p> <p>Avoid distractions e.g use of mobile phone, while travelling or moving the platform.</p> <p>Do not put objects on the platform control panel that could move and activate the controls.</p> <p>Do not place materials on the guard rails that could move and distract the operator.</p> <p>Operate MEWPs at a speed consistent with conditions.</p>
Environmental, lighting or weather conditions that could make overhead obstructions in the path of the MEWP difficult to observe (e.g poor/inadequate lighting, dust, glare from sun where overhead obstructions exist)	This could make it difficult for the MEWP operator to notice any obstructions/hazards.	Provide adequate background and task lighting where necessary, considering weather, time of day, seasonal changes, and the work environment.
Pedestrians, obstacles, or equipment in the path of/or around the MEWP.	This could distract the MEWP operator while approaching any obstruction/hazard.	<p>Segregate traffic routes so far as possible.</p> <p>Use a vehicle marshaller/and or spotter where necessary.</p> <p>Pedestrians should wear high-visibility clothing.</p>
Clarify if the ground is suitable for the MEWP to travel on in either a lowered or elevated position. (e.g uneven ground, steps, kerbs, open trenches, or objects)	This could cause a sudden vertical platform movement that could trap/crush the MEWP occupants against obstructions/hazards.	<p>Ensure the ground conditions are suitable for the MEWP to travel on.</p> <p>When travelling in boom-type MEWPs, adjust the platform position to give adequate view of the MEWP base/wheels and to minimise vertical platform (catapult effect) movements.</p> <p>Travel at a speed that ensures platform movements are controlled.</p>
Operating a boom-type MEWP when it is slewed 90 degrees or more to the primary configuration MEWP or operating a MEWP in which you can reposition the control box from the normal operating location.	The MEWP operator can suffer disorientation with respect to the expected direction of movement of the MEWP when operating the platform travel controls.	MEWP operators should always check the direction of movement of the MEWP with reference to the direction arrows on the MEWP base and platform controls before activating the controls.
<p>Operational error leading to unintended or unexpected movement when activating the MEWP controls</p> <p>Speed and movement of platform controls (proportional, ramping)</p>	<p>Lack of MEWP familiarisation given to the operator.</p> <p>The MEWP operator can suffer disorientation with respect to the expected direction of movement of the MEWP when operating the platform travel controls.</p> <p>Mistakes, rushing to get the job done and lack of concentration by the MEWP operator, distractions caused by others or work that the MEWP operator has to carry out.</p>	<p>Ensure that MEWP specific familiarisation has been completed.</p> <p>MEWP operators should always check the direction of movement of the MEWP with reference to the direction arrows on the MEWP base and platform controls before activating the control.</p> <p>Operators should always take the necessary time and not be rushed unnecessarily.</p>

Hazard	Typical causal factors	Examples of control measures
Over-reliance by the User and MEWP operators on secondary guarding	Blanket mandating of secondary-guarding devices. Presumption that secondary-guarding will provide absolute protection	The risk assessment needs to include consideration of entrapment hazards. The User and the MEWP operator should understand the limitations of the secondary-guarding device fitted. The operator must remain vigilant at all times.
Operating and positioning of an occupied MEWP platform from the ground control position.	Lack of observation, communication, and distance perception	The User should restrict access to the MEWP ground controls. If the MEWP platform is occupied, the operation must be from the MEWP platform.
<b>*This list is not exhaustive, and each task should be suitably risk assessed.</b>		

## 5. Carrying out a MEWP risk assessment

As part of managing health and safety you must control the risks in your workplace. To do this you need to consider what might cause harm and decide whether you are taking reasonable steps to prevent that harm. A suitable and sufficient risk assessment must be carried out, it should be both MEWP and task-specific and identify the groups of people that could be harmed for each category of hazard identified.

In an entrapment situation, the severity of harm is likely to be high (i.e significant injury or death), therefore adequate control measures are required to reduce the likelihood of harm and potential severity so far as is reasonably practicable.

The risk assessment should be recorded and communicated. It should also be reviewed during the course of the work and revised where necessary. If revised, it should be re-communicated to those groups of persons involved in the work task.

The risk assessment should include consideration of entrapment and crushing hazards and secondary risks associated with measures employed to control them, such as risks associated with emergency procedures and the introduction of secondary guarding devices.

For further advice on risk assessment, see INDG163 (HSE) (3), HSE General Information Sheet GEIS6 (1) and BS 8460: Safe use of MEWPs (2)

Risk assessments should be carried out by trained and competent persons and must be suitable and sufficient i.e:

The MEWP risk assessment should cover:	The MEWP risk assessment should show:
<ul style="list-style-type: none"> <li>• travelling to and from the work area.</li> <li>• setting up the MEWP prior to use.</li> <li>• positioning to the desired work location.</li> <li>• working at height.</li> <li>• manoeuvring MEWP at height.</li> <li>• rescue planning.</li> </ul>	<ul style="list-style-type: none"> <li>• all elements of the task have been assessed</li> <li>• you identified who might be affected, and how</li> <li>• you identified significant entrapment hazards, considering the number and groups of people who could be involved</li> <li>• the precautions are reasonable, and the remaining risk is as low as is reasonably practicable</li> <li>• you involved and communicated with your workers and/or their representatives in the process</li> </ul>

## 6. Safe System of Work

When working in an environment where trapping and crushing risks exist, a safe system of work (SSoW) should be devised to ensure that each stage of the work is carried out safely. The SSoW should relate to and supplement the risk assessment and should be communicated to all those involved in the work task.

### Examples of information which could be included in the Safe System of Work:

- Specifying the type of MEWP(s) to be used and suitable secondary guarding if required, to ensure the operational characteristics are well defined.
- Highlighting any trapping and crushing risk areas during the various phases of the work activity (travelling to, accessing the working space and undertaking tasks in the work area)
- Identifying control measures to be applied, including supervision and communication arrangements.
- The order of MEWP operation
- Training and competence requirements for those involved in the work
- Emergency and rescue plans (4)
- Supervision and monitoring that is proportionate to the level of risk.

## 7. Training and competence

Site Management should have knowledge of the factors that should be considered before selecting a MEWP for use. They should also understand the risks involved in the work when MEWPs are in use. General guidance is provided in HSE General Information Sheet GEIS6 -The selection, management and use of MEWPS (1).

A “MEWPs for Managers” training course is available for people who manage work activities involving MEWPs (5).

Supervisors should be instructed in the hazards, causal factors, and control measures identified in the task-specific risk assessments for the work to be carried out. They should be familiar with the plans for the work to be carried out and take part in regular on-site emergency lowering drills practice with the types of MEWPs that are under their supervision. In addition, it is recommended that supervisors are familiar with the contents of Part 2 of this guidance.

Managers and supervisors must ensure that MEWP operators are competent to operate the MEWP in the working conditions to which they are exposed. They should have attended a recognised MEWP operator course and may consider an advanced course such as IPAF PAL+ course.

MEWP Operators should be familiarised (6) with the make and model of MEWP they are authorised to operate and understand the function and operation of any secondary guarding device provided.

This familiarisation should be recorded in their physical or digital logbook. Managers and supervisors should refer to the operators logbook to gauge the capability of the operator. They should use this evidence to help them assess the risks involved in the tasks they plan, and should involve the operator in emergency and rescue plans.

## 8. MEWP selection

MEWPs have different functional performance characteristics, which allow a wide variety and different sequences of platform movements to be performed. The information provided by the risk assessment on the nature and location of entrapment risks, and when in the task the risks occur, will aid decisions on the type and model of MEWP best suited to the task.

Depending on what MEWP is selected, there may be primary-guarding and secondary-guarding options (see definitions) that can assist in helping avoid an entrapment situation and/or provide an alert that such a situation has occurred ([See Annexe 2](#)).

If the risk assessment identifies that the selected MEWP for the task still carries a significant risk of entrapment, further mitigation may still be required. This may include procedural changes, additional devices, or potential redesign of the task.

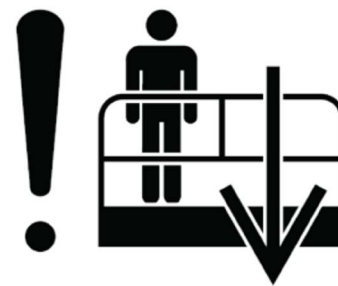


## 9. Emergency and rescue plans

The need to have an Emergency and Rescue plan when working at height is a legal requirement under UK legislation. It is also considered good practice by IPAF and other organisations for all regions as an effective method of managing risks when working at height.

The time taken to rescue someone who has become trapped and crushed can make a very significant difference to the injuries sustained.

Guidance for good practice when developing the emergency and rescue plan can be obtained from relevant sources such as the HSE and IPAF [www.ipaf.org/en-us/resource-library/rescue-persons-mewps](http://www.ipaf.org/en-us/resource-library/rescue-persons-mewps). You should pay particular attention to the selection and use of nominated ground rescue person(s) and the ability to access and operate auxiliary ground controls quickly in the event of an incident. Consideration should be given to the location and availability of the ground control key if applicable.



A decal may be positioned directly above or in the vicinity to identify the location of the emergency/auxiliary lowering controls

## 10. Selection and fitting of secondary guarding devices to MEWPs

Secondary guarding is not a mandatory requirement for the safe use of a MEWP, but Users are required to take all reasonable steps to reduce the identified risks to as low as reasonably practicable, so where entrapment hazards still exist, those responsible for selecting the work equipment will need to have demonstrated that they have considered the potential benefits secondary guarding might offer and justify their selection decision.

There is a commonly held belief that a MEWP fitted with secondary-guarding will provide all the occupants of the platform absolute protection against entrapment in all applications.

### **This is not true!**

Secondary guarding should not be relied upon in lieu of proper training, planning, risk assessment and following good practice guidance. The constant observation of their surroundings by the operator and persons in the MEWP is paramount to MEWP safety and reduction of entrapping incidents.

#### **Selection**

Where the task-specific risk assessment indicates that the fitting of secondary-guarding devices may overall reduce the risk of entrapment during the task. User should ensure that full consideration is given to both the positive and negative health and safety effects of fitting the device and any legal considerations.

A secondary-guarding device should only be fitted to a MEWP where it reduces the entrapment risks identified and it will not:

- Increase the consequences of injury should entrapment occur;
- create new or additional risks that outweigh the entrapment risks addressed (taking account of all the ways in which the MEWP is used including areas where entrapment risks are not present).

Secondary-guarding solutions can introduce additional risks and may also have implications for the SSoW and rescue planning. The User needs to demonstrate that these matters have been adequately considered.

Those responsible for selecting/specifying MEWPs and secondary-guarding devices need to consider the relative merits of each type of secondary guarding solution for their planned lifting operations, in combination with the primary safety characteristics of the MEWP, to ensure that they are the right machine for the task.

The UK Health and Safety Executive carried out research into the performance of generic examples of secondary-guarding (physical barrier; pressure sensitive trigger devices; proximity sensors), when employed in a range of different entrapment scenarios. Full details of this research can be found in the HSE report RR1180 (2022) (7).

The research identified some potential performance limitations applicable to certain generic design types in certain entrapment scenarios. The User should use information of this type to inform their consideration of appropriate selection of secondary guarding for each specific application.

## Fitting

In the first instance, the User should consult the Owner for advice on the supply and fitment of secondary guarding devices and systems but should note that UK Health and Safety law does not oblige the owner/rental company/supplier or manufacturer to give advice on the fitting items that they have not supplied. Alternatively, the Owner or User may source the secondary guarding devices and systems from a 3rd-party vendor or manufacturer.

There are specific legal requirements need to be understood and followed by anyone who fits secondary-guarding devices and systems on a MEWP (See Annexe 1).

## 11. References

# Annexe 1

### Legal requirements governing the fitment of secondary guarding devices and systems to MEWPs.

There are specific legal requirements that need to be understood and followed by anyone who fits secondary guarding devices and systems on a MEWP. The main requirements to be considered are the Provision and Use of Work Equipment Regulations 1998 (8) and the Supply of Machinery (Safety) Regulations 2008 (9). The Regulations both originate in European Directives and are complementary.

#### Provision and Use of Work Equipment Regulations 1998 (PUWER) (8)

Before putting MEWPs into use for the first time in the UK, PUWER Regulation 10 requires the user to satisfy themselves that the MEWP complies with the essential health and safety requirements of the Supply of Machinery (Safety) Regulations 2008. Normally, compliance may be presumed if the MEWP is UKCA, UKNI or CE marked and accompanied by valid Declaration(s) of Conformity.

**NOTE:** From 1 January 2023, all MEWPs placed on the market in Great Britain will have to be UKCA assessed and marked. MEWPs placed on the market in Northern Ireland will have to be CE or UKNI/CE-assessed and marked.

PUWER (Provision and Use of Work Equipment Regulations) Regulation 4(1) allows work equipment to be adapted, for example, for the specific operations and conditions in which it is used. Regulation 4(2) requires that adaptations must not increase the overall risks associated with its use.

#### Supply of Machinery (Safety) Regulations 2008 (SMSR) (9)

Under SMSR Regulation 7(1), before placing machinery, such as a MEWP, on the market and/or putting it into service, the manufacturer or authorised representative shall:

- (a) Ensure that it satisfies the relevant essential health and safety requirements (EHSRs) as contained in Schedule 2, Annexe 1.
- (b) Ensure that the technical file is available.
- (c) Provide the necessary information, such as instructions.
- (d) Carry out the appropriate procedures for assessing conformity.
- (e) Draw up the declaration of conformity and ensure that it accompanies the MEWP.
- (f) Affix the conformity assessment marking (UKCA/UKNI) to the MEWP.

If an individual substantially modifies\* a MEWP, they may become the new MEWP manufacturer and are responsible for complying with SMSR.

MEWPs are in SMSR under Annexe IV, so they are subject to special conformity assessment procedures. European Standard EN280 (10) is a UK-designated standard and provides guidance on how MEWP designs can comply with the EHSRs. Manufacturers can choose to assess conformity against the standard or against the EHSRs. To assist them to comply with the SMSR, manufacturers normally choose to have their designs examined and certified by UK Approved Bodies. The SMSR also allows manufacturers to self-certify their designs by demonstrating full compliance with EN280.

Secondary-guarding devices and systems may be classed under SMSR as safety components. Safety components must comply with Regulation 7(1) in the same way as machinery. Compliance with Regulation 7(1) means only that the safety component meets the Essential Health and Safety Requirements relevant to the safety component.

# Annexe 2

## Types of secondary guarding



### Physical barrier fixed full cage structure

Features a steel structure designed to transfer the kinetic energy into surrounding structures while maintaining a protected area for the operator



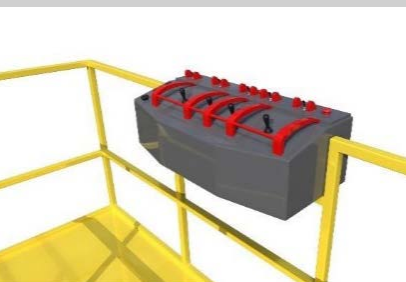
### Operator protective structure

Features a steel structure designed to transfer the kinetic energy into surrounding structures while maintaining a protected area for the operator.



### Side protection barriers

Structure is fitted to the guardrails and projects above the platform to protect the operator. May also be fitted with an overhead cross bar (not shown).



### Local control barriers

Features individual raised indents to protect specific controls from being accidentally operated.



### Contact device

When activated it stops immediate movement and activates audible and visual warning devices.

Some devices may also limit further movement, and some may reverse the last operated function.

# Annexe 2 Continued

## Types of secondary guarding



### Moveable or breakaway bar or contact alarm

(Detachable cable shown)

Designed to alert when an operator contacts the platform control panel, interrupting boom movement, sounding an alarm, and flashing a warning light.



### Pressure sensing control panel

When a significant abnormal force is exerted upon the control panel, boom and drive functions are automatically disabled.



### Contact poles

Poles with sensors are designed to activate when an obstruction contacts an activation whisker.



### Proximity device

Detects proximity of external structure and stops further movement.



### Two hand control promoting operator positioning

Requires dual-handed input for movement.



Reference No.	Standard/Guidance	Organisation	Website
<b>1</b>	GEIS6, The Selection, Management and Use of MEWPs	HSE	<a href="http://www.hse.gov.uk">www.hse.gov.uk</a>
<b>2</b>	BS 8460: Code of practice for the Safe Use of MEWPs	BSI	<a href="http://www.bsigroup.com">www.bsigroup.com</a>
<b>3</b>	INDG163 Risk Assessment	HSE	<a href="http://www.hse.gov.uk">www.hse.gov.uk</a>
<b>4</b>	Rescue of Persons from MEWPs (SFPSG) <a href="http://www.ipaf.org/en-us/resource-library/rescue-persons-mewps">www.ipaf.org/en-us/resource-library/rescue-persons-mewps</a>	IPAF & CPA	<a href="http://www.ipaf.org">www.ipaf.org</a> <a href="http://www.cpa.uk.net">www.cpa.uk.net</a>
<b>5</b>	IPAF MEWPs for Managers Training Course	IPAF	<a href="http://www.ipaf.org">www.ipaf.org</a>
<b>6</b>	Technical Guidance Note F1/08/07, Familiarisation	IPAF	<a href="http://www.ipaf.org">www.ipaf.org</a>
<b>7</b>	HSE research report RR1180 (2022)	HSE	<a href="http://www.hse.gov.uk">www.hse.gov.uk</a>
<b>8</b>	Provision and Use of Work Equipment Regulations 1998, Statutory Instrument 1998 No. 2306	HSE	<a href="http://www.hse.gov.uk">www.hse.gov.uk</a>
<b>9</b>	Supply of Machinery (Safety) Regulations 2008, Statutory Instrument 2008 No 1597	HSE	<a href="http://www.hse.gov.uk">www.hse.gov.uk</a>
<b>10</b>	EN280:2022 Part 1 and EN280:2022 Part 2 Mobile elevating work platforms – Design calculations – Stability criteria – Construction – Safety – Examinations and tests	BSI	<a href="http://www.bsigroup.com">www.bsigroup.com</a>

# Part 2: Guidance for employers, supervisors, operators, rescuers, and training bodies



This is the second part of guidance produced by the Plant Safety Group. Part 1 is aimed at planners, employers, managers, and training bodies. It provides information on hazards, risk assessment, controls, and responsibilities.

Part 2 is aimed at those using MEWPs and those responsible for rescuing anyone who is trapped/crushed in a MEWP platform. It has been designed to be used in briefings or toolbox talks. Remember a risk assessment, safe system of work (SSoW) and rescue plan should have been devised, documented, and communicated by managers and supervisors. The rescue plan should be practised prior to any work commencing.

Supervisors must be instructed in, provided with, and understand the SSoW for the work they are expected to control. Supervisors should monitor the work and provide advice for the review and revision of the risk assessments and SSoW as the work progresses.

Extra supervision may be required when an inexperienced operator is working in restricted spaces, or areas deemed to have increased risk of trapping and crushing.

It is recommended that supervisors are familiar with the contents of this guidance. Supervisors should be competent and must understand how MEWPs should be used in work situations safely. Additional information can be found in the Safe Use of MEWPs BS8460: (2) and IPAF MEWPs for Managers course (5).

This document is not intended to be complete guidance on all aspects of MEWP operation.

Operators of MEWPs must always be trained, competent and aware of their surroundings. Operators must operate the MEWP safely and in accordance with the training they have received and should not rely on secondary-guarding devices to protect them during operation.



## The entrapment risk

MEWPs are acknowledged to be one of the safest and most efficient means of providing enabling temporary working at height.

In some work situations, however, MEWP operators, have been trapped/crushed between the MEWP platform/basket and an overhead obstruction. This has resulted in a significant number of major injuries and fatalities. In some of these incidents, the operator's body has been forced over the control panel, holding the controls in the "on position", increasing the severity of any injuries.

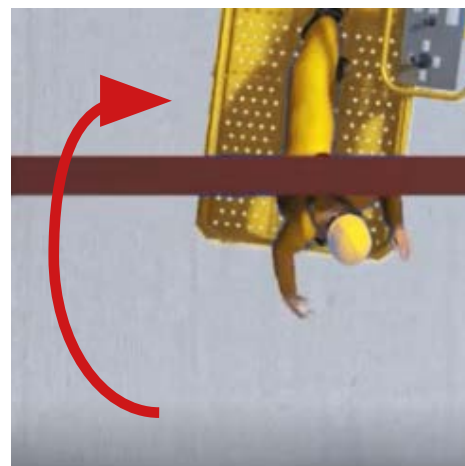
*This Good Practice Guidance has been produced by the Plant Safety Group, to raise awareness of this risk among MEWP operators, supervisors, and rescuers. For more detailed information please refer to the Part 1 of this document.*



## What increases the risk?

The following tasks/actions are the most common causes of entrapment, when a MEWP is operated close to an obstruction:

- The MEWP rising
- the operator inadvertently operating the controls (e.g knocking the controls, controls not to operator expectations)
- Reversing, slewing, or elevating into an obstruction
- Manoeuvring/positioning either the MEWP platform or base unit
- Steering the MEWP on full lock
- Driving the MEWP forwards or telescoping in the MEWP platform
- Unexpected movement of the boom near to an obstruction/structure
- Reversing the MEWP base unit or telescoping out the MEWP platform.



## What increases the risk of entrapment?

The points listed below may increase risk when operating a MEWP close to an obstruction / structure. This list is not exhaustive.

- Poor MEWP route planning
- Poor MEWP selection and set up
- Insufficient MEWP familiarisation and lack of experience
- Uneven ground especially with boom extended or elevated
- Poor visibility at height
- Poor observation, unaware of surroundings
- Distractions when operating MEWP, including other occupants
- Objects placed on or near the control panel
- Overriding MEWP controls and safety devices (including secondary-guarding)
- Accidental operation of controls
- Operating the wrong control or unfamiliar with controls
- Driving in the wrong direction whilst the platform is rotated
- Using faulty or poorly maintained MEWPs
- Weather/environmental conditions
- Poor operator behaviour
- Lack of sufficient/appropriate supervision e.g Spotter
- MEWPS should only be operated by trained operators.
- High drive speeds, lack of care, over confidence

## Common rescue issues

Once trapped, rescue can often be hampered because:

- No-one knows the person is trapped.
- There is emergency rescue plan in place.
- The emergency rescue plan was not practised or communicated.
- There is no key in ground level controls, limiting the ability to use ground level controls in an emergency.
- Complicated boom manoeuvre, the MEWP platform being moved through multiple levels of steel work or complex structures.
- Lack of familiarity with ground controls and emergency descent controls. Ground operatives who have never practised using the ground/rescue controls and cannot therefore safely bring the platform/basket down in an emergency.
- Operator wrongly positions the MEWP, meaning ground/ auxiliary controls are not easily accessible e.g scissor-lifts positioned alongside walls, or cladding or booms where canopies need to be lifted to access controls.
- An overload cell or other safety feature has been activated, this can affect the operation of the controls.
- The emergency stop has been activated; this can restrict the ability of the operator to be rescued.
- Unique recovery procedures e.g driving may be required, or an extension deck needs to be manually retracted.



# If someone has been trapped or crushed...

## REACT IMMEDIATELY!

# Follow your emergency rescue plan, you only have a few minutes to rescue and resuscitate them... every second counts!



## Ways to reduce the risk of entrapment

Working close to overhead structures and obstructions should be regarded as a “higher risk” MEWP operation. If you are expected to carry out this sort of work, you should ensure that the following issues have been properly addressed and that management have explained the steps taken to minimise entrapment risks in a pre-start briefing. If in doubt, ask!

### 1. Plan the MEWP route carefully

- a) Keep a sensible distance from obstructions when elevated in the platform:

The route taken by the MEWP should be planned to keep a sensible distance between the MEWP and any overhead obstruction. This distance will need to be greater for a boom-type MEWP being driven at height to allow for the possible “bounce” and/or “see-saw” effects.

- b) Avoid the drive/elevate/slew controls when close to an obstruction.

If working close to an overhead obstruction is unavoidable, it is strongly recommended that, where possible, only the fine-positioning controls of a boom-type MEWP should be used. Once the MEWP is close to the obstruction the “coarser” drive, elevate and slew controls should be avoided.

Movement should always be slow, deliberate, and planned following careful observation of your surroundings. This can be achieved by careful selection and use of the MEWPs proportional controls.

When operating a MEWP, the suggested sequence of control steps for elevating/raising and descending/lowering are given below:

<b>Boom elevating/raising</b>	<b>Boom descending/lowering</b>
1. Drive 2. Elevate 3. Slew 4. Telescope 5. Fine control	1. Fine control 2. Telescope 3. Slew 4. Descend 5. Drive
<b>Vertical elevating/raising</b>	<b>Vertical descending/lowering</b>
1. Drive 2. Elevate 3. Extend extension deck(s)	1. Retract extension deck(s) 2. Descend 3. Drive

- c) If driving at height is unavoidable, travel speeds should be kept to a minimum. This is particularly relevant at lower heights where increased drive speeds are available.

### 2. Select MEWP carefully

It is important to ensure the MEWP selected is suitable for the specific manoeuvre to be carried out if working close to an overhead obstruction. Particular attention should be given to the choice of:

Reach of machine – ideally, it is better not to operate close to the limit of the machine's “operating envelope”.

Clearance – ensure MEWP and platform are not too large for the spaces in which the machine must be .

### 3. Ensure familiarisation is specific

It is essential that appropriately trained operators receive a familiarisation that is specific to the MEWP they plan to use, conducted in a low-risk area away from overhead structures. In addition to familiarity with the normal operating controls of the MEWP, the minimum standard for each operator is to fully understand:

- Auxiliary/Emergency Descent Controls – how to use the lowering controls, both under power and auxiliary modes, including how the controls work once the load cell has been activated
- “Dead Man” Controls e.g foot pedals – what happens if you remove your foot from the foot pedal and re-insert in a simulated “slumped over the controls” situation?
- When operating a boom-type MEWP, how do the drive controls work when rotated past the 90-degree position

Personnel on the ground, who are competent to lower the MEWP in an emergency, should undergo familiarisation with the emergency and ground controls and practice emergency lowering procedures at regular intervals in accordance with the emergency rescue plan.

### 4. Ensure good ground conditions

Ground conditions should be suitable for the safe operation of the machine. The ground should, where possible, be relatively level and compacted with no obstructions in the operating zone. All trenches, column bases and pits should be identified and protected. If ground conditions are poor, do not operate the MEWP.

### 5. Ensure good visibility at height

When working inside a building, and at times of low light (e.g in winter months or poor weather), adequate task lighting should be provided, or work suspended.

### 6. Do not override the MEWP controls or use faulty MEWPs

- Check that MEWP has a valid thorough examination certificate and manufacturer's manual
- Always perform daily pre-use and function checks
- Always perform emergency/auxiliary function checks.
- Report all faults, isolate, and tag the MEWP.
- Any faults must be rectified before using MEWP.
- Do not override any controls including safety devices.



## 7. Practise the rescue procedure

The rescue procedures must be practised before the operation of the MEWP and periodically thereafter. The following points should have been considered before using the MEWP:

**Ensure the ground control key is available:** The ground control key for the MEWP should ideally be left in the base unit where this is practicable, or at least quickly available at ground level if not.

**Appoint a ground rescue person:** While the MEWP manoeuvre is taking place at least one (and as many as is appropriate) designated ground rescue person(s) should be appointed who know the rescue procedure and has been familiarised with the MEWP being used (including emergency rescue controls). They should always be readily available in the event of an emergency.

**Consider how to raise the alarm:** A system must be in place to identify that an operator may have become trapped, particularly for lone workers working close to an overhead structure. This needs careful consideration if the operator cannot be seen from the ground. Operators must take advice if such a system has not been put in place .

**Decide who should undertake the rescue and how:** This depends on the complexity of the operation, how the MEWP has arrived at the trapping/crushing point and therefore the relative risk of effecting a rescue from the ground compared to the risk of an operator, possibly in a state of panic, trying to rescue him/herself. It also depends on how the controls for the specific MEWP being used function if the load cell has been activated.

**The order of priority should be:**

**Operator:** The operator, or other competent people in the basket, should try to rescue themselves by re-tracing the steps they took in reverse order.

**Ground staff:** If visibility and understanding of situation from the ground are good, ground staff should carry out a rescue using the ground controls in the following order:

**Primary ground controls:** These will provide the full range of platform control but will need to be used in a careful and controlled manner to slowly manoeuvre the platform free of any obstructions, before bringing it safely to the ground.

**Auxiliary/emergency controls:** If the primary ground controls cannot be used (for example, if not functioning or controls are inaccessible) then the auxiliary/emergency controls should be used, though these may be more complex and operate more slowly.

**Another MEWP:** In some situations, the use of another MEWP to gain access to the platform may be the safest option. This will only be acceptable if such rescue has been planned and includes means of transferring between platforms which prevents anyone falling.

The Plant Safety Group Rescue of Persons from MEWPs ([www.ipaf.org/en-us/resource-library/rescue-persons-mewps](http://www.ipaf.org/en-us/resource-library/rescue-persons-mewps)) provides further general guidance on this topic.

## 8. Minimise distractions

Distractions in the platform/basket, such as mobile phones and trailing cables should be strongly discouraged. Loose materials on the MEWP handrails or in the basket of the MEWP should be prohibited and should be carried in approved containers and/or using approved materials handling attachments.

Distractions on the ground (people or objects near the MEWP base) should be removed before operating and exclusion zones complied with.

## 9. Do not obstruct MEWP controls

**MEWP Controls:** basket/platform hand and foot controls should not be obstructed. Tools and materials which could obstruct the controls should not be placed on the MEWP control panel but stored in approved containers and/or using approved materials handling attachments. Once in position, consider isolating the power until you need to re-position to reduce the risks of accidental operation.

**Auxiliary/emergency lowering controls:** these controls could be required in the event of an emergency rescue and should not be obstructed by objects on the ground (e.g., operating MEWP close to a wall with auxiliary/emergency controls facing the wall).

## 10. Slow down, do not crouch over the controls and look!

- Slow drive speeds should be used, particularly when reversing
- Crouching over the controls significantly reduces the operator's margin of safety
- Scan the area for obstructions both before and during MEWP operation
- Do not lean over the controls while operating the MEWP

Have you and the nominated ground rescue person(s) practiced the rescue procedure? If the answer is NO, immediately STOP what you are doing, return the MEWP to a safe position and speak to your manager or supervisor. For more details about reducing entrapment incidents/accidents, please refer to part 1 of this guidance document.

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