

SUPPORTING NOTES

BMV JV M5/J1-2 Oldbury Viaduct Renewal Scheme

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Introduction (Background)

- With the M5 Oldbury Viaduct scheme requiring a need to access the underside of the structure to carry out hundreds of concrete repairs to the soffit of the structure, referred to as “inclusions”, the site team has sought assistance from MEWP provider, Nationwide Platforms Limited (NWP)
- Planning and preparation for use of Mobile Elevating Work platforms (MEWP's) to enable safe access to carry out repair works are now well in hand
- With assistance provided by NWP, training of site based personnel that commenced in February 2018, is continuing, and has included (1) MEWP for managers, (2) IPAF training for operators, and (3) familiarisation training, the latter available for all personnel to be involved in tasks that will require use of MEWP's.
- Familiarisation training includes a short duration classroom briefing, practical demonstration and lowering procedures for each type/model to be used, and the safe use and inspection of safety harnesses and lanyards. This training is delivered at site
- NWP has also provided their new Virtual Reality Training Simulator (VR Simulator) to train existing MEWP operators at the M5 Oldbury Viaduct scheme during weeks commencing 16 and 23 Apr 18. This was the first time (anywhere) that NWP has used this technology for training
- In addition, the scheme will also be using SkySentry (preventing unauthorised or mistaken use), SkySiren PCS (protection against the risk of operator entrapment) and SkyScreen systems (reducing the risk of objects dropping from the platform basket), all provided by NWP
- The Viaduct scheme works are approx. 3km in length, of which around 1.7km is above or next to protected watercourses.
- In addition to the content of this document, a series of attachments, from IPAF, NWP, MS and HE are also available (provided)
- [Following substantial completion of repairs works requiring MEWP access, BMV and NWP are to produce a “case study” document \(file\) for the M5 Oldbury Viaduct scheme](#)

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General access beneath the viaduct structure



Examples of viaduct structure where MEWP's are to be used to access the soffit to affect repairs



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Preparation of ground beneath structure Bents for scissor lifts to travel and operate (TW design)



Preparation of ground beneath structure Bents for scissor lifts to travel and operate (TW design)



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MEWP scissor lift in position beneath structure, work area cordoned off from live traffic (A road)



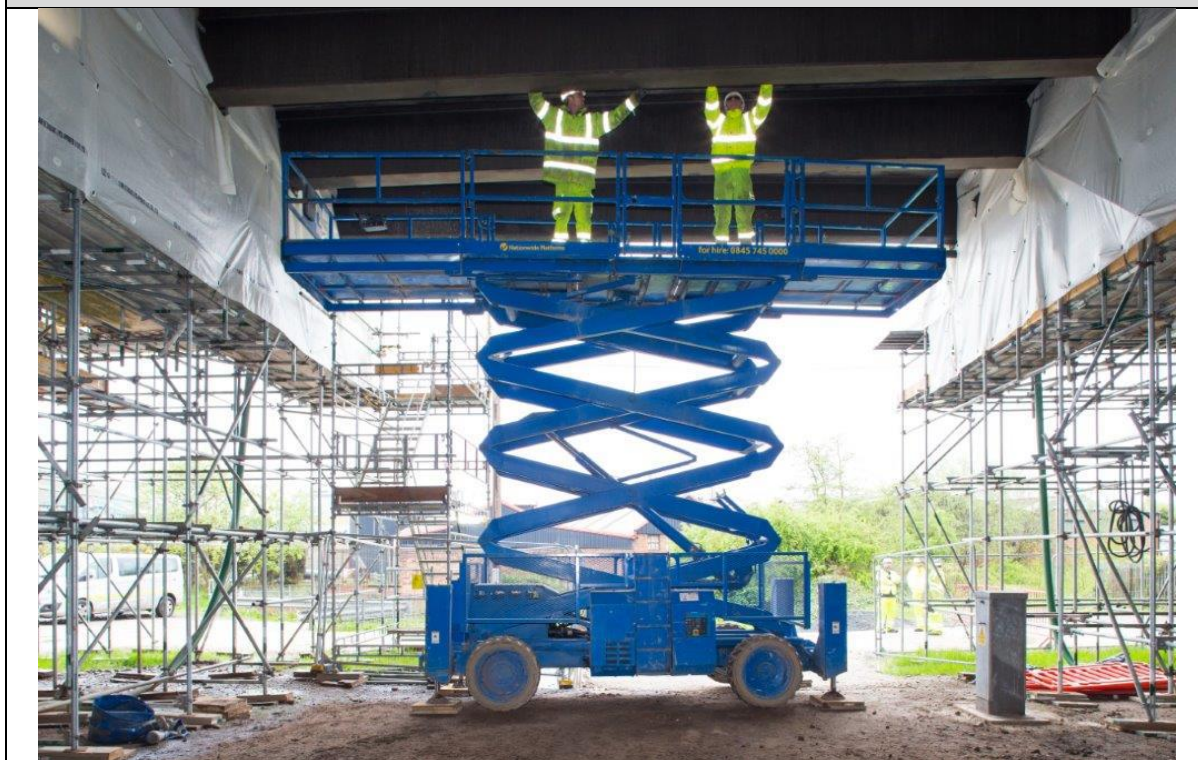
MEWP scissor lift in position beneath structure, work area cordoned off from live traffic (A road)



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Type 3a Mobile Vertical (scissor lift) – In use at M5 Oldbury



Type 3a Mobile Vertical (scissor lift) – In use at M5 Oldbury



Type 3a Mobile Vertical (scissor lift) – In use at M5 Oldbury

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Type 3a Mobile Vertical (scissor lift) – In use at M5 Oldbury



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Type 3a Mobile Vertical (scissor lift) – In use at M5 Oldbury



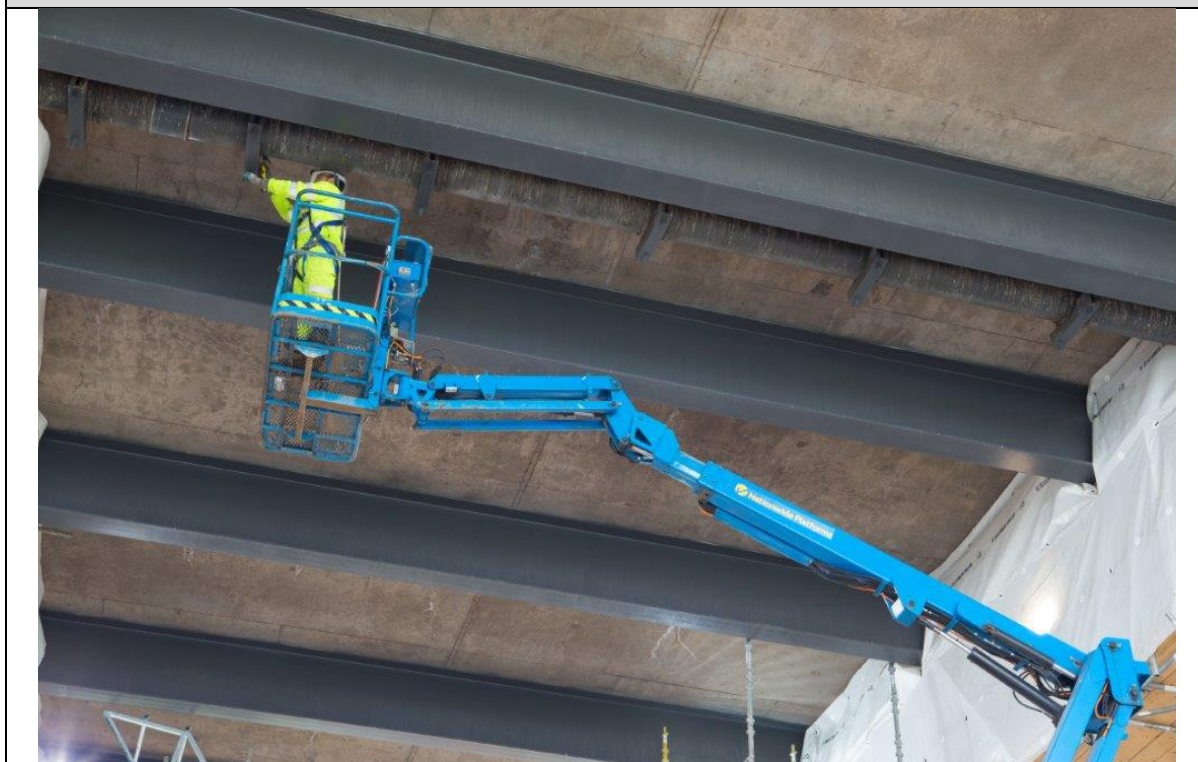
Type 3a Mobile Vertical (scissor lift) – In use at M5 Oldbury



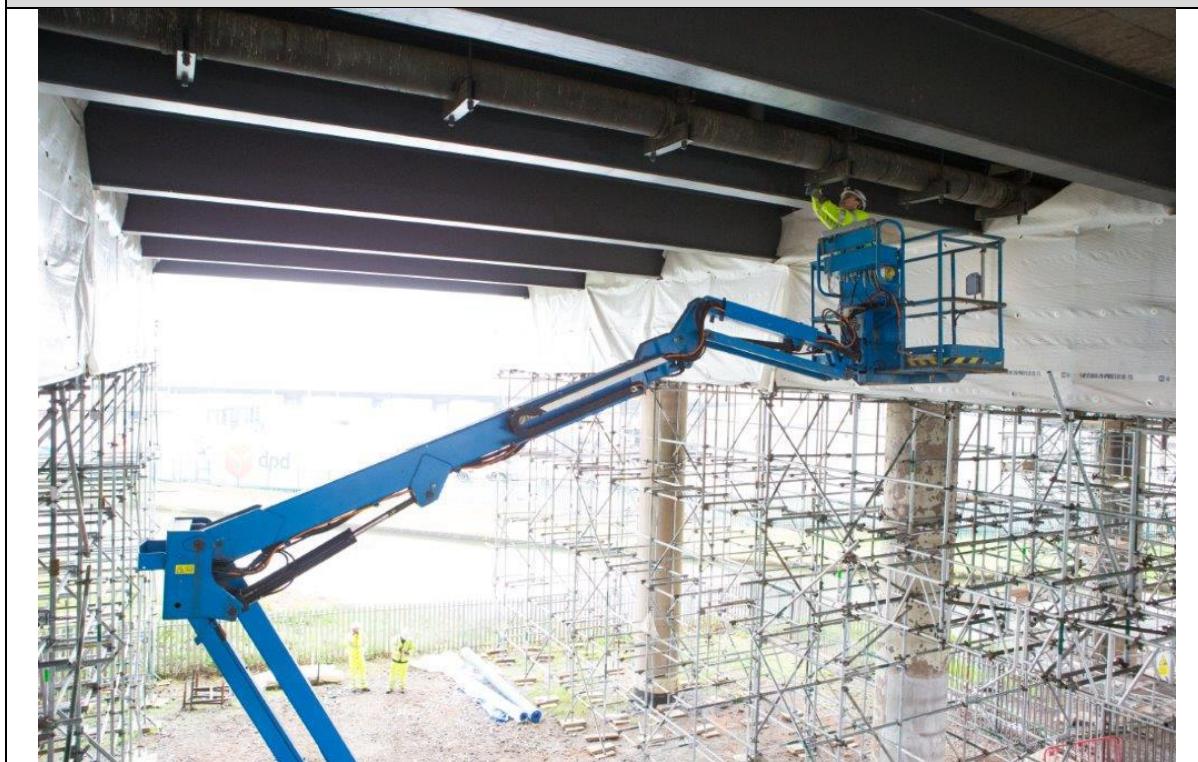
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Type 3b Mobile Boom – In use at M5 Oldbury



Type 3b Mobile Boom – In use at M5 Oldbury



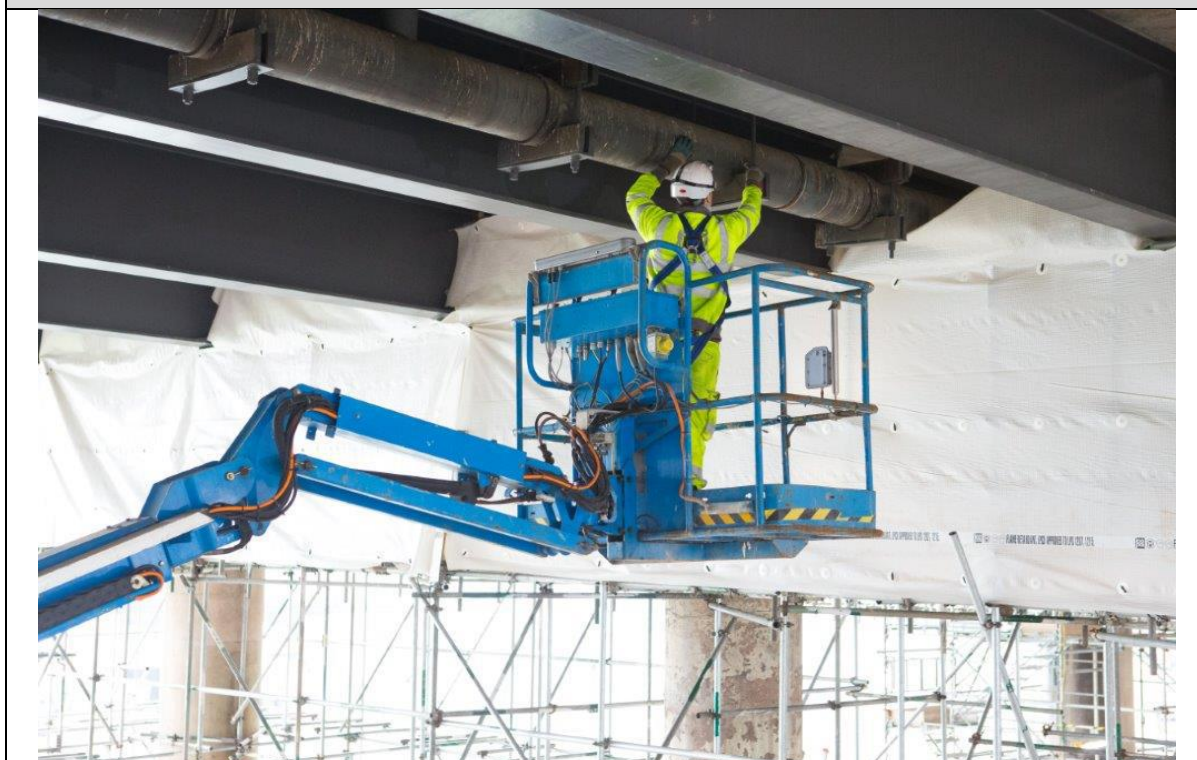
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Type 3b Mobile Boom – In use at M5 Oldbury



Type 3b Mobile Boom – In use at M5 Oldbury



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Type 3b Mobile Boom – In use at M5 Oldbury



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Type 3b Mobile Boom – In use at M5 Oldbury



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MEWP types: Consideration for use

1. Height and outreach

Do I need to reach a height straight up or do I need to reach up and then over?

For vertical access, scissor lifts may be best. When working over racking or shelving, mast booms are ideal. When working over obstacles, articulated booms provide a versatile solution

2. Environment

Will I be working indoors or outdoors,

Use a zero emission electric machine indoors, and in general a diesel machine outdoors. For versatility, consider a dual fuel unit.

At the M5 Oldbury Viaduct scheme, areas of use will be outdoors and well ventilated, but also in close proximity to road, pedestrian routes and waterways used by members of the public.

3. Terrain

What are the ground conditions I'll be working on?

If you're working indoors, consider non-marking tyres. On rough terrain select a four wheel drive option and select outriggers on sloping ground

4. Access

Are there any access restrictions to entering the working environment?

Indoors, will machines pass through doorways and lift shafts? Does the site have plant weight restrictions?

5. Working height

How far up and how far out do I need to reach?

Always check the working envelope diagrams to ensure the outreach required can be achieved at the height(s) you need to carry out your task. Also consider that maximum working heights are assumed as 2m above the platform height (feet level).

To help you find the ideal machine for your next job; visit the NWP website and use its "New To Platforms" selector <http://goo.gl/fFkOna>, download the NWP product selector App, or contact a local depot

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MEWP types: In use at the M5 Oldbury Viaduct scheme (M5 Oldbury)

Please note:

- A decision was taken by BMV JV at the start to limit the numbers of different types / models of MEWP's to be used, with the goal of less choice is better (simpler).
- It was recognised by reducing the numbers of types / models, the potential for confusion with controls, that may be slightly different for each model, would be lessened, and users would become more familiar with the process for pre and post use checks, emergency lowering, and limitations for use of each.
- In addition, familiarisation training was made simpler and more effective
- At peak, it is estimated that 25 MEWP's will be in use on the M5 Oldbury scheme

MEWP types and models, by category and size in use, includes as follows:

Type 3a Mobile Vertical (scissor lifts) –

- GS33 – Working height 12.06m
- GS43 – Working height 15.1m



Type 3b Mobile Boom –

- S65X – Working height 21.8m, Horizontal outreach 17.1m
- S85 – Working height 29.9m, Horizontal outreach 23.32m
- Z45DJXC – Working height 15.86m, Horizontal outreach 7.55m



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MEWP training

1. MEWP for managers (one day duration)

- The MEWP for managers qualification is a mandatory requirement for persons who are to manage or supervise works involving MEWP's
- Courses have been run at site and also at an NWP depot located close to the M5 Oldbury Viaduct scheme

2. MEWP operators

- As a minimum, operators must hold an IPAF or CPCS card that is current and covers the required MEWP category/categories.
- For those persons who hold a CPCS card, they may be required to attend an equivalent IPAF training course, because access to use MEWP's on the M5 Oldbury Viaduct scheme will be restricted by use of Sky Sentry (to prevent unauthorised or mistaken use)

3. Familiarisation (one day duration)

- At request of the H&S Team based at the M5 Oldbury Viaduct, familiarisation training, was arranged for and has been delivered at site, since Feb-18
- Training provides an opportunity for existing MEWP operators to refresh their knowledge on use and operation of MEWP's to be used, in the working environment that they are to be used.
- It has also been made available to those persons carrying out works in MEWP's and site supervisors.
- To-date, in excess of 100 persons have received this training, with all commenting on the benefits that the refresh of learning provided
- At the M5 Oldbury scheme, MEWP's are predominantly used to gain access to the viaduct structure, also referred to as a motorway on concrete stilts, from below
- Training incorporates safe lowering procedures for each MEWP type to be used, and safe use and inspection of safety harnesses and lanyards
- This means that we are assessing competence of operators against their previous training in a safe environment
- There will be a training cost, but the benefits of better awareness by users and project teams, not just MEWP operators, should outweigh moneys spent

4. Virtual Reality Training Simulator

- Please refer to pages below for details

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MEWP supervision and control

On the M5 Oldbury Viaduct scheme

Supervision and control of MEWP activities is carried out in accordance with the Morgan Sindall safe planning and operation of MEWP's standard, a copy of which is included as an appendix with this campaign

This requires appointment of a MEWP coordinator and MEWP supervisors, summary details of which are shown below:

MEWP coordinator:-

- Must have satisfactorily completed the nationally recognised IPAF MEWPs for manager course
- This must be refreshed every five years
- Log books demonstrating the operatives experience of using the particular type of MEWP are to be checked by the MEWP coordinator prior to allowing the operative to work
- If a MEWP operators experience on the particular type of MEWP (i.e. via the log book) cannot be demonstrated, the MEWP coordinator must observe the operative in the machine operating the controls fully, before work commences.
- Refer to Appendix B in the MS standard document for MEWP coordinator duties

A MEWP supervisor:-

- Must have satisfactorily completed the nationally recognised IPAF MEWPs for manager course
- This must be refreshed every five years
- Log books demonstrating the operative's experience of using the particular type of MEWP are to be checked by the MEWP supervisor prior to allowing the operative to work, confirmation that this has been undertaken is to be communicated to the MEWP coordinator.
- If a MEWP operators experience on the particular type of MEWP (i.e. via the log book) cannot be demonstrated, the MEWP supervisor must observe the operative in the machine operating the controls fully, before work commences
- Refer to Appendix C in the MS standard document for MEWP supervisor duties

Please refer to the following Morgan Sindall documents, included as appendices, for further details

- Safe planning and operation of MEWP's standard
- MEWP Acceptance sheet
- MEWP Supervisor Appointment

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Virtual Reality Training Simulator

NWP - Virtual Reality Training Simulator realistically mimics the sensation of boom and scissor (MEWP) operations.

Upskilling previously trained MEWP operators through delivery of familiarisation training at the place of work that MEWP's are to be used.

- The Simulator has been designed to allow operators a true-to-life look and feel of operating an access platform in a safe and controlled environment. It can be used to introduce new entrants to the industry, as well as providing a refresh to existing operators on the uses, risks and different types of powered access equipment.
- The Simulator uses a platform to 'stand on/in' that realistically mimics the sensation of boom and scissor operations.
- The photograph below shows the Highways England Project Manager, Zbigniew Twarowski, working through one of the training exercises.
- This is relatively new technology but is definitely the future of risk free classroom training/upskilling

Virtual Reality Simulator (VR Simulator) training;

- Training includes 4 course principles / state-of-the-art virtual reality technology / 30+ scissor and boom scenarios / replica controls based on real machines / fully immersive and realistic high-risk manoeuvres in a safe environment / conducted at training centres or on site / Operator skills scored using operator metrics and tracking systems
- The VR Simulator is being used to train existing MEWP operators by NWP for the first time (anywhere), in the Induction Room at the M5 Oldbury Viaduct scheme, during w/c 16 Apr and 23 Apr 18

Success criteria;

- Operators familiarised in MEWP use/ safer, more experienced operators/ operators practiced in responding to risks/ reduction in potential number of injuries or incidents/ reduction in potential damages to buildings and equipment

Very good feedback from users at the M5 Oldbury Viaduct scheme

- NWP provided a demonstration of their new ground breaking VR Simulator at the bmv JV Kelvin Way Project offices on Wed 28 Feb 18.
- The VR Simulator is being used to train existing MEWP operators by NWP for the first time (anywhere), in the Induction Room at the M5 Oldbury Viaduct scheme, during w/c 16 Apr and 23 Apr 18
- All operators commenting that it is a very good learning tool
- This would also provide planners and designers with an insight regarding difficulties and issues presented with tasks to be carried out using MEWP's that could be developed using BIM technology
- The combination of use of the VR Simulator and familiarisation training means we are assessing competence of operators against their previous training in a safe environment, as well as providing key learning in the safe operation of MEWP's to users who are not trained operators

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Virtual Reality Training Simulator



The Highways England Project Manager, Zbigniew Twarowski, is photographed above, working through one of the training exercises available on the Nationwide Platforms “Virtual Reality Training Simulator” in the Induction Room at the bmv JV (M5 Oldbury Viaduct scheme) Project offices

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Virtual Reality Training Simulator

A copy of the Virtual Reality Leaflet (2 pages) produced by Nationwide Platforms Limited is shown below for further info / ref



VIRTUAL REALITY Training Simulator

As Europe's leading provider of powered access training, Nationwide Platforms has invested in ground-breaking virtual reality simulators to complement its range of training courses. This pioneering new technology has been designed to allow operators to experience a true-to-life look and feel of operating an access platform in a safe and controlled environment.

- Four course principles
- More than 33 scissor and boom lift scenarios
- State-of-the-art virtual reality technology
- Replica controls based on real machines
- Fully immersive and realistic high-risk manoeuvres in a safe environment
- Conducted at training centres or on-site
- Operator skills scored using operator metrics and tracking systems

Training Benefits:

- Operators familiarised with MEWP use
- Safer, more experienced operators
- Practice in responding to risk
- Reduction in the number of accidents on site
- Reduction to damage to buildings and equipment
- High Risk operating scenarios in a risk free environment



The Virtual Reality simulator realistically mimics the sensation of boom and scissor lift operations.

Training courses cover four principle areas:

- Introduction to Powered Access
- Operator Mid-term Assessment and Update
- Site Induction and Workforce Skills Assessment
- Risk Assessment Workshop (see over for details)

Platform Hire | Specialist Equipment | IPAF Training
Call 0808 100 3586 | nationwideplatforms.co.uk



Nationwide Platforms

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Virtual Reality Training Simulator

Virtual Reality Training Course Prospectus

Introduction to Powered Access

Designed to introduce new entrants to the industry the uses, risks and types of powered access equipment as well as the safety laws and regulations involved. Users will complete two basic manoeuvre scenarios on the simulator.

Module 1 - Introduction to Powered Access

- What are they?
- What are they used?
- What are the risks?
- Types of powered access

Module 2 - Regulations & Law Overview

- Health & Safety at Work Act
- PUWER
- Working at Height

Module 3 - Access Platform Controls

- Control Guide
- Control demo/walk-through

Module 4 - Walk-through & Demo

- Simulator functions
- Familiarisation
- Scoring overview

Module 5 - Testing

- 10 Question multiple choice
- 2 VR Scenario Tests

Course duration
1/2 day

Maximum delegates
6

Outcomes -
NWP Certificate



Operator Mid-term Assessment / Update

Candidates will learn changes to IPAF, regulations and law surrounding powered access with courses of increasing difficulty identifying operator strengths as well as potential training needs. (Only for IPAF card holders)

Module 1 - IPAF & Safety Update

- IPAF Update
- Safety Update
- BS5460
- Working at Height Regulations
- CDM
- Recent accidents
- Causes & factors
- Accident Outcomes

Module 2 - Safety Systems

- Importance of Pre Use Check
- Emergency Lowering

Module 3 - Walk-through & Demo

- Simulator functions
- Familiarisation
- Scoring overview

Module 4 - Virtual Simulator Assessment

- 6 VR scenarios
- 3 levels of difficulty

Module 5 - Testing

- Knowledge Test 15 questions
- Wrap Up

Course duration -
1 day

Maximum delegates
10

Outcome -
NWP Certificate



Site Induction/Workforce Skills Assessment

Experienced IPAF card holders will complete scenarios of increasing difficulty with a trainer providing live feedback and comments on operational competence. Training outcomes and advice for candidates and managers based on scores, along with recommendations for machine use and further training required.

Module 1 - Walk-through & Demo

- Simulator functions
- Familiarisation
- Scoring overview

Module 2 - Virtual Simulator Assessment

- 6 VR scenarios
- 3 levels of difficulty

Module 3 - Feedback

- Training Suggestions
- Operator Feedback
- Wrap Up

Duration -
1 day

Maximum delegates
10

Outcome -
Induction Attendance
Training Suggestions



Risk Awareness Workshop

The course provides an update on powered access risks and control measures as well as an update on current laws regarding the use of access equipment. This training can support risk assessment planning and post-accident investigation.

Module 1 - IPAF & Safety Update

- IPAF Update
- Safety Update
- BS5460
- Working at Height Regulations
- CDM
- Recent accidents
- Causes & factors
- Accident Outcomes

Module 2 - Powered Access Risks & Controls

- Pre Use Checks
- Safety Systems
- Familiarisation
- Risk Assessments

Module 3 - Walk-through & Demo

- Simulator functions
- Familiarisation
- Scoring overview

Module 4 - VR Scenario Assessment

- Operate the machine in multiple scenarios
- Evaluate risks in each scenario
- Debrief risks and challenges

Module 5 - Testing

- Knowledge Test 10 questions
- Wrap Up

Duration -
1 day

Maximum delegates
10

Outcomes
NWP Certificate



"IPAF welcomes this technology and immediately endorses the use of VR simulators as a good training tool for MEWP operations, when used in addition to the current IPAF theory and practical training programmes."

Tim Whiteman, IPAF's CEO



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SkySentry (preventing unauthorised or mistaken use)

SkySentry is a simple and effective fleet management system designed to help you reduce costs, drive efficiency and improve safety.

Features

- Machine tracking and Geo-fencing technology
- Real time operator hours, machine status and management information
- Remote access from mobile devices
- Web based operating system
- Keypad and smartID card reader utilising GSM/GPS signals
- Exception reports and alerts straight to your desktop or mobile device

Benefits

- Locate machines with ease on large sites, lower insurance costs through tracking device fitted
- Match workers hours and time sheets to real data
- Easy access to real time information
- Customise to your own data reports
- Ensures only correctly trained and authorised personnel operate the machine
- Receive alerts if machine operated providing complete fleet visibility



SkySentry device

- Monitor machine utilisation and manage costs
- Receive information and alerts straight to your mobile device
- User friendly reports and information
- Smart card reader prevents unauthorised use
- Real time battery status maximising productivity at the start of a work shift

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SkySiren (protection against the risk of operator entrapment)

The pioneering SkySiren secondary guarding solution is designed to reduce the risk of injury or fatality from crushing on boom type Mobile Elevating Work Platforms (MEWPs).

Features

- Audible and visual warning
- Minimises false alarms
- Unobtrusive - integrated into MEWP basket

Benefits

- Minimises the risks associated with entrapment/crushing
- Alerts “on the ground buddy” an incident has occurred, enabling a swift rescue
- Doesn’t interfere with the day to day operation of the MEWP

Compliance with Regulations

When working close to overhead obstructions, the use of a well-designed secondary guarding device, such as SkySiren, should help MEWP users to satisfy the following:

- a) PUWER - requires that the work equipment provided is “suitable for use”. Employers have a duty to identify potential groups at risk, by performing risk assessments, and then ensure that the risks created by the use of the equipment are eliminated where possible by a combination of hardware measures (guards, protection devices, warning devices) and software measures (safe systems of work, training).
- b) If any particular risk assessment identifies a higher risk of potential entrapment (e.g. working close to overhead obstructions), then use of SkySiren® should probably be considered as part of a risk-reduction strategy together with the other recommendations in the Strategic Forum for Construction Plant Safety Group guidance on “Avoiding Trapping/Crushing Injuries to People in the Platform” (e.g. re-planning the work route, specific familiarisation with the MEWP being used, planning a rescue routine and additional training in use of the MEWPs ground rescue controls).
- c) Industry Guidance - Strategic Forum for Construction Plant Safety Group “Avoiding Trapping/Crushing Injuries to People in the Platform”. The emphasis in this guidance is on task-specific risk assessment to establish whether, having taken into account all of the issues raised in the document, there is potential risk of entrapment or crushing in any given work situation.

MEWP Compatibility

- SkySiren is compatible with most Genie booms and JLG booms and selected Niftylift models.

SkySiren Capability

- SkySiren is only active while the MEWP user is operating the MEWP - once stationary at height, SkySiren does not interfere with the normal work routines of the operator in any way.
- To ensure the sensitive edge is operating correctly, SkySiren continually monitors it and ‘fails safe’ should a problem occur.
- Please refer to SkySiren users operating manual for full details and for suggested operating procedure, which can be used to help plan a detailed method statement.
- SkySiren’s unique operation prevents nuisance tripping.

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SkySiren (protection against the risk of operator entrapment)



Double protection for operators

- Ultrasonic sensors detect entrapment hazards and automatically stop the platform
- Simple restart, with operator alerted to the hazard
- Proven SkySiren pressure sensor device provides back-up protection
- Flashing beacon and klaxon alert colleagues

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SkyScreen (reducing risk of objects dropping from the platform basket)

SkyScreen from NWP is an innovation in safety which minimises the risk of injury and damage by preventing dropped objects falling from the platform basket.

The new SkyScreen is a lightweight mesh that encompasses the platform basket without compromising visibility.

Features

- Lightweight mesh weighing only 2.5kg
- Full height coverage from top hand rail down to the top of the kick strip
- Tool-less installation, secured around handrails using Velcro anchor points with magnets to secure to the kick strip
- Constructed from a combination of fire retardant PVC outer and a woven mesh inner lining
- Polycarbonate rods used to provide rigidity to the net along the access gate area.

Benefits

- Retains maximum visibility through the mesh whilst still providing dropped object protection
- Provides containment for dropped objects, tools and materials down to 15mm in size
- Quickly fitted/ removed on-site as required for each task
- Compatible with other innovations including SkyRakBoom and SkySiren PCS
- Three panel design comprising of a left hand, a right hand and a gate section to provide total cover around the basket

MEWP Compatibility

- The mesh has been tested in line with LPS 1215 - Requirements for the LPCB Approval and Listing of Scaffolding Cladding Material.
- All materials are fire retardant



SkyScreen systems

- Quick and easy installation. No tools required
- Lightweight mesh encompasses the platform basket without compromising visibility
- Total cage protection
- Reduced risk of dropped objects when working at height

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Appendices (page 1 of 2)

IPAF – Andy access briefings

- A01 - Attach your lanyard
- A02 – Know your machine
- A03 – Pre-use inspection
- A04 – Rescue plan
- A05 – Beware of falling objects
- A06 – Unsafe ground
- A07 – Caution when loading and unloading
- A08 – Never attach banners to a scissor lift
- A09 – Don't use a MEWP as a crane
- A10 – Prevent unauthorised use
- A11 – Keep clear of overhead cables
- A12 – Overhead obstructions
- A13 – Register pre-owned machines
- A14 – Do not jump out of the platform
- A15 – Danger keep well clear
- A16 – Caution with guardrails
- A17 – Setting up on a slope
- A18 – Correct MEWP selection
- AM1 – Do not overload the platform
- AM2 – Do not interfere with ties

IPAF guidance

- E2 – Exiting the platform at height
- F1 – Familiarisation
- L1 – Safe delivery of MEWP's
- MEWP Pre-use inspection checklist

IPAF posters

- IPAF Category Poster
- IPAF Spiders Poster
- IPAF Spreaders Poster

IPAF tool box talks

- A1 – Personal fall protection equipment
- A4 – Understanding a MEWP Rescue Plan
- A6 – Ground conditions

IPAF video links

- Pre-start inspection: Boom lift: <https://youtu.be/siXQzUV84kA>
- Pre-start inspection: Vertical lift: <https://youtu.be/zhFobbbrFKE>

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Appendices (page 2 of 2)

Nationwide Platforms (NWP) documentation

- MEWP Selection Guide
- SkySentry (preventing unauthorised or mistaken use)
- SkySiren (protection against the risk of operator entrapment)
- SkyScreen systems (reducing risk of objects dropping from the platform basket)
- Virtual Reality (VR) Leaflet

Morgan Sindall documentation

- MS MEWP Acceptance sheet
- MS MEWP Supervisor Appointment
- MS Safe planning and operation of MEWP's standard

Highways England

- Raising the bar 1, Plant and equipment [Version 1, Sep 2013]
- Raising the bar 16, Working at height [Version 1, Sep 2013]