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Mobile Elevated Work Platform (MEWP) incident analysis

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Mobile Elevated Work Platform (MEWP) incident analysis

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Mobile Elevated Work Platforms (MEWPs) are commonly used across all industrial sectors by a whole variety of trades, including mechanical and electrical contractors, and painters and decorators, as a safe, temporary method of working at height. There is a large range of MEWPs on the market and their controls and functionality varies depending on the category, manufacturer, model and size of machine. As their popularity and range of applications has grown, concerns have emerged about trapping/crushing accidents involving MEWPs.

This report identifies accidents involving MEWPs and analyses common factors found. The work has focused on MEWP occupants being trapped against overhead or adjacent objects whilst in the platform of the MEWP, particularly when the operator becomes trapped over the controls (sustained involuntary operation of control). Typically, this has occurred when the operator has been moving the MEWP within relatively confined areas.

This research has centred on person-machine interface/human factors analysis rather than engineering issues.

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KEY MESSAGES

- The research provides evidence that there are significant numbers of accidents where operators of Mobile Elevated Work Platforms (MEWPs) are trapped or crushed between parts of the machine and nearby obstructions particularly when working in confined areas.

- Some accidents have resulted from operators reaching a position where they have been unable to operate/cease operating controls (sustained involuntary operation of controls).

- Some accidents have been the result of incorrect operation of controls. This can arise from different types of human error (slips, lapses and mistakes). To avoid such accidents there is a heavy reliance on operators not making foreseeable mistakes.

- Many MEWP users are likely to have low levels of experience of operating a MEWP, because it is a secondary and infrequent activity generated in connection with their main jobs (as electricians/painters, etc…) and this can adversely affect competence. Additionally, poor lone working and rescue procedures have exacerbated the level of injury sustained.

- Many incidents can only be effectively addressed through better design.

- The data does not provide substantive evidence about the efficacy or otherwise of training given to operators. However the researchers stress the importance of effective training to address, for example, incorrect operation of controls, not just on a class of machines but on specific models given the variation in designs.

EXECUTIVE SUMMARY

Mobile Elevated Work Platforms (MEWPs) are commonly used within industrial sectors as a method of working at height. There are a large variety of MEWPs on the market including scissor lifts, articulating booms, telescopic booms, vehicle mounted booms, rail mounted booms and deck mounted booms. MEWPs can also be classified under various categories (see BS EN 280:2009 and examples in Appendix 1). The controls and functionality of a MEWP will vary depending on the category, manufacturer, model and size of machine.

MEWPs are used across all sectors, particularly for temporary work at height such as construction and maintenance activities, and by a whole variety of trades including mechanical and electrical contractors, and painters and decorators.

This report has focused on MEWP occupants being trapped against overhead or adjacent objects whilst in the platform of the MEWP, particularly when the operator becomes trapped over the controls (sustained involuntary operation of control). This research has centred on person-machine interface/human factors analysis rather than engineering issues.

OBJECTIVES

- Identify data sources and initiate interrogation requests for MEWP incidents
- Gather, organise and review the data collected
- Highlight findings of the review and analysis of MEWP incidents

METHOD

A range of information about MEWP incidents was requested from international sources, including the Health and Safety Executive (GB), Occupational Safety and Health Administration (USA), Department of Labour (NZ), Safework (Australia) and the Australian Bureau of Statistics. The data was analysed for content in order to identify key factors that contributed to these incidents.

MAIN FINDINGS

A number of key contributing factors were identified for operators becoming trapped or crushed whilst within the MEWP platform. These are:

- Operator makes an error when operating the controls;
- Probable failure in observing (perceiving/identifying) a hazard in the surrounding environment (situation awareness);
- Operators leaning over the side rail of the platform while manoeuvring;
- Poor ground conditions;
- Poor MEWP condition/maintenance;
- Training and experience aspects;
- Working alone.

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1. INTRODUCTION

1.1 BACKGROUND

Mobile Elevating Work Platforms (MEWPs) are commonly used across all industry sectors, but particularly in construction to provide a safe temporary means of working at height. MEWPs are an effective way of preventing falls and have made a significant contribution to reducing accidents from this cause. However as their popularity and range of applications has grown, concerns have emerged about trapping/crushing accidents involving this equipment, particularly the human factors elements. This report identifies accidents involving MEWPs and analyses common factors, including human factors. The main focus of the analysis has been on accidents where people have become trapped between the guard rails or control panels of the platforms and nearby/overhead obstructions. Typically this has occurred when the operator has been moving the MEWP within relatively confined areas. In some cases people have been pushed against the controls and been unable to remove themselves from danger (sustained involuntary operation of controls). In other instances they have become trapped by other means such as overhead obstructions. Often workers on the ground have either not been aware that colleagues have become trapped or have been unable to undertake an effective rescue. MEWPs are fitted with base controls which are intended to be used in an emergency as a method of bringing the MEWP back to ground level. However, there is often a failure to make arrangements to ensure there are people on the ground who know how to operate the base controls. This means that in an emergency situation, if the operator becomes trapped within the basket, there is often no one who is familiar with how to operate the base controls and follow emergency rescue procedures.

In 2005 following a fatal crushing in a MEWP, HSE issued a press release advising manufacturers of MEWPs of the need to address those controls that were of such a design that their sustained involuntary operation was possible. The European standard for MEWP design, EN 280, is currently being revised to specifically address this issue, and manufacturers have been developing solutions. However this does not address the existing large number of machines currently in use and work is continuing with the industry to encourage assessment of risk and the development of retrofit solutions where necessary. To support this work, HSE needs to better understand the human factors elements of the accidents that have occurred, in order to prioritise solutions for both existing and new machines. Those who deliver training for MEWP operation and management can also use the information from this analysis.

This incident analysis is complemented by further research considering particular types of machines and activities. Particularly the platform control interfaces and platform environments of MEWPs.

1.2 AIMS AND OBJECTIVES

The purpose of this report is to identify possible human factors elements of the accidents that have occurred, so that designs and application of equipment and training of operators can be further improved.

The overall aim of this work was to obtain information about MEWP incidents and analyse the information from them. This was done by obtaining objective evidence of the nature and extent of the problems with entrapment by the MEWP platform, including sustained involuntary operation of controls. This was needed in order to effect change within the industry, and if necessary underpin enforcement action.

The objectives for the work were to:

- Identify data sources and initiate interrogation requests for MEWP incidents;
- Gather, organise and review the data collected;
- Highlight findings of the review and the analysis of MEWP incidents.

2. IMPLICATIONS

- Action needs to be taken to address the potential for sustained involuntary operation of controls specifically and entrapment/crushing more generally.

- Engineering solutions, which can be retrofitted to existing machines, are needed for the use of such machines in high entrapment risk situations and more creative solutions are needed for new machines.

- Manufacturers should, as a long-term aim, provide greater consistency and clarity in the design of platform and base controls.

- The need to improve engineering features on these machines and to improve the person-machine interface to protect against the potential for crushing/trapping injuries has been recognised by the committee revising *BS EN 280:2001 Mobile elevating work platforms — Design calculations — Stability criteria — Construction —Safety — Examinations and test.* The state of the art has not yet changed significantly to introduce effective engineering safeguards on new machines. Work in this area needs to continue.

- The Strategic Forum for Construction Best Practice Guide on *Preventing Trapping/Crushing Injuries in MEWPs* published in July 2010 contains sound advice on assessing and mitigating the risk. This incident review has not identified any mechanisms of harm, which were not included in this publication.

- Some of the practices that have led to accidents can be readily observed e.g. operators leaning over the guardrails whilst driving the equipment. This suggests there is scope for the reduction of injury potential through more knowledgeable, robust supervision of MEWP use on site.

- Contractors have a vital role to play in reducing risk, ensuring that MEWP operators are competent, appropriate familiarisation training is provided, there are people on the ground available and able to effect rescue and that the MEWP is in good condition and suitable for the job and the site.

3. METHODOLOGY

3.1 ONLINE DATABASE SEARCH

The HSE Information Centre search team conducted the literature search. Articles from health and safety related and other trade magazines and databases were retrieved. The databases searched were HSELINE; HEALSAFE; OSHLINE; NTIS; NIOSHTIC; RILOSH and CISDOC over a period of 20 years (1998-2009).

3.1.1 Key search terms used to search the electronic databases

The key search terms used were:

- Mobile elevated work platform incidents, entrapments and accidents;
- MEWPs incidents, entrapments and accidents;
- Mobile scissor lifts incidents, entrapments and accidents;
- Mobile articulating boom incidents, entrapment and accidents;
- Mobile telescopic boom incidents, entrapment and accidents;
- Mobile vehicle mounted boom incidents, entrapment and accidents;
- Mobile rail incidents, entrapment and accidents.

3.1.2 Selection criteria

Approximately 159 articles were located by the HSE Information Centre. These were then reviewed to remove duplicates arising from different search strategies; the abstract of each article was then read. Inappropriate articles that did not relate to the research topic were then eliminated.

A total of 49 full articles were obtained. On review of the 49 full articles, it was apparent that 24 articles were not relevant to the research topic, leaving a total of 25 articles in this review.

3.2 DATA OBTAINED DIRECT FROM SOURCES

3.2.1 HSE COIN reports

MEWP incidents that had previously been investigated or are undergoing investigation by HSE have the data recorded on the HSE Corporate Operational Information System (COIN) reports system. Altogether 17 COIN reports of incidents were retrieved (1996-2009) and the HSE inspectors associated with these incidents provided further information where this was available. Including this preliminary and emerging information from ongoing investigations was judged to be justified on the basis that detailed information on directly relevant cases was so scarce. Due to the sensitive nature of this information, the details of these incidents have been withheld in this report.

3.2.2 USA - Occupational Safety and Health Administration (OSHA)

The OSHA website was used to obtain information about MEWP incidents which had occurred in the USA over the last 10 years. The key search terms were used as a method of obtaining the USA incident data from the OSHA database. The search located 544 incidents. These incidents were checked for duplications and relevance. A total of 222 incidents from the OSHA database have been included within this report.

Note: a further 19 incident case reports were identified through the online database search, from the U.S. National Institute for Occupational Safety and Health (NIOSH).

3.2.3 New Zealand - Department of Labour

Information on MEWP incidents within New Zealand was sought from the Department of Labour in New Zealand. The information provided was limited and didn't consistently make the distinction between mobile and static work platforms. They stated that in the last 14 years they had a total of 26 reported incidents that resulted in 21 cases of serious harm and 1 fatality.

Altogether 16 of the 26 incidents have been added to this report, but only where it was stated within the information that the platform was a mobile platform.

3.2.4 Australia – Safework

An email response was received from Safework Australia that outlined reported injuries and fatalities between 2000 and 2008. Altogether they had 11 reported injuries or fatalities linked with elevated work platforms. No further information was given and it is unknown whether these were MEWPs or non-mobile elevated work platforms.

3.2.5 Australian Bureau of Statistics

An email request for information was sent to the Australian Bureau of Statistics. However there was no response and no information was gained.

3.2.6 International Powered Access Federation (IPAF)

Information on MEWP incidents was sought from IPAF and an additional 3 incidents were found via the IPAF lists of MEWP incidents.

3.3 GENERAL INTERNET SEARCH

A search was conducted on Google online to find information about further incidents which may have been missed. The key search terms that were used were the same as those used for the HSE database search and can be found in section 3.1.1. No additional incidents were found from the Google search. Then the Vertikal website (news and information for the crane and lift industry as cited by a contact in AFI-Uplift) was searched and 13 additional incident cases were found online over a 20 year period from 1989 to 2009. These incidents included incidents from Australia, UK, USA and Bulgaria.

3.4 LIMITATIONS OF THE DATA

The data that was collected from the range of sources listed above had a number of limitations. In some areas the data was incomplete, as a large proportion of the data gained was recorded at the time of the incident. The data included within the report has also been made anonymous. European data was difficult to obtain as the request for information was not responded too and therefore was not included in this analysis.

4. RESULTS

Table 1 summarises the MEWP incidents into the six MEWP categories and the outcome of the incident. Appendix 1 provides an example and definition of these six MEWP categories. The key features of the 47 trapped or crushed by MEWP incidents are discussed within Section 5.

Table 1 Summary of MEWP incidents, including the type of MEWP and the outcome

	Scissor Lift	**Articulating boom**	**Telescopic boom**	**Vehicle mounted boom**	**Rail mounted boom**	**Deck mounted boom**	**Totals**
Falls from MEWPs	**43**	**14**	**9**	**17**	**0**	**0**	83
MEWP overturned	**53**	**17**	**5**	**7**	**0**	**0**	82
Trapped or crushed by MEWP	**26**	**16**	**2**	**2**	**0**	**1**	47
Injured by MEWP	**21**	**3**	**1**	**7**	**0**	**0**	32
Collapse/ MEWP failure	**4**	**7**	**6**	**20**	**1**	**0**	38
Electrocution	**0**	**3**	**0**	**5**	**0**	**0**	8
Totals	147	60	23	58	1	1	**290**

5. COMMON THEMES FROM TRAPPING OR CRUSHING MEWP INCIDENTS

5.1 ERRORS WHEN OPERATING THE CONTROLS

Three main types of human error have been classified (HSG48): **slips, lapses and mistakes**.

Slips and lapses are generally associated with familiar tasks, which are typically described as 'skill-based' tasks.

Slips are errors where there is a failure in carrying out actions as intended. An example in the context of operating a MEWP could be:

- Selecting the wrong control on the panel;
- Moving the control in the wrong direction to that intended.

Lapses are when we forget to carry out an action, or lose our place in a sequence of actions. An example of a lapse in the context of operating a MEWP could be:

- Forgetting to operate the toggle between drive and height modes on a scissor lift, or
- Forgetting to take account of rotation on a boom MEWP when operating drive controls.

In both these examples, the physical movement of the control may be 'as intended', but the failure to take account of an additional factor that alters the response of the MEWP is the real error. Both slips and lapses are typically associated with a demand on attention elsewhere. In the context of MEWP operation this might be another part of the operating task, such as looking around or paying attention to a particular obstruction, focusing on the work location, or it might be as a result of distractions.

Mistakes are when people do the wrong thing believing it to be right. They are essentially an error in 'planning' the actions to take. There are two types, 'rule-based' and 'knowledge-based' mistakes.

Rule-based mistakes occur when we are using (remembering) familiar procedures or rules. These might be used in the planning of a complex task, but the task is made up of sets of actions that are known to us and grouped into rules or procedures. However, using our existing rules might not be the most appropriate way to achieve the task goal. An example of a rule-based mistake in the context of operating a MEWP might be:

- The operator, having worked previously on a MEWP for some time, had become familiar with a particular model and its control configuration. They might then fail to fully check the control characteristics on a different MEWP before using it. As a result they might operate a control that was correct for the function they wanted on the old model, but incorrect on the present one.
- Familiarity with the site and the route taken when routinely accessing a series of roof fittings in a warehouse might lead an operator to fail to check the ground conditions as they proceed on their route, resulting in a wheel dropping down a newly cut floor recess. This might result in an overturn or at the very least a significant unexpected movement at the platform.

Knowledge-based mistakes occur when we are solving problems from first principles, using our knowledge and reasoning. They are essentially a failure to form an appropriate plan to achieve the goal. This might be as a result of incorrect knowledge or reasoning.

An example of a knowledge-based mistake could be:

- A lack of awareness of the hazards associated with using a MEWP could lead an untrained operator to undertake a task in an inappropriate way, for example, on poor ground, in proximity to obstruction hazards, with too great a load, in windy conditions, etc.

- In the context of control operation errors, an example could be in manoeuvring the platform close to an obstruction using an inappropriate sequence of boom movement functions, and using slew as the last manoeuvre. If the slew speed is set fast, this can cause unexpectedly rapid movement, and a significant amount of 'bounce' or overrun. This could cause the operator to strike the obstruction, possibly injuring or trapping themselves, or others.

Operators choosing the incorrect control for the movement they wish to make was explicitly reported for 10 of the 47 incidents (21%). Twenty-nine of the incidents had incorrect operation of controls as a possible causal factor. This was also a probable cause of some of the 'sustained involuntary operation of control' incidents, as the operators appear to have inadvertently raised the platforms into overhead obstructions, when they wanted to drive the MEWP forward or backwards.

Different kinds of errors can occur at different stages of experience and familiarity with the task that is to be performed.

The joystick control on one model of scissor lift is jointly used for both the lift and drive functions, the only difference is that the operator has to change the button below to either the lift or drive function. This method of using the same control for two functions is a factor reported as a possible contributor for two incidents.

For the experienced operator using the same machine over an extended period of time, there are two types of human error that are most likely to arise from such a control configuration.

1. Slip – where the operator moves the joystick in the wrong direction from that intended (with the drive/lift function selected correctly).

2. Lapse – where the operator forgot to carry out the action of changing between the lift and drive function before operating the joystick.

Rule or knowledge-based mistakes are more likely to occur with inexperienced or untrained operators.

Articulating and telescopic boom-type MEWPs have many more functions compared to scissor lifts, and consequently have more controls. There is variability in control panel design between the different manufacturers, and even between models within manufacturers. Some of these differences are illustrated in Photographs 1 & 2.

The controls in Photograph 1 include a range of identical levers, side by side, for the movement of the boom functions. Pictograms above the levers identify which part of the boom the lever operates. The incorrect selection of a lever could result from the following range of human error types:

1. Slip – where the operator does the right action but on the wrong lever, or the wrong thing on the right lever;

2. Lapse – where the operator forgets to take account of something, such as their orientation if the platform is rotated on the end of the boom when operating the slew control, or that the boom is slewed when operating the drive controls;

3. Rule-based mistake – where the operator moves a control in the wrong direction believing it to be right.

NB: The first two errors are more likely to occur when there is a demand on attention elsewhere, such as looking around to check for obstructions or wheel alignment, etc.

Photograph 1 - Platform control panel for an articulating boom

Photograph 2 - Platform control panel for another articulating boom

The control panel within Photograph 2 has raised areas between the toggle switches, to try to stop them being activated if something/someone was leaning on the control panel. This is an example of how manufacturers have noted that accidental/inadvertent operation of controls is an issue and tried to design the issue out. This may also help to prevent damage to the controls themselves.

5.1.1 Reducing errors

While it is beyond the scope of this phase of the project to consider error reduction measures in depth, there a number of ways in which the likelihood of the different error types can be reduced.

Slips and lapses can only be reduced and mitigated through the appropriate design of controls and displays, minimising the opportunity for errors of this type to occur. The possibility of these types of errors could be accounted for as part of the design process and as part of risk assessments for MEWP work. The factors that influence the likelihood of these errors should be considered and controlled where possible. Training is not likely to have a large influence on these errors, as they are independent of rules and knowledge.

For mistakes, rules and knowledge need to be appropriate, and so in this context training and familiarisation with the equipment is important. Supervision, particularly of less experienced staff, may also be of benefit.

NB: We have not considered the role of violations in this report, because this is not within the scope of the study.

5.2 LIMITED OBSERVATION OF THE SURROUNDING HAZARDS

It was noted within 39 of the incidents that the operator might not have maintained their situational awareness of their surroundings whilst operating the MEWP. It is important for the operator to be aware of the surroundings in which they are working. A lot of concentration is required from the operator to ensure that they are carrying out the following activities whilst operating the MEWP:

- The operator needs to be aware of where the MEWP wheels are on the ground, checking the ground is suitable and that there are no hazards present;
- Operating the correct controls in terms of the movements that they want to make with the platform;
- The operator needs to be constantly checking for hazards that are present around the platform and taking action to avoid contact with any hazard, for example overhead beams;
- The operator should give adequate warning to everyone on the ground before moving the MEWP;
- The operator needs to ensure nothing on the platform is left unsecured or in a position/ state where it might fall off.

It is the third point that has contributed to some of the sustained involuntary operation of controls incidents. A common scenario has been the operator moving the MEWP and being struck on the back and consequently pushed across the controls. This has caused the operator to become trapped and resulted in the sustained involuntary operation of controls. Operators may also become distracted, which could also contribute to accidents.

5.3 OPERATOR LEANING OVER THE SIDE RAIL

A common factor among some of the incidents, especially the scissor lift incidents, involved the operator leaning over the guard rail to either perform a task or to look at the ground/wheels of the MEWP when the platform was raised. Whilst the operator has leant over the guard rail, they appear to have operated the control and moved the platform. This has caused them to become trapped between an overhead structure and the guardrail of the MEWP. This may have arisen from an operator making an error with the controls, or failing to take account of the proximity of the structure.

5.4 POOR GROUND CONDITIONS

MEWPs are intended to be used on level ground surfaces that are stable and will not compress under the weight of the MEWP. Two of the incidents had ground surface listed as a possible contributor to the incidents. This is especially true with incidents that involved MEWPs overturning. However it is also relevant in relation to trapping incidents, as the MEWP platform can be caused to move unexpectedly as a result of a wheel dropping down. This appears to have been a contributing factor in three of the trapping and crushing incidents.

5.5 MEWP CONDITION

Five of the incidents highlighted MEWP age or a control malfunction as a factor that may have contributed to the incident. MEWPs should only be operated when they are in a good working order, and this highlights the importance of carrying out pre-use checks and ensuring regular maintenance.

5.6 TRAINING AND EXPERIENCE

One of the incidents referred to a lack of training and limited experience of using MEWPs as a factor that may have contributed to the incident. While lack of training and limited experience was positively identified as a factor in only one of the incidents reviewed, it is considered likely to have been a factor in many more, but has not been evidenced because of the limitations of the data. Operators need to have been trained not only in the class of MEWP they are using but also on the specific make and model.

Also, frequent usage and experience of using MEWPs is of importance when considering an operator’s competence. Generally, operators tend to have a trade, for example an electrician or painter, and only use the MEWP as a method of getting to their work when working at height. This may result in a lack of familiarity with the task of operating a MEWP in general, or at least with the specific control arrangement on different models.

5.7 WORKING ALONE

MEWP operators are often within a platform on their own and on some occasions they are the only person working within the building. This was listed as a factor within three of the incidents. When an operator becomes trapped, especially as a result of involuntary sustained operation of controls, the operator needs to be rescued within minutes before asphyxia occurs. Therefore in the incidents where operators were working alone, there would not have been anyone around who could have helped to rescue the operator before asphyxia occurred.

It is important that there is a ground-based person who is aware of, and adequately trained in how to use the ground controls on the MEWP, including the emergency descent controls, as these are the controls that would be used to lower the platform during an emergency situation.

5.8 LIGHTING

Of the 47 incidents, 10 did not state what time of year the incident occurred, however listed below is the time of year the other incidents occurred:

- Spring – 10 incidents;
- Summer – 10 incidents;
- Autumn – 6 incidents;
- Winter – 11 incidents.

Only 13 of the incidents had the time of the incident listed within the information gathered. Of these 13 incidents, 6 occurred between 7am and 9am, therefore indicating that the incident occurred early in the working day.

Lighting is important for hazard identification as well as for control identification, however the data reviewed does not support analysis of time of day or year. It is also not possible to ascertain whether lighting levels were inside/outside or in a building.

6. CONCLUSION

A range of information about MEWP incidents has been analysed to try to identify key factors that contributed to them. The information gained was limited and the depth of information recorded at the time of the incidents was not consistent. This limited the depth of analysis that could be performed. The majority of the information described what was thought to have happened at the time of the incident, which set the scene for understanding what task the operator was trying to do and why they may have come into difficulty. Most of the records did not list the exact make and model of the MEWP that was involved in the incident, therefore a detailed consideration of the MEWPs involved and their control characteristics could not be carried out.

A number of key possible contributing factors have been identified for operators becoming trapped or crushed whilst within the MEWP platform. These are:

- Error when operating the controls;
- Limited observation of the surrounding hazards;
- Operators leaning over the side rail;
- Poor ground conditions;
- MEWP condition;
- Training and experience;
- Working alone.

Although the data does not provide sufficient information to understand all control errors, errors when operating controls are clearly a significant factor within the incidents, where sustained involuntary operation occurs, and in other control error situations. Errors in operating controls are foreseeable, as is the possibility of sustained involuntary operation. There are design changes which could be made to help prevent these incident occurring. Design to recognised ergonomics standards will reduce the number of errors that occur when operating the controls. Standardisation of control designs would also reduce the occurrence of skill-based errors, which occur when an operator changes from one MEWP to another.

The remaining factors are less easy to address through design and are something to be considered in relation to training and management of MEWP operations.
These findings can be used to inform and support the content of operator training courses for MEWPs.

7. APPENDIX 1

7.1 CATEGORIES OF MEWPS

Below are examples of each type of MEWP, which are discussed within this report:

7.1.1 Scissor lifts

Photograph 3 A scissor lift (Source – www.ipaf.org)

Scissor lifts are platforms mounted on a scissor type mechanism that rise in a straight vertical lift. These can be used indoors and outdoors. They tend to have a larger work platform than a boom, and can have a maximum safe working load of up to one tonne.

7.1.2 Articulating booms

Photograph 4 An articulating boom (Source – www.geineindustries.com)

Articulating booms as seen in Photograph 4 offers vertical and sideways outreach. The work platform can reach around and over obstacles. Articulating booms have more movement then a telescopic boom and can also be rotated around a 360° turntable.

7.1.3 Telescopic booms

Photograph 5 A telescopic boom (Source – www.jlg.com)

Telescopic booms as seen in Photograph 5 offers vertical and sideways outreach. The work platform can reach over obstacles. Telescopic boom lifts offer greater horizontal outreach, than other booms and can also be rotated around a 360° turntable.

7.1.4 Vehicle and rail mounted booms

Photographs 6 & 7 Two different types of vehicle mounted boom (Source – www.ipaf.org)

Vehicle and rail mounted booms are work platforms which are attached to the top of a vehice, as can be seen in Photographs 6 & 7. These platforms vary dramatically in size and shape and can consist of either a articulating boom or an telescopic boom in terms of the machanics of the lift.

7.1.5 Deck mounted booms

Photograph 8 A deck mounted boom (Source – www.niftylift.com)

A deck-mounted boom as seen in Photograph 8, refers to a platform being mounted on decks. Therefore the base of the boom can only move up and down the decks. These platforms vary in size and shape and consist of either a articulating boom or an telescopic boom in terms of the machanics of the lift.

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Mobile Elevated Work Platform (MEWP) incident analysis

Mobile Elevated Work Platforms (MEWPs) are commonly used across all industrial sectors by a whole variety of trades, including mechanical and electrical contractors, and painters and decorators, as a safe, temporary method of working at height. There is a large range of MEWPs on the market and their controls and functionality varies depending on the category, manufacturer, model and size of machine. As their popularity and range of applications has grown, concerns have emerged about trapping/crushing accidents involving MEWPs.

This report identifies accidents involving MEWPs and analyses common factors found. The work has focused on MEWP occupants being trapped against overhead or adjacent objects whilst in the platform of the MEWP, particularly when the operator becomes trapped over the controls (sustained involuntary operation of control). Typically, this has occurred when the operator has been moving the MEWP within relatively confined areas.

This research has centred on person-machine interface/human factors analysis rather than engineering issues.

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