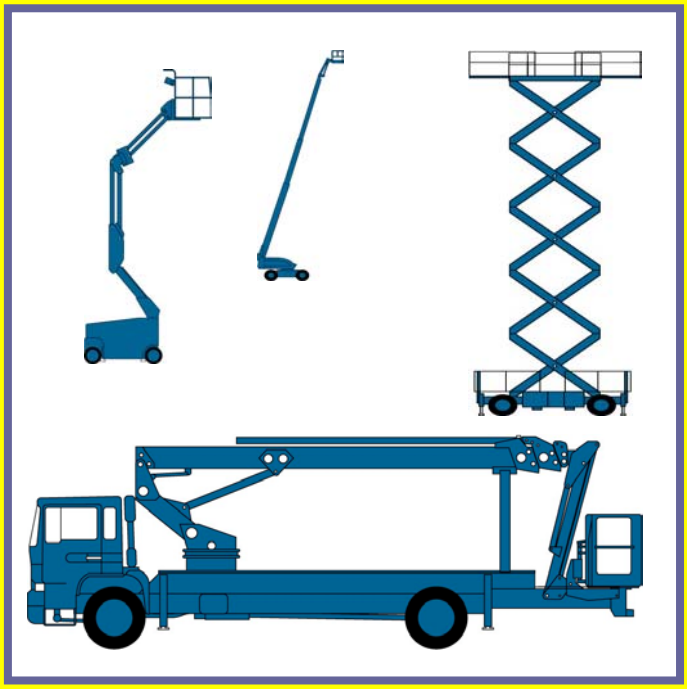
Mobile Elevating Work Platforms



Inspection, Thorough Examination and Maintenance

CPA Best Practice Guide

PAIG 0201

Inspection, Thorough Examination and Maintenance of Mobile Elevating Work Platforms

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Foreword

The Construction Plant-hire Association (CPA) has, for many years, been in the vanguard of plant safety. This *CPA Best Practice Guide on the Inspection, Thorough Examination and Maintenance of Mobile Elevating Work Platforms* is one of a number of guidance documents which confirm the Association's continued and dedicated commitment to safety and training.

This guidance replaces the CPA booklet *Inspection and Testing of Mobile Elevating Work Platforms* that was first published in 1983 and withdrawn from circulation at the time of the implementation of the Lifting Operations and Lifting Equipment Regulations (LOLER) 1998.

LOLER, like all recent health and safety regulations, are "goal setting" and do not attempt to give definitive rules. As a result, guidance, codes of practice, British and European Standards and HSE Approved Codes of Practice have become essential in helping our industry to interpret and add detail to the goals set by the regulations.

This CPA Best Practice Guide is just such a guidance that has been produced by a very experienced team of people with in-depth knowledge of mobile elevating work platforms (MEWPs) and who understand the practical nature of using them in all circumstances throughout all industries. The work has been done in partnership with specialist inspectors from the Health and Safety Executive (HSE).

On behalf of the members, the Construction Plant-hire Association wishes to express its thanks to the Powered Access Interest Group (PAIG) Steering Committee (see the Appendix 2) for their hard work and dedication.

W H Law
President
Construction Plant-hire Association

1. Introduction

The Lifting Operations Lifting Equipment Regulations 1998 (LOLER 98) and the Provision and Use of Work Equipment Regulations 1998 (PUWER 98) came into force in December 1998 and have introduced changes to the requirements for all lifting equipment regardless of where it is used.

The Regulations replace most of the old sectorial law relating to the use of lifting equipment and amend certain other Regulations. The new regulations are "goal setting" and their potential scope is extremely wide. They are risk based Regulations so the extent of the risk will determine the measures needed to eliminate or control it.

This guidance has been produced by the Powered Access Interest Group of the CPA. It should be used in conjunction with LOLER and PUWER and the HSE's Approved Codes of Practice (ACoPs) and Guidance. It gives more detailed and specific guidance for owners and users of MEWPs on maintenance, checks, inspection, thorough examination and testing.

Mobile Elevating Work Platforms (MEWPs) are "lifting equipment" as defined by LOLER. All lifting equipment is subject to maintenance and a number of routine checks, inspections, thorough examinations and tests to ensure that it is safe to use. The responsibility for ensuring that all of these activities are carried out rests with the employer of the user of the equipment. This work varies from the very simple visual checks carried out by the operator to the more complicated requirements of maintenance and thorough examination normally carried out by well qualified and experienced plant mechanics and engineering inspectors/surveyors.

The work activities may include:

- Pre-use checks by the operator, before the start of every shift.
- Periodic inspections at appropriate intervals between thorough examinations usually carried out by a competent person.
- Thorough examinations carried out every six months by a competent person.
- Testing of any load limiting control systems once a year.
- Proof load tests carried out before first use and after every major structural alteration or repair.
- Pre-delivery checks and inspections by a suitably trained person prior to the commencement of each hire.
- Maintenance checks and inspections, by a suitably trained person at intervals recommended by the manufacturer.

2. Persons Undertaking Checks, Inspections and Thorough Examinations

2.1 Checks and Inspections

Checks and Inspections should only be done by persons who have been trained and assessed on any particular type of MEWP. The drivers (operators) may perform checks and inspections.

2.2 Thorough Examinations

Thorough examinations should only be carried out by a competent person who will need to be aware of the relevant requirements of LOLER, the Supply of Machinery (Safety) Regulations 1992 and be fully conversant with the manufacturers' instructions and relevant British, European or International Standards for that equipment.

Competent persons should be trained, assessed, and certified as competent. It is essential that competent persons is sufficiently independent and impartial to allow objective decisions to be made. This does not mean that they must necessarily be employed from an external company. If employers and others from within their own organisations have the necessary competence, then they can use it. However, if they do, they must ensure that they also have the genuine authority and independence to ensure that examinations are properly carried out and that the necessary recommendations arising from them are made without fear or favour.

The competent person may wish to employ specialists to carry out specific parts of the thorough examination that he may consider necessary, for example NDT. It will be the responsibility of the competent person to specify precisely what is required, to ensure that such work is effectively managed and that the results of such work is assessed accurately in relation to its significance for the appliance.

Where the competent person identifies defects affecting the continued safe use of the appliance or specifies a time for the replacement of components, the responsibility for the rectification or replacements rests with the employer of the person using the appliance, (see HSE "Safe Use of Lifting Equipment", paragraphs 38 - 43).

Where equipment is hired, the user has the duty to ensure that the periodic thorough examinations are undertaken at the frequencies laid down in LOLER (or in the examination scheme, if there is one). The user may well come to an arrangement with the owner under which the owner carries out the thorough examinations, but that does not alter the user's duty to make sure they are done.

3. Checks and Inspections

3.1 General

Pre-use checks and weekly inspections must be carried out on the MEWP. The person planning the operation should ensure that they are appropriate, that they have been carried out and that there is a system in place to rectify any defects revealed.

If the driver (operator) is considered to be competent, he may be authorised to carry out periodic checks and inspections.

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The employer of the user should ensure that the machine is taken out of use for the period of time required to carry out the checks and inspections. Also, the employer should ensure that a safe system of work is in place to prevent people from being exposed to any risks, for example, the inadvertent operation of the equipment.

3.2 Daily Pre-Use Checks

At the beginning of each shift or working day, the following routine checks, as appropriate for the type of MEWP, should be carried out before work starts:

- checks as required by the manufacturer's handbook;
- cleanliness and general signs of damage;
- efficiency of brakes;
- correct pneumatic tyre pressures, where fitted;
- lights (when fitted);
- levels of the engine cooling-water and lubricating oil;
- component parts of the prime means of support for the work platform and extending structure;
- hydraulic leaks, including operation of stabilisers;
- correct functioning of controls, safety devices (interlocks, anemometers, load/moment limiters/sensors, 2-way communications systems);
- chassis, stabilisers.

3.3 Weekly Inspections

The following inspections should be carried out once a week when the MEWP is in use. These are in addition to the checks recommended in 3.2. They should be as appropriate to the type of the machine:

- inspections as required by the manufacturer's handbook;
- check pneumatic tyres, where fitted, for correct pressures and damage;
- wheel nuts must be in place and properly tightened;
- brakes should be tested to ensure efficient working;
- lights, when fitted, should be in working order;
- batteries should be clean, free from corrosion and checked for adequate water level (if applicable) before use and before recharging;
- all structural parts should be sound and free from visible defects;
- powered mechanisms for raising, slewing and steering etc. should be working properly;

- hydraulic systems should be free from leaks;
- hydraulic fluid levels should be checked where accessible;
- any additional equipment should be functioning satisfactorily;
- all electrical equipment operating at above 55 volts should be tested according to the Electricity at Work Regulations;
- the base structure, including any safety guards, must be free of damage and clear of debris;
- all engine, water, oil and fuel levels should be checked and topped up where necessary;
- all hoses, fittings, wiring and valves etc. must be inspected for leaks, security and damage;
- all ground station controls must be tested including any safety cut-outs fitted;
- all support structures such as scissor packs, booms or outriggers, where fitted, must be inspected for damage, loose or missing retaining pins, damaged hoses and wiring and any loose or missing fittings;
- any emergency lowering and slewing equipment fitted must be tested;
- all operating and warning decals should be clear and readable;
- all platform guard-rails, entrance-gate latches and harness points must be checked for security;
- all platform workstation controls including any emergency systems must be tested;
- drive systems, brakes, steering and speed controls must all be tested for correct operation;
- any audible or light alarms fitted by the manufacturer should be checked for correct operation;
- any communication system fitted between platform and ground level must be in good working order.

4. Thorough Examination

4.1 General

The employer of the user of the equipment should ensure that it is taken out of use for the period of time required by the competent person to carrying out the thorough examination. The employer must also ensure that a safe system of work is in place to prevent the competent person from being exposed to any risk, for example, the inadvertent operation of the equipment.

The employer should also ensure that facilities or services required by the competent person to carry out the thorough examination are provided, for example:

- an appropriate safe working area, cordoned off to prevent access by persons not directly involved;
- a driver/operator for the MEWP;
- person/s to remove covers or open up parts of the appliance;
- preparation of parts or areas of the appliance for non-destructive testing (NDT).

The LOLER regulations provide flexibility for competent persons to choose between either a “specified period” or an “examination scheme” approach to thorough examination, both of which can include testing.

4.2 Periodic Thorough Examination

4.2.1 General

All equipment used to lift persons must undergo a thorough examination by a competent person at least once every six months unless the competent person has imposed a shorter interval.

The prime function of a MEWP is to lift persons, so a six-monthly thorough examination would normally be required.

Prior to thorough examination the MEWP should be cleaned to remove any deposits such as oil or dirt, which would otherwise conceal the structure or mechanisms and prevent an effective examination. The examination should be carried out in a logical sequence to ensure that nothing is overlooked.

4.2.2 Details of Periodic Thorough Examination

The competent person should thoroughly examine the following:

- the supporting and elevating/lowering/extending structures, for deformation, damage, cracks, corrosion, welding etc;
- the work platform, for example: the floor, guardrails, toeboards, gates and safety-harness attachments, levelling and restraint mechanism;
- the fixings, for example: screws, nuts and bolts, bearings; hydraulics, electrics, suspension elements (ropes/chains), steering, brakes;
- safety systems and control systems, for example: anemometers, load/moment limiting (sensing) devices, communication systems, emergency-lowering system

and stop-buttons;
- all guards;
- power units and pumps;
- hydraulics/electrics;
- suspension elements, for example: ropes or chains;
- brakes;
- steering;
- slewing/rotating mechanisms;
- the chassis, including the stabilisers.

If extension/ retraction mechanisms within telescopic booms cannot be exposed or examined via removable covers, then some dismantling will be required to check chain or rope wear, wear pads, hydraulic cylinders.

Overload testing during thorough examination is not normally carried out, and it should only be considered after major repair or modification. In such instances, the manufacturer's advice should be sought.

Non-destructive testing may be considered necessary, particularly when there is a suspicion of cracks or other damage existing in structural or load-bearing parts, for example, pin-bearings connecting scissor-arms, knuckle-joints.

4.3 Written Scheme of Thorough Examination

4.3.1 General

A scheme of thorough examination is a written schedule of the steps to be taken so that the condition of the equipment is assessed at intervals that can be set by the competent person, (for example, condition monitoring). It is intended to ensure that the equipment remains safe to use and would include information on the required frequency of examinations.

Before thoroughly examining equipment subject to a written scheme, the competent person should take into account the age, loading, environmental and duty cycle history of the equipment and any examination intervals which have traditionally been accepted as appropriate for that or similar equipment.

Equipment that does not have a complete record of past usage will probably need to be subject to periodic thorough examination as in 4.2 above.

The competent person shall prepare the scheme of thorough examination and it is likely that it will require the co-operation of the equipment supplier (manufacturer) and user (owner). For example, only the supplier can provide limiting criteria based on the equipment design, such as the number of load cycles, load spectrum, critical parts, exceptional circumstances (shock loading etc.).

4.3.2 Details of Written Scheme of Thorough Examination

The written scheme of thorough examination for a MEWP should, as a minimum,

contain the following information:

- the name and address of the owner;
- the name, qualifications and address of the person drawing up the scheme and certifying that it is suitable and sufficient;
- if the competent person is not working on their own account, the name of their employing organisation and their position in that organisation;
- the make, model and identification number of the MEWP;
- any references used in drawing up the scheme which may include the manufacturer's manual, or information on the design life of the structure and mechanisms;
- details of any data logging system fitted, including a listing of the parameters monitored and the means by which data retrieval, monitoring and storage is achieved;
- details of the environment in which the MEWP will be used during the period covered by the scheme;
- identification of those parts of the MEWP requiring thorough examination and the probable methods of deterioration e.g. wear, corrosion etc.;
- frequency of thorough examination for those identified parts which may include time or loading or duty cycle limits and vary for different parts of the MEWP;
- method of thorough examination of those identified parts which may include the degree of dismantling required, any preparation to be carried out by the user prior to the examination, NDT techniques, timed replacement etc.;
- an indication of the resources required to carry out the inspection which may include qualified personnel, workshop facilities, specialist NDT and metallurgical facilities;
- any changes to equipment condition, operational or environmental parameters that would require a review of the scheme which may include damage to the structure, change of use from general use to heavy duty work, or moving from an inland location to a marine environment;
- the date of drawing up the scheme and the date at which any routine review will be required.

5. MEWPs not in Regular Use

In cases where a MEWP is not in regular use, it will be necessary for the competent person to specify a special programme of checks, inspections and thorough examination before it is used. The extent and thoroughness of this programme will depend not only on the length of the period that the MEWP was out of use, but also on its location during this period. A MEWP that has been standing under cover inside a workshop may require very little extra inspection. A MEWP that has been in the open and exposed to weather and atmospheric pollution may require an extensive appraisal to ensure its fitness for work.

Consideration should be given to the following:

- checks that may be recommended in the instructions for the machine;
- check all ropes for signs of corrosion, degradation, damage and, where applicable, thorough lubrication;
- check control linkage for evidence of seizure or partial seizure and for correct lubrication;
- test every motion for several minutes without load, each motion individually at first, then a combination of two or more motions simultaneously as appropriate, and then repeating the test with a load;
- check for correct functioning of all the safety devices;
- check hoses, seals or other components for evidence of deterioration.

6. Testing

6.1 General

Thorough examination will include testing. This can take many forms including functional testing, performance testing, non-destructive testing (NDT), overload testing, etc. The competent person should decide when a test is necessary and determine the most appropriate method of carrying it out.

It is important therefore that the competent person takes account of the instructions and other relevant information provided by the manufacturer or other appropriate specialist.

6.2 Testing as Part of a Thorough Examination

After a MEWP has been overload tested at the time of initial supply or installation, the competent person will need to consider whether overload testing is necessary to prove the continued integrity of the equipment, taking into account its age, usage, condition and operating environment. The instructions and other relevant information provided by the manufacturer or other appropriate specialist should be followed.

6.3 Testing after Major Repair or Modification

MEWPs should be thoroughly examined and tested after every major repair or modification. Any testing should be carried out in accordance with written instructions from the manufacturer or other appropriate design authority.

6.4 Testing of Load Limiting Device

The calibration of any load-limiting device should be verified by the use of calibrated weights at least every twelve months.

7. Non-destructive Testing Techniques

7.1 General

During thorough examination, either at a specified period or in accordance with a written scheme of examination, it may be appropriate to use certain non-destructive testing (NDT) techniques to assess the integrity of components. These techniques can assist in the detection of any material cracks or defects that might grow in service and ultimately lead to failure.

NDT techniques should only be carried out by adequately trained and experienced personnel who should be briefed on the extent of the NDT examination required in accordance the written scheme of examination. BS EN 473:1993 gives guidance on qualification and certification of NDT personnel and, unless the operator is working to a detailed written procedure, they should be qualified to level two.

The three most common types of NDT used are:

- Magnetic Particle Examination;
- Dye Penetrant;
- Ultrasonic Examination.

7.2 Magnetic Particle Examination

In this technique a magnetic field is induced in the area under examination whilst the surface is flooded with ferrous particles suspended in a liquid. Any cracks or defects will cause a discontinuity in the magnetic field which will in turn cause the ferrous particles to cluster over the defect indicating it as a dark line. This technique is only suitable for magnetic materials (most structural steels and some stainless steels) and will only detect surface defects and large defects just below the material surface.

Further guidance is given in BS 6072:1981, PD 6513:1985 and BSEN 10228-1:1999.

7.3 Dye Penetrant

In this technique the surface of the material to be examined is flooded with a liquid dye which penetrates into any surface cracks or defects. After a suitable period, the dye is cleaned off and the surface sprayed with an absorbent “developer” which draws the dye from any defects indicating the presence of a defect. The technique is often employed on non-ferrous materials such as aluminium alloys, but can only locate surface defects.

Further guidance is given in BS EN 571-1:1997 and BSEN 10228-2:1998.

7.4 Ultrasonic Examination

In this technique pulses of high frequency sound waves are transmitted from the surface of the material into its interior. Any defects or discontinuities cause the sound waves to be reflected back to the surface where they can be detected and, by measuring the time delay from the time of transmission, an estimate of the defects depth below the surface can be made. The technique can be used for a wide range

of materials and will detect both surface and subsurface defects. However, it requires both a skilled operator and specialist equipment and would normally be carried out by hiring in a specialist firm.

Further guidance is given in BS EN 583-3:1997.

8. Maintenance

All equipment must be maintained regularly as required by Regulation 5(1) of PUWER to ensure that it is safe to use.

8.1 Frequency

The frequency at which maintenance activities are carried out shall take into account the intensity of use, operating environment, variety of operations and the risk to health and safety from the possibility of malfunction or failure. The maintenance programme should be based on the manufacturer's recommendations and the owner's risk assessment. It must address those parts of the equipment that are likely to deteriorate and lead to health and safety risks. A formal system of planned preventative or condition-based maintenance should be adopted.

The manufacturer's (or in-house) maintenance instructions must be available to the persons involved in maintaining the equipment.

8.2 Maintenance Personnel

Maintenance activities should only be carried out by persons who are both familiar with the equipment and competent to carry out the work.

The employer must ensure the health and safety of maintenance personnel. They should be provided with such training and instruction to enable them to carry out the work in a safe manner.

Where MEWPs are on hire, it is important for both the owner and the hirer to establish which party is responsible for the various maintenance activities. The terms of the agreement should be set out in writing.

9. Keeping Records

9.1 Maintenance Records (Reconcile)

It is good practice to record all maintenance carried out and retain these records for the life of the machine in order to be able to:

- demonstrate that adequate maintenance has been carried out;
- identify repeated defects and trends;
- pass on this information to the next owners.

Maintenance records must be kept up to date as required by Regulation 5(2) of PUWER.

9.2 Statutory Inspection and Thorough Examination Records

Records of all inspections, thorough examinations and tests shall be kept as required by Regulation 11 of LOLER.

The period of time that the records must be retained depends on the circumstances in which the relevant inspection or through examination was conducted:

- In-service inspections at intervals between thorough examinations - keep report until next inspection is made.
- Thorough examination of the MEWP before it is first put into service - keep the report until the equipment is taken out of use.
- Subsequent in-service thorough examinations of a MEWP - keep the records until the next report is made or for two years, whichever is later.

Schedule 1 of LOLER gives details of the information to be contained in a report of a thorough examination and, for ease of reference this is reproduced in the Appendix of this guidance.

Any test certificates and/or other reports such as NDT, shall be attached to the report of thorough examination.

10. Definitions

10.1 Mobile Elevating Work Platform

A mobile machine that is intended to move persons to their working positions where they carry out work from the work platform with the intention that persons are getting on and off the work platform at one defined access position. As a minimum, the machine consists of a work platform with controls, an extending structure and a chassis.

10.2 Rated Load

The rated load is the load for which the MEWP has been designed for normal operation. The rated load is composed of persons, tools and material acting vertically on the work platform.

A MEWP can have more than one rated load.

10.3 Load Sensing System

The system of monitoring the vertical load and vertical forces on the work platform. The system includes the measuring device(s), the method of mounting the measuring device and the signal processing system.

10.4 Moment Sensing System

The system of monitoring the moment acting about the tipping line tending to overturn the MEWP. The system includes the measuring device(s), the method of mounting the measuring devices and the signal processing system.

11. Appendix

LOLER - Schedule 1: Information to be contained in a report of a thorough examination.

Regulation 10(1)

1. The name and address of the employer for whom the thorough examination was made.

2. The address of the premises at which the thorough examination was made.

3. Particulars sufficient to identify the equipment including where known its date of manufacture.

4. The date of the last thorough examination.

5. The safe working load of the lifting equipment or (where its safe working load depends on the configuration of the lifting equipment) its safe working load for the last configuration in which it was thoroughly examined.
6. In relation to the first thorough examination of lifting equipment after installation or after assembly at a new site or in a new location -

(a) that it is such thorough examination;
(b) (if such be the case) that it has been installed correctly and would be safe to operate.

7. In relation to a thorough examination of lifting equipment other than a thorough examination to which paragraph 6 relates -

(a) whether it is a thorough examination -
(i) within an interval of 6 months under regulation 9(3)(a)(i);
(ii) within an interval of 12 months under regulation 9(3)(a)(ii);
(iii) in accordance with an examination scheme under regulation 9(3)(a)(iii);
(iv) after the occurrence of exceptional circumstances under regulation 9(3)(a)(iv);
(b) (if such be the case) that the lifting equipment would be safe to operate.

8. In relation to every thorough examination of lifting equipment -

(a) identification of any part found to have a defect which is or could become a danger to persons, and a description of the defect;
(b) particulars of any repair, renewal or alteration required to remedy a defect found to be a danger to persons;
(c) in the case of a defect which is not yet but could become a danger to persons -
(i) the time by which it could become such a danger;
(ii) particulars of any repair, renewal or alteration required to remedy it;
(d) the latest date by which the next thorough examination must be carried out;

(e) where the thorough examination included testing, particulars of any test;
(f) the date of the thorough examination.

9. The name, address and qualifications of the person making the report; that he is self-employed or, if employed, the name and address of his employer.

10. The name and address of a person signing or authenticating the report on behalf of its author.

11. The date of the report.

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BS EN 583-1:1999: Non-destructive testing. Ultrasonic examination. General principles.

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