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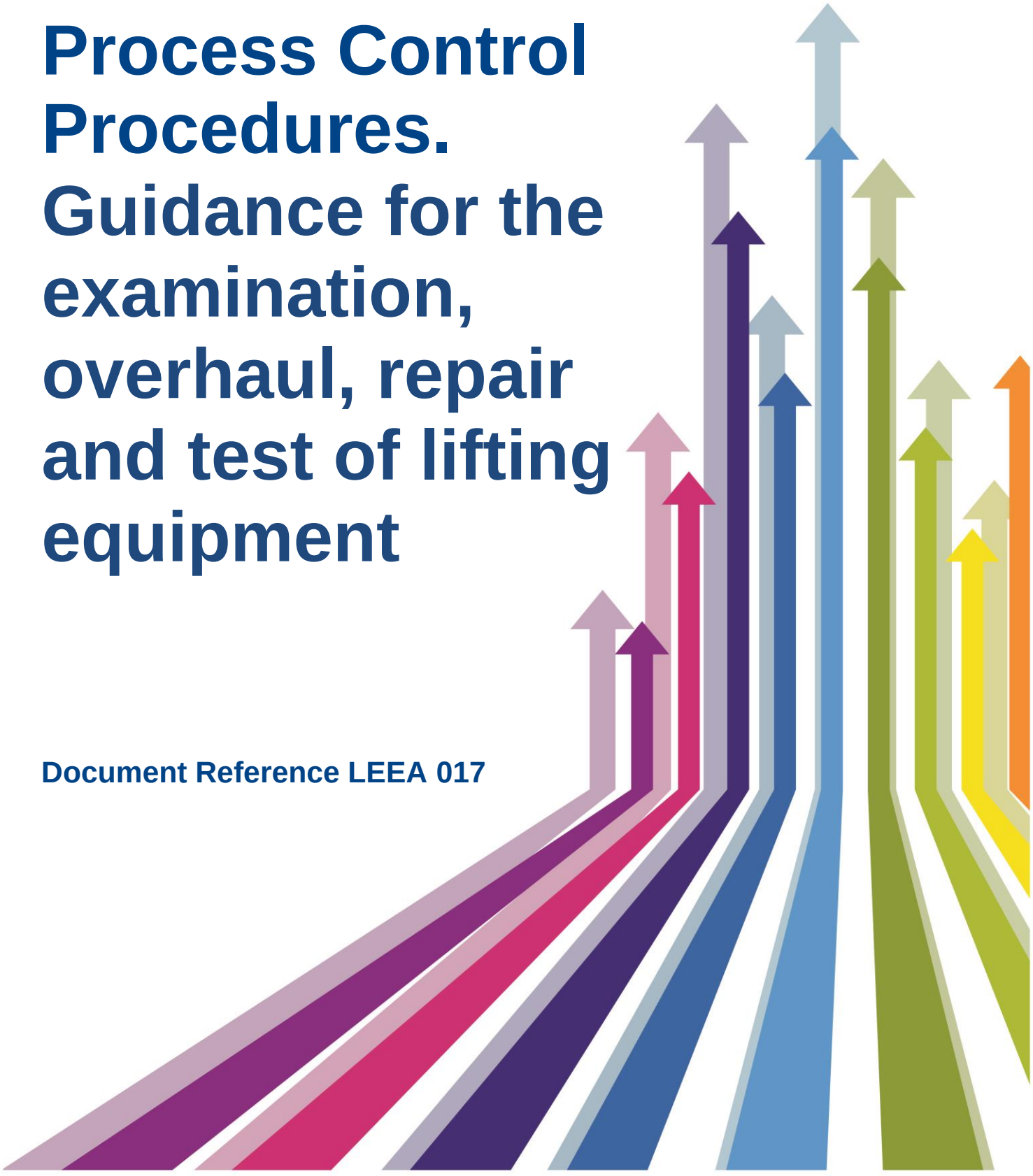
Process Control Procedures. Guidance for the examination, overhaul, repair and test of lifting equipment



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PROCESS CONTROL PROCEDURES
Guidance for the Examination, Overhaul, Repair and Test of Lifting Equipment
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1.0 Introduction

In carrying out the thorough examination of lifting equipment, whether or not this is the result of a periodic requirement, or as a result of exceptional circumstances which could affect the safe operation of the equipment, the Competent Person is called upon to make a judgement as to the fitness for further service of the equipment.

Much of the assessment is subjective, relying on the theoretical knowledge, practical experience and professional judgement of the Competent Person. He must take account of factors, such as wear, and must make an assessment as to their effects on the safe operation of the equipment.

This document outlines the procedures that should be adopted when carrying out the thorough examination of lifting equipment. The contents also apply to the supplementary testing of lifting equipment in support of a thorough examination, which may be necessary as the result of a periodic requirement, exceptional circumstance or new installation.

The procedures and requirements laid down in this document apply to work carried out both in house and on site, but where a requirement is specific to any one of these cases this is clearly identified.

It should be noted that supply legislation and the use of work equipment legislation allow the keeping of records by different means, e.g. hard copy, electronic retrieval, etc. Therefore, references to certificates and/or reports in this document include records made by any legal means.

2.0 Terms and Definitions

For the purposes of this guidance the following terms and definitions apply.

2.1 SWL (Safe (Specific-application) Working Load)

The safe working load or specific application working load (SWL) is the maximum load (mass) as assessed by a Competent Person which an item of lifting equipment may raise, lower or suspend under the particular service conditions. The SWL is marked on the equipment and appears in statutory records, i.e. inspection and examination reports.

Notes:

1. *The SWL will normally be the same value as the working load limit, maximum safe working load or rated capacity where the term is used for a particular item of lifting equipment; but it may be less.*
2. *In some geographical regions the word 'safe' is not used in the description, but the requirement is still the same. Hence the alternative 'Specific application' phrase. This document will use the acronym SWL for each.*

2.2 Working load limit (WLL)

The working load limit is the maximum load (mass) that an item of lifting equipment is designed to raise, lower or suspend. Sometimes this is referred to as the maximum safe working load or rated capacity.

2.3 Competent Person

The term, 'Competent Person' has long been used in legislation. Current legislation uses it for a variety of duties to describe a person with the necessary practical and theoretical knowledge, experience, training, skill and ability to perform the specific duty to which the requirement refers. There can therefore be several 'Competent Persons', each with their own duties and responsibilities, i.e. competent for the purpose. The Competent Person should have the maturity to seek such specialist advice and assistance as may be required to enable them to make necessary judgements and be of sound judge of the extent to which he/she can accept the

supporting opinions of other specialists. It is the view of LEEA that competency can be a corporate responsibility.

3.0 Attendance on site

When attending site, the person carrying out the thorough examination should initially report to the assigned representative of the duty holder on the site. Information should be exchanged as to the work to be done and safety precautions to be adopted, both from the examiners and site personnel point of view. The legislation under which the work is to be done should be established, where this is not already known, to ensure any specific requirements they may make are taken into account during the examination.

All statutory requirements for safety when working on cranes, hoists, ladders, scaffolding and other equipment detailed in the various applicable standards and legislation should be observed. Where additional site safety precautions apply these should also be observed.

The adequacy of anchorages and points of suspension to or from which equipment is to be attached or suspended, should be checked or assured, taking full account of any test load that may be applied.

Where load tests are to be conducted, assurances should be obtained as to the adequacy of floors, passages and standing over which the test weights will travel and stand.

In the case of power operated appliances, power supplies should be isolated during certain parts of the examination and steps agreed and taken to prevent the reconnecting of power supplies before the examination or tests are completed.

4.0 Pre-examination requirements.

The area in which the examination is to be carried out should be clean and clear of any materials or contaminants which may harm the item under examination. It should afford the person conducting the examination unimpeded access to the equipment or any part of the equipment which it is necessary to examine. Adequate lighting, either natural or artificial, should be provided and where it is necessary to supplement this, the examiner should have suitable additional lighting available, e.g. pocket torch.

The person undertaking the examination should also have available any visual aids as may be necessary, e.g. magnifying glass, and any tools or equipment as may be required to enable them to carry out the examination in a correct and proper manner.

Prior to commencing the examination:

1. Confirm the identity of the equipment against the original paperwork, for example the Manufacturers Certificate or the last report of thorough examination.

2. Ensure the markings are clear, i.e. identification, SWL and any other marking required by the standard or by legislation. Any additional marking should not be ambiguous or confusing.

3. Verify the correctness and suitability of the marked SWL. Where applicable check the existing Manufacturers Certificate or previous examination report and company record.

4. Appliances should be dismantled, degreased and cleaned to such an extent as is necessary to enable a thorough examination and proper assessment to be made. Cleaning methods and materials should not be harmful to the appliance or any of its components, etc.

5.0 Examination.
Lifting equipment will require a thorough examination as a part of a periodic examination or after exceptional circumstances which could affect the safe operation of the equipment.

An exceptional circumstance would include, for example, a major modification, repair, overload test, known or suspected damage or a change in the intended use or frequency of use.

Regular interim inspections should also be done if the risk assessment for the health and safety of personnel has identified risks to the operator or other workers. The frequency and extent of these inspections would depend on the potential risks identified. It should be noted that the reporting requirements of an inspection and that of a thorough examination are different.

Inspections are similar to thorough examinations, except they tend to focus on only those critical components that were identified in the risk assessment.

Thorough examinations and inspections should be carried out in accordance with the requirements of the relevant nationally recognised Standard and LEEA published guidance. Where possible manufacturers literature should also be consulted.

The examination or inspection, its findings and conclusions should take due account of any statutory requirements and limitations. Published acceptance/rejection criteria should be considered as maxima and used as guidance in reaching the final conclusion as to the fitness for purpose of the item under examination.

The examination or inspection must take into account the age of the equipment and an assessment shall be made to estimate the remaining life of the equipment or individual components. Part of the assessment shall include a comparison between the designed and actual or intended use to ascertain when components or assemblies require inspection or replacement.

In the case of power operated equipment, the examination should extend to the power supply system, which is considered to start at the point of isolation, i.e. isolator, switch fuse, shut off valve etc. In the case of an inspection this would only be necessary if the risk assessment identified those parts as potentially becoming a risk to the operator or other workers.

5.1 Interim Inspection.
In the case of an interim inspection:

1. Where an item is found to be defective requiring repair within a time scale determined by the competent person, a responsible representative of the user should be informed. If dangerously defective, a recommendation should be made that the user should withdraw it immediately from service. For immediate withdrawal it is advisable that the competent person documents the agreement forthwith that this has been advised.

   Note: inspections are often done at the same time as planned maintenance.

2. A record of the inspection should be made in writing as soon as practicable. It is recommended that in addition to any information required by specific national legislation that the following information should be provided in the report:

   - Information on the type and model of the equipment;
   - Any identification mark or number that it has;
   - Its normal location;
   - The date the inspection was carried out;

- Who carried out the inspection;
- Any faults; and/or;
- Any action taken.
- To whom the faults have been reported;
- The dates when the repair or other necessary action were carried out.

5.2 Periodic Examination
In the case of a periodic examination:

1. Where an item is found to be defective requiring repair within a time scale determined by the competent person, a responsible representative of the user should be informed. If dangerously defective, a recommendation should be made that the user should withdraw it immediately from service. For immediate withdrawal it is advisable that the competent person documents the agreement forthwith that this has been advised.

2. In the case where a defect is found in the lifting equipment involving an existing or imminent risk of serious personal injury, then a copy of the report of thorough examination should be sent to the enforcing authority as soon as practicable.

3. A record of the examination should be made in writing as soon as practicable. It is recommended that in addition to any information required by specific national legislation that the following information should be provided in the report:

    - The name and address of the employer for whom the thorough examination was made.
    - The address of the premises at which the thorough examination was made.
    - Particulars sufficient to identify the equipment including where known its date of manufacture.
    - The date of the last thorough examination.
    - The SWL of the lifting equipment or (where its SWL depends on the configuration of the lifting equipment) it's SWL for the last configuration in which it was thoroughly examined.
    - In relation to the first thorough examination of lifting equipment after installation or after assembly at a new site or in a new location –
        - that it is such thorough examination;
        - (if such be the case) that it has been installed correctly and would be safe to operate.
    - In relation to a thorough examination of lifting equipment other than that in the previous point;
        - The reason for the examination;
        - (If such be the case) that the lifting equipment would be safe to operate.
    - In relation to every thorough examination of lifting equipment
        - identification of any part found to have a defect which is or could become a danger to persons, and a description of the defect;
        - particulars of any repair, renewal or alteration required to remedy a defect found to be a danger to persons;
        - in the case of a defect which is not yet but could become a danger to persons –
            - the time by which it could become such a danger;
            - particulars of any repair, renewal or alteration required to remedy it;
    - the latest date by which the next thorough examination must be carried out;
    - where the thorough examination included testing, particulars of any test;
    - the date of the thorough examination.
    - 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.

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

Note 1: A template example of the above can be found in Annex 1. LEEA has several other templates available for members to use.

Note 2: The equipment defect found should not be remedied until the root cause of the defect has been identified and measures put in place to prevent reoccurrence. In the case of defects requiring immediate action the equipment should be withdrawn from service until preventative measures and repair have been implemented.

5.3 Examination following a test.
In the case of an examination following a test:

1. Where an item which is in service, fails the test and examination, the requirements given in paragraph 5.2 items 1 and 3 apply.

2. Where the equipment passes the test and examination the details of the test and results of the examination should be recorded in accordance with the requirements of paragraph 5.2 item 3.

6.0 Repairs
Where repairs are to be undertaken, care should be taken to ensure that only components of the correct size, material, grade and, where applicable, approved by the manufacturer are used. The original equipment manufacturers instructions should be followed where necessary. A record should be made of all repairs.

6.1 Repairs using uncertified components or affecting the SWL
On completion of repairs using uncertified components, or where the repair or process involved may affect the safe operation and use of the equipment, the equipment should be subjected to a thorough examination including necessary proof load testing and/or other such tests as are required by legislation and applicable standards or to ensure the safety of the equipment.

6.2 Repair using certified components
Where certified components are used to affect a repair, e.g. a replacement bottom hook, a subsequent proof load test will not usually be necessary and would be at the discretion of the Competent Person. On completion of repair the equipment should be examined to ensure the correctness of the work carried out and the integrity of the equipment. Where no test is made the original certificate for the equipment should be endorsed to cross refer this to the certificate(s) for the replacement item(s) and such certificate(s) attached to this.

7.0 Testing
Various tests may be necessary to supplement a thorough examination, to ensure the safe operation, detect faults, confirm the correctness of the equipment and to meet statutory requirements. These should be carried out in accordance with the manufacturers' instructions, standard and statutory requirements and should at least meet the requirements given below.

Examples of typical tests may include NDT, operational test, light load tests, overload tests, etc.

Test areas should be carefully selected, and steps taken to protect personnel and property. In particular ensure a clear area to facilitate the lifting and movement of test weights with the minimum of ground clearance.

7.1 Operational testing.
Operational testing of appliances, to ensure the correct working, connection of power supplies, reeving, etc., will be necessary as part of an examination and should precede any other tests which may be necessary.

Operate the appliance in a no load or light load condition. Check and observe the operation of:

1. Control command.
2. Mating parts, e.g. load chain - load wheel.
3. Brakes and self-sustaining mechanisms.
4. Drives, clutches and other vital mechanisms.
5. Motion limits, other safety devices and 'fail safes'.
6. Chain or rope guides, strippers and anchorages.
7. The general operation and working of the appliance.

7.2 SWL and Deflections measurement.
Prior to applying the full proof load the tester should be satisfied of the integrity of the appliance. A load equal to the SWL should be lifted just clear and the operation halted. The load should then be sustained for a period to ensure the integrity of the brake or self-sustaining mechanism.

Where the measurement of deflections is required, initial measurements should be taken before application of the SWL. Ensure the area through which it may be necessary to travel the load is clear and that the travel path may be observed at all times. The SWL should then be raised, and where applicable travelled, and deflection readings taken and recorded on the report.

7.3 Proof load testing.
Where a proof load test is required, this should be made in accordance with the manufacturers' instructions, relevant standard, other recognised standard or LEEA recommendations.

Note: Unless a mandatory requirement of the applicable national legislation or manufacturer, LEEA does not recommend the routine overload testing of lifting equipment, except following an exceptional circumstance such as significant modification or repair. This is because overload testing has few benefits and a number of disadvantages;

- *Some manufacturers do not recommend overload tests, except in 'exceptional circumstances'*
- *Repeated overloads can cause deterioration of the equipment over time*
- *Most structural failures are the result of fatigue and such defects will not be revealed by an overload test; fatigue cracking can be identified by thorough examination.*
- *Defects such as fatigue cracking can be made worse by overload testing but may still not be identified by the test.*
- *If the equipment fails during testing it can be dangerous and will certainly be expensive.*
- *Inspection bodies do not recommend it as there is no defined structural or mechanical benefit.*

Where an appliance is fitted with an overload protection device, load limiter or similar device it may be necessary to set or bypass this to enable the proof load to be applied. This should be done in accordance with the manufacturer's instructions. Steps should be taken to ensure this is correctly reset and checked upon completion of the test.

When applying the proof load, lift the maximum SWL just clear (for example 100mm to 200mm off the ground) then halt the operation. Then increase the load to the proof load without movement of the hoisting mechanism. The load should then be sustained for a period to ensure the integrity of the brake or self-sustaining mechanism. If this is satisfactory the proof test may proceed. The

load shall be traversed in the horizontal planes allowed by the control system or supporting structure, but not moved vertical plane, to apply the test load to all load bearing elements.

Throughout the test the appliance should be carefully observed for any adverse signs, e.g. exposure of defects, deformation and distortion. If any of these become apparent, the test should be halted, and the load safely lowered as quickly as possible.

Otherwise the process for lowering the load at the end of the test should be to decrease the load to the SWL without movement of the hoisting mechanism. Then lower the SWL till the load is fully supported using the hoisting mechanism.

A proof load of the hoisting mechanism can be conducted by apply a dynamic overload as specified by the manufacturer. This load should be raised and lowered at the speeds allowed by the control system. Excessive heights of lift should be avoided when raising loads.

On completion of the test the appliance should be subjected to a thorough examination, see 5.0 above.

7.4 Other tests

In the case of power operated equipment, specialist tests, e.g. insulation and continuity testing for electrical equipment or pressure on valves or vessels for pneumatic and hydraulic equipment, may be deemed necessary. These should be agreed with a responsible representative of the user prior to making the test, and the fact and results noted on the report.

Non-destructive testing may be necessary, either as a requirement of the standard, legislation or contract, or to supplement the visual examination. The method used should be appropriate for the nature of the equipment and detecting the type of fault for which the test is to be made. Such tests should be agreed with a responsible representative of the user prior to making the test, and the fact and results noted on the report.

Annex 1

Document Reference LEEA-030.2a3

LEEA
Full Member

CERTIFICATE OF THOROUGH EXAMINATION

This report complies with the Lifting Equipment Engineers Association Technical requirements

Date of Through Examination:	Date of Report:	Report number:

Name and Address of employer for whom the thorough examination was made:	Address of premises at which the examination was made:		
Description and identification of the equipment:	Safe Working Load(s):	Date of manufacture if known:	Date of last thorough examination:

Is this the first examination after installation or assembly at a new site or location?	YES		NO		Was the examination carried out:			
					Within an interval of 6 months?	YES		NO	
					Within an interval of 12 months?	YES		NO	
If the answer to the above question is YES has the equipment been installed correctly?	YES		NO		In accordance with an examination scheme?	YES		NO	
					After the occurrence of exceptional circumstances?	YES		NO	

Identification of any part found to have a defect which is or could become a danger to persons and a description of the defect:: (If none state NONE)				
Is the above a defect which is of immediate danger to persons	YES		NO	
Is the above a defect which is not yet but could become a danger to persons: (If YES state the date by when)	YES by:			
Particulars of any repair, renewal or alteration required to remedy the defect identified above:				
Particulars of any tests carried out as part of the examination: (If none state NONE)				
IS THIS EQUIPMENT FIT FOR PURPOSE?	YES		NO	

Name & Qualifications of person making this report:	Name of person authenticating this report: Signature:	Latest date by which next thorough examination must be carried out:
Name and address of employer of persons making and authenticating this report:		

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Document Originator K Crilly