



ENGINEERING SERVICES- BENTELY PARK

LIFTING EQUIPMENT

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1. PURPOSE

To ensure that all lifting equipment complies with appropriate standards and is used and maintained by trained personnel following approved procedures.

Lifting equipment referred to in this procedure:

Cranes; forklift trucks; stacker trucks; mobile work platforms; air hoists; winches; plate clamps; hand operated hoists; chain blocks; lever hoists; pulley blocks; chain slings; wire rope slings; shackles; lifting beams; personnel lift/work boxes; equipment lift boxes; pallet lifting cages; and lifting hooks.

2. SCOPE

This procedure applies to all users and persons exposed to lifting equipment as listed above.

3. RESPONSIBILITIES

The department manager must ensure compliance with the requirements of this procedure.

The Responsible Engineer/Competent person must approve the design, modifications and repair of lifting equipment.

All employees must ensure he/she is trained and authorised before performing any lifting activities, and also to ensure that the correct equipment is selected, checked, maintained and used in accordance with correct lifting techniques.

4. DEFINITIONS

4.1. Lifting machine/tackle

Lifting machine - is a machine or component which can raise, lower or suspend a load. Lifting machines include cranes, forklift trucks, stacker trucks, mobile working platforms, personnel lift/work boxes; equipment lift boxes; pulley blocks, runway beams with trolleys, davits and conveyors.

Lifting tackle – are components such as shackles, slings, hooks, chains and spreader beams used to connect lifting tackle to one another or to connect lifting machinery to loads.

4.2. Lifting point

Components or features of loads such as lifting lugs, eyes and reinforcement pads designed for the attachment or bearing of lifting equipment.

4.3. Purpose made lifting equipment

Lifting equipment not available as a standard or proprietary item, which is required to be designed and manufactured for a specific task or duty.

4.4. Safe working load

The maximum load determined by an operator, which an item of lifting equipment may raise, lower or suspend under particular service conditions.

4.5. Proof load

Test load applied to lifting equipment after manufacturing or following any repair, replacement or modification of any load bearing part. It is a specified load which is required to be withstood without the equipment showing permanent deformation beyond a specified amount or other defect.

4.6. Work load limit

The maximum mass or force which a product is authorised to support in a particular service

5. PROCEDURE**5.1. Design and specifications**

- 5.1.1. Specifications for all lifting equipment shall be approved by the Responsible Engineer/Competent person.
- 5.1.2. The design of purpose made lifting equipment shall be approved by the Responsible Engineer/Competent person.
- 5.1.3. Design drawings and calculations of purpose made lifting equipment shall be filed at the Company's Technical Records Section.
- 5.1.4. The design, operation, maintenance and inspection of lifting equipment shall comply with all statutory requirements and standards.

5.2. Registration and records

- 5.2.1. The Responsible Engineer/Competent person shall register all lifting equipment.
- 5.2.2. Registration of lifting equipment shall include:
 - 5.2.2.1. Unique identification number;

- 5.2.2.2. Marking of each item with the identification number and the safe working load and additionally, for portable lifting equipment, affixing a label or stamping of a serial number.
- 5.2.2.3. Creating and maintaining a file for each lifting appliance containing documentation relating to design, manufacture, testing, examinations, repairs and modification;
- 5.2.2.4. A notification system which displays the next due examination date and overdue examinations.
- 5.2.2.5. Shackles will bear the safe working load as per certification and will be inspected before use as per checklist
- 5.2.3. The identification number shall be marked on the lifting equipment by a tagging system. If labels are not suitable for lifting equipment such as slings, the number shall be included on SWL stainless steel/galvanized or alloy tags - pierce-fixed to the equipment or secured by a swaged, flexible wire grommet
- 5.2.4. Where tagging is impractical, the Responsible Engineer/Competent person shall decide the identification means (e.g. welded number).

5.3. Inspections

- 5.3.1. All lifting equipment shall be inspected at a prescribed interval, and results recorded.
- 5.3.2. Infrequently used lifting equipment shall be inspected by an authorised/appointed person prior to each use, as approved by the Responsible Engineer/Competent person.
- 5.3.3. The Responsible Engineer/Competent person shall appoint a qualified and competent Inspector.
- 5.3.4. Where inspection intervals are *not prescribed* by legislation the maximum intervals shall be:
 - 5.3.4.1. Blocks, hooks, shackles and cranes
 - 5.3.4.1.1. Visual inspection by an appointed person making records of apparent external conditions to provide the basis for continuation:
Normal service: Equipment in place – yearly
(Definition: Service, normal that involves less than 85% of rated load except for isolated instances)

Heavy service: As in normal service, unless external condition indicate that the disassembly should be done to permit detailed inspection – yearly

(Definition: Service involves operating at 85 – 100% of rated as regular specified procedure)

Severe service: as in heavy service – quarterly

(Definition: meant heavy service coupled with abnormal operatory conditions)

5.3.4.2. Hooks:

- 5.3.4.2.1. Any visible bend or twist from the plane of the unbend hook, any distortion causing an increase in throat opening of 5% not to exceed 6mm

5.3.4.3. Slings

5.3.4.3.1. Inspection frequency

- A Visual inspection shall be performed by the user or designated person each day before the rigging hardware is used.
- A periodic inspection shall be performed by a designated person at least 3 monthly and a determination made as to whether they constitute a hazard. Written records are required

5.3.5. Equipment to be checked pre usage (daily/before use) and on monthly intervals

- 5.3.5.1. Chain slings and attachments;
- 5.3.5.2. Wire rope slings and attachments;
- 5.3.5.3. Synthetic fibre slings and attachments;
- 5.3.5.4. Hand operated hoists;
- 5.3.5.5. Air hoists and air winches;
- 5.3.5.6. Plate clamps;
- 5.3.5.7. Lifting hooks (which are an integral part of lifting equipment such as a chain block or lever hoist)
- 5.3.5.8. Mobile cranes, hydraulic hoists and platforms
- 5.3.5.9. Forklifts and components handlers
- 5.3.5.10. Lifting hooks (which are fitted to hot metal cranes)
- 5.3.5.11. Production overhead cranes or other lifting equipment specified by the Responsible Engineer/Competent person.

5.3.6. The scope of the inspection shall allow the inspector to determine:

- 5.3.7. For lifting appliances such as chain blocks, generic scopes shall be developed.
 - 5.3.7.1. The suitability for continued use; and
 - 5.3.7.2. The maximum interval to the next inspection
- 5.3.8. For major lifting appliances individual scopes shall be developed.
- 5.3.9. Inspection reports shall include the date, the condition of the equipment, corrective actions required and the name of the inspector.

5.4. Modification/newly designed lifting equipment

- 5.4.1. All modifications/newly designed lifting equipment shall comply with the requirements of, and shall be designed and fabricated in accordance with accepted industrial standards.
- 5.4.2. Modified/newly designed equipment lifting equipment shall be inspected and tested by application of a proof load. A test certificate stating the safe working load and the proof load shall be obtained.
- 5.4.3. All records shall be included in the register and the marking of equipment suitably amended.

5.5. Repairs of lifting equipment

- 5.5.1. All repairs to lifting equipment other than the replacement of now critical parts shall be performed by the original Manufacturer, the Manufacturer's agent or a fabricator approved by the Responsible Engineer/Competent person.
- 5.5.2. Where load bearing components are repaired or replaced, lifting equipment is required to be inspected and tested by application of a proof load. A test certificate stating the safe working load and the proof load shall be obtained. All records shall be included in the register and equipment markings updated.
- 5.5.3. Lifting equipment which has been heat treated after manufacture must receive the same heat treatment after repairs are completed.

5.6. Damaged lifting equipment

Lifting equipment which is determined by the Responsible Engineer/Competent person to be worn or damaged beyond repair shall be destroyed by cutting and the lifting equipment register and record file amended accordingly.

5.7. Storage of lifting equipment

- 5.7.1. Controlled storage for lifting equipment shall be established in each Department.

- 5.7.2. Lifting equipment shall be stored in an appropriated storage area, off the ground and protected from the elements and contamination.
- 5.7.3. Lifting equipment shall be segregated by type or capacity and stored to allow ready identification.
- 5.7.4. All lifting equipment that cannot be manhandled safely shall be stored and handled by appropriate equipment

5.8. Lifting equipment authorisation and training

Operators shall be trained and certified competent to operate lifting equipment and shall be authorised / appointed before operating lifting equipment (see Regulation 18 of Driven Machinery Regulations to Occupational Health and Safety Act, 85 of 1993)

- 5.8.1. Training of operators for prescribed occupations in the operation of lifting equipment shall be undertaken by accredited Authorities.
- 5.8.2. A list of operators shall be entered into the Record Book or recorded on an Electronic training record system (MQA and Training Academy).
- 5.8.3. Only trained and competent operators shall direct the movement of loads when handled by overhead travelling cranes or mobile cranes.
- 5.8.4. Refresher training shall be performed at appropriate intervals to ensure operators retain competency in the use or operation of lifting equipment. Appropriate intervals for refresher training shall be determined by auditing work practices.

5.9. Examination and pre-start checks

The operator of mobile lifting equipment shall perform a pre-start check prior to use.

5.10. Use of lifting equipment

- 5.10.1. Lifting equipment shall only be operated by trained and competent operators.
- 5.10.2. Lifting equipment shall only be used if the due date for examination has not been exceeded and the operator has ascertained by visual inspection that:
 - 5.10.2.1. The equipment is in a satisfactory condition;
 - 5.10.2.2. The condition and design rating of lifting points on loads are suitable for the intended duty;
 - 5.10.2.3. Appropriate guarding is in place; and
 - 5.10.2.4. Safe working load will not be exceeded.
- 5.10.3. A single operator shall direct and control all lifting operations.
- 5.10.4. Adequate illumination shall be provided for all lifting operations

- 5.10.5. Where the operator does not have a clear view of the load being lifted, assistance shall be provided by a specifically instructed signaler (e.g. dogman). Electronic signaling and communications devices shall be protected from interference.
- 5.10.6. In the event of any malfunction of lifting equipment, operation shall cease and the malfunction brought to the attention of the Responsible Engineer/Competent person.
- 5.10.7. Access to areas where lifting operations are performed shall be restricted and protection provided or procedures developed to ensure persons in the vicinity are not subject to danger. Loads shall not be lifted over persons.
- 5.10.8. Lifting equipment shall not be used in circumstances where its stability is likely to be adversely affected such as on soft or uneven ground or on slopes, under high tension power lines and inclement weather conditions unless appropriate precautions are taken to ensure safe working.
- 5.10.9. Lifting equipment known or suspected to have been overloaded shall be withdrawn from service. The equipment shall be re-tested and certified by the approved Repairer before being returned to use. Records of the incident, testing and examination must be entered in the register.

5.11. Failure of lifting equipment

All cases of failure shall be referred to the Responsible Engineer/Competent person who shall ensure that a failure report is prepared.

5.12. Maintenance of lifting equipment

Maintenance of lifting equipment shall be separate from fault correction arising from examination. There shall be a formal maintenance schedule for all items.

5.13. Hired lifting equipment

- 5.13.1. The equipment, systems and methods of working of the hire company shall be consistent with the requirements of this procedure and comply fully with legislation.
- 5.13.2. For all hired lifting equipment, current test certification and other appropriate documentation shall be available, irrespective of the period of hire.

5.14. Hoisting of personnel using a crane

5.14.1. Personnel shall not be hoisted or lowered by a crane unless:

5.14.1.1. All other options such as scaffolding or elevated platform vehicles have been considered and ruled out;

5.14.1.2. The operation has been approved by the Responsible Engineer/Competent person;

5.14.1.3. The crane has been approved to hoist men by the Inspectorate Authority and has a current inspection certificate;

5.14.1.4. An approved work box (Bosuns chair) is used.

5.14.2. Approved work box (Bosuns chair) shall be marked with:

5.14.2.1. The maximum hoisted load (gross weight, kilograms);

5.14.2.2. Safe Working Load (kilograms);

5.14.2.3. Tare mass (kilograms);

5.14.2.4. Statutory approval number (if applicable);

5.14.2.5. Minimum allowable(rated) crane capacity (kilograms); and

5.14.2.6. Identification reference.

5.15. Equipment lift bail

5.15.1. Lift bail used in conjunction with a crane to hoist or lower materials or equipment.

5.15.2. Equipment lift bail shall be marked with the:

5.15.2.1. Safe Working Load (kilograms),

5.15.2.2. Identification reference.

5.15.3. Lifting slings used to hoist or lower an equipment lift bail shall be connected to the lift bail with shackles.

5.16. Pallet lifting cages

5.16.1. Pallet lifting cages used in conjunction with lifting equipment to hoist or lower pallets or material shall be designed and approved by the Responsible Engineer/Competent person.

5.16.2. Pallet lifting cages shall be manufactured to the approved design parameters and marked with the:

5.16.2.1. Safe Working Load (kilograms)

5.17. Synthetic webbing slings

Synthetic webbing slings shall be used in accordance with accepted industrial practice

5.18. General

- 5.18.1.** Personnel shall use tag lines where it is necessary to control the movement of loads handled by cranes.
- 5.18.2.** Sling protectors shall be used to protect slings from damage on the corners of loads.
- 5.18.3.** Lifting lugs shall be fitted to loads where lifting equipment connection points are not provided.
- 5.18.4.** Lifting beams and devices shall be used in the manner designed.
- 5.18.5.** Lifting hooks shall be equipped with a safety latch.
- 5.18.6.** Existing equipment shall be assessed and action taken to have safety latches fitted to bring equipment into compliance with the procedure.

6. REGULATIONS

- 6.1.** Driven Machinery Regulations to Occupational Health and Safety Act, 85 of 1993
- 6.2.** SANS Code 0147 (Cable cranes and Aerial ropeways)

7. CHECKLISTS FOR LIFTING/TACKLE EQUIPMENT

- 7.1.** MRC-ENG-ESV-CHK-018 - Air Hoist
- 7.2.** MRC-ENG-ESV-CHK-019 - Wire rope sling
- 7.3.** MRC-ENG-ESV-CHK-020 - Electrical hoist
- 7.4.** MRC-ENG-ESV-CHK-021 - Inspection on shackles
- 7.5.** MRC-ENG-ESV-CHK-022 - Rope tackle
- 7.6.** MRC-ENG-ESV-CHK-023 - Crawl
- 7.7.** MRC-ENG-ESV-CHK-024 - Beam clamp
- 7.8.** MRC-ENG-ESV-CHK-025 - Trolley Jack
- 7.9.** MRC-ENG-ESV-CHK-026 - Chain Block
- 7.10.** MRC-ENG-ESV-CHK-027 - Chain slings
- 7.11.** MRC-ENG-ESV-CHK-030 - Overhead crane
- 7.12.** MRC-ENG-ESV-CHK-032 - Engine dolly
- 7.13.** MRC-ENG-ESV-CHK-033 - Eye bolt inspection
- 7.14.** MRC-ENG-ESV-CHK-034 - Lever Chain Hoist
- 7.15.** MRC-ENG-ESV-CHK-035 - Sala Block
- 7.16.** MRC-ENG-ESV-CHK-036 - Safety Harness
- 7.17.** MRC-ENG-ESV-CHK-037 - Mobile Hydraulic lift