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Established By: Ashraf Elsaid	Position: Lifting Supervisor	Date: JULY-2022
Approved By: Ahmed Mohamed	Position: Operation Manager	

Inspection Procedure of Power Operated Hoists

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1. YOUR SAFETY IS FIRST:

Your safety wear is mandatory at job sites including in general: suit, shoes, helmet, gloves, ear plugs, glasses, and mask.

2. SCOPE:

This Procedure covers the inspection and testing of power operated hoists

3. PRODUCT/ MANUFACTURE STANDARDS:

BS EN 14492-2:2019	<i>Cranes. Power driven winches and hoists - Power driven hoists</i>
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4. DEFINITION:

, the following should be noted:

* Power Operated Hoist

Power operated hoist is an abbreviated term. More correctly, the term should be power operated chain hoist or power operated wire rope hoist, whichever lifting medium is employed. The term should also be prefixed by the type of power utilized, i.e. electric or pneumatic. This term is further shortened to hoist in some parts of the text where the meaning is obvious.

* Suspended Hoist

A suspended hoist has a hook or eye top fitting by which the hoist is mounted to its supporting trolley or suspension point.

* Combined Hoist

A combined hoist has an integral travelling trolley and is sometimes referred to as a built-in hoist.

* Fixed Suspension Hoist

A fixed suspension hoist has a top mounting by which the hoist may be rigidly suspended from a trolley or permanent structure.

* Foot Mounted Hoist

A foot mounted hoist has mounting brackets or feet enabling it to be bolted in a fixed position to a crab or permanent structure.

* Support Level

In the case of a suspended hoist, the support level is the level of the seat of the top hook or bearing point of the eye from which the hoist is suspended. In the case of a combined hoist, it is the level of the surface upon which the trolley wheels run. In other cases, it is the appropriate level similar to those stated. (See figure 6.1)

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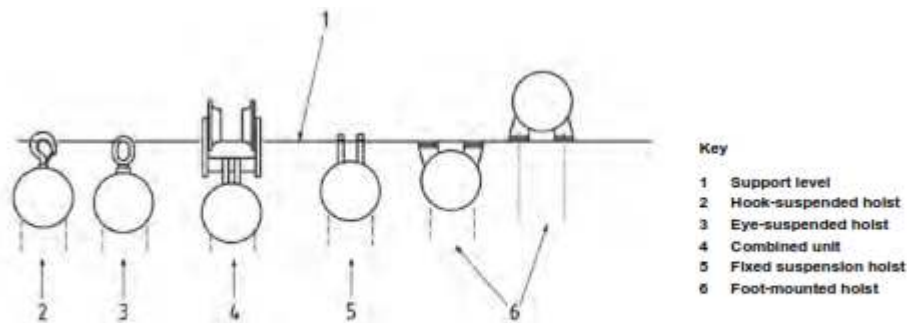


Figure 6.1
Support level for various types of hoists

* Extended Dimension

The extended dimension is the distance between the support level and the bottom hook seat in the extended position. (See figure 6.2)

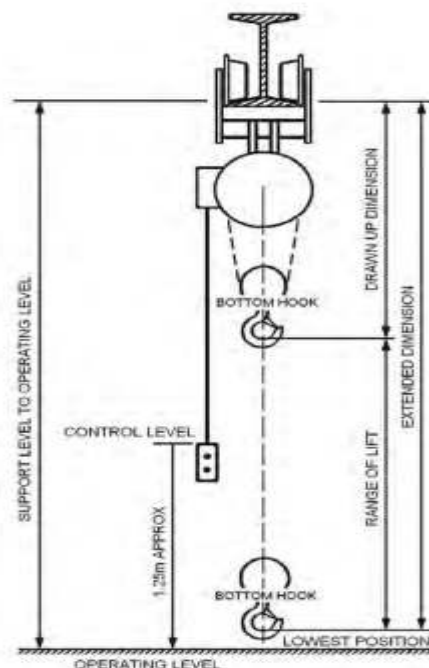


Figure 6.2

* Drawn up Dimension

The drawn up dimension is the distance between the support level and the bottom hook seat when the bottom hook is in the raised position. (See figure 6.2) This is sometimes referred to as the headroom as

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it is the effective headroom taken up by the hoist. However, the term headroom has not been used as it is sometimes used in everyday language to have other meanings.

*** Range of Lift**

The range of lift is the vertical distance which the bottom hook travels between the extended and drawn up positions. (See figure 6.2)

*** Operating Level(s)**

The operating level(s) is the level(s) at which the operative stands. (See figure 6.2)

*** Control Level**

The control level is the position above the operating level at which the controls are placed or to which the pendant control hangs. (See figure 6.2) Unless otherwise stipulated, this will be approximately 1.25 meters above the operating level

*** Limits**

Limits are mechanical or electro-mechanical devices which are used to restrict the amount of movement in any motion, i.e. lifting, lowering or travelling.

5. THOROUGH EXAMINATION:

The hoist must regularly be thoroughly examined by a Competent Person to check whether it remains safe to use. This is to be done within a maximum period of 12 months unless a written scheme of examination (for guidance refer to LEEA 032 Guidance to Written Schemes of Examination), drawn up by a competent person is in place and operating.

Reports of thorough examination should be compliant with the legal requirements or the LEEA template report documents, retained and cross referenced to the hoists historical records for inspection by the Competent Person or the enforcement authority.

Any defects found by the examination should be reported to the owner of the equipment, who must assess the root cause of the defect and implement procedures to prevent reoccurrence, e.g. training of operators, increased inspections, etc., before remedying the equipment and returning it to service. The competent person may deem it necessary to supplement their examination with testing. Such testing could be NDT, electrical safety testing, functional testing, overload testing, etc. The nature and extent of testing is always at the discretion of the competent person in support of their thorough examination.

Note:

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

- Some manufacturers do not recommend overload tests, except in 'exceptional' circumstances.

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- 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 during thorough examination.
- Defects such as fatigue cracking can be made worse by overload testing but may still not be identified by the test.
- If equipment fails during testing it could be dangerous and will certainly be expensive
- Inspection bodies do not recommend it as there is no defined structural or mechanical benefit

6- SAFE USE OF ELECTRIC POWER OPERATED HOISTS

In addition to any specific instructions relating to the safe use of the hoist issued by the manufacturer, the following points should be observed:

- (1) Electric power operated hoists must not be used to raise, lower or suspend a load greater than the marked SWL. Performance testing shall be carried after the functional testing with the rated load (1 X SWL) applied, to determine whether the equipment performs as the manufacturer intended. This shall include the operation of all controls to determine whether the equipment operates correctly, smoothly and free from any other damage.
- (2) Ensure that the load is directly under the hoist. The line of pull should always be vertical, never side lift or drag a load.
- (3) Do not use the load chain or wire rope to form a sling, i.e. it must not be wrapped around the load and back hooked, sickled or choke hitched.
- (4) The bottom hook should be attached to the load such that no part of the load is in contact with the point of the hook. The sling should be located in the seat of the hook and the safety catch closed.
- (5) The bottom hook should not be crowded with terminal fittings of slings. To prevent the hook becoming overcrowded, LEEA recommends that the upper ends of the sling legs are connected by means of a shackle or link of adequate strength.
- (6) Care should be taken to ensure that the hoist is not subjected to shock loading. When using hoists with dual speed, commence the lift in slow speed before progressing to full speed.
- (7) It should be borne in mind that the majority of hoists are fitted with some form of overload device designed to protect the hoist. This may be mechanical, electrical or thermo-electrical. Should the hoist fail to lift the load, it is probable that the load exceeds the SWL and should be checked before resetting the controls.
- (8) Never change motions (i.e. lift to lower or vice versa) without first allowing the motor to stop running. Quick reversal of direction causes shock loading and heavy current surges. This will result in burnt contacts, and imposes unnecessary strain on transmission shafts and gears.
- (9) Avoid unnecessary rapid and frequent incremental movements as this causes burning and pitting of contacts. Excessive rapid and frequent incremental movements could result in burning out of the motor.
- (10) Loads should not be left suspended from hoists for any length of time unless absolutely essential and a safe system or work and/or additional safety measures are provided to reduce the risk to an acceptable minimum. Where it is as a result of a breakdown, the operative should

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ensure that the danger area is cordoned off to prevent personnel from being at risk in the event of a descending load.

- (11) At no time should the operative permit either himself or other personnel to be beneath or on a suspended load.
- (12) In the case of hoists with push travel trolleys, never attempt to move the hoist by pulling on the pendant cable control. Always pull on the bottom hook of unladen hoists. If a suspended load is to be moved, wherever possible push rather than pull the load. Care must also be taken to ensure the load is not allowed to swing as this may endanger the operative and result in increased loadings on the hoist and its supporting structure.
- (13) In the case of hoists with power travel trolleys, care must be taken to prevent the load swinging unduly. If the trolley has dual speed traverse, always start in the slow speed before proceeding to full speed.
- (14) Avoid running trolleys into runway end stops as this will cause the load to swing unsafely, put shock loading on the hoist and its supporting runway and structure. End stops are a final safety device only.
- (15) Avoid excessive or intentional use of motion limit devices, they are a safety feature intended to protect the hoist. Where the operation requires regular approach to the highest and lowest possible hook positions, a positional or working limit should be fitted for this purpose.
- (16) No person other than a Competent Person or someone under the supervision of a Competent Person should attempt to dismantle the hoist or replace the load chain or wire rope.
- (17) Never remove guards or protective covers such as weatherproof covers or heat shields without the authority of a Competent Person.
- (18) Ensure the travel path is clear and free from obstructions before operating the hoist. This is especially important in the case of unladen hooks or remote control units. The operative must always have a clear vision of the travelling hook path to ensure accidental hook engagement or collisions do not occur.
- (19) Ensure the operative and other personnel are fully protected from hazardous materials which may form part of the load.
- (20) Before continuing with a lifting operation, the load should be raised just clear and the lift halted to ensure the integrity of the hoist and method of slinging which must sustain the load in any position. Only if the load is stable and balanced should the lift proceed.

7- IN-SERVICE INSPECTION AND MAINTENANCE

In addition to the statutory thorough examination by a Competent Person, electric power operated hoists should be visually inspected by a suitably qualified and experienced person prior to use or on a regular basis. For hoists

in regular use it is good practice to make the inspection at the start of each shift or each working day. For hoists used infrequently it should be done before use on each day of use.

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It is recommended that a formal system of pre-use inspection is implemented, and a written record kept identifying the date inspected, confirmation that it passed inspection and the name and signature of the person making the inspection. In the event that it does not pass the inspection, there should be a procedure to quarantine the hoist to prevent further use of the equipment until the problem has been resolved. The purpose of the pre-use inspection is to test functionality of the hoist and make a visual check for any obvious defects. The inspection should include the fixings, suspension points and supporting structures. The inspection should include the following points in addition to any specific checks recommended by the supplier:

- (1) State of chain or wire rope.
- (2) Correct operation of the brake.
- (3) Correct operation of hoist and, where fitted, lower limits.
- (4) Correct operation of controls.
- (5) A visual check for any obvious defects.

If any of the following faults are found, the hoist should be withdrawn from service and referred to a Competent Person.

*** All power operated hoists**

- (1) Signs of wear, deformation or damage to hooks, trolleys or other terminal or suspension fittings.
- (2) Hook safety latch damaged or inoperative. In the event of the latch appearing to be too short, this is an indication of the hook having opened out and may be the result of the hoist being overloaded.
- (3) Signs of wear and fretting corrosion to screw threaded shanks.
- (4) Load slips when hoisting or load will not lift although motor is running.
- (5) Load stops midway through a lifting cycle. In this case, where possible action must be taken to lower the load. If this cannot be done, the area must be cordoned off to prevent anyone approaching.
- (6) Hoist will not operate although power is on.
- (7) Spasmodic or erratic lifting operation and similar symptoms on the travel motion.
- (8) Trolley slips or skids on the runway.
- (9) Damage to any electric cable or cable gland.
- (10) Damage to the pendant control hand set including cable, rubber covers, legends or labels and support wire, chain or cord.
- (11) Excessive noise or unusual sounds from any part of the hoist, including motor, clutch, gearbox or brake.
- (12) Travel and/or hoist motions operate in opposite direction to control indication.
- (13) Load continues to travel excessive distance after motion control has been released.

*** Electric power operated chain hoists**

- (1) Load chain worn or damaged, in particular when wear has occurred on the bearing surfaces inside the links and to damage in the form of bent, notched, stretched or corroded links. In certain

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circumstances, very rapid wear of the load chain can develop, which is characterized by a rough appearance on the mating surfaces inside the links.

- (2) Load chain does not articulate freely.
- (3) Signs of damage or distortion to the slack end anchor which connects the load chain to the hoist casing and/or signs of damage or distortion to the load chain stop where one is fitted.
- (4) When bottom hook is fully extended to its lowest possible working position, the slack end of the chain pulls tight transmitting the load onto the slack end anchor.
- (5) When operating under load, the chain jumps and/or is excessively noisy.
- (6) Chain does not hang freely or is twisted over its length.
- (7) Chain does not enter or leave the load wheel freely. Chain guide or stripper are worn or damaged.
- (8) Chain collecting box is damaged or distorted.

Recommended further guidance on the inspection procedure and rejection criteria for load chain is given in ISO 7592.

*** Electric power operated wire rope hoists**

- (1) Load rope is worn or damaged; in particular, any increase or decrease in diameter, opening of strands, kinks or broken wires. Any signs of mechanical damage such as flattening, crushing, cuts, burring and corrosion. Faults are most likely to occur at the terminations and where the rope passes over sheaves and pulleys, in particular compensating sheaves.
- (2) Wire rope does not feed onto the drum correctly or winds in the wrong direction in relation to the control direction selected.
- (3) Damaged or worn rope guides and bands.
- (4) Signs of damage or distortion of the anchorage points or of the wire rope pulling through any clamping devices.
- (5) When bottom hook is fully extended to its lowest working position, there are less than 2 full turns of rope remaining on the drum. Under no circumstances must there be less than 2 full turns of rope remaining on the drum but consult the manufacturer's instructions as with some units 3 full turns must remain.
- (6) Wire rope is cabled; i.e. multiple falls of rope are twisted together. Recommended further guidance on inspection procedure and rejection criteria for wire rope is given in ISO 4309:

6. MARKING:

In addition to the information required by the legislation and standards, the following information should be permanently and legibly marked on a suitable part or parts of the electric power operated hoist:

- (1) Identification mark. (If the manufacturer has not provided a unique serial number then it is the responsibility of the user to add the identification mark to identify the equipment with the inspection and examination reports).
- (2) Rated capacity or SWL.

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- (3) Name of manufacturer or supplier.
- (4) Range of lift.
- (5) Power supply, voltage, phase(s) and frequency required.
- (6) Motor size(s) in kW and rating.

The following information should always be readily to hand:

- (1) Class of use.
- (2) Details of lifting medium, e.g. size and grade of chain, size, construction and minimum breaking load of wire rope etc.
- (3) IP rating.
- (4) Lifting speed or speeds.
- (5) Traverse speed or speeds.
- (6) Year of manufacture.
- (7) Any other marks or references that may identify the model or type.

7. REPORTING AND CERTIFICATION:

A certificate of test and thorough examination will be issued upon the satisfactory completion of the examination, i.e. the lifting equipment is safe to operate

A defect report will be issued if the lifting equipment fails to meet the requirements.