

OHS Safe Systems of Work - Lifting Plant Examinations

Contents

1. INTRODUCTION	1
2. SCOPE	1
3. LEGISLATION AND OTHER PUBLICATIONS	2
4. HAZARDS	2
5. SAFE WORKING ON PLANT: GENERAL	4
6. DURING EXAMINATION	7
7. PERMIT TO WORK	9
8. SUMMARY	9
Owner	9

1. INTRODUCTION

This safe system of work considers the hazards and risks when undertaking the examination of lifting plant. As a necessity of examination, lifting plant will have to be manoeuvred to prove satisfactory function and operation. This creates added risks such as falling from plant, being trapped, crushed or struck by plant movement. The safe system is to raise awareness of the hazards and therefore reduce the risks involved so far as is reasonably practicable.

This safe system of work is of a general nature and should be read in conjunction with the other publications and instructions issued to the Engineer Surveyor, relating to plant and equipment.

2. SCOPE

The guidance covers work associated with the examination of all types of lifting machines and lifting tackle.

2.1 Lifting Machines

For the purpose of this safe system of work, lifting machines are defined as:

- (i) Powered mobile and fixed cranes, all classes.
- (ii) Manual mobile and fixed cranes, all classes.
- (iii) Powered and manual lifting machines.
- (iv) Runways, gantries and other suspension structures.
- (v) Crane grabs and crabs.
- (vi) Powered and manual fork lift trucks and stackers, all classes.
- (vii) Powered loading shovels, bulldozers, scrapers and dumpers.
- (viii) Excavators, all classes.

This list is not exhaustive.

2.2 Lifting Tackle

For the purpose of this safe system of work, lifting machines are defined as:

- (i) Slings, all classes.
- (ii) Rings, hooks, plate clamps, shackles and eyebolts.
- (iii) Lifting beams, spreader beams and frames.

OHS Safe Systems of Work - Lifting Plant Examinations

This list is not exhaustive.

3. LEGISLATION AND OTHER PUBLICATIONS

3.1 Legislation

The following is a summary of relevant legislation, including:

- a. [The Health and Safety at Work etc. Act 1974.](#)
- b. [The Factories Act 1961.](#)
- c. [The Ship Building & Ship Repairing Regulations 1960.](#)
- d. [The Docks Regulations 1988.](#)
- e. [The Provision and Use of Work Equipment Regulations \(PUWER\) 1998.](#)
- f. [The Workplace \(Health, Safety and Welfare\) Regulations 1992.](#)
- g. [The Supply of Machinery \(Safety\) Regulations 1992.](#)
- h. [The Lifting Operations and Lifting Equipment Regulations \(LOLER\) 1998.](#)
- i. [The Management of Health and Safety at Work Regulations 1999.](#)

This list is not exhaustive and reference may need to be made to other Legislation as applicable.

3.2 Other relevant guidance

Which may include the following:

- a. Code of practice for the safe use of cranes: BS 7121 Pts 1 & 2, 1991.
- b. [Safe use of ladders and step ladders: LA455.](#)
- c. In-house procedures and instructions.
- d. Personal Protective Equipment.

This list is not exhaustive and reference may need to be made to other documents

4. HAZARDS

4.1 Anticipating the Consequences of Actions

Many accidents occur because of a lack of planning and/or consideration of what could happen as a result of actions on site.

4.2 Known Hazards

Examples of how injury can occur when undertaking the examination of lifting include:

- a. Trapping / Crushing.
- b. Falling.
- c. Being struck.

OHS Safe Systems of Work - Lifting Plant Examinations

- d. Electrical shock.

4.3 Hazard details

4.3.1 Trapping and Crushing points:

There are many trapping points to consider when undertaking the examination of lifting machines. Trapping hazards are present at following areas:

- a. Slewing of plant ie. cranes /excavators / loaders: Trapping can occur between slew ring and its attachments (ladders, underside of jibs, counterweight attachments etc.) and also between adjacent plant and building structure at slew ring drive systems.
- b. Luffing / derricking of crane / excavator jibs: At rope drums and diverter sheaves (hands or clothing being caught between ropes and rope drums and diverter sheaves); in machinery housings or apex assemblies. At jib pivot and articulating points. Moving counter balance systems on some types of portal cranes.
- c. Telescoping Jibs: At jib entry points and jib attachments.
- d. Hoisting / lowering of ropes: At rope drums and rope diverter sheaves, open gears, flywheels and pulley systems. Rotating machinery i.e. brake drums, winches etc. Hoist/lower travel carriages on tower cranes.
- e. On overhead crane systems: At rail track wheels and rails, winch drums and rope diverter systems. Between crab and crane structure. From other cranes on the same track. Crane and building.
- f. With mobile systems (cranes / excavators / fork lift trucks etc): Along travel routes being trapped by wheels or track drives. At rail lines and rail wheels. Being trapped against plant, machinery and adjacent building or plant structures.
- g. On forklift trucks: Between mast structure and fork carriage; mast and truck chassis.
- h. Between plant and site buildings or ground in the event of plant overturning during examination.

4.3.2 Falling:

Generally falls can occur at any time when undertaking the examination of lifting plant. By virtue of their construction climbing and access to areas above ground area necessity. The risk from falling is present when:

- a. Climbing jibs, masts, machine structures, overhead crane structures. slipping from ladders and plant structure.
- b. Using ladders and other means of access.
- c. Slipping on oil / grease on plant structure and ground , unstable or uneven ground conditions.

OHS Safe Systems of Work - Lifting Plant Examinations

- d. Tripping over obstacles on items of plant being examined, and items at ground level on site.
 - e. Deteriorating weather conditions. ie. if ice, rain and wind present.
- 4.3.3 Being struck:
- a. By moving parts of plant undergoing examination ie jib structures, slew arrangements, outrigger movement etc. on cranes and excavator / loaders. Fork arm movement on fork lift trucks.
 - b. By load hooks and suspended loads on cranes.
 - c. By wheels and track drives on mobile plant.
 - d. By other plant, and mobile systems in operation at site.
 - e. By chain slings and lifting beams and frames suspended from cranes.
 - f. By failure of plant under examination ie. loads being dropped, failure of plant structures.
 - g. From projections on machinery and buildings.
- 4.3.4 Other hazards include:
- a. Risk of electrical shock from live equipment and poorly maintained systems.
 - b. Plant being examined striking overhead electric power lines.
 - c. Exposed down shop conductor systems.
 - d. Fumes and dust from site work and manufacturing processes. Dust from overhead areas due to disturbance during examination.
 - e. Catch points - clothing or rings being caught on protrusions.
 - f. Noise - from plant being examined and adjacent work processes.
 - g. Vibration - from plant being examined.
 - h. Burns - hot surfaces on plant being examined.

5. SAFE WORKING ON PLANT: GENERAL

Prior to examination of plant:

5.1 Access & Egress

The Engineer Surveyor shall make his presence known to a responsible person at the location. At the end of their visit, the Engineer Surveyor shall advise that person that he is leaving the site.

5.2 Unoccupied Premises

OHS Safe Systems of Work - Lifting Plant Examinations

Under no circumstance shall the Engineer Surveyor work alone at unoccupied premises, or carry out any examination at premises where no member of the client's staff (or other responsible person) is present.

5.3 Appropriate Clothing

Engineer Surveyors shall wear suitable protective clothing and equipment e.g. Safety helmet, boiler suit, gloves, suitable safety boots or shoes, and safety harness, all of which shall be maintained in good condition and properly worn.

5.4 Personal Protection & Safety Equipment

Other personal protection and safety equipment shall be worn according to the site conditions and clients site safe systems of work e.g. eye protection, hearing protection, high visibility clothing, personal buoyancy equipment and respiratory protective equipment.

5.5 Inspection Plan

Engineer Surveyors shall plan the sequence of their examination prior to commencement. This is essential when undertaking the examination of mobile, tower, overhead or other large crane systems and plant with regard to health and safety.

Planning should include the following:

- a. A suitable and satisfactory emergency release/rescue procedure must be in place and capable of being initiated if required prior to commencement of examination.
- b. Briefing of the responsible person on site and plant driver/operator as to the sequence of examination.
- c. Banksman (where used) and plant driver/operator must fully understand the examination procedure and the system of hand signals to be used where applicable. All personnel must understand the emergency signals and procedures.
- d. Examinations of mobile plant should be away from regular site traffic and site routes. This will reduce the risk of being struck by, and striking, other site traffic and site personnel. If it is necessary to carry out examinations within a building or confined area ie. warehouse or factory etc, ensure adequate room to carry out the full examination without the risk of being struck by other plant movements or from being trapped or struck by plant under examination or causing risk to others in the area.
- e. Ensure ground conditions are sound and will fully support the plant to be inspected in all examination positions, without risk of overturning due to ground subsidence.
- f. Position of plant being examined to be well away from edges of excavations, and overhead electric power lines.

OHS Safe Systems of Work - Lifting Plant Examinations

- g. Ensure adequate clearance, and sufficient operating space, between plant being examined and adjacent fixtures to prevent trapping and crushing hazard.

The Construction (Lifting Operations) Regs 1961, Section 12 refers: When a lifting machine with a travelling or slewing motion is used, an obstructed passageway at least 600mm (2ft) wide must be maintained between the moving parts of the machine and any nearby fixture." This standard shall be applied to the inspection of all lifting machines with a travelling or slewing motion.

5.6 Isolation

Where plant and machinery needs to be isolated for inspection purposes, the Engineer Surveyor shall ensure power is isolated from the plant. This should consist of switching off power where required, locking off isolators with padlocks, and displaying warning notices at the isolation points.

5.7 Operation of Plant

Operation of plant and machinery shall be carried out by the clients staff / competent operator except where it is necessary for the Engineer Surveyor to do so as part of their examination.

5.7.1 Unrestricted View

The driver/operator of plant, must have a clear view of operations. Where this is not possible a banksman must be used.

5.7.2 Surveyor Restrictions

Engineer Surveyors should not drive or operate motions of plant for any other purpose than the minimum amount strictly necessary to carry out the examination.

Prior to operating any plant, the ES shall ask themselves whether it is possible to complete the examination without an operator.

Where the ES concludes it is possible to complete the examination by operating plant themselves, he/she shall:

- a. Obtain prior permission of a responsible person at the location.
- b. Take all reasonable care during the operation of the plant.
- c. Satisfy themselves that all reasonable safety precautions have been taken.
- d. Ensure that plant is left in a safe condition at the end of the examination.

5.7.3 Client Responsibility

Under no circumstance shall an Engineer Surveyor operate any item of plant if they have the slightest doubt as to their own ability to do so, or the authority of the person

OHS Safe Systems of Work - Lifting Plant Examinations

giving permission to do so. In all such cases, the Engineer Surveyor shall request the client provides a competent operator.

5.8 Notification of Appropriate Authorities

If a crane or other type of plant is to slew over a public highway, river or railway the Engineer Surveyor shall ensure the client has notified the appropriate authority.

5.9 Waterborne

With cranes on waterborne craft, information should be obtained regarding the amount of list and freeboard allowable under both safe working load and overload conditions, from a competent person or authority experienced in crane design and stability of craft. Plus, how far the crane is de-rated from land based ratings whilst on the barge or pontoon.

5.10 Environmental Conditions

Careful attention should be given to cranes operating in situations where they are likely to be affected by the weather. Certain weather conditions such as strong wind, heavy rains, ice or snow can impose loads on a crane and adversely affect the safety of crane operations. Never undertake examinations when the crane or load cannot be easily seen due to limitations on visibility or when coated with ice or snow. Cranes should not be operated in wind speeds exceeding those specified in the operating instructions for the crane.

5.11 Outriggers

Plant fitted with outriggers are not fully stable until the outriggers are set in accordance with the manufacturer's instructions. When used, always ensure outriggers are fully extended to their full extension position.

6. DURING EXAMINATION

6.1 Safe Access

Always use a safe means of access to reach parts of plant requiring inspection above ground level: i.e. properly secured ladders or access platforms. When working above ground level a safety harness should be worn by the Engineer Surveyor if there is an identifiable risk of falling.

6.2 Climbing Precautions

Keep a good foot and handhold when climbing plant structures. Watch for obstacles, protrusions, oil and grease deposits, ice and water, which may cause a tripping or slipping hazard.

6.3 Ladders

If long, extension or stepladders are used during the course of an examination, they must be in good condition and free from defects and damage. Wooden ladders must not be painted as the paint may hide defects. Always ensure ladders are stable and securely fixed. When using long or extension ladders, they must be securely fixed or supported, and be on a level firm surface. They must extend at least 1 metre above the highest level to be accessed.

OHS Safe Systems of Work - Lifting Plant Examinations

Stepladders must be long enough to enable an Engineer Surveyor to examine the plant whilst be able to hold onto the ladder.

6.4 Other Hazards

Engineer Surveyors should not position themselves close to open excavations, pits or water's edge during the course of examination.

6.5 Moving Plant & Parts

When plant is being moved during an examination, the Engineer Surveyor should position themselves clear of all moving parts and have a clear view of the driver/operator. Where this is not possible, a banksman should be used to relay the Engineer Surveyor's signals to the driver/operator.

6.6 Wheels & Tracks

Stand well clear of wheels and tracks when plant is being moved.

6.7 Other Plant

Be aware of other plant moving on site, and adjacent to the plant being examined (see permit to work section regarding working on, or examination of overhead cranes).

6.8 Rope Inspections

Always wear gloves when inspecting hoist ropes etc. If it is necessary to examine ropes when they are moving, ensure they are moving at slow speed and away from hoist and winch drums.

6.9 Suspended Loads

Never stand beneath suspended loads or parts of plant which could descend. ie under raised forks on fork lift trucks, raised buckets or loading shovels on excavator/loaders, or crane jibs.

6.10 Buoyancy Aids

Buoyancy aids/life jackets must be worn when undertaking examinations on waterborne plant, situated on barges, boats or pontoons, or plant adjacent to water's edge.

6.11 Trapping

An Engineer Surveyor should always position themselves where they will not be trapped between adjacent fixed structures and plant being examined.

6.12 Crushing

Keep hands, arms, feet and head clear of any potential trapping or crushing points such as plant pivot and articulating points, sliding and telescoping components and open rotating parts.

6.13 Pendant Controls

When working at height on a crane, ensure that any pendant controls are not within reach of anyone who could inadvertently operate the crane during examination.

OHS Safe Systems of Work - Lifting Plant Examinations

6.14 Securing Ladders

Ensure that when resting ladders against cranes or hoist blocks, the mechanisms upon which the ladders are resting are not capable of movement (i.e. braking applied, mechanism chocked etc.), during that part of the examination.

7. PERMIT TO WORK

Some clients operate a "Permit to Work" system when work is required on certain plant. The permit to work system is an extension to the safe system of work when written authorisation is required before a particular job can commence.

In a number of cases, there is a clear statutory duty to implement a permit to work procedure i.e. The Factories Act 1961 Sect. 27, (7) (8) "precautions needed to prevent overhead cranes approaching within 20 feet (6 metres) of any place where a person is working and is liable to be struck by the crane".

8. SUMMARY

The preceding sections outline the main considerations to achieve a safe system of work when undertaking examinations of lifting plant. Physical layout and operational facilities vary considerably depending on clients' premises and plant examined; therefore, the safe system of work must be adapted to take into account the particular characteristics and situation of the plant being examined, and the working environment in which it is operating.

Owner

Jane Nash

End of Document