LORRY LOADER

Notes on Regulations

- Health and Safety at Work Act 1974
- The Management of Health and Safety at Work Act 1992
- The Electricity at Work Regulations 1989
- Lifting Operations and Lifting Equipment Regulations 1998
- Provision and Use of Work Equipment Regulations 1998
- Road Traffic Act UK
- Control of Substances Hazardous to Health 1989
- The Supply of Machinery (Safety) Regulations 1992
- The Noise at Work Regulations 1989

Guidance notes and codes of practice

- Avoidance of Danger from Overhead Cables GS6
- Electricity on Construction Site GS24
- Control of Noise Order 1984
- Safe Use of Lifting Equipment L113
- Safe Use of Work Equipment L22
- BS 7121 Part 4 Safe Use of Cranes (Lorry Loaders)
A lorry loader is the combination of a load carrying vehicle (or lorry) and a loader (or crane) which is primarily intended to facilitate the handling of the load on or off the vehicle. A lorry loader is normally fitted with one pair of stabilising legs, and in this configuration depends on the weight of the vehicle, the reaction through the vehicle's springs and the stabilising legs for its stability.

The loaders are almost invariably hydraulically operated and can make use of articulated, and in many cases extending booms or jibs to obtain the load hook movements. The power required is normally obtained from the vehicle engine via a power take off and a hydraulic pump.

By using pressure limiting or relief valves on the hydraulic system lorry loaders are designed so that they are incapable of lifting an excessive overload.

Following the introduction of lorry loaders there has been an increase in the variety of applications with clamps, grabs, grapples, winches, buckets, inspection platforms being fitted for different needs.

Accidents can still occur through lack of knowledge or understanding. It is recognised that the safe use of a lorry loader ultimately rests with the operating personnel who has received training and demonstrated their competence.
The Power Unit

How does a diesel engine work?

The fuel used in modern high speed diesel engines, usually gas oil, is a liquid which does not vaporise at ordinary temperatures. It is injected into the cylinders of the engine in a very fine spray.

The air necessary for combustion is drawn into the combustion chamber and then compressed by the piston to a high pressure. The compression heats the air sufficiently to ignite the fuel spray spontaneously when the injection takes place.

This process is the characteristic feature of the diesel engine, or as it is otherwise called, the compression ignition engine.

Four-stroke cycle

It is quite simple mechanically. If we consider only the four-stroke engine (a complete movement of the piston, up OR down, is known as a stroke) the working cycle is as follows:

1. The piston moves down in the cylinder as the inlet valve opens, and a charge of clean air is drawn in. This is known as the Induction stroke. When the piston reaches the bottom of its travel, the inlet valve closes.

2. The piston moves up again, compressing the air in the cylinder, now with the inlet valve closed. This is known as the Compression stroke.

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2 In the **Compression stroke**, both valves remain closed whilst the piston moves upwards; the charge of air is compressed and its temperature rises steeply. Just before the piston reaches the top of the compression stroke, fuel is injected into the top of the cylinder (combustion chamber) in a very fine spray.

3 The fuel is ignited instantly by the heat of the compressed air, and the piston is driven downwards by the rapid expansion of the burning fuel gases. This is known as the **Power stroke**.

4 Following the power stroke, the exhaust valve opens as the piston moves upwards, and the waste gases are expelled. This is known as the **Exhaust stroke**.

When the piston reaches the top of its stroke the exhaust valve closes, and this completes one cycle (four strokes).

The cycle repeats itself as long as the engine is supplied with air and fuel.

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**Air Induction System**

An air cleaner filters the air before it enters the combustion chamber, protecting the engine from dust, water and other foreign matter.

There are two types of air cleaner in general use, the **dry filter** type and **oilbath** type. Both types are usually fitted with a **pre-cleaner**. The pre-cleaner comprises either a cap or bowl shaped so as to create a swirling action which causes the heavier particles of dirt to fly outwards and be deposited either within the casing of the pre-cleaner, or ejected through vents to the atmosphere.
Dry type air filter

This type uses a paper filter element. Air is drawn through the pre-cleaner into the filter housing, then passes through the paper filter and into the engine. Foreign particles are retained by the filter, or else ejected through a rubber clack valve.

Servicing usually consists of gently blowing away the accumulated dust with a LOW pressure air line or, when necessary, renewing the filter.

Oilbath type air filter

Air is drawn through the pre-cleaner down the inlet tube; then passes through the oil bath, and via a series of wire mesh screens into the engine.

Foreign particles are retained by the oil in the oilbath or collect on the oil-soaked wire mesh screen.

1. Both types of filter should be serviced at intervals recommended by the manufacturer. UNLESS THE CONDITIONS OF WORK ARE IN RAIN OR DUST! In these bad conditions the filters require more frequent servicing.

2. Some dry type filters incorporate a visual indicator which shows when the element requires cleaning or changing.
Turbocharger

Some engines have a turbocharger fitted. Exhaust gases from the engine drive a turbine at very high speed. The turbine is connected to an impeller which forces air under pressure into the induction manifold. The pressurised air increases the efficiency of the engine.

The engine should be run at a high idle speed for one minute before stopping. If this procedure is not complied with, the turbocharger can continue to run for a considerable time after the engine has stopped. As the turbocharger is lubricated from the engine lubrication system, it may then suffer loss of lubrication and seize up.

Note: Turbocharger speeds of 65,000 rpm are common. Special precautions must be taken when stopping a turbocharged engine.
Fuel systems are designed and adapted by manufacturers to suit their particular requirements. Basically, they consist of standard components.

A supply of fuel is contained in the fuel tank. From there it is delivered via the primary fuel filter, which filters out coarse grit and foreign matter, and through the fuel lift pump to the main fuel filter which removes the finer particles. Next it goes to the injection pump which measures, pressurises and delivers the fuel to the engine’s injectors by way of high pressure pipes, at the correct time. Excess fuel is delivered back to the fuel tank.

Diesel fuel is injected either into the cylinders by direct injection, or by injection into a pre-combustion chamber.

Direct injection takes place through several small atomising orifices, directly into the cylinder, where it is ignited. Multiple orifices, particularly of small size, increase the risk of clogging.

Pre-combustion designs inject through one large orifice into a pre-chamber where the fuel is atomised, and burning begins. The mixture then passes into the cylinder where complete combustion occurs.

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**Fuel injection system**
Bleeding the fuel system

If air has entered the system, through lack of fuel, loose connections, fractured pipe etc. the engine will either stop or badly misfire. After the cause of the entry of air has been rectified, the system must be 'bled' as follows:

Note: This procedure should be carried out by a trained and competent person.

In-line fuel pump

1. Check adequate supply of fuel in the tank.
2. Check that the fuel cap air vent is clear.
3. Open the air bleed screws on the filters and prime by operating the lift pump until fuel flows free of air. Continue pumping whilst tightening the vent screws.
4. Carry out procedure (3) at the injection pump and restart the engine.

DPA fuel injection pump

On DPA pumps open the air bleed screws on the main filters, pump body and governor housing. Operate the priming lever and close the bleed screws in the following order: fuel filters, pump body and then governor housing. Also slacken and bleed at pump inlet union.

Note: If the engine still misfires, reopen, bleed and close each screw in turn working from the fuel tank towards engine.

Set throttle in RUN position and bleed two of the injectors using the engine starter motor. Start engine and check for misfire. If misfire persists repeat process with remaining injectors.

Always take care to observe regulations concerning avoidance of fuel spillage onto site surface causing pollution.
Fuel tank

Only clean fuel must enter the tank, through a filter in the filler. Fuel tanks may 'sweat' inside during the night due to condensation and, to prevent this, they should be filled at the end of each day.

Avoid topping up with fuel from the bottom of a storage drum that may be contaminated with dirt or water.

Filters

These must be cleaned at intervals recommended and, where replaceable types are employed, new elements and gaskets fitted. If the presence of dirt or water is suspected then the whole system should be cleaned.

Fuel lift pump filter

This, with the sediment bowl, if fitted, must be cleaned regularly. Care must be taken in refitting so as not to damage the filter and gasket(s).

Fuel injection pump governor

Normally lubricated from its own sump, it must be checked regularly for correct oil level. Drain and refill in accordance with the maker's instructions. No attempt should be made to tamper with or adjust the governor.

Starting Aids

Ignition of fuel in diesel engines depends upon high temperature of the inducted and compressed air. It is sometimes necessary during cold weather to assist the ignition of the fuel. Two types of device are in general use, an excess fuel device and a glow plug device.

Excess fuel device

This allows delivery of an excess amount of fuel to the combustion chambers. It is normally operated by a control button on the fuel injector pump housing. The throttle must be open before setting the button. The device disengages automatically when the engine starts.
Glow plug device

An electric element fitted in the induction manifold (or in some cases, in each pre-combustion chamber) is operated by a control switch. When the starter is engaged, the inducted air flows over the element and is warmed to assist ignition.

**Note:** A variation, known as the THERMOSTART, injects fuel into the induction manifold where it is ignited by the glow plug to produce a flame to assist ignition.
Lubricating system

Without oil between the moving parts, wear through friction would be excessive and power would be lost. The heat generated would cause expansion and seizure of the parts.

Oil reaches the main and big-end bearings, camshaft bearings and rocker shaft under pressure. It bleeds out of the rocker shaft bearings and returns to the sump by gravity. The oil is heated by its contact with the moving parts, so this heat is removed by either an oil cooler fitted in the system, or by the movement of air past the surface of the sump. Foreign matter washed from the moving parts and passageways of the engine by the oil, either falls to the sump or is held in suspension by detergent oil and then removed by the filter.

The oil level in the sump should be checked before starting the engine. Remove the engine oil level dipstick, wipe clean and replace in the engine. Remove dipstick again and check the oil level against marks. If the level is low add clean oil until the correct level is obtained. Do not overfill.

Immediately after the engine is started, the oil pressure gauge should be checked for the correct pressure reading. A warning light is usually fitted to warn of low oil pressure. This warning light or gauge should be checked occasionally throughout the day for correct reading.

Any excessive oil consumption, unusual noises or vibrations should be noted and reported.

Typical lubricating system
**Cooling System**

**Liquid cooling**

The cooling system is designed to dissipate excessive heat. The engine cylinder block and head contain passages to allow circulation of the coolant (water). The system includes a radiator which provides a large cooling area and acts as a reservoir, a fan to increase the cooling air flow and a thermostat to restrict the flow of water to the radiator until correct working temperature is reached.

The coolant is circulated by a water pump and by the fact that heated water rises to the top of the radiator through convection.

Most liquid cooling systems are pressurised, using a special radiator cap, to allow higher working temperatures. Exercise extreme caution to avoid being scalded when removing the pressure cap from a hot radiator.

**Air cooling**

Another method of cooling is to provide each cylinder with finning over which cooling air is blown by a fan (blower). Ducting around the cylinders contains and guides the air down one side of the engine, around the cylinders, and then exhausts to atmosphere.

**Maintenance of Cooling System**

The system should be checked daily for:

- sufficient and correct type of coolant
- correct fan belt tension and condition
- cleanliness of air passages

During cold weather always be aware of the operating temperature of the engine of the machine. A temperature gauge or warning light is generally fitted for this purpose.
**Electrical System**

To start the engine, the crankshaft must be revolved. Diesel engines employ an electric starter motor powered from the battery to perform this function. The motor is mounted on the engine and, when the starter switch or button is engaged, the motor turns a small sliding pinion which meshes with a gear ring around the flywheel. The starter motor pinion gear disengages automatically when the engine starts.

The starter motor mounting bolts and connections require occasional checking for security.

The battery, or more than one battery, is maintained in a charged condition by a **dynamo** or an **alternator**. The batteries also supply electrical current for the lights, horn, windscreen wipers etc.

**Batteries**

Electrolyte (the acid liquid in batteries) should be checked regularly to ensure that it covers the plates. **Distilled water only** should be used to top it up.

In addition to checking the level of the electrolyte the following regular checks should be made.

- Battery posts clean and free from corrosion.
- Terminals secure and clean.
- Batteries secure in their mountings.
- Filler caps in position with the air vents kept clear.

**Note:** Due to the presence of flammable gas given off in use, naked lights must not be allowed near batteries.

**Ammeter**

This is a gauge mounted on the instrument panel. It indicates the amount of charge current the batteries are receiving from the dynamo/alternator, or if a discharge (negative) situation applies. Whilst the engine is running the ammeter will normally indicate a positive charge.
Dynamo or Alternator

The purpose of the dynamo or alternator is to keep the batteries fully charged to enable all electrical circuits, including lights, and to keep them fully operational.

The mountings should be checked at regular intervals for security and, in addition, the end bearings lubricated in accordance with manufacturer’s recommendations.

No engine should be run with the batteries disconnected as this may damage the dynamo/alternator internal components.

Note: When a power unit is fitted with an alternator:

It is essential that the alternator is disconnected, to avoid damage to internal components, before any electric arc welding is carried out on either the machine or its attachments.

The ignition switch must be in the ON position when the engine is running, and OFF when the engine is stopped, or the batteries disconnected.

Belt drives

Cooling fan, dynamo, alternator, exhaust, water pump and compressor are generally driven from the engine crankshaft pulley by means of one or more belt drives.

These belts require regular attention to ensure serviceability and correct drive tension. Usually adjustment is made by moving one pulley closer to, or further away from, another pulley; or by employing a spring-loaded jockey wheel riding on the belt to limit the amount of slack.

Always refer to the maker’s handbook for the correct belt adjustment.

Multi-belts must always be replaced as a complete set. If more than one belt runs on the same set of pulleys, all must be replaced in any fail.
Power for the operation of the crane and stabilisers is provided by the hydraulic system which is driven from the PTO (Power Take Off) from the lorry engine. When the engine is running, hydraulic oil is pumped from the hydraulic tank circulated and returned via the control valves and filter. When a control valve is opened, all under pressure is fed to the selected hydraulic ram or motor. Relief valves are included in the system to prevent excessive build-up of pressure and to limit the lifting capacity of the lorry loader.
MODULE FOUR – MANAGEMENT OF THE LIFTING OPERATION

(BS7121 Safe use of cranes Part 1)
(BS7121 Safe use of cranes Part 4 Lorry Loaders)

Safe System Work

A safe system of work should be established and this should be followed for every lifting operation whether it be an individual lift or a group of repetitive operations.

The same principles should be applied when lifting operations are carried out at a site or when the crane is a permanent fixture, e.g. in a factory or at a dock.

The safe system of work should include the following

1. Planning of the operation
2. Selection, provision and use of a suitable crane/s and equipment
3. Maintenance, examination and where necessary testing of the crane/s and equipment
4. The provision of properly trained and competent personnel who have been made aware of their relevant responsibilities under the Health and Safety at Work etc. Act 1974
5. Adequate supervision by properly trained and competent personnel having the necessary authority
6. Ensuring that all necessary test certificates and other documents are available
7. Preventing unauthorised movement or use at all times
8. The safety of persons not involved in the lifting operation

Note:

1. It is essential for the safety of the operation to ensure that all personnel can communicate in the same language.
2. The lifting operation should be taken to include any necessary preparation of a site and erection and dismantling of the crane/s
3. The safe system or work should be effectively communicated to all parties concerned.
Employers must ensure, so far as is reasonably practicable, that the systems of work are safe and without risk to health. Systems of work means the way in which the work is organised to be accomplished and includes for example, the layout of the workplace, the order in which jobs are carried out, or any special precautions that have to be taken before carrying out certain hazardous tasks.

For Example:
This regulation will mean that a machine, the manner in which it is operated, and the environment in which it is operated must all be safe and without risk to health.

Section 2 (2) Health and Safety at Work Act 1974

Designing a Safe System of Work (Example)

1. An initial consideration of the work requirements
2. Identify organisational structures (company management)
3. Appoint competent personnel for system of work design
4. Agree document format (company policy)
5. Use a systematic approach to structuring work (simple and efficient method)
6. Set targets (time management)

The next page demonstrates by the aid of a flow chart, one example of establishing a methodical approach to implementing safe system of work.

Example of development stages for a safe system of work
Set objectives.
1) Produce safe system of work
2) Maximise efficiency of lifting operations

Evaluate competency of team
Appoint team members to specific tasks

Crane operations
Study environment.
Identify hazards.
Risk assessment hazards.
Assess personnel competency.
Consult regulations and codes of practice for relevant crane tasks.
establish good and safe working practices according to regulations
and codes of practice.

Install programme
Communicate to all parties concerned.
Reappraise system at regular intervals.
Record all stages.

Codes of practice identified by design team
BS7121 Safe use of Cranes

Control of the lifting operation

To ensure the implementation of the safe system of work, one person should be appointed to have overall control of the lifting operation to act on behalf of the management of the organisation requiring the load to be moved (the employing organisation).

The appointment of the person does not remove any legal responsibility from the management but enables them to use his expertise the better to fulfil their responsibilities.

The person appointed may have other duties and need not be an employee of the employing organisation.

The appointed person should have adequate training and experience to enable these duties to be carried out competently.
Duties of person appointed to control the lifting operation

1. The assessment of the lifting operation to provide such planning, selection of crane/s, lifting gear and equipment, instruction and supervision as is necessary for the task to be undertaken safely.

This should include consultation with other responsible bodies if necessary and ensuring that where different organisations are involved they collaborate as necessary.

2. Ensuring that adequate inspection and maintenance of the equipment has been carried out.

3. Ensuring that there is an effective procedure for reporting defects and incidents and taking any necessary corrective action.

4. Responsibility for the organisation and control of the lifting operation

The appointed person should be given the necessary authority for the performance of all these duties and, in particular, authority to stop the operation whenever he considers that danger is likely to arise if the operation were to continue.

Duties, but not responsibilities, may be delegated to another person where considered appropriate.

Note: As the crane driver is required to be at the controls of the crane when it is handling loads, it would not be appropriate to appoint the driver to be in control of the lifting operation.

For a simple lifting operation, the management of the employing organisation may consider it appropriate to appoint the slinger to be in control.
Section 2

Initiating the hire

Initiating the hire

Telephone → Desk controller, sales rep, incompany hire

Condition of the hire on site

General hire (contract hire)

Company policy
Safe system of work
BS 7121

Management of the lifting operation

a. Planning the operation
b. Control (appointed person)
c. Competent person
d. Risk assessment
e. Site inspection
f. Provide own specialist lifting equipment

Contract lift

Company policy
Safe system of work
BS 7121

Contractor provides a service

a. Method statement
b. Safe system of work
c. Risk assessment
d. Appointed person
e. Competent person
f. Site inspection
g. All equipment and lifting gear

Note: In both conditions above the main contractor must be informed exactly what is happening, as they are solely responsible for the site, and the ground stability on which the appliance is standing.
Not withstanding any advice the crane owner may offer concerning the selection of a particular crane or any other relevant matter, the responsibility for ensuring that the crane is of a suitable type, size and capacity for the task being undertaken and for planning the operation remains with the user organisation.

It is therefore clear, that if an individual or organisation does not have expertise in lifting operations, they should not hire cranes, but should enter into a contract lift.

**Lifting team**

All personnel involved in the lifting team must be trained and competent to carry out their designated tasks.

**Appointed person**

Controls the lifting operation by ensuring that a safe system of work is constantly in practice.

**Slinger**

Selects lifting gear; attaches and detaches slings to loads.

**Signaller**

Directs the movement of the crane

**Crane operator**

Is responsible for operating the crane in accordance with the manufacturer’s instructions and within the safe system of work.

**Note:** For a more detailed explanation, refer to BS 7121 Part 1
Section 3

Planning of the lifting operation

All lifting operations should be planned to ensure that they are carried out safely and that all foreseeable risks have been taken into account.

Planning should be carried out by personnel who have the appropriate expertise and have been appointed for this purpose.

In cases of repetitive or routine operations, this planning may only be necessary in the first instance, with periodic reviews to ensure that no factors changed.

Planning should include consideration of the following:

1. **The load, its characteristics and the method of lifting**, and it may also be necessary to make allowance for any adhesion between the load and its support.

2. The selection of suitable crane/s appropriate to the operation ensuring that adequate clearances are maintained between the load/s and the crane structure.

3. The selection of lifting gear, the weight of which should be taken into account when assessing the load on the crane/s.

4. The position of the crane/s and of the load before, during and after the operation.

5. The site of the operation taking into account proximity hazards, space availability and suitability of the ground or foundations.

6. Any necessary erection and dismantling of the crane/s.

7. The environmental conditions that exist or may occur at the site of the operation, which may necessitate stopping the operation when conditions are unsuitable.

**CONTRACT HIRE**

**BS7121 Part 1**

**User’s duties when using hired cranes**

When a crane is hired out together with a driver by the organisation requiring the load to be moved (the user organisation), the crane owner has a duty to provide a competent driver and a crane that is properly maintained and inspected, thoroughly examined, tested and certified.

The user organisation retains the responsibility for appointing the competent person for those matters for which the appointed person is expressly made responsible and for following the recommendations given in this Part of BS 7121.
MODULE FIVE – CHAINS, SLINGS AND LIFTING GEAR

The majority of accidents associated with cranes and other lifting appliances are caused by faulty slinging (overloading, unbalanced loads, etc.) which results in the load falling or tipping out of control and damage to plant and machinery and to the load.

The crane operator must rely on the slinger or signaller, who should be trained and competent and aware of all possible hazards.

All ropes, chains, slings, etc. must be clearly marked and the safe working load specified. All equipment used in lifting operations must be:

- properly constructed and maintained
- free of any defect or damage likely to affect its strength
- regularly examined
- securely attached to the load
- not be overloaded.

In accordance with BS 7121, lifting operations should be undertaken only by trained and competent persons, authorised to do so.

Thorough Examinations

The Lifting Operations and Lifting Equipment Regulations state lifting equipment should be thoroughly examined before first use and every 12 months or as the company scheme requires. The lifting equipment should be marked with its Safe Working Load (SWL).

Inspections

All lifting equipment should be inspected at a frequency and extent determined by the conditions it is used in. All inspections shall be carried out by competent persons.
Site Investigation (Crane Stability)

Major investigation areas:

1. Site ground stability
2. Available space for operations
3. Proximity hazards
4. Safe access
5. Level operating conditions
6. Reinstatement of area
7. Long term erosion of ground
8. Planning of work
9. External interference
10. Underground movement
11. Pre-built structures
12. Common services
13. Unauthorised excavations
14. Radius of appliance
15. Pre-erection criteria
16. Load bearing areas
17. Possible weather problems
18. Available packing
19. Damage to surface
20. Environmental pollution from appliance
Marking

Every rope, chain, etc. must be clearly marked with its SWL and carry an identity mark, except for ropes and rope slings if this information is available from a table of safe working loads posted on the site.

Overloading

Ropes, chains, etc. must never be overloaded except under test and as authorised by an experienced and competent person.

Preventing damage

The edges and corners of a load should be packed to prevent sharp edges damaging lifting ropes, chain, slings, etc.
Hooks

All hooks used for lifting must be fitted with a safety catch, or should be moused, or so shaped as to prevent the sling eye or load coming off the hook.

[Images of different types of hooks: Open top swivel hook, Moused hook, Hook with spring loaded safety catch, C hook with link]

Slings

Slings must be attached to the lifting appliance correctly by an approved method, either by securing the ring directly onto the hook if size permits, or by use of a suitable shackle, fitted with the crown of the shackle on the hook and the pin fully engaged.

The correct method of slinging will vary with the types of load, the different materials or items lifted. It is essential to see that the load is secure. Care must be taken to see that slings are not damaged, and suspect or defective slings must be discarded.

Dog ropes or tag lines, securely attached to the end of the load, should be used when handling long or large loads, to direct the load into position and prevent it spinning. Tag lines should be as short as possible.
Multiple slings (two-legged, three-legged, etc.) must be connected by a ring or shackle and the load properly distributed so that no leg is overloaded.

The angles between sling legs should be less than 90°. At angles greater than this, the strain on each leg increases very rapidly to a point where they may break because of overloading.

2 leg sling

With a simple two-legged parallel sling, the load in each leg is half the total load. As the angle between sling legs increases, the load in each sling leg increases to approximately double at an angle of 120°. With a sling angle of 90°, the SWL of sling should be at least 43% greater than the nominal weight of the load.
Angle between slings

How load in each sling leg increases as angle between sling legs is increased (Refer to manufacturers SWL tables)

**Repaired ropes, chains, etc.**

Any chain sling etc. which has been altered or repaired by welding must be examined and retested.

Nylon sling used to lift decking

Cradle sling

**Note:** Care must be taken to prevent slings sliding in towards each other.

Double wrap sling grips and load and helps prevent it from slipping sideways
Choker sling

Knotted ropes, chains or slings and those which have been shortened or joined by nuts and bolts through the links must not be used.

**Unbalanced Loads**

Particular care should be taken to see that the centre of gravity (point of balance) is in the approximate centre of the load, with the line of lift passing through it. An unbalanced load may result in far greater strain on one leg of a sling and cause it to break or the load to swing out of control.
Construction of Slings

Slings are available in a wide range of styles made from many different materials to suit particular purposes.

Chain slings are made from various grades of steel. They can stretch and the links may become distorted and fracture if subject to excess stress. Chain slings should only be shortened by using the correct shortening clutches. Chains must not be knotted or joined by nuts and bolts. Hooks must be of the ‘C’ type of fitted with a safety latch.

Wire rope slings are made from drawn steel wire. Each leg of the sling will have an eye formed at either end. Wire rope slings may be damaged when ‘kinked’ sharply or if put under stress when twisted. Steel wire rope may be damaged by corrosion through poor care and storage.

Wire rope slings must not be made up on site using bulldog grips.

Wire ropes and slings are of many different types of construction, each having properties related to usage. It is therefore important, when ordering an item, to specify the use to which it is to be put.

Kinked Wire Rope

Fire rope slings might be made from natural fibres (manila, sisal, hemp) or man-made fibres. Only purpose made slings, clearly marked with SWL, should be used on site. Fibre rope slings are more easily cut or damaged, and periodic checks should be made to see that they are serviceable. Natural fibre ropes should not be used for making up slings on site.

Man-made fibre ropes do not rot but can be affected by some chemicals. Care should be taken to avoid contamination with alkalis or acids. Suspect or contaminated man-made fibre ropes and slings must not be used.

Flat lifting slings are used where special lifting operations are required and afford a certain amount of protection to the load.
Flat and round slings may be made of woven artificial materials (such as nylon, polyester, polypropylene and terylene) with ‘eyes’ sewn in, or plastic coated wire mesh, or formed by a series of plaited wire ropes between two end fittings. These might also be covered with a plastic material.

All woven materials are prone to damage and should be regularly checked for serviceability. Slings should be protected from sharp edges and placed evenly about the load, not twisted. Care must be taken to see that the SWL is not reduced by having a sling angle greater than 90°.

**Shackles**

Two types of shackle are commonly used in lifting operations. They are the Bow type shackle and Dee type shackle, both of which are available with threaded or plain pins.

**Shackles**

Bow shackles should be used when more than one attachment is to be made, or to allow movement on the plane of the shackles. Dee shackles are usually joining shackles.

Overloading, eccentric shackle loads, and misuse can distort shackles; they should be checked regularly for shape and wear.
Eyebolts

Eyebolts are made to screw into or through a load and may be plain (dynamo) or have collars. The plain eyebolt is good only for vertical loading. Even when a collared eyebolt is used, the safe working load is reduced with angular loading.

Collared eyebolts with links may be used providing the angle of load to the axis of eyebolt thread does not exceed 15 degrees. Over 15 degrees, safe working loads must be derated in accordance with BS 4278: Specification for eyebolts for lifting purposes.

When installed, the collar must be at right angles to the hole, should be in full contact with the surface, and be properly tightened.

The load should always be applied in the plane of the eye, never in the other direction. If necessary, washer or shims should be inserted below the collar to ensure that the eye is correctly aligned when tight.

Extreme care must be taken to ensure that metric threaded eyebolts are not inserted in imperial threaded holes. Although these might appear to match, it is an interference fit only, and the mechanical strength may be almost nothing.

- Ensure that the crane hook is positioned above the loads centre of gravity
- Ensure that the load is free before lifting and that all legs have a direct load
- Ensure that ‘snatch’ loading does NOT take place
- Ensure that NO ONE rides on a load which has been sling and is being lifted
- Use tag lines to stabilise long or large loads
- Ensure that the load is landed onto battens to prevent any damage to slings, and to assist their easy removal
- Ensure that no one is under a load which is being lifted
Chains, rope slings and lifting gear safety checklist

Prior to commencement of work

- Ensure that an adequately trained, competent person is available to take charge of the operation.
- Ensure that a current thorough examination has been carried out for each chain rope sling and lifting gear, or wire rope.
- Ensure inspections are carried out by competent persons.
- Identify and ensure that all slings are clearly marked with the safe working load.
- Ensure that correct and up to date copies of the Sling Chart and Safe Working Load Tables are available, when using multi-leg slings.
- Ensure that only the correct crane signals will be used.
- Ensure that a suitable rack is available for storing slings, etc. when they are not in use. Wire ropes should be stored in a dry atmosphere.
- Ensure that the weights of loads to be lifted are known in advance, and that load weights are clearly marked.
- Find out, in advance, the type of eyebolt fitted to the load, to ensure that the correct equipment, shackles, hooks and lifting beams are available on site.

Whilst work is in progress

- Ensure that copies of the Sling Chart and Safe Working Tables are being used, where necessary.
- Ensure that the correct techniques are being used for the attachment to the appliance and slinging.
- Ensure, wherever possible, that the angles of slings are no more than 90 degrees.
- Ensure that regular inspections of the equipment are carried out.
- Stop persons ‘hooking back’ onto the legs of slings.
- Limit the use of endless wire rope slings.
- Ensure that wire rope slings are protected from sharp corners of loads by suitable packings.
- Ensure that slingers understand that ‘doubling up’ slings does NOT ‘double up’ the safe working load; avoid this practice if possible.
- Prevent strops, slings and ropes from being dragged along the ground.
- Ensure that hooks used for lifting are NOT also carrying unused slings.
- Ensure that any unused leg of a multi-sling is correctly hooked back. The correct sling only should be used.
- Ensure that unfit slings are removed from the site, and a responsible person informed.
Other Attachments

A variety of other attachments may be used with a lorry loader. This enables it to be utilised in many other activities from handling specialised loads (brick stacks) to clearing up excavated material from streetworks without the need for further equipment.

Clamshell grab

Brick grab
MODULE SIX – SLINGER SIGNALLER

Requirements for Slinger and Signaller

The slinger when required should:

- Be medically fit with particular regard to eyesight, hearing and reflexes
- Be agile and have the physique to enable him to handle lifting equipment and tackle.
- Have been trained in the general principles of slinging and be able to establish weight and judge distance, heights and clearances.
- Be capable of selecting tackle and lifting gear suitable for the loads to be lifted.
- To be able to give clear and precise signals
- Be easily identifiable to the loader driver (by wearing ‘high visibility’ clothing, or other means)
- The signaller should always stand in a secure position where he can see the load and the operator
- The operator should only take instructions and signals from one person except the emergency stop signal which should be accepted from anyone

Slinger and Signaller Safety Checklist

Inspect to ensure that:

- Slings and other chains are not shortened by tying knots in them or by wrapping them round the crane hook
- Chains are not joined by means of bolts or wire
- Wire ropes are not sharply bent at any point
- Wire ropes are never in contact with hot metal or acids that will damage them
- Wire ropes are never used singly when hooked by a spliced eye. The cable is liable to untwist, allowing the splices to open and slip
- The proper pin is used in all shackles
- All end links, rings or shackles ride freely upon any hook on which they are used.

Reject:

- any slings of insufficient length which create a wide angle between legs
- extra long slings which seriously reduce the headroom
- any wire ropes that have become damaged or rusty
When loading
Slings should be protected from sharp edged loads by packing soft wood or other suitable material between the load and the sling. Bricks are not suitable packaging material.

Ensure the load is evenly distributed to avoid excessive stress on one side of the sling.

DO NOT let any load rest on a wire rope; it may crush the strands and render the rope unsafe.

Before lifting
Ensure that the load is securely slung.

Always see that the crane hook is centrally placed over the load to prevent it swinging when the load is being raised, and that the load is in balance.

Take your hands away from any chains or ropes before the crane takes the load.

Check that the load is free for lifting.

Give warning to all persons to keep clear of the load.

During lifting
Use only an approved signalling system.

Always lift slightly, then pause to see that the load is safe and balanced.

Signals must be given by the person responsible for the lift, and nobody else.

Hooks and slings not in use should not be carried on the carrying hook, since they may cause the sling carrying the load to ride on the nose of the hook.

Never ride on a crane load, or allow any other person to do so.

Whenever possible, keep the load clear of people.

Chains, slings, hooks or loads should never be dragged along the ground.

When unloading
Make sure there is a firm foundation for the load, and make provision for the removal of all slings.

Stack material securely and provide a safe access for subsequent removal.
MODULE SEVEN – OPERATION

Lorry Loader Operator

Lorry loader operators on construction sites should:

Be medically fit with particular regard to eyesight, hearing and reflexes.

Have been trained to operate the particular machine and be able to judge distance, heights and clearances.

Be able to understand and respond to recognised crane signals.

Be capable of identifying and selecting suitable lifting gear.

Have sufficient knowledge of the machine to carry out routine maintenance pre-start checks and operator inspections.

Siting and Stability of Lorry Loaders

Particular attention should be paid to the following:

1. Application of the hand brake

2. Inspection of site for support conditions and proximity hazards

Siting

Pressures upon the ground are likely to occur under the stabiliser feet and it is here that the use of packing to spread the load under the feet should be considered when working on soft ground.

Particular care should be taken to ensure that tyres and stabiliser feet are not positioned close to excavations, manhole covers etc.

The machine must always stand on firm level ground. Working on sloping ground should be avoided.

Always lock stabiliser extensions ensuring maximum spread of stabilisers.

Special reinforcement may be required if standing stabilisers on footpaths where there is a danger to or from underground services such as gas mains or electricity cables which could result in injury or death.
Load Rating Plate

Lorry loaders must be fitted with a load rating plate that details the SWL (safe working load) at differing radii. It will also show the derating for use with other attachments such as grabs or magnets.

The load rating plate should be clearly legible.

**Proximity hazards**

Be aware to the presence of proximity hazards such as overhead electric lines or conductors, nearby structures or cranes, public access areas including highways, railways and rivers. Loaders touching or even coming near to overhead electric cables can kill the lorry loader driver or other persons nearby. A lorry load should not be closer to a live cable than the maximum radius plus 6 metres. Under no circumstances should a lorry loader travel under live overhead cables with the jib raised or extended. Regular travelling under cables should be by a route marked with goal posts. If in any doubt contact the District Engineer of the local electricity or generating board. If contact is made with overhead cables warn other persons to keep well away and not to touch crane, load or slings.
Overhead electric lines

6m

Maximum radius

Incorrect

Safety clearance goalposts

Correct

Travelling under electric lines and cables
Winch

The addition of a winch used with lorry loaders are almost invariably hydraulically powered. It enables certain hydraulic safety features to be applied to the winch motor.

All lifting must be done vertical as non-vertical lifting will impose side loading on the boom.

Never drag a load to the machine as this will increase stabiliser loadings.

It is essential to use only ropes of the correct size, type and construction as specified by the winch manufacturer.

The jib should be raised to its maximum working radius and the hook lowered to ground level to ensure that at least two full turns of rope remain on the winch drum.

Rope handling and installation of a new rope can lead to damage by careless handling.

If at any time the rope on the drum becomes slack or crossed or trapped on the winch no further lifting should be undertaken until the rope has been paid out and re-spoiled correctly and examined for possible damage by a competent person.

Where rope guards are fitted it is essential that these remain in their correct positions and are removed only for the purposes of maintenance, inspection or adjustment.

When carrying out inspections and examinations it is necessary to examine the whole length of rope.

Particular attention to the rope that has been running or stationary over drums, sheaves and any other areas likely to sustain damage.

Dressing of ropes should be at regular intervals and before the rope shows signs of corrosion or dryness.

Lift do not drag
Note: The signaller should stand in a secure position, where they can see the load and can be seen clearly by the crane driver, and they should face the crane driver if possible. Each signal should be distinct and clear.

Keeping of records

The following reports must be kept at the site if the work is intended to last more than six weeks, otherwise at the main office of the contractor, and must be open to inspection by an HSE Inspector and copies supplied to him or her on request.

As an alternative, records or tests may be kept on an electronic database, provided that the following safeguards are incorporated into the system:

The records must be capable of being reproduced as a written copy when required and must be secure against loss or unauthorised interference.

The information must be authenticated only by a person who is in the position to declare that the information is correct.
Reports of thorough examinations should be kept:

1 in the case of lifting equipment put into use for the first time until he ceases to use it

2 in the case of lifting accessories put into use for the first time 2 years after report was made

3 where the safety of lifting equipment depends on installation conditions until he ceases to use the equipment at the place it was installed or assembled

4 in the case of lifting equipment be thoroughly examined every 12 months or as company scheme until the next thorough examination or 2 years

5 every inspection report shall be kept until the next inspection.
MODULE NINE – MAINTENANCE

Maintenance Programme

All machines are expensive. If users are to obtain a profitable return on plant investment, it is essential that the machine is maintained fully and economically.

An efficient maintenance programme makes use of all available resources. These include the operator, the site mechanic, depot mechanic and various workshop facilities.

The object will be to:

- maintain maximum output from the machines
- obtain maximum working life between overhauls
- as far as possible prevent breakdowns on site

Generally, maintenance can be divided into two categories:

- planned
- preventative

An effective maintenance programme should be a combination of the two.

Planned maintenance

This is an overall plan designed to ensure that the machines are fully maintained with the minimum number of staff. Aim for an even work load on the maintenance department.

The plan should take into consideration:

- company policy
- length of time the machine will be retained
- type of machine
- type of work for which it will be used
- expected hours the machine will work by day, week, month etc.
Previous experience, and knowledge obtained from records or other sources or
different machine characteristics, can assist greatly in the formulation of such a
plan. Regular technical inspections are necessary to allow amendments to the
plan as needs arise, also to ensure that operator maintenance is being carried
out efficiently. The reports from these should indicate:

⇒ the location of the plant
⇒ the lubrication and cleanliness state of the machine
⇒ the mechanical state of the machine. Show repairs that require immediate
  action; repairs that should be effected in the very near future; and those that
  can safely be carried forward to a more convenient date
⇒ the total machine hours

Records of field servicing, adjustments and running repairs will assist in
amending and updating the overall maintenance plan. The plan must be
sufficiently flexible to allow for unforeseen circumstances, such as machine
damaged in transit etc.

Preventative maintenance

This is a series of checks and inspections performed at regular intervals. They
are designed to extend the working life of the machine, and prevent premature
and unexpected failure of components.

The inspection will be of the whole machine to assess general wear and condition
of parts, and allow ordering of any replacements. It will also allow the
arrangement of machine time so that repairs or replacements can be effected
with the least interruption to the work schedule.

The operator’s contribution to preventative maintenance is of prime importance. It
is essential that adequate time and facilities are given. Supplies of materials (oils,
greases etc.) should be always to hand, with suitable provision for storing them.

All maintenance should be carried out in accordance with the machine
manufacturer’s schedule or as dictated by company policy.
SUMMARY OF REGULATIONS

Provision and Use of Work Equipment Regulations 1998

Summary of Regulations, Codes of Practice (L22) and Guidance Notes

Regulation

4(1) Work equipment must be suitable for the purpose for which it is used.

4(2) When selecting equipment the employer shall have regard for the health and safety of persons affected by its use and the risks posed.

5 All work equipment shall be maintained in an efficient state, good working order and in good repair and if the machinery has a maintenance log, it shall be kept up to date.

6 Where a risk assessment has identified a significant risk to the operator or other workers from the work equipment, a suitable inspection should be carried out, by a competent person, at a frequency determined by the type of equipment, how it is used and the conditions it is used in.
   A record of the results of the inspection shall be kept until the next inspection.
   No work equipment shall leave an employers undertaking or be obtained from another undertaking unless accompanied by a record of the last inspection to be carried out.

7 The use of the work equipment is restricted to authorised personnel and that repairs, modifications and maintenance are only carried out by trained, authorised personnel.

8 The employer shall ensure that all persons who use work equipment have adequate health and safety information and where appropriate written instructions.
   The employer shall also ensure that supervisors and managers of work equipment have adequate health and safety information and where appropriate written instructions.

9 The employer shall ensure that persons who use work equipment and persons who supervise and manage the use of work equipment have received adequate training in its use, methods that may be adapted, risks in its use and precautions to be taken.

10 This regulation deals with conformity to European community requirements in so much as the machinery meets certain health and safety requirements and is CE marked.
Regulation 11 deals with dangerous parts of machinery and the fixing of guards, interlocks etc. It also details the need for information, instruction and training where maintenance or adjustments may need to be carried out with the machinery running.

This regulation deals with specified hazards and the need to prevent them. Regulation 12(3) states "any article or substance falling or being ejected from work equipment" *(Loads or parts of loads falling)*

This regulation deals with protection of employees from very hot or cold surfaces. *(Exhaust pipes, hot engine etc.)*

These regulations deal with control systems. Start controls, stop controls, emergency stop controls and the marking and signing of controls. All controls should be clearly marked to show their function.

This regulation deals with stability and states that work equipment must always be used within its limits of stability.

This regulation deals with suitable and sufficient lighting for operation of work equipment.

This regulation deals with maintenance operations and the need to shut down the machine or if it needs to be running the precautions that need to be taken to ensure the health and safety of the employees.

These regulations deal with markings and warnings with regard to health and safety. *(Crush zones, Reversing horns, etc.)*

These regulations deal with employees carried on mobile work equipment. The equipment must be suitable for carrying persons and be safe. It needs properly constructed seats and must be driven at safe speeds. If after carrying out a risk assessment there is a danger from falling objects then a falling object protective structure (FOPS) is required and similarly if there is a risk of overturn of more than 90 degrees then a roll over protective structure (ROPS) is required. To prevent injury from sudden movements etc. a suitable restraining system should be fitted, this will generally be a seat belt.

This regulation deals exclusively with overturning of fork lift trucks and states that if the vertical mast is strong enough to prevent rollover of more than 90 degrees then only suitable restraining systems are required (e.g. seat belts) if the mast is not of sufficient strength or if the machine does not have a vertical mast then a ROPS roll over protective structure and a restraining system must be provided.

This regulation deals with the drivers field of vision and requires adequate devices to improve the drivers field of vision, e.g. plane, angled and curved mirrors, fresnel lens, radar and cctv. It also deals with emergency braking, the fitting of lights for work in the dark and the fitting of fire extinguishers in mobile plant where escape cannot easily be achieved.
Summary of Regulations, Code of Practice (L113) and Guidance Notes

**Regulation 3** deals with ensuring that the work equipment is so constructed or adapted as to be suitable for the purpose for which it is intended to used or be provided. It also states that the employer shall have regard to the working conditions and risks to the health and safety of persons by the use of the work equipment. This takes in the designing of the machine to avoid operator strains and stresses, the safety of materials used in the manufacturing, safe means of access and egress with due regard to protection against slips, trips and falls. It identifies the need for operator protection from the environment and the need for appropriate devices to measure wind speeds, where lifting equipment or its load may be affected by high winds.

**Regulation 4** deals with strength and stability. It requires that lifting equipment is of adequate strength and stability for each load and that any part of the load or any equipment used for lifting the load is of adequate strength and stability. Where stability depends on the use of stabilisers the equipment should not be used unless they are in place and operating effectively. Where equipment is dismantled and reassembled it should be ensured that the equipment is stable in all conditions. Particular care should be taken of the ground and other surfaces on which the equipment might be used. Mobile equipment with pneumatic tyres should not be used to lift loads unless the tyres are inflated to the correct pressures, suitable means to check the pressures must be provided.

Where there is a significant risk of overturning and/or overloading from the use of the equipment it should be provided with appropriate devices such as rated capacity indicators or rated capacity limiters.

Timber pallets are examples of items that are part of the load and such should be of adequate strength for the load they are to support.

**Regulation 5** deals with lifting equipment used for lifting persons.

It states that the equipment must be such that it prevents a person being crushed, trapped or struck or falling from the carrier. It must have suitable devices to prevent the risk of a carrier falling and that if any person is trapped in a carrier they are not exposed to danger and can be freed.

The guidance states that people should never be lifted on the fork arms or a pallet, but that a properly maintained, purpose built working platform with guard rails and toe boards must be provided and it should be fixed to the machine so as to prevent it being displaced or tipping unduly. There should be guards or screens to prevent occupants from reaching any dangerous parts of the machinery and they should be protected from overhead hazards. The floor of the carrier should be non slip.
Where persons could become stranded by a malfunction of the machine they must not be exposed to danger and a reliable means of rescue must be available.

Any equipment used for lifting persons should have a safety coefficient of 2:1 as to the strength of the equipment when used for lifting. e.g. derate the equipment by half its safe lifting capacity when lifting persons.

**Regulation 6** deals with positioning and installation and states that lifting equipment shall be positioned so as to minimise the need to lift loads over people, and to minimise the risk of crushing people in any configuration.

If lifting suspended loads, then measures must be taken to prevent the freely suspended load from moving in an uncontrolled manner and ensure that all hooks and other similar devices are of the type that reduces the risk of the load becoming displaced.

**Regulation 7** deals with the marking of lifting equipment and requires all lifting equipment (machinery and accessories) to be clearly marked to indicate their safe working loads.

Where the safe working load depends on the configuration of the machine, the machine shall be clearly marked to indicate the safe working load for each configuration or the information which indicates the safe working loads for each configuration shall be kept with the machine. All accessories for lifting shall be clearly marked so that it is possible to identify the characteristics necessary for their safe use.

Lifting equipment for lifting persons shall be appropriately and clearly marked to this effect and clearly show the maximum number of persons that can be carried and lifting equipment that is not designed for lifting persons but could be used in error for lifting persons shall be clearly marked to indicate that it is not designed for lifting persons.

All work equipment must be clearly marked with any appropriate markings for reasons of health and safety.

**Regulation 8** deals with the organisation of lifting operations and requires that all lifting operations (any operation concerned with the lifting or lowering of a load) are planned by a competent person, that they are appropriately supervised and carried out in a safe manner.

British Standard BS7121 (Safe Use Of Cranes) sets out the procedures that should be followed and adherence to this standard will ensure that you are complying with Regulation 8 of LOLER.

- An example of the requirements of a simple lift plan are;
- Assess the weight of the load
- Select the correct lifting accessories with regard to the size, shape and weight of the load and the environment in which it will be used
- Check the anticipated route of the load
- Select and check the landing area
- Fit the lifting accessories (chains, slings etc.) in a safe and approved manner
• Carry out the lift, with a trial lift to check centre of gravity, confirm safe attachment and attach tag lines if necessary
• Land the load, on bearers etc. if necessary, and remove slings etc.

Some other factors to take into account that are mentioned in the guidance are:

Plan the lifting operation so as not to lift loads over areas occupied by persons or establish a safe system of work if this is not practicable.

Take adequate precautions where it is necessary to leave loads suspended.

Where the operator cannot see the load during the entire lifting operation ensure that a responsible person has appropriate means of communication to guide the operator.

All lifting accessories should be compatible with the load, only shortened in an approved manner, adequately and safely secured to the load and ensure that the lifting equipment is not operated unless the person attaching the load has given their authorisation to do so or authorisation has been given by some other authorised person.

Lifting operations should be halted when meteorological conditions deteriorate to the point when it could affect the integrity of the lifting equipment or endanger persons. e.g. high winds, sleet, snow etc.

Only use lifting equipment where there is sufficient headroom.

Lifting equipment should not be used in a manner likely to cause it to overturn, inadvertently move or slip and loads should not be dragged if it is likely to cause damage or overload the lifting equipment.

Suitable precautions should be taken to minimise the risks from proximity hazards.

Where appropriate the safe working load of lifting equipment should be reduced to take into account the environment or mode in which it is being used (this is usually referred to as derating).

Where lifting equipment primarily designed to lift loads is being used to lift persons, the control position of the lifting equipment shall be manned at all times and persons being lifted shall have a reliable means of communication with the equipment operator or other responsible person.

No load greater than the safe working load shall be lifted except for the purpose of testing when a competent person requires it. Employees shall have appropriate instruction and training so that they are able to ensure that lifting equipment is safe to use (Pre use checks).

All lifting accessories shall be stored in conditions that do not lead to damage or deterioration.
Regulation 9 deals with thorough examination and inspection. All lifting equipment shall be thoroughly examined for any defect before it is put into service for the first time unless the equipment has not been used before and an EC declaration of conformity has been received that was made not more than 12 months before or if the equipment has been obtained from another undertaking that it was accompanied by physical evidence that the last thorough examination required by this regulation had been carried out.

Where the safety of lifting equipment relies upon its installation conditions it shall be thoroughly examined before being put into service for the first time and after assembly on a new site or in a new location.

All lifting equipment and accessories for lifting persons shall be thoroughly examined at least every 6 months.

All other lifting equipment shall be thoroughly examined at least every 12 months.

If a company draws up an examination scheme the intervals between thorough examinations shall be determined by that scheme and the definitive timings above will not apply. The scheme should take account of the condition of the machine, the environment in which it is being used and the number of lifting operations and types and weights of loads being lifted.

All lifting equipment shall be thoroughly examined each time exceptional circumstances that are liable to jeopardise the safety of the lifting equipment have occurred irrespective of any of the above.

All equipment leaving a persons undertaking or being obtained from another persons undertaking shall be accompanied by physical evidence that the last thorough examination required by these Regulations has been carried out.

Where equipment is already in use a thorough examination as required by these regulations shall be made before the next examination would have been required under the old Regulations.

Testing will be carried out if the competent person decides it is necessary and the nature of the test and appropriate method of carrying out the test will also be determined by the competent person.

Where a risk assessment has identified a significant risk to the operator or other workers from the use of the lifting equipment then a suitable inspection should be carried out by a competent person at a frequency and extent dependent upon the potential risk from the lifting equipment.

Whereever lifting equipment or accessories are used they should be accompanied by physical evidence that they have been thoroughly examined as required by these Regulations.

Regulation 10 deals with reports and defects.

Any person making a thorough examination for an employer shall notify the employer immediately of any defect which in their opinion is or could become a danger to persons. As soon as practicable a report of the thorough examination in writing, authenticated by or for him/her by signature or equally secure means, containing the information required by Schedule 1 (see below) of the Regulations,
shall be given to the employer and any person from whom the equipment has been hired or leased.

Where in their opinion there is a defect involving existing or imminent risk of serious personal injury they shall send a copy of the report as soon as practicable to the relevant enforcing authority.

Where defects have been identified the employer shall ensure that the equipment is not used until the defects have been rectified.

Information required in a report under Schedule 1.

- Name and address of 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 the date of manufacture.
- The date of the last thorough examination.
- The safe working load of the equipment or where the safe working load is dependent on configuration, the safe working load for the configuration at which the equipment was last thoroughly examined.
- If it is the first thorough examination after installation or assembly, that it such an examination and that it has been installed/ assembled correctly and would be safe to operate.
- Whether it is an examination within:
  - A 6 month interval under Regulation 9(3)(a)(i).
  - A 12 month interval under Regulation 9(3)(a)(ii).
  - In accordance with an examination scheme under Regulation 9(3)(a)(iii).
  - After the occurrence of exceptional circumstances under Regulation 9(3)(a)(iv) and if such be the case that the lifting equipment is safe to operate.
- 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 but could become a danger to persons:
  - The time by which it could become such a danger.
  - Particulars of any repair or renewal required to remedy it.
- The latest date by which the next thorough examination must be carried out.
- Where the thorough examination included any 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/her employee.
- The name and address of the person signing or authenticating the report on behalf of the author.
- The date of the report.