



**hr training
& development**



SLINGER / SIGNALLER STUDY GUIDE

Revised: January 2015

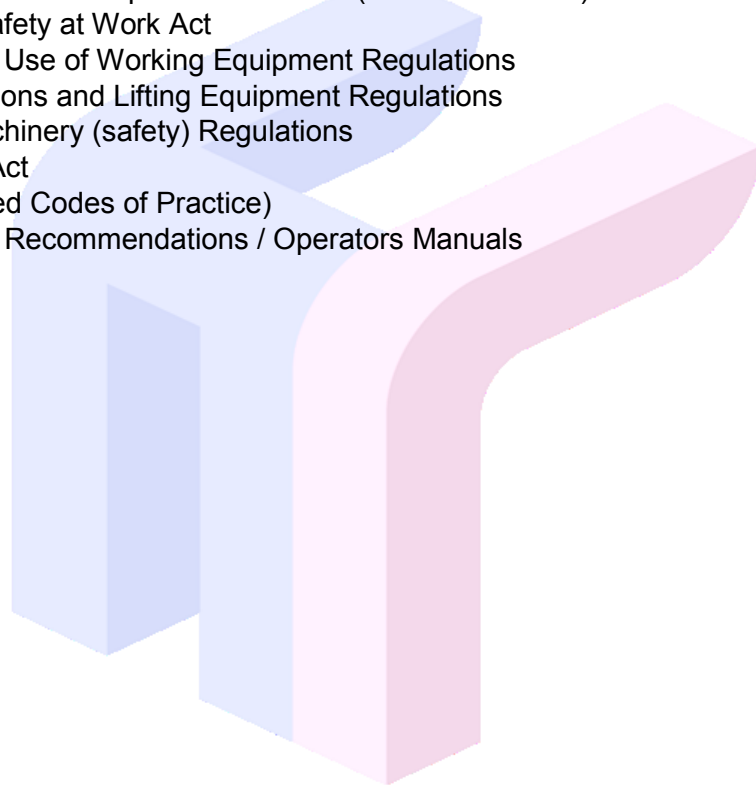
Note

This publication is designed to be used as additional course study only. It should not be deemed, used or substituted for the need for suitable and adequate training.

Any recommendations or information contained in these additional study notes, or given by HR Training and Development Ltd was believed to be accurate and no liability or responsibility for negligence will be accepted by the company.

Attention should be drawn to other available sources of information relevant for additional study:

- Health and Safety Executive for information on health and safety at work with free information and publications (www.hse.gov.uk)
- Construction Plant Competence Scheme (www.citb.co.uk)
- Health and Safety at Work Act
- Provision and Use of Working Equipment Regulations
- Lifting Operations and Lifting Equipment Regulations
- Supply of Machinery (safety) Regulations
- Road Traffic Act
- HSE (Approved Codes of Practice)
- Manufactures Recommendations / Operators Manuals



SLINGER / SIGNALLER - INTRODUCTION

The role of a Slinger/ Signaller on site can both be a physical and mentally demanding role, The slinger/signaller must have both the practical and theoretical knowledge to be able to carry out the lifting activities both safely and efficiently. The duties of a slinger/signaller can vary depending on the type of lifting equipment being used.

Roles and Responsibilities

Appointed Person

The competent person appointed to have overall control of all lifting operations on site. His/ Her responsibilities will include:

- The overall planning, reviewing and updating of the Lifting Operations Plan (lift plan).
- The production of risk assessments/ method statements in regards to the lifting operations.
- Responsibility for the organization and control of the lifting operations.
- Ensuring that appointments to the crane team are made, and leading that team.
- Ensuring that adequate examination, inspection and maintenance is carried out.
- Ensuring that the certification for all Crane Operators and Slinger/Signaller is valid.

Crane Supervisor

Each lifting operation must be properly supervised to ensure that Method Statements are being followed and the operation is being carried out safely. The person carrying out this supervision will be the Crane Supervisor.

Slinger Signaller

The Slinger Signaller is the person that is responsible for attaching and detaching the load to and from the lifting equipment, for the correct use of lifting accessories and equipment in accordance with the planning of the operation and for initiating and directing the safe movement of the lifting equipment and load.

Crane Operator

This person is responsible for the setting up and operating of the crane to given instruction.

Definitions and Terminology Associated with Lifting Operations

Lifting Equipment

Work equipment for lifting or lowering loads and include its attachments for anchoring, fixing and supporting it.

- | | |
|-----------------|---------------------|
| • Tower cranes | Excavators |
| • Mobile cranes | Crawler cranes |
| • Lorry loaders | Telescopic Handlers |
| • Beam hoists | Forklift Trucks |

Mobile crane



Beam hoist



Lorry loader



Excavator



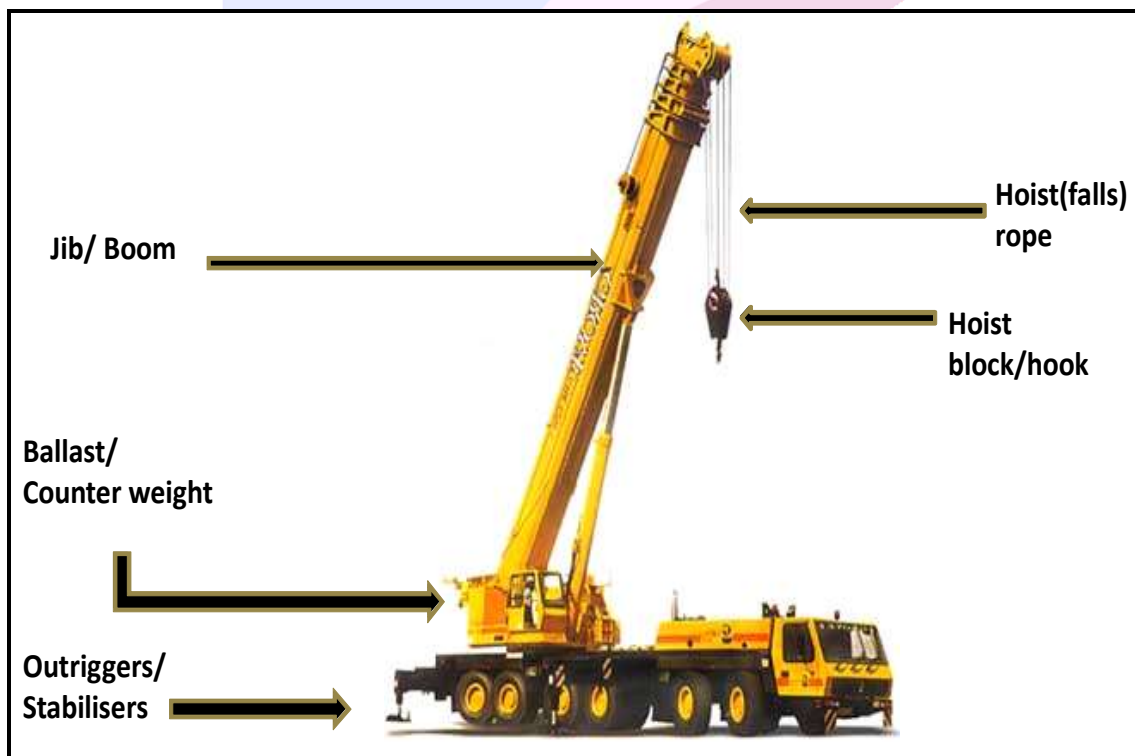
Telescopic handler



Crawler Crane



Crane components



TERMINOLOGY

Radius

The radius for lifting is usually measured from the centre of rotation or slew ring of the crane (horizontally) to the vertical line of the hook block.

Counterweight/Ballast

The weight attached to the rear of the crane to keep the crane in balance.

Lifting/Duties chart

A range of information that is supplied with the crane by the manufacturer that gives different lifting capacities at various radius and configurations.

Lifting Capacity

This is determined by the manufacturer and is the maximum lifting capacity of the crane for a particular radius/ configuration. Lifting and duty charts must be referred to by the operator.

Automatic safe load indicator

This is an automatic device which sounds an alarm when the cranes safe working load is approached or exceeded. The slinger/signaller should check with the lifting equipment operator that the alarm has been activated before work commences.

Hoist (Falls) Rope

This is the number of times the hoist rope runs between the hook block and the jib head. The number of falls of rope can affect the lifting capacity, increasing the falls can increase the lifting capacity for a particular configuration and decreasing the number of falls can reduce the lifting capacity. Hoist speed is also affected when changing the number of falls, reducing falls will increase hoist speed as increasing falls will reduce the speed of the hoist block.

Hook (Hoist) Block

This runs on a pulley and is suspended between the falls of rope.

Stability

Mobile Cranes - When cranes are set up and loading they will inevitably apply pressure to the ground; Cranes can be fitted with outriggers or stabilizers to enhance stability and to significantly increase lifting duties. Pressure caused by the dead weight of a crane with outriggers or stabilizers plus any suspended load are transmitted to the ground beneath the crane through the outrigger / stabilizers.

This pressure can be reduced by placing suitable packing material to create a greater surface area and enhance the stability of the crane. If ground pressure is a problem then alternatively a reduction in crane size should be considered.

Crawler Cranes - The parts of the crawler crane that apply loading pressure to the ground are through the track base of the crane, this can be reduced by increasing the track surface area.

Tower Crane - Have extendable structural members to increase the base dimensions for greater stability.

Fly Jib / Extensions

These are auxiliary attachments that are fitted at the end of the crane jib to gain extra height/ reach. It is important that manufacturer's procedures are followed precisely when fitting these as to avoid accidents, incidents and damage.

Contract Lift

Crane Company plans and supervises the lifting operation.

Standard Crane Hire

Crane and operator work to customer's instruction via a lift plan.

Safe Working Load (SWL)

The SWL is the maximum load that the accessory is allowed to lift in certain configurations. Most polyester webbing slings are coloured and have black lines on them that may indicate the SWL of the accessory. Always refer to the manufacturer's literature for colour coding information. The SWL on multi leg slings only applies when both legs are equally loaded and within an included angle of 90°.

Centre of Gravity (C of G)

This is the point that the load is in balance, this should be determined prior to lifting and a test / trial lift must be carried out to confirm the C of G and ensure the load is equally supported; secure and all lifting accessories are attached correctly.

Lifting Accessories

The following sling configurations are available:

- Single
- Two legs
- Three legs
- Four legs
- Endless

They are normally one of three types; Chain, Steel Wire Rope, and Fibre (natural or artificial).

Chain Slings

Chain slings are generally the most versatile type of sling, as well as being the most robust. General purpose chain slings usually have one, two, three or four legs.



Chain Sling Advantages

- Able to withstand rougher handling
- More flexible when not under load tension
- Will grip a load more firmly
- Not as easily damaged by sharp corners and edges
- Resistant to abrasion

Swivel hook

Swivel hook are used to prevent any twisting of the lifting accessories and are very useful when moving long loads with a machine with a short radius, the signaller can twist the load away from the machine stopping the load contacting the machine.



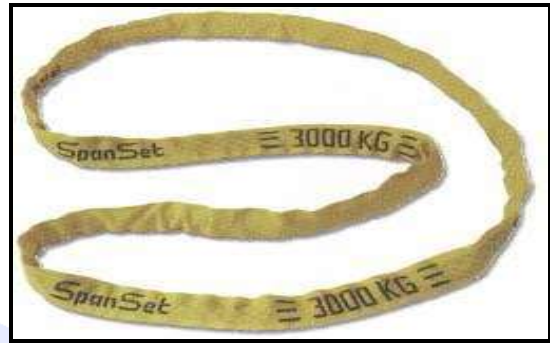
Shortening Clutches

Are only available on chain slings and enable the shortening of one leg per shortening clutch on a multi leg chain sling to adjust to the load to be lifted.



Round and Flat Web Sling

Round and flat web slings are used for easily damaged or delicate loads and for their lightness and ease of handling. They are susceptible to damage and should be protected from sharp edges with suitable packing.



Round and flat web sling disadvantages are:

- More vulnerable to cuts and abrasion than chains and steel wire rope.
- More liable to wear and mechanical damage.
- May be weakened to some degree by damp, chemicals, heat etc.

Steel Wire Rope

SWR slings are strong general purpose accessories available in a range of capacities i.e. safe working load.



Advantages of steel wire rope are:

- Very little stretch when subjected to max SWL.
- Can be supplied as single, multi leg.
- Can be fitted with a range of terminal endings (hooks, shackles etc).

End Fittings

The end fittings on chain slings will generally be either sling hooks fitted with safety catches, or C hooks. Both of these are designed to minimise the risk of the load slipping out of the hook. Special purpose fittings are available for lifting drums, pipes, cases, etc.

Hook With Safety Catch



'C' Hook



Shackles

Shackles must always be used on lifting hooks if more than one sling is to be connected to it to avoid the overcrowding of the hook bowl.

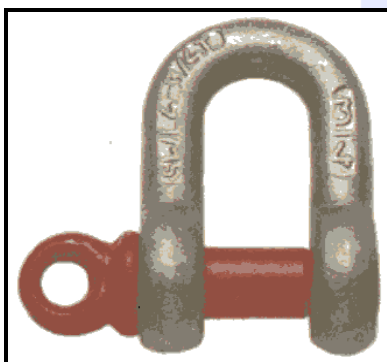
Dee Shackle

Normally used as a terminal shackle at the load and used in a vertical position.

Bow or Harp Shackle

Used at the lifting hook to prevent overcrowding of hook bowl when more than one sling is used.

Dee Shackle



Bow or Harp Shackle



Lifting Spreader Beam



Lifting spreader beams are designed for lifting long loads. They must be a tested piece of equipment marked with its SWL.

Plate Clamps



Plate clamps are used for lifting sheets of metal or beams. They must be free from grease and oil and must be a tested piece of equipment marked with its SWL.

Inspection of Accessories (pre and post operational checks)

The slinger signaller should carry out an inspection of the lifting accessories they propose to use to ensure they are safe for use prior to use, and similarly after use to ensure no damage has occurred to the accessory through the lifting operation. Ensure gloves are worn when carrying out these checks as they can prevent skin diseases and cuts/ abrasions from the accessories.

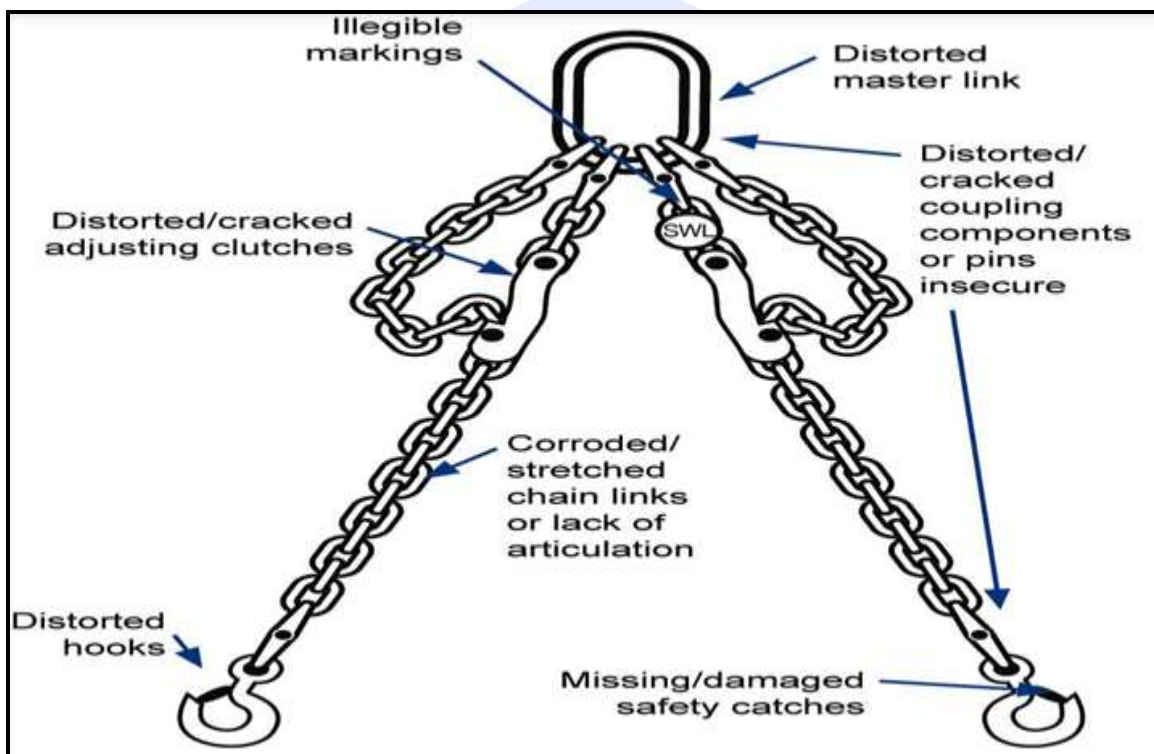
This inspection can be broken down into three stages:

- Carry out checks in accordance with manufacturer's recommendations and relevant regulations.
- Record when these checks have been carried out and the findings of these checks.
- Report any defects immediately. Damaged accessories must be taken out of service and clearly marked as unusable.

Lifting accessories must be:

- In a safe working condition and suitable for their proposed use.
- Inspected prior to and after use.
- Thoroughly examined/ tested by an authorised and competent person at least every six months and a test certificate issued after testing is found satisfactory.
- Carry an identification tag with its SWL and serial number
- Accompanied with the appropriate paper work /test certificates
- Of the correct safe working load for the proposed operation and not exceeded, if it is suspected an accessory has exceeded its SWL then it must be taken out of service, marked appropriately and thoroughly examined by a competent person.
- Used in accordance with manufacturers
- Taken out of service if found to be faulty, damaged or defective.

Pre Use Checks - Chain Slings



- Check Safe Working Load and included angle.
- Damage or excessive wear to links and link interfaces.
- Cracks / distortion in links, hooks or master ring.
- Stretching of sling legs (Multi leg slings- ensure all legs are of equal length. Single leg- check for stretched, elongated links).
- Corrosion / rust.
- Sling ID number – check it corresponds with test certificate and in date.
- CE mark, when marked on a product, signifies the product meets applicable safety criteria/ requirements of a European directive.

Pre Use checks - Fibre / Flat Web Slings

- Safe working Load.
- Wear, cuts and abrasions.
- Excessive wear in sling eye.
- Stitching in tact.
- Rot, mildew or chemical damage.
- Internal damage.
- Sling ID number – check it corresponds with test certificate and in date.
- CE mark.

Pre Use Checks - Steel Wire Rope

- Safe working Load.
- Severe kinking or bending.
- Flattening or broken wires.
- Sling ID number – check it corresponds with test certificate and in date.
- CE mark.

Pre Use Checks – Shackles

- Safe Working Load.
- Cracks / corrosion.
- Distortion of shackle pin or body.
- Condition of shackle and pin thread.
- Compatibility of pin to shackle.
- Wear on pin and in shackle crown.
- Sling ID number – check it corresponds with test certificate and in date.
- CE mark.

Safe Use of Slings









Working load limit - The WLL is the maximum mass which the sling or lifting accessory has been designed to raise, lower or suspend under normal conditions.

Safe Working Load - The SWL is the maximum mass, which may be raised, lowered or suspended under specific conditions. These will vary with the angle of lift and conditions of use.

Note: When using a single leg sling for a vertical lift the sling will be capable of taking the full SWL applicable to the sling. In the case of multi-leg slinging applications the SWL of each sling is reduced as the lifting angle is increased. In addition to this, the SWL may be reduced or increased depending on the type of slinging method (choke hitch, basket hitch etc).

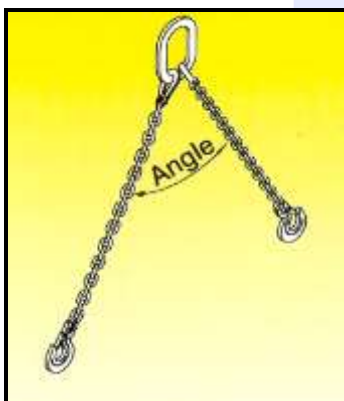
The following table gives an example of the factors to be multiplied to the SWL in order to work out the new SWL for a particular sling and slinging method.

Example: webbing sling with SWL 1t. Choke hitch applied, new SWL 0.8t. SWL reduced by 20%.

Sling Configurations – Mode Factors								
The maximum load that can be lifted = mode factor x SWL marked on the sling								
NP = Not Preferred NA = Not Applicable								
Type of Sling	Single leg in-line	Single leg choked	Single leg basket	Single leg back hooked	Single leg halshed	Endless in-line	Endless choked	Endless basket 0-90°
								
Fibre Rope	1	0.8	1.4	1	1.6	1	0.8	1.4
Webbing	1	0.8	1.4	NA	NP	1	0.8	1.4
Roundsling	NA	NA	NA	NA	NA	1	0.8	1.4
Wire Rope	1	0.8	1.4	1	1.6	NP	0.8	1.4
Chain	1	0.8	1.4	1	NP	NP	1	NP

Safe Use of Slings

For two legged slings the angle between the opposing legs and the slinging method used (choke hitch, basket etc) will determine the safe working load.

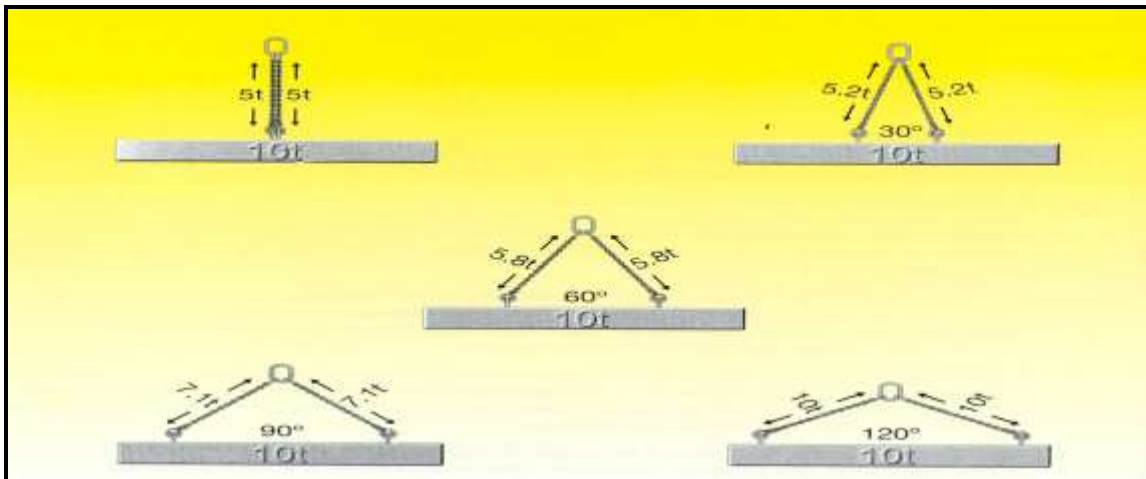


Two Legged Sling This will be marked with its SWL at 90°, which will apply for all angles between 0° and 90°. Some may be marked with additional SWL of 90° which will apply for angles between 90° and 120°. If the legs of the chains are more than 90° apart, then the SWL must be reduced accordingly. It is generally good practice to keep the angle between 60° and 90° with 60° being the recommended.

Three Legged Sling This will be marked with its SWL at 45°. The SWL is only good if all 3 legs are attached to the load. If you are lifting the load with only 2 of the 3 legs then de-rate the sling by two-thirds of the SWL. The same applies if lifting on 1 leg; the SWL will be one-third of the stated SWL. Maximum angle of lift is 45°.

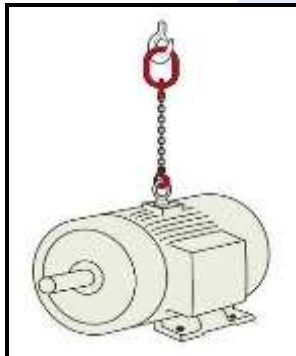
Four Legged Sling This will be marked with its SWL at 90°. The maximum angle between opposite legs of the sling will determine the SWL. Like 2 and 3 legged slings the SWL stated is when all 4 legs are attached. When using less than the 4 legs de-rate as required. Example: Only two legs of an 8t four leg chain sling are being used- maximum load that can be lifted = 4t. The maximum angle must not exceed 120°.

An example of how the load in each leg increases as the angle is increased.

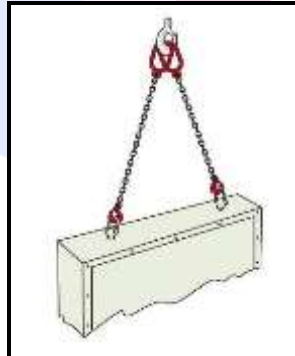


Slinging Methods

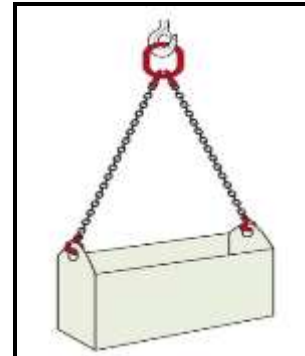
Single Leg Straight Lift



Two Single Legs



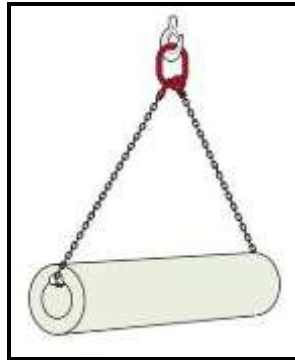
Two Leg Lift



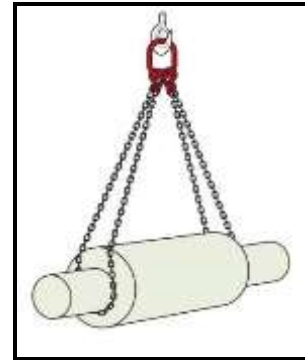
**Two Leg Sling,
One Leg Used
(De-rate as applicable)**



Single Leg Basket



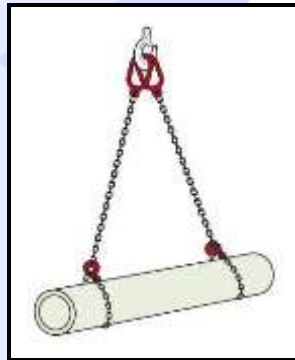
Basket Hitch



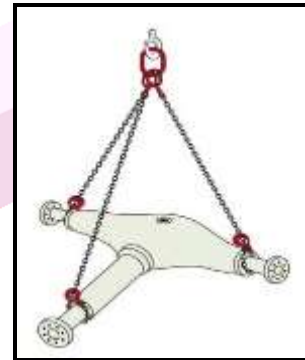
Single Choke Hitch



**Two Single Legs
Choke Hitch**



**Three Leg
Choke Hitch**



Tubes / bundles - when lifting bundles, tubes or other loose materials, whether banded or not, slings should be double wrapped around the load and a choke hitch applied for load security, similarly a double wrap and choke should be applied where there may be possibility of the legs sliding together.

Planning the Lift

Before any lift can take place the lift needs to be properly planned and appropriately supervised.

A lift plan must be drawn up by a competent person (appointed person) and a risk assessment and detailed method statement should be put in place for the proposed operation.

This should also cover any movement of the lifting equipment, for which a traffic management plan should be in place.

Traffic Management Plan

A traffic management plan should be planned around the FOUR STAGES OF HIERARCHY

- 1 Eliminate the need to reverse
- 2 Minimise the need to reverse
- 3 Isolate the area of vehicle movements
- 4 Control movements within the isolated area by means of a marshal

The traffic management plan should cover:

Traffic routes	Pedestrian routes
Site access points	one way systems
Restricted areas	Proximity hazards (overhead cables etc)
Escape routes	Refuge areas

Refuge areas should be easily accessible for persons to use and be able to protect the uses from plant movements.

Signs and barriers should be suitable for the task, visible and of sufficient strength to protect the area. Any signs or barriers should ONLY be moved or taken down to allow authorised machines access or exit from the area or when the activity has finished. This should only be carried out by a trained authorised person.

Prior to the slinging of any load the slinger should ascertain the weight of the load. Under no circumstances should an item be lifted if its weight is unknown.

Methods of obtaining the weight vary from:

- Weight being marked on the item.
- Weight indicated on delivery document.
- Enquiries to manufacturer.
- Calculation of mass.
- Always take into account the gross or total weight to be lifted i.e., the weight of the load, the weight of the lifting accessories and the weight of the hook block.

Other points to consider are:

- Where the load is to be picked up from.
- Where the load is to be placed, is the landing area prepared and capable of taking the size / weight of load.
- The area the load will travel over.
- The proximity of the public, pedestrians must be physically segregated from the lifting operation and overhead loads.
- How the load is to be slung, is the slinging method suitable and correct for the type of load.
- Will the fitting and removing of the accessories involve working at height i.e. Safe access and egress on and off scaffolds, wagon beds, below ground level.
- How to direct the crane operator. (Hand signals / radios) agreed and confirmed.
- Ensure you are easily identifiable to the crane operator and others by wearing special/ unique clothing.
- Ensure you have agreed an emergency procedure in case visibility is lost between the operator and the signaller (**The Machine Should Be Stopped**)
- Ensure you have the required information in regards to the load, weight, size and shape of the load.
- The weather. High wind speeds can have adverse affects on lifting operations and must be monitored continually throughout lifting, always be aware that high wind can cause load swing on loads with a large surface area, increase or slow the slewing speed of the crane, or put loads out of the working radius of the crane and ultimately close down the lifting operation. Excessive rain can also have adverse effect on lifting operations as it may cause reduced visibility between slinger and operator, increase the weight of porous materials to be lifted and may make the materials / slings slippery.
- A signaller must always be used before moving a crane on site, particularly when the operator is unable to face the direction of travel. The signaller must also guide the crane safely near excavations Keeping a safe distance away from them (Ideally twice the depth of the excavation)

Reasons That May Cause Accidents

Working in confined spaces / areas

- Risk to other personnel in area.
- Reduced manoeuvrability.
- Increases in levels of noise, fumes.
- Counterweight coming into contact with structures and creating crush zones.
- When working in a confined space / area a recommended distance of 600mm must be maintained between counterweight of the crane and structures, if this is not possible all access must be blocked off from personnel.

Lifting on slopes

- Radius of the crane can increase resulting in instability of the crane.
- Ensure crane sited on suitably firm and level ground.

Slinger / Signaller unfamiliar with the lifting accessories to be used

- The slinger signaller must have sufficient information, instruction and training on the type of accessories they are using (LOLER 98).

Over head cables

- In certain circumstances high voltage electricity can conduct (arc) across to the item of plant. Safe recommended distances must be maintained (if unsure, always contact the relevant electricity company for specific requirements prior to commencing work near electricity).
- The minimum distance from the ground level barrier to the line (from the highest point or full reach of the machine) is determined both by the type of support (such as a goal post system, wood or metal poles and pylons) and the voltage of the overhead line (as advised by the electricity company).

Many incidents involving crane overturn can be contributed to the following

- Excessive load swing.
- High speed slewing with load, always consider the length of time and distance needed to stop the slew and the expected swing of the load which will make the load move outwards (increase the radius) and trail the jib / boom.
- Working / lifting on soft or sloping ground.
- Exceeding the rated capacity for the crane or insufficient counterweight / ballast.

Cranes working in the same operating radius of each other

- The lift plan / method statement should specify the crane supervisor maintain full co-ordination of the cranes with possible limits on slewing activities.

Jib / boom deflection

- Crane jibs or booms are constructed as to bend or deflect when under tension, when initially taking the weight of heavy load the jib / boom may start to deflect, this should be corrected by the operator of the crane so that the hoist rope remains vertical and the slinger signaller should be aware that the load may swing resulting in an increase of radius.

Hook block coming into contact with structures / ground

- If the hook block lands on the ground or similar, resulting in loss of tension of the hoist rope, then the pulleys must be checked for hoist rope alignment and the main hoist drum checked to ensure there is no rope crossover.

Before Lifting

- The area should be checked for suitable signs and barriers
- There is no other works being carried out that could interfere with the lifting operation
- There is no unauthorised plant or personnel in the area
- All personnel involved in the operation are suitably trained and authorised to carry out the task
- Only trained and authorised slinger signallers should carry out the lifting operation.
- Risk assessments, method statements and lift plan for the operation acknowledged.
- Relevant test certificates (crane and accessories) and crane operator competence card checked.
- Slings checked and properly attached and secure to the load.
- Ensure the crane hoist rope is vertical before lifting, if not readjust as this may cause the load to swing and put the load out of the cranes radius.
- Are the legs of the multi-leg slings equally loaded and within the recommended SWL for the angle applied.
- A line of communication (hand signals / radios) agreed and confirmed with the crane operator.
- Area the load is travelling free of people and hazards.
- Landing site prepared and ready for receiving the load.
- Weather conditions acceptable.
- If required, hand / tag lines attached and suitable.

If any of the above are not in place this could affect the integrity of the lifting operation

During the Lift

- Carry out initial test / trial lift of load to determine centre of gravity and ensure load secure and stable.
- Ensure a suitable amount of line / rope length as this will affect the load swing. (Longer the line length - slower and further the swing, Shorter the line length - faster and shorter the swing).
- Remain in full communication with the operator of the crane at all times.
- Give clear and precise instruction.
- Remain vigilant for any changes to the area the load will be travelling i.e. people, plant, obstructions.
- Lift / travel and lower load smoothly and maintain full control of the lift at all times.

Landing the load

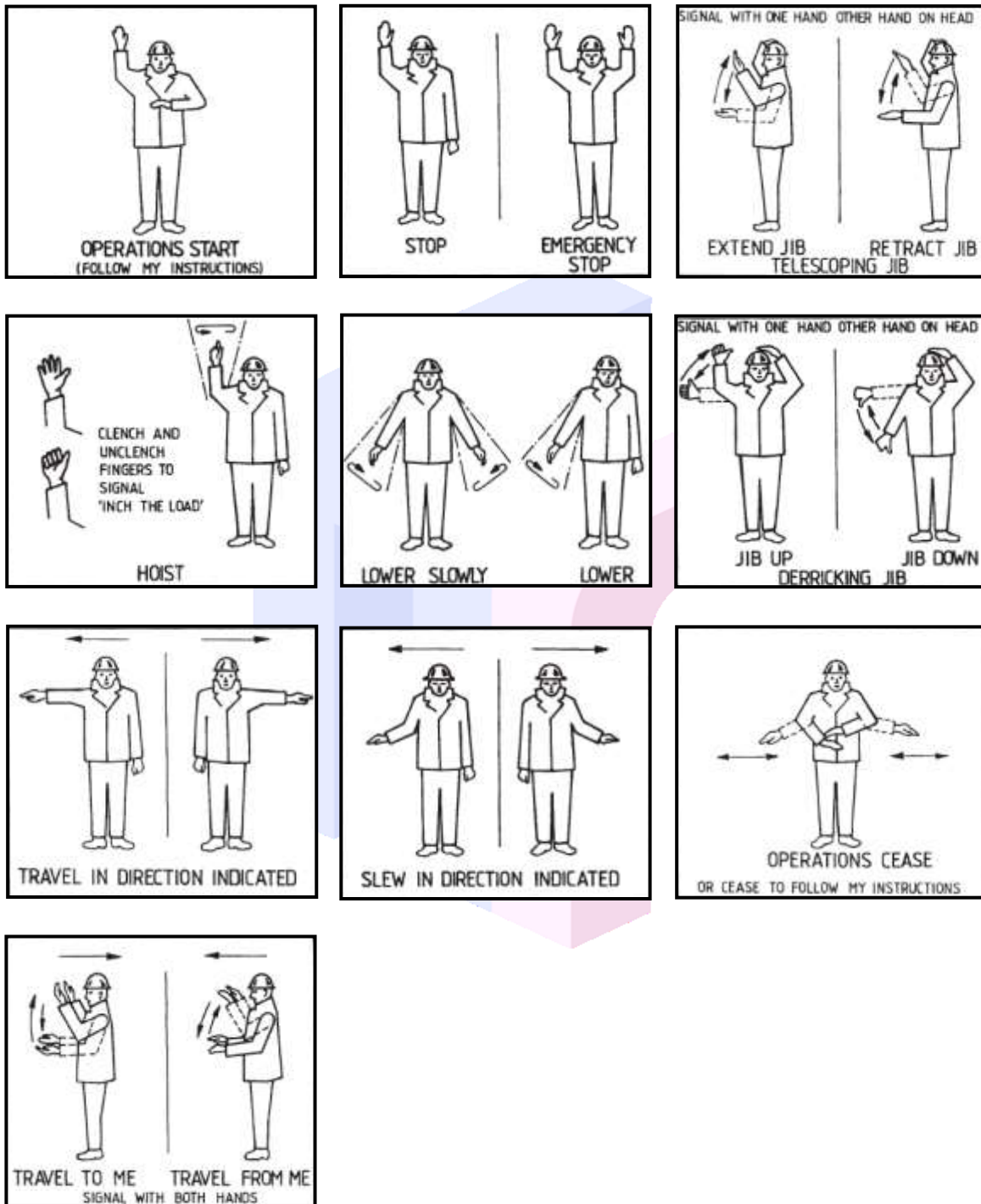
- The landing site should be clear of all obstructions, level and capable of taking the weight and size of the load.
- Where necessary lower the load on to chocks to prevent crushing the slings and to enable easy removal.
- After removal of the slings from the load, ensure they are back-hooked to the master link to reduce the likelihood of fouling obstructions or striking personnel.
- Ensure when detaching the lifting accessories from loose bundles and similar items that suitable chocks are in place to prevent them rolling/ collapsing when released.

After the Lift

- After the lifting is complete, carry out checks to all the lifting accessories to ensure no damage has occurred to them during the work.
- Ensure correct storage and maintenance of the lifting accessories after use.
- Store accessories in dry conditions, preferably hung up and free from pollution and extremes of temperature.
- Clean and allow to dry naturally.

RECOMMENDED CRANE SIGNALS – (BS 7121) SAFE USE OF CRANES

The signaller should stand in a secure position where he can see the load and can be seen clearly by the crane operator and should face the operator if possible. Each signal should be distinct and clear.



RADIO COMMUNICATION

Radio communication is used for blind lifts or where visibility is poor.

Problems may include:

- Loss of signal – remedied by using a booster and checking radio at start of shift.
- Interference – remedied by choosing a different radio frequency.
- Misunderstandings – remedied by using clear, unique call signs and not responding to any command which is not preceded by the call sign. Also the voice commands only being given by one person.

If using radios for the lifting operation always ensure the following:

- All persons involved in using the radio equipment know how to use them
- Batteries fully charged and spare ones supplied
- Correct frequency selected
- Signal strength sufficient
- Call signs confirmed and agreed
- Inform the crane operator of the task
- Where the load is
- The weight of the load
- What hazards are present
- Where the load is going

These are the standard voice commands used for lifting operation:

- Take the weight
- Hoist / Hoist Slowly
- Lower / Lower slowly
- Slew left / right
- Trolley in / out
- Jib up / down
- Extend / retract jib
- Travel forward / backward
- Stop / Stop now (STOP IMMEDIATELY - EMERGENCY)

When lowering off always give the operator distances such as:

- Lower down (always checking visually for hazards)
- 20m to go (make sure the area is clear)
- Keep lowering (you are in a safe position)
- 10 to go (the operator is slowing down)
- 5m to go (bearers are in position)
- 2m to go (ensuring the load is in full control)
- 1m to go (the operator is in slowest speed)
- Load landed (ensure load is in correct position)
- Stop (ensure you can release accessories safely)

HEALTH AND SAFETY AT WORK ETC ACT 1974

The Health and Safety at Work etc Act 1974 also referred to as HASAW or HSW is the primary piece of legislation covering occupational health and safety in the United Kingdom. The Health and Safety Executive (HSE) is responsible for enforcing the Act and a number of other Acts relevant to the working environment. Health and Safety legislation places the responsibility for safety at work on everyone and everyone at work has a duty under this Act.

For free information and publications regarding health and safety at work visit www.hse.gov.uk

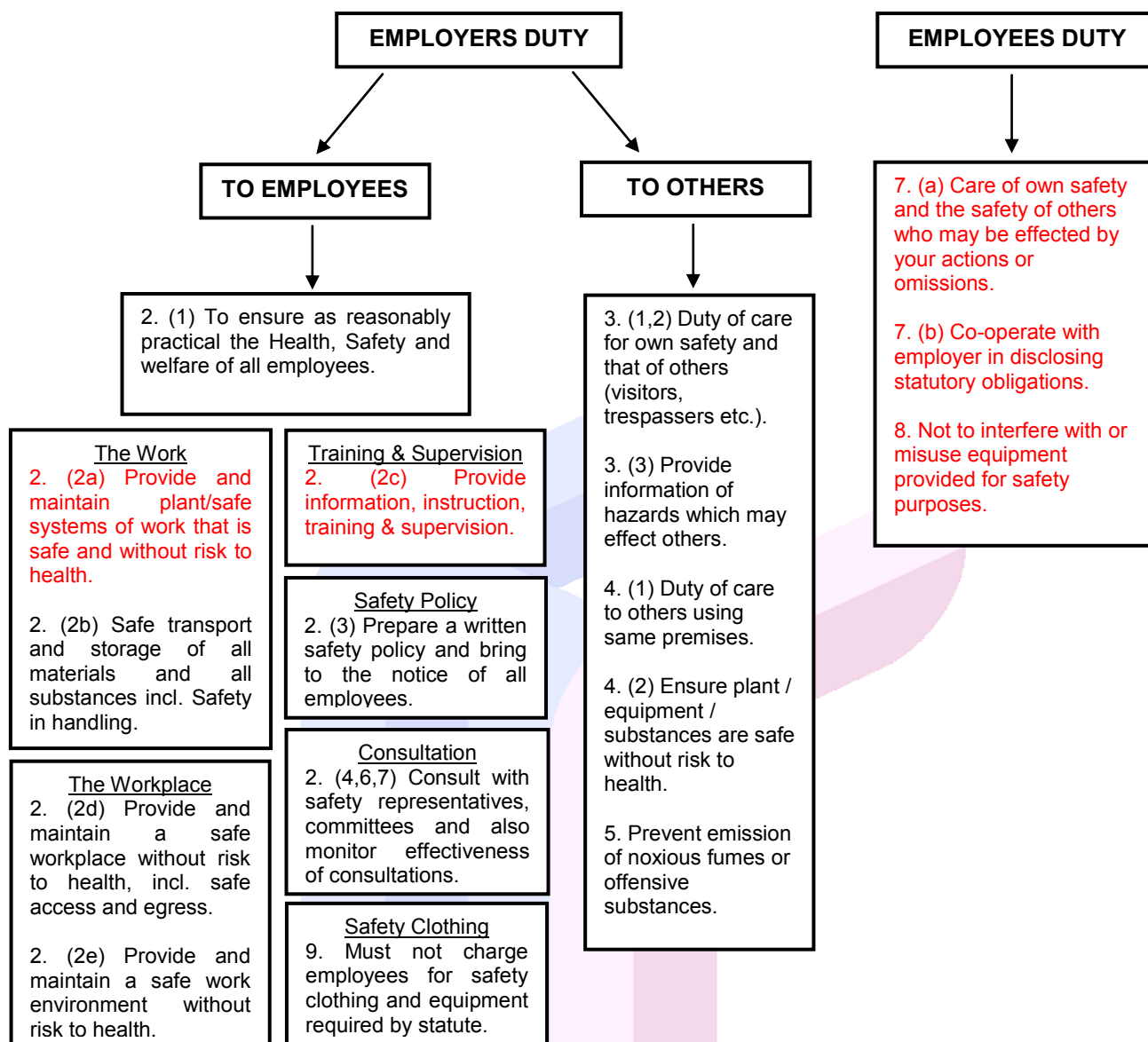
The Health and Safety Executive may take to court and prosecute any persons they find are in contravention of these duties with a fine and/or imprisonment.

The levels or sanctions that can be applied by Employers and Judicial bodies to operators who do not comply with or follow legislation and regulations are verbal warning, written warning, and dismissal and may lead to prosecution.

The Main legislation and regulations applying to the use of lift trucks is:

- The Health and Safety at Work Act 1974
- The Management of Health and Safety at work regulations
- The Provision and Use of Working Equipment Regulations (PUWER)
- The Lifting Operations and Lifting Equipment Regulations (LOLER)
- The Workplace (Health, Safety and Welfare) Regulations
- Approved Codes of Practice (ACOP) an Approved Code of Practice is a document that provides information on how to comply with a specific set of regulations.

HEALTH & SAFETY AT WORK ACT 1974 – SLINGER / SIGNALLER



In addition to your duties under relevant regulations and legislation, it is good practice to keep a good working relationship with your employer, co-workers and clients which can result in repeat and prolonged business.

- Work safely
- Efficiently
- Co-operate
- Adhere to site rules
- Comply to method statements
- Be punctual
- Polite/ helpful etc.

THE PROVISION & USE OF WORK EQUIPMENT REGULATIONS 1998 (PUWER 98)

Apply to all work equipment. It is required that:

Work equipment must be suitable for the purpose for which it is used or provided, and should be properly maintained and inspected at suitable intervals - This applies not only to complex machinery, but items such as hand tools too.

Work equipment must be maintained in a safe condition – This will require control systems to be in place to check on the condition of work equipment and take corrective action as required.

Users must be given information, instruction and training as appropriate – What is appropriate depends on the risk associated with the equipment and the level of competence required to keep those risks at an acceptable level. Work place risk assessments highlight the hazards and level of risk.

Controls and their functions must be easily identifiable – The aim is to ensure that the wrong controls are not used by mistake.

Machines must be capable of being isolated from the power source – This may be a simple function or a high voltage source that requires special arrangement for isolation.

Where the use of equipment is likely to involve specific risks, the use, maintenance etc of the equipment is restricted to people given the task of using and / or maintaining it.

Users, supervisors and managers have received adequate training for the reasons of health and safety.

THE LIFTING OPERATIONS AND LIFTING EQUIPMENT REGULATIONS (LOLER 98)

Deal with specific hazards / risks associated with lifting equipment and lifting operations.

As a lifting machine, cranes, their use and the use of lifting accessories fall under this scope of regulations and particularly that management ensure that all lifting operations involving lift trucks are:

- Properly planned (by a competent person)
- Appropriately supervised
- Carried out in a safe manner

In addition to this, all lifting equipment should be:

Strong, stable and suitable – Sufficient enough for its proposed use. Similarly, the load and anything attached must be suitable.

Positioned or Installed – To prevent the risk of injury, for example, equipment or load falling on people.

Visibly Marked – Appropriate information should be taken into account for its safe use. Slings, clamps etc should be similarly marked.

Planning & Supervision – All lifting operations should be planned and supervised and carried out in a safe manner by people that are trained and competent.

Thorough Inspection – Where appropriate, before lifting equipment is used for the first time, including accessories, it should be thoroughly examined. Lifting equipment may need to be examined in use at periods specified in the regulations and for all other equipment at annually (at a minimum).

Reporting – A competent person should carry out all examination work and report to the employer to take appropriate action.

Authorisation

Following satisfactory completion of slinger signaller training / Qualification, employees should be given written authorisation by their employers to carry out these lifting operations. Authorisations may be done on an individual basis or centrally recorded by employers. No persons should carry out lifting or operate plant unless they are authorised, competent.

Training

Slinger signallers should be trained to the level of skill necessary to carry out lifting procedures safely and efficiently and Employers should keep records of all training given to individuals including conversion and refresher training. Accredited Qualifications and cards can benefit slingers as they are proof of training, competence, skills and can often lead to employment and promotional prospects.

The Environment

Operators should be aware of their impact upon the environment whilst using the item of plant at work and try to minimize this as much as practically possible by keeping a well maintained machine, efficient use of the machine, lower engine speed, correct disposal of waste, ensure no spillages whilst re-fuelling / oils etc, prior planning of work and to ensure extra precaution taken whilst working near water courses / woodlands etc.

The Working Area

The employer should:

- Ensure as reasonably practical the Health, Safety and Welfare of all employees.
- Provide and maintain a safe place of work, without risk to health, Inc safe access and egress.
- Provide and maintain a safe work environment – without risk to health.
- Consider the safe movement of lift trucks and loads as part of their overall safety policy for people, plant and equipment.

Site Induction

When starting on a new site or as changes to the present work environment you are on take place, site personnel should be given a site safety induction; this induction is to ensure all people on site have the necessary information regarding safety, the environment / workplace they are working and procedures put in place.

Inductions may be site specific but typical subject areas that should be covered are:

Access/egress, accident/near miss reporting, welfare facilities, emergency procedures, escape routes and assembly points, first aid, plant and equipment use, lifting operations, working from heights, safety signs, site layout, pedestrian walkways, traffic routes, waste disposal, smoking, lift plans, risk assessments, method statements etc.

The Lift Plan

As slinger signaller activities fall under the scope of the Lifting Operations and Lifting Equipment Regulations a comprehensive lift plan should be drawn up by an authorised and competent person, which will incorporate initial planning to ensure lifting equipment provided is suitable for the range of tasks it is to carry out and planning of individual lifting operations so they can be performed safely. This not only applies to the use of cranes but all lifting equipment, Cranes, Excavators, Forklift Trucks, Lorry loaders. Each item of lifting equipment poses its own hazards which are sometimes over looked.

Excavators

Many excavators are used on site for lifting and moving loads in addition to transporting loads while still attached to the excavator. For this operation even gentle turning on level ground should be avoided as this can cause instability issues causing the machine to tip over sideways due to the centre of gravity exceeding the machines track base.

There are additional hazards for the slinger/signaller. She/he should ensure that the machine is configured for travel, the load is kept as close to the ground as possible without coming into contact with it.

Ensure there is a safe refuge easily accessible at all times, the route is clear of obstructions to prevent slips trips and falls, they can remain clear of the load and the machine but stay in sight of the operator.

Before attempting to attach a load to a machine which is fitted with a quick hitch coupler ensure that the controls are isolated and the operator has acknowledged you to approach the machine.

The working full working radius of the machine is regarded as the danger area when approaching the machine so ensure you have the operators attention before entering into the machines radius.

Ensure the attachment is approved for lifting with a SWL stamped visible, the attachment is in good condition and all pins and safety devices in place.

Ensure the lifting accessories (Chains/straps) are of suitable length so as to not catch/snag on the lifting equipment and the load can still be lifted clear of the ground without the need to rotate the hitch. The bottom ram should always be extended this will prevent damage to the accessory, by twisting or restricting the movement of the load against the hitch or bucket.



If a task cannot be carried out as detailed in the lift plan, then work should stop until the lift plan/ task is amended by an authorised and competent person.

Risk Assessment

Prior to any work task actually taking place a risk assessment must be carried out. A risk assessment is a careful examination of the workplace and task to highlight any possible hazards to personal safety and eliminate, reduce or minimise the possible hazards (a hazard is defined as a potential threat or risk to life, health, property or environment).

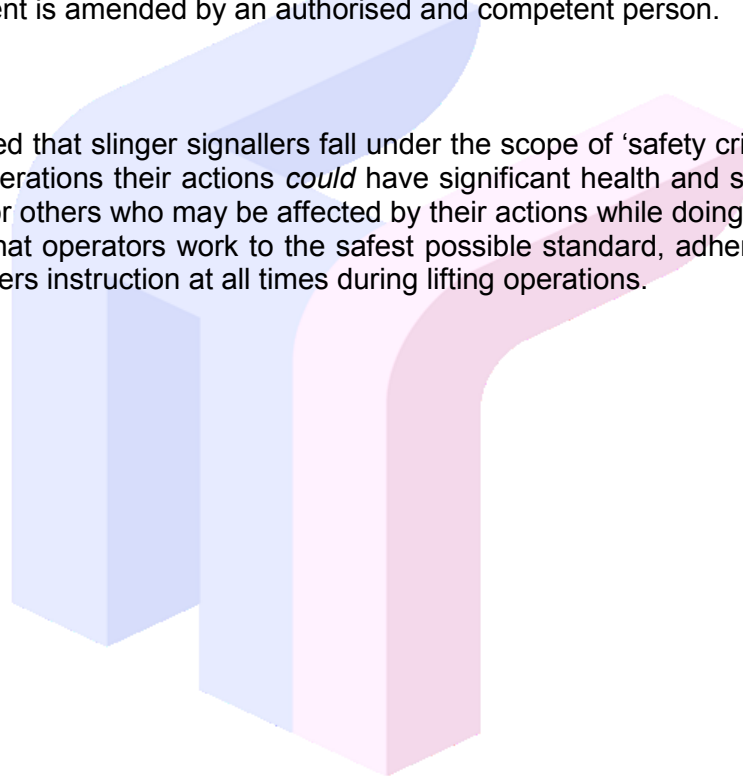
Method Statement

Once the risk assessment is in place a method statement may be drawn up which will detail the procedure and steps in which the work is to be carried out, it is a document that gives specific instruction on how to safely perform the task. The operator is required to read, acknowledge and comply with the method statement.

If a task cannot be carried out as detailed in the method statement, then work should stop until the task /method statement is amended by an authorised and competent person.

Safety

It is generally regarded that slinger signallers fall under the scope of 'safety critical workers' in that carrying out lifting operations their actions *could* have significant health and safety consequences on themselves and/ or others who may be affected by their actions while doing these activities. It is therefore important that operators work to the safest possible standard, adhere to legislation, site rules and manufacturers instruction at all times during lifting operations.



THEORY TEST QUESTIONS

1. On what type of loads would a spreader beam be used?
A.
2. How can a qualification or card benefit a slinger/signaller?
A.
3. On hoist-rope lifting equipment, how does the rope or line length affect loads swings?
A.
4. When checking the condition of lifting accessories, why must gloves be worn?
A.
5. What possible effects does excessive rain have on the lifting operation?
A.
6. What makes up the total (or gross) weight of a load that is to be lifted?
A.
7. What does The Health and Safety at Work Act require employers to do with regards specifically to plant?
A.
8. a) When is a trial lift carried out and b) name THREE checks to be made?
A.
9. Before being guided by a signaller for a pick and carry duty, what instruction should be given to the machine operator by the signaller if they lose sight of each other?
A.
10. When using more than one lifting accessory, how should they be secured to the crane hook?
A.
11. Travelling with extra-long loads can be more hazardous for what reason?
A.

THEORY TEST QUESTIONS (cont.)

12. Polyester webbing slings are coloured and have black lines. What do the different colours and number of lines indicate?
A.
13. a) On the lifting-capacity diagram chart within Section A40 (see end of theory test questions), name component A and b) state its function.
A.
14. If radios are to be used during the lifting operations, what FIVE actions and checks must be made by the slinger/signaller before use?
A.
15. The legs of a chain sling should be no more than 90 degrees apart from each other. What happens to the SWL if the angle is larger?
A.
16. What are the TWO actions that a slinger/signaller undertakes on lifting accessories during pre-use inspections?
A.
17. If assisting in fitting a fly jib to the crane, why is it important that the manufacturer's procedures are followed precisely?
A.
18. What is the definition of, or how can a hazard be described?
A.
19. Name THREE ways in which wind speed can affect the lifting operation.
A.
20. Wind speeds can be variable throughout the working day. What action must be taken to ensure safe working conditions are maintained?
A.

THEORY TEST QUESTIONS (cont.)

21. What are the possible outcomes of facing prosecution for not complying with legislation and regulations?
A.
22. If attaching accessories to a quick-hitch coupler of a machine such as an excavator, give TWO reasons why should the coupler should be tilted in the downwards position (ram extended).
A.
23. If the hook block of a hoist rope-equipped lifting equipment inadvertently (accidentally) lands, what is a possible consequence?
A.
24. What TWO checks need to be made before a load is to be lowered into a trench or excavation?
A.
25 Which parts of a slewing-type lifting equipment is the radius (for lifting) measured from?
A.
26. Why should checks be made to lifting accessories after work has ceased?
A.
27. Two boom/jib equipped cranes are working in the same vicinity that encroach on the operating radius of each. What actions would the lift plan or method statement normally specify?
A.
28. When working with non-hoist rope lifting equipment e.g. excavator, forklift etc. just before going to attach or disconnect a load, a) what action should the slinger/signaller undertake, b) what action should the machine operator undertake and c) explain why?
A.

THEORY TEST QUESTIONS (cont.)

29. What TWO things should be considered when selecting a place of refuge or safety within a designated plant manoeuvring area?
A.
30. Name FIVE proximity hazards which could affect a lifting operation.
A.
31. When undertaking a pick-and-carry duty, explain why turning, even gently, with a suspended load can cause an effect on the machine.
A.
32. On the lifting capacity diagram chart within in Section A40 (see end of theory test questions): a) what is the type of sling shown in item B and b) what is type of hitch shown?
A.
33. List SIX factors that must be taken into account by both the machine operator and slinger/signaller if a suspended load is to be travelled across a site.
A.
34. Name THREE ways in which a slinger/signaller can minimise their impact upon the environment during lifting operations.
A.
35. If guiding an item of lifting equipment undertaking pick-and-carry duties near an open trench which has a depth of 2 metres, what is the minimum distance to maintain?
A.

THEORY TEST QUESTIONS (cont.)

36. State the functions or job role of the following personnel: a) appointed person, b) crane/lifting operations supervisor, c) lifting equipment operator.
A.
37. On a busy construction site, how would the slinger/signaller be identified to the lifting equipment operator?
A.
38. Name FIVE items that should be listed within a site traffic management plan.
A.
39. Give FOUR reasons that may cause mobile-type lifting equipment to overturn.
A.
40. Name FOUR different types or levels of sanction that can be applied (by employers and judicial bodies) to slingers/signallers who do not comply with, or follow legislation and regulations.
A.
41. What is meant by centre of gravity, or how is the centre of gravity determined, on a load to be lifted?
A.
42. a) On mobile-type lifting equipment, what can apply loading or pressure to the ground and b) name TWO ways that pressure can be reduced.
A.
43. When can barriers/signs marking a lifting operations working area be removed?
A.

THEORY TEST QUESTIONS (cont.)

44. What is the purpose of a risk assessment?
A.
45. Suspended loads with a large surface area need additional care for what reason?
A.
46. Give TWO examples of where The Work at Height Regulations may apply to lifting operations.
A.
47. When working with slewing type-lifting equipment in a restricted/confined area: a) what danger can be present with regards to the machine's counterweight, b) when should measures be taken and c) what measures should be implemented?
A.
48. If a load is inadvertently slewed rather quickly by the operator of an item of lifting equipment, what TWO initial effects does it have on the load whilst slewing?
A.
49. During inspections, damage has been found to a lifting accessory. What TWO actions must be taken?
A.
50. a) On hoist rope-equipped lifting equipment, how does the number of lines or falls of rope affect the lifting capacity and b) how is hoist speed affected when the number of lines (or falls of rope) is reduced?
A.
51. During the lifting operation, part of the task cannot be carried out as detailed in the lift plan. a) What initially must happen to the lifting operation and b) who authorises any changes?
A.
52. The slinger has to use new lifting accessories that they are unfamiliar with. What do Regulations (e.g. LOLER 98) and other guidance require the slinger/signaller to have?
A.

THEORY TEST QUESTIONS (cont.)

53. What must be taken into account if a suspended load is being lifted with an accessory e.g. chains, which has extra-long legs?
A.
54. The safe working load (SWL) of a multi-leg chain sling only applies in what TWO conditions or configuration?
A.
55. List SIX typical subject areas that should be covered in a site induction.
A.
56. a) Who is allowed to issue lifting accessory test certificates and b) when are they issued?
A.
57. Before guiding and assisting the movement of mobile lifting equipment that is being repositioned to carry out a new lifting operation a) what should the marshaller/signaller ensure and b) with whom?
A.
58. What are the ideal conditions for lifting accessories to be stored?
A.
59. a) What is the purpose of a Method Statement, lift plan and b) what is required of the slinger/signaller?
A.
60. Prior to undertaking signalling duties for pick-and-carry duties, describe FOUR actions to be made by the slinger/signaller to ensure their own safety?
A.

THEORY TEST QUESTIONS (cont.)

61. What is regarded as the danger or hazard zone during a lifting operation?

A.

62. Only two legs of a 6 tonne four-leg chain sling are being used. In principle, what is the maximum load that can be lifted with that sling?

A.

63. When a suspended load is being travelled, in what position should the load be situated?

A.

64. What needs to be inspected on a quick-hitch coupler of an excavator if attaching lifting accessories for the lifting of slung loads?

A.

65. Name the FOUR stages of the hierarchy of control for vehicle/plant manoeuvring operations

A.

66. A 1-tonne webbing sling is attached to a load using a choke hitch. What is the maximum weight the accessory is allowed to lift? (Note. The tester may provide a different figure in order to check understanding)

A.

67. What should the slinger confirm with the lifting equipment operator regarding the audible alarm (if fitted) when setting up to carry out a lift ?

A.

68. What is the difference between a contract lift and a 'standard' crane hire?

A.

69. Name THREE ways that a hired-in slinger/signaller can contribute in ensuring repeat business with the client or principal contractor.

A.

THEORY TEST QUESTIONS (cont.)

70. Why must the hoist rope of an item of lifting equipment (mobile/crawler crane etc.) be kept vertical before lifting any loads?

A.

71. Explain THREE factors that could affect the integrity of a lifting operations exclusion zone and safe movements within the zone.

A.

72. If setting up to lift loads in a pedestrianised area, state ONE factor that needs to be taken into account by the slinger/signaller.

A.

73. a) Name THREE different types of lifting accessories, and b) state ONE advantage of each compared to other types of available lifting accessories.

A.

74. a) What does the safe working load (SWL), as stamped on lifting accessories, indicate? b) what action should be taken if the SWL is not marked on a lifting accessory?

A.

75. How does the use of a swivel hook assist in the lifting operation?

A.

76. What information is needed when estimating the weight of a load?

A.

77. What THREE main duties of The Health and Safety at Work Act must employees follow?

A.

THEORY TEST QUESTIONS (cont.)

78. What could affect the strength of the signal if radios are being used between the lifting equipment operator and the slinger/signaller?

A.

79. During a lift, it is suspected that a lifting accessory exceeded the rated capacity. What would be the course of action?

A.

80. With lighter boom construction on boom or jib-equipped cranes, how does the deflection of a boom or jib affect the lifting of a load?

A.

81. Why are those undertaking slinging/signalling duties generally regarded as 'safety-critical' workers?

A.

82. a) What is meant by the rated (lifting) capacity of lifting equipment and b) who determines it?

A.

83. If a load is being travelled or slewed, what TWO possible factors should the slinger take into account?

A.

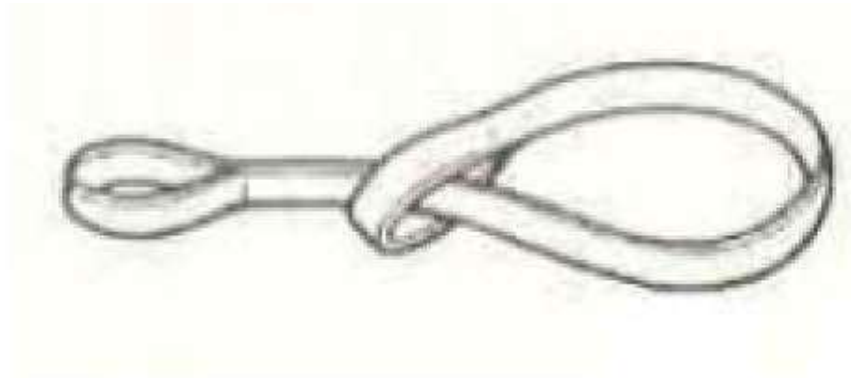
84. State the possible effect on an item of lifting equipment if it is positioned on a slope and lifts a load?

A.

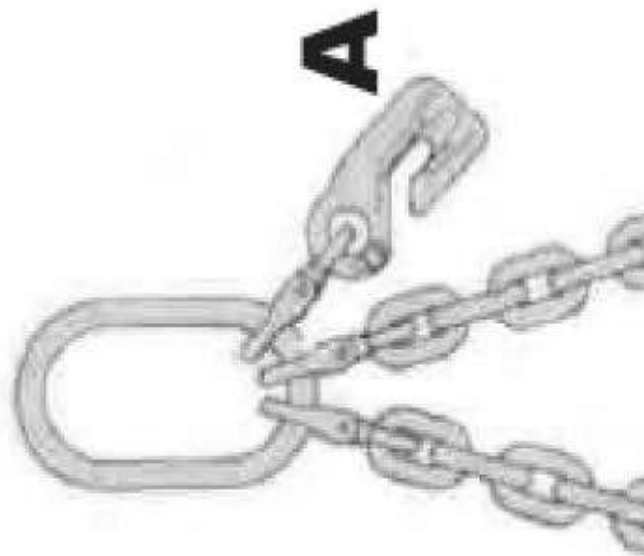
85. a) What determines the minimum distances that any part of plant and machinery has to be kept from overhead electricity lines and b) explain why a distance should be kept?

A.

THEORY TEST QUESTIONS (cont.)
Lifting equipment



B



A





We also carry out the following courses:

Plant NVQs

Construction NVQs

IPAF

PASMA

Confined Space

Site Safety Plus

New Roads & Street Works Act

Health, Safety & Environment Touch Screen Test

Driver CPC

HR Training & Development

1 Belfry Road
Cross Green
Leeds
LS9 0AY

Telephone: 0113 380 7900

www.hr-training.co.uk