



Instructions for the safe use of: Shackles

The information in this leaflet should be passed to the user of the equipment

DLH ONLINE

This document is issued in accordance with the requirements of Section 6 of the Health and Safety at Work etc Act 1974, amended March 1988. It outlines the care and safe use of SHACKLES and is based on Section 18 of the LEEA Code of Practice for the Safe Use of Lifting Equipment.* It should be read in conjunction with the requirements for general purpose slinging practice given overleaf, the principles of which may be applied to the use of shackles with or without slings.

This information is of a general nature only covering the main points for the safe use of shackles. It may be necessary to supplement this information for specific applications.

ALWAYS:

- Store and handle shackles correctly.
- Inspect shackles before use and before placing into storage.
- Select the correct pattern of shackle and pin for the application.
- Allow for the full resultant imposed load.
- Fully tighten the pin.
- Ensure the load acts through the centre line of the shackle using spacers if necessary to meet this requirement.

NEVER:

- Use shackles with bent pins or deformed bodies.
- Force, hammer or wedge shackles into position.
- Eccentrically load shackles.
- Replace the pin with a bolt.
- Fit pins in contact with moving parts which may loosen or unscrew them.
- Shock load shackles.

Selecting the Correct Shackle

Shackles are available in a range of material grades, sizes and designs. Select the shackle to be used and plan the lift taking the following into account:

Type of shackle to be used - dee or bow, British Standard or other design.

Type of pin - screwed with collar and eye are suitable for general purposes; with countersunk head for where clearance is limited; bolt and nut for where the pin may be out of sight or subject to movement.

Full resultant imposed load - when using shackles with multi-leg slings remember that as the included angle increases and so does the load in the leg and any attachment to the leg. When used to suspend pulley blocks account must be taken of the imposed load due to operating effort.

CAUTION: BS and ISO Standard shackles are designed and rated for the pin to accept a central point load. Other, commonly available, types are designed and rated for the load to be evenly distributed over the full width of the pin. Unless the basis for rating is clearly stated it should be assumed that the jaw must be fully filled and the load evenly spread across the shackle pin width.

Storing and Handling Shackles

Never return damaged shackles to storage. They should be dry, clean and protected from corrosion.

Do not alter, modify or repair shackles and never replace missing pins with unidentified pins, bolts etc, but refer such matters to a Competent Person.

Never galvanise or subject a shackle to other plating processes without the approval of the supplier.

Using Shackles Safely

Do not attempt lifting operations unless you understand the use of the equipment, the slinging procedures and the mode factors to be applied.

Do not use defective shackles or unidentified pins.

Shackles should be fitted so that the body takes the load along its centre line and is not subjected to side bending loads. When connecting a number of sling legs, and similar applications, position them so that they do not impose a side load on the shackle jaws. Use spacers to position them if necessary.

Ensure the pin is correctly screwed into the shackle eye. Tighten by hand, use a small bar to lock the collar to the shackle eye. Check that the thread is fully engaged with the body but is not too long so that tightening causes the body to deform.

With bolt and nut pins ensure the nut jams on the inner end of the thread and not on the eye of the shackle. The bolt should be free to rotate with minimal side float. The split cotter pin must be fitted before making a lift.

When using shackles with slings in choke hitch, or in other applications where there may be movement, place the pin through the eye or link of the sling and never in contact with the bight of the choke or moving parts which may cause the pin to unscrew.

In-service Inspection and Maintenance

Maintenance requirements are minimal. Keep shackles clean, the threads free of debris and protect from corrosion.

Regularly inspect shackles and, in the event of the following defects, refer the shackle to a Competent Person for thorough examination: illegible markings; distorted, worn, stretched or bent body; bent pin; damaged or incomplete thread forms; nicks, gouges, cracks or corrosion; incorrect pin; any other defect.

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Further information is given in:

* The Code of Practice for the Safe Use of Lifting Equipment, published by:

LIFTING EQUIPMENT ENGINEERS ASSOCIATION

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GENERAL PURPOSE SLINGING PRACTICE

The following information is based on Section 1 - Appendix 1.5 of the LEEA Code of Practice for the Safe Use of Lifting Equipment.* It should be read in conjunction with the instructions for the safe use, given overleaf, of which it forms an integral part and with any specific instructions issued by the supplier.

This information is of a general nature only covering the main points for the safe use of various types of slings for general lifting purposes.

ALWAYS:

- Plan the lift, establish the weight of the load and prepare the landing area ensuring that it will take the weight.
- Check slings and equipment are free of damage, use slings/slinging methods suitable for the load and protect slings from sharp edges and corners.
- Attach the sling securely to the load and appliance and position hooks to face outwards.
- Ensure the load is balanced and will not tilt or fall.
- Keep fingers, toes etc clear when tensioning slings and when landing loads.
- Ensure that the load is free to be lifted.
- Make a trial lift and trial lower.

NEVER:

- Use damaged slings or accessories.
- Twist, knot or tie slings.
- Hammer slings into position.
- Overload slings due to the weight of the load or the mode of use.
- Trap slings when landing the load.
- Drag slings over floors etc or attempt to pull trapped slings from under loads.
- Allow personnel to ride on loads.

Sling Configurations and Rating

Slings are available in single, two, three and four leg or endless form. In practice it will be found that chain, wire rope and fibre rope slings are available in any of these configurations but that flat woven webbing is limited to single leg and endless whilst roundslings are only supplied in endless form. The maximum load that a sling may lift in use will be governed by the slinging arrangement (mode of use) and may vary from the marked SWL.** In the case of textile slings the SWL for the various modes of use is usually given on the information label. In other cases it is necessary to multiply the marked SWL by a mode factor.**

The following three simple rules will ensure that the sling is not overloaded. In some cases this will mean that the sling will be under utilised although this is unlikely to hinder the user unduly. Where the maximum utilisation is required reference should be made to a Competent Person who understands the factors involved and who can perform the necessary calculations.

- (1) For straight lift never exceed the marked SWL and in the case of multi-leg slings the specified angle or range of angles.
- (2) When using slings in choke hitch multiply the marked SWL by 0.8 to obtain the reduced maximum load the sling may lift ie reduce the safe working load by 20%.
- (3) With multi-leg slings, when using less than the full number of legs, reduce the maximum load in proportion to the number of legs in use. Simply multiply the marked SWL by the number of legs in use expressed as a fraction of the total thus: one leg of a two leg sling = $\frac{1}{2}$ marked SWL, three legs of a four leg sling = $\frac{3}{4}$ marked SWL and so on.

Operative Training

Slings should only be used by trained operatives who understand the methods of rating and application of mode factors.****

Safe use of Slings

- o Good slinging practice must ensure that the load is as safe and secure in the air as it was on the ground and that no harm is done to the load, lifting equipment, other property or persons.
- o Establish the weight of the load, ensure the lifting method is suitable and inspect the sling and attachments for obvious defects. Prepare the landing area making sure the floor is strong enough to take the load. Follow any specific instructions from the supplier.
- o Ensure the lifting point is over the centre of gravity. Any loose parts of the load should be removed or secured. Secure the sling firmly to the load by hooks onto lifting points or shackles etc. The sling must not be twisted, knotted or kinked in any way.
- o Use packing to prevent damage to the sling from corners or edges and to protect the load.
- o Do not exceed the SWL or rated angle. Any choke angle must not exceed 120° and any basket 90°.
- o Do not hammer, force or wedge slings or accessories into position; they must fit freely.
- o When attaching more than one sling to the hook of the appliance use a shackle to join the slings and avoid overcrowding the hook.
- o Use an established code of signals to instruct the crane driver.
- o Ensure the load is free to be lifted and not, for example, bolted down.
- o Check that there are no overhead obstacles such as power lines.
- o Keep fingers, toes etc clear ensuring they do not become trapped when lifting, lowering or controlling loads.
- o Make a trial lift by raising the load a little to ensure it is balanced, stable and secure and if not lower it and adjust the slinging arrangement. o Where appropriate use tag lines to control the load.
- o Except where special provision is made, do not allow anyone to pass under or ride upon the load. The area should be kept clear.
- o Make a trial set down, ensure the sling will not become trapped and the load will not tip when the slings are released. Use supports which are strong enough to sustain the load without crushing.
- o Never drag slings over floors etc or attempt to drag a trapped sling from under a load. o Never use a sling to drag a load.
- o Place the hooks of free legs back onto the master link and take care to ensure that empty hooks do not become accidentally engaged.
- o Never use slings in contact with chemicals or heat without the manufacturers approval.
- o Never use damaged or contaminated slings.
- o On completion of the lift return all equipment to proper storage.

Further information is given in:

* LEEA Code of Practice for the Safe Use of Lifting Equipment.

** BS 6166 Part 1 - Lifting Slings, Methods of Rating.

*** BS 6166 Part 3 - Selection and Safe Use of Lifting Slings for Multi-purposes.

**** HSE Guidance Note GS39 - Training of Crane Drivers and Slingers.

Various British Standards covering individual products.