



Instructions for the safe use of shackles



This information should be made available to the user of the equipment.

This document is issued in accordance with the requirements 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 19 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 detailed in this document, the principles of which may be applied to the use of shackles either with or without slings.

The information is of a general nature only covering the main points for the safe use of shackles which comply with standards RR-C-271, EN13889 and the withdrawn standard BS3032, although withdrawn many shackles are still manufactured to this standard and are likely to remain in use for many years. It may be necessary to supplement this information for specific applications.

ALWAYS

- Store and handle shackles correctly.
- Inspect shackles before use and before placing in storage.
- Select the correct shackles pattern and pin type for the application.
- Ensure that the shackles are strong enough for the full resultant-imposed load.
- Fully tighten the pin.
- Ensure that the load acts through the centreline of the shackle using spacers if necessary to achieve this.

NEVER

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

NOTE! Untested, commercial pattern shackles are available for use in lashing applications, these should never be used for lifting applications.

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, to a recognised standard and design.

Type of pin – screw pin with collar and eye are suitable for general purposes, countersunk heads are available where clearance is limited. Bolt and nut pin where the shackle 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 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 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 across 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 clean, dry and protected from corrosion. Store on a rack or other container away from sources of moisture.

Do not alter, modify or repair shackles and never replace missing pins with unidentified pins, bolts etc. If in doubt consult a competent person.

Never galvanise or subject a shackle to any plating process without the approval of the manufacturer.

Selecting the correct shackle

Common types of shackle

Alloy screw pin bow shackle to RR-C-271 & ISO 13889



Alloy screw pin dee shackle to RR-C-271 & ISO 13889



Alloy safety pin bow shackle to RR-C-271 & ISO 13889



Alloy safety pin dee shackle to RR-C-271 & ISO 13889



Large or Small screw pin dee shackle to BS3032



Using Shackles Safely

Do not attempt lifting operations unless you understand the use and limitations to 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 the centreline and is not subjected to side bending loads. When connecting several 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.

If constructing a two-leg sling use a safety bow shackle attaching the sling legs to the bow of the shackle and placing the pin onto the hook.

Ensure a screw pin is correctly screwed into the shackle eye. Tighten by hand then 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 so short that it causes the body to deform, ensure the collar sits flush with the eye of the shackle.

With bolt and nut pins ensure that 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 should be fitted before making the lift.

If using a shackle with a synthetic sling ensure the shackle is big enough to avoid pinching or binding the sling.

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 other moving parts which may cause the pin to unscrew.

In Service Inspection and Maintenance

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

Regularly inspect eyebolts and in the event of any of the following defects refer to a competent person for thorough examination:

- Illegible markings.
- Distorted bent, stretched or bent body.
- Bent pin.
- Damaged or incomplete thread forms.
- Nicks, gouges or cracks.
- Corrosion or other defects.

Further information can be found in the Code of Practice for the Safe Use of Lifting Equipment published by the Lifting Equipment Engineers Association and available as a free download on www.leeaint.com/downloads

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 previously 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 it will take the weight.
- Check slings and equipment are free of damage, use slings/sliding 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 positioning slings and landing loads.
- Ensure 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.
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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 while roundslings are only supplied in endless form. The maximum load 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 appear underutilised although this should not hinder the user. Where the maximum utilisation is required, reference should be made to the competent person who understands the factors involved and 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 (i.e., SWL-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 being used. Simply multiply the SWL by the number of legs being used as a proportion of the whole (e.g., using three legs of four is $\frac{3}{4}$ SWL, one of two is $\frac{1}{2}$ SWL etc.)

Operator Training

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

Safe Use of Slings

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.

Establish the weight of the load, ensure the lifting method is suitable and inspect the slings 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.

Ensure the lifting point is over the centre of gravity. Any loose parts of the load should be removed or secured. Attach the slings firmly to the load onto lifting points or shackles etc. The sling must not be twisted, knotted or kinked in any way.

Use packing to protect the sling from damage and to protect the load.

Do not exceed the SWL or rated angle. Any choke angle must not exceed 120° and any basket 90°.

Do not hammer, force or wedge slings or accessories into position, they must fit freely.

When attaching more than one sling to the lifting appliance hook use a shackle to join the slings and avoid overcrowding the hook.

Use an established code of signals to instruct the crane driver.

Ensure the load is free to be lifted and not fixed down.

Check for overhead obstructions such as power lines.

Keep fingers, toes etc clear to ensure they do not get trapped.

Make a trial lift by raising the load a little to check for balance, stability and security., if not, lower and adjust the slinging arrangement.

Where appropriate use a tag line to control the load.

Except where special provision is made do not allow anyone to pass under or ride upon the load. Keep the area clear.

Make a trial set down, ensuring the slings will not become trapped and the load will not tip once the slings are released. Use supports which are strong enough to sustain the load without crushing.

Never drag slings across floors or attempt to a trapped sling from under a load.

Never use a sling to drag a load.

Place the hooks of free legs back onto the master link and take care to ensure that empty hooks do not become accidentally caught.

Never use slings in contact with chemicals or heat without the manufacturer's approval

Never use damaged or contaminated slings.

On completion of the lift return all equipment to proper storage.