

SAFETY AND HEALTH STANDARDS SLINGS and RIGGING HARDWARE

Effective Date: 05/10/11

Standard: 16.6

Document Number: **KUCSH0049**

Rev: 04

16.6.1 INTRODUCTION

16.6.1.1 This standard describes the requirements that apply to the storage, inspection, and use of detachable rigging hardware used for lifting purposes.

16.6.2 DEFINITIONS

16.6.2.1 Shackle – A U shaped load bearing connector designed to be used with a removable pin.

16.6.2.2 Pin, shackle – A steel bolt made to span the two shackle ears.

16.6.2.3 Qualified Person – A person who, by possession of a recognized degree in an applicable field or certificate of professional standing, or who, by extensive knowledge, training, and experience, has successfully demonstrated the ability to solve or resolve problems relating to the subject matter and work.

16.6.2.4 Sling – An assembly used for lifting when connected to a lifting mechanism. The upper portion is connected to the lifting mechanism and the lower supports the load.

16.6.2.5 Rigging hardware – This hardware includes shackles, links, rings, swivels, turnbuckles, spreader bars, eyebolts, and hoist rings. (The use of non-engineered “home made” rigging hardware is prohibited.)

16.6.3 REQUIREMENTS

16.6.3.1 A register of rigging slings must be established.

16.6.3.2 All slings shall be inspected by a qualified person annually. Inspections and repairs to cables and lifting equipment must comply with the manufacturer’s specifications and regulatory requirements. A tag will be attached to the sling indicating the annual inspection has been completed and all information must remain legible.

- A sling will also be inspected by a qualified person after any unusual situation that may have damaged it, such as overload, accident, or fire. It should not be placed back in service until its continued safe use has been verified.

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- 16.6.3.3 Employees that are assigned to tasks associated with the use of slings and other lifting hardware will be trained in selection, inspection and rigging practices associated with lifting activities.
- Employee(s) shall be responsible for inspecting, on a daily basis before each use, all slings and other rigging hardware for damage, wear, or defects. Damaged, defective, or worn equipment must be **IMMEDIATELY** REMOVED FROM SERVICE AND PROPERLY DISPOSED OF. (See 16.6.3.6)
- 16.6.3.4 Wire rope slings shall be removed from service if any of the following conditions are present:
- Ten randomly distributed broken wires in one rope lay, or five broken wires in one strand lay. Snagged, nicked, or severely bent wires count as broken wires.
 - Wear or scraping of 30% of the original diameter of the outside individual wires.
 - Kinking, crushing, birdcaging, or any other damage resulting in distortion of the wire rope structure.
 - Evidence of heat damage.
 - Any marked reduction in diameter either along the entire main length or in one section.
 - More than one broken wire in the vicinity of a zinced and / or swaged fitting.
- 16.6.3.5 Slings must be removed from service if hooks are cracked, have been opened more than 15% of the normal throat opening (measured at the narrowest point) or twisted more than 10 degrees from the plane of the unbent hook. (Normal opening is the designed throat opening dimension.)
- 16.6.3.6 Slings that are removed from service due to defects shall be tagged out of service and the supervisor will be notified. The supervisor will schedule for a qualified person to inspect items taken out of service so they can be either repaired and recertified or destroyed if repair is not practical.
- 16.6.3.7 Slings must be used in accordance with the rated capacity as shown on the sling collar or tag. When purchasing, the rated capacity is to be specified and stamped on the collar or attached tag.

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- Slings must not be shortened with knots or bolts or other makeshift devices.
- Eyes in wire rope slings must not be formed by using knots or wire rope clips.
- Sling legs must not be kinked.
- Slings must be protected or padded to prevent contact with sharp edges of loads (look for cuts or damage).
- Slings must not be pulled from under loads when the load is resting on the sling.
- Shock loading is prohibited.
- All lifting hooks (except for grab and chain shortening hooks) will be fitted with a safety latch to prevent the load from accidentally detaching, unless otherwise specified in a risk assessment.

16.6.3.8 A procedure must be in place to prevent the use of lifting or rigging equipment in lifting operations if such equipment has been used for towing. All such equipment that has been designated for towing must be tagged as such.

16.6.3.9 Bridles and associated rigging for attaching the manbasket to the hoist line may be used only for the manbasket and are not to be used for any other purpose when not hoisting personnel (See Safety and Health Standard 16.20).

16.6.3.10 Synthetic web slings:

- Each sling must be marked or coded to show the rated capacities for each type of hitch and synthetic web material (look for the marking).
- Nylon web slings must not be used where fumes, vapors, spray, mists, or liquids of acids or phenolics are present.
- Polyester and polypropylene web slings must not be used where fumes, vapors, sprays, mists, or liquids of caustics are present.
- Synthetic web slings must not be used to lift where sharp metal edges are present. Blocking must be used to prevent the sling from contacting the metal edges.

16.6.3.11 Synthetic webbing slings with one or more of the following visible defects shall be removed from service.

- Acid or caustic burns.
- Melting or charring of any part of the surface.

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- Snags, punctures, tears, or cuts.
- Broken or worn stitches that expose the warning cords.
- Wear or elongation exceeding the amount recommended by the manufacturer.
- Distortion of fittings.
- Frozen slings or slings subjected to temperatures below minus 20°F or above 180°F shall be removed from service or have capacities reduced in accordance with manufacturer's requirements.

16.6.3.12 All Slings must be stored in a manner that will protect them from damage by moisture, heat, corrosion, or physical abuse.

16.6.3.13 Shackles shall be removed from service if damage such as the following is visible:

- Indications of heat damage including unauthorized welding on or weld spattering.
- Excessive nicks or gouges.
- A 10% reduction of the original or catalog dimension at any point around the body or pin.
- Incomplete pin engagement or thread damage.

REFERENCES:

MSHA 30 CFR Subpart M and O.

OSHA 29 CFR 1910.184

ASME B30.9 - 2010

ASME B30.26 - 2004

Safety and Health Standard 16.4 Cranes and Hoists

Safety and Health Standard 16.20 Fall Protection (Working at Heights)

REVISION HISTORY:

MOC#	Description of Change	Prepared By	Date
15573	Scheduled review and update – last update 05/05. The standard was reviewed and updated by the C6 Standards Champion and Custodians. Updated format and Document number added.	KUC Safety and Health Standards Committee	04/11