Inspection Criteria
for Rigging Accessories and Wire Rope and Slings
per DOE-STD-1090-2004

This inspection criterion is intended to cover operator pre-use inspections only. It does not cover the qualified inspector’s initial and period inspections. It does not cover operational requirements, proof testing, care, maintenance or storage. These issues are detailed in the appropriate sections of DOE-STD-1090-2004 and should be reviewed by the operator prior to use.

Rigging Hooks
- The manufacturer’s identification shall be forged, cast, or die-stamped on a low-stress and non-wearing area of the hook.
- The operator or other designated person shall visually inspect hooks daily or prior to first use, if the hook is not in regular service, for the following (records are not required):
  1. Cracks, nicks, gouges.
  2. Deformation.
  3. Damage from chemicals.
  4. Damage, engagement, or malfunction of latch (if provided).
  5. Evidence of heat damage.
  6. Wear.
  7. Hook attachment and securing means.
If any of the above conditions are found remove the hook from service and contact MFD Safety Officer.

Shackles
- Each shackle body shall be permanently and legible marked by the manufacturer.
- Raised or stamped letters on the side of the bow shall be used to show:
  1. Manufacturer’s name or trademark.
  2. Size.
  3. Rated capacity, recommended safe working load.
- Grade A shackles (Regular Strength), together with their pins and bolts shall be forged from carbon steel.
- Grade B shackles (High Strength) together with their pins and bolts shall be forged from alloy steel.
- Shackle pins shall fit freely without binding and seat properly.

Eyebolts
- Eyebolts used for hoisting shall be fabricated from forged carbon or alloy steel.
- Eyebolt marking:
  1. Carbon Steel Eyebolts shall have the manufacturer’s name or identification trademark forged in raised characters on the surface of the eyebolt.
  2. Alloy Steel Eyebolts shall have the symbol “A” (denoting alloy steel) and the manufacturer’s name or identification mark forged in raised characters on the surface of the eyebolt.
- Carefully inspect each eyebolt before use.
- Visually inspect the hole to ensure that there has been no deformation.
- Check the condition of the threads in the hole to ensure that the eyebolt will secure and the shoulder can be brought down snug.
- Destroy eyebolts that are cracked, bent, or have damaged threads.
- Ensure that the shank of the eyebolt is not undercut and is smoothly radiused into the plane of the shoulder or the contour of the ring for non-shouldered eyebolts.

Turnbuckles
- Turnbuckles may be used in sling systems provided that they are engineered, designed, and approved as a part of the sling system. Approved turnbuckles shall be marked and identified...
for use with the sling set for which they were designed and shall be load-tested as part of the sling set.

- Before each use, turnbuckles shall be inspected for damage. Damaged threads, jamb nuts, or bent frame members make the unit unsuitable for use.
- Turnbuckles shall be fabricated from forged alloy steel.
- Turnbuckles shall be provided with a jam nut of a type which does not depend upon deformation of the threads for security.
- Manufacturer's name or trademark and turnbuckle size shall be permanently marked on the body of the turnbuckle.

**Links and Rings**

- Links and rings are usually designed and manufactured as a part of the lifting hardware for a specific purpose, such as the peak link on multiple-leg slings. However, the rings and links may also be found on the load-attachment end of slings.
- Welded rings or links shall be subjected to a nondestructive weld test (NDT) and have documentation provided. NOTE: NDT is not required for forged rings or links.
- Rings shall be forged or welded from low alloy steel.
- Rings or links should be marked by the manufacturer with the manufacturer's name or trademark and ring or link size.

**Swivel Hoist Rings**

- Swivel hoist rings for hoisting shall be fabricated from forged carbon or alloy steel.
- Swivel hoist rings shall have the manufacturer's name or trademark, working load limit (WLL), and recommended torque value permanently marked (forged, stamped, or inscribed) by the manufacturer on the swivel hoist ring. Permanently attached metal tag bearing the same information may also be used.
- Carefully inspect each swivel hoist ring before use (see Figure 12-6).
- Visually inspect the hole to ensure that there has been no deformation.
- Check the condition of the threads in the hole to ensure that the hoist ring will secure and the bushing can be brought down snug.
- Destroy hoist rings that are cracked, bent, have damaged threads, or do not operate freely.
- Permanently installed hoist rings shall be inspected before each use to ensure free movement of bail and swivel.

**Wire Rope Sling**

- Wire-rope sling users shall visually inspect all slings each day they are used or prior to use if the sling has not been in regular service (records are not required).
- Users shall carefully note any deterioration that could result in an appreciable loss of original strength and determine whether further use of the sling would constitute a safety hazard.
- Slings shall be immediately removed from service if any of the following conditions are present:
  1. Ten randomly distributed broken wires in one rope lay or five broken wires in one strand in one rope lay.
  2. Wear or scraping of one-third the original diameter of the outside individual wire.
  3. Kinking, crushing, bird caging or any other damage resulting in distortion of the rope structure.
  4. Evidence of heat damage.
  5. End attachments that are cracked, deformed, or worn.
  6. Corrosion of the rope or end attachments.
  7. Missing or illegible sling identification.
- Wire-rope slings shall be marked with the manufacturers name, id or trademark, rated capacity for the type of hitch(es), working load limit, purchase order number or serial number, diameter or size, evidence of periodic inspection date. Sling identification should be maintained by the user so as to be legible during the life of the sling. (Stenciling or stamping on the swages of a sling is not recommended.)
Wire rope purchased to fabricate slings shall be made in the United States by a member of Wire Rope Technical Board (Except stainless steel). Stainless steel wire rope shall be made in the United States and shall be 302 or 304 grade stainless steel.

Wire Rope Clips (Clamps)
- Shall be permanently and legibly marked with the size and manufacturer’s identifying mark.

Alloy Steel-Chain Slings
- This section applies to slings made from grade 80 and 100 alloy chain manufactured and tested in accordance with National Association of Chain Manufacturers welded steel chain specifications – 1990. If chain other than this is used, it shall be used in accordance with the recommendations of the chain manufacturer.
- Steel-chain sling users shall visually inspect all slings before they are used as follows:
  1. Conduct a link-by-link inspection for the following defects: nicks, cracks, gouges, wear, bent links, stretched links, shearing of links, cracks in any section of link, scores, abrasions, heat damage, rust, corrosion or markings tending to weaken the links. Reject if discovered.
  2. Check steel-chain slings for uneven lengths when sling legs are hanging free.
  3. Check rings and hooks for bends, distortion, cracks in weld areas, corrosion, and scores, heat damage, or markings tending to weaken the links. Reject if discovered.
  4. Perform inspection on an individual-link basis. If any link does not hinge freely with the adjoining link, remove the assembly from service.
  5. Remove from service assemblies with deformed master links or coupling links.
  6. Remove from service assemblies if hooks have been opened more than 15 percent of the normal throat opening measured at the narrowest point or twisted more than 10 degrees from the plane of the unbent hook.
  7. Do not straighten deformed hooks or other attachments on the job. Assemblies with such defects shall be reconditioned by the manufacturer or discarded.
  8. Remove from service assemblies with cracked hooks or other end attachments; assemblies with such defects shall be reconditioned or repaired prior to return to service.
  9. Do not use homemade links, makeshift fasteners formed from bolts, rods, and the like, or other nonstandard attachments. Reject if discovered.
  10. Do not use makeshift or field-fabricated hooks on steel-chain slings. Reject if discovered.
- Ensure that steel-chain slings used are permanently marked with size, manufacturer’s grade, rated load and angle on which the rating is based, reach, number of legs, sling manufacturer and inspection due date. This information may be stenciled or stamped on a metal tag or tags affixed to the sling.

Metal-Mesh Slings
- Users of metal-mesh sling shall visually inspect all metal-mesh slings before each use.
- Metal-mesh slings shall be removed from service if any of the following defects are present:
  1. A broken weld or brazed joint along the sling edge.
  2. A broken wire in any part of the mesh.
  3. Reduction in wire diameter of 25 percent due to abrasion or 15 percent due to corrosion.
  4. Lack of flexibility due to distortion of the mesh.
  5. Distortion of the female handle so the depth of the slot is increased by more than 10 percent.
  6. Distortion of either end fitting so the width of the eye opening is decreased by more than 10 percent.
  7. A 15 percent reduction of the original cross-sectional area of metal at any point around a handle eye.
  8. Any distortion or twisting of either end fitting out of its plane.
9. Cracked end fitting.
10. Evidence of heat damage.

Synthetic-Web Slings
• Users of synthetic-web sling shall visually inspect all slings before each use.
• Slings shall be removed from service if any of the following defects are visible:
  1. Acid or caustic burns.
  2. Melting or charring of any part of the surface.
  3. Snags, punctures, tears, or cuts.
  4. Broken or worn stitches.
  5. Wear or elongation exceeding the amount recommended by the manufacturer.
  6. Distortion of fittings.
  8. Missing or illegible sling identification.
• Ensure that each sling is permanently marked to show:
  1. Name or trademark of manufacturer.
  2. Manufacturer’s code or stock number.
  3. Rated capacity for types of hitches used.
  4. Type of synthetic-web material.
  5. Hand written, or ink embossed markings are not acceptable. Sling tags shall be indelibly marked and the lettering shall not wear off with use. The markings shall remain legible for the life of the sling.

Synthetic Roundslings
• Users of synthetic roundslings shall visually inspect all slings before each use.
• Each polyester roundsling shall be permanently marked or labeled showing:
  1. Name or trademark of manufacturer.
  2. Manufacturer’s code or stock number.
  3. Rated capacities for the three basic hitches. (Vertical, choker, vertical basket)
  4. Core fiber type – if cover(s) is of a different fiber type, both fiber types shall be identified.
  5. Length (reach) – bearing point to bearing point.
  6. Each manufacturer shall internally identify their product with name or trademark for traceability.
• Slings shall be removed from service if any of the following defects are visible:
  1. Acid or caustic burns.
  2. Melting or charring of any part of the surface.
  3. Snags, punctures, tears, cuts or abrasive wear that expose the core yarns.
  4. Broken or worn stitches in the cover which exposes the core yarns.
  5. Wear or elongation exceeding the amount recommended by the manufacturer.
  6. Stretched, cracked, worn, pitted or distortion of fittings.
  8. Missing or illegible sling identification.