

Report Date: 30 Apr 2012

**Summary Report for Individual Task
551-881-8122
Perform field maintenance on lifting devices
Status: Approved**

DISTRIBUTION RESTRICTION: Approved for public release; distribution is unlimited.

DESTRUCTION NOTICE: None

Condition: Aboard a vessel, at sea, at anchor or moored alongside a pier, day or night, under all sea and weather conditions, given a lifting device.

Standard: The Soldier, when asked, correctly recited from memory the definitions pertaining to lifting devices, correctly identified the testing requirements and inspection intervals, and correctly identified the installation level procedures for the inspection of lifting devices. The Soldier correctly conducted the inspection and testing of cranes, hoists and slings.

Special Condition: None

Special Standards: None

Special Equipment:

Safety Level: Medium

MOPP:

Task Statements

Cue: None

DANGER

None

WARNING

None

CAUTION

None

Remarks: None

Notes: None

Performance Steps

1. Demonstrate basic knowledge of the definitions pertaining to lifting devices.

a. Lifting Devices. Any device or component used to raise, lower, hold, or position a load from one location or elevation to another.

b. Lifting Fixtures. Any device or assembly of devices used to facilitate attachment of a load to a lifting device. Examples of lifting fixtures include an H-beam with nylon slings, wire rope with spreader bars or rope with lifting clamps.

c. Load Rating. The load rating is the maximum authorized load that may be lifted by a lifting device. The load rating may be less than or equal to, but shall not exceed the Manufacturer's Rated Load. For fixtures, the smallest Manufacturer's Rated Load component shall equal the fixtures rated load.

d. Manufacturer's Rated Load. The Manufacturer's Rated Load is the maximum load that a piece of equipment and/or its accessories are allowed to lift; based on the equipment's capacity data plate or other guidance from the manufacturer.

Note: The requirements of Title 29, Code of Federal Regulations, Parts 1915, 1917, 1918, and 1919 take precedence over any bulletins for lifting devices used in maritime application.

2. Identify testing requirements pertaining to lifting devices.

a. Prior to initial use, all new, extensively repaired, or altered lifting devices shall be given a rated load test. Manufacturers and repair activities should perform this test and provide written certification of load testing to the using activity. If load test certification is not obtained or available, using activities shall arrange for testing, through General Support (GS) or Direct Support (DS) maintenance activities. Manufacturer's certification or other records of rated load testing shall be maintained by the using activity.

Note: A test load, when required, may exceed the manufacturer's rated load as much as the applicable percentage in Table 551-881-8122_01.

b. Prior to initial use, all new, extensively repaired, or altered lifting devices shall be given a functional test to determine operability of the equipment. Before performing the functional test, the proper operation of brakes and limit, locking, and other safety devices shall be tested under no-load conditions.

c. Lifting devices which have been idle for one year or more shall be functionally tested at 100 percent of the rated load prior to use.

d. To determine the test load, refer to Table 551-881-8122_01 unless other parameters are specified by the manufacturer. The load rating may be less than or equal to, but shall not exceed the Manufacturer's Rated Load. For fixtures, the smallest Manufacturer's Rated Load component shall equal the fixture's rated load.

(1) Test loads for all types of cranes and hoists may take the form of a calibrated load indicator, a calibrated dynamometer, weights that may be locally fabricated, or any available item of proper weight.

(2) All load testing devices, i.e., load indicator and dynamometer, shall have a valid calibration label affixed in a conspicuous place. All locally fabricated weights and available items used for load testing must be verified for proper weight by the use of a calibrated scale.

e. Upon successful completion of the load test, the lifting device will be assigned a load rating. The load rating shall be clearly marked on the device. In addition, the load rating shall become a part of the maintenance records of the equipment.

f. Preventive maintenance intervals and additional load testing may be established locally based on the type of materials handled, equipment utilization, local requirements or conditions, manufacturer's recommendations, and special requirements.

Item	Test Load (Given as percentage of load rating)
Cranes, Mobile All Capacities	110%
Cranes, Fixed All Capacities	125%
Hoists, Powered or Manual All Capacities	110%
Forklift Trucks	100%
Jacks	100%
Metal Mesh Slings All Sizes	150%
Wire Rope *	
Wire Rope, Chain or Synthetic Web **	200%
Lifting Fixtures ***	200%
All other Lifting Devices	100%
* When tested as an integral part of a lifting device which is listed elsewhere in this table, use the Maximum Test Load for that device.	
** When tested separately from other lifting device components.	
*** When the rope, chain, or synthetic web is easily removed from a fixture, it should be tested separately.	

Test Load Table
Table 551-881-8122_01

3. Identify inspection intervals and requirements pertaining to lifting devices.

a. Prior to initial use of all new, extensively repaired, or altered lifting devices, visual inspection shall be performed in accordance with the criteria specified in (b) below, and the applicable appendix under both daily and periodic inspection criteria. This inspection shall be performed before, during, and after load testing.

b. All lifting devices shall be inspected in accordance with the applicable appendix of TB 43-0142, applicable equipment TM, manufacturer's recommendations, and the following minimum criteria:

Note: Locally developed forms should be used to record the accomplishment of daily inspections. To provide operators of lifting equipment with daily safety inspection information, it is advisable to attach a card, placard, or other means of describing pertinent inspection criteria contained in the appendixes of TB 43-0142.

(1) Daily inspection of lifting devices shall be performed by the operator before use. Also, prior to use, lifting devices which have been idle for one month or more, but less than six (6) months, will be given an inspection in accordance with daily inspection criteria, plus a thorough, documented inspection of wire ropes, crane hooks, and crane hoist chains. Daily inspections should comply with the criteria specified in the appropriate technical manual for the device or the applicable appendix of TB 43-0142. Manufacturer's manuals will also be used for commercial equipment as available.

(2) Monthly inspections shall be conducted on critical items in use such as hooks, wire ropes, brakes, and hoist chains. Operator or Unit Maintenance personnel who are technically experienced and qualified may be designated to perform these inspections.

(3) Periodic inspections shall be conducted by Unit Maintenance personnel, assisted by Operator/Crew personnel, at least every twelve (12) months and prior to the use of lifting devices which have been idle for six (6) months or more. Periodic inspection criteria in the appropriate appendix, manufacturer's documentation, and applicable equipment TMs shall be used to determine serviceability of the equipment.

(4) Periodic inspections of lifting devices for handling hazardous materials such as ammunition and explosives, molten metals, acids, strong caustics, and flammable and toxic materials shall include a functional test. The periodic inspection and functional test procedures shall be repeated before handling any load heavier than that lifted in the last functional test. The heaviest load shall never exceed the load rating of the lifting device.

(5) Inspection and test results, excluding daily inspections, shall become part of the maintenance record of the lifting device.

4. Identify installation level procedures for the inspection of lifting devices.
 - a. Ensure that only qualified personnel are assigned to the inspection, testing, and maintenance of lifting devices.
 - b. Ensure that test operators are carefully selected, and thoroughly trained before they are permitted to test-operate powered materials handling equipment.
 - c. Ensure that signalmen/operator helpers, or personnel supervising load test lifts, are thoroughly knowledgeable of standardized hand signals.
 - d. Ensure that maintenance, inspection, and testing programs are initiated and conducted for all lifting devices in accordance with the requirements of the applicable Department of the Army technical publications for special type or special use lifting devices, when appropriate. Tool set components such as hydraulic jacks, rings, hooks, spreader bars, "A"-frames, and lifting clamps are considered secondary items and their inspection and testing may be accomplished at the Unit Maintenance level. (Testing will be accomplished by support maintenance when units are unable to because of lack of equipment or expertise.)
 - e. Ensure that maintenance records for each lifting device are initiated and maintained in accordance with DA Pam 738-750. Monthly (cranes only) and periodic inspections, and required tests should be scheduled on DD Form 314 (Preventive Maintenance Schedule and Record), or through Automatic Data Processing (ADP). The records should include:
 - (1) Nomenclature of the lifting device, including manufacturer's rated load.
 - (2) Identifying marks, i. e., serial number, date of manufacture, etc.
 - (3) Test certification (DD Form 314 entry signed by test operator or test director; or manufacturer's or repair contractor's certificate), attesting to the fact that a load test has been successfully passed.
 - (4) Location of stationary lifting devices or location of responsible organization for mobile or portable lifting devices.
 - (5) Schedule and record of inspections.
 - (6) Schedule of tests and records of result, including current load rating of the lifting device, and data describing the characteristic load (for lifting devices handling hazardous materials), etc.
 - (7) Schedule of maintenance services.
 - (8) Records of parts replaced.
 - (9) The critical dimensions of all features of lifting devices whose functional serviceability is determined by wear.
 - (10) Any additional data pertinent to identification or safe operation.
 - (11) Signature of the person who performed the inspection.
 - f. Establish a marking system and mark all equipment in accordance with requirements of AR 750-1.

Note: Stenciling is not required on lifting devices seven or more feet above floor level.
 - g. The load rating and date of the next periodic inspection shall be stenciled on crane booms and other basic units. The stencil should be of sufficient size and be located so it will be clearly visible from the ground and from the operator's position.

h. Hoists, chains, slings, and hooks have permanently affixed durable identification number, load rating, and next periodic inspection date and shall be marked to indicate the item identification number, load rating, and updated to indicate the next periodic inspection date. This marking may be accomplished by means of color coding, pressure sensitive tapes, metal tags, or a combination of these methods. Hooks shall not be painted, as doing so would cover small cracks.

i. A"-frames, shop floor cranes, hoist beams, jack stands, and jacks, shall be stenciled with the load rating and date of the next periodic inspection.

j. Forklifts shall be stenciled on the side of the mast to the operators left with load rating and the date of the next periodic inspection. Stenciled letters should be one inch or larger in size.

k. Lifting fixtures shall be marked to indicate use of fixture, the load rating, source of load rating, and next periodic inspection date. This marking may be accomplished by means of color coding, pressure sensitive tapes, metal tags, or a combination of these methods. Hooks shall not be painted as doing so would cover small cracks.

Note: Under no circumstances shall these markings be painted over or removed, except for maintenance or inspection, or change of the forklift's load rating, at which time the item will be re-stenciled.

l. Ensure that daily and periodic inspections are performed in accordance with this publication or the applicable technical manuals for special type or special use lifting devices, when appropriate. Preventive maintenance should be scheduled and performed in accordance with applicable technical publications, and/or manufacturer's manuals, as available.

5. Conduct daily, monthly, and periodic inspections and tests of cranes.

a. The following items shall be inspected daily or prior to use:

(1) All controls and operating mechanisms for maladjustments, excessive wear, or contaminated by leaking lubricants or foreign material.

(2) All safety devices for malfunction.

CAUTION

Raise and lower the hoisting mechanism very slowly when testing limit switches.

(3) All installed hoist and travel limit switches should be checked for failure by raising and lowering throughout the full range of the lifting device with no load other than that of the hoisting mechanism. The hoisting mechanism should be raised and lowered very slowly when testing limit switches.

(4) Air or hydraulic systems components for deterioration or leakage. Hydraulic fluid leakage is classified as follows:

(a) Class I; Seepage of fluid (as indicated by wetness or discoloration) not great enough to form drops.

(b) Class II; Leakage of fluid great enough to form drops but not enough to cause drops to drip from the item being checked/inspected.

(c) Class III; Leakage of fluid great enough to form drops that fall from the item being checked/inspected.

(5) Crane load hooks for;

(a) Deformation.

1 Throat opening of more than fifteen percent in excess of normal.

2 More than ten degree twist from the plane of the unbent hook.

(b) Cracks.

(c) Wear.

(d) Damage or malfunctioning latch and hook attachment.

(e) Remove hooks from service if they meet one or more of the above criteria.

(f) Remove hooks having any visual evidence of an increase in throat opening, twisting, or deformation of any sort from service when the original dimensions of the hook are not known.

(6) Electrical apparatus for malfunction, signs of excessive deterioration, dirt, and moisture accumulation.

(7) All rope and cables for improper rigging and excessive wear, or damage such as;

(a) Reduction of rope diameter below nominal value.

(b) Broken outside wires.

(c) Worn outside wires.

(d) Corroded, broken, or frayed wires at end connections.

(e) Corroded, cracked, bent, worn, improperly sized, or improperly applied end connections.

(f) Severe bending.

(g) Kinking.

(h) Crushing.

(i) Caging.

(j) Popped core.

(k) Evidence of damage due to welding arc or other heat sources.

(8) Hoist chains for;

(a) Excessive wear or stretch.

(b) Bent or twisted links.

(c) Defective welds.

(d) Nicks and gouges.

b. When any of the above items are found to exist, further operations of the crane will be discontinued until it has been corrected or determined to present no hazard. An exception is that equipment operation is allowable with Class I or II hydraulic leaks provided consideration is given to the fluid capacity of the equipment and fluid levels continue to be checked as normally required. This exception does not apply to leakage of hydraulic brake systems.

c. Monthly inspections shall include the items of daily inspection above and the following:

(1) Greasing of all grease fittings.

(2) Wire Rope; make a thorough documented inspection of all ropes. Particular attention shall be given to inspection of rope sections subject to rapid deterioration, such as the following:

(a) Sections in contact with saddles, equalizer sheaves, or other sheaves where rope travel is limited.

(b) Sections of rope at or near terminal ends; sections subject to reverse bends.

(c) Sections normally hidden during daily visual inspections.

(d) Repetitive pickup points on drums.

(3) Presence of any of the following shall be cause for the wire rope to be removed from service;

(a) Broken Outside Wires. Those sections of the rope subjected to reverse bends and operation over small diameter drums or sheaves require particularly close attention;

1 Replace the wire rope when six randomly distributed broken wires in one rope lay, or three broken wires in one strand in one rope lay are found.

2 Broken wire count should be made of the worst strand at the worst section of the wire rope and confined to the distance required for one strand to make one complete turn around the rope.

3 Broken wire count will be entered on the test record.

(b) Reduction of Rope Diameter. Measure for reduction of rope diameter. Several measurements shall be taken at locations subject to the most stress and wear;

(c) Marked reduction in diameter of wire rope may indicate loss of core support. The continued use of wire rope of reduced diameter will cause sheave distortion. Replacement should be made when reductions are more than:

1 1/64 inch for diameters up to and including 5/16 inch.

2 1/32 inch for diameters 3/8 inch up to and including 1/2 inch.

3 3/64 inch for diameters 9/16 inch up to and including 3/4 inch.

4 1/16 inch for diameters 7/8 inch up to and including 1-1/8 inch.

5 3/32 inch for diameters 1-1/4 inch up to and including 1-1/2 inch.

(d) Worn Outside Wires, replace when wear of one-third the original diameter of outside individual wires is observed.

(e) Corroded, Broken, or Frayed Wires at End Connections.

1 Ropes should be examined frequently at socketed fittings, and upon the development of one broken wire adjacent to this point, the rope should be re-socketed or replaced.

2 Re-socketing should not be attempted if the resulting rope length will be insufficient for proper operation.

(f) Corroded, cracked, bent, worn, improperly sized, or improperly applied end connection.

(g) Severe kinking, crushing, cutting, or unstranding.

(h) Evidence of damage due to welding arc or other heat sources.

(i) No less than two full wraps of rope remaining on the hoist drum is permitted when the hook is in its extreme low position with the boom in its most upright position. The rope end shall be securely attached to the drum by the clamp or socket arrangement approved by the crane or rope manufacturer. The same limit applies to the boom hoist drum rope when the boom is in its extreme low position.

(4) Hooks; Perform a documented inspection of crane hooks for cracks, throat opening of more than fifteen percent in excess of normal, more than ten degree twist from the plane of the unbent hook or wear exceeding ten percent of the original dimensions. Remove hooks from service if they meet one or more of the above criteria. Remove hooks having any visual evidence of an increase in throat opening, twisting, or deformation of any sort from service when the original dimensions of the hook are not known.

(5) Hoist Chains; Perform documented inspection of hoist chains for excessive wear, twist, distorted links, or stretch beyond manufacturer's recommendation.

d. Periodic Inspections; Complete inspection of cranes shall be performed at the intervals defined in paragraph 3. These inspections should include the items of the daily and monthly inspections above, requirements of any applicable technical manuals, and the following:

(1) Proper marking to include load ratings and date of next periodic inspection.

(2) Evidence of mishandling and/or damage.

(3) Deformed, cracked, broken, missing or corroded members in crane structure and boom.

(4) Loose bolts or rivets.

(5) Cracked or worn sheaves and drums.

(6) Worn, cracked, or distorted parts such as pins, bearings, shafts, gears, rollers, and clamping devices.

(7) Electrical apparatus, for signs of pitting or any deterioration of controller contactors, limit switches and pushbutton stations.

(8) Excessive wear on brake and clutch system parts, linings, pawls, and ratchets.

(9) Load, boom angle, wind, and other indicators over their full range for any significant inaccuracies. For all of the above indicators, the indicated value shall be no greater than 119 percent, and no less than 97 percent of the actual (true) value. For any conversions required by the operation, such as converting boom angle degrees into radius feet, a conversion chart shall be provided.

(10) Gasoline, diesel, electric, or other power plants for improper performance or noncompliance with safety requirements.

(11) Steering, braking, locking, and travel devices for malfunction.

(12) Excessively worn or damaged tires or tracks, when applicable.

(13) Excessive wear of chain drive sprockets and excessive chain stretch.

(14) Booms. Check for bends, distorted sections, broken welds, excessive corrosion, loose bolts or rivets, operable weights and boom angle indicator.

Note: Usage and testing of repaired (rebuilt) and or modified lattice type booms is authorized only upon approval by the National, Maintenance Point (NMP)

(15) Drums, Sheaves, Pulleys. Check for:

(a) Smoothness and freedom from surface defects.

(b) Eccentric bores, cracked hubs, spokes, or flanges. (Any of these defects will cause the crane to be removed from service.)

(c) Size and configuration of grooves, a sheave or pulley with a ten percent increase in groove depth or internal flange width due to wear or distortion shall be replaced.

(d) Sheave pitch diameters:

1 Boom hoisting sheaves shall have pitch diameters of not less than fifteen times the nominal diameter of the wire rope used.

2 Load hoisting sheaves shall have pitch diameters of not less than eighteen times the nominal diameter of the rope used.

3 Hook block sheaves shall have pitch diameters of not less than sixteen times the diameter of the rope used.

(e) Cracked or worn sheaves and drums.

(f) Proper sheave diameter.

(g) Rope properly secured to the drum.

1 When the crane or hoist is in its extreme upright and extended position and the hook is touching the ground, there shall be two full wraps of cable remaining on the drum.

2 When the boom is in its extreme low position there shall be two full wraps of cable remaining on the boom hoist drum.

3 Pay particular attention to those positions of the rope subjected to reverse bends and operation over small diameter drums and sheaves.

(h) Compatibility with type of use. For example;

1 Rope used cranes exposed to high heat must have a steel wire core.

2 A corrosive resistant core and/or galvanized finish is required for an excessively corrosive exposure.

3 Fiber core wire rope slings of all grades should not be exposed to temperatures in excess of 200 F.

(i) Excessive wear of chain-drive sprockets and excessive chain stretch.

(16) Hydraulic Hoses, Fillings, and Tubing Inspection. All hydraulic hoses, fittings and rigid tube lines should be inspected. Particular attention should be given to those hoses which flex in normal operation of crane functions. Any deterioration should be carefully examined and determination made as to whether further use of the component would constitute an undue hazard. Conditions such as the following should be sufficient reason for replacement:

(a) Any evidence of hydraulic oil leakage at the surface of the flexible hose or its junction with the metal end couplings.

(b) Any blistering or abnormal deformation to the outer covering of the hydraulic hose.

(c) Hydraulic oil leakage at any threaded or clamped joint that cannot be eliminated by normal tightening or recommended procedures.

(d) Evidence of excessive abrasion or scrubbing on the outer surface of a hose, rigid tube, or hydraulic fitting. Means should be taken immediately to eliminate the interference of the elements in contact or otherwise protect the components.

(17) Pumps and Motors. The following may be reason for replacement or repair:

(a) Loose bolts or fasteners.

(b) Leaks at joints between sections.

(c) Shaft seal leaks.

(d) Unusual noises or vibration.

(e) Loss of operating speed.

(f) Excessive heating of the hydraulic oil.

(18) Valves. The following may be reason for replacement or repair:

(a) Cracks in valve housing.

(b) Improper return of spool to neutral position.

(c) Leaks at spools or joints.

(d) Sticking spools.

(e) Failure of relief valves to attain correct pressure setting.

(19) Cylinders. The following may be reason for replacement or repair:

(a) Drifting caused by oil leaking across piston.

(b) Rod seals leaking.

(c) Leaks at welded joints.

- (d) Scored, nicked, or dented cylinder rods.
- (e) Dented case (barrel).
- (f) Loose or deformed rod eyes or connecting joints.

(20) Filters. Evidence of rubber particles on the filter element may indicate hose, O-ring, or other rubber component deterioration- Metal chips or pieces on the filter may denote failure in pumps, motors, or cylinders. Further checking will be necessary to determine origin of the problem before corrective action can be taken.

(21) Wire Rope. A thorough documented inspection of all ropes shall be made. During the inspection of the rope, clean with rags and apply sludge compound prior to rewinding on the drum. Presence of any of the following shall be cause for removal from service:

(a) Broken outside wires. Those sections of the rope subjected to reverse bends and operation over small diameter drums or sheaves should be given particularly close attention;

1 Replace the wire rope when six randomly distributed broken wires in one rope lay, or three broken wires in one strand in one rope lay are found.

2 Broken wire count should be made of the worst strand at the worst section of the wire rope and confined to the distance required for one strand to make one complete turn around the rope.

3 Broken wire count will be entered on the test record.

(b) Reduction of rope diameter below normal value. Marked reduction in diameter of wire rope may indicate loss of core support. The continued use of wire rope of reduced diameter will cause sheave distortion. Replacement should be made when reductions are more than:

1 1/64 inch for diameters up to and including 5/16 inch.

2 1/32 inch for diameters 3/8 inch up to and including 1/2 inch.

3 3/64 inch for diameters 9/16 inch up to and including 3/4 inch.

4 1/16 inch for diameters 7/8 inch up to and including 1-1/8 inch.

5 3/32 inch for diameters 1-1/4 inch up to and including 1-1/2 inch.

(c) Worn outside wires, Replace when wear of one-third the original diameter of outside individual wires is observed.

(d) Corroded, broken, or frayed wires at end connections;

1 Ropes should be examined frequently at socketed fittings, and upon the development of one broken wire adjacent to this point, the rope should be r-e-socketed or replaced.

2 Re-socketing should not be attempted if the resulting rope length will be insufficient for proper operation.

(e) Corroded, cracked, bent, worn, improperly sized, or improperly applied end connections.

1 When eyes are formed using wire rope clips, the clips will be spaced six diameters of the rope apart.

2 The clips U-bolts will be installed on the dead end of the rope with the base against the live end.

3 Nuts on U-bolts should be checked after initial use and re-tightened, if necessary, to the torque specifications in Table 551-881-8122_02.

4 The number of clips and the proper torque necessary to assemble wire rope eye-loop connections with a nominal efficiency of 80 percent is as follows in Table 551-881-8122_02.

Rope diameter (inches)	Torque to be applied to nuts to clips (ft-lbs)	Number of clips	Nominal size of clips (inches)
5/16	25	3	3/8
3/8	25	3	3/8
7/16	40	4	1/2
1/2	40	4	1/2
5/8	65	4	5/8
3/4	100	4	3/4
7/8	165	5	1
1	165	5	1
1-1/4	250	5	1-1/4
1-3/8	375	6	1-1/2
1-1/2	375	6	1-1/2
1-3/4	560	6	1-3/4

Wire Rope Clips
Table 551-881-8122_02

5 When using Crosby Rope Clips, caution should be used to ascertain that the saddle is of the proper rope lay, i.e., Right or Left, as a rope can be cut by using the wrong saddle.

(f) Wedge socket end attachments;

1 There should be no rough edges or burrs on the wedge or socket when installed.

2 If the end of the rope is welded, the welded end should be cut off. This will allow the distortions of the rope strands, caused by the sharp bend around the wedge, to adjust themselves at the end of the line.

3 The dead end of the rope should extend from the socket for a distance of 6 to 9 times the rope's diameter.

4 The dead end of the wire should never be clamped to the live end.

5 The dead end of the wire should be clamped to a short extra piece of rope as close to the wedge as possible. The U-bolt should bear against the tail and the saddle of the clip should bear against the short extra piece.

(g) Severe kinking, crushing, cutting, or un-stranding.

(h) Evidence of damage due to welding arc or other heat sources.

(i) No less than two full wraps of rope remaining on the hook line drum is permitted when the hook is in its extreme low position with the boom in its most upright position and the rope end is securely attached to the drum by the clamp or socket arrangement approved by the crane or rope manufacturer. The same limit applies to the boom hoist drum rope when the boom is in its extreme low position.

(22) Hooks. Inspect for cracks, throat opening of more than fifteen percent in excess of normal, more than a 10 degree twist from the plane of the unbent hook, or wear exceeding ten percent of the original dimensions. Remove hooks from service if they meet one or more of the above criteria. (When original dimensions of hook are not known or when measuring devices are not available, hooks having any visual evidence of an increase in throat opening, twisting, or deformation of any sort will be removed from service.)

(a) Any questionable condition disclosed by visual inspection shall warrant the use of magnetic particle or other suitable crack detection or inspection methods.

(b) Swivelling type hooks should rotate freely. Repair or alteration of hooks by welding or reshaping is not recommended. Hooks shall have safety closure latches properly positioned and functional, except when the use of a hook with a safety closure may create additional hazards in operations. In these instances, the local commander may give written approval to deviate from this requirement. This approval should be reviewed annually to ensure that the need for the deviation is still valid.

(c) Hooks shall not be painted. Paint will cover small stress cracks from metal fatigue due to repeated usage. New hooks shall have all paint removed prior to being placed in service.

(23) Hoist Chains. Perform documented inspection of hoist chains for excessive wear, twist, distorted links, or stretch beyond manufacturer's recommendations.

e. Tests. When required, perform a functional test to determine operability of the equipment. Functional testing shall consist of lifting a characteristic load (determined locally), holding it at an appropriate height for one minute, maneuvering it in a manner which will simulate the operation of the lifting device in the working environment, and lowering it to its original position. For lifting devices used to handle hazardous materials, conduct the function test as above, using an inert item equal in weight to or heavier than (not to exceed the manufacturers load rating of the device) the heaviest item normally lifted by the devices as its characteristic load. A visual inspection will be performed prior to and after functional test is performed. Record pretest and post-test findings, actions taken, and test date in the end item's historical records.

f. Standby Cranes. Cranes used for standby service shall be inspected at least semi-annually in accordance with the criteria for an annual inspection. Such cranes which are exposed to adverse environment should be inspected more frequently.

6. Conduct daily and periodic inspections and tests of hoists.

a. The following items shall be inspected daily or prior to use:

(1) All controls and operating mechanisms for maladjustments, excessive wear, or contaminated by leaking lubricants or foreign material.

(2) All safety devices for malfunction.

CAUTION

Raise and lower the hoisting mechanism very slowly when testing limit switches.

(3) All installed hoist and travel limit switches should be checked for failure by raising and lowering throughout the full range of the lifting device with no load other than that of the hoisting mechanism. The hoisting mechanism should be raised and lowered very slowly when testing limit switches.

(4) Air or hydraulic systems components for deterioration or leakage. Hydraulic fluid leakage is classified as follows:

(a) Class I; Seepage of fluid (as indicated by wetness or discoloration) not great enough to form drops.

(b) Class II; Leakage of fluid great enough to form drops but not enough to cause drops to drip from the item being checked/inspected.

(c) Class III; Leakage of fluid great enough to form drops that fall from the item being checked/inspected.

(5) Crane load hooks for;

(a) Deformation.

1 Throat opening of more than fifteen percent in excess of normal.

2 More than ten degree twist from the plane of the unbent hook.

(b) Cracks.

(c) Wear.

(d) Damage or malfunctioning latch and hook attachment.

(e) Remove hooks from service if they meet one or more of the above criteria.

(f) Remove hooks having any visual evidence of an increase in throat opening, twisting, or deformation of any sort from service when the original dimensions of the hook are not known.

(6) Electrical apparatus for malfunction, signs of excessive deterioration, dirt, and moisture accumulation.

(7) All rope and cables for improper rigging and excessive wear, or damage such as;

(a) Reduction of rope diameter below nominal value.

(b) Broken outside wires.

(c) Worn outside wires.

(d) Corroded, broken, or frayed wires at end connections.

(e) Corroded, cracked, bent, worn, improperly sized, or improperly applied end connections.

(f) Severe bending.

(g) Kinking.

(h) Crushing.

(i) Caging.

(j) Popped core.

(k) Evidence of damage due to welding arc or other heat sources.

(8) Hoist chains for;

(a) Excessive wear or stretch.

(b) Bent or twisted links.

(c) Defective welds.

(d) Nicks and gouges.

b. When any of the above items are found to exist, further operations of the crane will be discontinued until it has been corrected or determined to present no hazard. An exception is that equipment operation is allowable with Class I or II hydraulic leaks provided consideration is given to the fluid capacity of the equipment and fluid levels continue to be checked as normally required. This exception does not apply to leakage of hydraulic brake systems.

c. Periodic Inspections. Complete inspection of hoists shall be performed at the intervals defined in paragraph 3. Hoist inspections can make use of technical manual requirements (where applicable), plus the following:

(1) General. Perform normal preoperational maintenance, inspections, and check for;

(a) Proper marking to include load ratings and date of next periodic inspection.

(b) Evidence of mishandling and/or damage.

(c) Deformed, cracked, broken, missing or corroded members in crane structure and boom.

(d) Loose bolts or rivets.

(e) Cracked or worn sheaves and drums.

(f) Worn, cracked, or distorted parts such as pins, bearings, shafts, gears, rollers, and clamping devices.

(g) Electrical apparatus, for signs of pitting or any deterioration of controller contactors, limit switches and pushbutton stations.

(h) Excessive wear on brake and clutch system parts, linings, pawls, and ratchets.

(i) Load, boom angle, wind, and other indicators over their full range for any significant inaccuracies. For all of the above indicators, the indicated value shall be no greater than 119 percent, and no less than 97 percent of the actual (true) value. For any conversions required by the operation, such as converting boom angle degrees into radius feet, a conversion chart shall be provided.

(j) Gasoline, diesel, electric, or other power plants for improper performance or noncompliance with safety requirements.

(k) Steering, braking, locking, and travel devices for malfunction.

(l) Excessively worn or damaged tires or tracks, when applicable.

(m) Excessive wear of chain drive sprockets and excessive chain stretch.

(2) Structural Members. Check for bends, distorted sections, broken welds, excessive corrosion, and loose bolts and rivets.

(3) Hooks. Inspect for cracks, throat opening of more than fifteen percent in excess of normal, more than a 10 degree twist from the plane of the unbent hook, or wear exceeding ten percent of the original dimensions. Remove hooks from service if they meet one or more of the above criteria. (When original dimensions of hook are not known or when measuring devices are not available, hooks having any visual evidence of an increase in throat opening, twisting, or deformation of any sort will be removed from service.)

(a) Any questionable condition disclosed by visual inspection shall warrant the use of magnetic particle or other suitable crack detection or inspection methods.

(b) Swivelling type hooks should rotate freely. Repair or alteration of hooks by welding or reshaping is not recommended. Hooks shall have safety closure latches properly positioned and functional, except when the use of a hook with a safety closure may create additional hazards in operations. In these instances, the local commander may give written approval to deviate from this requirement. This approval should be reviewed annually to ensure that the need for the deviation is still valid.

(c) Hooks shall not be painted. Paint will cover small stress cracks from metal fatigue due to repeated usage. New hooks shall have all paint removed prior to being placed in service.

(4) Power Systems. Check for satisfactory operation and compliance with applicable preventive maintenance and safety requirements.

(5) Safety Equipment. Inspect all safety equipment, including limit stops, for wear or damage and to insure proper affixment and functioning.

(6) Wire Rope. A thorough documented inspection of all ropes shall be made. During the inspection of the rope, clean with rags and apply sludge compound prior to rewinding on the drum. Presence of any of the following shall be cause for removal from service:

(a) Broken outside wires. Those sections of the rope subjected to reverse bends and operation over small diameter drums or sheaves should be given particularly close attention;

1 Replace the wire rope when six randomly distributed broken wires in one rope lay, or three broken wires in one strand in one rope lay are found.

2 Broken wire count should be made of the worst strand at the worst section of the wire rope and confined to the distance required for one strand to make one complete turn around the rope.

3 Broken wire count will be entered on the test record.

(b) Reduction of rope diameter below normal value. Marked reduction in diameter of wire rope may indicate loss of core support. The continued use of wire rope of reduced diameter will cause sheave distortion. Replacement should be made when reductions are more than:

1 1/64 inch for diameters up to and including 5/16 inch.

2 1/32 inch for diameters 3/8 inch up to and including 1/2 inch.

3 3/64 inch for diameters 9/16 inch up to and including 3/4 inch.

4 1/16 inch for diameters 7/8 inch up to and including 1-1/8 inch.

5 3/32 inch for diameters 1-1/4 inch up to and including 1-1/2 inch.

(c) Worn outside wires, Replace when wear of one-third the original diameter of outside individual wires is observed.

(d) Corroded, broken, or frayed wires at end connections;

1 Ropes should be examined frequently at socketed fittings, and upon the development of one broken wire adjacent to this point, the rope should be re-socketed or replaced.

2 Re-socketing should not be attempted if the resulting rope length will be insufficient for proper operation.

(e) Corroded, cracked, bent, worn, improperly sized, or improperly applied end connections;

1 When eyes are formed using wire rope clips, the clips will be spaced six diameters of the rope apart.

2 The clips U-bolts will be installed on the dead end of the rope with the base against the live end.

3 Nuts on U-bolts should be checked after initial use and re-tightened, if necessary, to the torque specifications in Table 551-881-8122_02.

4 The number of clips and the proper torque necessary to assemble wire rope eye-loop connections with a nominal efficiency of 80 percent is found in Table 551-881-8122_02.

5 When using Crosby Rope Clips, caution should be used to ascertain that the saddle is of the proper rope lay, i.e., Right or Left, as a rope can be cut by using the wrong saddle.

(f) Wedge socket end attachments;

1 There should be no rough edges or burrs on the wedge or socket when installed.

2 If the end of the rope is welded, the welded end should be cut off. This will allow the distortions of the rope strands, caused by the sharp bend around the wedge, to adjust themselves at the end of the line.

3 The dead end of the rope should extend from the socket for a distance of 6 to 9 times the rope's diameter.

4 The dead end of the wire should never be clamped to the live end.

5 The dead end of the wire should be clamped to a short extra piece of rope as close to the wedge as possible. The U-bolt should bear against the tail and the saddle of the clip should bear against the short extra piece.

(g) Severe kinking, crushing, cutting, or un-stranding.

(h) Evidence of damage due to welding arc or other heat sources.

(7) No less than two full wraps of rope remaining on the hook line drum is permitted when the hook is in its extreme low position with the boom in its most upright position and the rope end is securely attached to the drum by the clamp or socket arrangement approved by the crane or rope manufacturer. The same limit applies to the boom hoist drum rope when the boom is in its extreme low position.

(8) Hoist Chains. Perform documented inspection of hoist chains for excessive wear, twist, distorted links, or stretch beyond manufacturer's recommendations.

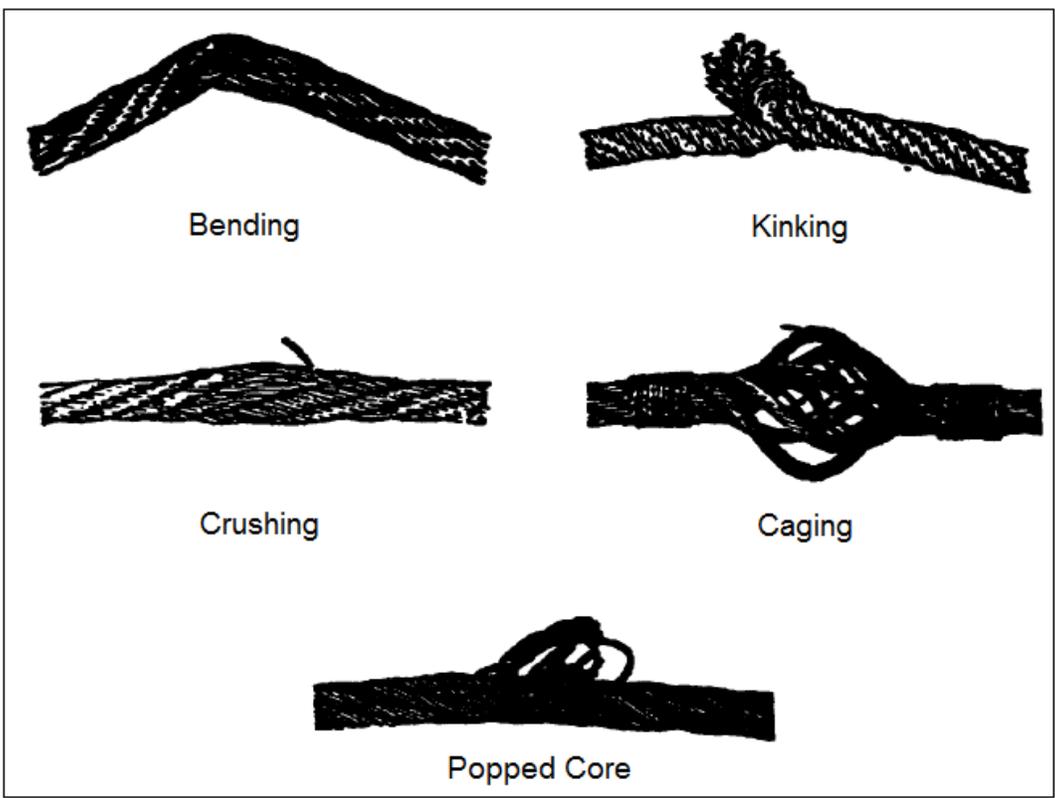
d. Tests. When required, perform a functional test to determine operability of the equipment. Functional testing shall consist of lifting a characteristic load (determined locally), holding it at an appropriate height for one minute, maneuvering it in a manner which will simulate the operation of the lifting device in the working environment, and lowering it to its original position. For lifting devices used to handle hazardous materials, conduct the function test as above, using an inert item equal in weight to or heavier than (not to exceed the manufacturers load rating of the device) the heaviest item normally lifted by the devices as its characteristic load. A visual inspection will be performed prior to and after functional test is performed. Record pretest and post-test findings, actions taken, and test date in the end item's historical records.

7. Conduct daily and periodic inspections and tests of slings.

a. Daily inspection. Visual inspection of slings and all fastenings and attachments shall be conducted daily or before use using the following minimum criteria. Where a degraded condition is found to exist paragraph 8.b should be checked for further reject/accept criteria. Damaged or defective slings shall be immediately removed from service.

(1) Wire Rope Slings. Check for:

- (a) Reduction of rope diameter below nominal value.
- (b) Broken outside wires.
- (c) Worn outside wires.
- (d) Corroded, broken, or frayed wires at end connections.
- (e) Corroded, cracked, bent, worn, improperly sized, or improperly applied end connections.
- (f) Severe bending, kinking, crushing, caging, or a popped core, refer to Figure 551-881-8122_01.
- (g) Evidence of damage due to welding arc or other heat sources.



Wire Rope Damage
Figure 551-881-8122_01
Page 19

(2) Chain Slings. Check for:

- (a) Excessive wear or stretch.
- (b) Bent or twisted links.
- (c) Defective welds.
- (d) Nicks and gouges.

(3) Metal Mesh Slings. Check for:

- (a) Unpadded sharp corners.
- (b) Evidence of twisting or kinking.
- (c) A broken weld or brazed joint along the sling edge.
- (d) A broken wire in any part of the mesh.
- (e) Reduction in wire diameter.
- (f) Lack of flexibility due to distortion of the fabric.
- (g) Distortion of handle.
- (h) Evidence of heat damage.

(4) Rope (Natural and Synthetic Fiber) Slings. The existence of any of the following conditions will require that the sling be immediately removed from service:

- (a) Abnormal wear.
- (b) Powered fiber between strands.
- (c) Broken or cut fibers.
- (d) Variation in the size or roundness of strands.
- (e) Discoloration or rotting.
- (f) Distortion of hardware in the sling.

(g) Fiber rope slings shall not be used if end attachments which are in contact with the rope have sharp edges or projections.

(5) Synthetic Web Slings.

- (a) Each sling shall be marked or coded to show the rated capacities and type of synthetic web material.

(b) Synthetic webbing should be of uniform thickness and width and selvage edges should not be split from webbings width.

(c) Fittings should be free of all sharp edges that could in any way damage the webbing.

(d) Sling surface should have no evidence of melting or charring from acid, caustic, or other burns.

(e) In addition, check for the following:

1 Snags, punctures, tears, or cuts.

2 Broken or worn stitches.

3 Distortion of fittings.

(6) Hoisting Beam Slings. This type sling is commonly used for removing engines or power packs from aircraft and combat vehicles. Inspect these slings for the following conditions:

(a) Proper assembly.

(b) Cracked or broken welds.

(c) Bent or loose bolts, rivets, pins and other attachment devices.

(d) Excessive wear or corrosion.

b. Periodic Inspections. A thorough periodic inspection of slings shall be made on a regular basis, to be determined by frequency of sling use, severity of service conditions, nature of lifts being made, and experience gained on the service life of slings used in similar circumstances. Such inspections shall in no event be at intervals greater than once every 12 months. Criteria in paragraph 8.a, and the following should be used:

(1) Wire Ropes Wire Rope Slings. Check for:

(a) Broken wires, replace the wire rope when six randomly distributed broken wires in one rope lay, or three broken wires in one strand in one rope lay are found.

(b) Broken wire count should be made of the worst strand at the worst section of the wire rope and confined to the distance required for one strand to make one complete turn around the rope.

(c) Broken wire count will be entered on the test record.

(2) Reduction In diameter. Marked reduction in diameter of wire rope may indicate loss of core support. Replacement should be made when reductions are more than:

(a) 1/64 inch for diameters up to and including 5/16 inch.

(b) 1/32 inch for diameters 3/8 inch up to and including 1/2 inch.

(c) 3/64 inch for diameters 9/16 inch up to and including 3/4 inch.

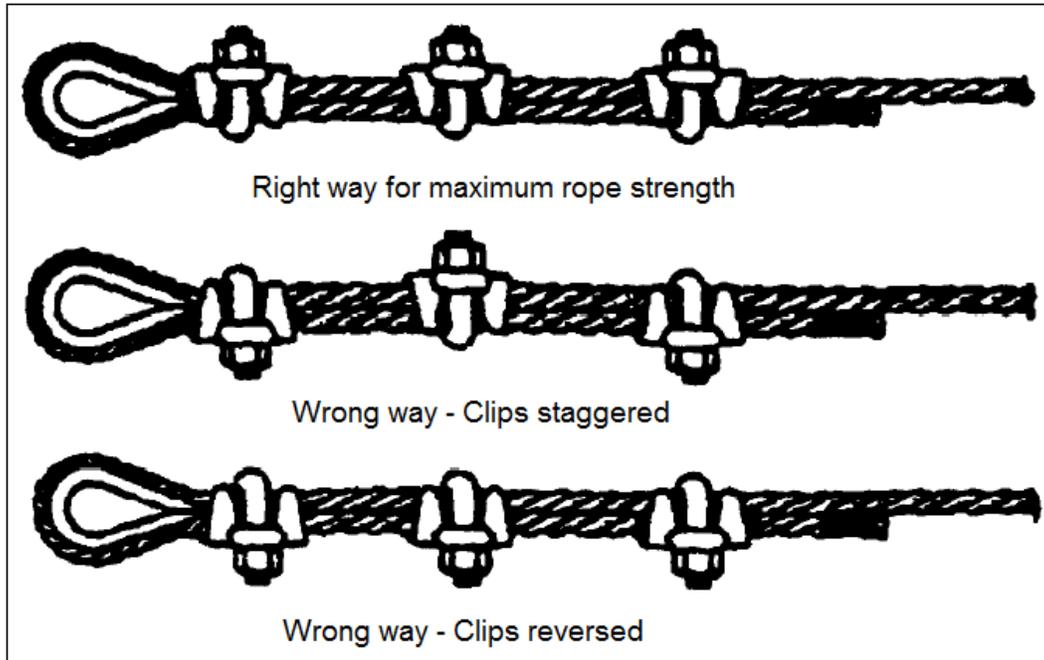
(d) 1/16 inch for diameters 7/8 inch up to and including 1-1/8 inch.

(e) 3/32 inch for diameters 1-1/4 inch up to and including 1-1/2 inch.

(3) Wear. Replace when wear of one-third the original diameter of outside individual wires is observed.

(4) Condition of end attachments. Special attention should be given to end attachments. Ropes should be examined frequently at socketed fittings, and upon the development of one broken wire adjacent to this point, the rope should be re-socketed or replaced. Re-socketing should not be attempted if the resulting rope length will be insufficient for proper operation.

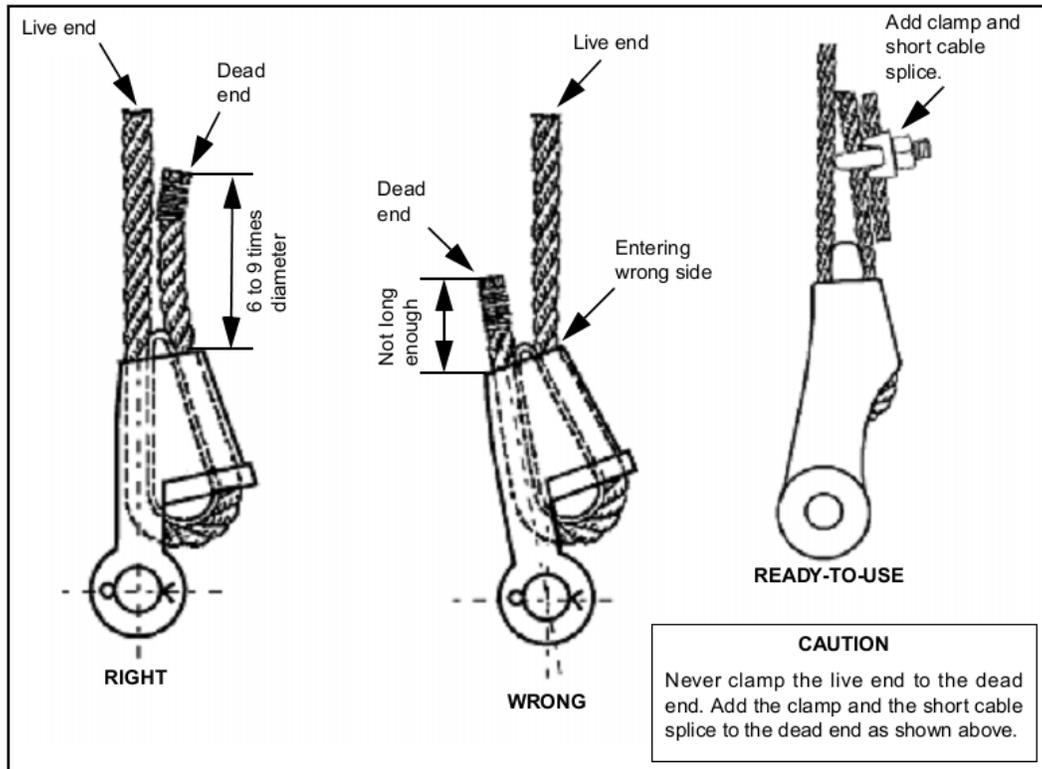
(5) When eyes are formed using wire rope clips, the clips will be spaced six diameters of the rope apart. The clips U-bolts will be installed on the dead end of the rope with the base against the live end; refer to Figure 551-881-8122_02. Nuts on U-bolts should be checked after initial use and re-tightened, if necessary, to the torque specifications in Table 551-881-8122_01. The number of clips and the proper torque necessary to assemble wire rope eye-loop connections with a nominal efficiency of 80 percent is found in Table 551-881-8122_01.



Wire Rope Clips
Figure 551-881-8122_02

(6) When using Crosby Rope Clips, caution should be used to ascertain that the saddle is of the proper rope lay, i.e., Right or Left, as a rope can be cut by using the wrong saddle.

(7) One of the more popular end attachments for wire ropes is the wedge socket. There should be no rough edges or burrs on the wedge or socket when installed. If the end of the rope is welded, the welded end should be cut off. This will allow the distortions of the rope strands, caused by the sharp bend around the wedge, to adjust themselves at the end of the line. The dead end of the rope should extend from the socket for a distance of 6 to 9 times the rope's diameter. The dead end of the wire should be clamped to a short extra piece of rope as close to the wedge as possible. The dead end of the wire should never be clamped to the live end. The U-bolt bears against the tail and the saddle of the clip should bear against the short extra piece; refer to Figure 551-881-8122_03.



Wedge Sockets
Figure 551-881-8122_03

(8) Minimum sling length. Between splices, sleeves, or end fittings, cable laid slings and 6 x 19 and 6 x 37 wire rope slings shall have a minimum clear length of rope ten times the rope diameter. Between loops or end fittings, braided slings shall have a minimum clear length of rope forty times the component rope diameter. Grommets and endless slings shall have a minimum circumferential length of 96 times the body diameter of the grommet or endless sling.

(9) Rated capacity. Rated capacities for slings shall be as shown in Tables 1910.184.1 through 1910.184.22 of 29 CFR Part 1910.184 of the General Industry Standards.

- (a) Nominal wire rope breaking strength.
- (b) Splicing or end attachment efficiency.
- (c) Number of parts of rope in sling.
- (d) Type of hitch, e.g., straight pull, choker hitch, or basket hitch.
- (e) Angle or Loading.
- (f) Diameter of curvature around which the sling is bent.

(10) Corrosion. Corrosion will often occur internally before there is any visible external evidence on the rope surface. Pitting of wires is a cause for immediate rope removal. A slight discoloring of rust merely indicates a need for lubrication. By contrast, severe rusting is grounds for immediate rope replacement.

(11) Kinks. Kinks are permanent distortions caused by loops drawn too tightly. Ropes with kinks must be removed from service.

(12) Basketing. In some cables with longer lays or smaller diameter wires, the outer layer of wires or strands can loosen when bent with no load applied. In many instances the rope can be gently worked back and forth to resume its original configuration. If the rope does not resume its original shape with a load heavy enough to straighten the rope, the rope must be replaced.

(13) Heat Damage. Extended exposure to a fire can result in loss of internal lubrication or even a loss in strength of the rope. Obvious scorching is grounds for rope replacement.

(14) Protruding Core. If, for any cause, the rope core protrudes from an opening between the strands, the rope is unfit for service and should be replaced.

(15) Electric Arc. Rope that has been in contact with a live power line or lightning may have wires that are fused, discolored, and/or annealed; any of the preceding is justification for rope replacement.

(16) Alloy Steel Chain Slings.

(a) All chains shall be manufactured and tested by the chain manufacturer in accordance with ASTM Specification for Alloy Steel Chain A391 -65 (ANSI G61 .1-1966). Other grades of proof tested steel chain include Proof Coil, BBB Coil, and Hi-Test Chain. These grades are not recommended for overhead lifting and therefore are not covered by this bulletin.

(b) Hooks, rings, oblong links, pear shaped links, welded or mechanical coupling links, and other attachments shall have a rated capacity at least equal to that of the alloy steel chain with which they are used. Homemade links, makeshift fasteners formed from bolts, rods, etc., and other such attachments shall not be used. Mechanical coupling links or low carbon steel repair links shall not be used to repair broken lengths of chain.

(c) Inspection shall be made on a link by link basis with the chain collapsed. If any link does not hinge freely with the adjoining link, or if obvious signs of stretch are detected, the assembly shall be removed from service. If wear at any point of any chain link exceeds that shown in Table 551-881-8122_03, the assembly shall be removed from service. Sharp transverse nicks should be rounded out by grinding. If the depth of the gouge or rounded out portion exceeds the values shown in Table 551-881-8122_03, the assembly shall be removed from service.

(d) When new, chains should be calibrated for length in sections of from 1 to 3 feet long (section should have a minimum of 5 links). At each inspection, the increase in length of the chain section shall be measured and entered into the maintenance records. Reduce the rated capacity by 2 percent for each 1 percent increase in length. Hoist chains shall be removed from service when a 5 percent increase in length occurs and sling chains shall be removed from service when a 10 percent increase in length occurs.

Chain Size (Inches)	Maximum Allowable Wear Inches
1/4	3/64
3/8	5/64
1/2	7/64
5/8	9/64
3/4	5/32
7/8	11/64
1	3/64
1-1/16	7/32
1-1/4	1/4
1-3/8	9/32
1-1/2	5/16
1-3/4	11/32

Chain Wear Limits
Table 551-881-8122_03

(17) Metal Mesh Slings.

(a) All slings shall have permanently affixed durable identification showing the rated capacity of vertical basket hitch and choker hitch slings and the next periodic inspection date.

(b) Remove from service if there is a:

- _1_ Reduction in wire diameter of 25 percent due to abrasion or 15 percent due to corrosion.
- _2_ Distortion of the female handle so that the depth of the slot is increased more than 10 percent.
- _3_ Distortion of either handle so that the width of the eye is decreased more than 10 percent.
- _4_ 15 percent reduction of the original cross sectional area of metal at any point around the handle of the eye.

(18) Rope. Natural and Synthetic Fiber Slings. Fiber rope slings made from conventional three strand construction fiber rope shall not be used with loads in excess of the rated capacities prescribed in Tables 16 through 19 of the General Industry Standards 29 CFR Part 1910.184.

(19) Synthetic Web Slings. Synthetic web slings should not be used with loads in excess of rated capacities prescribed in Tables 20 through 22 of the General Industry Standards 29 CFR Part 1910.184. Types of slings and types of hitches, etc., are illustrated in the General Industry Standards and ANSI Standard 830.9.

(20) Tests. Conduct the function testing of slings and cables concurrently with the corresponding inspection and test of the lifting device system of which they are integral part. Working load limits of the lifting ropes, chains, slings, or combinations should never be less than the load rating of the hoisting device. Keep individual records for each sling. Record pretest and post-test findings, actions taken, and test date in the historical records of the sling or lifting cable.

(21) Hooks. Hooks used with slings shall be inspected concurrently with the slings. Check for deformation, distortion, cracks, wear, damage, or malfunctioning latch and hook attachment. Visual examination may be supplemented with magnetic particle or other non-destructive type testing whenever apparent conditions indicate the need for more in-depth inspection. Hooks shall be removed from service if they are cracked, have throat openings of more than fifteen percent in excess of normal, more than a ten degree bend or twist from the plane of the unbent hook, or wear exceeding ten percent of the original dimensions.

(Asterisks indicates a leader performance step.)

Evaluation Preparation: None

PERFORMANCE MEASURES	GO	NO-GO	N/A
1. Demonstrated basic knowledge of the definitions pertaining to lifting devices.			
a. Lifting Devices			
b. Lifting Fixtures			
c. Load Rating			
d. Manufacturer's Rated Load			
2. Identified the testing requirements pertaining to lifting devices.			
a. Load test			
b. Functional test			
3. Identified inspection intervals and requirements pertaining to lifting devices.			
a. Daily			
b. Monthly			
c. Periodic			
4. Identified installation level procedures for the inspection of lifting devices.			
a. Personnel			
b. Maintenance, inspections and testing procedures			
c. Maintenance records			
d. Marking system			
5. Conducted inspections and tests of cranes.			
a. Daily			
b. Monthly			
c. Periodic			
6. Conducted inspections and test of hoists.			
a. Daily			
b. Periodic			
7. Conducted inspections and tests of slings.			
a. Daily			
b. Periodic			

Supporting Reference(s):

Step Number	Reference ID	Reference Name	Required	Primary
	29 CFR 1910	Occupational Safety and Health Standards	No	No
	AR 385-10	The Army Safety Program.	No	No
	AR 750-1	Army Materiel Maintenance Policy.	No	No
	PAM 750-8	The Army Maintenance Management System (TAMMS) Users Manual.	No	No
	TB 43-0142	SAFETY INSPECTION AND TESTING OF LIFTING DEVICES	No	No

Environment: None

Safety: In a training environment, leaders must perform a risk assessment in accordance with FM 5-19, Composite Risk Management. Leaders will complete a DA Form 7566 COMPOSITE RISK MANAGEMENT WORKSHEET during the planning and completion of each task and sub-task by assessing mission, enemy, terrain and weather, troops and support available-time available and civil considerations, (METT-TC). Note: During MOPP training, leaders must ensure personnel are monitored for potential heat injury. Local policies and procedures must be followed during times of increased heat category in order to avoid heat related injury. Consider the MOPP work/rest cycles and water replacement guidelines IAW FM 3-11.4, NBC Protection, FM 3-11.5, CBRN Decontamination.

Prerequisite Individual Tasks : None

Supporting Individual Tasks : None

Supported Individual Tasks : None

Supported Collective Tasks :

Task Number	Title	Proponent	Status
N/A	N/A	Not Selected	Obsolete