



Electrical Transmission & Distribution Partnership

OSHA Construction Outreach Training Course

Lifting & Rigging Continuing Education

Presenter Guide -
4th Quarter 2016

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Introduction

This Lifting & Rigging continuing education course is designed to be presenter lead. The presenter may choose to augment the material with videos, handouts or other media to enhance the learning experience. The presenter may choose to incorporate visual aids such as rigging equipment both good and damaged, and/or handouts to enhance the presentation.

Using this material in combination with practical experience, good presentation skills and knowledge of adult learning techniques, the presenter has a greater opportunity to deliver the information effectively.

Edgar Dale stated that 2 weeks after a learning event, adult learners remember:

- ✓ 10% of what they read
- ✓ 20% of what they hear
- ✓ 30% of what they see
- ✓ 50% of what they see and hear
- ✓ 70% of what they say
- ✓ 90% of what they say while performing a task

Microsoft® PowerPoint® combined with good instructional skills and instructor/student dialogue work strongly in the fifty to seventy percent range. PowerPoint® presents the information to the attendee and the instructor summarizes the content of the slides. It is critical to engage and involve the attendee in the process. Ask open-ended questions that will elicit conversation and discussion, but be cautious to maintain control of the discussion.

Conversation and scenarios are good, but can cause the discussion to run long. If it seems like the group is losing focus during the course, the facilitator can direct the group back on track by using comments like “This is a great discussion, but let’s get back to the subject at hand”.

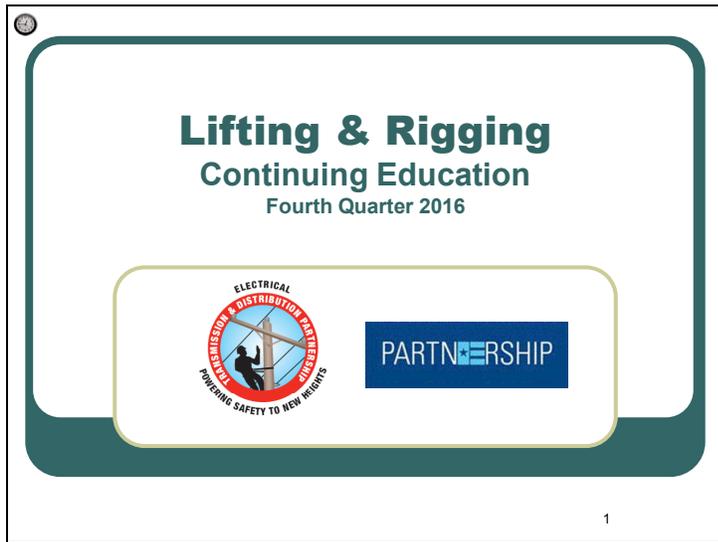
Another tool is the “Parking Lot” which is simply a newsprint chart, dry erase board, or note pad where the presenter records questions that are not answered or comments not addressed during the meeting and that may require more research. It is vital to capture any ongoing discussions or questions on the “Parking Lot” and follow up when the information is known.

This refresher is to be delivered in the fourth quarter of 2016. Delivery time is approximately 1 to 1.5 hours in one setting or divided-up into multiple, shorter sessions. It is critical that the presenter familiarizes himself or herself with the material prior to delivery.

At the end of this document are three handouts that discuss rigging hardware inspection, manual material handling, and an OSHA Fact Sheet that explains the requirements for a qualified rigger. The presenter can use this material in conjunction with the PowerPoint® presentation to augment the topic.

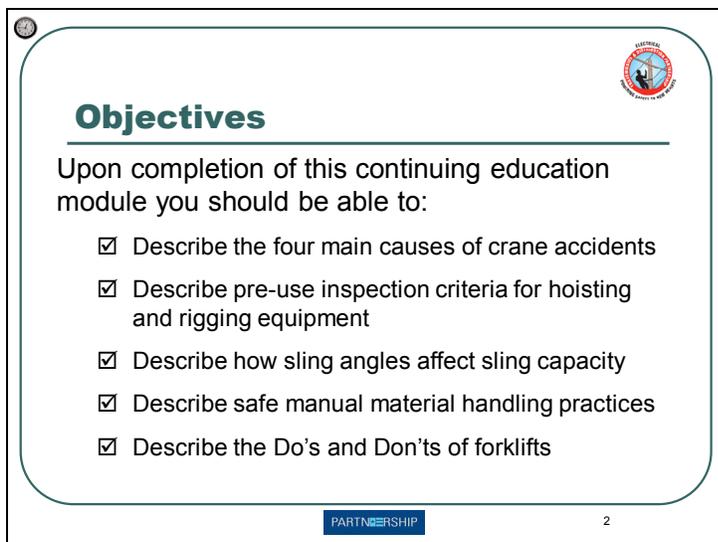
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Slide 1



Introduce the subject. Explain that this is the continuing education module for the 4th quarter 2016.

Slide 2



Discuss the objectives of this course. Explain that you are going to discuss all types of lifting and rigging from mechanical (cranes and forklift trucks) to manual methods (lifting with the human body).



Major Causes of Crane Accidents

- Power-line Contact
- Overturns
- Falls (from crane)
- Mechanical failures



PARTNERSHIP 3

Explain that OSHA has identified some major causes of crane accidents. In nearly 45 percent of the incidents, boom or crane contact with energized lines has been the cause. Others include dropped loads, boom collapse, workers crushed by the counter weight, outrigger misuse, falls, and rigging failures. Another key issue is crane failures that occur due to machines not being properly maintained or inspected regularly to ensure safe operation.

Slide 4

Planning Before Startup

- Level the crane
- Ensure support surface is firm and able to support the load
- Know the basic crane capacities, and limitations
- Know job site restrictions
- Make other personnel aware of hoisting activities
- Barricade areas within swing radius.
- Ensure proper maintenance and inspections.

PLANNING & SAFETY

PARTNERSHIP

4

Explain that before a load is lifted, certain criteria must be established. The competent person must ensure the equipment is in good working order. The crane must be level and the surface must be able to support the load. If surface will not support the load and crane weight, you must use cribbing, matting, or other material to make the surface stable.

The operator must know the crane capacities, limitations and job site restrictions such as location of overhead energized lines, unstable soil, or high winds. Prior to making the lift, make sure other personnel on site are aware of overhead lifting operations. Never let anyone get beneath an overhead load.

All personnel must be aware of the hazards of swinging loads. When using cranes that the house rotates over the outrigger beams, it is necessary to barricade an area 360 degrees around the crane to avoid workers from entering an area where they can be caught between the counterweight and a stationary object.



Competent Person

- The competent person must inspect all machinery and equipment prior to each use, and during use, to make sure it is in safe operating condition



PARTNERSHIP 5

Explain that OSHA regulations state that the employer must designate a competent person who will inspect all machinery and equipment prior to each use, and during use, to make sure that it is in safe operating condition. Any deficiencies will be repaired, or defective parts replaced, before continued use. In addition to frequent inspections, a thorough, annual inspection of the hoisting machinery will be made by a competent person, or by a government or private agency recognized by the U.S. Department of Labor. Records must be maintained of the dates and results of inspections for each hoisting machine and piece of equipment

Competent Person: 1926.32(f) of the OSHA standards defines a competent person as one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.



Spotter

- When hoisting loads in close proximity to energized lines, a spotter must be used
- Must not have other responsibilities
- Must have clear communication with the operator
- Must have a clear view



PARTNERSHIP

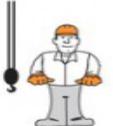
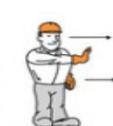
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Equipment traveling under or near a power line must:

- (a) Have a lowered boom/mast and support system
- (b) Obey minimum clearance distances set in Table T
- (c) Reduce speeds to minimize breaching
- (d) **Use a dedicated spotter if closer than 20 feet**
- (e) Illuminate or identify the power lines at night
- (f) Identify and use a safe path of travel

Explain that when using a spotter the spotter must not be given other responsibilities, and must be free from distractions. The spotter must have an unobstructed view both horizontal and vertical. They also need to maintain communications with the operator.

Standard Crane Hand Signals

| | | | | |
|--|---|---|---|--|
|  |  |  |  |  |
| <small>STOP - With arm extended horizontally to the side, palm down, arm is swung back and forth.</small> | <small>EMERGENCY STOP - With both arms extended horizontally to the side, palms down, arms are swung back and forth.</small> | <small>HOIST - With upper arm extended to the side, forearm and index finger pointing straight up, hand and finger make small circles.</small> | <small>RAISE BOOM - With arm extended horizontally to the side, thumb points up with other fingers closed.</small> | <small>SWING - With arm extended horizontally, index finger points in direction that boom is to swing.</small> |
|  |  |  |  |  |
| <small>RETRACT TELESCOPING BOOM - With hands to the front at waist level, thumbs point at each other with other fingers closed.</small> | <small>RAISE THE BOOM AND LOWER THE LOAD - With arm extended horizontally to the side and thumb pointing up, fingers open and close while load movement is desired.</small> | <small>DOG EVERYTHING - Hands held together at waist level.</small> | <small>LOWER - With arm and index finger pointing down, hand and finger make small circles.</small> | <small>LOWER BOOM - With arm extended horizontally to the side, thumb points down with other fingers closed.</small> |
|  |  |  |  |  |
| <small>EXTEND TELESCOPING BOOM - With hands to the front at waist level, thumbs point outward with other fingers closed.</small> | <small>TRAVEL/LOWER TRAVEL - With all fingers pointing up, arm is extended horizontally out and back to make a pushing motion in the direction of travel.</small> | <small>LOWER THE BOOM AND RAISE THE LOAD - With arm extended horizontally to the side and thumb pointing down, fingers open and close while load movement is desired.</small> | <small>MOVE SLOWLY - A hand is placed in front of the head flat to give the action signal.</small> | <small>USE AUXILIARY HOIST (tagline) - With arm bent at elbow and forearm vertical, elbow is tapped with other hand. Then regular signal is used to indicate desired action.</small> |
|  |  |  |  | |
| <small>CRAWLER CRANE TRAVEL, BOTH TRACKS - Rotate feet around each other in front of body; direction of rotation away from body indicates travel forward; rotation towards body indicates travel backward.</small> | <small>USE MAIN HOIST - A hand taps on top of the head. Then regular signal is given to indicate desired action.</small> | <small>CRAWLER CRANE TRAVEL, ONE TRACK - Indicate track to be locked by raising flat on that side. Rotate other flat in front of body in direction that other track is to travel.</small> | <small>TROLLEY TRAVEL - With palms up, fingers closed and thumb pointing in direction of motion, hand is jerked horizontally in direction trolley is to travel.</small> | |

Slide 7

Load Charts-Hand Signal Charts

- Load charts and the operator's manual must be available in the cab at all times
- Hand signal charts
 - Posted on machine
 - Posted in vicinity

HOIST With load attached, hoist slowly until the load is at the desired height. Do not hoist faster than the rated hoisting speed.

LOWER With load attached, lower slowly until the load is at the desired height. Do not lower faster than the rated lowering speed.

USE MAIN HOIST This signal is used to indicate that the main hoist is to be used.

USE WINCH/CRANE This signal is used to indicate that the winch or crane is to be used.

RAISE BOOM This signal is used to indicate that the boom is to be raised.

LOWER BOOM This signal is used to indicate that the boom is to be lowered.

MOVE SLOWLY This signal is used to indicate that the crane should move slowly.

RAISE THE BOOM AND LOWER THE LOAD This signal is used to indicate that the boom is to be raised and the load is to be lowered.

LOWER THE BOOM AND RAISE THE LOAD This signal is used to indicate that the boom is to be lowered and the load is to be raised.

PARTNERSHIP 7

Explain that the picture in the slide is not a complete hand signal chart, but merely an example. An example of a complete chart is on the previous page.

Explain that 1926.1417(c)(1) states that the procedures applicable to the operation of the equipment, including rated capacities (load charts), recommended operating speeds, special hazard warnings, instructions, and operator's manual, must be readily available in the cab at all times for use by the operator.

1926.1417(c)(2) states that where rated capacities are available in the cab only in electronic form: In the event of a failure which makes the rated capacities inaccessible, the operator must immediately cease operations or follow safe shut-down procedures until the rated capacities (in electronic or other form) are available.

Also, explain that hand signal charts must be either posted on the equipment or conspicuously posted in the vicinity of the hoisting operations.

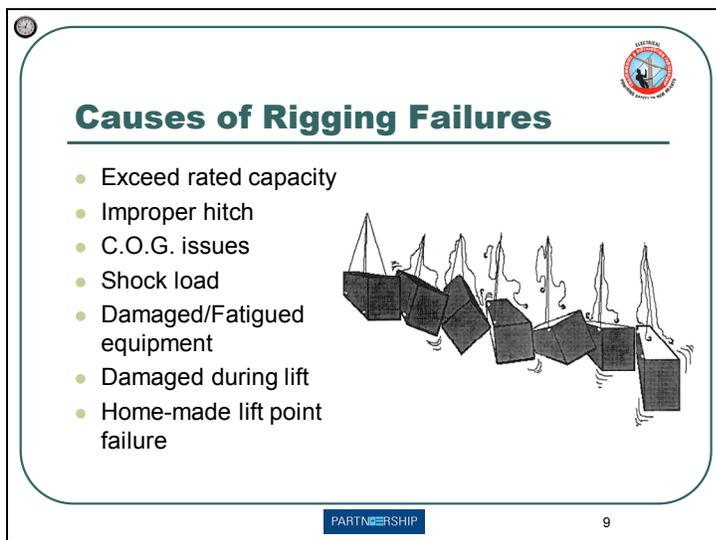
Slide 8



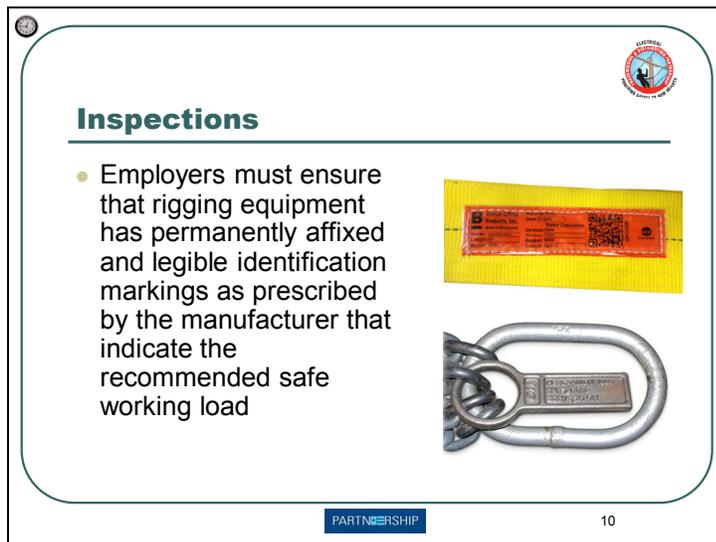
When is a qualified rigger required? (See Handout). Employers must use qualified riggers during hoisting activities for assembly and disassembly work. Additionally, qualified riggers are required whenever workers are within the fall zone and hooking, unhooking, or guiding a load, or doing the initial connection of a load to a component or structure.

Explain that you are now going to discuss pre-use inspection of general rigging hardware and discuss a few safe work practices associated with rigging and lifting.

Slide 9



Discuss the primary reasons for rigging failures.



Inspections

- Employers must ensure that rigging equipment has permanently affixed and legible identification markings as prescribed by the manufacturer that indicate the recommended safe working load

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10

Explain the OSHA requirements. Employers must ensure that rigging equipment:

Has permanently affixed and legible identification markings as prescribed by the manufacturer that indicate the recommended safe working load;

Not be loaded in excess of its recommended safe working load as prescribed on the identification markings by the manufacturer; and

Not be used without affixed, legible identification markings

Slide 11



Inspections

- Each day before being used, the sling and all fastenings and attachments shall be inspected for damage or defects by a competent person designated by the employer
- Additional inspections shall be performed during sling use, where service conditions warrant
- Damaged or defective slings shall be immediately removed from service

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OSHA and ASME (American Society of Mechanical Engineers) require that a visual inspection for damage will be performed by the user or other designated person each day or shift the sling is used. Damaged slings will be removed from service and not be used until they are repaired or they are discarded.

Slide 12



Wire Rope Inspection

- Look for:
 - Excessive broken wires
 - Kinking
 - Bird Caging
 - Crushing
 - Deformation
- Ten randomly distributed broken wires in one rope lay, or five broken wires in one strand in one rope lay



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Explain that when inspecting wire rope slings, the user will look for items such as:

- ✓ Broken wires
- ✓ Kinking
- ✓ Bird caging
- ✓ Crushing or deformation of the rope

Wire Rope Inspection

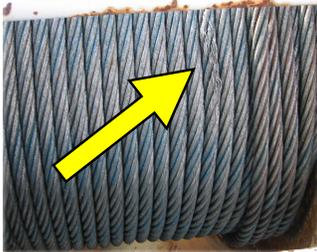


- Look For:
 - Main Strand Displacement
 - Core Protrusion

PARTNERSHIP 13

Explain that in this picture the main strand misplacement in this eye will require that this winch be taken out of service.

**Out Of Service Criteria
Wire Rope Winch Lines**



- 6 randomly distributed broken wires in one lay
OR
- 3 broken wires in one strand in one lay
- At end fittings-1 broken wire

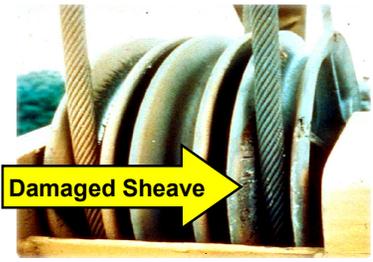
PARTNERSHIP 14

Explain that this winch must be removed from service because of number of broken wires. Depending on the type of wire rope, for winch lines, six randomly distributed broken wires in one lay or three broken wires in one strand in one lay is cause for removal from service.

Slide 15

Sheave Inspection

- The grooves must be smooth and free from surface defects which could cause rope damage



Damaged Sheave

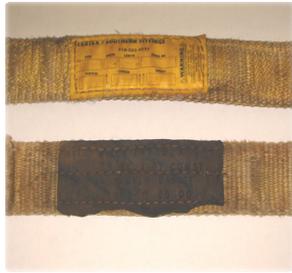
PARTNERSHIP 15

Explain that sheave grooves will be smooth and free from surface defects that could cause rope damage.

Slide 16

Web Sling Inspection

- Synthetic web slings shall be removed from service if:
 - Illegible Tag
 - Burns
 - Tears
 - Cuts
 - Punctures
 - Broken/worn stitches



PARTNERSHIP 16

Explain that all web slings must be marked with the name or trademark of the manufacturer, the rated capacities for the different types of hitches and they type of material. If the sling has a tag and the tag is missing or is not legible, it must be taken out of service.

Shackle Inspection

- **Look for:**
 - 10% wear in the bow
 - 10% wear in the pin
 - Any Unusual Bends
 - Any Change in Shape
 - Cracks or Sharp Nicks
 - Modifications
 - Pin replaced with a bolt



PARTNERSHIP 17

Explain that when inspecting shackles, the main points are to look at the pin, and the bow. If the pin does not insert correctly or all the way, this is a sign of damage. In addition, if the bow is worn more than 10 percent, this is a sign of wear. Do not modify a shackle by replacing the pin with a bolt or other object. A damaged shackle cannot be repaired and must be discarded.

Fiber Rope Inspection

- Natural and synthetic fiber rope slings **WILL** be immediately removed from service if any of the following conditions are present:
 - Abnormal wear.
 - Powdered fiber between strands.
 - Broken or cut fibers.
 - Variations in the size or roundness of strands.
 - Discoloration or rotting.
 - Distortion of hardware in the sling.



PARTNERSHIP 18

In our industry, fiber rope is one our most useful items. Rope is used to secure, haul, and rescue. Rope should be kept dry and as clean as possible. As with all other rigging equipment, it must be inspected for wear and damage. When inspecting a fiber rope sling, first examine the surface. Look for dry, brittle, scorched, or discolored fibers. Scratch the fibers with a fingernail. If the fibers come apart easily, the fiber sling has suffered some kind of chemical damage and must be discarded.

Slide 19

Fiber Rope Inspection

- Check the interior of the rope

Look here for broken, melted fibers and/or powdery build-up

PARTNERSHIP 19

Explain that a buildup of powder-like sawdust on the inside of the fiber rope indicates excessive internal wear and is an indication that the rope is unsafe.

Slide 20

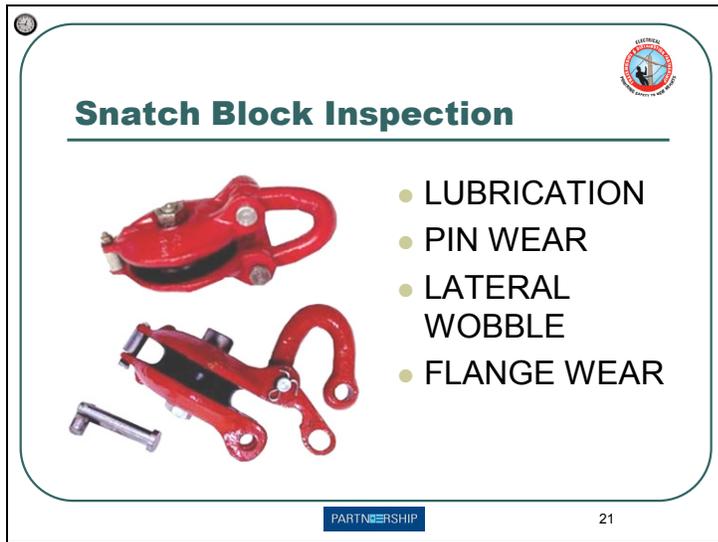
Chain Slings

- A thorough periodic inspection of alloy steel chain slings in use shall be made on a regular basis
- Such inspections shall in no event be at intervals greater than once every 12 months
- The employer shall make and maintain a record of the most recent month in which each alloy steel chain sling was thoroughly inspected

PARTNERSHIP 20

Each chain sling must be inspected daily before use. Each chain sling must have a minimum annual inspection by a competent person. That inspection must also be documented.

Slide 21



Snatch Block Inspection



- LUBRICATION
- PIN WEAR
- LATERAL WOBBLE
- FLANGE WEAR

PARTNERSHIP 21

The slide features a title 'Snatch Block Inspection' in bold green text. Below the title is a photograph of two red snatch blocks and a silver pin. To the right of the image is a bulleted list of inspection points: LUBRICATION, PIN WEAR, LATERAL WOBBLE, and FLANGE WEAR. The slide includes a logo in the top right corner, a 'PARTNERSHIP' label at the bottom left, and the number '21' at the bottom right.

Explain that Snatch blocks should be inspected for wear, loose parts, and lubrication.

Slide 22



Crane Hook Inspection

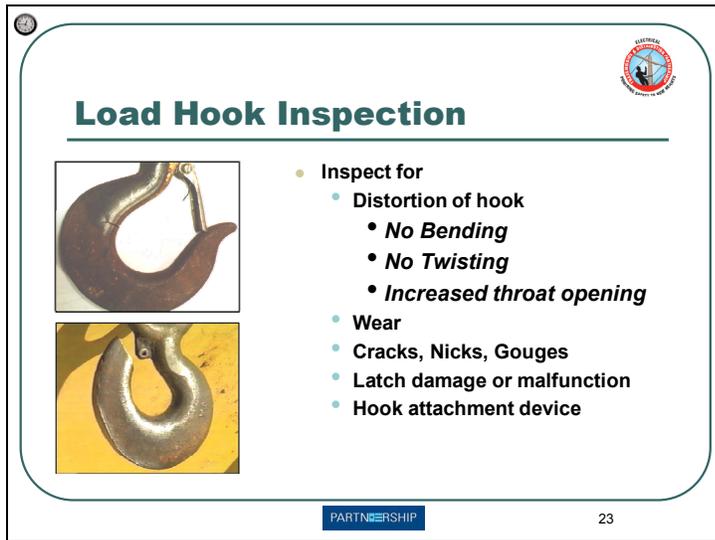


- Normal Service
 - *Yearly*
- Heavy Service
 - *Semiannually*
- Severe Service
 - *Quarterly*

PARTNERSHIP 22

The slide features a title 'Crane Hook Inspection' in bold green text. Below the title is a photograph of a green crane hook. To the right of the image is a bulleted list of inspection frequencies: Normal Service (Yearly), Heavy Service (Semiannually), and Severe Service (Quarterly). The slide includes a logo in the top right corner, a 'PARTNERSHIP' label at the bottom left, and the number '22' at the bottom right.

Explain that the periodic inspection is determined based on the use. A periodic inspection is a more thorough inspection than the frequent inspection.



Load Hook Inspection



- Inspect for
 - Distortion of hook
 - No Bending**
 - No Twisting**
 - Increased throat opening**
 - Wear
 - Cracks, Nicks, Gouges
 - Latch damage or malfunction
 - Hook attachment device

PARTNERSHIP 23

When inspecting hooks look for distortion or bending. When looking head on at the hook tip, there should be no twist or deflection in any direction. Check for wear, cracks, etc.



Safe Rigging Practices



PARTNERSHIP

24

Explain that the following section will discuss safe rigging practices.

Rigging Equipment

- Working Rules for Slings
 - **Never** exceed the rated capacity
 - **Never** use a damaged sling
 - **Never** shorten with knots, bolts, or other devices
 - **Always** protect slings from sharp edges of the load
 - **Always** keep hands and fingers clear of slings under tension

PARTNERSHIP 25

The following are some working rules when using slings.

- ✓ As with any rigging component, never exceed its rated capacity;
- ✓ Never use damaged equipment;
- ✓ Never shorten slings with knots or any other devices;
- ✓ Always protect slings from sharp edges; and
- ✓ Always keep hands clear of slings under tension.

Rigging Equipment

- Consider the following
 - Lifting Factors
 - Sling angle
 - Capacity of rigging hardware
 - Weight of the load
 - Environment
 - Wind



PARTNERSHIP 26

Before lifting any load, you must take into consideration the size, weight, and center of gravity of the load. This will help determine how many slings to use and how the object will be rigged. In addition, sling length will have an effect on the sling angle. A small sling angle can have a significant effect on the sling tension.

Do not exceed capacity of any lifting equipment.

Estimating the load

If you are unsure of the load weight, you can do several things:

- ✓ Check shipping papers
- ✓ Check name plates and labels
- ✓ Ask the equipment manufacturer
- ✓ Use industry standard tables and charts
- ✓ Estimate the weight using weights of similar loads, Stay within 50% of cranes rated capacity when using load weight estimates

Storage

- ✓ When storing slings, care should be taken to prevent damage.
- ✓ Synthetic slings need to be stored out of direct sunlight because UV rays break down the material.
- ✓ Chain and wire rope slings should be stored off the ground and kept dry to keep them from corroding.
- ✓ Do not throw heavy items on top of slings so they do not kink or break any strands.
- ✓ Ideally, slings should be hung during storage.

Slide 27

Rigging Equipment

- Sling Angles
 - Two slings, each supporting the same weight and having the same support angle results in an equal distribution of the load to each sling

500 lbs 0 0 500 lbs

1000lb

0° Angle

PARTNERSHIP 27

When two slings of the same length and the same support angle are used on a load that is balanced, the total weight of the load is divided equally between the sling legs.

Load Angle Factor

Sling Leg

L=20'

H = 10'

LOAD WEIGHT = 10,000 POUNDS

- Divide the sling length by the height from the load to the hook

Sling Tension = L/H x ½ Load

- 20 ÷ 10 = 2
- 2 x ½ Weight = 10,000
- Each leg = 10,000 tension

PARTNERSHIP 28

Two slings, each having the same length, and having the same support angle results in an equal distribution of the load on each sling. To calculate a load on a sling, you take the length of the sling divided by the height from the load to the lifting attachment (hook), measured from the bottom of the hook to the load. This L over H gives you a number from zero to two. That is your angle multiplier. You then take that number and multiply it by ½ the weight of the load. As the multiplier increases, the load on the sling leg increases.

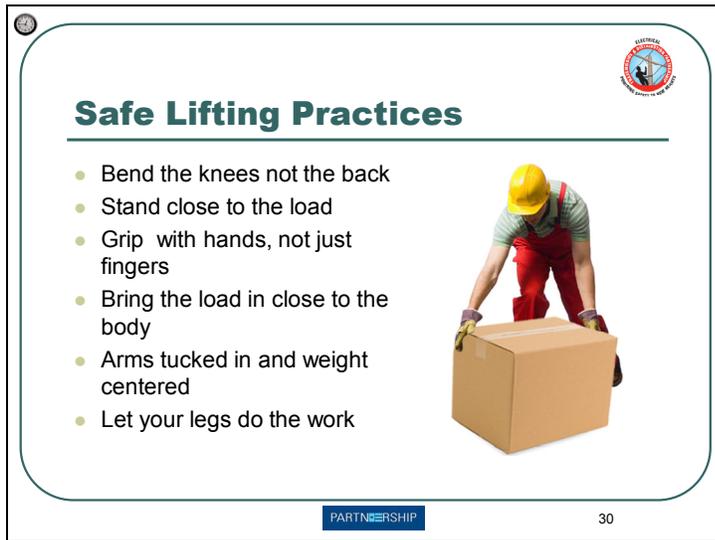
Manual Material Handling & Lift Truck

PARTNERSHIP

29

Explain that the following section will discuss both manual material handling and the use of forklifts.

Slide 30



Safe Lifting Practices

- Bend the knees not the back
- Stand close to the load
- Grip with hands, not just fingers
- Bring the load in close to the body
- Arms tucked in and weight centered
- Let your legs do the work

PARTNERSHIP 30

Explain that to lift properly, body mechanics are critical. Always plan the lift. If possible, use a machine for heavy or awkward loads. When lifting with the body do not bend at the waist, instead bend the knees. Stand close to the load. Grip with your hands, not just your fingertips. Bring the load close to the body. Tuck the arms in and make sure the weight is centered. Let your legs do the work.

Slide 31



Lifting & Carrying

- How to Lift and Carry Safely
 - Carrying
 - Make sure you can see where you're going
 - Move slowly with small steps
 - Don't twist the body – change direction with your feet
 - Try not to lift the load above shoulder level
 - Unloading, same as lifting

PARTNERSHIP 31

When carrying the load, make sure you can see where you are going. If you cannot see, get help. Do not twist the body, change direction with your feet. Try not to lift the load above shoulder level. Carry long objects such as conduit over the shoulder. However, watch for ends

hitting people or objects. When unloading, following the same steps as lifting except in reverse order.

Slide 32



Forklift Safety Do's and Don'ts

- **DO:**
 - Inspect daily
 - Refuel or recharge only in designated areas
 - Keep loads low and balanced, tilt back slightly
 - Keep wide loads centered



PARTNERSHIP 32

Explain that only those persons that are trained may operate a forklift. Retraining must be conducted every three years or sooner if supervision deems necessary. Before operation, the operator must inspect the unit daily. If there are any problems, do not use the machine. Refuel or recharge in designated areas. These areas may contain flammable atmospheres, so do not smoke. When traveling with a load, keep the load low and tilted back slightly. When handling wide loads, make sure they are centered and balanced.

Slide 33



Forklift Safety Do's and Don'ts

- **Do:**
 - On slopes travel with load up hill
 - Drive in reverse, if vision is blocked (except uphill)
 - Back out slowly and check behind you after unloading
 - Park on flat surfaces with forks tilted forward and lowered; block wheels if on a slope



PARTNERSHIP 33

When traveling on slopes, the load should always be located on the uphill side. If the load obstructs your view, drive in reverse, except when going uphill. Back out slowly and check the

area around you before moving. It is a good idea to sound the horn before moving to alert others in the area. When parked, lower forks to the ground. If not possible to park on a flat surface, chock the wheels.

Slide 34



Forklift Safety Do's and Don'ts

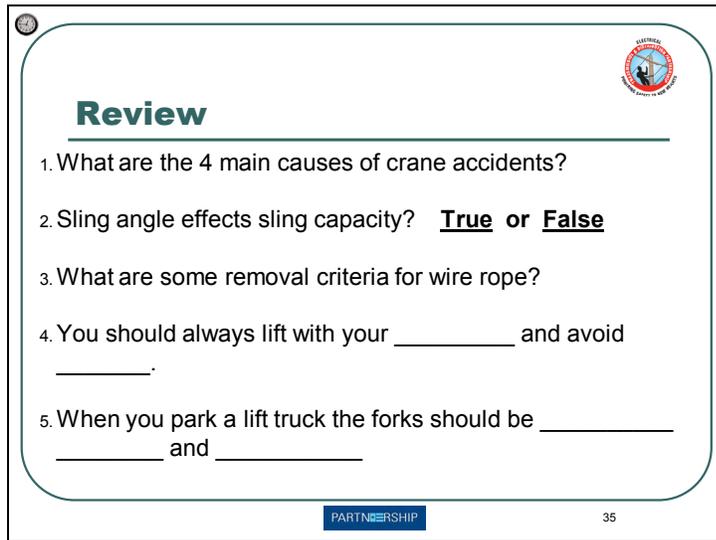
- **Don't:**
 - Lift or Carry people unless forklift is equipped to do so
 - Overload the forklift
 - Travel with forks raised higher than needed



PARTNERSHIP 34

Do not carry people unless the forklift is equipped to do so. If so equipped, there are special precautions must be taken. As with all material handling equipment, make sure you are within the safe working load. Never let another employee get beneath the load. When traveling, keep the forks as low as possible. Observe basic safe driving rules such as do not speed, keep it under control, and watch for pedestrians.

Slide 35



Review

1. What are the 4 main causes of crane accidents?
2. Sling angle effects sling capacity? **True or False**
3. What are some removal criteria for wire rope?
4. You should always lift with your _____ and avoid _____.
5. When you park a lift truck the forks should be _____ and _____.

PARTNERSHIP 35

Desired answers

- Contact with power lines; overturns; falls; mechanical failures
- True
- Excessive broken wires; kinking; bird caging; crushing; deformation
- Legs, Twisting
- Tilted Forward Lowered

Safe Rigging Practices Handout

Material handling using rigging hardware is a special skill, which requires special tools, special methods, and a special mindset to safely lift, move and locate materials and equipment. The three most important points to remember when performing work using rigging hardware and techniques are:

- 🍊 **ALWAYS inspect your equipment before use. Do not use damaged or defective rigging hardware.**
- 🍊 **NEVER exceed the rated capacity of the rigging hardware**
- 🍊 **Stay clear of loads about to be lifted or moved and NEVER stand or place any part of your body under a suspended load.**



Screw Pin Shackle or Clevis



Nylon Web Sling

- ☑ Look for wear at the bow section. Greater than 10% reduction in original width is requires removal from service
- ☑ Look for nicks, cuts, gouges or deformation of the body
- ☑ Look for wear or damage to the pin and pin threads and always ensure that the pin is fully screwed into the clevis body before lifting
- ☑ Only use rigging hardware for rigging jobs. Material shackles may be rated for the load but they are not designed to be used as rigging hardware
- ☑ Do not substitute a bolt or spud wrench for the original pin
- ☑ Slings with *any* cuts, nicks, tears, and/or other type damage must not be used
- ☑ All web slings must have legible tags that show the capacity in all hitch configurations, the manufacturer and the material of which it is made
- ☑ Sling angles reduce lifting capacity



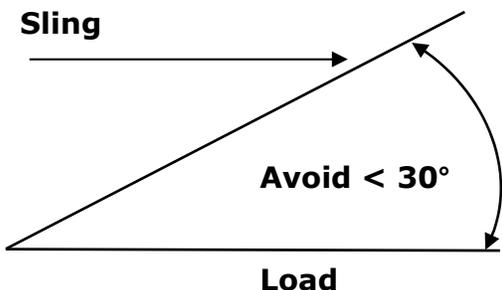
2-Way Chain Sling



Wire Rope Slings



Load Hook With Safety Latch



- ☑ Only lifting chains may be used for lifting
 - ☑ Lifting chains must have a documented inspection performed at intervals no greater than every 12 months
 - ☑ Lifting chains must be visually inspected before each use. The user must inspect all the links, hooks, rings, and any other attachment(s)
 - ☑ Lifting chains must be tagged to show their capacity in each hitch configuration and the manufacturer
 - ☑ Do not use cargo chains for lifting
-
- ☑ When inspecting wire rope check the sling body and the sling eyes for:
 - ☑ Broken Wires, Kinks, Bird Caging, Crushed Strands, deformation of the sling body or eye
 - ☑ Remember the D/d ratio to avoid sling damage
 - ☑ To calculate the D/d ratio, add together the diameter (D) of the object to be lifted and the diameter (d) of the sling, then divide the sum by the diameter of the sling. For lifting, Ratios of 18:1 or greater are desired
 - ☑ Hooks designed to have safety latches must have properly working safety latches
 - ☑ Never disable or tape open a hook latch
 - ☑ When inspecting hooks, look for:
 - ☑ Broken or missing latches
 - ☑ Bends, gouges, twists or deformation
 - ☑ Stretched throat opening
 - ☑ Deformation
 - ☑ Sling angles and choker hitches reduce the rated capacity of ALL sling types
 - ☑ Sling angles less than 30° should be avoided
 - ☑ When sling angles are 30° the tension on each sling is equal to the total weight of the lifted load!

**Luck Runs Out-Safety Does not!
Rig it Safe- Rig it Right**

Manual Material Handling Handout

Safe lifting and carrying techniques are crucial to prevent painful and expensive injuries in the workplace. Unfortunately, in practice, most workers do not consistently use safe practices. These unsafe practices place workers at great risk to their personal well-being.

Safe Lifting Prevents Major Injuries

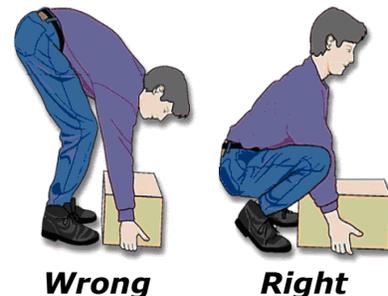
Thousands of back injuries and other soft tissue injuries occur in the workplace each year, many leading to permanent pain and disability. These injuries are often caused by unsafe lifting and carrying of heavy or awkward objects, and are easily prevented. The most common types of job-related back injuries are:

- 🍊 Strain—overused or overstretched muscles
- 🍊 Sprain—torn ligaments from sudden movement
- 🍊 Herniated disk—loss of cushioning ability from strain or age

Safe Lifting and Carrying Techniques

Safe lifting and carrying techniques are the key to dramatically reducing debilitating back and soft tissue injuries on the job. When lifting, workers should consider the following lifting safety tips:

- 🍊 ***Consider using a machine if practical***
- 🍊 ***Warm up before lifting***
- 🍊 ***Use team lifting for heavy or awkward objects***
- 🍊 ***Avoid working in awkward positions***
- 🍊 ***Plan your route before you lift***
- 🍊 ***Bend at the knees, not the waist***
- 🍊 ***Lift with your legs, not your back***
- 🍊 ***Keep the load close to your body***
- 🍊 ***Avoid lifting above the shoulder level***
- 🍊 ***Avoid twisting***
- 🍊 ***Make sure you can see where you are going***



Although improper lifting, carrying, and moving techniques are the primary cause of back and other soft tissue injuries, injuries are much more likely to occur when employees are in poor physical condition and overweight. Therefore, employees should be encouraged to maintain a healthy weight and good muscle tone. Just remember, you only have one body, if you do not take care of it, or abuse it, it will break down.

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LIFTING MADE SAFE AND EASY

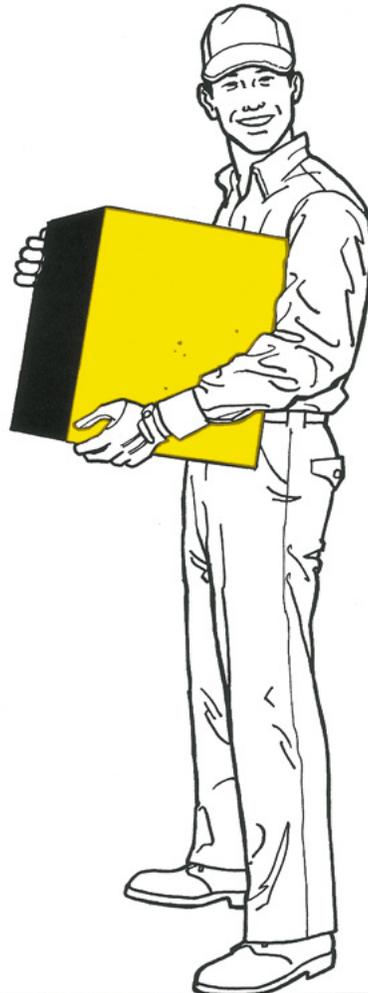


BEND KNEES • LIFT SMOOTHLY



**IF TOO HEAVY OR CLUMSY
- GET HELP!**

**KEEP LOAD
CLOSE AND
DON'T TWIST**



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OSHA[®] FactSheet

Subpart CC – Cranes and Derricks in Construction: Qualified Rigger

This fact sheet describes the qualified rigger requirements of subpart CC – Cranes and Derricks in Construction, as specified in 29 CFR 1926.1401, 1926.1404, and 1926.1425. These provisions are effective November 8, 2010.

When is a *qualified rigger* required?

Employers must use *qualified riggers* during hoisting activities for assembly and disassembly work (1926.1404(r)(1)). Additionally, *qualified riggers* are required whenever workers are within the fall zone and hooking, unhooking, or guiding a load, or doing the initial connection of a load to a component or structure (1926.1425(c)).

Who can be a *qualified rigger*?

A *qualified rigger* is a rigger who meets the criteria for a qualified person. Employers must determine whether a person is qualified to perform specific rigging tasks. Each *qualified rigger* may have different credentials or experience. A *qualified rigger* is a person that:

- possesses a recognized degree, certificate, or professional standing, or
- has extensive knowledge, training, and experience, and
- can successfully demonstrate the ability to solve problems related to rigging loads.

The person designated as the *qualified rigger* must have the ability to properly rig the load for a particular job. It does not mean that a rigger must be qualified to do every type of rigging job.

Each load that requires rigging has unique properties that can range from the simple to the complex. For example, a rigger may have extensive experience in rigging structural

components and other equipment to support specific construction activities. Such experience may have been gained over many years. However, this experience does not automatically qualify the rigger to rig unstable, unusually heavy, or eccentric loads that may require a tandem lift, multiple-lifts, or use of custom rigging equipment. In essence, employers must make sure the person can do the rigging work needed for the exact types of loads and lifts for a particular job with the equipment and rigging that will be used for that job.

Do *qualified riggers* have to be trained or certified by an accredited organization or assessed by a third party?

No. Riggers do not have to be certified by an accredited organization or assessed by a third party. Employers may choose to use a third party entity to assess the qualifications of the rigger candidate, but they are not required to do so.

Does a certified operator also meet the requirements of a *qualified rigger*?

A certified operator does not necessarily meet the requirements of a *qualified rigger*. Determining whether a person is a *qualified rigger* is based on the nature of the load, lift, and equipment used to hoist that load plus that person's knowledge and experience. A certified/qualified operator may meet the requirements of a *qualified rigger*, depending on the operator's knowledge and experience with rigging.

This is one in a series of informational fact sheets highlighting OSHA programs, policies or standards. It does not impose any new compliance requirements. For a comprehensive list of compliance requirements of OSHA standards or regulations, refer to Title 29 of the Code of Federal Regulations. This information will be made available to sensory impaired individuals upon request. The voice phone is (202) 693-1999; teletypewriter (TTY) number: (877) 889-5627.

For more complete information:



U.S. Department of Labor

www.osha.gov

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