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CRANE SAFETY IN INDUSTRIAL AND CONSTRUCTION ENVIRONMENTS

**Leader's Guide, Fact Sheet
& Quiz**

Item Number: 5092

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This easy-to-use Leader's Guide is provided to assist in conducting a successful presentation.

PREPARING FOR THE MEETING

Here are a few suggestions for using this program:

- a) Review the contents of the Fact Sheet that immediately follows this page to familiarize yourself with the program topic and the training points discussed in the program. The Fact Sheet also includes a list of Program Objectives that details the information that participants should learn from watching the program.
- b) If required by your organization, make an attendance record to be signed by each participant to document the training to be conducted.
- c) Prepare the area and equipment to be used for the training. Make sure the watching environment is comfortable and free from outside distractions. Also, ensure that participants can see and hear the TV screen or computer monitor without obstructions.
- d) Make copies of the Review Quiz included at the end of this Leader's Guide to be completed by participants at the conclusion of the presentation. Be aware that the page containing the answers to the quiz comes before the quiz itself, which is on the final page.

CONDUCTING THE PRESENTATION

- a) Begin the meeting by welcoming the participants. Introduce yourself and give each person an opportunity to become acquainted if there are new people joining the training session.
- b) Introduce the program by its title and explain to participants what they are expected to learn as stated in the Program Objectives of the Fact Sheet.
- c) Play the program without interruption. Upon completion, lead discussions about your organization's specific policies regarding the subject matter. Make sure to note any unique hazards associated with the program's topic that participants may encounter while performing their job duties at your facility.
- d) Hand out copies of the review quiz to all of the participants and make sure each one completes it before concluding the training session.

5092 CRANE SAFETY IN INDUSTRIAL AND CONSTRUCTION ENVIRONMENTS FACT SHEET

LENGTH: 17 MINUTES

PROGRAM SYNOPSIS:

Employees lift and move things on the job every day, but when a human's strength isn't enough, cranes can provide the major lifting power that's needed to get the job done. Their lifting abilities are indispensable for many industrial and construction operations; however, they can also create serious hazards for the people who work with them. Crane-related accidents not only damage materials and equipment, but can also cause injuries and even fatalities. To avoid these problems, employees need to understand the hazards that can be associated with using cranes, the federal regulations that have been established to address those hazards and the equipment and procedures they should use to lift, move and land loads safely. This program reminds workers about various crane hazards and how they can avoid them.

Topics include three basic types of cranes, OSHA Crane Standards, crane inspection, preparing a boom lift for operation and how to rig, lift, move and land a load safely.

PROGRAM OBJECTIVES:

After watching the program, the participant should:

- Know the three basic types of cranes and how they work.
- Understand the hazards that can be associated with using different types of cranes.
- Understand the safety regulations that address these hazards.
- Know the equipment and safe work practices they should use when working with cranes.
- Know what to check when inspecting different types of cranes.
- Know how to ensure that a boom crane is stable.
- Know how to raise, move and land a load safely.

PROGRAM OUTLINE:

THREE BASIC TYPES OF CRANES

- **We lift and move things every day.**
 - But sometimes "arm strength" just isn't enough, and it takes major lifting power to get the job done.
 - That's when we need to use cranes.
- **Their lifting capability can be indispensable, but it also creates potential hazards for the people who work with them.**
- **Over the years, different types of cranes have been created to meet the requirements of different types of lifting, and operating, environments.**
 - Although the equipment may share many similarities, it's important to understand their differences as well in order to use them safely.
- **Most industrial cranes fall into three basic categories:**
 - Overhead cranes.
 - Jib cranes.
 - Boom cranes.
- **"Overhead cranes" are typically attached to support platforms or the walls of buildings.**
 - The hoist cable and hook of these cranes move along a track called a "bridge", usually in a straight line.
 - Their tracks are usually fixed in place.
- **Most "jib cranes" are also fixed in place, but they can have a greater range of motion because their horizontal arm can pivot from side to side.**
 - The arm is locked in a horizontal position so its vertical angle can't be changed.
- **"Boom cranes" are similar to jib cranes in that their hoist cable and hook hang from an arm that can pivot, but the angle of a boom crane arm can be adjusted.**
 - The length of some booms can be changed as well.
- **While this makes boom cranes more versatile, it also means that more variables have to be taken into account to use the equipment safely.**
 - Boom cranes such as "truck" or "tower" cranes are considered to be the most complicated type of lifting equipment.

- **According to the Bureau of Labor Statistics, more than 5 workers are killed every month while performing tasks associated with cranes, derricks and hoists, and many others are injured.**

- A crane, a boom, or the load itself can fall on them.
- They can be caught in a crane's moving parts or be crushed between a load and a wall or other immovable object.
- They can even be electrocuted if the crane gets too close to an overhead power line.

OSHA CRANE STANDARDS

- **To address these hazards, the Occupational Safety and Health Administration (OSHA) has created safety regulations for cranes and similar equipment that is used in both general industry and construction.**

- **OSHA's Crane Standards establish policies as well as procedures that are intended to prevent incidents and protect the health and safety of employees who work with cranes. These rules cover:**

- Assembly and disassembly of crane equipment.
- Ground conditions that are required for safe crane operation.
- Hand signals that should be used to communicate during crane operations.
- How to work safely around power lines.

- **The OSHA Standards also establish the qualifications: training that operators, signal persons, maintenance and repair personnel must have in order to work with cranes.**

- **All crane operators must be "licensed" by a government agency or be "certified" either by an accredited testing organization or audited employer program.**

- OSHA also requires employers to "qualify" each operator by assessing their knowledge and ability.

- **"Signal persons" must be "qualified" by either a "third party qualified evaluator" or their employer's own "qualified evaluator", based on the criteria that OSHA specifies in the Standards.**

- **Employees who perform maintenance and repair tasks can only operate a crane as part of their work if:**

- They are familiar with how that specific type of crane functions.
- They are directly supervised by a "qualified" or "certified" crane operator.

CRANE INSPECTION

- **Safe practices for crane operations begin with an inspection of the crane, well before you rig the load or fire up the equipment.**

- Identifying problems before they turn into major malfunctions is a good way to prevent incidents and injuries.
- The process begins with a thorough visual inspection.

- **Look for missing parts, signs of excessive wear, leaks, cracks and other damage.**

- Then check the crane's fluid levels and refill them as needed.
- Test the brakes and other controls to make sure that they are all functioning the way they should.

- **When you start up a crane, listen for any unusual noises.**

- These can alert you to mechanical problems that you can't see.

- **When inspecting a crane's "hardware", pay special attention to the hook.**

- If its safety latch is bent or broken, don't use it!
- It could cause the load to slip off, dumping and damaging materials and possibly injuring a rigger or bystander.

- **Be on the lookout for damage to other parts of the hook as well. Replace it when:**

- The opening has been stretched wider by fifteen percent or more.
- It has been twisted out of alignment by more than 10 degrees.

- **After you have completed a general inspection, you should focus on special features of the particular type of crane you're working with.**

- **For example, overhead cranes are equipped with:**

- "End stops", that prevent the cranes from running off the rails.
- "Bumpers" that absorb the impact when the crane reaches the end of its travel.

- **These parts are prone to wear and tear, so make sure they are in place, undamaged and functional before starting work with an overhead crane.**

- **Before using a jib crane:**

- Make sure you know the jib arm's range of motion, so you can prevent your hands, fingers or other body parts from being caught in the equipment or being hit when it swings.

- Test the "hoist brake" to ensure that it can safely stop and hold the load.

- **Your assistance can be very important in maintaining safety, even if you're not a crane operator.**

- If something doesn't look right, you need to report it to the equipment operator or your supervisor.

PREPARING A BOOM CRANE FOR OPERATION

- **Boom cranes offer their users great power and lifting capability, but to work with them safely you need to use caution and pay attention to detail.**
- **If things go wrong while a boom crane is making a lift, it's often because mistakes were made when the crane was being set up. Improper setup can:**
 - Cause the crane to dump the load.
 - Damage the crane and the materials being hoisted.
 - Tip the crane over.
 - Lead to worker injuries or even fatalities.
- **Before making a lift, you can guard against all of these hazards by:**
 - Making sure that the crane is level.
 - Consulting its load chart to determine its weight limits and proper boom adjustment.
- **A boom crane is equipped with "legs", called "outriggers", which are used to stabilize the crane and keep it level.**
 - Make sure the outriggers rest on solid ground after they have been extended.
 - If necessary, lay wood or metal plates down under the legs to ensure firm footing.
- **The "bubble level" that is mounted on the crane will also help you to adjust the outriggers properly.**

PREPARING TO LIFT THE LOAD

- **Once you have the crane set up correctly, you can prepare to lift the load.**
 - The crane's "load chart" will indicate how much weight the equipment can safely lift when the boom is set to various angles and lengths.
 - Never guess at these numbers!
- **A copy of the load chart should be permanently attached to the crane.**
 - Your supervisor may have a copy as well.
- **When you're calculating the weight of a load, remember to include all of the "lifting accessories," such as the rigging, block and hook.**
 - Then use the chart to determine the boom length and the angle that should be used for safe and efficient operation.

RIGGING THE LOAD

- **Once you have familiarized yourself with the crane you're going to use and have set it up correctly, you are ready to "rig" the load.**
- **First, make sure there's nothing in the area to get in the way of workers or equipment.**
 - Clear away boxes, tools, materials and debris that may be lying around.
- **When using a sling, choose the type that is best suited to lifting the load safely.**
 - Synthetic web slings will generally not mar or crush the load they carry.
 - Chain and wire rope slings have great strength for heavy lifting.
 - Metal mesh slings are designed to resist damage due to hot, abrasive or sharp-edged loads.
- **Always check a sling's load rating to make sure it can carry the amount of weight you plan to lift.**
- **The hitch that is used to connect the load to the crane hook should keep good control of the load.**
 - A "vertical hitch" is the simplest type, directly connecting the attachment point on a load to the crane hook.
 - A "basket hitch" cradles the load and distributes tension over more of the sling.
 - A "choker hitch" tightens on the load as it is lifted, exerting pressure over a full 360 degrees.

LIFTING THE LOAD

- **The crane should be positioned so that the hoist rope hangs straight down, directly over the center of the load.**
 - The load must be lifted straight up and put down the same way.
 - Lifting "off center" could damage the crane or the load or injure people who are working nearby.
- **Next, attach the load to the hook.**
 - Be sure to position the sling at the center of the hook, where it's strongest.
 - Never position the sling on the tip of the hook where the weight of the load can bend or weaken it.
- **At this point, the signal person should use standard hand signals to ask the operator to make a trial lift.**
 - The load should be raised about a foot off the ground to confirm that the rigging is secure and the load is under control.

- If everything's okay, the lift can proceed.
- **As the load rises, pay close attention to the angle between it and the ground.**
- A load is most secure when it's level.
- A lift angle greater than 10 degrees could dump the load.
- **If the load angle appears to be too great, lower the load again and adjust the sling to better balance it.**

MOVING THE LOAD

- **Once a load leaves the ground, the next challenge is to move or "travel" with it safely.**
- **With fixed equipment such as overhead and jib cranes, this can be accomplished by moving the hoist block or jib arm.**

Remember:

- If you need to change speed, do it gradually.
- **While a mobile or "crawler" crane can swing its boom to move a load while staying in one place, sometimes the crane itself will "travel" with the load. In these cases, you should always:**
 - Drive the equipment steadily, at low speed.
 - Watch where you're going.
 - Keep an eye on the load.
- **An effective way to control a load while it's being moved is to attach one or more ropes called "taglines" to the hoist block or the load itself.**
 - Workers can use tension on the taglines to help guide a load smoothly and safely to its destination.
- **Never pass a load over a coworker, or let anyone walk underneath it**

LANDING THE LOAD

- **To "land" a load safely when it has reached its destination, you should:**
 - Lower it slowly.
 - Stop a few inches above the ground to make sure everything is secure.
 - Then lower it the rest of the way.
- **Never leave a load "hanging".**
 - A suspended load is an accident waiting to happen.
 - Someone could walk or drive into it, or it could fall.
- **Once the load is on the ground, remember to remove the slings from the load and the hook.**
 - Slings that are left on the hook can snag on other objects when the hoist starts moving again.
- **You should also raise the hoist block high enough so that no one will hit their head on it or run into it with another piece of equipment.**

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ANSWERS TO THE REVIEW QUIZ

1. a
2. b
3. a
4. b
5. b
6. a
7. a
8. b
9. a
10. b

CRANE SAFETY IN INDUSTRIAL AND CONSTRUCTION ENVIRONMENTS
REVIEW QUIZ

Name _____ Date _____

The following questions are provided to determine how well you understand the information presented in this program.

1. Overhead cranes are usually attached to support platforms or the walls of buildings.
 - a. True
 - b. False

2. On overhead cranes, the hoist cable and hook move along a track that is called a "boom".
 - a. True
 - b. False

3. If they're not using wireless devices, workers are required to communicate using standard hand signals during crane operations.
 - a. True
 - b. False

4. All "signal persons" who work with cranes must be licensed by an accredited government agency.
 - a. True
 - b. False

5. You can't determine anything important about the condition of a crane just by listening to it.
 - a. True
 - b. False

6. The total weight of a crane's load should always include the weight of the rigging, block and hook.
 - a. True
 - b. False

7. A copy of a boom crane's load chart will usually be attached permanently to the equipment.
 - a. True
 - b. False

8. You should position a sling on the tip of the crane's hook because that is where the hook is strongest.
 - a. True
 - b. False

9. After landing a load, you should remove the slings from both the load and the hook.
 - a. True
 - b. False

10. On a busy or crowded worksite, coworkers can walk underneath a raised load as long as they are wearing a hardhat.
 - a. True
 - b. False