INTRODUCTION TO THE PROGRAM

Structure and Organization

Information in this program is presented in a definite order, so that employees will see the relationships between the various groups of information and can retain them more easily. The sections in this program include:

- The OSHA crane safety regulation.
- Equipment inspection.
- General and operational safety devices.
- General operating procedures.
- Working with boom cranes.
- Hand signals.

Background

While there are many different types of cranes, they all have the ability to make many jobs much easier by being able to lift enormous weight. But they also share the potential for danger when they are not operated safely.

Crane-related accidents are often serious, due to the cumbersome and heavy loads that are lifted. A small miscalculation, or a brief moment of inattention, and disaster could strike. Once a load falls not much can be done to stop it, and there is little time for people to safely move out of the way. A coworker could be injured, or expensive equipment could be damaged or destroyed... including the crane itself. OSHA has been so concerned about crane safety that they revised their crane safety regulations to make them even more stringent.

It is estimated that over 90% of crane-related accidents are caused by human error. So it is very important for employees to learn how to work with cranes safely. They need to know that with the proper preparation, equipment and attitude, costly accidents and injuries can be avoided.

Objectives

To help employees understand how to work with cranes safely, this education and training program is designed to present basic information in this area. Upon completion of the program, employees should:

- Understand the most important aspects of the OSHA crane safety regulation.
• Be able to conduct a thorough inspection of both their worksite and the cranes they are working with.

• Be familiar with both general and operational crane safety devices and know how they function.

• Know the best methods of lifting and lowering a load.

• Be able to recognize and use standard hand signals to direct different crane operations.

Reviewing the Program

As with any educational program, the "presenter" should go through the entire program at least once to become familiar with the content and make sure the program is consistent with company policy and directives. An "Outline of Major Program Points" in the program is included in this Presenter's Guide to help with this task and for general reference.

As part of this review process, you should determine how you, as the presenter, will conduct your session. The use of materials such as handouts, charts, etc., that may be available to you needs to be well thought out and integrated into the overall program presentation.
PROGRAM OUTLINE

The following outline summarizes the major points of information presented in the program. The outline can be used to review the program before conducting a classroom session, as well as in preparing to lead a class discussion about the program.

- Because of the hazards associated with working with cranes, OSHA has had "crane safety" regulations in force for some time.
  — But until recently, they hadn’t been changed for almost 40 years.

- However, with the crane-related accidents in the construction industry increasing rapidly, in August of 2010 OSHA updated a number of provisions in the construction portions of the regulations.
  — To be more in tune with today’s sophisticated equipment and operating environments.

- The crane regulations cover a number of areas, including:
  — Ground conditions.
  — Assembly and disassembly.
  — Work around power lines.
  — And inspections.

- They also address:
  — Signaling.
  — Fall protection.
  — Work area control.
  — Operator certification.
  — Qualifications for "signal persons" and maintenance personnel.
  — And training.

- While you should be familiar with all of the provisions of the crane regulations that affect you and the people that you work with, some of the recent changes in the regulations are particularly notable.

- Before a crane is positioned or assembled, it must be verified that the "ground conditions" are firm, drained and graded so that the crane can set up safely.
- Crane assembly, disassembly and set-up must be overseen by personnel who are "competent” and "qualified”.

- There are new restrictions as to how far a crane must be from power lines when it is being assembled, operating or traveling.
  — Generally it must be at least 20 feet away at all times.
  — But this can vary depending on the amount of current going through the lines.

- By November 10, 2014 all crane operators must be "certified" by either:
  — An accredited testing organization.
— A licensed government agency.
— Or a qualified employer program.

• "Signal persons" must be "qualified" based on the criteria OSHA has specified in the regulation, by either:
  — A "third party qualified evaluator".
  — Or their employer’s own "qualified evaluator".

• Maintenance employees can only operate a crane as they work on it if:
  — They’re familiar with how that specific type of crane functions.
  — Or they’re directly supervised by a qualified or certified crane operator.

• There are many types of cranes.
  — They have many similarities.
  — Yet they also have important differences.

• Boom cranes... such as "truck" or "tower" cranes... are the most complicated type of cranes.
  — While we don’t cover "tower cranes" in this program, much of what we’re discussing (including the OSHA crane regulations) applies to them as well.

• Boom cranes are similar to jib cranes in several ways:
  — They both have a hoist rope and a hook.
  — The rope and hook hang from an arm.
  — But in a boom crane the boom arm can also be adjusted for angle and length.

• There are many variables to take into account when dealing with boom cranes.
  — Operators are required to take special training to use them.
  — Because they are powerful and complicated, it is important to learn how to use them before work begins.

• The first thing to do before working with any crane is to locate the standard safety devices. There are two types:
  — General safety devices.
  — Operational safety devices.

• General safety devices often include bells and warning lights.
  — If sensors detect a problem, the devices will sound off or blink.

• Other common general safety devices include horns and warning tags that are used to alert coworkers if:
  — The crane is moving.
  — The crane is not functioning properly.

• Occupational safety devices monitor or control the handling capability of the crane, and include:
— Overload Indicators.
— Emergency stop buttons.
— Limit switches.

• For example, a limit switch cuts off power when a crane reaches the end of its range of movement.

• After locating the safety devices, it is important to inspect the crane thoroughly.
  — Accidents can be prevented by finding small problems before they become major malfunctions.
  — Check the crane’s fluid levels.
  — Try out the controls.
  — Test the brakes.

• Start the crane up.
  — By listening for unusual noises, you can often locate leaks or other potentially serious problems.

• While inspecting a crane, pay special attention to the hook.
  — Hooks are used to attach the load to the hoist rope.
  — Never use a hook with a broken or bent safety latch.
  — The sling could slip off and damage the load.

• Look for hooks that are stretched or twisted as well. A hook should be replaced if:
  — The opening is stretched 15% or more from its original size.
  — It is twisted more than 10 degrees.

• Always check the weight limits on any crane... before using it.

• Most boom crane accidents are the result of mistakes made during set-up. Prevent problems by:
  — Using a load chart.
  — Ensuring that the crane is level.
  — Knowing the capacity of the slings that are being used.

• A boom crane is equipped with legs called outriggers, which are used to position and level the crane.
  — Start by extending the outriggers and placing them on solid ground.
  — Wood or metal plates are often used to ensure secure footing.

• After extending the outriggers, check the level inside the cab to see if the crane is parallel to the ground.
  — If the crane is not level, and a lift is attempted, severe damage could result to the crane itself.
  — An unbalanced crane can also tip over and damage equipment or injure a coworker.
— Take the time to level a boom crane with its outriggers.

- **When setting up a boom crane for a lift, consult the crane’s load chart.**
  — The load chart lists the weight capacity for the crane at various boom angles and lengths.
  — A copy is permanently attached to the crane.
  — Your supervisor usually has a copy as well.

- **When calculating the weight of a load include all lifting equipment... such as the rigging, block and hook.**
  — Make sure to find the correct boom length and Angle that is needed for the lift.

- **Take the time to understand the load chart before beginning a lift.**

- **When the crane is set up... and you are familiar with how it works... you are ready to "rig" the load.**
  — Make sure nothing is in the way of the crane.
  — Clear away boxes, tools or any materials that may be lying around.

- **Once the area is clear, position the crane directly over the load so that the hoist rope hangs straight down.**
  — The load must be lifted straight up and down.
  — If the load is lifted diagonally, the crane could be damaged.

- **Next, attach the load. Be sure to put the sling on the hook correctly.**
  — A hook is designed to support loads at its center.
  — Never put the sling on the tip of the hook.
  — The weight of the load could stretch and weaken the hook.

- **Once you have rigged and attached the load, make sure that everyone understands standard hand signals.**

- **To show that you want to hoist a load:**
  — Lift your arm, point up and move your index finger in a small horizontal circle.

- **To indicate that you want to lower a load:**
  — Point your arm downward, extend your index finger, and move it in a small horizontal circle.

- **To signal that you want to stop the crane:**
  — Point your arm out to the side, face your palm to the ground, and move your arm back and forth horizontally.

- **To call for an emergency stop:**
— Point both of your arms out to the side, face both palms downward and move your arms back and forth horizontally.

• **If you are using a boom crane, there are two other hand signals that everyone should know:**
  — To signal that you want to raise the boom, extend your arm out to the side and then point your thumb up.
  — To show that you want to lower the boom, extend your arm out to the side and point your thumb down.

• **As the lift begins, pay close attention to the "angle of the load."**
  — This is the angle between the load and level ground.

• **The best way to lift is with the load parallel to level ground.**
  — If the angle of the load exceeds 10 degrees, the load could fall out of the sling.
  — This could cause damage to the equipment or to the load... and might injure a coworker.

• **Once the load is balanced and is hoisted into the air, you may need to travel with it.**
  — Be sure to move at low speeds.
  — This helps you keep an eye on the load while watching where you are going at the same time.
  — Stop periodically to ensure that the load is stable.
  — Avoid sudden stops and starts that could unbalance the load.

• **Always watch where you are going.**
  — Never pass a load over someone.
  — Never let anyone walk underneath a load.
  — They could be seriously injured or killed if the load falls on them.

• **You have the greatest control of the load when using a "tagline".**
  — A tagline is a piece of rope attached to the hoist block, or the load itself.
  — By putting tension on the tagline, you can help move the load smoothly and safely to its destination.

• **When you get a load to its destination be sure to "land" it immediately.**
  — A suspended load is an accident waiting to happen.
  — Someone could walk or drive into the load... or it could fall.

• **As you put the load down, lower it slowly, stopping a few inches from the landing point.**
  — Make sure everything is secure.
  — Then lower the load the rest of the way.
• Once the load has been landed, the slings should be removed and put back where they belong.
  — This prevents them from snagging on other objects when the crane travels again.
  — Also raise the hoist block high enough so no one will hit their head or run into it.

** SUMMARY **

• By moving the things that take a lot of power to lift, cranes help make life easier.
  — But if they are not used properly, they can cause damage... injury... even death.
  — Knowing how to lift, move and land a load will help keep us all safe.

• Know the OSHA crane regulations, and how they affect you and your coworkers.

• Familiarize yourself with the type of crane that you are using.

• Remember to inspect the crane before working with it.

• Make sure that you and your coworkers know the proper hand signals.

• Know the weight capacity of a crane before rigging a load.

• Always position a crane directly over the load.

• When lifting, check the angle of the load to make sure it is level.

• Safety can sometimes seem like a "burden". But by learning to use cranes properly, that "load" can be "lifted" off of our shoulders!
QUIZ
CONSTRUCTION SAFETY SERIES:  
Crane Safety

Name:____________________________________ Date:_____________________

1. True or False... It is critical to know the weight capacity of a crane **before** hoisting a load?
   ___ True
   ___ False

2. Which of the following is **not** a type of industrial crane?
   ___ Boom.
   ___ Jib.
   ___ Barrel.
   ___ Overhead.

3. True or False... When performing an inspection of a crane, it is not necessary to check fluid levels to see if they are within acceptable limits?
   ___ True
   ___ False

4. True or False... Every boom crane has its own load chart?
   ___ True
   ___ False

5. Which of the following operational safety devices does **not** monitor and control the handling capabilities of a crane?
   ___ Overload indicators.
   ___ Emergency stop buttons.
   ___ Anti-slip bevels.
   ___ Limit switches.

6. True or False... To signal an "emergency stop", extend both of your arms out (with palms down) and move them horizontally?
   ___ True
   ___ False
QUIZ

CONSTRUCTION SAFETY SERIES:
Crane Safety

PRESENTER'S COPY...WITH ANSWERS

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   X False

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