

HIGH-IMPACT CRANE SAFETY

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

INTRODUCTION: A brief description of the program and the subject that it addresses.

PROGRAM OUTLINE: Summarizes the program content. If the program outline is discussed before the video is presented, the entire program will be more meaningful and successful.

PREPARING FOR AND CONDUCTING THE PRESENTATION: These sections will help you set up the training environment, help you relate the program to site-specific incidents, and provide program objectives for focusing your presentation.

REVIEW QUESTIONS AND ANSWERS: Questions may be copied and given to participants to document how well they understood the information that was presented. Answers to the review questions are provided separately.

ATTENDANCE RECORD: Document the date of your presentation as well as identify the program participants. The attendance record may be copied as needed.

INTRODUCTION

Many types and sizes of cranes assist us in lifting and moving heavy loads in our workplaces: overhead bridge cranes, mobile gantry cranes, jib cranes and others. No matter what the size or type, all cranes present potential hazards that must be addressed to prevent serious injuries or death. Because a crane accident with devastating consequences can occur in a split second, our safe use of cranes is critical to the health and safety of everyone in the plant.

This dynamic video features 5 re-enactments of accidents involving indoor cranes. These re-enactments illustrate the importance of our following safe work procedures to protect co-workers and company property when using any type of crane. The program shows when and how crane inspections and pre-operational checkouts are performed, how to determine the weight of a load and load capacity of a crane and how to inspect and safely use slings. Other topics include lifting and moving loads safely, use of hand signals when operating cab-controlled cranes and safe work procedures for crane repair.

***Accidents re-created in this program are based on OSHA investigations or company records. Details have been changed in the interest of confidentiality and instructional clarity.**

PROGRAM OUTLINE

BACKGROUND

- Cranes all have a common purpose, which is to assist us in lifting and moving heavy loads with a minimum of stress and strain on our bodies.
- These tools are necessary for production. In many instances, the job cannot be done without them.
- If we use cranes improperly or in an unsafe manner, we lose the advantage that they give to us.
- While crane operators outside on construction sites must deal with overhead power lines, unstable loads and uneven working surfaces, operators inside the plant are more concerned with protecting co-workers and production machinery from out-of-control or falling loads.

INSPECTIONS AND PRE-OPERATIONAL CHECKOUT

- Periodic crane inspections are performed every one to twelve months and are usually made by an outside source.

- Frequent inspections are made daily to monthly and are required for safe operation.
- Pre-operational checkouts should be performed daily or before using a crane. You must be trained and authorized to perform this procedure.
- If you have a checkout sheet provided by your company, you should follow the procedures listed on it.

PRE-OPERATIONAL CHECKOUT PROCEDURES

- As a competent person who is trained and authorized to perform checkout, you should make sure that you pay attention to the following items:
- Make sure the pendant controls work correctly. Check for sticking buttons and make sure that all of the buttons work properly.
- Be sure that you can read all of the directional indicators and that they aren't worn off. If any of the controls fails to work properly, tag the pendant out of service immediately.
- The hook should be checked to make sure it has no cracks and the safety latch should be in good condition.
- The hook must not be more than 10 degrees out of alignment and the throat must not have spread more than 15 percent from normal.

DETERMINING LOAD WEIGHT AND LOAD CAPACITY OF CRANE

- Before attaching the load to the lifting device, you must know the approximate weight and center of gravity of the load as well as the load capacity of the crane.
- One way of determining the weight of the load is to look for the manufacturer's information attached to the load.
- You can also check the shipping papers or work orders for information about weight.
- Other ways to determine the weight is to look at the mechanical or shop drawing; you may also consult material weight charts for information.
- If you can't find any information, you can estimate the weight of the load by comparing your load to a comparable known weight. You may also get a second opinion from your supervisor.
- After determining the weight of the load, make sure that this weight is 50 percent or less than the lifting capacity of the crane. For example, if a crane is rated for 1,000 pounds, assume it will support only 500 pounds.

SLING INSPECTION AND USE

- When attaching the load, you must determine the type and number of slings needed to lift the load and make sure that the load is correctly balanced.
- Before use each day, the sling, all fasteners and attachments must be inspected for damage or defects by a competent person designated by the company.
- Additional inspections must be performed in situations where slings are subjected to increased sling hazards.

- If at any time you find the sling is defective, it should not be used but instead removed from service immediately and destroyed.
- If you discover that a sling is too long for the job, never shorten it with a makeshift device or by tying a knot in it.
- A sling will have to be re-rated by the proper authority if it someone has tampered with it.
- When attaching the load to the slings, be sure they are secure. Pay attention to the load capacity of the sling as the rigging configuration changes.
- When using a basket hitch, make sure both legs are balanced and share equal amounts of the load. Make sure the sling is padded to protect it from being cut by sharp edges.

SLING ANGLES

- When attaching the load to a sling, chains or a choker, you must understand the relationship between the weight of the load and the angle of the sling or chain.
- As the angle of the sling increases, the amount of tension on the sling also increases.
- Consult load angle factors charts to correctly determine sling tension.

PREPARING TO LIFT THE LOAD

- The cardinal rule in making any lift is to be sure that no person or property will be injured in the event of equipment failure.
- Maintaining control of the load begins when you select the proper lifting equipment and determine the center of gravity of the load. This will help control any shifting of the load in the harness.
- Be aware of pinch points that exist between the sling and the load, between the load and a fixed object and between the load and its resting point.
- If a hook is used in lifting, make sure the load is deep in the hook and the safety clip is in place. Make sure any sling, choker or chain is positioned properly in the throat.
- If you have attached the load successfully to the crane, the next step is to move it to its destination.
- With the load ready to lift, look around you to make sure you have a clear path to your destination no matter how near or far away that may be.

LIFTING AND MOVING LOADS

- Lift slowly to take any slack out of the sling or attachments. This will also minimize swinging.
- Never leave a suspended load unattended. By doing so, you are losing control of the load.
- After the load is airborne, move the crane with a slow, steady, continuous motion.
- Lift the load just high enough to clear obstructions; loads raised excessively high create even more hazards.
- Avoid any jerky movements or abrupt stops. These may cause the load to continue traveling in a given direction and suddenly swing out of control.
- Never move a load over a co-worker or knowingly allow anyone to walk under the load.

- While moving the load, check to see where you are walking; you may stumble over objects on the floor while looking up at the load.
- When the load is in the position, lower it and stop the hook when enough slack allows for unhooking.
- When the work is complete, return the crane to its designated place and make sure aisles and walkways are kept clear.

CAB-CONTROLLED CRANES

- Often the operator of a cab-controlled crane cannot see the load. This type of job requires the assistance of a second person known as a director or signaler.
- The director is responsible for communicating directions to the operator through a system of visual or audible signals.
- If you are giving the signals, make sure they are clear and concise. Also be sure the operator is receiving clearly the signals that you are sending.
- As an operator, you should never move the load unless you are sure you clearly understand the signals.
- While there should never be more than one signaler at a time, the “stop” signal should be obeyed at all times no matter where it comes from or how many people send it.

CRANE REPAIRS

- When making crane repairs, remember that Lockout/Tagout is the most important procedure that will protect you from injury.
- Many repairs are made after workers first lock and tag out all forms of energy connected with the crane.
- If the crane must be operated as part of the repair, all safety precautions must be taken. A qualified and authorized person must direct the repairs.

SEVEN KEYS TO PREVENTING CRANE ACCIDENTS

- To prevent crane accidents that result in injury and death, remember these seven key points:
 - ❶ You must be trained and authorized to operate any crane or hoist.
 - ❷ Know and understand how to conduct a pre-operational checkout.
 - ❸ Understand how to determine the weight of the load and rig it properly.
 - ❹ Know the relationship between the angle of the load and the tension on the sling.
 - ❺ Understand the proper way to lift, move and release the load as well as how to use hand signals.
 - ❻ Never exceed the lifting capacity of the crane and attaching devices.
 - ❼ Never create a hazard for people or property with a lifted load.

ACCIDENTS AND THEIR SAFETY LESSONS

Accident 1: Load Moved by Unauthorized Employee Strikes Co-Worker

Ronaldo was moving an obsolete control cabinet with the crane when his supervisor called out to him about a late shipment. While Ronaldo and the supervisor walked away to check on the shipment, the cabinet was left suspended from the crane. Moments later, a forklift operator found his path blocked by the cabinet and decided to move the cabinet even though he knew he was not trained and authorized to operate the crane. As he pushed buttons on the control pendant, he began a casual conversation with another worker. The crane moved the cabinet as he talked with the female co-worker. He was not even watching the moving load as it struck and crushed another employee walking through the area.

Safety Lessons:

- Never leave a suspended load unattended.
- Don't operate a crane unless you have been trained and authorized.
- When operating a crane, don't allow yourself to become distracted.

Accident 2: Motor Falls From Damaged Sling and Injures Maintenance Mechanic

George Gantry, an experienced maintenance mechanic, was moving a large electric motor from the railcar receiving area into the shop for some repairs. He failed to inspect the nylon sling before using it to lift the motor. As the damaged sling broke, the motor fell on George's leg and caused serious injuries.

Safety Lessons:

- Always inspect cranes and lifting devices before use.
- Never sacrifice safety for speed.

Accident 3: Operator Loses Control of Odd Shaped Load

Charlotte was a new employee who had just finished training as a material handler. After rigging the odd shaped load with the sling, she lifted it with the crane and it quickly careened out of control. The load knocked her down and struck a nearby worker's leg, causing serious injury.

Safety Lessons:

- Keep loads under control at all times.
- Be sure rigging is correct for all loads.
- Lift only a small amount to test for stability before continuing.

Accident 4: Heavy Parts Fall from Improper Rigging and Kill Crane Operator

Ralph's supervisor asked him to get the proper slings in order to move a crate of obsolete cast iron parts from the area. After learning that he would have to go to the tool crib to get the slings, he decided to lift the crate using the chains that were already there. The chains broke and the load fell on Ralph. The accident was fatal.

Safety Lessons:

- Always select the proper lifting device for each load and inspect it for good condition.
- Be sure the lifting device is rated for the load.
- Never stand under a load.

Accident 5: Forklift Operator Killed in Collision with Suspended Load

While unloading pipe in the maintenance shop, Jim got a telephone page and left the last load of pipe suspended beside the pipe rack. Bob drove a forklift into the shop from outside and proceeded quickly to the pipe rack area to take away empty pallets so he could finish the job. Bob didn't see the suspended pipe and drove directly into it. He suffered a fatal head injury.

Safety Lessons:

- Never leave a suspended load unattended.
- Always be sure walkways and drive aisles are clear of the crane and the load.
- Always return cranes to their proper storage positions after use.
- Think ahead to anticipate hazards.
- Leaving a load suspended causes you to lose control of the load.

PREPARE FOR THE SAFETY MEETING OR TRAINING SESSION

Review each section of this Leader's Guide as well as the videotape. Here are a few suggestions for using the program:

Make everyone aware of the importance the company places on health and safety and how each person must be an active member of the safety team.

Introduce the videotape program. Play the videotape without interruption. Review the program content by presenting the information in the program outline.

Copy the review questions included in this Leader's Guide and ask each participant to complete them.

Copy the attendance record as needed and have each participant sign the form. Maintain the attendance record and each participant's test paper as written documentation of the training performed.

Here are some suggestions for preparing your videotape equipment and the room or area you use:

Check the room or area for quietness, adequate ventilation and temperature, lighting and unobstructed access.

Check the seating arrangement and the audiovisual equipment to ensure that all participants will be able to see and hear the videotape program.

Place or secure extension cords to prevent them from becoming a tripping hazard.

CONDUCTING THE PRESENTATION

Begin the meeting by welcoming the participants. Introduce yourself and give each person the opportunity to become acquainted if there are new people joining the training session.

Explain that the primary purpose of the program is to stress the importance of crane safety in preventing property damage and personal injury inside your facility.

Introduce the videotape program. Play the videotape without interruption. Review the program content by presenting the information in the program outline. Copy the "Accidents and Their Safety Lessons" portion of this leader's guide and hand out to the participants.

Lead discussions about dangerous situations or accidents that have involved cranes in your facility and how they could have been prevented. Use the review questions to check how well the program participants understood the information.

After watching the videotape program, the viewer will be able to explain the following:

- When and how crane inspections and pre-operational checkouts are performed;
- How to determine the weight of a load and the load capacity of a crane;
- How to inspect and use slings as well as how sling angles add tension to the load;
- How to safely lift and move loads;
- How hand signals are used during operation of cab-controlled cranes;
- Why lockout/tagout procedures are important during crane repair.

**HIGH-IMPACT CRANE SAFETY
REVIEW QUESTIONS**

Name _____ Date _____

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

1. You should not use a hook that has a throat that has spread more than _____ percent from normal.
 - a. 10
 - b. 15
 - c. 25
 - d. 50

2. If manufacturer's information attached to a load does not include its weight, where might you find this information?
 - a. the shipping papers or work orders
 - b. the mechanical or shop drawing
 - c. material weight charts
 - d. all of the above

3. If a crane is rated for a 1,000 pound load, what is the maximum amount you should assume it will support?
 - a. 500 pounds
 - b. 750 pounds
 - c. 1,000 pounds
 - d. 2,000 pounds

4. If a sling is too long for the job, you should tie a temporary knot in it to shorten it and then remove the knot after the lift is complete.
 - a. true
 - b. false

5. Before making any lift, the most important thing you should do is _____.
 - a. find all potential pinch points that could pose hazards
 - b. make sure the sling is protected from sharp edges
 - c. make sure no injuries or property damage will occur if the equipment fails
 - d. none of the above

6. Which of the following statements should be considered unsafe?
 - a. never leave a suspended load unattended
 - b. never move a load over a co-worker
 - c. always lift the load as high as possible
 - d. always keep co-workers from walking under a raised load

7. If you are operating a cab-controlled crane, you should obey the "stop" signal even if the director is not the person giving it to you.
 - a. true
 - b. false

8. Lockout/tagout is the most important issue in protecting you from injury when crane repairs are being made.
 - a. true
 - b. false

ANSWERS TO THE REVIEW QUESTIONS

1. b

2. d

3. a

4. b

5. c

6. c

7. a

8. a