CRANE SIGNAL PERSON BASIC TRAINING

Introduction

This Leader's Guide is designed to help you conduct a successful safety presentation. This Guide includes the following material:

Program Overview: This is a summary of the video program content. If the program content is discussed before the video is presented, the entire program will be more meaningful and successful.

Preparing for and Conducting the Presentation: This information will help you prepare the training setting, help you relate the program to your specific work situation, and provide objectives for focusing your presentation.

Discussion Ideas: A number of ideas are presented that can help encourage discussions related to crane signal person procedures and operations.

Review Questions and Answers: The Comprehension Test may be copied and given to participants to document how well they understood the information in the video. Answers to the test questions are provided separately.

Video Overview

Introduction

The beginning of the program describes how important cranes are for the movement of material and equipment in the construction environment. The importance of clear communication between the crane operator and the crane signal person is also highlighted. The relevant OSHA and ASME standards are also cited.

Basic Crane Components and Operation

Cranes have been in operation for more than 2,000 years, having been invented by the ancient Greeks. Today, there are a wide variety of cranes found at construction sites, such as truck mounted cranes, rough terrain cranes and crawler cranes equipped with tracks.

The basic components of mobile cranes include a movable boom attached to a platform. The boom can be raised or lowered, as well as rotated to move a load horizontally. There are also cranes with telescoping booms. A spool with steel cables extends to the end of the boom and attaches to the load. A powerful motor provides the force to move the boom and raise or lower the load. Most cranes also have heavy counterweights to help offset the weight of the load. Many cranes have outriggers to increase stability and help ensure that they remain level during operation.

Tower cranes are also widely used. The jibs on most tower cranes are secured in a horizontal position and rotate on their pedestal. The load can be raised or lowered, and travel horizontally along the length of the jibs.

Crane Limitations

It is important to be aware of crane limitations, such as their load limits. The further the load is moved from the center of the crane, the less weight the crane can lift. For example, extending a telescopic boom reduces its lifting capacity. Also, lowering the boom decreases the crane's load limit, because the load moves further away from the crane.

When a crane picks a load, the boom often deflects downwards. This is called boom deflection. This can present two hazards. It lowers the cranes lifting capacity by causing the load to be further from the crane. It can also cause the load to swing as it lifts off.

Crane Hand Signals

Standardized hand signals are commonly used by the crane signal person. The signal person is the only one who should give signals to the operator. The only exception is if other personnel see a hazard, they can use the emergency stop signal. When the signal person gives directions to the operator, they must be from the operator's perspective.

The video illustrates the twenty standardized hand signals that are included in OSHA and ASME documents. The first group of signals applies to both mobile and tower cranes: Stop, Emergency Stop, Hoist, Lower, Move Slowly, Swing, and Dog Everything.

The next group generally applies to mobile cranes: Use Main Hoist, Use Whipline, Boom Up, Boom Down, Boom Down and Raise the Load, Boom Up and Lower the Load and Travel.

This set of signals applies to crawler cranes: Travel-Both Tracks and Travel-One Track.

Cranes with telescoping booms also have specific signals: Telescope Out, Telescope In, Telescope Out (One hand signal), and Telescope In (One hand signal).

Two additional signals apply to tower cranes only: Tower Travel (Travelling tower cranes only, and Trolley Travel.

Voice Signal Communication
In situations where hand signals are not appropriate, voice signals are an option. Portable radios are often used. They should be tested before crane operations begin and they should use a dedicated channel. The crane operator must use a hands free device. Verbal signals should be short and clear. They should include three key elements, spoken in this order:

- **The function and direction**
- **The distance and/or speed**
- **Function stop**

The function names should be the same as the hand signals described earlier. Here are some examples of proper voice signals:

- **Boom up. Slowly. Slowly. Boom stop.**
- **Lower load. 10 feet. 5 feet. 2 feet. Lower stop.**

The function, such as Boom, Lower, Swing and Travel are spoken first, followed by the direction or speed. The signal to stop always has the function first, followed by stop.

As with hand signals, voice communication between the signal person and the operator should be continuously maintained during crane movements. Directions should be given from the direction perspective of the operator.

Non-standard and New Signals
A situation may arise where standard signals don't communicate all the information the operator needs lift. In that case, a new, non-standard signal may be used, as long as it is clearly understood by the operator, signal person and lift director.

OSHA guidelines regarding the use of non-stand signals are outlined in CFR 1926.1419.

General Safety Considerations
An overview of basic safety precautions are described.

- Typical PPE will likely include hard hat, safety glasses, gloves, high visibility vest and work boots.
- Before the lift begins, check that the load hook is centered over the load and that the rigging gear is properly set. Also check that the load stays centered during the lift.
- Watch for power lines to be sure the boom or load doesn't get too close.
- Watch the boom deflection closely to make sure it doesn't exceed the load radius.
- Make sure other personnel stay out of the crane operating area and always keep yourself and others from under a suspended load.

- The rotation of the cab and counterweights presents a hazard. Stay well away from its rotation zone.

- Avoid using your hands to control a load. Use a tag line so you can stay a safe distance from the load.

Video Overview, continued

- When an operator is moving a load horizontally, it may swing if the boom stops suddenly. Stay well away from swinging loads.

- Also, pay close attention to weather conditions. Lightning and strong side winds can produce serious hazards. The steel boom can act like a lightning rod and the wind pushing on the load and boom can make cranes unstable.

Conclusion

This has been a basic overview of signal person roles, responsibilities, signals and safety considerations. It is likely that there are other signals, safety procedures and policies that are specific to your work site. Cranes are magnificent pieces of equipment. Knowing their limitations and communicating clearly with the operator will help keep them operating safely, while protecting the safety of the operator and your co-workers on the ground.

Interview Statements

The video also contains several statements by an experienced crane operator about the vital role the crane signal person plays to ensure the safety and effectiveness of crane operations.

Preparing for and Conducting the Presentation

- Before presenting the video, review each section of this Leader's Guide and view the video before the presentation.
- Make sure the presentation area is quiet, has good lighting, unobstructed access and good climate control.
- Check the seating arrangement and the audiovisual equipment to ensure that all participants will be able to see and hear the presentation. If extension cords are to be used, secure them in such a way that they won't become a tripping hazard.
- 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.
- Make everyone aware of the importance your organization places on protecting employee's health and safety and how everyone must be an active member of the safety team.
- Explain the objectives of ***Crane Signal Person Basic Training***
    1. Provide a general overview of crane operations and limitations.
    2. Describe and demonstrate the standard crane hand signals.
    3. Explain and demonstrate the correct use of voice signal communication.
    4. Explain the use of non-standard and new signals.
    5. Describe the basic safety practices for a crane signal person.

- Next, introduce the video and play it without interruption.
- After the video is finished, you can tailor discussions to your specific situation, or refer to the Discussion Ideas section below.
- After the discussion, give a copy of the Test included in this Guide to each participant and ask them to complete the questions.
- Maintain copies of an attendance record and each participant's test as written documentation of the training.

Discussion Ideas

The following questions may be used to encourage additional discussion.

1. Does anyone have a story about mishaps or near misses related to improper or unclear crane signal operations?
2. What are some common mistakes made by crane signal people?
3. Why is it important for signal people and crane operators to understand crane hand and voice signals?

Crane Signal Person Basic Training

Video Comprehension Assessment

Name_____ Date_____

Circle the letter or letters for each correct answer.

1. Which of the following components are typically found on cranes? Choose all answers that apply.
   A. A movable boom that can be raised, lowered and rotated.
   B. A spool with a steel cable that extends to the end of the boom and attaches to the load.
   C. Counterweights that offset the weight of the load.

2. What is the purpose of crane outriggers? Choose all answers that apply.
   A. Help raise and lower the load.
   B. Increase the stability of the crane.
   C. Help keep the crane level.

3. What is the mechanism that moves a load horizontally along the jib of a tower crane?
   A. Dolly B. Trolley C. Gantry D. Jib

4. Identify the factors that **decrease** a cranes load limit. Choose all answers that apply.
   A. Raising the crane boom.
   B. Extending a telescoping boom. (Telescope out)
   C. Lowering the boom.
   D. Shortening a telescoping boom. (Telescope in)

5. As a crane begins to lift a load, the boom can bend downward slightly. This is called:
   A. Boom contraction C. Boom deflection
   B. Boom extension D. Boom retraction

6. When the signal person gives directions to the crane operator, the directions must be from the crane operator's perspective.
   A. True B. False

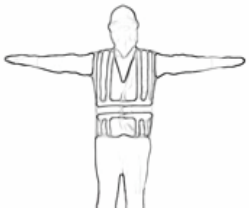
7.Select the correct hand signal for "**stop.**"

A. Extend your arm horizontally to the side with the palm down and move your arm back and forth.

B. While your arm and index finger is pointing down, make small circles with your hand and finger.

8.Select the correct hand signal for "**emergency stop.**"

A. Clasp your hands together at waist level.



B. Extend both arms horizontally to the side with palms down and move both arms back and forth.

9.Select the correct hand signal for **"hoist."**

A. Place one hand above the hand giving the signal to the operator.

B. Extend your upper arm to the side, with your forearm and index finger pointing straight up. Make small circles with your hand and index finger.

10.Select the correct hand signal for **"lower."**

A. While your arm and index finger is pointing down, make small circles with your hand and finger.

B. Tap your fist on the top of your head. Then use a regular signal for the desired action.

11.Select the correct hand signal for **"move slowly."**

A. Extend your arm horizontally to the side with the palm down and move your arm back and forth.

B. Place one hand above the hand giving the signal to the operator.

12. Select the correct hand signal for **"swing."**

 **A.** Extend your arm horizontally with your index finger pointing in the direction that the boom is to swing.	 **B.** Extend your arm horizontally to the side with your fingers closed and thumb pointing up.

13. Select the correct hand signal for **"dog everything."**

 **A.** Clasp your hands together at waist level.	 **B.** Extend your arm horizontally to the side with the palm down and move your arm back and forth.

14. Select the correct hand signal for **"use main hoist."**

 **A.** Rotate your fists around each other while held in front of your body.	 **B.** Tap your fist on the top of your head.

15. Select the correct hand signal for **"use whipline."**

 **A.** Bend your arm at the elbow with your forearm vertical, and then tap your elbow with your other hand.	 **B.** Clasp your hands together at waist level.

16. Select the correct hand signal for **"boom up."**

 **A.** Extend your arm horizontally to the side with your fingers closed and thumb pointing up.	 **B.** Hold both fists at waist level. Point inward with your thumbs, while keeping you're other fingers closed.

17. Select the correct hand signal for **"boom down."**

 **A.** Extend your arm horizontally with fingers pointing up. Make a pushing motion in the direction of travel.	 **B.** Extend your arm horizontally to the side with your fingers closed and thumb pointing down.

18. Select the correct hand signal for **"boom down and raise the load."**

 **A.** Extend your arm horizontally to the side with your thumb pointing down. Open and close your fingers for as long as the movement is desired.	 **B.** Hold one fist in front of your chest with your thumb tapping your chest.

19. Select the correct hand signal for **"boom up and lower the load."**

 **A.** Extend your arm horizontally to the side with your thumb pointing up. Open and close your fingers for as long as the movement is desired.	 **B.** Hold both fists at waist level. Point inward with your thumbs, while keeping you're other fingers closed.

20. Select the correct hand signal for **"travel."**

 **A.** Extend your arm horizontally to the side with your fingers closed and thumb pointing up.	 **B.** Extend your arm horizontally with fingers pointing up. Make a pushing motion in the direction of travel.

21. Select the correct hand signal for **"travel, both tracks"** for crawler cranes.

 **A.** Rotate your fists around each other while held in front of your body.	 **B.** While your arm and index finger is pointing down, make small circles with your hand and finger.

22. Select the correct hand signal for **"travel, one track"** for crawler cranes.

 **A.** Extend your arm horizontally to the side with the palm down and move your arm back and forth.	**B.** Raise your fist to show which track should be locked.  Rotate your other fist in front of your body to show direction the other track should travel.

23. Select the correct hand signal for **"telescope out."**

 **A.** Hold both fists at waist level. Point outward with your thumbs, while keeping you're other fingers closed.	 **B.** Extend your arm horizontally to the side with your fingers closed and thumb pointing up.

24. Select the correct hand signal for **"telescope in."**

 **A.** Extend your arm horizontally with fingers pointing up. Make a pushing motion in the direction of travel.	 **B.** Hold both fists at waist level. Point inward with your thumbs, while keeping you're other fingers closed.

25. Select the correct hand signal for **"telescope out," one hand signal**.

 **A.** Hold one fist in front of your chest with your thumb tapping your chest.	 **B.** While your arm and index finger is pointing down, make small circles with your hand and finger.

26. Select the correct hand signal for **"telescope in," one hand signal**.

 **A.** Hold one fist in front of your chest with your thumb pointing outward and the heel of your fist tapping your chest.	 **B.** Hold both fists at waist level. Point outward with your thumbs, while keeping you're other fingers closed.

27. Select the correct hand signal for **"tower travel,"** used with travelling tower cranes.

 **A.** Extend your arm horizontally to the side with the palm down and move your arm back and forth.	 **B.** With your arm extended horizontally and your fingers pointing up, make a pushing motion in the direction of travel.

28. Select the correct hand signal for **"trolley travel,"** used with tower cranes.

 **A**. Raise your palm with your fingers closed. Point your thumb in the direction to travel and make a jerking motion.	 **B.** Extend your upper arm to the side, with your forearm and index finger pointing up. Make small circles with your hand and index finger.

29. When the signal person is using verbal signals, they should be spoken in this order:
    First, the function and direction
    Second, the distance and/or speed
    Third, function stop
    A. True
    B. False

30. Hand and voice signals should be continuously maintained during crane movements.
    A. True
    B. False

31. From the following list, choose the safety procedures to be practiced by signal people. Choose all answers that apply.
    A. Wear the PPE designated by the employer
    B. Verify that the load hook is centered over the load
    C. Check for power lines to avoid
    D. Make sure all personnel stay out from under suspended loads

32. From the following list, select the safety practice signal people should follow. Choose all answers that apply.
    A. Stay away from the rotation zone of the cab and counterweights
    B. When possible, use a tag line instead of your hands to control a load
    C. Stay away from the area where a load could swing.
    D. Be aware of potentially dangerous weather conditions, such as high wind and lightning.

Test Answers

Crane Signal Person Basic Training Video

1. A, B, C
2. B, C
3. B
4. B, C
5. C
6. A
7. A
8. B
9. B
10. A
11. B
12. A
13. A
14. B
15. A
16. A
17. B
18. A
19. A
20. B
21. A
22. B
23. A
24. B
25. A
26. A
27. B
28. A
29. A
30. A
31. A. B, C, D
32. A, B, C, D