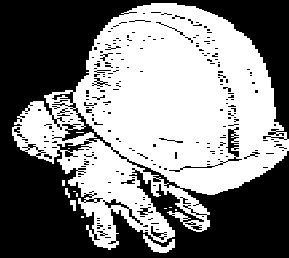



TRAINING GUIDE

HIGH VOLTAGE LINES



2001

Before you begin the meeting...

- Does this topic relate to the work the crew is doing? If not, choose another topic.*
- Did you read this Training Guide and fill in the blanks where the  appears? (To find the information you need, look over the Safety Walkaround Checklist for this topic.)*

Begin: Electricity jumps! Always keep yourself and your equipment a safe distance from high voltage lines. Even low voltage can injure or kill you, but today we'll be talking about high voltage. About 700 U.S. workers are killed by electricity each year, many because they got too close to a high voltage line. We'll explain some steps to take if someone gets an electric shock—but even the best emergency care can't always save a life. It's best not to get too close to electricity in the first place.

You or a crew member may want to add a personal story about high voltage electricity.

Next, discuss with the crew where there may be danger from high voltage lines at this particular job site:



ASK THE CREW THESE QUESTIONS:

After each question, give the crew time to suggest possible answers. Use the information following each question to add points that no one mentions.

- 1. Electricity can be dangerous at any voltage, but our subject today is high voltage. Does anyone know what we mean by high voltage electricity?**
 - Over 600 volts.
- 2. How far away should you stay from an overhead high voltage line?**
 - People should stay between 6 and 20 feet away, depending on the voltage. The higher the voltage, the farther electricity can jump. No part of your body should come within this minimum clearance distance.
 - Most tools, equipment, and machinery should also stay between 6 and 20 feet away.
 - Lifting and hoisting machinery (like cranes) should stay between 10 and 42 feet away from the line, depending on the voltage.

- An electric line might move (due to strain on the supporting structures, etc.) Your clearance distance must allow for this possible movement.
- Never work above a high voltage line, regardless of the distance.



Use the Safety Walkaround Checklist for this topic to fill in the following chart. If voltages and minimum clearances are different on different parts of the site, list them separately for each area. Explain the chart to the crew.

Area on Site	Line Voltage	Clearance for People and Most Equipment	Clearance for Lifting and Hoisting Machinery

3. What if you have to work within the minimum clearance distance?

- Make sure the electric line is de-energized.
- Consider **any** line to be “live” unless you know it is de-energized and it is visibly grounded.

4. Keep *all* tools and equipment away from high voltage lines. You can get a serious shock if anything you’re using or carrying accidentally contacts a line. What are some tools and equipment that you should be especially careful with?

- Metal ladders
- Long pipes
- Tree trimming equipment
- Cranes
- Scaffolds
- Antennas
- Extension rollers used in painting
- Lifting equipment

5. According to Cal/OSHA, there should be two signs on all cranes, derricks, power shovels, pile drivers, and similar machinery, warning about the clearance distance from high voltage lines. What information is on these signs?

- They say that operators should keep this equipment at least 10 feet from high voltage lines that carry 50,000 volts or less. The clearance distance is more if the line carries higher voltage. These signs are required—let your supervisor know if they’re not there.

6. If your electrical resistance is low when you get a shock, more electricity will flow through your body. That will usually cause more injury. What are some things that can lower your resistance?

- Working in a wet or damp location
- Using wet tools
- Sweating
- Working in contact with good conductors like metal pipes, tanks, or boilers.

7. What kinds of injuries can you get from a high voltage electric shock?

- High voltage can stop your heart or your breathing.
- It can also cause fibrillation—a fast, irregular heartbeat.
- You can get a serious burn—external or internal.
- You can fall off a ladder or scaffold and get injured.
- Even if you're not on a ladder or scaffold, high voltage can “throw” you—causing fractures or broken bones.

8. What should you do if someone gets an electric shock?

- Don't touch the person **until** power has been disconnected.
- Call 911.
- Give immediate first aid or CPR if necessary.
- Calm and reassure the injured person. Don't move them until trained help arrives.
- Notify on-site first aid personnel or a supervisor as soon as possible.

Name of on-site first aid provider:



CAL/OSHA REGULATIONS

Explain: Most of the safety measures we've talked about are required by Cal/OSHA. We have to take these precautions—it's the law. I have a Checklist of the Cal/OSHA regulations on high voltage electricity. If you'd like to know more, see me after the meeting.

COMPANY RULES

(Only if applicable.) Besides the Cal/OSHA regulations, we have some additional company rules about high voltage electricity.

Discuss company rules: _____



COMMENTS FROM THE CREW

Ask: Do you have any other concerns about high voltage electricity? Do you see any problems on our job? (Let the steward answer first, if there is one.)

What about other jobs you've worked on? Have you had any experience with high voltage electricity that might help us work safer on this job?

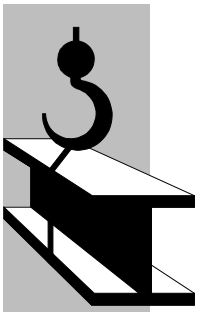
SIGN-OFF FORM HIGH VOLTAGE LINES

Date Presented: _____ By: _____

Project Name/No.: _____ Location: _____

NAMES OF THOSE WHO ATTENDED THIS SAFETY MEETING

<i>PRINTED NAME</i>	<i>SIGNATURE</i>

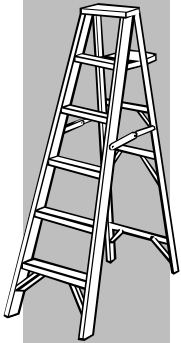


Laborer Electrocuted by Energized Crane

A 26-year-old construction laborer was electrocuted when he tripped and came into contact with a crane. The crane had become energized through accidental contact with a high voltage line overhead.



The crane was in an area with both telephone and high voltage lines, and the crane operator was aware of them. Earlier in the day, the crane had brushed against telephone lines and had to be repositioned. However, at this time in the late afternoon, the operator's vision of the high voltage lines was obstructed because of the sun's position. The auxiliary line of the crane made contact with the high voltage line. The auxiliary line burned in two and the ball/hook assembly fell to the ground. Voltage was 16,000 volts.

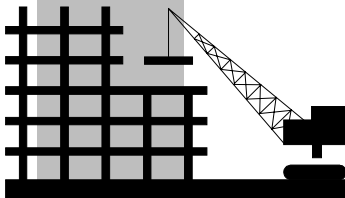


The laborer was carrying a wire rope over to be used to attach a pile of plywood to the crane's hook. The crane operator and laborer were both startled by the fall of the ball/hook assembly. The boom of the crane momentarily drifted, contacting the high voltage line directly.

At the same moment, the laborer tripped and brushed against the corner of the energized crane. Cardiopulmonary resuscitation was immediately administered by co-workers until paramedics arrived. However, the laborer was pronounced dead.

May 12, 1992

What should have been done to prevent this accident?



Preventive Measures

Cal/OSHA investigated this accident and made the following recommendations.

Employers should:

- Provide information to workers on what kinds of hazards to look for and how to avoid them.
- Develop and implement strict safety procedures when working with a crane in the vicinity of high voltage power lines.
- Contact the local electric power company and have the power turned off when working within a certain distance of high voltage power lines.

This Case Study is based on an actual California incident. For details, refer to California Dept. of Health Services, Occupational Health Branch, Fatality Assessment and Control Evaluation (FACE) Report #CA92006.