

STORED ENERGY: *The Hidden Hazard*

Introduction

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

Video Overview: This is a brief summary of the program content.

Video Outline: This is a more detailed overview of the program contents that you can refer to when talking about the video before or after the presentation.

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 the topic of the video.

Review Questions and Answers: The quiz can be used to document how well viewers understood the information presented. Answers to the review questions are provided separately.

Video Overview

This program is designed to raise viewer's awareness about common stored energy hazards found in facilities such as warehouses, receiving areas, bulk storage areas and maintenance areas. The video explains that electrical and mechanical stored energy are commonly encountered in the workplace. There are OSHA regulations, such as Lockout/Tagout that address hazards related to electrical and mechanical stored energy. However, there is another, less well known type of stored energy related to the sheer weight of things in our workplaces, such as loaded pallets, heavy equipment, and bulk material such as grain, salt or animal feed. This type of stored energy is also called potential energy. Another type of stored energy is called "elastic stored energy" which can be found in ropes and cables used to move heavy objects or equipment. Potential energy and elastic stored energy hazards are a source of a variety of serious injuries and fatalities.

Stored Energy: *The Hidden Hazard* focuses on identifying and avoiding potential energy and elastic stored energy hazards.

Video Outline

Menu Page

When the DVD is inserted into a player, a title and menu page automatically appears. The menu gives you the option of playing the entire video, or the video segment that focuses on railcar safety. In the full-length video, the railcar section illustrates some common stored energy hazards related to railcars. The separate railcar safety video segment includes all of the railcar information from the full-length video, plus specific safety procedures related to the use of car pullers and opening railcar doors.

I. Introduction

The video begins with a scene in a warehouse where a forklift operator has just placed a loaded pallet in an unstable position at the top of a stack. An employee passing by is intently studying some paperwork and fails to notice the unstable pallet. Suddenly the pallet shifts and plunges from the top of the stack. At the last instant, the employee sees the load hurtling down at him and he quickly jumps back as the massive load crashes to the floor in front of him.

II. Electrical and Mechanical Stored Energy

The narrator explains that equipment such as motors, control panels, conveyors and hydraulic systems contain electrical and mechanical stored energy.

III. Weight = Stored Energy

But there's another kind of stored energy we might be less familiar with: The sheer weight of things in our workplaces, such as loaded pallets, heavy equipment, and bulk material such as grain, salt or animal feed. That weight is a type of stored energy, also called potential energy. The higher the object is from the ground, the greater its' stored energy.

IV. Elastic Stored Energy

Another kind of stored energy to be aware of is called "elastic stored energy." For example, when a bungee cord is slack it contains no stored energy. But when it gets stretched out, the energy needed to stretch it is stored there until it's released. In the workplace, the same kind of energy – in much greater quantities – can be found in ropes and cables that are used to move heavy objects and equipment. Unfortunately, potential energy and elastic stored energy can be a source of serious injuries and fatalities at some facilities.

V. Awareness and Observation

To protect ourselves we can increase our awareness of stored energy hazards and we can become more observant for them in our surroundings. But, every workplace is different and the hazards can change from day to day. The video next explores some actual workplaces to identify real stored energy hazards.

VI. Receiving Areas

The video illustrates various scenes in receiving areas, such as dock plates, trucks, railcars and forklifts moving product. Viewers are invited to identify the stored energy hazards in the scenes.

A. Dock Leveler Mishap

The video next illustrates a mishap that could result from these hazards. A worker raises a dock leveler as a truck backs up. A person on the dock is standing too close to the leveler. When the leveler drops, it lands on the toe of the worker's boot. Next, the right way procedure is illustrated. The operator makes sure the person is clear before lowering the leveler.

B. Ocean Containers and Trucks

Ocean containers and trucks that unload product through rear doors are another source of hazards. When opening the doors, the weight of the material can cause it to suddenly spill out, or force a door open and cause an injury. Trucks that raise their hopper to unload material also present a stored energy hazard. If a hydraulic or mechanical failure happened while the hopper was raised, it could suddenly drop. Bottom dumping hopper trucks, which are much safer because the hopper remains stationary while the material unloads from the underside.

C. Rail Car Safety

Rail cars are another potential source of stored energy hazards.

1. Car Pullers - Some locations move cars into position using car pullers. As the winch pulls the car, huge amounts of elastic stored energy builds up in the cable. If the cable broke or came loose, the energy in the cable would be released with explosive force. The video illustrates a series of guards that help protect the operator from a broken cable.

The video also explains the following car puller safety procedures.

- When attaching the hook to the car, be careful to avoid pinch points.
- Inspect the anchor point, hook, clamps, sheaves, for any loose, frayed, or damaged conditions.
- Make sure the tracks are clear of obstructions, including snow or ice.
- Check that the deadhead pulley and the winch are in good operating condition.

- Make sure that all personnel are clear from the cable's line of fire.
- Turn on the alarm or warning light 10 seconds before moving the car. Some car puller systems have an automatic alarm system that sounds an alarm when the puller is activated. A timer then delays operation of the puller for 10-15 seconds while the alarm sounds.

2. Boxcar Doors

Before opening doors, be sure the boxcar wheel is chocked and set the manual brake. Place a blue flag in front of the car; indicating work is taking place inside the car. Then check the door rail system for damage.

Boxcar door handles may contain stored energy that could cause it to quickly turn on its own, possibly injuring an operator. To manage this hazard, the video illustrates the following procedures:

- One person should open the latch while another person maintains a firm grip on the handle.
- When using a come-along or chain puller, hook the lever end to a sturdy anchor point near the ladder, but not to the ladder. Inspect for wear or damage before using it. Connect the hook to a strong anchor point on the door. Keep personnel away from the "fall area" of the door. Position your body away from the line of fire of the cable.

3. Bulkhead Doors

Some boxcars may have bulkhead doors inside that slide on rails. The hazard occurs if someone tries rocking a jammed door to dislodge it. Doors have come off their rails and fallen on people, causing serious injuries and deaths. It's important to follow the safety procedures for inspecting and moving doors. If a door jams or is difficult to move, contact the railroad service crew or reject the car.

VII. Bulk Storage

The video illustrates several bulk storage areas, including flat storage grain, grain in large bins and salt in large mounds.

A. Weight of Bulk Product

At first glance, the products stored in bins or large mounds don't look especially dangerous. But think about the amount of weight – the stored energy – in the material. Just one cubic yard of salt or grain weighs about 1,300 – 2,000 pounds, or about 600 - 900 kilograms. This is an approximate amount for some types of salt and grain.

Note: Different types of salt and grain have varying weights, some of which are greater than the weights described in the video. For example, the Salt Institute explains that de-icing salt weighs 72-84 pounds per cubic foot. That equals 1,944 – 2,268 pounds per cubic yard. (1,153 – 1,345 Kg/cubic meter)

B. Salt Mound Collapse

A worker is walking past a large salt mound with a steep wall of salt where it has been excavated. Suddenly a section of the face collapses, knocking down and burying the worker. The narrator explains the importance of staying a safe distance from the face of a storage mound or bin. If the product appears unstable, notify your supervisor so the problem can be corrected.

C. Grain Bins

Grain bins are another place where stored energy can turn deadly. Tragedy most often strikes when someone enters a bin and attempts to dislodge grain that's bridged or caked. Grain can fall on the person and bury them, or they can break through the bridged grain and get buried or pulled into the flowing grain. If it becomes necessary to enter a bin, carefully follow the confined space entry procedures for bin entry.

The video includes graphic depictions of bridged and caked grain in bins. Also included is a scene of a person entering a bin while following the correct confined space entry procedures.

D. Tragic True Story

The video next features a man recounting the story of his brother who became trapped in a grain bin.

“My brother’s name was Wayne. He was a truck driver for the competitor. Driving a feed truck, delivering feed to the farms. Helping in the feed mill. Whatever needed to be doing. He was basically like a “jack of all trades.

Growing up, I couldn’t have asked for a better friend. Him and I we fought like brothers normally do. We always worked together as a family, that’s the way our mom and dad was. We worked together on the farm and we played together. And my brother, he would have done almost anything for anybody.

No one knows when he entered into this bin. They found him there, the second shift personnel found him about 5:30, 6:00 in the evening. Everyone else had left facility and had gone home. They looked out and they saw my brother’s car still there, wondering how come that car was still there? That’s when they started looking for him. That’s when he looked in the bin and saw just his hand sticking out of that corn.

You know that you have an opportunity to make the right choice or the wrong choice. And that can determine what tomorrow is going to bring. My brother, he made a very poor choice, when he entered that bin or whether he just shoveled on the bin without the fall protection on. But, we have policies and procedures, they’re all in place. At this facility, all of the policies and procedures were in place. They knew what they were supposed to do, but they were not followed. And that’s when it comes back to individual choices.

You know, there is nothing that I can change about what happened with my brother, but if through this video if someone watching changes the way that they do things, and this changes their life, then, you know, in a sense with my brother, I believe that something good can come out of this whole situation.

VIII. Warehouses

The video illustrates a variety of warehouse scenes, including forklifts moving and stacking pallet loads of product. Viewers are asked how many stored energy hazards they can see.

A. Loaded Pallets

Pallets loaded with product can be a serious stored energy hazard. What makes them a potential hazard is their weight; combined with the height they’re stacked. For example, a pallet load of 50-pound (23 kilogram) bags can easily weigh 2,500 pounds (1,134 kilograms) – about the weight of a small car. The higher the pallet is from the floor, the more stored energy it contains.

B. Identifying and Correcting Pallet Hazard

The scene of the unstable pallet from the opening of the video is replayed. The person walking in the aisle is looking around the warehouse is being observant of his surroundings and he notices the leaning pallet. He calls to a forklift operator who drives up and adjusts the unstable pallet.

C. Moving Heavy Equipment

Another common stored energy hazard involves transporting heavy equipment or parts. To transport this material safely, use equipment that can safely handle the weight.

IX. Maintenance Areas

The video illustrates a variety of scenes in a maintenance area, such as a worker using a hoist to lift a motor, shelves holding boxes of equipment, a large hammer resting on the top of a ladder, steel beams and rods on a rack, a big wood box on top of a rack, and a TV monitor sitting on a mezzanine above a desk. Viewers are asked to see how many stored energy hazards they can identify.

A. Computer Monitor Falls

A person on the mezzanine is moving some equipment. Nearby is the computer monitor sitting close to the edge of the mezzanine. A woman begins doing some work at the desk below. The worker on the mezzanine bumps the monitor while moving a pallet, sending the monitor crashing to the floor within inches of the woman working at the desk. Next, the correct procedures are illustrated, as the person working on the mezzanine sees the monitor and moves it to a safer location.

X. Stored Energy Hazards Away From the Workplace

Awareness of stored energy hazards goes beyond the workplace. In fact, our homes often contain stored energy hazards that we can easily overlook. Things such as bookshelves, heavy furniture and large TV's can become serious hazards. The U.S. Consumer Product Safety Commission estimates that in 2005, at least 3,000 children under the age of 5 were admitted to U.S. hospital emergency rooms after televisions tipped over on them.

Between 2004-2005, more that 100 deaths – mostly young children - were caused by falling furniture or televisions.

XI. Conclusion

Whether we're at work or at home, the variety of stored energy hazards we can encounter is nearly endless, and the hazards can change from day to day. So the key to our safety is awareness - awareness of the hazards we could encounter and awareness of our surroundings. This awareness will help us to either eliminate stored energy hazards or stay out of their line of fire. We'll not only protect ourselves, we'll protect the well-beings of our co-workers and our family members as well.

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 videotape program. 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 that the primary purpose of this program is to increase viewer's ability to identify stored energy hazards so they can avoid the hazards or have them corrected.
- ❑ Next, introduce the video and then play it without interruption.
- ❑ After the video is complete, you can tailor any discussion to your specific situations. You can refer to the **Discussion Ideas** section of this Guide for additional ideas. If you want to review the content of the program with participants you can refer to the **Program Outline** in this Guide.
- ❑ After the discussion, give a copy of the review questions included in this Guide to each participant and ask them to complete the questions.
- ❑ Maintain copies of an attendance record and each participant's quiz as written documentation of the training performed.

Discussion Ideas

In addition to discussion topics you may have planned, the following questions may be used to encourage discussions.

1. Can you describe the stored energy hazards in your workplace?
2. Are there stored energy hazards you are aware of in our workplace that can be corrected?
3. Can anyone recall a mishap or a near miss incident involving a stored energy hazard?
4. Can anyone describe stored energy hazards you could encounter at home or other places away from work?

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Review Quiz

Name _____ Date _____

1. Two common types of stored energy are:
 - a. Electrical
 - b. Digital
 - c. Mechanical

2. The type of stored energy related to the weight of objects such as loaded pallets, heavy equipment or bulk material such as salt, grain or fertilizer is called:
 - a. Electrical energy
 - b. Potential energy
 - c. Thermal energy

3. The higher an object is from the ground, the greater its stored energy.
 - a. True
 - b. False

4. The type of stored energy in a stretched bungee cord, or a steel cable that is pulling on a heavy object is called:
 - a. Mechanical stored energy
 - b. Thermal stored energy
 - c. Elastic stored energy

5. Trucks that raise their hopper to unload product present a potential stored energy hazard.
 - a. True
 - b. False

6. Car pullers, which pull rail cars into position with a winch and cable system, **do not** present a stored energy hazard.
 - a. True
 - b. False

7. A pallet load of 50-pound (23-kilogram) bags can weigh as much as a small car.
 - a. True
 - b. False

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Quiz Answers

1. a,c
2. b
3. a
4. c
5. a
6. b
7. a