BWC's Division of Safety & Hygiene

Safety Leader's Discussion Guide

2006

- Cell phones and safety
- Emergency eyewash and showers
- Defensive driving strategies
- Developing an employee safety committee
- Loading dock safety
- Fall protection for general industry
- Flammable liquids
- Static electricity hazards
- Lockout/tagout
- Portable LPG cylinders
- Working safely with chemicals
- Vibrating tools

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Dear safety leader:

Reducing workplace accidents is a win-win situation.

The employee wins because he or she goes home safely each day, which means the employee's family also wins.

The employer wins because accidents affect morale, decrease productivity and increase the employers' workers' compensation costs. Healthier workers mean a healthier bottom line.

One way to help keep your work force healthy is by using this *Safety Leader's Discussion Guide*. Developed in cooperation with the Society of Ohio Safety Engineers, this guide covers a variety of safety meeting topics that give your employees the information they need to work safely. The articles are written in a style that encourages class participation and interaction. Also, each topic includes lists of additional resources.

Regular safety meetings help get your employees involved in the safety-management process and familiarize them with injury- and illness-prevention practices. Employee awareness and involvement will improve your company's safety performance; and when workers go home each day to their families with their health intact, we all win.

Sincerely,

Willam E. Mabe

Administrator/CEO
Ohio Bureau of Workers' Compensation

Lynn Kruse

Superintendent
BWC's Division of Safety & Hygiene

P.S.: Plan now to attend the Ohio Safety Congress & Expo, March 28-30 at the Greater Columbus Convention Center.

Using the *Safety Leaders' Discussion Guide* is easy.

1. Prior to the meeting, review the preparatory notes at the beginning of the chapter to familiarize yourself with the topic.
2. Supplement your presentation with safety examples found in your specific workplace.
3. For more information on the topic, contact BWC or refer to the list of additional resources included with each chapter.
4. Let us know what you think of the guide by sending an e-mail to the address listed at the end of each chapter:

   Safety@ohiobwc.com

Cell phones and safety

By Tim Govenor

Before you begin

If your company has policies regarding cell phone use and safety, obtain a copy to share with the employees. If no policy exists, consider this topic for discussion with other leaders.

It is estimated in 2005 there were 1.3 billion cell phone users worldwide. "Can you hear me now?," the catchphrase used by Verizon, has become part of our culture. Cell phone use has expanded into every activity in our lives, from emergency communication to picking products from a grocery shelf. It sometimes seems people have no idea what to do with a spare moment other than make a cell phone call.

Ask the group what they have seen people doing while talking on a cell phone. Answers may include grocery shopping, driving, walking, bicycling, standing in line, waiting in a restaurant, using the restroom, eating or attending a meeting.

Ask the group to identify their thoughts when in the presence of someone answering or using a cell phone. Possible answers include:

- It gets my attention;
- It is rude;
- I do not care to hear the conversation;
- The conversation is interesting;
- Why do people speak so loudly using a cell phone;
- They interrupt my thoughts;
- They disturb the peace;
- Go someplace else with your phone.

Research shows cell phone use represents a great distraction for the user. Think about the activities associated with using a cell phone.

Ask the group what possible distractions are associated with using a cell-phone before, during and after phone use. The list might include:

- Finding the phone;
- Activating the phone;
- Looking at the phone to determine the incoming number or messages;
- Keeping one hand free to handle the phone;
- Focusing on who you will call;
- Looking at the phone while dialing;
- Scrolling through menus;
- Retrieving paper or pencil;
- Making notes;
- Listening to voice prompts for message retrieval;
- Deleting or saving messages;
- Checking to see if the signal has been dropped during a call.

Conclusion

Whether you are in the presence of a user or you use a cell phone personally, using the phone is a significant distraction. Being distracted while driving, while operating tools and equipment, when walking across the street, when in public or at work increases the risk of injuries and crashes.

Researchers have compared the level of distraction to a blood alcohol level of 0.08. Research also has shown that a cell phone conversation while driving is a greater distraction than conversing with a passenger. Research has also shown that drivers "reacted significantly slower to unexpected events in the first two minutes of the phone conversation and are, for a large part of the conversation, unaware of traffic movements around them."

Given this information, ask the group what can be done to reduce the distractions from cell phone use. Their answers may include:

- Ignore calls while driving or performing detailed or hazardous activities;
- Restrict cell phone use in hazardous areas;
- If driving, pull off the road to a safe location to answer or make cell phone calls;
- Stop what you are doing to focus on the call;
- Turn the cell phone off and utilize voice mail or messaging service;
- Leave the cell phone at home;
- Ask passengers in your vehicle to handle cell phone activities.

Action items

- Create, review or revise your workplace cell phone policy.
- Because you are aware cell phone use is distracting, adopt a personal policy to limit phone use in situations that pose risk of injury or crash.
- Being aware cell phone use is distracting and annoying to others in the vicinity, be especially discrete when using a cell phone.

Tim Govenor is a certified industrial hygienist and certified safety professional employed by The Ohio State University where he is semiretired and serves as the university's chemical hygiene officer. Govenor has served as president of the local chapters of the American Society of Safety Engineers, American Industrial Hygiene Association and Society of Ohio Safety Engineers.

We always strive to improve the *Safety Leader's Discussion Guide*. Your feedback can help. Please send your comments via e-mail to Safety@ohiobwc.com.

Reference section

Web sites

- University of Utah study: www.utah.edu/unews/releases/05/feb/cellphones.html
- The Influence of the Use of Mobile Phones on Driver Situation Awareness: www-nrd.nhtsa.dot.gov/departments/nrd-13/driver-distraction/PDF/2.PDF
- Tips for Cell Phone Driving Safety: www.geocities.com/morganleepena/safety.htm
- Cell Phones Advice: www.cell-phone-advice.com

Videotapes

BWC's Division of Safety & Hygiene's video library has a videotape on distracted driving. This is available for loan to Ohio employers. Order a catalog by calling **1-800-OHIOBWC** (ask for the video library), or visit our Web site, **ohiobwc.com**.

Emergency eyewash and showers

By Warren K. Brown

Chemical exposures can cause serious bodily injuries. Statistics show about 20 percent of eye injuries are the result of chemical exposures. In almost all cases, the recommended first-aid measure is to immediately flood the affected area of the body with copious quantities of water for 15 to 30 minutes. Having the right type of unit in the appropriate location is the key to reducing the potential for serious bodily damage if an incident should occur. Commercially available units for the most part are easy to use and maintain.

Ask the group to identify common problems associated with these emergency eyewash stations. The answers should include keeping them accessible, clean and in good operating condition. Since they generally are used infrequently it is difficult to convince the work force to follow the guidelines.

Ask the group what an organization can do to combat this concern. The answer is that a standard maintenance procedure and frequency must be established to ensure that units are maintained and ready when needed.

Ask the group what can be done to avoid the need to use eyewash stations. These devices are reactive, in that they are used after the incident has occurred. Answer: It is important each organization's safety program address the importance of using the appropriate protective clothing and equipment, so the need to use the quick drenching devices is minimized.

Ask the group what must be done to help ensure these devices will be used when needed.
The answer is employees must be trained to recognize:

- When to use the devices;
- How to use them;
- Where they are located so they can find them when and if the need arises.

For example, these devices need to be tested on a periodic basis to ensure they function properly; and they need to be kept clean and unblocked so someone who is vision-impaired can find the device.

Before you begin

Review this information and your company policies with respect to emergency eyewash and showers. Survey your facilities for examples of areas where these devices are in place and the types in use. A couple of photographs of the units or manufacturers' information sheets can aid in your discussion with the employees.

Ask the group to discuss guidelines for installing emergency eyewash/showers.
The standards suggest:

* The eyewash/shower should be within 10 seconds walking time from any potential hazard, and the path to the device should be as unobstructed as possible;
* The eyewash/shower should be on the same level as the hazard;
* Depending on the severity of the hazard it may be prudent to locate the eyewash/shower much closer to the hazard area;
* The standard calls for the water temperature to be tepid or lukewarm. Select the shower/eyewash that has the capability to supply the proper temperature water for the particular hazard environment expected.

Ask the group what procedures to follow after an eyewash device has been used.

* When the units are used the water and contaminant must go somewhere. Depending on the area, there could be floor drains nearby or a containment basin.
* Perform an evaluation of the expected contaminants to assure the contaminants are properly disposed of.
* In some instances, a mop may be the right answer.
* Put provisions in place to get the floor area isolated until it can be cleaned so employees don't inadvertently walk through the water and contaminant.

Ask the group to identify other issues that may need to be addressed in the workplace. Possible answers include:

- Temperature extremes, such as outside exposures that can occur during cold weather and require special units with heaters and remote controlled valves;
- Where whole body exposure to a contaminant is likely; it may be prudent to have an enclosed shower since it is likely that the exposed person will have to disrobe;
- Portable units have their special issues as well. For example, they require periodic extensive flushing and, even with additives, they have to be monitored for contamination of the enclosed water.

If there is a potential for chemical exposures to the body in your work environment, there must be provisions for providing and using proper protective equipment. Also, the proper placement of emergency eyewash/showers must be accomplished. A trained professional, with the help of your work force, should determine where chemical exposures are likely to occur, and then specify the appropriate units and installation guidelines. Use visible and uniform signs at each location to help employees know where the nearest units are located. With the units in place, trian all employees at risk in how to use the units, as well as how to inspect and assure the cleanliness of the units and housekeeping required after a unit is tested or used.

Group activity

Instruct your employees to return to their respective work areas and look for potential chemical exposures that could splash their bodies. Ask them to make an initial determination of whether there is a likelihood of chemical contact, and have them suggest if there is an adequate device appropriately located or if one needs to be installed. Reconvene the group to discuss their findings, and take any deficiencies noted and fix them.

Warren Brown, a certified safety professional, is supervisor of safety and security for DMAX Ltd. in Fairborn, Ohio. In 1988, he was named a General Motors Corp. Safety Fellow, the company's highest safety honor.

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Reference section

Web sites

- Purdue University: www.purdue.edu/rem/safety/shower.htm
- OSHA's Eye and Face Protection page: www.osha.gov/SLTC/eyefaceprotection/index.html
- 10 Ways to Prevent Occupational Eye Injuries: www.preventblindness.org/resources/factsheets/Preventing_Workplace_Injuries_MK33.PDF

Standard

- American National Standard for Emergency Eyewash and Shower Equipment, ANSI Z358.1-2004

Articles

- Hurley, Robert. "Are your emergency eyewashes ready for action?" *Occupational Hazards*, Mar 2000, v62 n3, p65-68
- Hall, Randall. "Reverse tempering emergency equipment water." *Occupational Hazards*, Feb 2004, v66 n2, p33-34

Videotapes

BWC's Division of Safety & Hygiene's video library has a number of videotapes on eye safety. These are available for loan to Ohio employers. Order a catalog by calling **1-800-OHIOBWC** (ask for the video library), or visit our Web site, **ohiobwc.com**.

Defensive driving strategies

By Ted Ingalls

Before you begin

1. Identify all vehicle-related activities your organization utilizes.
2. Identify all vehicle incidents or near incidents that have occurred within the past five years. You may want to ask others for their thoughts in preparation.
3. Have a flip chart or whiteboard available to capture the discussion points and answers to questions.
4. Use a question and answer format that encourages participation and involves the group in the discussion.

Driving is risky business. Essentially, people — young and old, blue-collar workers and company presidents — are in control of lethal weapons when they drive on our roadways.

The National Highway Transportation Safety Administration (NHTSA) reports 43,220 people lost their lives in vehicle incidents during 2002. Fifty-eight percent of those killed were not wearing a seat belt and 40 percent were in some way impaired. Occupationally, 22 percent of work-related fatalities resulted from vehicle mishaps.

Think of that waste. Think of the suffering of those injured … and those who lose family and friends.

Ask how many of the group or their families have been involved in a motor vehicle incident.

Ask how many incidents involved only property damage, and how many involved injury.

Record the numbers on the flip chart or white -board.

Ask the group who is responsible for driving safely. The correct answer is: we the drivers are solely responsible. It is up to us to drive safely and to look out for others.

Ask the group to identify the major causes of vehicle incidents. Write the group's ideas on the flip chart or whiteboard.

See if the group's ideas compare favorably to those of safety professionals who were asked the same question.

- Distractions 40 percent
- Aggressive driving 22 percent
- Drinking 12.8 percent
- Seat belt use 12.5 percent
- Speeding 7.0 percent
- Drowsy driving 3.5 percent
- Failure to yield 2.2 percent

Discuss how the group feels about these causes and request they share their observations or their personal experiences that exemplify the causes.

Conclude this part of the discussion. The truth is this: They are all important. Any one of those behaviors can lead to the death of an employee or a member of your family.

Let's be honest: Showing gory pictures does not change driving behavior.

So, how can we help drivers avoid incidents?
First, buckle up – always. Have everyone in the vehicle use their seat belt.
Second, avoid distractions.

Ask the group to identify all the possible driving distractions they can think of, including those at work or at home. Write their answers on the flip chart or whiteboard.

The message for everyone is this: Each of us must wear a seat belt and eliminate distractions. The consequences of failure are potentially life-threatening.

Ask if there are additional tips that will help us improve our driving abilities. The answer is "Yes." Use the "Four A's" of driving.

- Anticipate. Drivers must remain alert at all times to what is going on around them and in the distance ahead.

- Adjust. Drivers must continually adjust to changing circumstances. The extremely changing nature of driving requires constant attention to detail and adjustment.

- Assume Nothing. Drivers should take nothing for granted.

- Allow No Distractions. Drivers need to stay focused on their job of driving safely and arriving at their destination without incident.

Conclusion
Since employees are licensed drivers, sound, safe-driving principles should be taught and reinforced. To do nothing invites possibly devastating consequences to our families and friends who might suffer because we thought the subject was unimportant.

Group action
Ask the group how they think the information in this session could be put to good use.

Ted Ingalls, a certified hazardous materials manager, is president of Performance Management Consultants in Dublin, Ohio. The firm provides training and development in safety management and leadership, develops safety problem-solving teams, and helps organizations implement behavior-oriented safety systems and processes. It also conducts safety culture assessments, individual evaluations and technical safety training.

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Reference section

Web sites

- National Safety Council: www.nsc.org/library/facts/defdriv.htm
- Deerbrook: www.deerbrook.com/auto_safety/defensive_driving.asp
- Federal Motor Carrier Safety Administration: www.fmcsa.dot.gov/facts-research/research-technology/publications/accidenthm/driver.htm

Videotapes

BWC's Division of Safety & Hygiene's video library has a number of videotapes on driving safety. These are available for loan to Ohio employers. Order a catalog by calling **1-800-OHIOBWC** (ask for the video library), or visit our Web site, **ohiobwc.com**.

Developing an employee safety committee

By Dan Stockwell

Before you begin

Have the following materials available for discussion:

- An example of the your safety committee agenda sheet;
- An example of your safety committee inspections/projects action register.

Organizations sometimes have committees, which seem to function without purpose or direction. A safety committee with a purpose and objectives can be an important element in an organization's health and safety process. However, for this goal to be accomplished, employees need to be involved, and management can assist with this process.

In forming a committee, management can provide direction by:

- Establishing a budget;
- Suggesting the frequency of meetings;
- Establishing the committee function within the organization.

In developing a committee, it is important to have representatives from both the hourly and salaried ranks. Depending on an organization's structure, generally it is good to have representation from each department, since the committee's decisions may affect the entire organization. Committee members may either be volunteers or persons selected by their departments.

A safety committee should develop a mission statement, which outlines:

- The committee's purpose;
- Member roles and expectations;
- How the committee will be structured;
- The committee's responsibilities to the organization.

This should be one of the first action items the committee completes.

A committee's basic structure should include a chairperson to coordinate and direct the committee, and a secretary to assist with meeting minutes and other communications, such as following up on projects or assignments. Some organizations have assistant chairpersons to help the committee. This structure serves as a training process and assists with development of committee members.

Depending on the structure of an organization, basic committee functions may include:

- Developing a yearly health and safety plan of action, including goals and devising a process to track the elements in the plan;
- Conducting periodic health and safety inspections to identify and correct physical conditions, as well as unsafe work practices and procedures;
- Reviewing or investigating accidents, injuries and near misses, as well as recommending corrective actions;
- Coordinating and/or conducting health and safety training;
- Developing health and safety procedures and policies;
- Providing representation from various departments concerning health and safety issues.

The committee should meet on a periodic basis to follow-up on the action items established by the committee. This follow-up and the completion of action items can provide committee members with the encouragement to further participate in the health and safety process.

Summary

Employee involvement through a safety committee can facilitate cooperation and communication in an organization. However, a safety committee cannot take the place of individual responsibility and accountability for health and safety. It also is no substitute for an active and committed management effort toward occupational safety and health. A safety committee is just part of the health and safety process.

Daniel R. Stockwell, a certified safety professional and certified industrial hygienist, is the senior regional health and safety administrator for O-I (formerly known as Owens-Illinois) in Zanesville, Ohio. He is a past president of the Society of Ohio Safety Engineers, and has more than 25 years of experience in occupational safety and health.

We always strive to improve the *Safety Leader's Discussion Guide*. Your feedback can help. Please send your comments via e-mail to Safety@ohiobwc.com.

Reference section

Web sites

- Guide to Effective Joint/Labor Management Health & Safety Committees: www.state.nj.us/health/eoh/peoshweb/jlmhsc.pdf
- Leading an Effective Safety Committee: www.memic.com/publications_library/EffectiveSafetyCommittee.pdf
- Online training -- Safety Committee Operations: www.cbs.state.or.us/external/osha/educate/training/pages/101outline.html

Publications

- *Leader's guide to safety committees*. J.J. Keller & Associates, 1997
- Lingafelter, Jennifer. "Building an effective safety team." *Workers' Comp Quarterly*, Summer 2005, p22-25

Videotapes

BWC's Division of Safety & Hygiene's video library has videotapes on safety committees. These are available for loan to Ohio employers. Order a catalog by calling **1-800-OHIOBWC** (ask for the video library), or visit our Web site, **ohiobwc.com**.

Loading dock safety

By Amy Stewart

Before you begin

How safe is your loading dock? What are typical causes of loading dock accidents, incidents and events? What do we check to prevent loading dock accidents? Through group discussion, the workers will raise each others' awareness of hazards and safe practices around loading docks. Loading dock safety should include hazard identification, safety committee discussions, peer-to-peer feedback and employee suggestions. The discussion leader should provide feedback on employee suggestions to upper management where appropriate.

Warm-up exercise – Group discussion

(1) List types of loading dock hazards.
(2) Discuss the methods used to compensate for hazards.
(3) Discuss how you can improve safety in the following three categories:
    * Warehouse or loading dock facility;
    * Cargo damage;
    * Vehicle movement during loading or unloading.

What can we do?

Ask the group to list the leading causes of fatalities in loading dock areas. Examples include a worker being crushed by an overturned forklift, a fall from a loading dock.

Ask what contributing factors lead to these events, and what can be done to prevent incidents? Answers include policies and procedures, education/training, lighting, barriers, enforcement, engineering, visual/audible alarms/sensors.

Is there anything we should do about a vacant loading dock, or if the dock door is open for ventilation?

- Close dock doors to secure the docking area when not in use.
- Erect barriers.
- Re-route pedestrian traffic.
- Install sensors.

Cargo

- How could a fire start in the loading dock area, and what should be done to prevent fires? (Trailer marker lights against the building; cargo; electrical shorts; smoking – non-flammable materials, frequent inspection, retardant)
- Describe the procedures for preventing trailer tip-overs, upending or landing gear collapse. (Trailer restraint system, inspect movement before adding to the load)
  (Leave coupled where appropriate, consider trailer restraint system)

Vehicle movement

- Newer trailer designs, such as air-ride trailers, lower profile tires and low-bed trailers might require special handling procedures. What hazards are created with these new designs and what can be done to compensate?
  * Mechanic or hydraulic levelers, ramps, vs. ski-slope effect

- Identify ways communication is used in the loading dock area, from signage to audible/visual alarms, to signaling devices or gestures.
  * Wear bright colors; promote employee contribution, policy and enforcement of posted safe rules and operating procedures; conduct proper training; and use proper equipment.

- Unscheduled departure: Examine why premature dock/trailer separation occurs.
  * In a hurry; time is money. Take positive action to prevent a driver's attempt to make a premature, unscheduled departure.

- Do wheel chocks and setting brakes entirely eliminate trailer creep? If not, why not and what can be done to prevent creep?
  * Leave tractor cab attached to trailer or vehicle restraints are other considerations.

Action steps

Individual

Workers must not only be mindful of what they are doing, but also be aware of the actions of those around them, especially forklifts and other forms of material handling equipment. Although this lesson is not all-inclusive of every specific hazard at loading docks, all employees must raise their awareness of the risks associated with working around loading docks and should look to identify opportunities for improvement.

Group

Safety committee – Working with the check list, design a list of improvements that can be made in the loading dock area, and prioritize, beginning with minimal cost to "super-size" involving major upper-management investment.

Tailor a training program for all employees who enter or work in any capacity in the loading dock area, and include procedure, rules and guidelines for keeping injury/fatality/damage-free.

Amy Stewart is a certified safety professional and a transportation research scientist at Battelle Memorial Institute in Columbus, Ohio. She has been published in the American Traffic Safety Association's *Journal of Traffic Safety*; and has written several transportation safety training manuals and videos. In 1997, Stewart was named Safety Professional of the Year by the All-Ohio Chapter of the American Society of Safety Engineers.

We always strive to improve the *Safety Leader's Discussion Guide*. Your feedback can help. Please send your comments via e-mail to Safety@ohiobwc.com.

Reference section

Regulations

- 29 CFR 1910.178 (Powered Industrial Trucks)
- 49 CFR 393.106 (Front End Structure Subpart I, Protection Against Shifting or Falling Cargo)
- 49 CFR 393.40 (Required Brake Systems)
- 49 CFR 393.41 (Parking Brake Systems)

Web sites

- New Jersey Fatality Report: www.state.nj.us/health/eoh/survweb/02nj081.pdf
- Loading dock safety checklist: www.wcfgroup.com/wcfWebsite/pdf/WCFLoadingDockSafety.pdf
- Dock safety article: www.mhmsontario.com/news.html
- Loading dock safety products and information: www.ritehite.com

Books and Articles

- Swartz, George. *Warehouse safety: A practical guide to preventing warehouse incidents and injuries*. Government Institutes, 1999
- Utt, Kirby, "Loading Dock Safety Summary," *Central Ohio ASSE Newsletter*, March 2004

Fall protection for general industry

By John N. Waller

Before you begin

Walk around the area of your business looking for fall hazards.
Fall protection in general industry is addressed in the following OSHA standards:

1910.23	Guarding floor and wall openings and holes;
1910.66	Powered platforms for building maintenance;
1910.66	Appendix A, Guidelines;
1910.66	Appendix C, Personal Fall Arrest System;
1910.132	General Requirements (Personal Protective Equipment);
1910.269	Electric Power Generation, Transmission, and Distribution.

This training is to increase employee awareness and identification of fall hazards that are present at this facility, and to help develop a comprehensive employee fall-protection plan that complies with applicable standards that either eliminate fall hazards or provide appropriate protection against such hazards.

Falls from elevation hazards exist in almost every workplace. Falls from elevations were the fourth leading cause of death in the workplace. From 1980 to 1994, 8,102 people were killed from falls. This accounted for 10 percent of all workplace fatalities, averaging 540 deaths per year. The causes of these fatalities ranged from ironworkers working 200 feet above the ground, to stock clerks pulling items off shelves using a 4-foot ladder. Walking or working surfaces, unprotected sides or edges more than 4-feet high, and ladders and scaffolds all contribute to elevation hazards.

It is important to understand that there are two types of falls:

- Falls from the same level, such as when you trip;
- Falls from a different level, such as falling off a platform. Fall protection must be implemented when the distance between two levels exceeds four feet. Housekeeping is a good place to start when discussing fall protection.

How many times do you walk through a work area and find obstructions in walkways? From the standpoint of preventing injuries, it's critical to keep these walkways clear. It is also the law. OSHA regulations require "all places of employment, passageways, storerooms and service rooms shall be kept clean and orderly and in a sanitary condition." This is fairly simple to accomplish. Clean up after yourself, and be aware of your work area. The regulations require aisles and passageways to be clear and in good repair, to be clearly marked and sufficiently wide if mechanical equipment is being used.

OSHA standards define floor holes as "an opening measuring less than 12 inches but more than 1 inch in its least dimension, in any floor, platform, pavement or yard, through which materials but not persons may fall." Floor openings are defined as "an opening measuring 12 inches or more in its least dimension, in any floor, platform, pavement or yard, through which persons may fall." Entrances to stairs are common floor openings. Regulations require railings on all exposed sides of the stairway opening, except at the stairway entrance. Standard railings consist of a top rail, mid rail, and posts, and have a vertical height of 42 inches from the upper surface of top rail to floor. The midrail should have a height of 21 inches. Toe boards are used to prevent tools or equipment from being accidentally kicked off an edge, or through a hole. Toe boards should be four inches in height, with not more than one-fourth-inch clearance above floor level.

In cases where floor holes are covered, you need to provide temporary guardrails or an attendant when the cover is removed. Guardrail protection is also required around open pits, tanks and vats. This protection is required to prevent employees from falling off of or through open holes or sides.

Stairs have their own set of regulations. Flights with four or more steps need standard railings or handrails. Stairs less than 44 inches wide and with both sides enclosed need at least one handrail, preferably on the right side descending. Stairs less than 44 inches wide with one open side need at least one rail, on the open side, and if both sides of a set of stairs are open, you need two handrails, one on each side. Larger width stairs have additional requirements, with some stairways needing a third rail in the center.

Ladders are another cause of falls. Poor design, improper maintenance or incorrect use can cause a ladder to fall or fail. A ladder is defined as "an appliance consisting of two side rails joined at regular intervals by crosspieces on which a person may step to ascend or descend." Portable ladders come in various types, including stepladders, straight ladders and extension ladders.

It's important that you choose the correct ladder for the task you will perform. Inspect ladders before use, paying attention to missing or damaged parts. Ladders need to be correctly placed with a secure footing, or lashed or held in position. Ladders used to gain access to a roof should extend at least three feet above the point of support. Use Ladders at such a pitch that the horizontal distance from the top support to the foot of the ladder is one-quarter of the working length of the ladder. You should always face the ladder, and use both hands when climbing or descending ladders.

Group actions

As a group, inspect your workplace. Make sure:

* Work areas are clean;
* Walkways are clear, defined and of adequate width;
* Platforms and stairs have necessary railings, toeboards and handrails;
* Ladders are in good condition.

John N. Waller is regional health and safety manager for PSC Container Services Group. He oversees occupational health and safety at 24 facilities.

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Reference section

Web sites

- OSHA's Walking/Working Surfaces page: www.osha.gov/SLTC/walkingworkingsurfaces/index.html
- Falls from Elevation: www.cdc.gov/niosh/injury/traumafall.html
- Ladder Safety: www.pp.okstate.edu/ehs/links/ladder.htm
- Housekeeping: www.ccohs.ca/oshanswers/hsprograms/house.html

Videotapes

BWC's Division of Safety & Hygiene's video library has a number of videotapes on fall protection, housekeeping and ladders. These are available for loan to Ohio employers. Order a catalog by calling **1-800-OHIOBWC** (ask for the video library), or visit our Web site, **ohiobwc.com**.

Flammable liquids

By Joseph Hammond

Before you begin

- Gather information about the flammable liquids in your facility.
- Review the inventory lists prepared for the Hazard Communication standard requirement.
- Verify storage locations of substances that are used.
- Utilize material safety data sheets (MSDSs) as a useful resource for your discussion.
- Obtain samples of the warning labels you use in your Hazard Communication program.
- Collect safety containers used in your facility for this demonstration.

Begin by asking the group to define flammable liquids. Flammable liquids are those which:

- Vaporize at less than 100 degrees F;
- Can be easily ignited;
- Are capable of burning with great rapidity after the source of ignition is removed as long as conditions remain within combustible limits.

According to OSHA, flammable liquids are liquids with a flash point of less than 100 degrees F. The flash point is the lowest temperature at which a liquid gives off enough vapor to form a flammable mixture with air.

Discuss with the group the two types of labeling systems used to identify flammable liquids.

- The NFPA diamond label. A fire hazard rating of three or four denotes a flammable liquid.
- The HMIS system, which uses a similar color and numbering method. With both systems the color red refers to flammability.
- At this point, show examples of both systems.

The explosive concentration of vapors in air has a lower and upper limit. The lower explosive limit (LEL) is the lowest concentration that will ignite. The upper explosive limit (UEL) is the highest concentration that will ignite. If the vapor concentration is between the LEL and UEL, a fire or explosion will occur if an ignition source is present.

Vapors that are heavier than air will flow from an open container to a lower level. A spark or other ignition source can ignite the vapors.

Ask the group for examples of known ignition sources posing a fire hazard at your site.

Examples may include:

- Smoking;
- Electrical motors or switches;
- Static electricity;
- Heat guns;
- Welding;
- Radiant heat;
- Sparks from hand tools.

The methods we may employ to reduce or eliminate hazards associated with flammable liquids include:

- Substitute a less-hazardous product;
- Maintain only the amount needed to perform the task;
- Remove outdated, unused or waste materials from the premises;
- Control ignition sources;
- Avoid pouring flammable liquids into drains;
- Use safety containers designed specifically for flammable liquids;
- Place containers of flammable liquids, such as spray cans, thinners and solvents in flammable safety cabinets. "Approved Cabinets" need to be properly installed/ventilated and limited to 60 gallons of material;
- Store large containers of flammable liquids, such as drums, in an area specifically designed for them. Often, this is an area separated from ignition sources or in a separate facility. Alternatively, store drum-sized containers in a room with a two-hour fire wall and with one and one-half-hour fire doors. The floor should be diked, and floor drains should not share the common sanitary storm drain. Explosion proof electrical fixtures are to be in place;
- Install automatic alarms and fire supression systems;
- Restrict entry to only authorized persons.

Show the types of safety containers your facility uses. Point out the features they possess and, at the same time, display an appropriate label.

Flammable liquids may present health hazards due to exposure. Check a product's MSDS for its specific permissible exposure limit or threshold limit value. Typical symptoms are:

* Inhalation of flammable liquids can cause irritation to the respiratory passages, nausea, headaches, muscle weakness, drowsiness, loss of coordination, disorientation, confusion, unconsciousness and death;

* Skin contact with flammable liquids can cause the skin's oils to be removed, resulting in irritated, cracked, dry skin, rashes and dermatitis;

* Eye contact with flammable liquids can cause burning, irritation and eye damage;

* Ingestion of flammable liquids can irritate the digestive tract, causing poisoning and death.

Conclusion

The use of flammable liquids is a necessary part of our work. It poses an element of danger to our operation. However, with the proper level of respect and caution we should be able to maintain a safe workplace. Fire and explosions have been a source of personal injury and property damage. Everything that can be done to protect our people and our jobs should be a part of our mutual agenda.

Group actions

Ask all attendees to review their respective areas for containers of flammable liquids. Check to see if the containers are:

- Inventoried;
- Properly labeled;
- Properly stored;
- Maintained away from ignition sources.

Have them bring their findings for discussion at the next meeting.

Joe Hammond is a certified professional environmental auditor and occupational safety and health technologist. After a 27-year career with BWC, Hammond now provides safety training and consulting services to clients throughout Ohio. He is an authorized OSHA 10- and 30-hour course trainer.

We always strive to improve the *Safety Leader's Discussion Guide*. Your feedback can help. Please send your comments via e-mail to Safety@ohiobwc.com.

Reference section

Web sites

- OSHA training materials on flammable and combustible liquids: www.osha.gov/SLTC/smallbusiness/sec8.html
- Online Safety Library – Flammable and Combustible Liquids: www.pp.okstate.edu/ehs/links/flam.htm
- OSH Answers—Flammable and Combustible Liquids: www.ccohs.ca/oshanswers/chemicals/flammable/

Videotapes

BWC's Division of Safety & Hygiene's video library has a number of videotapes on flammable and combustible liquids. These are available for loan to Ohio employers. Order a catalog by calling **1-800-OHIOBWC** (ask for the video library), or visit our Web site, **ohiobwc.com**.

Static electricity hazards

By Arne Larson

Before you begin

Survey your facility to identify activities that have potential to create static electricity sparking. Review safety procedures at your company designed to prevent hazards caused by static electricity. If available, bring examples of bonding and grounding devices to demonstrate their use.

Under certain conditions, liquids, solid objects and people can become charged with static electricity. If these charges cannot move or flow to ground, the static charges continue to accumulate, and will eventually develop enough energy to jump as a spark to another nearby object. If flammable gas or vapor is present when this occurs, this spark can ignite a fire or cause an explosion.

Everyone has probably experienced a static electricity spark (and shock) at one time or another. This usually happens in the winter when there is not much moisture in the air (humidity is low), but can occur any time of year.

Review the sources of static electricity with the group. Write these terms on a white board or flip-chart for later reference.

- Triboelectrification occurs when two different materials make contact and then separate (walking across a carpet).
- Liquid shear charging is created by the flow of liquids through a pipe, hose or vessel (filling a tank truck through a loading pipe). Free falling liquids through air can also generate static charge.
- Induction charging occurs when a neutral ungrounded object moves into the electric field that surrounds a highly charged object (walking on a wood floor and touching a charged object).
- Corona charging is caused when a nonconductive object is sprayed with a stream of material that is electrically charged (electrostatic paint spraying).

Methods to prevent static electricity discharge
Discuss with the group each of these seven ways to reduce or eliminate static electricity. Ask them to identify locations in the facility where examples may be found.

- Bond – connect two or more conductive objects together with a conductor (like a wire) to equalize the potential charge between them.
- Ground – connect one or more conductive objects directly to the earth with a conductor (like a wire or steel rod).
- Humidification – moisture in the air (humidity above 60 percent) can help dissipate static charges on objects.
- Additives – certain fuel additives can increase the conductivity of the liquid.
- Static collectors – highly conductive devices that collect static charges from non-conductive sources and safely channel it to ground.
- Materials – conductive flooring and shoe soles can help dissipate static charges away from the person.
- Minimize splash filling and free-fall of low conductivity flammable liquids.

Types of static discharges
Ask the group to identify situations at your facility where static discharges may occur.

- Capacitive discharge – sparks that occur between conductive objects, such as a metal drum and a metal container.
- Brush discharge – may occur when a grounded conductor comes close to a charged non-conductive object. For example, removing a sweater and putting it on a metal hanger rod.
- Note: there are other types of discharges associated with powders and powder coating operations. See reference materials for more information.

Preventing fires and explosions
Discuss with the group the safety precautions listed below for working with flammable liquids, gases, vapors and dusts to minimize generation of static electricity. Ask if they can think of any other ways to prevent static sparking.

- Bond and ground all metallic equipment.
- Bonding and grounding are both required when handling flammable liquids
- Non-metallic piping and containers cannot be bonded and grounded. If possible, these materials should not be used to handle flammable liquids.
- Special care is required when dispensing flammable liquids.
  - * Minimize splash filling and free fall as much as possible.
  - * Reduce the flow rate of the liquid. A slower liquid velocity helps minimize agitation and turbulence.
  - * Increase conductivity of a liquid by using anti-static additives, or mixing in other more conductive liquids (for example, ethanol, acetone).
  - * In-line microfilters can cause rapid charging of low conductivity liquids.
  - * Enclose filters in a grounded metal enclosure.
  - * Plastic bags and drum liners can generate static charges when pulled apart or across other materials.
- Static-dissipating soles on shoes and treated or cotton clothing can help reduce static buildup.
- Inspect and repair grounding wires, straps, connections, clamps, etc. to ensure a good path to ground is maintained.

Arne Larson is a safety specialist with the Lubrizol Corp.'s research and testing facility in Wickliffe, Ohio. He has 16 years of experience in safety and industrial hygiene.

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Reference section

Web sites

- Static electricity: www.worksafesask.ca/files/ont_iapa/staticelectricity.html
- Static protection through bonding and grounding: www.iaei.org/magazine/04_c/johnston.htm
- Petroleum Equipment Association—Stop Static: www.pei.org/static/

Publication

- Recommended Practice on Static Electricity, NFPA 77, National Fire Protection Association, 2000

Lockout/tagout

By Mark J. Mullins

Before you begin, obtain the following:

- A copy of your lockout/tagout procedure, if one exists;
- A copy of your lockout/tagout permit/form;
- Any accident or near-miss reports that occurred regarding lockout/tagout;
- Samples of the locks and tags used in your facility;
- Any personal protective equipment, required to be worn during lockout/tagout, if applicable;
- A chalkboard or whiteboard to capture some of the possible answers. Use these to stimulate discussion.

Be prepared to use a question-and-answer format requesting the participants to drive the discussion and suggest improvements to your system.

Approximately 145 deaths are attributed to the failure to control energy in the workplace. Sixty-three percent of the workers injured by the release of energy were production workers.

Ask the group to define the purpose of the organization's lockout/tagout program. The answer should be to prevent energy from accidentally being released while a machine or equipment is being serviced.

Ask the group to name some of the energy sources in your workplace. Examples include:

- Electrical;
- Mechanical;
- Stored energy;
- Hydraulic;
- Pneumatic;
- Valve handles;
- Disconnect switches;
- Springs.

If you have any of these energy sources, have the participants identify them and where they are located.

Review any incidents that have occurred because of a failure to isolate energy sources.

Definitions
Review the following definitions with the group.

Affected employee
Employee who operates or uses the equipment that is under lockout, or who works in an area where lockout/tagout is being performed.

Authorized employee
Employee, such as an electrician, who performs service or maintenance on electrical equipment.

All devices designed to control the flow of energy, such as circuit breakers, valve handles or disconnect switches, must have the capability of being locked out.

The main objective of the lockout procedures is to achieve a zero-energy state on any piece of equipment being serviced.

Ask the participants to identify what should be included in a lockout/tagout program. Possible answers are listed below.

- Include a written program, along with employee training on the program and periodic inspections.
- Provide locks, tags, valve locks and other hardware to the employee for isolating, securing or blocking equipment to be serviced. All isolating equipment must be durable, identifiable, standardized and capable to isolate the energy and warn against hazardous conditions.
- Have the authorized employee periodically review the program at least on an annual basis to identify areas for improvement. The employee certifies this review process.
- Develop special procedures, document and use them for those out of the ordinary energy sources.
- Keep the energy source in an off or safe position for the devises used.
- Notify all affected employees of the lockout/tagout.
- The authorized employee will verify the equipment is properly isolated and safe to service.
- Upon completion of the work, the authorized employee will verify the machine can safely be returned to service and the affected employees have been notified.

Ask the group to identify potential lockout/tagout traps or programs. Use a chalkboard or white board to capture suggestions from the participants and use this information for discussion. Possible answers are:

- Failure to identify all energy sources. In some cases, the electrical energy may be properly locked out, however other forms of energy such as pneumatic, hydraulic, energy due to gravity may be left within the equipment;
- Improper isolation of a lock. Your lock must positively prevent the energy isolating switch from operating. Locking your lock through the shackle of another person's lock will not prevent the operation of the energy isolating switch;
- Not applying your own lock. Remember, your lock is your lifeline. Do not perform any work on equipment until you perform all lockout steps.

Mark J. Mullins, CSP, CHMM, is the health and safety supervisor for Lubrizol Corp. in Painesville, Ohio. He has been with the corporation for 33 years, and has 20 years of experience in occupational health and safety. Mullins is past president of the Society of Ohio Safety Engineers and is vice-president of the Northern Ohio chapter of the American Society of Safety Engineers. He also is on the board of directors of the Greater Cleveland Safety Council.

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Reference section

Web sites

- OSHA's Lockout/Tagout page: www.osha.gov/SLTC/controlhazardousenergy/index.html
- BWC's one-hour safety presentation on lockout/tagout: www.ohiobwc.com/employer/programs/safety/SandHTrain.asp
- Lockout/tagout program from Virginia Tech: www.ehss.vt.edu/Programs/OSD/LockoutTagout/LOTO.htm

Videotapes

BWC's Division of Safety & Hygiene's video library has a number of videotapes on lockout/tagout. These are available for loan to Ohio employers. Order a catalog by calling **1-800-OHIOBWC** (ask for the video library), or visit our Web site, **ohiobwc.com**.

Handling and storage of portable LPG cylinders

By Lowell E. Snodgrass

Before you begin

Identify the liquefied petroleum gas (LPG) cylinders used in your workplace. These may be propane, acetylene, butane, or propane/butane mixture. Bring a cylinder of the most-used LPG to the discussion area. If cylinders are not available or difficult to bring, you can use photographs as visual aids. Identify and bring with you the material safety data sheets (MSDSs) for all LP gases used by the group. Check the areas where LPG cylinders are stored for your location, and note any problems in the storage area.

A variety of industries use LPG cylinders for many applications. Storage and handling of these cylinders depends upon the type, size and use. A few storage and handling requirements apply to all these cylinders. Of primary interest is the flammability of LPG at temperatures between 0 and 120 degrees F. This guide will discuss the storage and handling of portable cylinders smaller than 100-pound gross weight, but not the small butane single use canisters used in the food service industries.

Most liquefied petroleum gases used in industry are not classified as toxic. The greatest hazard in working with these cylinders is the risk of fire or explosion.

Common uses for LPG include:

- Acetylene for welding and cutting is dissolved in acetone to reduce the chances of auto-polymerization. This allows high-volume storage of acetylene at low pressures;
- Propane for lift truck motor fuel is normally mounted horizontally in a specially designed bracket. Specific training is required to avoid mis-mounting the cylinder;
- Propane used for other motor fuels may be attached for use of the liquid or the gas portion of the fuel. Cylinders designed for use of liquid fuel and those designed for using the fuel as a gas must be stored separately;
- Propane/butane mixtures for utility and construction site heaters are in 20-pound cylinders that commonly have no specific brackets. These must be secured in an upright position to avoid tipping over.

Review with the group the types of LPG cylinders used. Ask where the LPG cylinders are stored in your workplace, and add any storage areas not mentioned by the group.

Review the reasons the cylinders are stored in these areas. Go over the fire protection, security and inspection of the areas. NFPA recommends a fire extinguisher of 18 pounds of agent or more for cylinder storage areas. For security, always lock cages or storage rooms with controlled keys.

Ask the group where is it not safe to store LPG cylinders. Add that NFPA says they should not be stored on roofs, in ways of exit, under or on stairways, in areas of public access or near sources of ignition.

Ask the group how they get an LPG cylinder when they need one. Recognize the correct answers and review the procedures, including:

- Who has access;
- How to transport the cylinder to the point of use;
- Always check the cylinder for leaks (by odor), and have the safety pressure release valve at the vapor space of the cylinder (as marked on the cylinder). It must be secured against dropping or rolling, and must never be carried by holding onto the valve or connecting port.

Ask the group what you should check for when connecting a cylinder. Possible answers include:

- Oil, grease, dirt or corrosion on the connections;
- Damaged connections or connecting hoses;
- Damaged mounting brackets;
- An odor after the cylinder is attached. If the odor persists, the connection is leaking.

Ask the group what you should do if the connection is leaking when a fresh cylinder is being attached.

- For minor leaks, back off the connection and reseat the connectors;
- For a large leak, or if the second attempt fails, remove the cylinder, mark it as defective and try another;
- Observe caution to avoid freezing the skin from contact with the gas or liquid.

Go over the storage areas with the group. Note the reasons the storage areas are located as they are. Review the answers given in the discussion, and reinforce the most important points, such as: inspection of the cylinder before use, care in transporting the cylinder, testing for leaks when attaching a fresh cylinder, and avoiding sources of ignition in the storage area and when connecting a cylinder.

Address any concerns expressed by the group, and follow up the meeting with answers that are not immediately available.

Group actions

Ask the group to inspect the cylinders (or photographs) used as training aids, and take down any comments or questions they may have.

Have the group review any MSDSs you brought to the class.

Ask the group to look over the storage area when they are nearby, and think through the next time they might need to change a cylinder.

Have the members of the group who do not normally change cylinders observe others as they perform the task correctly.

Lowell E. (Rick) Snodgrass, a professional engineer, began his career in occupational safety, health and environmental control in 1971. He has managed these programs for Ferro Corp., Nestle' USA, Battelle Memorial Institute and KTH Parts Industries. Snodgrass is a past president of the Society of Ohio Safety Engineers and the Northern Ohio chapter of the American Industrial Hygiene Association. He has authored *Safety Leader's Discussion Guide* articles since 1982.

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Reference section

Web sites

- National Propane Gas Association: www.npga.org/
- OSHA's page on compressed gas and equipment: www.osha.gov/SLTC/compressedgasequipment/index.html
- LP Gas Association (U.K.): www.lpga.co.uk/contents.htm

Standard

- Liquefied Petroleum Gas Code, NFPA 58. National Fire Protection Association, 2004

Publication

- US EPA, 40 CFR Part 68, "Risk Management Program Guidance for Propane Users and Small Retailers," EPA 550-B-98-022

Videotapes

BWC's Division of Safety & Hygiene's video library has a number of videotapes on compressed gas cylinders. These are available for loan to Ohio employers. Order a catalog by calling **1-800-OHIOBWC** (ask for the video library), or visit our Web site, **ohiobwc.com**.

Working safely with chemicals

By Daniel E. Gleghorn

Before you begin

Examples are an excellent way to help inform trainees of how working safely with chemicals might affect them. Collect information about actual injury or illness incidents or near misses in your facility. You also can include examples of situations in the attendee's home environment.

Often employees are injured, become ill or die by chemicals not recognized as hazardous or dangerous. A chemical also may cause injury, illness or death because the employee believes someone would never handle or breathe it.

It is important to emphasize to trainees the first step in working safely with chemicals is to determine what exposure they might have, determine if someone has measured the exposure, and review the material safety data sheet (MSDS) to determine the hazards of and safeguards for working with the chemical.

State the purpose of this training session: to familiarize everyone with the importance of working safely with chemicals and how to recognize hazards of chemical exposure.

Ask those in attendance to name instances where they or someone they know were injured or became ill from improperly handling chemicals at work or at home. If there is a whiteboard or flip chart available, write their responses down.

If the group is having trouble identifying instances, you may want to help them out with the examples found in the table on the next page. Review the instances and, if possible, show pictures of specific situations.

The hazards associated with handling chemicals are not always recognized. Often, it is easier to be unsafe than to be safe. Sometimes we rationalize the job will take so little time, or we have always done it this way, so choose to ignore the risks. Health hazards of chemicals include:

- Lung damage;
- Skin damage;
- Organ or blood damage.

Physical hazards of chemicals include:

- Fires;
- Explosions.

Ask the group who, in your facility, might be exposed to chemical hazards or dangers. The answer is anyone, especially employees who might work with chemicals in their jobs, such as maintenance workers, painters, chemists or lab workers, production workers, visitors to the facility or employees working at home.

Understanding the principals of working safely with chemicals

Ask the group what the three major types of health hazards are. The answers are:

- Lung damage;
- Skin damage;
- Organ and blood damage.

Ask the group if the person working with a chemical is the only person exposed to hazards of the chemical. The correct answer is that an associate or someone walking by may also be exposed to more, but less obvious, hazards or danger.

The person working with the chemical can be protected by proper process controls or personal protective equipment (PPE); but a person who happens by later may be exposed to a reaction of the chemical process.

It is important to note that PPE does not make a process safe, but provides a barrier between the person working with the chemical and the hazard of the chemical.

Action steps

1. Review the workplace to determine the chemicals used.
2. Review MSDSs for the chemicals used to determine the hazards and protections required.
3. Review exposure monitoring to determine if engineering controls are necessary or feasible, and if PPE is required.
4. Follow your organization's policies and procedures for working safely with chemicals.
5. Have trainees review potential chemical hazards outside the workplace to provide protection to their families and themselves.

Daniel S. Gleghorn, a certified safety professional, has 35 years of experience in occupational safety and health. He is executive vice-president of American Safety & Health Management Consultants Inc.; and previously managed industrial health and safety issues for various subsidiaries of the Goodyear Tire & Rubber Co. Gleghorn was named All-Ohio Safety Professional of the Year for 1990.

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Type of chemical	Type of operation or job	Type of injury or illness
Acid or caustic	Mixing a solution for a process	Chemical burn
Formaldehyde/silica	Making foundry molds	Lung disease
Organic paint thinner	Mixing paint	Dry skin/dermatitis
Organic paint thinner	Spray painting	Lung disease
Degreaser fluid	Cleaning parts	De-fat skin and organ damage
Sodium hypochlorite (Clorox)	Bleaching/cleaning	Skin damage

Reference section

Web sites

- Haz-Map: hazmap.nlm.nih.gov
- OSHA's Hazard Communication page: www.osha.gov/SLTC/hazardcommunications
- Where to Find Material Safety Data Sheets on the Internet: www.ilpi.com/msds

Videotapes

BWC's Division of Safety & Hygiene's video library has a number of videotapes on chemical safety and hazard communication. These are available for loan to Ohio employers. Order a catalog by calling **1-800-OHIOBWC** (ask for the video library), or visit our Web site, **ohiobwc.com**.

Vibrating tools

By Andrew M. Pawuk

Before you begin

Gather samples of vibrating tools and anti-vibration gloves that may be used at your job site. Be prepared to identify specific tool anti-vibration features.

Have you ever experienced a tingling, pain or numbness while operating vibrating tools? You may think these signs are just part of your job and continue with your task. However, your body is giving you warning signs that something is not right. Continuing the task can lead to serious health problems, which can jeopardize your ability to work.

Vibrating tools can cause hand and arm vibration. The operation of these tools causes a rapid back and forth motion that is transmitted from the tool to the hands and arms of the person holding the tool. This condition is called Vibration-induced White Finger (VWF), or Raynaud's Syndrome. It is caused when the circulatory system in your hands and fingers are damaged during use of vibrating tools. This, in turn, impairs circulation in your hands and fingers and results in VWF. Although acute symptoms may subside, the illness is chronic and will worsen progressively with repeated exposure.

Ask participants if they have ever experienced any symptoms during or after the use of vibrating tools. Their answers may include:

- Tingling fingers;
- Fingers turning white or blue;
- Difficulty picking up small objects;
- Reduced sense of heat, cold and pain in hands;
- Numbness;
- Trouble performing fine tasks, such as buttoning or zipping clothes.

Ask what type of tool may cause these symptoms. Typical answers may include:

- Drills;
- Grinders;
- Sanders;
- Lawn mowers;
- Jack hammers;
- Reciprocating tools;
- Snow blowers;
- Chain saws;
- Any tool which must be held during operation.

Ask the group what factors affect the possibility of VWF? Possible answers are:

- The amount of vibration produced by the tool (vibration intensity);
- How long the tool is used each day;
- Total hours, months and years of use of a vibrating tool;
- The way a person holds the tool;
- Exposure to the cold;
- Tobacco smoke.

Ask how soon after using the tool can the symptoms occur.

- Employees may have symptoms soon after beginning to use the vibrating tool.
- Other employees may not have any trouble for a long time, up to months or years.

Employees may experience these symptoms immediately following the use of a vibrating tool. Often these will disappear soon after the employee completes work with the vibrating tool. Employees should consider it a warning about future vibrating tool exposure and VWF. Continued vibrating tool exposure will increase the severity of the condition. Also, exposing your hands to cold temperatures while using vibrating tools has been found to contribute to the onset of symptoms. Tobacco smoke has been found to increase an individual's chances of having VWF.

Ask the group how employees can reduce their exposure to VWF. Possible answers include:

- Use methods to avoid vibrating tools whenever possible;
- Utilize tools that are in good condition because well-maintained equipment will reduce unnecessary vibration;
- Employ tools that have built-in anti-vibration features whenever possible;
- Let the tool do the work without placing a lot of force on the tool or with a tight grip;
- Limit the time the vibrating tool needs to be used whenever possible;
- Alternate the use of vibrating tools frequently with other tasks;
- Keep your hands warm.

Will personal protective equipment lessen a person's exposure to vibrating tools? Caution is needed when using anti-vibration gloves or mittens. They must allow vibration reductions, have minimal thickness to allow the dexterity required for safe and efficient tool operation and have adequate damping characteristics.

- The vibration damping material should extend from the palm of the glove to the fingers and thumb. These are the areas where primary VWF occurs and must be protected.
- The thumb must be protected with anti-vibration material on both sides. The material at the thumb normally rotates when gripping, thereby exposing the backside of the thumb to vibration.
- The glove should be loose fitting because over-sizing a glove increases manipulative dexterity.

Conclusion

VWF is a medical condition that can affect a person's ability to perform his or her job and daily activities. When knowledge of any symptoms occurs, steps must be taken to eliminate or reduce the employee's exposure to the cause. Failure to do so will worsen the condition, which may lead to the person's being unable to continue his or her work performance.

Andrew M. Pawuk has contributed to the *Safety Leader's Discussion Guide* for 12 years. He is the safety and security manager at Lucas Metropolitan Housing Authority in Toledo. Pawuk previously served for 18 years as the safety director for major hospitals in Toledo and Columbus; as a safety and health specialist for Columbia Gas of Ohio; and as a private consultant.

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- National Institute for Occupational Safety & Health publications on vibration: www.cdc.gov/niosh/topics/ergonomics/#vib
- OSH Answers – Vibration: www.ccohs.ca/oshanswers/phys_agents/vibration/
- Anti-vibration gloves: www.jan.wvu.edu/cgi-win/OrgQuery.exe?Sol281
- Raynaud's Phenomenon: www.niams.nih.gov/hi/topics/raynaud/ar125fs.htm

Training techniques

By Amy Stewart

A guide for safety leaders

Preparation is important. Training sessions can be so much better, if a little time is invested in advance to prepare. Follow these simple steps to develop a great training session.

The first step in training is to prepare for the training session by answering these basic training questions and taking action to get started.

Preparation

Who will be the audience? Identify the characteristics of who will attend. For example, how much do they know about the subject, what are their interests and how will they use the information.

What are the training objectives? What do you want the attendees to take away with them? Will you try to sell them on ideas, embrace change or use new methods? Will this be an informational training session? To provide your training session with a well-defined purpose, formulate clear and specific objectives rather than general statements. At the completion of the training, what do you want attendees to know or understand? Are there specific actions you want them to take? Is it possible to connect the training to the company's safety goals or safety vision?

Where will the meeting take place? If possible, arrange to meet in an area with ample space that is free from distraction. Consider seating needs, including whether or not you will need tables on which to write. Will there by adequate lighting, and will it be necessary to dim or adjust the light levels? Should you furnish water or other beverages? Are toilet facilities nearby? Training is more effective if people are comfortable and when training sessions are well planned and engaging.

When is the best time to schedule the training? Prepare well in advance.Try to pick a convenient time, one that takes into account people's schedules, production commitments and holidays. Try not to schedule a training event at the beginning or end of the month or on Mondays. Fridays can sometimes be difficult, as well. Mornings or early in the shift are better than afternoons or late in the shift.

Prepare by gathering materials, policies, procedures, equipment, news articles, examples and anything else to help make the training interesting and visual. Collect historical information you can share, such as previous incidents, incidents that occurred at other organizations, workers' compensation information, pictures/slides, etc. It is often helpful to show examples of good performance, equipment, practice and process, so that attendees can see what good looks like.

Audience participation

Consider the amount of audience participation you desire. Information transfer is greatly improved, if you provide people the opportunity to participate during training.

Here are participation techniques you may wish to consider.

- Use question and answer sessions to develop audience interaction and to test knowledge.
- Use small-group breakout sessions that permit groups of individuals to develop ideas and thoughts in response to a question or a challenging problem.
- Following videotape presentations, ask the audience what they thought were the important points, or how the information applies to their work setting. Record thoughts on whiteboard or flip chart for review.
- Ask a participant to read a short paragraph (prepared in advance) that explains an important point. This information could be from a news clipping, procedure or incident review.
- Give each participant a short quiz to answer. After completing the quiz, have participants, one at a time, answer a question and see if everyone agrees. If not in agreement, there is a learning opportunity.

Audiovisual planning

Audiovisual materials can greatly improve learning. Collect or develop overhead transparencies, slides, pictures, PowerPoint slides, videotapes or audiotapes that demonstrate key points or help to supplement key topics. One needs to be careful, however, not to overdo it. Audiovisual materials are supplementary and should not become the presentation.

Organizing the training session
The second step is to organize the training session by dividing it into three sections. By formatting the session into sections, the presentation will be effective, go smoothly and you will achieve the training objectives.

Section one, the introduction
Consider how you want to introduce people, yourself and generally create a relaxed atmosphere. Introduce the topic and why people have been invited to the training session, along with the purpose of the training.

Discuss the training objectives, and then ask the participants what they want to take away from the training session. It is advisable to write the training objectives and the participants' "take-aways" on a whiteboard or flip chart.

Section two, the main part of the training session
In this section, preparation, audience participation and audiovisual planning come together.

First, get the participants' attention by telling a brief story or relating an incident that illustrates the importance of safety in relation to the training session objectives.

Second, get into a thorough and honest discussion of how the training topic relates to those in attendance, to their families and to the organization. For example: Why do people not follow safe work practices? How does not wearing safety equipment affect productivity? What is necessary to do the job safely and productively? The key is to create honest dialogue, not a negative, destructive, anti-organization movement.

Third, discuss a safe way of operating, such as how the procedure works, or how people can help one another to work safely, or how to get assistance, or what to do when an emergency occurs. Help the audience think through their decision-making process when they are confronted with the topic.

Fourth, spell out the benefits of making the right choice. Help people to visualize the good things ahead, if they make the safe choice. Be careful not to threaten with negatives. Instead, help attendees see how they and the organization benefit from working safely.

Section three, influencing action
You want the attendees to use the information on the job right away and to make the right decisions. So, give them easy steps to take. Once people have made a decision and take a modest step toward working safely, they have done the hardest work.

What might be an easy step? If they are too numerous to name, an effective way is to create a to-do list. What needs to be done differently, or what will each person start to do when they are back on the job? Identify other actions that need to be taken in support of working safely, and ask for volunteers, or assign people to carry out these assignments.

Conclude the training session by summarizing the to-do list and all assignments. If possible, inform participants of the next training session date, time and location. Also, document the training activity.

Amy Stewart is a certified safety professional and a transportation research scientist at Battelle Memorial Institute in Columbus, Ohio. She has been published in the American Traffic Safety Association's *Journal of Traffic Safety*; and has written several transportation safety training manuals and videos. In 1997, Stewart was named Safety Professional of the Year by the All-Ohio Chapter of the American Society of Safety Engineers.

We always strive to improve the *Safety Leader's Discussion Guide*. Your feedback can help. Please send your comments via e-mail to Safety@ohiobwc.com.

Reference section

Web sites
- Adult Learning Styles: www.cyg.net/~jblackmo/diglib/styl.html
- Help! They Don't Speak English Starter Kit: www.escort.org/products/yahelpkit.html
- International Association for Continuing Education and Training: www.iacet.org.
- OSHA's training resources: www.osha.gov/dcsp/ote

Standards
- American National Standard, Criteria for Accepted Practices in Safety, Health and Environmental Training, ANSI Z490.1-2001, American National Standards Institute, 2001

2006

Safety meeting log

	Cell phones and safety	Emergency eyewash and showers	Defensive driving strategies	Developing a safety committee	Loading dock safety	Fall protection for general industry	Flammable liquids	Static electricity hazards	Lockout/tagout	Portable LPG cylinders	Working safely with chemicals	Vibrating tools			
Meeting date															
Employee names	(Initial squares below to indicate attendance at meetings.)														

notes

notes

Governor Bob Taft
Administrator/CEO William E. Mabe

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