



Safety Leader's Discussion Guide

- Job safety analysis
- Computer workstation ergonomics training
- Traffic control/flaggers
- Hand tool safety
- Compressed gas storage
- Safety on the road
- Preventing cuts and lacerations
- Combustible dust in the workplace
- Crisis plans for schools
- Asbestos awareness
- Protecting older workers
- Safety management systems



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Dear safety leader:

Workplace safety starts with your organization's leaders making the health and well-being of its workers a top priority. However, each employee plays a part in the safety process.

By working together, management, safety team members and frontline employees can make safety a cornerstone of your operations. And a key component of any successful workplace safety program is ongoing training.

Through regular training, your workers will better understand and recognize workplace hazards. Safety leaders can use this guide to improve employee awareness and keep workers actively involved in the safety process. Monthly topics in this year's edition include safety on the road, protecting older workers, developing crisis plans and much more.

Including safety topics in regularly scheduled meetings makes good business sense because it gets results. By keeping safety in the forefront, you'll help protect your employees and reduce costs. In the end, a focus on workplace health and safety benefits employers, workers and communities throughout our great state.

Sincerely,

A handwritten signature in black ink that reads "Don Bentley". The signature is fluid and cursive, with a long horizontal stroke extending to the right from the end of the name.

Don Bentley
Acting Superintendent
BWC's Division of Safety & Hygiene

Want more safety information?

Attend BWC's Ohio Safety Congress & Expo from March 31 – April 2, 2009, at the Greater Columbus Convention Center.

Job safety analysis By Cari Gray

Before you begin

A job safety analysis (JSA) helps workers identify and prevent hazards before they happen. Review your company's operations to determine if you use JSAs. This can include your company's safe work procedures, operating procedures or even quality analysis.

Introduction

JSAs, which are also known as job hazards analyses, are a useful tool for any workplace. You can use JSAs to investigate accidents, for job training and to evaluate new equipment. JSAs are also great for identifying and minimizing hazards. They can also help bring employees back to work after an injury as part of a transitional work program.



Discussion

So who develops a JSA? A variety of employees can help develop your company's JSAs. You should consider including managers, supervisors, team leaders and anyone with knowledge about a specific job. Be sure to include a job expert – someone who performs the job on a routine basis.

If you have not created JSAs, you should prioritize jobs as listed below.

- **First priority** – Jobs with a high frequency of accidents
- **Second priority** – Jobs with severe injuries or high loss
- **Third priority** – Jobs with the potential to cause severe injuries or high loss
- **Fourth priority** – New jobs without an accident history (e.g., new equipment/procedures, changes resulting from modifications on new/old equipment)

How to develop a JSA

To develop a JSA, you must first determine and document each step in a job. Use operational documents to start.

Next, identify the hazards in each step of the job. Be sure to consider striking objects, falls, burns, exertion, electricity, chemical hazards and vehicles.

Finally, recommend a safe procedure for completing the task. The safe procedure can include engineering or administrative controls as well as personal protective equipment.

Training

Practice makes perfect when it comes to creating JSAs. You can use an actual job to get started; or have a group write a mock JSA on a simple task (e.g., making a peanut butter sandwich). Examples of the job steps include:

- Gathering the supplies;
- Opening the container;
- Spreading the peanut butter;
- Cutting the sandwich and eating it.

The hazards associated may include: dropping the container causing a cut; strain from opening the jar; being cut by the knife; and choking. Some solutions include: wearing steel-toe safety shoes; using proper opening tools; wearing cut-resistant gloves; and providing training in first aid for choking.

Once you have developed JSAs, have safety personnel and/or upper management review the documents. Ensure each job step has a corresponding potential hazard and a safe procedure. Ensure the documents are accessible to all employees. Some companies post these documents in the work area or on a machine; some companies include them in operating manuals.

Group activity

Choose a job to focus on, and then have the group discuss:

- The steps of the job;
- The hazards associated with the job;
- The steps workers should take to avoid the hazards.

Use a work sheet, flip chart or white board for this exercise. Create three columns like the ones in the illustration found below. Have the group work together to fill in the chart.

References

OSHA "Job Hazard Analysis" Publication 3071.
<http://www.osha.gov/Publications/osha3071.pdf>

BWC JSA one-hour presentation
<http://www.ohiobwc.com/downloads/blankpdf/JSAOneHour.ppt>

Cari Gray is an industrial safety consultant specialist for BWC's Division of Safety & Hygiene. She has worked in the safety field since 1999.

Job steps	Hazards	Safe procedure

Computer workstation ergonomics training

By Mike Lampl

Before you begin

Observe your work areas and write down your observations. Pay attention to:

- Homemade adaptations to accommodate personal preferences and needs;
- Awkward postures at computer workstations;
- Information on injuries that may relate to ergonomic conditions.

Introduction

This session will cover:

- Defining ergonomics;
- Defining cumulative trauma disorders (CTDs);
- Discussing workplace risk factors that contribute to CTDs;
- Basic positioning tips to improve risk factors at computer workstations;
- Other methods for reducing CTDs.

Start the discussion by asking what is ergonomics? Ask the group each corresponding question and listen to the members' input. Discuss the answers and consider giving the group a copy of the questions and answers.

What is ergonomics?

Ergonomics is applying engineering and scientific principles when designing a work environment that accommodates the employee in relation to the workplace, product, equipment, tools, workspace and organization of the work. The objective of ergonomics is to fit the task to the worker, rather than forcing the person to adapt to the work environment.

Ergonomics is essentially making jobs user friendly. Benefits include: fewer injuries and CTDs; improved productivity; and better performance and quality. Ergonomics is not an overnight proposition. It is a continuous improvement process that minimizes or eliminates workplace risk factors.

What are CTDs?

Cumulative trauma disorders refer to wear and tear on the musculoskeletal system. Common CTDs include carpal tunnel syndrome, tendonitis and lower back disorders. Pain, swelling, inflammation, burning and stiffness are often associated with CTDs, or they may lead to a CTD.



What are workplace risk factors?

Common workplace risk factors include:

- Forceful exertions;
- Repetitive motions;
- Awkward postures;
- Mechanical pressure on soft tissue;
- Inadequate rest.

Just because one or more of these risk factors are present in a job does not necessarily mean a CTD will develop. However, especially with exposure to multiple risk factors, the potential for CTD is higher. Conversely, if you eliminate any or all of these risk factors, the potential for overexertion or injury decreases. Use the basic positioning tips below for computer workstations to minimize or eliminate risk factors.

- Position the monitor and keyboard directly in front of you.
- Place the monitor at your best focus distance to avoid eyestrain and forward leaning. This is typically at least 20 inches away, but it can vary based on specific vision correction.
- Place the mouse next to the keyboard, so you can use it without reaching.
- Place the top of the monitor (e.g. menu bar) at or slightly below eye level.
- Align your head and neck with your torso.
- Relax your shoulders, with your arms hanging at your sides.
- Place your forearms and thighs nearly parallel with the floor.
- Have your wrists in a neutral posture.
- Have your feet flat on the floor, or supported by a foot rest.
- Rest the lumbar curve of your back against the backrest on your chair.
- Make sure there is approximately a hand's thickness between the front edge of the chair and the back of your knees.
- Position any document holders to reduce or eliminate neck twisting or bending.
- When using the phone and computer simultaneously, consider using a headset.
- When using a laptop for extended periods, consider using a docking station and full-sized keyboard.

What else can reduce CTDs?

To reduce CTDs and/or the severity of CTDs, you should:

- Take breaks from the computer and do other tasks such as filing, copying, etc.;
- Understand what is adjustable at your workstation;
- Report work-related pain and discomfort; get a medical evaluation when needed;
- Give suggestions for ergonomic improvements;
- Exercise and maintain a healthy lifestyle;
- Use good ergonomic principles at home as well as work;
- Keep your work area organized.

Group activity

Conclude the training by asking each member to identify one key point he or she can apply from today's discussion. If the discussion leads to making physical changes (e.g., raising or lowering a work height), be sure to document the discussion and follow up appropriately.

References

<http://www.osha.gov/SLTC/etools/computerworkstations/index.html>

<http://healthycomputing.com/>

<http://ergo.human.cornell.edu/>

<http://www.ohiobwc.com/employer/programs/safety/ErgoTools.asp>

Mike Lampl is a certified professional ergonomist. He is the acting ergonomics technical advisor for BWC's Division of Safety & Hgiene. He has 15 years of safety and health experience in private industry and at BWC. Mike also is a member of the planning committee for the Applied Ergonomics Conference sponsored by the Institute of Industrial Engineers.

Traffic control/flaggers

By Connie L. Muncy

Before you begin

Review this information and your organization's policies with respect to safe flagging operations. Have available for the group a copy of the *Ohio Manual of Uniform Traffic Control Devices (OMUTCD)* and a sample copy of a traffic control plan.

Introduction

In 2006, more than 1,000 people died as a result of motor vehicle crashes in work zones, according to the Federal Highway Administration. That number has increased by 45 percent over the past decade. Flaggers must receive proper training to ensure their own safety as well as all of those who depend on them, including work crews, motorists, pedestrians and bicyclists.



Discussion

Ask the group to identify common flagging errors. Answers might include seeing flaggers:

- Not wearing an American National Standards Institute (ANSI) Class 2 or 3 high visibility garment, or not wearing a garment properly. (Flaggers should ensure they wear and fasten garments properly to guarantee maximum visibility.);
- Using a non-standard flagging technique or not having a paddle or flag;
- Standing in a blind area without sufficient advance notice to drivers (hilltops, road bends, etc.);
- Turning their back on traffic, crossing the centerline or leaving no escape route;
- Becoming distracted, chatting with others or straying from their post.

Ask the group to discuss proper placement for flaggers. Answers might include:

- At the beginning of the taper (on lane closures);
- On the shoulder or in a barricaded lane;
- Never in the path of moving vehicles;
- Never abandoning the post until relieved by another flagger.

Ask the group to list factors affecting the visibility of the flagger from a driver's point of view. These might include:

- Hills;
- Curves;
- Obstructions;
- Shade;
- Color contrast;
- Bad weather;
- Darkness;
- Other workers.

Ohio

Ask the group to list factors affecting vehicle stopping distance. These might include:

- Traffic volume and traffic speed;
- Vehicle weight;
- Pedestrians and bikes;
- Road condition;
- Hills;
- Weather conditions;
- Visibility.

Ask the group to list factors affecting driver's abilities. These might include:

- The road itself;
- Weather;
- Alcohol and drugs;
- Exhaustion;
- Driver's experience;
- Driver's age.

Finally, remind the group that the factors discussed are vitally important. Also, remind the group members that they must take appropriate measures to protect themselves and, in turn, everyone else who depends on them in work zones. Remind them that flaggers must:

- Always use standard flagging technique per the OMUTCD;
- Remain vigilant at all times;
- Never cross the centerline;
- Always have an escape route;
- Always expect the unexpected;
- Never trust the driver;
- Have an effective way to quickly alert the work crew of errant vehicles (such as an air horn, whistle or other warning that they can sound quickly and hear even under noisy conditions).

Group activity

- Present a copy of a traffic control plan from the OMUTCD and have the group identify the proper location for the flagger.
- Mark the floor with masking tape to resemble a mock roadway. Supply the group with a traffic paddle and flag and take turns demonstrating proper technique on each for stopping, slowing and releasing traffic. Have group members critique one another, with an emphasis on observing anyone crossing the centerline, turning their back on traffic or forgetting to make a proper check before releasing traffic.
- Have one group member demonstrate errant vehicle procedure and have the rest of the group critique the demonstration. Did he/she act quickly, remembering to, in this order:
 1. Move out of the way;
 2. Effectively warn co-workers;
 3. Return to his or her post to continue to direct traffic;
 4. Note any information concerning the errant vehicle.

References

Ohio Manual of Uniform Traffic Control Devices
www.dot.state.oh/divisions/highwayops/traffic/publications2/Ohiomutco

Connie Muncy, a certified industrial hygienist and certified flagger instructor with the American Traffic Safety Services Association, is the safety officer for the Montgomery County Sanitary Engineering water utility in Kettering, Ohio.

Hand tool safety

By Warren K. Brown

Before you begin

Review the history of hand tool incidents in your organization and the action plans designed to correct or avoid future possible incidents.

Introduction

One of the key issues associated with hand tool safety is choosing and using the right tool. Unfortunately, many people use tools improperly at home, where they improvise with what they have on hand. Also, many people view hand tools as simple to use, so there is little concern for safety. In reality, a person using hand tools, no matter what they are, should always follow safety precautions. Approximately 8 percent of industrial incidents result from the improper use of hand tools, according to studies. Injuries range from simple cuts, contusions and abrasions to amputations, fractures and punctures.



The fact that nearly everyone uses hand tools in some fashion further complicates the education process. By looking at the injury statistics for your organization, you can discover valuable clues about the tools workers are misusing most often.

Perform a survey of your organization's hand tools. Locate a representative sample of the tools for the presentation. Become familiar with your organization's injury experience and know the proper way to use, inspect and store those tools. Typical hand tools workers use in your organization could include hammers, saws, pliers, wrenches, screwdrivers and knives. Below are examples of improper use of hand tools.

- Pushing rather than pulling a wrench to loosen a tight fastener.
- Bending metal with undersized pliers, which can damage the pliers and the metal.
- Holding an item you're working on in one hand while attempting to remove a screw with a screwdriver in the other hand.
- Cutting toward your body with a cutting tool
- Using dull cutting tools.
- Filing materials not properly secured in a vise with no handle on the file.
- Using a tool not sized properly for the job (e.g., sockets that are slightly larger than the fastener).

Inspect tools before each use to make sure they are in good condition. Repair damaged tools before using them. Examples of tools that need repair include:

- A hammer with a chipped head and/or with a loose or broken handle;
- A screwdriver with a worn or broken tip;
- Any cutting tool with a dull surface;
- Chisels with a mushroomed head;
- Tools that have had their temper removed or modified due to excess heating.

Ohio

Now that we have listed some of the problems associated with the use of hand tools, have the group discuss ideas that you can use to reduce the potential for injury while using hand tools both on and off the job.

General safety rules for hand tool usage include:

- O Selecting the correct tool and the right sized tool for the job;
- O Inspecting tools for damage before attempting a task;
- O Keeping tools clean and cutting tools sharp;
- O Carrying tools in a manner that prevents cuts to yourself or someone else, especially if you should fall;
- O Never striking a screwdriver with a hammer;
- O Never using wrenches or other tools as hammers;
- O Always passing tools to others handle first and never throwing tools to another person;
- O Ensuring workers have proper training before using a particular tool for the first time;
- O Transferring tools to a work area by rope or bucket when using a ladder or taking tools to an elevated surface by ladder;
- O Storing tools with sharp edges safely in your storage device;
- O Wearing proper personal protective equipment (e.g., safety glasses, face shields, gloves, etc.) when using hand tools;
- O Cutting away from your body to avoid injury if the cutting device should slip;
- O Taking advantage of the ergonomically shaped handles available on some tools and holding tools in a manner that minimizes stress to the hand, wrist and arm.

Make sure employees have the appropriate training for the tools they use.

When starting a job requiring the use of hand tools, ask yourself: Do I have the right tools? Do I know how to use these tools correctly? Are the tools in good condition? Do I have the right personal protective equipment? Is there a place to store these tools when not in use?

Quiz – Circle T for true or F for false.

1. If the wrench being used cannot turn the bolt, use a cheater bar. T F
2. The best way to transport tools is in your pocket. T F
3. When handing a tool to another person, hand it to them handle first. T F
4. It may be necessary to use personal protective equipment when using hand tools. T F
5. Is it safer to pull or push a wrench? a. Pull b. Push
6. Since workers use tools both on and off the job, there is no need to train at work. T F
7. There is no need to store hand tools in an orderly fashion. T F

Answers: 1. F; 2. F; 3. T; 4. T; 5. A; 6. F; 7. F.

Resources

Guide to Hand Tools – Hand Tool Institute, Tarrytown, NY www.hti.org

What are Hand Tools – EG03 – BWC Division of Safety & Hygiene (ohiobwc.com)

Hand and Power Tools – OSHA publication 3080; 2002

Hand and Power Tool Safety PowerPoint – Vermont SIRI www.esf.uvm.edu/sirippt/handsafe

Hand Held Tool Safety – Caterpillar Safety Tool Box Safety Talks www.safety.cat.com

Warren K. Brown, CSP, ARM, CSHM, is retired from Delphi. He is co-founder of the Kittyhawk Chapter. He was selected Safety Professional of the Year by the American Society of Safety Engineers (ASSE) All-Ohio Council (1987) and ASSE Region VII (1988-89). He serves as president of the ASSE 2008-2009. He holds a BS in Industrial Technology from Ohio University, MBA from the University of Dayton and an ARM from the Insurance Institute of America. In 1988, he was named a General Motors Safety Fellow, General Motors' highest individual safety award.

Compressed gas storage

By Connie L. Muncy

If you do not respect me ...

I will jet away faster than any dragster.

I will smash through brick walls.

I will spin, ricochet, crash and splash through anything in my path.

(Compressed Gas Association)

Before you begin

Review this information and your organization's policies with respect to safe storage of compressed gases. Prepare a list of the types of compressed gases used in your facility along with a list of the locations of your compressed gas storage areas.



Workplaces often use a wide variety of compressed gases for a broad spectrum of purposes. Yet these fascinating materials all have one thing in common – if stored improperly, they can be deadly. Storage hazards may include injury from falling cylinders, exposure to toxic gases, asphyxiation, frozen body tissues, fire or explosion. Studies have shown that a typical “K” size nitrogen compressed gas cylinder (5-foot tall by 9-1/4 inches in diameter) has stored energy equivalent to half a pound of TNT. Mishandle such a cylinder, and it could behave like a bomb or missile.

To keep tragedy from occurring in compressed gas storage areas:

- Always store cylinders upright;
- Install “no smoking” signs where flammable gases are stored;
- Secure gas cylinders at all times to prevent falling;
- Use caps on all cylinders designed to accept a cap except when connected for use;
- Segregate incompatible gases;
- Segregate full and empty cylinders;
- Ensure all labels can be read;
- Keep heat and flame away;
- Keep electrical devices and combustible materials away;
- Do not store cylinders in direct sunlight, or near sources of heat or spark;
- Do not store cylinders in aisles or hallways, or under staircases.

Do not store cylinders in unventilated areas (e.g., closets and footlockers); ask the group why storing cylinders in such locations could prove hazardous. Answers should include a discussion of how undetected build-up of gases from a leaking cylinder could result in a flammable, explosive, toxic or asphyxiating atmosphere.

Ohio

Ask the group what extra precautions should you take in outdoor cylinder storage areas. Answers might include:

- Not storing near electrical wires;
- Protecting cylinders from impact;
- Forbidding smoking, open flame or combustion sources within 20 feet;
- Storing cylinders on a flat, dry surface as well as protecting them from damage caused by the elements (rain, snow, wind, direct sunlight, etc).

Point out that some compressed gases possess additional, unique hazards. For this reason it is important for workers to maintain and familiarize themselves with the material safety data sheet (MSDS) for all compressed gas cylinders in your workplace. These sheets contain important information on proper handling, storage, usage, emergency procedures and first-aid instructions. Below are examples of unique requirements for particular gases.

- Keep oxygen, a potent oxidizer, from contact with oils, dirt, fuel gases (e.g., propane and acetylene), hydrocarbons and any other combustible materials. Not taking these precautions could cause an explosion. Keep oxygen at least 20 feet away from these materials, or install a non-combustible barrier of at least 5 feet with a fire-resistance rating of at least 30 minutes.
- Never generate, pipe or use acetylene at >15 psig. Under certain conditions, acetylene readily forms explosive compounds with copper, silver and mercury. Keep acetylene from contacting these metals. Also, store acetylene cylinders in an upright position to allow the proper functioning of a porous calcium silicate filler and solvent, such as acetone. Such materials are added to the cylinders to help stabilize this gas.

Group activity

- Supply the group with a MSDS for a compressed gas used in your workplace. Ask group members to identify requirements for handling and storage noted therein.
- Emphasize they must periodically inspect storage areas. Have the group walk to a nearby compressed gas storage area and complete a practice inspection. Use the Compressed Gases Self Inspection check list located on the National Institute for Safety and Health's Web site: <http://www.cdc.gov/niosh/docs/2004-101/chklists/r1n29c~1.htm>

Connie Muncy, a certified industrial hygienist, is the safety officer for Montgomery County Sanitary Engineering water utility in Kettering, Ohio.

Safety on the road

By Michael Ely

Before you begin

Check your organization's records for any transportation-related accidents in the past five years. These accidents may involve property damage, personal injury or both. Also, review your organization's fleet safety program and/or driver requirements.

Introduction

Each year, transportation-related accidents are the leading cause of workplace fatalities in both the U.S. and Ohio. In 2006, transportation-related accidents accounted for 42 percent of all workplace fatalities in the U.S., according to the Bureau of Labor Statistics. That year, 2,413 workers lost their lives to transportation-related accidents nationwide. BWC records show 56 workers died in transportation-related accidents in Ohio.



Discussion

Most Americans use transportation, either personal or public, on a daily basis. Additionally, many workers drive their own car or a company-owned vehicle as part of their job duties. All of this driving can lead to the potential for injuries and death. However, you can take steps to reduce possible injuries, death and property damage.

The American National Standards Institute (ANSI) gives guidance to companies regarding the use of motor vehicles on the job. Its Z-15 standard (Safe Practices for Motor Vehicle Operations) includes the following elements:

- Safety policy;
- Responsibilities and accountabilities;
- Driver recruitment, selection and assessment;
- Organizational safety rules;
- Orientation and training;
- Reporting rates and major incidents to executives;
- Communications;
- Vehicle specifications;
- Inspections and maintenance;
- Regulatory compliance management;
- Management program audits.

Additionally, your organization should develop policies on:

- Use of seat belts;
- Preventing distractions while driving;
- Recognizing aggressive driving, and;
- Use of company vehicles for personal and/or business purposes.

Ohio

Conducting a comprehensive review of your transportation program, including how it is organized and implemented, may provide additional protection for employees.

Another important aspect of fleet safety is driver training because company vehicles may operate differently than your employees' personal cars. Training your employees on defensive driving techniques also provides additional protection. You should offer refresher training on a regular basis to ensure employees understand the concepts.

Your workers face transportation-related hazards, both on the job and off, everyday. Every worker is responsible for driving in a safe manner. Meanwhile, your company is responsible for maintaining a safe fleet of vehicles and proper safety training for your employees. A good fleet management program is the first step in achieving these goals.

Group activity

Ask the group:

- What hazards do you face on the road? (Answers might include reckless drivers, speeding drivers, distracted drivers, drunk drivers, aggressive drivers/road rage, poor driving conditions, poorly maintained vehicles, etc.)
- What actions can you take to protect yourself when driving? (Answers might include proper vehicle maintenance, seat belt use, pre-trip planning, adequate rest, avoiding alcohol use or certain medications, driver training, avoiding cell phone usage, staying focused, taking adequate breaks, etc.)
- What actions can your company take to better protect you? (Answers might include a fleet safety program, checking driving records, proper vehicle maintenance, proper vehicle selection for the job, proper driver training, drug and alcohol testing, etc.)

References

American Automobile Association Foundation for Traffic Safety

<http://www.aaafoundation.org/home/>

National Highway Traffic Safety Administration

<http://www.nhtsa.dot.gov/>

National Institute for Occupational Safety and Health – Highway Safety

<http://www.cdc.gov/niosh/topics/motorvehicle/>

National Safety Council – Driver Safety

<http://www.nsc.org/resources/issues/drivsafe.aspx>

National Transportation Safety Board

<http://www.nts.gov/>

Occupational Safety and Health Administration

http://www.osha.gov/OshDoc/data_Vehiclesafe/vehiclesafefactsheet.pdf

Michael Ely is a certified safety professional and the safety technical advisor for BWC's Division of Safety & Hygiene.

Preventing cuts and lacerations

By Rich Gaul

Before you begin

Assess work operations, review accident reports as well as personal protective equipment available/required to prevent cuts and lacerations. Be prepared to use a question-and-answer format to encourage employee participation in the discussion. Encourage employees to provide examples of potential cut and laceration hazards as well as suggestions for improvements to your organization's safety program.

Introduction

Each year, millions of workers suffer workplace injuries that could have been prevented. Some of the most common and preventable injuries are cuts and lacerations. Although statistical data differs from study to study, cuts and lacerations often rank as the second or third most frequent workplace injury. Approximately 30 percent of all workplace injuries involve cuts or lacerations, and about 70 percent of those injuries are to the hands or fingers.

Common cut/laceration injuries (use examples relevant to your operations) include:

- Scratches and abrasions;
- Minor cuts requiring first aid;
- Needle sticks;
- Puncture wounds;
- Deep lacerations requiring medical attention, sutures;
- Lacerations involving nerve and/or tendon damage;
- Amputations.

Note: Review past incidents/injuries involving cuts and lacerations. Have participants discuss the cause of the injuries and how the worker or the employer could have prevented the injuries from occurring. Review the items on the next page to determine if any of the injuries resulted from not following one or more of the listed items. Also, ask participants to identify other typical hazards/causes.



Typical hazards/causes of cuts and lacerations

- Improper training
- Lack of established safety procedures
- Employees in a hurry, taking short cuts or not following safety procedures
- Failure to wear cut-resistant gloves or wearing improper gloves for job
- Contact with metal items such as nails, metal stock or burrs
- Hand tools with blades (e.g., knives, box cutters, screwdrivers, chisels)
- Powered machinery with cutting blades, pinch points, chain and sprocket, conveyor belts, rotating parts, motors, presses, lathes
- Handling sharp objects or material such as glass, sheet metal
- Improper tool for the job or tool used improperly (e.g., using a screwdriver as a pry bar)
- Tools in poor condition (e.g., cracked or broken handle, dull blade, mushroomed head or slipperiness from exposure to oil-based chemicals)
- Missing or improperly adjusted guarding
- Poor housekeeping, clutter, debris
- Poor lighting, reduced visibility

Prevention strategies

The key to preventing these injuries is keeping body parts away from hazards. Employers should establish work procedures to identify and control exposure to hazards. Ask participants to suggest control measures to minimize the risk for cuts and lacerations. Possible answers include:

- Training employees to use established safety procedures;
- Maintaining proper machine guarding;
- Using lockout/tagout procedures;
- Wearing personal protective equipment;
- Safe tool use;
- Good housekeeping.

One of the most common sources of cuts and lacerations is the use of knives and other cutting tools. Gather examples of utility knives and other cutting tools used at your facility and a copy of safety procedures regarding their use. Review your safety procedures, or use the following suggestions.

Knife/blade safety

- Wear proper safety gear; eyewear, gloves, sleeves.
- Use the proper tool for the job.
- Inspect tools prior to use.
- Keep work area clear.
- Keep tool under control at all times.

- Keep the item you are cutting secured; don't hold work in hand while cutting.
- Use a sharp blade; a dull blade requires greater force, increasing potential hazards.
- Replace blades when they become dull; use caution when disposing of used blades (e.g., use approved sharps container or wrap the cutting edge with heavy tape).
- Stand in a well-balanced position.
- Pull the blade toward you when cutting on a horizontal surface.
- Make sure the path of the cut is clear, and keep the non-cutting hand out of the path of the cut.
- When cutting thick material, use several passes of the blade and apply more downward pressure with each pass.
- Never use a cutting blade as a screwdriver, pry bar or chisel.
- Don't leave exposed blades unattended; use self-retracting cutting blades.
- When appropriate, use rounded tip cutting blades rather than pointed tip blades.
- Maintain proper storage or use a separate drawer for sharp cutting tools.
- Keep cutting tools in a closed position or covered with a protective sheath.

Gather examples of gloves or other personal protective equipment designed to minimize risk of cuts and lacerations.

Gloves

Selecting the right glove for the right application can improve worker safety and productivity. Comfort is one of the most important factors when selecting hand protection. If gloves are not comfortable, workers are less likely to wear them. Understanding the different types of gloves and their appropriate uses is important to a good hand-protection program.

Closing

With thorough analysis and planning, you can develop a prevention plan to help eliminate these types of injuries from your workplace. Thankfully, the number of cuts and lacerations reported decreases each year.

Rich Gaul is a safety project manager for BWC's Division of Safety and Hygiene.

Combustible dust in the workplace

By Michael Ely

Before you begin

Before leading the discussion, research the following questions.

- Does your facility use or store organic materials (e.g., flour, sugar, wood, coal, cotton, plastic, rubber, etc.); does your facility use or store combustible metals (e.g., aluminum)?
- Has visible dust from any of these materials collected anywhere in the facility?
- Has your organization had a past fire or explosion caused by combustible dust?
- Does your company have a housekeeping program to address how and when to clean up combustible dust?



If you answered yes to the last question, review it before the discussion. If not, prepare one prior to the group discussion.

Introduction

The 2008 explosion and fire at Imperial Sugar Refinery in Port Wentworth, Ga. emphasizes the need for safety procedures when dealing with fine organic dusts (e.g., sugar and flour). In the past 28 years, about 300 dust explosions have killed more than 120 workers and injured several hundred more in sugar plants, food processors, and many industrial and wood manufacturers. In most cases, sound housekeeping practices and good occupational safety and health programs could have prevented these accidents.

Discussion

Your mother really didn't hate you. When she told you to throw flour on a stovetop fire, her goal was to smother the fire with an easily accessible material. However, she might as well have told you to dump gasoline on the fire. That's because fine organic dust particles, just like gas vapors, burn with a great deal of energy. If suspended in the air, organic dust can explode with great force. This is exactly what happened at the Imperial Sugar Refinery on Feb. 7, 2008, where 14 workers died and more than 40 were injured.

Ohio

Elements of a dust explosion

Elements needed for a fire (the familiar “fire triangle”) include:

1. Combustible dust (fuel);
2. Ignition source (heat), and;
3. Oxygen in air (oxidizer).

Additional elements needed for a combustible dust explosion include:

4. Dispersion of dust particles in sufficient quantity and concentration, and;
5. Confinement of the dust cloud.

Dust explosions are almost always a small explosion followed by a larger, more powerful explosion as the dust cloud stirred up by the first, smaller explosion ignites.

What do you need to do?

First, determine if your workplace has the potential for hazards associated with the buildup of organic dust. Material safety data sheets provide good information on the properties of materials that are present in the workplace. However, many do not address the hazards of dust from the material in question. Most of the common organic materials, such as wood, grains, cotton, etc. are easy to recognize. However, plastics, rubber and fine combustible metals such as aluminum and magnesium also present similar hazards. Large particles of these materials are not the concern. Rather, the small, very fine dust particles that are generated by grinding, milling or other mechanical operations do present a danger.

If a potential hazard exists in your facility, company personnel should conduct a full evaluation to determine where dust is generated and what, if any, housekeeping policies and procedures are in place to clean it up. Give special attention to all horizontal surfaces to determine if dust accumulation is present. Engineering controls are the best method of controlling the problem, but even with the best, it may become necessary to clean up dust accumulations.

You should have procedures and proper equipment available to clean up accumulations of combustible dust. Never clean combustible dust accumulations with compressed air. Blow downs only create hazardous clouds of dust. Vacuum, wet mop, shovel or sweep dust carefully into proper containers. This prevents dust particles from being stirred up into the air. During these cleaning operations, remove any ignition sources; this includes the shutdown and lockout of energy sources and equipment.

Summary

Combustible dust is a dangerous, silent killer. It lurks in unseen places such as rafters, the tops of hoods and ductwork, just waiting to become airborne and ignited into an explosive cloud. Make sure your workers are aware of this hazard and use proper procedures and equipment when cleaning dust. Workers should report dust accumulations to management immediately. Yes, your mother did love you. She just didn't understand the hazards of the material she told you to use. Now you understand the hazard and recognize the importance of keeping combustible dust away from all ignition sources.

Group activity

The safety leader should ask the questions below.

- Where do we generate organic or fine metal dust in our facility?
- Where would you expect to find accumulations of dust in our facility?
- Have you seen accumulations of dust?
- How would you go about cleaning it up?
- Where are the tools kept for the cleaning of combustible dust?
- What should you do if you see a combustible dust cloud?

References

http://www2.iccsafe.org/states/ohiofire/OH_Fire/07Fire_PDFs/Rule%2013_Combustible%20Dust-Producing%20Operations.pdf

<http://www.osha.gov/dts/shib/shib073105.html>

<http://www.cdc.gov/niosh/face/stateface/or/03or021.html>

<http://www.cdc.gov/niosh/fire/reports/face8549.html>

http://www.csb.gov/index.cfm?folder=current_investigations&page=info&INV_ID=53

http://www.csb.gov/completed_investigations/docs/Dust%20Final%20Report%20Website%202011-17-06.pdf

<http://www.engcollab.com/handling.htm>

<http://www.nfpa.org/assets/files/pdf/Haysville.PDF>

<http://www.electromach.com/download/Ex/dustexplosionprotection.pdf>

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Crisis plans for schools

By Bill Wilcox

Before you begin

Review the written crisis plan for your school. Determine the strengths and weaknesses of your school's safety procedures and your crisis plan. Call a meeting of administrative staff to discuss your school's safety/crisis plan.

Introduction

Webster's Dictionary defines a crisis as "a crucial or decisive point or situation." So, would a school ever find itself in a crisis? The answer is a resounding yes. Because a crisis can happen at any school at any time, you need to examine the plan you have in place to deal with any potential crisis situation. Schools across Ohio are familiar with the concept of a crisis plan. But are you ready to use yours if the need arises?



Discussion

Ohio law says "the board of education of each city, exempted village and local school district shall adopt a comprehensive school safety plan for each building under the board's control." The law also requires any plan to include:

- A protocol for addressing serious threats to the safety of school property, students, employees or administrators, and;
- A protocol for responding to any emergency that compromises the safety of school property, students, employees or administrators.

Each protocol must include appropriate procedures approved by the board for responding to threats and emergency events. This includes notification of appropriate law enforcement personnel, calling specific emergency response personnel for assistance and informing the parents of affected students.

Ohio House Bill 422 (HB 422), commonly known as the "safety drill" bill, took effect two years ago. It requires "school safety plans to be updated every three years or whenever a major modification to the school building necessitates changes in the plan's procedures." Additionally, the legislation requires the principal or director of any school or preschool (both public and private) to conduct a school safety drill once each school year. The drill must instruct students of the procedures they will follow should the school need to secure them in the building rather than evacuate them.

Many schools had crisis plans in place. However, just as many had never used them in an actual crisis and, therefore, could not predict how the plan would work in a real-life emergency. HB 422 requires, at the very least, that schools conduct a crisis plan drill once every school year. Much like a fire or tornado

Ohio

drill, a crisis plan drill helps administrators, teachers and students become familiar with the proper procedures to take in the event of an actual emergency. Ohio's public schools must conduct an annual safety drill by Dec. 1 of each school year.

So, what should you include in your plan? Unfortunately schools must be prepared to take on a host of potential problems, including:

- Medical crises (e.g., food poisoning, drug overdose, homicide, etc.);
- Facilities emergency (e.g., fire, bomb threats, etc.);
- Student crises (unauthorized removal of a student, runaway situation, etc.).

Remember, each of the potential problems mentioned above requires a unique approach and response from the school and its personnel. The first priority of any plan should be to protect the health and well-being of students, faculty and staff. A district-wide crisis plan is vital and necessary. However, each school in the district should have an individualized plan that considers its unique conditions and characteristics.

Any plan should also designate school personnel into various roles in the event of a crisis, including:

- School incident commander;
- Liaison officer;
- Media officer;
- Safety officer;
- Operations officer;
- Logistics officer;
- Scribe team leader;
- Medical disaster response team leader;
- Student care team leader;
- Student accountability coordinator.

The plan should include the correct spelling of each person's name and his or her location in the building. Also, include work and personal phone numbers.

Group activity

Have the group review and discuss the key aspects of your school's safety/crisis plan. Discuss areas of weakness considering potential emergency situations mentioned above. List potential areas for improvement and discuss ways to expand or update your crisis plan.

Conclusion

It is almost impossible for a school's safety/crisis plan to cover every potential crisis. However, periodically assessing your school's changing needs will keep your plan current and relevant. Remember, state law requires schools to update their written crisis plan at least every three years.

Don't delay, because a crisis can happen at any moment. Good intentions won't help you in a real-life emergency. Having a tested safety/crisis plan is the best way to prepare for the worst scenarios.

Bill Wilcox is the safety coordinator for the Ohio School Boards Association.

Asbestos awareness

By Sharon Roney

Before you begin

Note: This lesson provides an overview of asbestos awareness. It doesn't replace the asbestos awareness training required under the Occupational Safety & Health Administration's (OSHA's) 29CFR 1910.1001(j)(7)(iv).

Review blueprints and specification sheets for the building(s) in question. Determine the age of the building(s). Obtain copies of any asbestos surveys and/or abatement reports. Provide a list of any known asbestos-containing materials in the building(s). If no survey exists, be prepared to identify questionable materials that you should leave undisturbed until examined (i.e., samples are obtained).



Introduction

Asbestos is a naturally occurring fibrous mineral mined throughout the world since 1890. There are several types of asbestos, including chrysotile, crocidolite, amosite, tremolite, actinolite and anthophyllite. Chrysotile, which has a curly fiber, is most commonly found in building products. The other types are found in more specialized applications and have straight fibers.

Builders have used asbestos since the beginning of the 20th century because of its physical properties of soundproofing, chemical resistance, strength and fireproofing. Materials such as plaster, window caulk, pre-formed pipe insulation, floor tile, ceiling tile, adhesives, paper products, paints and coatings can contain varying concentrations of asbestos. These materials range from those that can crumble using hand pressure (friable), such as sprayed-on fireproofing, to those that are very hard (non-friable), such as building siding.

The following list, compiled by the U.S. Environmental Protection Agency (EPA), includes potential asbestos-containing materials.

- Asbestos-cement sheets, pipe and shingles
- Roof coatings and roofing felt
- Flooring felt
- Pipeline wrap
- Asbestos clothing
- Vinyl/asbestos floor tile
- Automatic transmission components
- Clutch facings
- Disc brake pads
- Drum brake linings and brake blocks
- Commercial and industrial asbestos friction products
- Sheet and beater-add gaskets (except specialty industrial)
- Commercial, corrugated and specialty paper
- Millboard

Ohio

In the late 1970s, the U.S. Consumer Product Safety Commission banned the use of asbestos in wall-board patching compounds and gas fireplaces. In 1989, the U.S. EPA banned most asbestos-containing products. This rule was overturned in 1991. Currently, there are a few specific banned materials; they include flooring felt, rollboard, and corrugated commercial or specialty paper. Use of asbestos in products that did not historically contain asbestos is also banned.

Asbestos is a known human carcinogen. People can inhale asbestos fibers into the lungs. From there, they can travel to the alveoli (small sacs at the very end of the airways) and become lodged. These fibers damage the lungs, creating scar tissue, which can lead to a condition known as asbestosis.

Asbestosis is primarily associated with individuals working in industries that formerly used asbestos in large quantities (e.g., shipbuilding). The likelihood of a worker contracting asbestosis increases with greater exposure to asbestos fibers. X-rays can detect this condition by revealing the scar tissue (plaques) in the lungs. Lung cancer and mesothelioma (a cancer of the lungs' linings) are also associated with exposure to asbestos. Mesothelioma may not show up until many years after asbestos exposure.

Regulations

There are federal EPA and Ohio Department of Health regulations covering asbestos-containing materials. These regulations generally define asbestos-containing materials as those containing more than 1 percent asbestos. Regulations primarily focus on the removal of materials and prevention of contamination during removal activities. The Ohio Department of Health certifies workers who inspect buildings for asbestos and those who remove asbestos. To be a certified inspector, these workers must attend approved training classes.

You can find OSHA regulations in the asbestos standard for general industry (1910.1001). There are also regulations for the construction industry and shipyards. The general industry regulation says to presume installed thermal system insulation as well as sprayed-on and troweled-on surfacing materials found in buildings constructed no later than 1980 are asbestos-containing materials (PACM). You do not need to presume this if samples have proven they are asbestos containing (ACM) or non-asbestos containing. Building owners must:

- Inform other employers and their own employees who will perform housekeeping activities of the presence and location of such materials;
- Post signs at entrances to mechanical rooms/ areas that contain ACM/PACM;

- Identify previously installed ACM/PACM with labels or signs;
- Provide an asbestos awareness training course to employees who will perform house-keeping activities in an area containing ACM or PACM.

Issues

You can't identify asbestos-containing materials with the naked eye. Experienced inspectors can identify suspected materials. However, they must confirm their findings via laboratory analysis. Workers should not disturb, move or clean up damaged building materials that could contain asbestos. These materials include:

- Hard pipe insulation that looks like plaster;
- Corrugated paper pipe insulation;
- Sprayed-on insulation;
- Hard wall plaster;
- Ceiling tiles (12" x 12" or smaller);
- Crumbled floor tiles;
- Vermiculite.

Report any of the previously mentioned items to a supervisor or other designated person. If you see someone cutting, sanding or otherwise damaging these materials, stop them and ask if the material has been identified as non-asbestos. Remember, asbestos fibers can be in the air even if visible dust is not present.

References

OSHA: Safety and Health Topics – Asbestos
<http://www.osha.gov/SLTC/asbestos/index.html>

National Institute for Occupational Safety and Health – Safety and Health Topic: Asbestos
<http://www.cdc.gov/niosh/topics/asbestos/>

U.S. EPA – Asbestos
<http://www.epa.gov/asbestos/index.html>

Ohio Department of Health – Asbestos
<http://www.odh.ohio.gov/odhPrograms/dspc/asbes1/asbestos1.aspx>

National Institutes of Health – Asbestos/Asbestosis
<http://health.nih.gov/topic/AsbestosAsbestosis>

Sharon Roney is a librarian for BWC's Division of Safety & Hygiene. Before joining BWC, she worked in environmental consulting for 15 years.

Protecting older workers

By Mike Lampl

Introduction

Older individuals are the fastest-growing age group in the U.S. For the purposes of this discussion, this means individuals 50 years old or older. Due to good health, a desire to remain active or financial circumstances, many individuals in this age group will choose or will need to remain employed.

The safety tips below come from a joint study by BWC and the University of Cincinnati, as well as input from BWC safety consultants.

Discussion

Ask the group to discuss the benefits of an older work force? How old is old? Have fun. Discuss the tips in the column to the right with employees and seek suggestions that could make the workplace safer for workers of any age. If you are meeting with managers, discuss the design tips and work on an action plan to implement them.



Reaction time

As people age, reaction time frequently decreases. Therefore, older workers may not react as quickly in a hazardous situation; this may include operating machinery, particularly if they are not familiar with the equipment.

Tips

- Encourage older workers to get regular vision exams to identify any problems and the ways to correct them.
- Older workers need sufficient lighting. It's best to have nearly uniform lighting throughout the workplace. Design gradual transition zones between areas of low and high lighting.
- Place signage in places easily seen, and avoid distractions and cluttering.
- Minimize sources of background noise.
- Avoid environments that create echoes.
- Ensure equipment warning devices are loud, operational and recognizable.

Balance

Older individuals can suffer from decreased balance due to aging, development of medical conditions or the effect of medications used to treat other conditions. The rate and extent of these changes vary from person to person. With aging, the physiological systems that play a key role in maintaining balance may become impaired (e.g., vision, muscle tone, inner ear and nervous system).

Tips

- Keep walking surfaces free of contaminants such as water, oil and ice.
- Provide handrails on inclines or stairs.
- Keep one hand on a handrail when carrying items up and down stairs and ramps.
- Wear slip-resistant and low-heeled shoes that fully support your feet.
- Maintain a regular exercise program.

Ohio

Respiratory system – breathe easy

Cardiovascular respiratory function, which is associated with maximum exercise levels, declines 15 percent to 25 percent from age 20 to age 65. Oxygen consumption sharply declines after the age of 50, which makes intense physical activity more difficult for older individuals.

Tips

- Due to reduced capacity and stress from temperature extremes, be cautious or avoid strenuous work in hot/humid environments or cold environments.
- If an environment is hot, take precautions to avoid dehydration. Drink plenty of water and other fluids that do not contain caffeine.
- Be cautious with physically demanding work, particularly if the individual does not routinely perform such work.
- Encourage self-paced rather than machine-paced work.
- Ensure employees take breaks.

Musculoskeletal system

Data from the U.S. Bureau of Labor Statistics shows back injuries are the most common occupational injuries and illnesses, with upper extremity and lower extremity injuries close behind. High repetition and sustained loading associated with prolonged standing and/or walking can harm an aging musculoskeletal system. People feel the effects of skeletal aging mainly in their knees, fingers, hips and spinal column.

Tips

- When increased efforts are needed, use a mechanical aid or get help from others.
- Organize the workstation to avoid lifting or reaching above shoulder level.
- Avoid repetitive tasks; incorporate job rotations if possible.
- Avoid prolonged standing. If prolonged standing is necessary, provide workers with anti-fatigue mats.
- Older workers can usually work just as fast as their younger colleagues with the proper job design. Provide a sufficient spacious workstation so employees can perform the task in alternating postures and locations. Provide tools that prevent extreme postures or having to work in a bent-over position. This places extreme demand on the joints.

Vision care

Reduced visual perception, particularly near vision, can make it difficult for older workers to perform tasks at a close range. Corrective lenses may improve near vision, but they can also increase glare. Increased glare poses a problem for detecting or reacting to potential harmful events, particularly in dimly lit areas.

Tips

- Improve contrast between objects by increasing lighting.
- Reduce glare by using shades and awnings for windows, diffusers for light sources, indirect lighting, or a larger number of low power and adjustable light sources.
- Keep workers from frequently crossing between dim areas to brightly lit areas.
- Avoid shades of blue, blue on green or blue on black in the work environment; it's difficult for older workers to differentiate these colors.
- Place signs in places that are easily seen, and avoid distractions and cluttering.

Hearing

We can expect gradual loss of hearing as we age. This loss may be imperceptible, but it does make it more challenging for older workers to discern specific sounds when they are in noisy rooms. Some older workers may have more profound hearing loss, which may place them at risk if they can't hear warning devices in the workplace.

Tips

- Minimize machine, air conditioning and other sources of background noise.
- Use sound-absorbing construction material.
- Avoid room designs that create echoes.

Reference

<http://www.ohiobwc.com/employer/brochureware/olderworkers/>

Mike Lampl is a certified professional ergonomist. He is the acting ergonomics technical advisor for BWC's Division of Safety & Hgiene. He has 15 years of safety and health experience in private industry and at BWC. Mike also is a member of the planning committee for the Applied Ergonomics Conference sponsored by the Institute of Industrial Engineers.

Safety management systems

By Bruce Loughner

Before you begin

Study your organization's safety practices. Find out if your organization has a documented safety management system (SMS) in place. If you do not have a SMS, the following points can help you get started.

Introduction

A SMS is an integrated, documented process that outlines how an organization intends to develop and meet its safety objectives. A SMS should capture the full breadth of your safety efforts. However, it does not contain the details for implementing each safety objective. Instead, supporting documents and programs, many of which may already exist in your organization maintain those details.



The value of a SMS is that it provides:

- A comprehensive view of the safety effort;
- A linkage among different essential elements;
- A means of keeping the organization on track and moving in the same direction;
- A consistent method of managing and improving the safety efforts.

Your SMS is a map for achieving safety excellence. It must be a journey you and your organization are willing to take and are capable of making. You should tailor a SMS to meet your organization's specific needs. Merely adopting someone else's system invites a poor fit.

Discussion

Gather a group to discuss the creation of a SMS for your organization. First, there must be a consensus decision that a SMS is appropriate. For a SMS to be effective, your organization must be willing to bring all safety efforts under one umbrella and use it to drive safety improvements. One of the primary benefits of a documented system is that it keeps everyone moving in the same direction. If the consensus has not yet developed, a system approach will not be effective.

Second, the self-assessment process should be well under way for a clear picture of where the organization wants to go. The SMS provides the documented framework of your efforts. However, the vision of your destination comes from the self-assessment process. Only when this is clear are you ready to create a SMS.

Ohio

Next, you should examine existing policies and programs to determine where they fit within the organization's essential elements. Use the self-assessment to identify missing or weak policies, procedures and programs that need reinforcement or development.

Finally, install a departmental and organizational discipline to use the SMS once you complete it. You can achieve this by implementing an accountability system that starts at the top management level and continues down to the supervisor level. Be sure this commitment and leadership is in place before you begin.

Group activity

Have the group consider and discuss the items below needed for developing and implementing a SMS.

1. Determine the makeup of a multidisciplinary team with experience in operations, engineering, administration, and safety and health.
2. Develop plans to design and implement program elements that have been identified as weaknesses or gaps.
3. Identify measures to track progress toward total implementation.
4. Determine how to conduct periodic reassessments of the SMS to identify opportunities for improved performance.
5. Identify action steps for achieving a functional SMS.

Bruce Loughner is a safety project manager for BWC's Division of Safety and Hygiene. He has 20 years of safety and health experience in both general industry and construction safety. He holds a bachelor's degree in industrial safety from Indiana University of Pennsylvania.

Using the Internet to find safety information

By Karen Jensen

Introduction

As you use the *Safety Leader's Discussion Guide* throughout the year, you may find you know some topics better than others. Before presenting a topic to your group, you may want to brush up on it with additional information. The Internet is a great source of information. But where do you start? Below are pointers to help you find what you're looking for.

Three sites to get you started

These Web sites offer a variety of workplace safety and health information. They may be all you need.

www.osha.gov

The Occupational Safety and Health Administration (OSHA) Web site is an excellent place to check first, especially if OSHA has a standard or rule on a particular topic. If you want more information on hazard communication or bloodborne pathogens or lockout/tagout, OSHA is an authoritative source. The best way to navigate the site is to use the index across the top of the home page. Select the first letter of the topic, for example H for hazard communication, and you will gain access to a plethora of information on your selected topic.

www.cdc.gov/niosh

Like OSHA, the National Institute for Occupational Safety and Health (NIOSH) is a federal government agency. However, instead of issuing standards, NIOSH conducts research. You can navigate the site by using the handy index on the home page, or via the yellow tabs found above the index. NIOSH is especially strong on information about workplace health issues.

www.ohiobwc.com

From BWC's home page, select Safety services to access a variety of tools and resources, including publications, lifting guidelines, ergonomics information and training materials. There are also links to other Web sites on occupational safety and health, disaster planning and ergonomics.



Ohio

Where to find additional information

You can find more occupational safety and health information via lists or directories that organizations or individuals have compiled. On BWC's Web site (see above), you'll find links to many safety- and health-related sites in the Safety services section under On-line tools and resources. Below are other sources for workplace safety and health information.

<http://www.ccohs.ca/oshlinks/region/united-states.html>

The Canadian Centre for Occupational Health and Safety provides an extensive directory of Internet sites called OSH Links. While most of the sites in the directory are Canadian, this particular Web page lists more than 125 U.S. sites.

<http://www.croetweb.com>

CROETweb.com is an occupational safety and health resource directory sponsored by the Center for Research on Occupational and Environmental Toxicology (CROET) at Oregon Health & Science University in Portland, Ore.

<http://www.osh.net>

Osh.Net is an Internet gateway for occupational health and safety resources and information.

Improving your Internet searches

Here are suggestions on how to improve Internet searches.

Search terms: The search terms we use can help refine a search. If you're not getting what you're looking for, try thinking about other terms you can use. Instead of "forklift," for example, try "powered industrial truck," or "lift truck."

Advanced search: Most search functions have an advanced search option. If you use a particular search engine regularly, learn how to use its advanced search. It will help you narrow your searches by giving you the ability to use phrases and limit by format and domain. A search for the phrase "power press" will be more precise than a search for "power" and "press" as separate terms. With advanced search, you can specify you want a PowerPoint presentation on your topic. If you want to avoid commercial sites, you can limit your search to only government and/or university sites.

BWC's Division of Safety & Hygiene libraries

If you've spent about 20 minutes or more searching for information and still haven't found what you're looking for, you can call BWC's librarians for assistance. They can help you refine your search, suggest appropriate sites or e-mail you links to Web pages that will answer your questions. You can reach the BWC librarians by calling 1-800-OHIOBWC and following the prompts.

Karen Jensen has been a librarian with BWC's Division of Safety & Hygiene libraries since 1986. She assists internal and external customers who have information inquiries, primarily on the subject of occupational safety and health. She also is responsible for adding new titles to BWC's video library.

ohiobwc.com

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