

LET'S TALK SAFETY

2012

52 Talks on
Common Utility
Safety Practices for
Water Professionals



American Water Works
Association

The Authoritative Resource on Safe Water®

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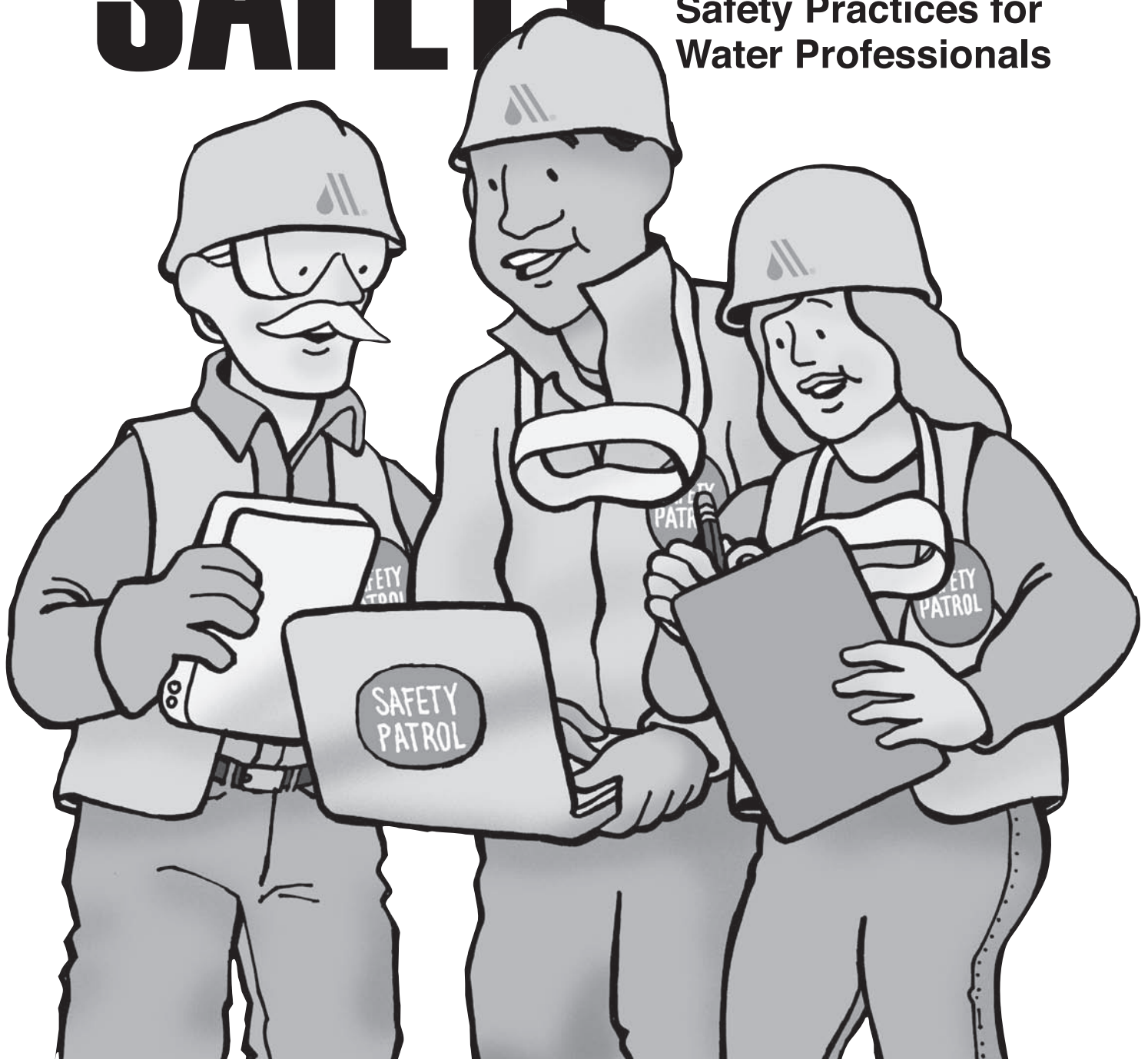
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LET'S TALK **2012**

SAFETY

52 Talks on
Common Utility
Safety Practices for
Water Professionals



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About *Let's Talk Safety*

The American Water Works Association is pleased to provide you with this 2012 edition of *Let's Talk Safety*. Contributing editor Charles Basham and AWWA staff have reviewed, updated, and edited the discussion topics to ensure they continue to be current, pertinent, and beneficial to you and your employees. Web site addresses at the end of every article allow you and your staff to conduct deeper research into particular safety topics. New this year, where the disc icon  appears, a corresponding video clip is available on *Let's Talk Safety 2012: Enhanced DVD/CD* (#10125), available through the AWWA Bookstore at awwa.org/store.

There are also repeat articles from previous editions. Many AWWA members and *Let's Talk Safety* subscribers have asked that specific articles be updated and repeated every year. Certain safety topics remain extremely important and warrant regular discussions.

We have timed the weekly placement of certain topics to coincide with national awareness efforts like National Electric Safety Month. We hope you use these opportunities to leverage the importance of a particular safety topic by tying it to a national campaign.

How to Use *Let's Talk Safety*

We are all seeking an injury-free work environment. Our universal goal is to have every employee, every day, return home to his or her family uninjured. We believe that the first step to not being injured is knowing that you can be injured. *Let's Talk Safety* is designed to help you build awareness of potential work hazards and provide safety practices that help mitigate those hazards. Talking to your employees about their safety and listening to their safety concerns and experiences are the foundation to building an effective safety culture. This book will help you open up important safety dialogues and give you common starting points for discussion. You may also want to consider placing these articles in your employee safety publications.

Here's how you can make your safety meetings more interesting, engaging, and effective:

- Cover only one safety topic in a meeting. Employees can easily lose focus when too many topics are discussed.
- Ensure the discussion topic is pertinent to the participants. AWWA *Let's Talk Safety* covers topics in a generic manner, and a particular talk may not apply to every workplace and every work situation. Be creative and use a topic presented here and relate it to your work group's particular safety issue or concern.
- Involve the employees in the meeting. You may want to appoint a different employee each week to lead the discussion. Ask questions and ask for personal examples of near misses and hazardous situations.
- Don't let a safety meeting become a complaint session—especially if it's not about safety! Acknowledge the complaint and let the workers know it will be addressed afterward. Keep the focus on the safety topic at hand.
- Chalkboards, charts, DVDs, and other interactive materials will all help keep the topics interesting and engaging. Change up the meetings occasionally by bringing in the tools or personal protective equipment being discussed. When talking about large equipment, hold the meeting in the yard and use the specific equipment as the backdrop. Occasionally invite guest speakers who are experts in a particular subject.
- Conduct your meetings early in the week so the employees have a chance to practice what they hear.
- Use the “Additional Notes” space we've included at the end of most topics to add personal observations and to jot down specific incidents or experiences you want to discuss. Avoid embarrassing a particular employee by pointing that person out as an example of what not to do. Speak in generalities if possible.
- Pass out copies of the *Let's Talk Safety* briefing each week.

The safety awareness information presented in this book is designed to help your utility workers develop a greater safety awareness of potential job hazards and help them make informed, mitigating decisions. The information contained in *Let's Talk Safety* provides only general safety awareness guidelines related to the many aspects of working in the water utility industry. This compendium is not comprehensive and does not cover every potential aspect of a safety issue a typical water utility worker may encounter.

The safety articles are not intended, nor should they be considered, as a substitute for more comprehensive and formal safety training courses and certification programs that provide greater detail and explanation.

For employees to do their jobs effectively and safely, they must be responsible for learning and understanding the safety rules and regulations that apply to their

particular occupation. Health and safety regulations and requirements mandated by the federal, state, and provincial governments, as well as by your company's established policies and regulations, need to be consulted before any work begins.

Each article provides a reference for Web-based information that can provide additional information as well as possible updates or changes to safety regulations. Also review the extensive AWWA safety DVDs that can be purchased to augment safety awareness training. Refer to the back of this book for a list of DVDs and other products that are available.

Acknowledgments

This 2012 edition of *Let's Talk Safety* has been revised and updated. Contributing editor Charles Basham, a corporate and utility safety professional, is past president of Utility Communicators International and has written extensively about utility safety for more than three decades.

Reviewers who contributed to this edition include

Mike Jacobs, Tualatin Valley Water District (Ore.); AWWA Health, Safety and Environment Committee (chair)

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ABCs of Work Safety: Awareness, Background, and Caution

Knowing that you can be hurt is the first step toward not getting hurt! Simply put, workplace and home accidents and injuries are 100 percent preventable. An easy way to prevent accidents is to live and work by three important safeguards: Awareness, Background, and Caution. These are the “ABCs of safety.”

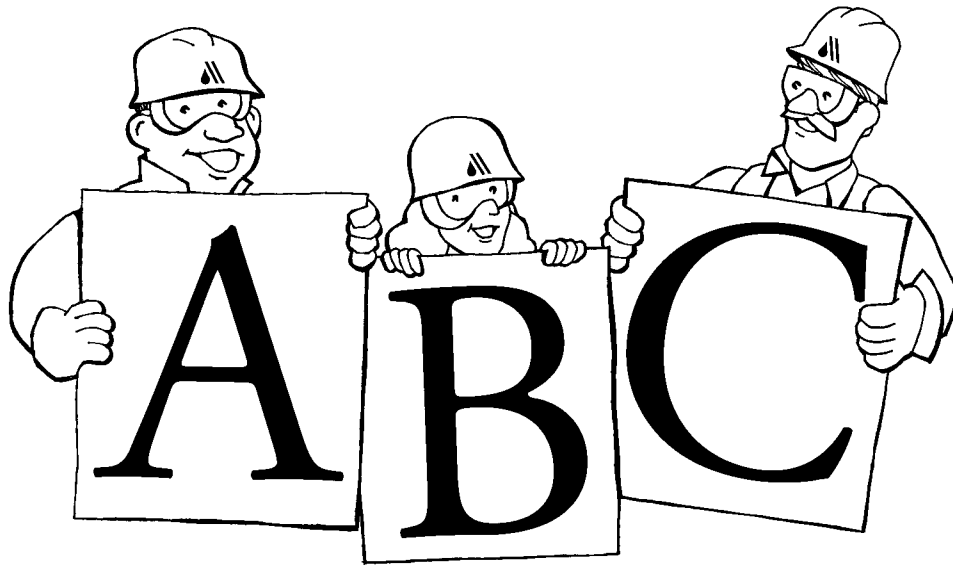
The ABCs will help identify most hazards you might typically encounter while at work, at home, or even at play. Applying these terms can help create an atmosphere of safety *before* you start a task . . . because *after* an accident, it’s too late for anything but second guessing.

Awareness. Constant awareness is critical. It’s the “Watch out!” part of the ABCs. Awareness means applying and using your knowledge and common sense to recognize and avoid safety hazards before an accident occurs. At a jobsite, be continually aware not only of the hazards you face but also of those faced by your co-workers. If you see a hazardous situation (perhaps something as simple as someone is not wearing the proper personal protective equipment [PPE], stop the work immediately and speak up! You have the right to stop the work and express your concerns about an unsafe and hazardous situation.

Background. Your years of on-the-job work experience, your training, and your education are all key ingredients to a formula for working safely. You can use that wisdom and knowledge to enhance your company’s safe work procedures. Unfortunately, many experienced trade workers have learned to take safety shortcuts to save time. Eventually, many of these shortcuts lead to catastrophic injuries or they are passed on to others as the right way to do the work.

Caution. Caution is a level of awareness in which “a bell goes off in your head.” Often an accident victim will say, “I knew that was going to happen.” A tempting response is “If you knew it was going to happen, why didn’t you do or say something to prevent it?”

Properly trained and safety-conscious workers shouldn’t be afraid to speak up when confronted with a dangerous situation. They should do whatever is necessary to prevent an accident.



Conduct a Regular Workplace Safety Checkup

While personal safety vigilance is an essential part of your day-to-day activity, it's also helpful to regularly conduct a safety review. The following checklist will help you get started, but you may choose to add more of your own safety tasks that pertain specifically to your worksite and your company policies:

Yes	No	
-----	----	--

- | | | |
|--------------------------|--------------------------|---|
| ☐ | ☐ | Do employees know how to properly use their safety equipment? |
| ☐ | ☐ | Are spill kits and battery safety boards displayed in the battery rooms?
Are employees trained and advised in these procedures? |
| ☐ | ☐ | Have fire extinguishers been inspected annually by a certified person? |
| ☐ | ☐ | Have employees been trained in fire extinguisher use in the last year? |
| ☐ | ☐ | Are fire extinguishers and first-aid kits accessible and ready for use? |
| ☐ | ☐ | Are hearing protection, safety glasses and goggles, hard hats, reflective safety vests, work gloves, work boots, and other personal protective equipment available and in good condition? |
| ☐ | ☐ | Are floors, stairs, and handrails in good condition? |
| ☐ | ☐ | Are exits properly marked, lighted, and clear of obstructions? |
| ☐ | ☐ | Have employees been trained in first aid and CPR (certificates current)? |

Yes No

- | | | |
|--------------------------|--------------------------|---|
| ☐ | ☐ | Are building sprinkler systems inspected annually (by an outside source)? |
| ☐ | ☐ | Have employees received required annual training such as hazard communication, bloodborne pathogens, and so on, in the last year? |
| ☐ | ☐ | Are hand tools and ladders in good condition and inspected regularly? |
| ☐ | ☐ | Do any power tools have frayed cords or other defects? |
| ☐ | ☐ | Are extension cords in good condition and properly rated for the load? |
| ☐ | ☐ | Make certain extension cords are not used in place of permanent wiring (watch for trip hazards!). |
| ☐ | ☐ | Are flammable liquids stored in containers that are marked with the type of liquid they contain and are containers self-closing and self-venting? |
| ☐ | ☐ | Are emergency evacuation procedures posted and emergency phone numbers posted? |
| ☐ | ☐ | Do all employees have accident-reporting packets? |
| ☐ | ☐ | Are annual eye exams (optic laser) completed on designated employees? |

If you checked “no” to any of these questions, take the time to correct those items and stay safe.

For more information go to: www.nsc.org

Additional Notes

Temperature Extremes Can Be Deadly

Fresh air and beautiful scenery are often considered the benefits of working outdoors. But when it gets extremely cold or hot outside, the idea of an indoor job may seem more comfortable. However, temperature extremes are much more than a matter of comfort. They can also bring on health hazards with deadly consequences. It's important that you and your co-workers know how to recognize the symptoms of hypothermia, frostbite, and heat-related illnesses, and know how to respond to the effects.

Winter: Hypothermia and Frostbite

Hypothermia is a life-threatening condition that occurs when the body core loses heat faster than it can be generated. The early symptoms include uncontrollable shivering, impaired or slurred speech, and awkward or clumsy body movements. As the body temperature continues to drop, nausea, apathy, confusion, and lethargy can also occur. Often a severely affected victim will lie down, fall asleep, or lose consciousness. The final stages can result in coma and death.

If you identify any of the above symptoms in yourself or someone you are working with, take the following steps immediately:

- Get the victim to a warm location that is sheltered from the wind.
- Remove all wet clothing and anything that might restrict circulation. Cover the victim with warm, dry clothing or blankets. Also be sure to cover the victim's head.
- Rewarming should be started by applying warm compresses to the chest, neck, and groin. If necessary, body-to-body contact can be used as a first-aid measure. This passive rewarming approach may be all that is required for a conscious person who is shivering. Hot water and direct heat should never be applied!

If the victim does not respond and the symptoms become progressively worse:

- Call 911 immediately in accordance with your emergency plans.

- Monitor the victim's breathing and start CPR if it becomes dangerously slow or stops.
- Keep the victim immobile until medical help arrives.

Frostbite

Frostbite occurs when the fluids and underlying soft tissue of the skin freeze. It is typically accelerated by wind and humidity. This means that although the temperature is above 32°F (0°C), the skin may still freeze because of a windchill factor.

The most commonly affected areas are the nose, cheeks, ears, fingers, and toes. Symptoms of frostbite include gray or yellowish patches of skin. The affected part(s) are usually numb but feel cold. Pain is sometimes felt early but later disappears. The skin remains soft and flexible, but after it thaws, it becomes red and flaky.

If the frostbite is severe (deep), the skin is generally waxy and pale, which on thawing may turn blue or purple. Large blisters may also appear.

First aid for frostbite includes bringing the victim indoors and providing warm non-alcoholic beverages. Warm the frozen area by immersing it in warm water (not hot!) or wrapping it in blankets or clean clothing. Do not rub the affected area; that can lead to gangrene. Obtain medical assistance as soon as possible.

Summer: Heat-Related Illnesses

When your body heats up faster than it can cool itself, mild to severe illnesses may develop. Air temperature, humidity, and clothing can increase the risk of developing heat illnesses. Age, gender, weight, physical fitness, nutrition, alcohol or drug use, or pre-existing diseases, like diabetes, can also increase the risk.

Knowing how to recognize the early symptoms of heat illnesses and knowing how to prevent, control, and respond to the effects can help make everyone's job safer.

How to help prevent or control heat illnesses:

- Drink about a cup of cool water every 15–20 minutes. Avoid caffeine, sugary drinks, and alcohol. Use sports drinks in moderation.
- Limit exposure time to the heat; schedule hot jobs for cooler times of the day. Take frequent rest breaks in cool areas.
- Gradually adapt yourself to the heat. It takes up to 10 days for your body to adapt to high heat.
- Slow your pace and try to mechanize heavy jobs.
- Wear loose, lightweight clothing and a hat, and protect exposed skin.
- Do not use salt tablets.

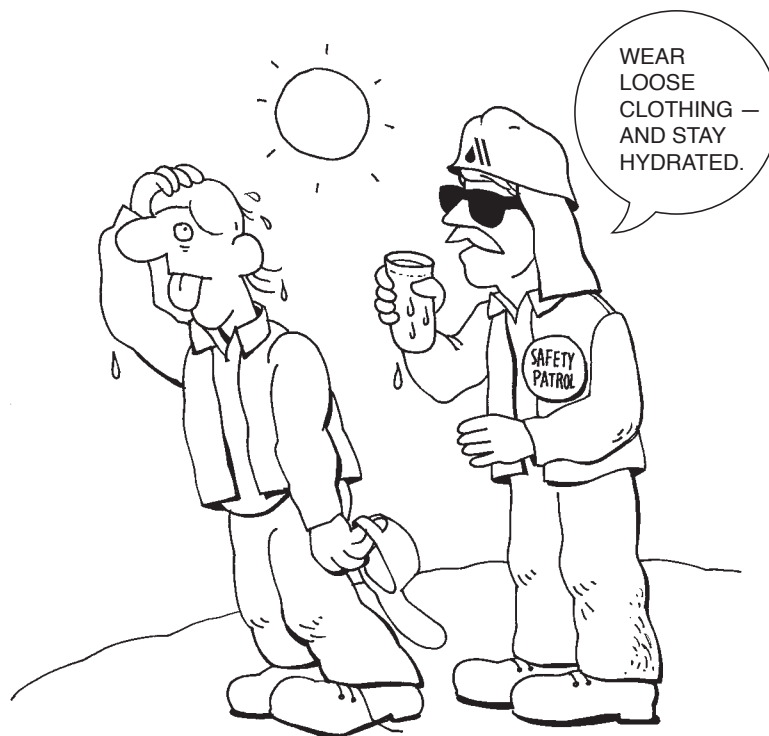
Strenuous activity can lead to a skin rash, stomach cramps, fatigue, or dizziness. If this happens, the victim needs to immediately seek rest in a cool shady place, drink lots of water, and repeatedly wet and dry the skin.

If the symptoms increase to excessive sweating; cold, moist, pale, or flushed skin; thirst; extreme fatigue; headache; nausea; or a rapid pulse; the victim may be experiencing heat exhaustion. The victim should immediately lie down in a cool, shaded place and sip lots of cool water until the symptoms disappear. If the symptoms worsen or the victim becomes unconscious, immediately get medical help according to the emergency procedures specified in the Emergency Action Plan designated for your work location and your business unit.

Severe heat illness can lead to a heat stroke, which can be fatal or lead to permanent brain damage if the victim does not receive immediate medical treatment. Unfortunately there's little warning when a victim reaches this crisis stage.

If a victim's skin becomes hot, dry, red, or spotted, and they experience confusion, delirium, convulsions, or slip into unconsciousness, the person is likely experiencing a heat stroke and urgently needs medical help. While waiting for that help to arrive, loosen the victim's clothing and pour water over the entire body. Never try to force an unconscious victim to drink water.

For more information go to: www.statefundca.com; www.bt.cdc.gov



What You Don't Know About Radon Can Kill You!

Radon is a radioactive gas formed by the natural decay of uranium in rock, soil, and water.

It's colorless, odorless, tasteless, and chemically inert. There's no way of telling if it is present, or how much is present, unless you specifically test for it. So why is this invisible gas a safety concern? Because, according to the Surgeon General of the United States, radon is the second leading cause of lung cancer in the country. It actually doubles the risk of getting lung cancer in someone who smokes cigarettes.

Extremely minute quantities of uranium occur widely in many types of rock and soil, and radon is found in all 50 states. The real risk from radon is derived from its products of natural radioactive decay, as damaging ionizing radiation in the form of alpha particles and other "daughter products" can be emitted.

The term *radon* usually is used in its broadest sense, referring to the gas itself and its decay products.

Radon exposure is typically an indoor air problem. Radon and other gases in the rock or soil below a building rise and eventually force themselves into the building through extremely small cracks and pores in the foundation, floors, or walls.

Once inside, the gases are trapped and can become concentrated, eventually reaching hazardous levels.

The areas of greatest risk of exposure are basements, unvented crawl spaces, and small confined spaces on the lower floors of a house or commercial building. These areas are closest to the source of the radon (the soil or rock) and may not be well ventilated.

Adverse Health Effects

The alpha particles and other daughter products formed when radon decays can be inhaled and become trapped in your lungs. As these particles decay even further, harmful ionizing radiation is released that can damage lung tissue and possibly lead to lung cancer. However, not everyone who is exposed to radon will develop cancer.

There are no immediate observable short-term effects of radon exposure, such as coughing, shortness of breath, or mouth and throat irritation. Radon can only be detected by testing.

If you smoke cigarettes and are exposed to radon gas, your risk of developing lung cancer is especially high. But if you quit smoking and lower your potential exposure to radon, you can significantly reduce your cancer risk.

Testing for Radon

Contact the National Safety Council at its Radon Hotline, 1-800-767-7236, to order a brochure with information on low-cost short-term test kits. Many major hardware stores also carry test kits.

The one-time test kits are easy to use. Most are opened and left on the building's lowest lived-in level for 2 to 90 days, depending on the device, and then the exposed kit is returned to a specified laboratory for analysis. The results will be mailed directly to you. But, if you don't feel comfortable conducting your own radon tests, many qualified professionals will conduct tests for a fee. Contact your state radon office or state air quality control program for more information about licensed testing companies.

If elevated or potentially hazardous radon levels are detected, there are many mitigation measures that can be taken to reduce exposure. The exact methods used will depend on the level of the gas and the design of the building. Some techniques are directed toward preventing radon from entering a building in the first place. Others are designed to reduce, by ventilation, the concentration of radon once it's in a structure.

Many states certify or license radon contractors. Again, contact your state radon office for more information on testing, mitigation contractors, or other information regarding radon gas.

For more information go to: <http://www.epa.gov/radon/>

Additional Notes

Job Hazard Analysis: An Important Tool for Identifying and Reducing Hazards

A job hazard analysis (JHA) is a safety evaluation process. Many companies, both large and small, have successfully used a JHA to identify potential dangers of specific tasks in order to reduce the risk of injury to workers.

It takes a little time to do a proper JHA, but it's time well spent. Be sure to involve the employees in the process—they perform the work and often know the best ways to work more safely.

How to Conduct a JHA

- Start by talking to your employees. Tell them what you are doing and why. Explain that you are studying the safety of the work tasks they perform and not their work performance.
- Review your company's accident/injury/illness/near-miss history to determine which jobs pose the highest risk.
- Identify the Occupational Safety and Health Administration (OSHA) standards that apply to your jobs and incorporate the OSHA requirements into the JHA.
- Evaluate jobs where you have identified violations of OSHA standards and/or company safety procedures.
- List the jobs having the greatest potential to cause serious injuries or illness, even if there is no history of such problems.
- Make a note of the jobs in which a simple mistake could lead to severe injury.
- Evaluate jobs that are new or have been changed and those jobs that are so complex they require written instructions.

Break the job task into steps:

- Watch each worker perform his or her job in a routine manner. List each step of each task in the order in which it takes place.

- Begin each step with a verb; for example, “Turn on the saw.”
- Do not make it too broad or too detailed.
- You may want to photograph or videotape each step for further analysis.
- Review the steps with all the workers who do the same job to make sure nothing’s been left out.

Identify the hazards of each step and ask:

- What can go wrong?
- What are the consequences?
- How could an accident happen?
- Are there other contributing factors? The weather, seasonal workload, or new construction are examples.
- How likely is it that a hazard will occur?

Review the List of Hazards With Employees

Your employees can provide a tremendous amount of information. Take the time to talk to them—and be sure to listen! Asking for their honest input will engage them in the process and lead to a higher level of safety awareness. You will likely hear several practical ways they believe the job hazards and job processes affecting them can be eliminated or at least reduced.

Describe the Ways to Eliminate or Reduce the Safety Hazards

You’ve evaluated the findings in your analysis and concluded there’s a safer way to do the job. Now your work begins. In your JHA you’ll need to:

- First, make any changes to the equipment, tools, or engineering controls to eliminate a hazard. This might include adding machine guards, improving lighting, or having better ventilation.
- Change the work processes.
- Change the administrative controls or make changes in how the task is done if engineering controls aren’t possible. Perhaps you could rotate jobs, change the steps in the process, or provide additional training.
- When engineering and administrative controls aren’t possible or don’t adequately protect the workers, make additions and changes in the required personal protective equipment.

Implementing Your JHA Changes

- To complete the JHA, you'll need to correct all unsafe conditions and processes. The resulting changes may require additional training for your employees. Make sure they understand the changes and the reasons behind those changes.
- Periodically review the JHA. You may find hazards you missed before. Update and review the document when the task or process changes or when injuries or a close call occur when performing the recommended task.

You'll find your JHA to be a valuable tool. Not only will it help to reduce worker injuries, but also it's a document you can use for training purposes. It can also serve as a reference tool in the event of an accident investigation.

For additional information go to: www.osha.gov; www.setonresourcecenter.com/safety

Additional Notes

Workplace Violence: Dealing With Dangerous Customers

Unhappy customers who harass and intimidate utility workers, either in a company location or in the field, pose a threat to the utility worker. The Occupational Safety and Health Administration (OSHA) singles out utility employees as being the most vulnerable to workplace violence. This is because they deliver services, often work alone or in small groups, and may exchange money with the public. The most at-risk workers are the billing service staff, meter readers, and field staff who make house calls to investigate customer complaints or install services. Those responsible for shutting off water services are perhaps the most likely to encounter customer hostility.

According to a survey conducted by Northwestern Mutual Life Insurance Company, 44 percent of workplace violence incidents are perpetrated by irate customers or clients.

A potentially violent customer may catch a utility worker off guard. This is when a cool head and violence-prevention training come into play.

A utility worker who encounters an angry customer at a company facility should never become defensive, confrontational, or patronizing. Instead, talk to the person in a calm, soft voice. This helps them realize the volume of their own voice and perhaps may prompt them to respond in kind.

Listen closely to the complaint, smile pleasantly, and treat the customer with respect. Empathize by acknowledging how the person is feeling—"I understand why you are upset." "I know that this is difficult . . ."

Ask open-ended questions: "What happened?" "What can we do to help you?" By getting customers to talk, instead of yell, you can break their train of thought and even diffuse their anger. No matter what, report the incident. Especially keep a record of volatile customers so other employees can be better prepared for future encounters.

In the field, all of the above suggestions apply. If the situation becomes uncomfortable, leave the premises, go to a safe place, and call for help. If the customer shows a

weapon or physically threatens the utility worker, the incident needs to be immediately reported to the police as well as to utility management.

If a situation is potentially dangerous, such as shutting off service, OSHA recommends hiring an employee safety service or requesting police assistance. OSHA also recommends that employees who carry money should not work alone.

Other ways to increase staff safety include:

- Equipping field staff with cell phones, handheld alarms, or noise devices
- Requiring staff to set check-in times to keep a contact person informed of their location throughout the day
- Keeping utility vehicles in good working condition to avoid a breakdown in unsafe areas
- Providing drop safes to limit the amount of cash a bill collection employee carries

If a violent incident occurs, the employer should provide the affected employees with emotional support such as crisis intervention and counseling.

A workplace violence prevention program is only as effective as top management is willing to make it. But it is every employee's responsibility to be aware, act on warning signs, and learn how to deal with threats.

—Adapted from *Opflow*, April 2004

*For additional information go to: www.cdc.gov/niosh/violrisk.html or
<http://crimeprevention.rutgers.edu/crime/violence/workplace/prevention.htm>*

Additional Notes

Safe Driving in Adverse Weather Conditions

The changing and extreme weather conditions of fall and winter require adjusting your driving habits. The days are shorter and driving in the dark is common. Driving after dark is more hazardous simply because of reduced visibility. Even on cold days visibility can be decreased because smoke and haze tend to hang in the heavier air. Fog, rain, and icy conditions occur more frequently. You can reduce your driving risks by following a few simple rules.

Driving at Night

- Check that the headlights, taillights, and directional signals are working before leaving.
- Check headlights for proper aim—for your benefit and for other drivers; keep your headlights on low beam when other drivers are around.
- Clean the windshield inside and out; nicotine and carbon monoxide from smoking reduces vision and puts a film on the inside windows.
- Give your eyes time to adjust to darkness before driving.
- Never drink and drive.
- Don't wear sunglasses at night—they don't reduce headlight glare.
- Turn on your headlights in early twilight to help you see and be seen.
- Reduce your speed and increase your following distance.
- Never stop on any roadway if you can help it.
- Take curves slower at night; headlights point straight and shine off the road.

Driving in Rain

- Reduce your speed and allow extra following distance.



- Turn on the headlights to help you see and be seen. In some states, it's now a law that the headlights must be on when the windshield wipers are required.
- Keep the defroster running to keep the inside of the windshield free of moisture.
- Be aware that rain on the window can distort vision in rearview mirrors.
- Be careful when passing.
- Be aware of pedestrians; they are dodging puddles and unaware of you.
- Before it rains, check your wipers and make sure your window washer reservoir is full.

Driving in Fog

- Slow down gradually; allow vehicles behind more stopping time.
- Turn on low-beam headlights—even during the day.
- Don't turn on your high-beams, they will only cause a glare.
- Run the windshield washer and wipers.
- Turn on the defroster and fan.
- Try to find and follow the right edge of the road for guidance.
- Avoid hunching forward to see better—you see better sitting normally.

- Be alert for cars pulled off on the shoulder.
- Passing other vehicles in fog is dangerous; slow down when being passed.
- If you can't see at all, pull off the road. Leave parking lights on and start flashers.
- Place warning devices several hundred feet behind a stalled vehicle. Turn on flashers and leave on vehicle lights.

Operating a motor vehicle in bad weather does present potential dangers. However, most of the severe traffic collisions occur when the weather is at its best. This is because most drivers are not concentrating on the operation of their vehicles, are mentally distracted, and the vehicle's speed is increased. This is why it is important for you to concentrate on your actions, be courteous, and drive defensively anytime you operate a motor vehicle.

And, in good weather or bad, always buckle up!

For more information go to:

www.weather.com/activities/driving/drivingsafety/drivingsafetytips/tipIndex.html;

www.aaexchange.com/main/default.asp?categoryid=3&subcategoryid=55

Additional Notes

Don't Let Chemicals Get to You!

Water utility operators and laboratory staff are frequently exposed to chemicals that, if not handled properly, can cause severe harm or even death. Many chemicals are extremely toxic and lethal, even in small quantities.

The effects of a chemical exposure can be local—at the point of contact—or systemic. Systemic exposure occurs when the chemical agent is absorbed into the bloodstream and distributed throughout the body's organs. This can easily happen by touch, inhalation, or ingestion. If you are exposed to a toxic chemical, the severity of damage will depend on the toxicity of the substance, its solubility, its concentration, and the duration of the exposure.

There are a variety of ways you can be accidentally exposed to dangerous chemicals:

Contact With the Skin

Spills and splashes when in the laboratory or when loading chemicals into vats or mixing bays can easily contaminate exposed skin. When chemicals come in contact with the skin or mucous membranes, they can cause surface irritation at best and, at worst, be absorbed into the bloodstream, resulting in systemic poisoning.

Chemicals primarily penetrate the skin through hair follicles, sebaceous glands, sweat glands, and open wounds. Touching contaminated hands to the mouth, nose, and eyes can also cause chemicals to be absorbed into the body.

Inhalation

Inhalation is the most common form of toxic ingestion. Toxic vapors, mists, gases, particulates, and even dust can easily and quickly be absorbed through the mucous membranes of the mouth and nose. After that, the chemical quickly travels into the throat and lungs and causes serious tissue damage along the way. The damaging effects are further compounded if the substance passes through the lungs into the circulatory system.

Ingestion

Mouth pipetting in the laboratory can lead to the ingestion of toxic chemicals. But the more common cause of unintentional ingestion is from foods that were stored in containers that had previously been used to store nonfood items (paint, plant food, or other substances). Another common, but very unsafe, practice that can lead to ingestion is storing food in a place where chemicals are stored—or storing chemicals in a refrigerator used for food.

Ocular Exposure

Unprotected eyes are easily contaminated by chemicals due to splashing, aerosol contamination, or simply by being rubbed with contaminated hands. Many chemicals can cause burns and even a loss of vision. Absorption into the bloodstream can also quickly occur because eyes contain many blood vessels.

Injection

Inattentive laboratory workers are particularly susceptible to needle accidents. When not handled properly, needles can easily and quickly inject chemicals into the body. Broken glass containers that held toxic chemicals can also cut the skin and expose a worker to blood contamination.

Avoiding Chemical Exposure

- Use all required personal protective equipment (PPE).
- Never eat, drink, or smoke while handling hazardous chemicals.
- Always read a chemical's material safety data sheet (MSDS) prior to use.



- Always wash your hands with soap and hot water after using chemicals.
- Never try to identify a chemical through smell or taste.
- Know, understand, and practice the emergency evacuation and containment procedures and equipment.
- Properly store all hazardous chemicals.
- Make sure all chemical containers are correctly labeled.
- Always use hazardous chemicals as intended.
- Avoid creating aerosols in the laboratory: do not use open vessels for processing chemicals.

For additional information go to: www.cdc.gov/niosh/topics/chemical-safety/

Additional Notes

Night Work: Reduced Visibility Increases Hazards

Working at night presents some special safety challenges, particularly for drivers. The biggest challenge is finding a way to cope with the reduced visibility. At dawn and dusk, the sun is low in the sky and causes glare on a vehicle's windshield. Once the sun has set, the distance a motorist can see is restricted by headlight efficiency, and some drivers have poor night vision.

Statistics show 25 percent of workers killed on the job when struck by a vehicle were working between 6 p.m. and 6 a.m., but only 9 percent of the workforce are on duty during those hours. This means that crews working at night are three times more likely to be struck by a vehicle than their daytime counterparts.

Even when workers are wearing reflective safety vests, motorists aren't always able to determine that the object with the reflective tape is a human. When turned sideways, bending over, or while standing motionless, workers are often mistaken for traffic cones or other safety markers. Motorists are less likely to slow down for a marker on the roadside than for a worker. Safety experts also tell us that working near the road is more dangerous at night because traffic is lighter, allowing motorists to travel faster through the work zone.

The condition of drivers at night also presents a hazard to workers. A higher percentage of drivers at night are subject to fatigue or to alcohol or drug impairment. According to the National Transportation Safety Board, "drowsy driving" accidents have outpaced drunken driving accidents in the past decade.

Here are some things you can do to make the work zone safer at night:

- Make sure your work outfit has an abundance of reflective material. The bright orange or yellow that motorists can see so well during the day does little good at night unless it is accompanied with reflective material on your vest or jacket, hard hat, and pants.
- Place parked equipment so it serves as a boundary to protect work zones.

- Use floodlights to illuminate flagger stations, equipment crossings, and any other areas where crew members will be working. Floodlights can cause a disabling glare for drivers entering a work zone, so once the lights are set, a utility worker should drive through the area to observe their positioning and make adjustments as necessary.
- Because of reduced visibility, crew members need to slow down and work more cautiously, especially when working around excavations. Shadows and dark areas inside trenches make the simple job of getting in and out of trenches more difficult. Footing near trench walls may appear to be more stable than it actually is.
- Crew members signaling and operating excavation equipment also need to take extra care in their job duties. The glare from traffic headlights and the fact that some excavation areas are partially hidden in shadows make jobs more difficult.

Reduced visibility isn't just an issue at off-site work locations; because of dark areas and shadows created by floodlights, an area of the facility you are quite familiar with during daylight hours looks different at night. Outdoor filter beds, stairways and ramps, equipment storage areas, loading docks, and large water tanks are all areas that are more difficult to negotiate in the dark. Water storage tanks, for example, may be extra cold and have more moisture or ice on them at night, making footing or handholds more slippery and dangerous. Dew or ice may also exist on loading docks, stairways, and ramps, so slow down and take extra time and caution when walking across these areas.

When moving around the facility grounds at night, always carry a large flashlight with you to supplement whatever fixed lighting is available. It's a good idea to also carry a small backup flashlight in case the large light stops working during your rounds. Even though vehicular traffic is minimal on treatment plant grounds in the evening, you should still wear reflective clothing anytime you are outside the facility so co-workers and emergency personnel can see and identify you when they are on the facility grounds.

If you take the necessary precautions, your night-work duties can be performed without any problems. Don't get left in the dark; make the night shift safe and secure.

For more information go to: http://www.ewh.com/how_7343109_work-safely-dark-construction-sites.html



Additional Notes

Recent OSHA Crane and Derrick Safety Rules—Are You Compliant?

Important changes to the OSHA Crane and Derrick safety rules came into effect in late 2010. The revised standards address critically important provisions for crane operator certification, crane inspection, setup, and disassembly.

These new rules are intended to prevent the leading causes of crane fatalities such as falls, crushing/striking, and electrocution. In addition, the rules address tower crane hazard and the use of synthetic slings for assembly/disassembly work, and they clarify the scope of the regulation by providing both a functional description and a list of examples for the equipment that is covered.

The new rules also include requirements related to ground condition assessments, crane operator qualifications, pre-erection inspections, and several other issues. OSHA estimates that the regulation will prevent 22 fatalities and 175 nonfatal injuries every year.

One major new mandate in the rule is the institution of certification requirements for crane operators for the type of equipment they are using. Other crane-related workers, including riggers, will have to be qualified as well.

If you have not already done so, download or thoroughly review the new safety standard at www.osha.gov/FedReg_oshapdf/FED20100809.pdf. The regulation text is available at www.osha.gov/cranes-derricks/index.html. Unfortunately, space limitations here prevent a thorough analysis of the 1,070-page revised standard for Cranes and Derricks in Construction. What's more, dozens of state safety agencies have their own variations to the crane safety standards, so be sure to contact your state's health and safety agency for more specific details.

Mobile Crane Safety

Most utilities employ mobile cranes in their regular heavy-duty construction and repair operations. And mobile cranes are responsible for the most accidents, injuries, and fatalities of all of the crane types. If you use mobile cranes, you need to be aware of the potential work hazards, get the proper training regarding operation and load

preparation, and know the proper PPE for your crews such as hard hats, safety boots, and high-visibility clothing.

Falling Loads

Falling loads pose an extreme hazard to operators and nearby workers. Never exceed the load size and weight capacity of the crane. If you're unsure about your crane's capacity for size and weight, calculate the weight to ensure it meets the safety parameters. Load-indicating devices (called load moment devices) can prevent an accidental overload. Be sure to properly secure the loads to be lifted. Before the work begins, inspect the slings, chains, and hooks that will be used to lift and secure the load.

Always rotate, raise, and lower the crane boom slowly and avoid sudden stops or accelerations. These movements could jar the load. When rotating the load, use taglines or guidelines to control the arc and swing. Never lift loads over workers or over the crane's cab. If this type of lifting is necessary, use safety hooks and other approved securing devices. If two cranes are needed to lift a load, a qualified person should be in charge of planning and directing the lift.

Avoid Electric Contacts and Electrocutions

The new OSHA regulation includes new mandates for working around power lines. Cranes all too often come in contact with overhead electrical lines at worksites. You can reduce the risk by surveying the jobsite and looking for the electric hazards such as temporary power poles and power lines. You must consider all lines to be energized and dangerous unless they are certified to be de-energized by your local electric utility. Nobody else can make that guarantee—especially not the foreman, a fellow worker, or even a local electrician.

It would even be safer to have the utility move the wires before the crane work begins. Never allow the boom, load, or tag lines to get any closer than 10 feet from a power line. And, depending upon how much electricity is carried in the lines, an even greater distance may be required! Check with your local electric utility for details. Also, when the crane is moving its boom and a load near power lines, it's essential to have a spotter watch the load and the lines. Watching the lines and the crane's movement should be that spotter's only job! The spotter not holding a tagline or directing traffic. That spotter needs to be in constant eye contact with the operator (using industry-approved hand signals) and/or radio communications as the work progresses.

If a crane/load touches an energized power line, it's the workers on the ground touching the crane or standing near the crane who are in the greatest danger of electrocution. People need to stay far away from a crane when it's operating near power lines. If there is a power line contact, the crane operator is actually safe; the operator is like a bird on a power line. To safely clear the line, the operator will need to slowly move back the boom in the exact reverse manner as when contact was made.

Tip-overs and instability are another frequent safety hazard. Soft or unlevel ground can cause a crane to tip. Always use the outriggers to stabilize the crane. Never operate the crane if the load or slope lifts the wheels off the ground. For stability when traveling, keep the boom steady in the direction of the movement. Boom stops should be used if there is a danger of the boom falling backward.

Workers near mobile cranes can also easily get run over if they don't pay attention—and especially if the operator loses sight of them. Operators should use an audible warning and operating signal device to notify workers of movement. Workers should stay out of the way of the load as well as the crane and outrigger wheels. If the operator has a limited view, a qualified signals person should direct and communicate the operations.

For additional information go to: www.osha.gov/cranes-derricks/index.html.

Additional Notes

Carpal Tunnel Syndrome

That tingling or numbness you've ignored for months in your hand and wrist suddenly becomes a sharp, piercing lightning bolt that shoots through your wrist and up your arm. Is it just a passing cramp? More likely you have carpal tunnel syndrome, a painful, progressive condition that affects roughly 1 out of 20 people. Its cause is compression of a key nerve in the wrist.

What Is Carpal Tunnel Syndrome?

Carpal tunnel syndrome (CTS) occurs when the median nerve in your forearm gets squeezed as it passes through a narrow opening in the wrist called the carpal tunnel. Frequently, the pressure comes from the swelling of irritated tendons in the wrist area (due to overactivity) or an injury such as a sprain or fracture. But, just as likely, the disorder can result from your congenital predisposition—the carpal tunnel is simply too small for the size of your nerves. Other contributing factors may include mechanical problems in the wrist joint; work stress; and even the repeated use of vibrating hand tools. CTS is also associated with pregnancy and diseases such as diabetes, thyroid disease, or rheumatoid arthritis. In some cases, no cause can be identified.

What Are the Symptoms?

The following symptoms typically start gradually and can be present in one or both hands:

- A tingling sensation or numbness in the thumb, palm, or fingers on one hand or both.
- Fingers that seem to be swollen, even with no visible swelling.
- Pain that affects one or both hands or wrists.
- Difficulty moving the fingers.
- Symptoms that first appear at night, then during the day.
- A weak grasp or grip.

Who Is at Risk?

Carpal tunnel syndrome usually occurs only in adults, and women are three times more likely than men to develop CTS, perhaps because the carpal tunnel itself may be smaller in women than in men. The dominant hand is usually affected first and produces the most severe pain. The risk of developing CTS is not confined to people in a single industry or job, but the syndrome is especially common in those performing repetitive motion type work. Little evidence supports extensive computer use as a risk factor for CTS, although it may cause a different form of hand pain.

How Can It Be Prevented?

At the workplace, workers can do on-the-job conditioning, perform stretching exercises, take frequent rest breaks, and wear splints to keep wrists straight. A complete ergonomic evaluation of the workstation, tasks, and tools can adapt the workplace conditions and job demands to the capabilities of workers. However, research has not conclusively shown that these workplace changes prevent the occurrence of CTS.

What Are the Treatments?

Once diagnosed, treatments for CTS should begin as early as possible. Initial treatment generally involves resting the affected hand and wrist for at least two weeks, avoiding activities that may worsen symptoms, and immobilizing the wrist in a splint to avoid further damage from twisting or bending.

Drugs—In special circumstances, various drugs can ease the pain and swelling associated with CTS.

Exercise—Stretching and strengthening exercises under the supervision of a professional physical therapist can be helpful in people whose symptoms have abated.

Alternative therapies—Acupuncture and chiropractic care have benefited some patients but their effectiveness remains unproved. An exception is yoga, which has been shown to reduce pain and improve grip strength.

Surgery—Carpal tunnel release is one of the most common surgical procedures in the United States. Surgery involves cutting the band of tissue around the wrist to reduce the pressure on the median nerve. Surgery is typically done under local anesthesia and does not require an overnight hospital stay. Many patients require surgery on both wrists.

Although symptoms may be relieved immediately after surgery, full recovery from carpal tunnel surgery can take months. Recovery typically includes physical therapy. Some patients may need to adjust job duties or even change jobs after recovery.

Recurrence of carpal tunnel syndrome following treatment is rare. The majority of patients recover completely.

*For more information go to: <http://www.cdc.gov/niosh/topics/ergonomics>;
<http://www.mayoclinic.com/health/carpal-tunnel-syndrome/DS00326>*

Working Safely in a Confined Space: Trenches, Manholes, and Vaults

If your job involves maintenance and construction, it's inevitable that someday you'll work in a trench, manhole, or vault. Each of these confined spaces can provide potential safety hazards.

Numerous, and quite specific, federal and state safety rules, requirements, and precautions have been established to keep you safe in a confined space—too many to comprehensively list here. However, the majority of the most pertinent safety information can be found in the Occupational Safety and Health Administration (OSHA) regulations: www.osha.gov/SLTC/confinedspaces.

Trenches and Excavations

Before any digging begins, you need to call 811 and have the local utility service locate and mark the underground gas, sewer, electricity, water, and communication lines.

All trenches deeper than 4 feet must have a safe and readily accessible means of exit, such as a stairway, ramp, or ladder. If the trench is deeper than 5 feet, it may also need to be inspected and have shoring installed before work can begin.

Manholes and Vaults

Confined-space work in manholes and vaults poses several hidden hazards, especially air quality. If an oxygen deficiency or hazardous atmosphere has the possibility to exist in the work area, the air must be tested before employees enter and also while the work is being conducted. If necessary, ventilation must be provided and continued as long as the manhole or vault is open. If the confined space is vacated for any period of time, such as a lunch break, the atmosphere should be retested before re-entry is allowed.

The most common hazards are exposure to:

- Combustible or flammable vapors and gases.
- Oxygen deficiency by displacement with other gases and the introduction of nitrogen from cable pressurization.

- Toxic gases from decomposing vegetation and soil, chemical spills, and engine exhaust from vehicles and equipment.
- Airborne combustible dust at a concentration that obscures vision at a distance of 5 feet or less.
- An atmospheric concentration of a substance greater than the allowed limit in the Material Safety Data Sheet for that substance.

Safety Equipment

Several types of equipment are required for safe entry into a confined space:

- Work-area protection devices, such as traffic (reflective) vests, traffic cones, man-hole guards, and work-area protection signs.
- Atmospheric tester for combustible gas, oxygen deficiency, and other toxics.
- Power ventilator (blower).
- First-aid kit.
- Portable fire extinguisher (dry chemical).
- If hazardous conditions exist (or may exist), you will also need emergency rescue equipment readily available in the immediate work area. This includes a breathing apparatus, safety harness and line, and basket stretcher.

For additional information go to:

www.osha.gov/SLTC/confinedspaces; www.cdc.gov/niosh/pdfs/87-113.pdf;

www.dir.ca.gov/dosh/dosh_publications/confspa.pdf



Additional Notes

Basic CPR Saves Lives

Not long into an average workday several years ago, two Wisconsin utility workers saw something go very wrong with a 40-year-old co-worker. During a mid-morning break, the co-worker was warming a snack in a microwave oven when he collapsed and stopped breathing. One of his colleagues immediately ran to a phone and called 911. He then returned to the fallen man and began mouth-to-mouth resuscitation. Another colleague simultaneously performed chest compressions on the victim.

The fallen worker had suffered ventricular fibrillation, a serious and frequently fatal condition. Without immediate medical attention, ventricular fibrillation can lead to cardiac arrest and death.

The victim, a laborer who occasionally works alone on hydrants, was lucky to be with other employees when his attack occurred. Today, he is feeling fine. And his co-workers received AWWA Heroism Awards for their quick lifesaving efforts.

What did the two heroes do? They took two key actions:

1. Called 911
2. Performed cardiopulmonary resuscitation (CPR)

The first action in a medical emergency is to call 911. Ideally, one person can attend to the victim while another calls 911. But if you are the only one around, it's critical that you call for emergency help before you begin CPR. The sooner the emergency response personnel arrive, the sooner they can administer the lifesaving equipment.

Basic CPR can be learned in less than a day of training, and many businesses will either sponsor their staff to attend CPR classes or bring a professional in for the staff training. A person trained in CPR can assess if a victim needs to be treated with mouth-to-mouth resuscitation and chest compressions, and then appropriately conduct these procedures.

New CPR Guidelines

New CPR guidelines were released in October 2010 by the American Heart Association (AHA). The revised protocol recommends that the three steps of cardiopulmonary resuscitation be rearranged.

The new first step is doing chest compressions instead of first establishing the airway and then doing mouth to mouth. The new guidelines apply to adults, children, and infants (except newborns).

The old method was A-B-C—for airway, breathing, and compressions.

The new method is C-A-B—for compressions, airway, and breathing.

By starting with chest compressions, many victims can be saved without additional action. The former approach was causing delays in chest compressions, which are crucial for keeping the blood circulating.

The AHA believes the new guidelines will inspire more people to perform CPR. Many would-be rescuers found mouth-to-mouth resuscitation intimidating and considered it difficult to perform without the proper training. The general feeling now is that most anybody can do chest compressions even without a CPR class. Properly executed chest compressions will help save lives, because in many cases there is a reserve of oxygen left in the victim's blood and lungs. Chest compressions can take advantage of that oxygen reserve.

Here's a step-by-step guide for the new CPR:

- Call 911 or ask someone else to do so.
- Try to get the victim to respond; if he does not, gently roll him on his back.
- Start chest compressions. Place the heel of your hand on the center of the victim's chest. Put the other hand on top and interlace the fingers.
- Press down so you compress the chest at least 2 inches in adults and children and 1.5 inches in infants (use only the pressure 2–3 fingers on an infant). One hundred compressions a minute or even a little faster are optimal. (That's approximately the beat of the Bee Gee's song "Stayin' Alive").
- If you've been trained in CPR, you can also open the airway with a head tilt and chin lift.
- Pinch the victim's nose closed. Take a normal breath, cover the victim's mouth with yours to create an airtight seal, and give two 1-second breaths as you watch for the chest to rise.
- Continue compressions and breaths—30 compressions, two breaths—until help arrives.