February 2012

Shop and Tool Safety, Electrical Safety

A Quick Checklist of Tool Safety Dos and Don’ts

Are Your Tools Working With You or Against You?

TOOL USE is one of the behaviors that helps define us as human. From the small and unassuming (scissors) to the large and impressive (clutch operated drill press), tools make our work faster and easier and contribute to our quality of life. Failing to use them safely, however, can turn tools from allies into enemies.

Statistics show that tool-related injuries occur more often at home than at work, and are almost always the result of human error. Workshop and automotive tools, knives, saws, heat-producing devices and even bungee cords are tools that can be mishandled. The consequences include cuts, scrapes, bruises, burns, electrocution, broken bones and crushing injuries. According to the US Department of Labor, more than 4,500 fatalities occurred in American workplaces in 2010, many of which involved tools and electricity. Whether you work in an office or a machine shop, whether you are at home or at work, take tool safety seriously.

**Tool**

Choosing the right tool for your project is the first step in avoiding injury. Select tools designed for the task. Serious problems can arise when tools are altered or used in unintended ways. Tool grips should fit your hand and the tool should be comfortable for you to operate. Tools should be clean, in good repair and properly maintained. Power tool accessories (blades, bits, extensions) should only be adjusted when the tool is unplugged, locked out and tagged out. Extension cord capacity should always match or exceed the electrical demands of the power tool.

**Task**

Think the project through and prepare carefully before picking up a tool and starting a task. This includes reading and following manufacturer’s instructions. Be prepared to react if the unexpected should happen. What are the risks and hazards associated with this task? Could your fingers stray into the path of the office paper cutter? Are there knots in the board you’re about to cut that could throw off your power saw?

**Operator**

Operator performance is the most important element in ensuring a safe work day. Lack of training or preparation, failure to read and follow product instructions, and using tools differently from their intended purpose or past their limits are only some examples of operator faults that can lead to injury or fatality. Improper body positioning and taking shortcuts with protective equipment can also contribute to injuries. Complacency or overconfidence account for many incidents each year, as even highly skilled, experienced operators can become careless or distracted, or take shortcuts when they are in a hurry.

As with all work tasks and processes, performing your job safely is directly affected by your state of mind. Be aware of the task at hand and recognize how seriously you can be injured, even when using simple tools. Understanding who could be affected (besides yourself) is another reality check. Not only you, but your family, co-workers and community all pay the price if you are injured.
Use These Valuable Tools Every Day

Proper Training
Every year, many tool-related injuries occur simply because people have not completed required training or fail to follow manufacturer’s instructions. Putting yourself in the path of a tool’s energy, failing to wear protective clothing and other common pitfalls are less likely to occur if you are properly trained.

Taking the time to train for and learn about your tools is a great investment in your health and safety. Read and follow the manufacturer’s cautionary instructions as well as your department’s safe work procedures. To stay safe, be clear on the tool’s intended purpose and limitations and how it functions. Understand and follow correct maintenance and storage requirements. Seek out specific online or in-person instruction if necessary when using unique and customized tools.

Proper Maintenance and Storage
Caring for tools properly can avert serious injury. Consider the danger when a power cord is allowed to fray, or when an operator pushes too hard on a tool because the blade is dull.

Check power tool cords and plugs with every use. Keep moving parts lubricated according to manufacturer’s instructions. Hand tools should be clean and free of oil, dirt or damaged grips that could cause your hand to slip. Arrange for required maintenance and other service, and store tools in safe, dry locations. Keep blades and sharp points covered.

Protective Equipment
Some tools require specific Personal Protective Equipment (PPE), which is defined in your department’s safe work procedures. Examples include UC laboratory SOPs, workshop safe work practices and field operations safety manuals. Even when PPE is not explicitly defined (such as with home-based activities), some common-sense guidelines should always be followed. These include not allowing clothing, jewelry or long hair to become entangled in moving parts, and using safety glasses, ear plugs, dust masks and appropriate gloves for the task at hand. Other safety measures include not working with tools when you are fatigued or under the influence of alcohol or sedating prescription drugs.

Body Positioning
Proper posture, stance and body positioning are integral to safe tool use. Over-reaching, improper ladder use and unstable footing can cause a fall or contact with moving parts.

Leaning, twisting or standing in awkward positions to reach a task can also cause serious injury. Whenever possible, place yourself at a comfortable level with your work. Keep your balance by working on a dry, level surface and maintaining a solid stance with feet about shoulder-width apart. Be sure your reach distance and force requirements are appropriate for the tool and the task.

Follow safe-work requirements that specify your distance from “energized” or moving parts or any object that could begin to move due to counterweights, air movement or other means.

Mind on Task
Experienced and novice operators alike can allow dangerous practices to slip into their work routines. Distraction, rushing, fatigue or “off-work” states of mind can cause you to lose focus and make a mistake that leads to injury.

When a tool becomes a danger, not only the operator is at risk. Nearby co-workers, or family members if working at home, can be injured if a power tool sends a shard of metal or wood across the room, or if sparks ignite fumes or sawdust in the work area.

Practice putting your entire concentration on the task you’re about to perform. Take periodic breaks to avoid fatigue from repetitive actions. Pause before starting your work so that you can take the time to assess potential dangers and do what is needed to avoid them. Never cut corners on wearing Personal Protective Equipment or following safe work procedures. Be on your guard for feelings of overconfidence. The unexpected can happen and you and others can be seriously injured, even if you have safely performed the task many times before.
A Tool by Any Other Name

Think about how much you depend on your hands. Working, playing, communicating and thousands of other everyday activities wouldn’t be possible without the use of your hands. Hand injuries can have devastating effects on you as well as your family and your career.

In 2009, the US Bureau of Labor Statistics reported that more than 100,000 workers lost an average of four workdays due to cuts and lacerations, the third most common type of non-fatal work injury. Your hands can sustain cuts, bruises, burns and pinching injuries whether you are working in a lab, workshop, office or home.

- Be safety-conscious when using tools that can puncture or cut.
- Keep tools in good repair; dull tools are more likely to slip and cause serious injury.
- Wear gloves if appropriate for the tool you are using or task you are performing.
- Sweep up broken glass and dispose of it safely; do not pick it up with your fingers.
- To treat minor cuts, apply direct pressure, wash with mild soap and water and, when the bleeding has stopped, cover with a bandage that will not stick to the injury.
- Report all injuries, no matter how small, to your supervisor as soon as possible.

Click here for more information on hand safety.

“I don’t work in a laboratory or machine shop and I don’t use tools, so I don’t think this safety advice applies to me.”

Think again! Not all tools reside in workshops, garages or industrial facilities. Starting with the toaster you use to make breakfast, to your stapler and scissors at work and on to the knives you use at dinner, tools are a natural part of your home and work life. Even the most familiar ones have the potential to harm you and others. Focus on using tools safely every time you use them and carefully control their use by children. Take the time to learn how to operate, maintain and store tools properly.

Above all, keep your mind on the task. Follow manufacturer’s instructions for all power tools and appliances. Keep fingers away from pinch points and sharp edges. Don’t push tools past their limits or remove safety guards. At work, familiarize yourself with your department’s safe work practices and emergency response plan. Be sure you are comfortable with and qualified to operate the tools you intend to use. If not, seek training or skilled help with tool use before proceeding.

Tools in Your Home
- Electrical appliances
- Hammers, pliers, clamps, wrenches and other common hand tools
- Ladders and step stools
- Bungee cords, straps and fasteners
- Scissors, craft knives, rotating fabric cutters and other sharp objects
- Kitchen knives, pizza cutters, skewers, etc.
- Garden tools, hedge trimmers and other landscaping equipment

Tools in Your Office
- Scissors and paper cutters
- Staplers and staple pullers
- Exact-o knives and their blades (don’t store them with blade installed in a drawer where someone could inadvertently touch them)
- Shredders
- Box cutters (always retract blades into the knife body before storage)
- Extension cords and power strips
- Heaters, fans, coffeemakers and other electrical appliances
- Copiers, LCD projectors, printers, and other devices that have moving parts or generate heat.

Learn More About

Tool Safety Training
Proper training is essential to preventing tool-related injury. The California Code of Regulations (CCR) states the requirements for tool safety training in the workplace.

CCR/8-3203 requires a system for ensuring that employees comply with safe and healthy work practices and defines how instruction should be provided. Whenever new substances, processes, procedures or equipment are introduced to the workplace, appropriate training is required for each employee. Talk to your supervisor, department safety coordinator or EH&S office for more information about CCR requirements.

Selecting and Using the Right Tools
Using tools that are not right for the job or do not fit your hand result in awkward postures, harmful contact pressure and other risks. You can prevent injury by taking a methodical approach to safe hand tool use. Start by choosing a tool that fits your hand comfortably. For example, with double-handle tools such as pliers, the grip span (distance between the two handles) should not be less than one inch when fully compressed and no more than three inches when fully open.

When using single-handed tools such as screwdrivers and wrenches, be sure that all of your fingers can comfortably wrap around the tool handle to ensure a strong, secure grip. Use angled pliers and wrenches to help you stay balanced and reduce pain and injury. Whenever possible, use tools with handles coated in a soft material, or add a sleeve to make the handle more comfortable and your grip more secure. Use the right tool for the job. For example, don’t use a shovel as a digging bar, or a screwdriver as a chisel or Pry bar. Keep sharp tools sharp, and keep all hand tools clean. Accumulations of dirt, dust or oil can cause a tool to slip and cause an injury.

Click here for a helpful collection of tool safety tips.
What is “EI-LOTO” and Why is it so Important?

EI-LOTO MINI-QUIZ: Which of the following statements about EI-LOTO are true?

- It is a methodical way of controlling equipment hazards that could cause injury
- It is practiced throughout the UC system
- It is required by CalOSHA to help ensure worker safety
- It identifies hazardous physical conditions and guides you to control them
- It is a reliable way to personally ensure your safety and to stay healthy

If you checked all of the boxes above, you have the right idea about EI-LOTO. Energy Isolation - Lock Out/Tag Out or “EI-LOTO” broadly defines a set of methods used to prevent tool or machine parts from moving, or energy from flowing unexpectedly in equipment, causing worker injuries. EI-LOTO, pronounced “E-I-LOTO (where LOTO rhymes with grotto)” is highly effective, required by regulatory agencies, and an integral part of UC employee safety programs. In the UC system, EI-LOTO safety processes apply to everything from computerized robotics, to scanning electron microscopes, to parked vehicles.

How does EI-LOTO work? What is likely to come to mind is the need to disable electrical equipment during cleaning or servicing. Basic EI-LOTO is simply unplugging equipment with the plug being controlled by the person working on the equipment.

More complex EI-LOTO may involve fuses, breakers and alternate electricity sources also being disabled. This is called “de-energizing” and there are points on equipment where locks are installed to ensure power cannot accidentally be restored. An “Accident Prevention Tag” is attached to the locked equipment to document the EI-LOTO process ongoing at the equipment.

Each lock and tag can only be removed by the person who put it there following a systematic safety review to ensure that it is safe to re-start the equipment. While the lock and tag are in place, no one is permitted to touch or try to activate the equipment.

“Practicing EI-LOTO is vital in preventing injury, and it’s each worker’s personal assurance that they’ll maintain their health and safety on the job,” says Jim Gilson, Senior Safety Engineer at UC Berkeley. “Even a small departure from the EI-LOTO procedure can result in disaster. People have been seriously injured and departments have suffered major disruptions and financial losses to their operations when short-cuts around EI-LOTO were taken. By practicing EI-LOTO, equipment hazards are identified and controlled before personnel start working on the equipment, energy-isolation locations are locked and tagged, and safe work processes are documented, before the person sets out to work on the equipment. Job planning becomes easy and straightforward as safe work steps are clear and easy to follow, and all equipment energy hazards are known and de-energized by all workers.”

Energy Isolation is the Key

Avoiding electrocution is only one of the ways that EI-LOTO procedures protect people. Other forms of energy can be just as hazardous as electricity and must be isolated and controlled. Basic physics concepts come into play when any kind of potential energy is involved. For example, an experienced worker was injured while cleaning a large building ventilation fan. Even though the motor was turned off for cleaning, the fan did not stop. Differences in air temperature in the duct caused the blades to continue turning. The worker, who had used a make-shift method to stop the fan’s rotation and then continued cleaning, was injured. This is an example of how a proper EI-LOTO procedure is needed for all kinds of energy sources.

Equipment may be powered by or store hydraulic, mechanical, compressed air, pressurized water or other kinds of energy. An EI-LOTO program identifies all energy hazards on a piece of equipment, and outlines safe work processes and tools to control the hazards while work is done on the equipment. To de-energize fluids or gasses under pressure, valves can be locked closed, bleed-valves opened or “blinds” installed to block pipes. To prevent movement, equipment can be “blocked” with devices that temporarily prevent suspended or rolling parts from moving. Even placing a wheel-chock on a parked vehicle, or buckling your seat-belt, is practicing EI-LOTO!

Click here to view the complete article.
Careless Chris

Careless Chris Puts Speed Before Safety ...an Imaginary Scenario

Rain was in the forecast, so Careless Chris decided to get a jump on his landscaping maintenance. He mowed his lawn, pulled weeds and planted some colorful flowers. All that was left was the simple task of trimming the thorny hedge at the back of his property. Trouble with the chain saw soon turned into trouble for Chris, however.

Click here to read the story

Feedback, Please

Send an email to safetyspotlight@ucdavis.edu to submit your comments on the February 2012 issue or to suggest content ideas for future issues. We look forward to hearing from you!

COMING SOON!

March 2012

Reducing Your Exposure to Environmental Danger

Dust, fumes, chemicals, biohazards and noise can all be harmful when not properly controlled. The March 2012 issue of Safety Spotlight highlights effective measures for keeping your workplace environment a healthy one.

UC Davis “Safety Star Program” Recognizes Employees Who Model Safe Work Behavior

UC Davis' Safety Services staff and allied departments provide a spectrum of programs and communications that encourage a culture of safety. The true measure of their success is seen when employees take proactive steps to prevent injury and illness in their workplaces.

To recognize conscientious employees who model safe work practices, the UC Davis Safety Council* launched its landmark “Safety Star” program in fall 2011.

Each month, individual employees are nominated for Safety Stardom via a user-friendly form on the Safety Services website. Nominees are reviewed by the Safety Council and one person is selected to receive the award during a surprise presentation in his or her workplace.

Since the program was introduced in September 2011, Safety Star winners have been selected from a range of different campus departments. Winners have initiated safety programs, encouraged others to follow safe work practices such as wearing appropriate PPE, identified areas for improvement, assisted in data collection or performed other tasks that result in a safer campus environment.

“The Safety Stars program directs praise where it is most deserved: to those who demonstrate their concern for others regardless of their position or job title,” says Aimee Pfohl, Departmental Safety Coordinator (DSC) Program Coordinator in UC Davis' EH&S group. “Their efforts set an example and help to nurture a culture of safety throughout the campus.”

*The UC Davis Safety Council is made up of representatives from Safety Services departments, including EH&S, Risk Management, Occupational Health, Emergency/Continuity Planning and Fire Prevention, as well as members of the UC Davis Police Department’s Crime Prevention staff.

Tool Safety Questions

Try Your Hand at These True-or-False Tool Safety Questions

1. A screwdriver can substitute for a chisel if used carefully.
2. It is not safe to carry a power tool from place to place while it is running.
3. Sparks emitted from a grinding wheel or other tools can cause nearby sawdust, debris or fumes to catch fire.
4. New, battery-driven power tools are less likely to injure you than older plug-in models.
5. You are more likely to be injured when using tools in the workplace than in the home.
6. Disabling the guard on a circular saw is safe if you are an experienced woodworker.
7. You should always wear gloves when working with tools.
8. Long hair, dangling jewelry or loose clothing can become entangled in moving parts and cause serious injury.
9. It is safer to push pliers and wrenches away from yourself rather than toward yourself.
10. The best hand tool is one that fits your hand, is designed to do the task, comfortable to use and in good condition.
11. Power tools that are not properly grounded or insulated can cause electric shock.
12. If you are careful, it’s OK to increase the leverage of a tool by slipping a piece of pipe over the handle.

Answer key: 1-False, 2-True, 3-True, 4-False, 5-False, 6-False, 7-False, 8-True, 9-False, 10-True, 11-True, 12-False

© 2012, Regents of the University of California

Connect

Know where to turn on your UC campus for the information you need to keep yourself, your workplace and your environment safe and secure. Click on the campus links below to connect to local program, educational and informational resources.