

Common Electrical Hazards...

Electricity is one of the great inventions of our time. However, working with electricity can be extremely dangerous and if misused and treated carelessly can result in great personal injury and property damage. Injuries can include burns, amputations and death. Some professionals such as electricians and linemen work with electricity directly. Others workers such as town and state employees may work with electricity indirectly and may also be exposed to electrical hazards.

Electricity has long been recognized as a serious workplace hazard. OSHA's electrical standards are designed to protect employees exposed to dangers such as electric shock, electrocution, fires, and explosions. Electrical hazards are addressed in specific standards for the general industry, shipyard employment, and marine terminals. Here are some common electrical hazards and areas of concern that we still find in workplaces throughout Connecticut.

Lack of GFCI's When Using Extension Cords / Using Double Insulated Tools

Most employers have electric tools that are portable. Most of the time these portable tools are used with extension cords. Extension cords can be damaged from frequent use and storage issues. If employees use these tools in a wet or damp environment an electrocution hazards exists. To protect employees a ground fault circuit interrupter (GFCI) should be utilized.

A ground-fault occurs when there is a break in the low-resistance grounding path from a tool or electrical system. The electrical current may then take an alternative path to the ground through the user, resulting in serious injuries or death. The ground-fault circuit interrupter, or GFCI, is a fast-acting circuit breaker designed to shut off electric power in the event of a ground-fault within as little as 1/40 of a second. It works by comparing the amount of current going to and returning from equipment along the circuit conductors. When the amount going differs from the amount returning by approximately 5 milliamperes, the GFCI interrupts the current.

The GFCI is rated to trip quickly enough to prevent an electrical incident. If it is properly installed and maintained, this will happen as soon as the faulty tool is plugged in. If the grounding conductor is not intact or of low-impedance, the GFCI may not trip until a person provides a path. In

this case, the person will receive a shock, but the GFCI should trip so quickly that the shock will not be harmful. GFCI's are available in wall mounted receptacles, circuit breakers and portable units.



Many portable hand tools, such as electric drills, are now manufactured with non-metallic cases. If approved, we refer to such tools as **double insulated**. Although this design method assists in reducing the risk from grounding deficiencies, a shock hazard can still exist. In many cases, persons must use such electrical equipment where there is considerable moisture or wetness. Although the person is insulated from the electrical wiring and components, there is still the possibility that water can enter the tool housing. Ordinary water is a conductor of electricity. Therefore, if the water contacts energized parts, a path will be provided from inside the housing to the outside, bypassing the double insulation. When a person holding a hand tool under these conditions touches another conductive surface in their work environment, an electric shock will result.

Since neither insulation (double insulation) nor grounding can provide protection under these conditions, it is necessary to use other protective measures. One acceptable method is a ground fault circuit interrupter (GFCI).

Conductors Entering Boxes, Cabinets, or Fittings

Since conductors can be damaged if they rub against the sharp edges of cabinets, boxes, or fittings, they must be protected from damage where they enter. To protect the conductors, some type of clamp or rubber

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grommet must be used. The device used must close the hole through which the conductor passes as well as provide protection from abrasion. If the conductor is in a conduit and the conduit fits tightly in the opening, additional sealing is not required.

The knockouts in cabinets, boxes, and fittings should be removed only if conductors are to be run through them. However, if a knockout is missing or if there is another hole in the box, the hole or opening must be closed.

Covers and Canopies

All pull boxes, junction boxes, and fittings shall be provided with covers approved for the purpose. If metal covers are used, they shall be grounded. In completed installations, each outlet box shall have a cover, faceplate, or fixture canopy. Covers of outlet boxes having holes through which flexible cord pendants pass shall be provided with bushings designed for the purpose or shall have smooth, well-rounded surfaces on which the cords may bear.

Flexible Cords and Cables

The standard for safe use of flexible cords is one of the most frequently violated electrical standards, particularly in smaller facilities. There is a definite need and place for cords, but there is also a temptation to misuse them because they seem to offer a quick and easy way to carry electricity to where it is needed. The basic problem is that flexible cords in general are more vulnerable than the fixed wiring of the building. Therefore, cords should not be used if one of the recognized wiring methods could be used instead.

Working Space About Electric Equipment

Sufficient access and working space shall be provided and maintained about all electric equipment to permit ready and safe operation and maintenance of such equipment. Working space around equipment may not be used for storage. When normally enclosed live parts are exposed for inspection or servicing, the working space, if in a passageway or general open area, shall be suitably guarded.

Reverse Polarity / Open Ground

Reverse polarity is a condition when the identified circuit conductor (the grounded conductor or neutral) is incorrectly connected to the ungrounded or "hot" terminal of a plug, receptacle, or other type of connector. This happens when the hot and neutral wires get flipped around at an outlet.

Reversed polarity at outlets is a shock hazard. Electronic equipment plugged in to an outlet with reversed polarity will still function, but that doesn't mean it is safe.



"Open ground" means that the ground wire has not been properly connected. A simple electrical tester should be used to check outlets to ensure proper wiring.

Guarding of Live Parts

It should be noted that the purpose of this requirement is to protect any person who may be in the vicinity of electrical equipment against accidental contact. These people are presumably not electricians working on the equipment, and are not qualified or trained to be in close proximity to live parts. Except as required or permitted elsewhere, live parts of electric equipment operating at 50 volts or more shall be guarded against accidental contact by approved cabinets or other forms of approved enclosures, or by any of the following means:

- By location in a room, vault, or similar enclosure that is accessible only to qualified persons.
- By suitable permanent, substantial partitions or screens so arranged that only qualified persons will have access to the space within reach of the live parts. Any openings in such partitions or screens shall be so sized and located that persons are not likely to come into accidental contact with the live parts or to bring conducting objects into contact with them. It is good practice to use covers, screens or partitions which can only be removed by use of tools, so that unqualified persons are less likely to violate them.
- By location on a suitable balcony, gallery, or platform.
- By elevation of 8 feet or more above the floor or other working surface. Note that, although equipment elevated at least 8 feet is considered to be guarded, this may not be adequate if material being handled is likely to make contact with live parts. In locations where electric equipment would be exposed to physical damage, enclosures or guards shall be so arranged and of such strength as to prevent such damage. Entrances to rooms and other guarded locations containing exposed live parts shall be marked with conspicuous warning signs forbidding unqualified persons to enter. You should be constantly aware of hazards in your workplace. New work or changes may create a new hazard, or poor maintenance may allow reappearance of old ones.

Conclusion

Recognizing and correcting electrical hazards is crucial to ensure the safety and health of your employees. It is very important that electrical installations meet and/or exceed all applicable OSHA regulations. Please call CONN-OSHA at 860-263-6900 for any specific questions or clarification of the OSHA regulations.

Connecticut Department of Labor - OSHA
38 Wolcott Hill Road
Wethersfield, CT 06109

To receive the *Quarterly* electronically or to make suggestions on how to improve this newsletter, contact gregory.grayson@dol.gov. In the subject line type "subscribe" and provide your e-mail address. You may also reach us by phone at (860) 263-6900 or visit us at: www.ConnOsha.com

The 10-hour OSHA Course in Construction ~ in Connecticut (OSHA 10)

What's It All About???

The State of CT requires the OSHA 10-Hour Construction Industry Outreach training course for all workers when working on a Public Works Project (Prevailing Wage projects over \$400,000 for new construction, over \$100,000 for renovations, even if your portion of the contract is less than this), and the date of training shall be no more than 5 years prior to the commencement date of the public works project.

Simply put, all persons that work on publically funded projects in Connecticut need to have, and retake the 10-Hour OSHA Construction class every 5 years. Persons with the 30-hour OSHA card meet this requirement, but when the 30-hour card becomes 5 years old, only need to re-take a 10-hour class to work on these projects.

If an employee loses their card, the employee must contact the authorized instructor that taught his/her class. Only their instructor can replace a lost card, and only if it is no more than 3 years old, at a cost of \$25.

The enforcing authority is the CT Dept. of Labor, Wage and Workplace Standards Division. If you have additional questions about this please call them at 860-263-6790 or go to:



<http://www.ctdol.state.ct.us/wgwkstnd/prevailwage.htm>

An Information Bulletin can be found here:

<http://www.ctdol.state.ct.us/wgwkstnd/InfoBull051109-ConstSafety.pdf>

The Final Regulations can be found here:

<http://www.ctdol.state.ct.us/wgwkstnd/ConstSafetyFinalRegs.pdf>

These documents are located on the CT Dept. of Labor, Wage and Workplace Standards Division Prevailing Wage page, which can be found here:

<http://www.ctdol.state.ct.us/wgwkstnd/prevailwage.htm>

Holiday Entertaining & Fire Safety Tips

One in three Christmas tree fires are caused by electrical problems:

- When purchasing an artificial tree, look for the "Fire Resistant" label. Although this label does not mean the tree won't catch fire, it does indicate that the tree will resist burning and should extinguish quickly.
- When purchasing a live tree, check for freshness... needles are hard to pull off and when bent between fingers, the needles do not break.
- The trunk of a fresh tree will be sticky with resin and when tapped on the ground, it will not lose many needles.
- Before setting up your live tree, cut a few inches off the trunk to expose fresh wood which allows for better water absorption and helps to keep the tree from becoming a fire hazard.
- Keep the tree stand filled with water.
- When setting up your tree, keep it away from fireplaces and radiators.
- Use only non-combustible or flame-resistant materials to trim your tree.
- And it should go without saying...never use lit candles on your tree

Fire Safety:

- Test your smoke alarms monthly and make sure that your house is protected by an adequate number of working alarms.
- Smoke alarms should be located inside each bed-

room, outside each sleeping area, and on every level of your home.

- Share your fire escape plan, including the location of your outside meeting place, with your overnight guests. Everyone should know at least two ways out of each room in your home.
- Keep halls, stairs, and doorways properly illuminated and free of clutter and other objects that could hinder an escape during a fire emergency.
- Consider having older guests or those with mobility issues sleep on the ground floor of the house.

Decorating Safety:

- Avoid overloading electrical outlets, which can overheat and cause a fire.
- Do not place extension cords where they could cause a tripping hazard, like doorways.
- Do not run extension cords under rugs or furniture.
- Keep all decorations 3 feet away from heat sources, including space heaters and fireplaces.
- Keep young visitors in mind. Place breakables, candles, and other potentially dangerous items out of their reach.
- Turn off and unplug all decorations before leaving home or going to sleep.
- Use only weatherproof electrical devices for outside activities. Protect outdoor electrical devices from moisture.
- Make sure live Christmas trees are watered daily.

Fatality & Casualty Reporting

State & Town: CONN-OSHA (860) 263-6946 (local) or 1-866-241-4060 (toll-free)
Private Employers: Report to Federal OSHA at 1-800-321-OSHA(6742)

Hazard Corner...

Maintenance Worker Electrocuted While Attempting to Change a Light

In October of 2004, a 32-year-old male maintenance worker died from electrocution while working at an assisted living facility in Washington State. The victim was changing a broken metal halide bulb in a ceiling fixture. To remove it, the victim turned off the area wall light switch and taped the switch in the "off" position. The victim climbed into the attic space and detached the fixture "light can" to remove the broken bulb.

While holding on to the fixture in one hand, he touched the bulb base with a non-insulated tool and was electrocuted. The fixture was still hot (energized). It was part of a building emergency lighting system on a separate circuit. The wiring was not shown in the "as-built" plans he was using and it was not connected to the breaker.

The victim was found-deceased in the second floor ceiling location of the building. The employee was not trained or authorized to do electrical work; neither was he experienced in changing metal halide bulbs which often are difficult to remove.

To prevent similar occurrences employers should follow these guidelines:

- Only qualified electricians should work on electrical systems.
- Proper Lockout-Tagout procedures should be used when work is done on any system that may contain electrical energy.
- Electrical systems and components must be tested to ensure they are de-energized before performing work. Turning off a light switch or circuit breaker may not de-energize an electrical system or its components.
- Tools for de-energizing circuits should not be supplied to untrained personnel. Make sure appropriate testing devices and insulated tools are used and verify that personnel are knowledgeable and trained in their safe operation. In most cases it is recommended that a licensed electrician perform the testing.
- Don't rely on "as built" electrical drawings to determine current electrical system design and operation. Systems must be verified in place by testing and tracing the actual configuration.
- The facility accident prevention guidelines for these types of lighting systems should describe this electrocution hazard for maintenance personnel.
- Electrical breakers should be clearly labeled to indicate their action, location, and purpose.

CONN-OSHA~ Training Update...

OSHA Recordkeeping *December 1, 2015, from 10:00 a.m. to noon* At this workshop the 29 CFR 1904 Recordkeeping and Reporting Occupational Injuries and Illnesses standard will be reviewed.

The Control of Hazardous Energy (Lockout/tagout) *December 16, 2015, from 10:00 a.m. to noon* This two-hour course will help to satisfy the requirements for training as detailed in the OSHA regulation for those who are working in areas where Lockout programs are in place, or whose job requires them to actually perform the Lockout and isolation of the energy sources.

OSHA Recordkeeping *January 13, 2016 from 10:00 a.m. to noon* At this workshop the 29 CFR 1904 Recordkeeping and Reporting Occupational Injuries and Illnesses standard will be reviewed.

Powered Industrial Trucks *February 24, 2016 from 10:00 a.m. to noon* This workshop includes the basic requirements of the OSHA 29 CFR 1910.178 Powered Industrial Truck Standard which affects both General Industry and Construction material handling operations.

Introduction to OSHA *March 2, 2016 from 10:00 to noon* This session will discuss the basic components of the Compliance Visit and review the CONN-OSHA's Consultation Services that will help employers reduce workers compensation costs, training costs, medical costs, legal costs, and absenteeism.

Construction Site Safety *March 23, 2016 from 10:00 a.m. to noon* Construction managers, first line supervisors, and construction employees will be provided with an overview of four areas of concern on the construction site. Program contents include: fall protection, scaffolding and ladder safety, electrical hazards, and excavation & trenching safety.

Breakfast Roundtable This discussion group meets the third Tuesday of every month from 8:15 am to 9:45 am. Pre-registration is required. Visit our web page for more information: <http://www.ctdol.state.ct.us/osh/Breakfast/index.htm> To be placed on the e-mail distribution list, contact John Able at able.john@dol.gov

Classes are free and are held at 200 Folly Brook Boulevard, Wethersfield, CT in Conference Room A/B (unless otherwise noted). To register, contact Catherine Zinsser at zinsser.catherine@dol.gov. Pre-registration is required. A Photo I.D. is also required to allow entry into a public building. For more training information, visit the CONN-OSHA web site www.ConnOsha.com