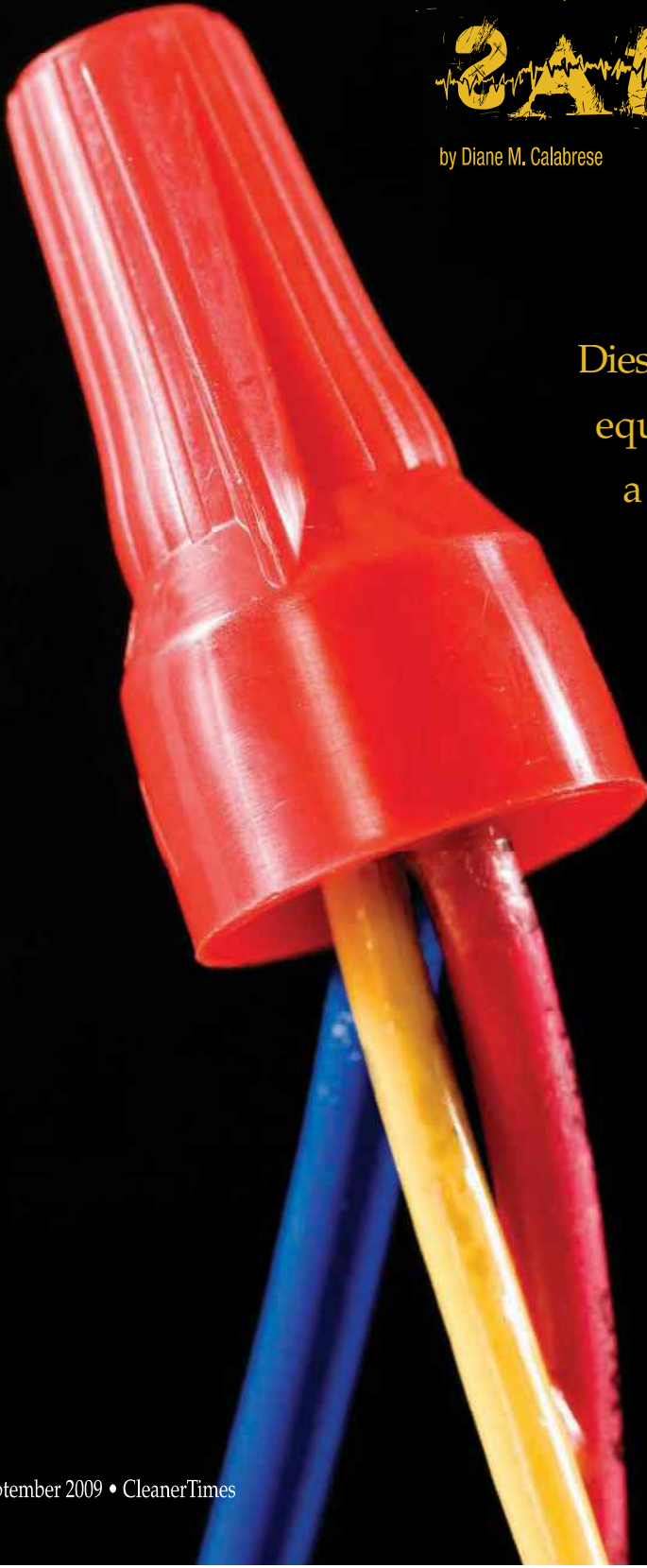


# ELECTRICAL SAFETY

by Diane M. Calabrese

Diesel fuel may power a contractor's equipment, but electrical safety is a concern everywhere. Even when a machine is not connected to the grid, most work occurs near wires and outlets.





**A**s in all safety matters, alert, well-trained employees keep a workplace incident free. Safety-conscious employees can recite the protocols for the basics, such as ground fault circuit interrupters (GFI or GFCI). The GFI devices, which are especially important in moist places, should be tested regularly.

GFIs protect a worker if something goes awry inside a machine (e.g., frayed wires). A GFI detects any difference between the current going to the equipment and the current flowing back (ideally, to ground). If there is a difference, the errant current is going somewhere—and potentially puts the equipment operator at risk of shock. The GFI stops current flow in such a situation.

Knowledge and attitude both keep workers safe whether using electricity or working in areas with electrical hookups. Even with an understanding of fuses and circuit breakers, grounds, polarization, GFIs, and wire sizing firmly established among the team, a setting can still pose risks either because it is so familiar or it is unique.

If there is one overriding challenge in electrical safety, it is “complacency,” says Zach Wilson, co-owner Ohio Window Cleaning and Power Washing, Cincinnati, OH. “After years without an accident, it is easy for employees and supervisors to forget how dangerous working around electricity is...”

Alertness matters at every instant, explains Wilson. Experience with the type of job site should not lure anyone into a false sense of security.

Neither should the seemingly innocuous nature of a new venue. “We did a horse barn last week,” says Don Flory, vice president of Mobile Enviro-Wash, Ltd. Lawrence, KS. The ever-present goal in any setting, including that one, is “to stay away from hot spots.”

### Approach

“When we go on a job, we make sure the electricity is turned off,” says Flory. That is “our preference,” he explains. When it is not possible to cut power, his team works to ascertain that all the boxes are protected.

Lockout-tagout kits and GFI protection systems are also part of the safety tools deployed by Flory’s team. Still, he explains, there is no substitute for paying attention to the surroundings and determining what the lay of the land is.

“Common sense...is probably the best approach in any safety issue,” says Flory. Assessing first to identify trouble spots is where a job must begin. Because his team works most often on vehicle exteriors, the move to interior sites with lines to the grid requires everyone to rethink their comfortable patterns.

To promote safety, contractors train their employees and match them with the best equipment available. “Proper equipment is important, but more important than the equipment is employee awareness,” says Wilson.

“In addition to reminders on jobs that present a particular hazard, we also have monthly safety meetings and cover basic safety guidelines such as proper ladder safety and proper work around electrical safety hazards,” says Wilson.

Hazards vary not only from job to job, but also from company to company.

“Our most dangerous situation is when cleaning second story windows around power lines,” says Wilson. “It is easy to get focused on the windows and not see the power lines directly overhead,” he explains.

It is imperative to keep those lines in view so as not to run a ladder or pole into the lines, explains Wilson. “Now granted, the lines should be properly insulated but you can never count on that,” he says.

### Procedure

Stringency matters. Employees must know that a pinched, cut, or modified electrical cord poses a grave danger, explains Aaron Steele, owner, Maxwell Cleaning, Ogden, UT.

Damaged cords must be repaired before they are used, and damaging cords must be avoided. “We have special training for employees on how to properly replace ends to meet OSHA standards and how to properly set up a site to prevent damage to electrical cords,” says Steele.

“Using damaged, frayed, or altered extension cords could result in fines to your company by OSHA [or by the customer],” explains Steele. “It could result in bodily harm not only to the employee using it, but also those workers around them.”

There is just no alternative to consistently correct procedure when electrical safety is the issue. “We should all be conscientious about our workplace environment and have safety at the forefront,” says Steele.

Securing machines that enhance

safety is part of the effort. "We try to use equipment that has GFI adapters," says Steele. "We also look at waterproof equipment and the life—durability of the equipment."

A big factor in maintaining electrical safety is the human dimension. "We all have to continually remind each other what is at stake," says Wilson. Consequences of any departure from protocols are serious. Shocks and burns resulting from electrical safety lapses affect thousands of

people each year. And several hundred people die from their encounters.

#### Essentials

GFI devices are designed to protect humans. Circuit breakers protect equipment. Both should be used.

The GFI detects amperage loss no matter where it is going—bad motor, short circuit, frayed cable. Some GFIs are made a part of the circuit breaker. Even with a GFI in place, small leakages (below 0.05 amps) that can pose a shock

hazard may not trigger a shutoff.

Bottom line: The GFI is not an all-encompassing mode of protection. Contractors still must maintain their equipment, including routine inspection of cords and wires.

The lifespan a manufacturer assigns to a wire must be heeded. After a certain age, wires may become brittle.

Insulation of wires connecting to the grid is not only affected by age, but also by the environmental conditions to which the lines are exposed. Contractors working in places where the client's wiring is subject to particular stresses—moisture, salts, freezing, or extreme heat—should be particularly careful when evaluating the site prior to launching a job.

Consider purchasing double-insulated tools whenever possible. And treat all wires with respect. Just as a power washing contractor would not use high pressure on certain exteriors, a contractor must match the gauge of a wire to the electrical load it will take. The conductance of a wire depends not only on the resistance of the material that makes the wire, but also on the cross-section area of the wire (gauge) and the length of the wire. Altering one variable without adjusting the others changes the way a given wire will function.

If a cord is not a match for the load, heat build-up can occur in the wire. That is one reason extension cords pose risks. In addition, the coupling required with extensions adds a juncture that could allow a breach for current.

Manufacturers provide instructions on gauges of wires to be used (should replacement be necessary). They must be followed to ensure safety.

Finally, buried electrical lines should not be forgotten. Take advantage of free services provided by utilities to mark the position of lines before commencing work. In many municipalities, the law requires doing so.

The Occupational Safety and Health Administration (OSHA) is an excellent source of tools for training employees in the essentials of electrical safety. Begin with [www.osha.gov/SLTC/electrical/index.html](http://www.osha.gov/SLTC/electrical/index.html). *or*



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