

Shock TO THE System

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From electrocutions to deadly fires, a variety of accidents and deaths in the lab have been linked to a lack of proper electrical safety. While maintaining a safe research environment is vital to pass inspection, it's also vital in saving lives.

In August 2005, tragedy struck the campus of Cleveland State University when distinguished researcher, Tarun Mal, was killed in a laboratory accident. The 42-year-old biology professor was electrocuted as he plugged equipment into an electrical outlet.

And at the University of Hawaii in March 2016, postdoc Thea Ekins-Coward lost her arm in a laboratory explosion caused from a static electricity charge that ignited a tank containing a highly flammable pressurized mixture of hydrogen, oxygen, and carbon dioxide, according to *Science* magazine. The final report found that the tank was not grounded, and the ignition probably happened “when the statically charged researcher touched the metal housing of the gauge.” The university was ultimately found to have systemic safety failures in the lab.

Horrible electrical accidents like these are an unfortunate occurrence in laboratories across the country. The major hazards associated with electricity in the laboratory are electrical shock or electrical fire. Oftentimes, however, such electrocutions and electrical fires could have been avoided if the laboratory had been aware of safety hazards and taken appropriate measures to correct.

Careful Compliance

Laboratories are stocked with electrically powered equipment used on a daily basis. Whether it's vacuum pumps, stir plates, UV lamps, or refrigerators, all electrical equipment can pose a serious hazard if not properly maintained or improperly used.

While universities have their own individual safety compliance standards, many refer to

ELECTRICAL SAFETY MUST-DOS

Make sure your team follows these precautions to lower the risk of personal injury or damage to important laboratory electrical equipment:

- ▶ Inspect wiring of equipment before each use.
- ▶ Replace all frayed or damaged electrical cords immediately.
- ▶ Use only equipment with three prongs (ground) in the laboratory.
- ▶ Use extension cords only temporarily. Otherwise, request installation of a new outlet.
- ▶ Equip all electrical power outlets in wet locations with ground-fault circuit interrupters (GFCIs) to prevent electrocutions. GFCIs are designed to “trip” and break the circuit when a small amount of current begins flowing to ground.
- ▶ Know the location and how to operate shut-off switches and/or circuit breaker panels and use these devices to shut off equipment in the event of a fire or electrocution.

codes and standards set by the National Fire Protection Association (www.nfpa.org) — the global organization devoted to eliminating death, injury, property and economic loss from fire, electrical, and related hazards. Laboratories on university campuses and institutions are regularly inspected to ensure that they adhere to established safety codes.

The laboratory of Daniel Gorelick, PhD, assistant professor in the Department of Cellular & Molecular Biology, at Baylor College of Medicine, Houston, Texas, is inspected once a year, and he says his team is reminded not to overload circuits.

“This means limiting our use of power strips, and never plugging one power strip into another,” says Gorelick. “We are also prohibited from using electrical space heaters.”

On some campuses, safety inspections are done even more frequently.

“We are inspected twice a year, and principal investigators are asked to do a quarterly self-inspection,” says Andrea C. Gore, PhD, professor and Vacek Chair of Pharmacology, at the University of Texas at Austin.

Gore says the school’s Environmental Health & Safety’s general lab inspection list includes checking for frayed or torn electrical cords on instruments, an extension cord that is used permanently, a blocked electrical panel, and improper use of cords/receptacles. All of these are code violations.

For inspector Mark Yanchisin at the University of Florida, finding these types of violations as well as more egregious ones is far too common.

As the university’s Clinical and Laboratory Safety Program Manager, Yanchisin and his team are charged with inspecting the research and teaching labs of about 1,000 principal investigators each year. With the main campus and another 40 or so research sites around the state, it equates to about 3,000 labs. Their goal is to act as a facilitator in resolving non-compliance laboratory safety issues and to train lab staff for safe use of equipment and hazardous materials.

“We never cease to be surprised by what people do when they think they’re saving time,” says Yanchisin. “The PIs have university credit cards and will buy supplies at a hardware store and attempt an electrical job themselves,” he says. “Self repairs are our worse culprits.”

“When we inspect a lab, we often find code violations that weren’t there the previous year,” he adds. “It just means it has to be ripped out, so in the end it was a waste of the PI’s time and money.”

His advice: Ask if you have a question or don’t know the answer or codes. Don’t cut corners. And have new equipment or lab changes checked by an electrician or your safety inspector officers. 