



Shock Treatment: Preventing the Unseen Dangers of Static Electricity

If your laundry ever has made a crackling noise when you take it out of the dryer, or you've watched children rub balloons on their heads to make their hair stand up, you have witnessed the effects of static electricity.

In everyday life, instances like these seem harmless, but in many workplaces static electricity can be extremely dangerous. Often described as a hidden hazard, electrostatic discharge can unexpectedly damage electronic components and cause injuries to workers.

According to Ed Weggeland, past president of the Electrostatic Discharge Association in Rome, NY, electrostatic discharge, or ESD, is defined as the transfer of charge between bodies at different electrical potentials. "For example, a person walking across the floor generates static electricity as shoe soles contact and then separate from the floor surface," Weggeland said. "ESD happens whenever a charged object or human comes into contact with, or [close] to, an oppositely charged object."

Most electrostatic charges naturally dissipate into the atmosphere or vanish through contact with something on the ground. But in many cases a charge can accumulate.

Weggeland stressed that ESD events happen all the time, but most low-level discharges go undetected. Humans do not feel ESD events lower than 3,000 volts, but anything greater than 3,000 is noticeable. Large ESD events may cause a worker to recoil from the shock, creating a potential danger for workers in a confined space or near moving machinery.

Very larger ESD events – those typically greater than 80,000 volts – are extremely dangerous. Such sparks can knock a person to the floor and cause injuries. These high ESD voltages often are found in and around high-speed Web processing equipment, Weggeland said.

Workplaces where employees handle solvents, petroleum, gases, sugar, flour, chocolate powder and other potentially flammable materials also face ESD hazards. In flammable atmospheres, a large static spark can have serious consequences. Many workplace fires, explosions, and injuries have been linked to a static spark ignition of vapors, gases, and dust.

Get Grounded

According to the Electrostatic Discharge Association, equipment design simply cannot eliminate all static generated in a work environment. This makes grounding and bonding of machinery to prevent the accumulation of charge the next line of defense against ESD. Grounding and bonding also may be necessary on a human level. According to the association, some workers in the electronics industry wear a strap that is attached to their wrists and taken back to a verified ground point. Workers who have active jobs can ground themselves by wearing static-dissipative boots.

Some applications cannot be dealt with by grounding and bonding. Insulating material such as plastics – Teflon, nylon, and PVCs – will accumulate electrostatic charge on their surfaces even when grounded, according to the Electrostatic Discharge Association. Controlling static on insulated materials requires other measures such as charge neutralization, the association said.

Another method of minimizing charges is to make sure material transfer rates are kept within recommended low velocities. Transferring a low-conductivity solvent at very high speed will build up a



substantial amount of static. But slightly reducing speed can reduce the amount of static being generated, according to Electrostatic Discharge Association recommendations.

Team Effort

A workplace susceptible to electrostatic discharge should consider establishing an ESD coordinator and an ESD team, Weggeland recommended. "The team approach particularly applies to ESD because the problems and the solutions cross various functions, department heads, management personnel, and representation from areas such as engineering, manufacturing, field service, training and quality, he added. This will ensure a variety of viewpoints and the availability of expertise, Weggeland said.

Once a coordinator and a team are in place, they should identify areas prone to ESD events. National Electric Code regulations require areas to be appropriately classified and designated. The ESD team should make sure safety advisory signs are in place and the organization is taking all possible precautions to prevent problems with static in each area. It also is important that ESD teams raise awareness of electrostatic charge hazards in the workplace, especially among employees working with flammable materials.

*Copyright 2007 *National Safety Council* All Rights Reserved.*