



Safety Training Topics

November 2021

Flame-Resistant Apparel

Epilepsy and Seizures

Compressed Air

Circuit Breaker Panelboards

SAFETY TRAINING TOPIC

Flame-Resistant Apparel

STREET CLOTHES

Artificial fabrics such as nylon and polyester melt into the skin before igniting.

Fabrics melted into the skin make burns deeper and more severe.

Fabrics melted into the skin are extremely painful to remove.

Don't wear artificial fabrics on the job site.

Shirts, pants, underpants, socks, jackets, gloves, and hats are all items that should be made of a natural fiber, rather than nylon or polyester.

FLAME-RESISTANT CLOTHING WEAR

Wear flame-resistant clothing when working on any equipment that is field-marked to warn of electric arc hazards.

Wear flame-resistant clothing when working on any equipment that may produce an arc blast. Essentially, this is all energized three-phase equipment that has contacts that open and close. If in doubt, ask your foreman for the flash hazard analysis of the equipment you will be working on, and find out what the flash protection boundary distance is for that equipment.

Flame-resistant clothing is made from special flame-retardant materials. Nomex is one of the most widely-recognized trade names of such materials.

Flame-resistant clothing protects you from arc flashes, not steady flame.

Flame-resistant clothing will not protect you if you decide, for example, to walk into a burning building. But, it does provide a high degree of short-term protection.

Flame-resistant clothing, if worn properly so that it is securely sealed, will provide a barrier between you and superheated plasma gas.

You must wear the other PPE appropriate to your job, along with the flame-resistant clothing. The only purpose of the clothing is to protect you from an arc flash.

Always wear safety glasses or goggles along with the flame-resistant clothing, even if you are wearing the flame-resistant hood and face shield.

Do not open or remove the flame-resistant clothing if you are within the flash protection boundary distance.

Keep in mind that an arc flash can happen at any time. It does not know whether you are taking a break or not. If you are standing in the path of an arc flash, what you are doing at the time doesn't matter.

FLAME-RESISTANT CLOTHING CARE

Inspect your flame-resistant clothing before wearing it.

Give it the smell test, as well as a visual check. If it is not clean, you risk exposure to pathogens.

Look for tears or pinholes, as they can allow plasma through.

Look for stains or anything that may create an ionization path across or through the material.

Launder per manufacturer's instructions. It's best to use a surfactant or non-abrasive detergent (read the label) and reject detergents that contain wood pulp.

Do not launder flame-resistant clothing more times than the manufacturer allows.

When washing flame-resistant clothing, do not mix it with garments made of other materials. Doing so may contaminate the flame-resistant clothing with fibers from the other materials, and that could allow a breach of the suit under flash conditions.

Dry the suit immediately after washing and do so per the manufacturer's instructions. Any material left damp will degrade more rapidly than if dried properly. Also, material left damp will grow molds that can allow a breach of the suit under flash conditions.

REVIEW AND DISCUSSION

- Why should you not wear nylon or polyester clothing on an electrical job?
- Are you wearing any nylon or polyester now? Have another crewmember read your shirt label, if need be.
- What will flame-resistant clothing protect you from? Not protect you from?
- When should you wear flame-resistant clothing?
- What should you do if you're unsure if the equipment you'll be working on requires flame-resistant clothing or not?
- Should you wear safety glasses with your flame-resistant clothing, even if you are wearing the flame-resistant hood and face shield?
- If it's hot and you need to take a break, can you stop work and open your flame-resistant clothing? Why or why not?
- What should you do before wearing flame-resistant clothing?
- What are some inspection considerations?
- How should you launder flame-resistant clothing, if the company doesn't handle laundering for you? What are some rules about washing these?

SAFETY TRAINING TOPIC

Epilepsy and Seizures

WHO CAN HAVE SEIZURES

People with seizure disorders including, but not limited to, epilepsy.

- A person who has a fever not related to a seizure disorder.
- People with certain diseases, such as diabetes.
- People who are using pharmaceuticals, correctly or otherwise.
- People with no history of seizures.

TYPES OF SEIZURES

A seizure is a condition where a person's nervous system is overwhelmed.

The grand mal seizure that most people associate with epilepsy is the most dramatic, but not the only, kind of seizure.

At the other end of the seizure spectrum is near comatose loss of consciousness. Seizures occur in varying degrees between these extremes, but are generally characterized as grand mal, petite mal, or psychomotor seizures.

GENERAL SEIZURE RESPONSE

Call for help immediately and activate the Emergency Medical System. Remain with the victim until help arrives or until your foreman assigns someone to take your place. If you are the first on the scene, you are in charge until your foreman or emergency response personnel say otherwise.

Look for any blood, vomit, dentures, or other foreign bodies in the mouth of the victim. Do not attempt to remove them as long as the patient is breathing.

If the victim isn't moving, ensure the victim's airway is not obstructed. An easy test is to ask the victim a question. If the victim answers, the airway is open. If you don't get an answer, place your ear over the victim's mouth or nose and listen for exhalation.

If you are trained in CPR, you may need to administer it.

Make someone available to go with the victim if the victim goes to the hospital. You may need to provide separate transportation from the emergency vehicle. Someone will need to help with the victim's personal effects, admissions paper-work, and notification of family or others. That person may be the foreman or someone appointed by the foreman.

REMOVING OBJECTS FROM THE MOUTH

Generally, by reaching in to pull an object out of the mouth, you are more likely to shove an object farther down the airway than to remove it. Medical personnel have suction equipment for removing such objects.

You can try the Heimlich maneuver if the victim cannot breathe with the object in place.

Clear secretions with a tissue, and try to keep the victim in a side-lying position to prevent choking.

The tongue is the most common airway obstruction. If the victim is lying on his/her back, use a chin-lift or gentle jaw thrust maneuver to raise the tongue. Do not hyperextend the neck.

IF THE VICTIM IS UNRESPONSIVE

- Do not move the victim-the fall may have broken bones or done other damage.
- Do not give the victim water, until the victim is fully conscious.

IF THE VICTIM IS THRASHING ABOUT

- Move hard objects, such as furniture, away from the victim to prevent further injury.
- Place pillows, cushions, or other soft objects around the victim.
- Do not attempt to restrain the victim. Don't even touch the victim if he or she is moving and still having the seizure.
- Do not yell at the victim to calm down. Seizure victims have no control over their seizure, and any excited action on your part will simply draw an unneeded crowd.
- Stay as calm as you can, and reassure the victim and others around.

REVIEW AND DISCUSSION

- What are some rules about responding to active seizures?
- Who can have seizures? Are all seizures dramatic? When should you call for help?
- How long should you remain with the victim?
- What should you look for in the mouth of the victim?
- What should you ensure, if the victim isn't moving?
- Should someone be available to go with the victim? Why?
- How do you remove objects from the victim's mouth?
- What are some rules about responding to passive seizures?

SAFETY TRAINING TOPIC

Compressed Air

DANGERS OF COMPRESSED AIR

A person took a blast of air at 80 PSI in a small wound on his hand. The air caused his arm to swell to twice its normal size, and left him with shooting pains from his fingers to his shoulder.

A blast of 40 PSI can rupture an eardrum from four inches away. It can also cause a fatal brain hemorrhage.

Air at 12 PSI is enough to pop an eyeball out of its socket.

Air at 4 PSI can rupture your bowels. Don't ever "goose" somebody with an air hose.

Compressed air entering through the mouth can rupture lungs and other internal parts.

Using compressed air to blow dust or other debris off your clothing can actually drive it under your skin. This can result in an embolism and a painful death.

CAUTIONS

Wear safety glasses whenever using air tools.

Before operating an air tool, take a quick look at the hose and fittings, to spot anything obviously wrong. If the hose is excessively cracked or worn, take it out of service.

When using compressed air for cleaning, use a pressure-limiting device that limits the nozzle pressure to 30 PSI. You can operate such a device in conjunction with a tank or pipe pressure of 80 PSI or higher. These devices are usually point of use regulator sets complete with a moisture trap.

Hold the nozzle when turning the air on and off. Otherwise, it may dislodge, jump, or in some other way go where it's not supposed to go.

Never kink an air hose to stop the airflow. That's the job of the air valve.

Don't patch a leaking hose with duct tape. You can replace the hose, or you can repair the leak by cutting out the bad section and joining the hose back together with a connector and clamps.

Keep air hoses out of aisles, if possible. If not possible, use a guard over the hose to protect it.

If you have a choice of nozzles, obtain the one with barrel holes perpendicular to the shaft, rather than one with a solid barrel. This is called a safety nozzle. The barrel holes release the pressure from the nozzle, if the tip is covered by any- thing-such as a body part.

Don't point the nozzle at other workers.

PORTABLE AIR COMPRESSORS

While it's unlikely you will be responsible for a plant air system, you may be responsible for a portable air compressor for use with power tools. A portable compressor has its own special requirements.

When loading it in the truck, don't set it on top of the hoses.

THE LIFT

Stow the compressor securely, just as you would other tools, for transportation.

Consider the bending radius of the hoses-rolling them up too tightly will damage them.

Check the hoses and fittings before first use-hoses may have been damaged or fittings may have loosened during transit. Use the safety clips at connections.

Use a heavy cord to power it, and route it to avoid tripping hazards.

You know to use the right power source, but a qualified "helpful" person on the site could jury-rig things and hook you to the wrong source. Take care of the power yourself, to avoid this problem.

You most likely would bring extra lengths of air hose to the job site. Be sure to manage any excess hose so it doesn't create a tripping hazard.

REVIEW AND DISCUSSION

- What are some things that compressed air can do to the human body?
- Why should you never "goose" someone with an air hose?
- Why should you never use an air hose as a brush for cleaning debris off your clothes?
- What should you always wear, when using air tools?
- Why should you hold the nozzle when turning the air on or off?
- What is a safety nozzle, and how does it work?
- If you have a leaking air hose, should you duct tape it? Why or why not? If not, what should you do instead?
- How tightly should you coil the air hoses, when taking a portable compressor from job to job?
- Why should you check hoses and fittings before first use after transporting a compressor?
- Why should you handle the power for the compressor yourself, rather than letting the customer or some other person of unknown qualification do it?

SAFETY TRAINING TOPIC

Circuit Breaker Panelboards

WHY THIS IS IMPORTANT

Working in energized panelboards poses a shock and flash risk to the installer.

With today's 24/7 operations, it is unlikely you will be able to de-energize a panel, unless it is a new installation.

INSPECTION

Before removing the covers from an energized panelboard, note the position of each branch circuit breaker.

If any circuit breaker is in the tripped position for no apparent reason, notify your foreman before proceeding with work.

The two preceding steps may prevent you from being wrongly accused of knocking down a branch circuit, or from inadvertently causing harm by closing a breaker that is on a faulted circuit.

Note the rating and type of circuit breakers the panelboard will accept. Verify the circuit breaker you are installing will fit in the panelboard.

Before adding breakers, verify that the interrupt rating of each circuit breaker to be installed exceeds the available fault current at the panelboard. Do not install a circuit breaker that does not meet or exceed the available fault current in the panelboard.

The available fault current at any location in the facility is generally not posted, but you can make a quick check by looking at other breakers in the panelboard. Question installing a breaker rated at 10 KAIC in a panelboard full of breakers rated at 25 KAIC.

COVER REMOVAL & REPLACEMENT

Removing and replacing panelboard covers is a two-person job.

Store all screws, bolts and other hardware used to secure the covers so they will not be lost. Replace any missing hardware with equivalent devices. The hardware that holds covers in place is designed to keep the covers from blowing off should a fault occur in the enclosure. Missing hardware may allow a door or panel to become a projectile in a fault condition. The result may be the loss of life, limb and property.

If you open a circuit breaker accidentally, do not reset it. Notify your foreman or the operations people immediately. You may do more damage by resetting a breaker than by leaving it open.

RACEWAY, WIRE AND TERMINATIONS

The installation of new circuits often requires you to drill holes in the enclosure for new raceway fittings. Careful drilling, with proper covering and catch materials, will prevent metal chips from falling on energized bus.

Use knockout punches where possible to prevent burrs.

Use a small magnet to remove metal shavings from the enclosure.

Metallic raceway is part of the grounding system. Tighten the locknut so the connection is snug.

Carefully install conductors into raceway to prevent nicks and other damage to insulation. Replace the conductors if the insulation is damaged. If unsure, perform an insulation resistance test.

Do not install more than one conductor under a lug or termination. Install additional ground or neutral bus bars as required to meet conductor requirements.

Do not allow loose strands of conductor to "stick out" from termination.

Update the panel circuit directory to reflect new work.

If you remove circuits, place the affected circuit breakers in the "OFF" position and label the circuit breaker as "SPARE" on the panel circuit directory.

REVIEW AND DISCUSSION

- Why is it important to document tripped and "OFF" circuit breakers before removing panel covers?
- When should you reset a circuit breaker that you have accidentally knocked open?
- How many people does it take to remove a panelboard cover?
- How many people does it take to work in a panelboard?
- Should you be concerned if some of the panelboard fasteners are missing?
- What are some concerns about making holes in enclosures?
- When should you double up conductors under a single lug?
- When removing old circuits, what do you do with the circuit breaker?
- Is it acceptable to terminate neutral conductors on the ground bus?
- If a wire is nicked, what color of electrical tape should you use to conceal the damage? Or, should you use tape at all? Why or why not?