NECA
OREGON PACIFIC CASCADE CHAPTER
NATIONAL ELECTRICAL CONTRACTORS ASSOCIATION

Safety Training Topics

September 2022

Tools – Hand Tool Safety

Tools – Hydraulic and Pneumatic Tools

Tools – Powder-Actuated Tools

Tools – Power Tool Safety

The Safety Attitude

SAFETY TRAINING TOPIC

Tools – Hand Tool Safety

WHY THIS IS IMPORTANT

A misapplied hand tool can easily result in injury.

A worn or damaged tool can easily result in injury. Tool-related injuries are 100% preventable. Check tools before you use them.

Poor tool use and maintenance habits are common.

If the tool slips off the part you're doing electrical work on, it may result in more than skinned knuckles-you could come in contact with energized parts.

PICK THE RIGHT TOOL FOR THE JOB

Do not use a screwdriver, wrench, or other tool as a hammer. Use a hammer, instead. If you use a ratchet as a hammer, you'll damage the mechanism and it will slip later.

Use insulated tools around energized equipment. Electrical tape wrapped on the shank of a screwdriver is not suitable insulation.

Avoid using adjustable wrenches. Use the correct size box end or open end wrench.

Do not use pliers to turn nuts or bolts.

When using a slotted screwdriver, use the correct size blade for a given slot. Use Phillips head tools for Phillips head fasteners, Torx™ head tools for Torx™ head fasteners, and so on.

Do not use a screwdriver as a pry bar.

A screwdriver with a fatter handle reduces wrist strain. Use hardened, industrial-quality tools.

REPLACE WORN TOOLS

Replace any tool if the plating is chipped or peeling.

Replace a screwdriver if the tip is chipped, bent, or rounded off.

Replace a box end wrench if the box edges aren't sharp or true.

Replace an open end wrench if the jaws are no longer square.

Replace an adjustable wrench if the jaws have noticeable play, the mechanism slips or binds, or the jaws are rounded.

Replace a socket wrench if the wrench binds, if the locking mechanism no longer holds, or the wrench won't easily switch from forward to reverse.

Replace individual sockets if they are cracked, they don't stay on the wrench or extension, or if the faces or corners are no longer true.

Replace adjustable pliers if the jaws slip or bind. Replace them if the jaw grooves are worn too much for an effective grip.

Replace or sharpen any cutting tool that has lost its edge. Replace wire strippers and cutters that are dull.

MAINTAIN TOOLS

Keep tools clean so they don't slip when you use them. Keep tools dry so they work properly. Keep them on a pad if storing them in a metal container.

Keep tools organized so you're not tempted to use the wrong one.

Keep tools with moving parts, like adjustable pliers, lubricated.

WEAR PPE

Wear safety glasses to protect your eyes.

Wear work gloves as needed to protect your hands.

MISCELLANEOUS

When using a knife, push away from your body.

When using wire strippers, take care not to "aim" them at another person or at your own face.

REVIEW AND DISCUSSION

- Why should you use the right tool for the job?
- What's the problem with using a worn or damaged tool?
- What should you use, if you need to hammer something? Why not a ratchet?
- How does the type of screw or other threaded fastener you're using help determine what type of screwdriver to use?
- When should you replace screwdrivers?
- When should you replace wrenches and pliers?
- When should you replace sockets and ratchets?
- When should you replace cutting tools?
- What are some rules about tool maintenance? Why is tool maintenance important?
- What are some PPE issues?

SAFETY TRAINING TOPIC

Tools – Hydraulic and Pneumatic Tools

PRESSURE

Pneumatic tools operate with sufficient pressure to cause bodily harm or death. At the point of use for a distributed air system, the operating pressure is typically 30 PSI, but it can be much higher at the main air header. Portable pneumatic tools typically operate at the pressure of the air tank-usually 80 PSI or higher.

Hydraulic tools operate by forcing the volume of one chamber into the much smaller volume of another chamber, thereby multiplying the pressure. The explanation for the physics of this is called Bernoulli's Law. Pressure created by hydraulic tools can be several thousand PSI, which is enough to penetrate metals. Even manually-powered pump action punch sets generate significant pressure.

Check hoses and fittings before and during use. If a hose looks cracked or chipped, replace it.

Fix any leak immediately. A hose leak can mean a hose is about ready to pop off a fitting, or it can mean it is about to burst. A pinhole leak in a hydraulic line can slice off your leg.

Never aim a powered tool at another person.

Hold pieces down with clamps, rather than with your fingers or those of a coworker. If the work surface isn't amenable to clamping, use vise grip pliers or some other tool instead of your bare hands.

Safety glasses are the bare minimum PPE when using pneumatic or hydraulic tools. Depending on the situation, you may need to wear goggles or a face shield. Wear work gloves if exposure to metal shards is a possibility.

NOISE

The high-pitched whine of the spinning parts of the tool attacks your hearing at its boundaries. In fact, you may not even be able to hear noise that is destroying the cilia - those little hairs deep inside your ear. Wear hearing protection when using air-powered tools.

The noise of the compressor is usually loud enough to require hearing protection.

OIL

If a tool drips or leaks oil, wipe up the oil immediately. In addition to creating a slipping hazard, the oil may attack skin tissue or have vapors that are irritating or even harmful.

Wash your hands after using pneumatic or hydraulic tools, so you don’t ingest the oil that these tools use.

Pneumatic tools usually have mineral oil or some other light oil in their working parts. The air around you will have some oil in it as you use the tool. Provide some ventilation to reduce toxicity.

Hydraulic tools use hydraulic fluid. This fluid does not have the same properties as the motor oil in your car. It is usually more toxic.

Depending on the fluid, you may need to wear rubber gloves to service the tool. If you are unsure, read the manufacturer's manual. Servicing the tool can be any- thing from adding hydraulic fluid to replacing a leaky seal.

REVIEW AND DISCUSSION

- Do air-powered tools pose much of a hazard?
- Do hydraulic tools produce enough pressure to penetrate metal?
- When should you check hoses and fittings?
- When should you fix a leak?
- Is a pinhole leak dangerous?
- Where should you never aim a powered tool?
- What are safe ways to hold work pieces in place?
- What PPE is appropriate for use with these tools?
- What are some noise issues to be aware of?
- What are some safety rules regarding the oil or other fluids used in hydraulic and pneumatic tools?

SAFETY TRAINING TOPIC

Tools – Powder-Actuated Tools

GENERAL REQUIREMENTS

Only qualified operators should operate these tools. Powder-actuated tools are, in essence, firearms-and deserve the same level of respect and care.

As with firearms, anyone near the area of operation must wear hearing protection. Unlike firearms, operators and anyone nearby must wear face protection-not just safety glasses-because of the proximity of the point of impact.

Always inspect the tool before use. A misfire can be lethal, so en on the side of caution.

Never load a tool until yon are ready to use it. Unload the tool before breaks. Never leave a loaded tool unattended-unload it.

Do not leave loads unattended. If you do not have a way to lock np unused loads, leave them with your foreman or another person designated for that purpose.

Never point the tool at any person, whether it is loaded or not. Point it toward the ground, any time it is out of its case and not being used.

Rope off the work area and post the appropriate warning signs.

Use the correct tool for the application. For example, don’t use a low velocity tool in a high velocity application or use a high velocity tool in a medium velocity application.

Use the appropriate powder charge for the application. You can determine the powder load by observing the color of the load (gray, brown, green, yellow, red, or purple) and the case color (brass or nickel). Nickel cases always have a higher energy level than brass ones. Caseless loads are in the six lowest energy levels.

Determine base material suitability prior to using the tool.

DETERMINING BASE MATERIAL SUITABILITY

- Using a fastener as a center punch on the base material you intend to use, strike the fastener with one sharp blow.
- If the tip left a clear impression in the material and the point of the fastener is not blunted, proceed with the first test fastening.
- If the tip didn't leave a clear impression in the material or if the tip of the fastener is now blunted, the material is too hard.
- If the material cracks or shatters, the material is too brittle.
- If the fastener sinks into the material, the material is too hard.

LIMITATIONS

Do not use these tools in the presence of flammable gases, vapors, or dust. Do not use in the presence of other explosive materials.

Do not drive the fastener into an existing hole, unless you use a manufacturer-supplied guide for that purpose.

Do not drive fasteners into very hard or brittle materials unless you have fasteners and charges designed for that purpose. Such materials include cast iron, glazed tile, glass block, face brick, and hollow tile.

If driving into thin material that the fastener might completely penetrate, place a suitable backstop behind the material.

Don’t drive a fastener into a spot less than 1/2 inch from the edge of steel or 3 inches from the edge of masonry.

Don't drive fasteners into concrete unless the material is at least three times as thick as the depth of the fastener penetration.

OPERATING THE TOOL

Use the shield, fixture, adapter, and/or accessory as specified by the manufacturer. If in doubt, consult the manual or contact the manufacturer for assistance.

Align the tool so it is perpendicular to the work surface. Otherwise, you may get a collateral discharge. The manufacturer may allow you to make exceptions to this rule by providing a different procedure for special applications- this will typically include additional precautions.

Make a test fire, before making all the fastenings required for the job. Start with the lowest energy level recommended for the job. If the fastener doesn't penetrate deeply enough, try the next most powerful charge.

Should a misfire occur, hold the tool against the work surface for a full 30 seconds. Then, follow the manufacturer’s instructions exactly. If you get more than one misfire in a given shift, ask your foreman to help you determine the cause.

REVIEW AND DISCUSSION

- Who can administer powder-actuated tool training?
- What protection must everyone use when near a powder-actuated tool operation?
- Who can use these tools?
- When should a tool be loaded? Unloaded? Why?
- What should you do with unused loads if you must leave the area?
- What are the rules for pointing the tool?
- How do you know you have the right charge for the application?
- How do you test the material to see if it is too hard?
- What if you need to drive the fastener into an existing hole?
- What should you do if a misfire occurs?

SAFETY TRAINING TOPIC

Tools – Power Tool Safety

GENERAL RULES FOR USE

The minimum PPE is a pair of safety glasses. Hearing protection is usually warranted.

Do not wear loose clothing around rotating equipment, including power tools. This includes work gloves - use the proper type. Ask your foreman if you are unsure.

If you have long hair, wear it put up in a hairnet, ponytail, or other restraint to keep it from getting caught in the rotating parts.

Use the correct attachments and any guards that go with them. Do not use a dull drill bit or a rounded screwdriver bit.

Inspect the tool before use.

Don't carry tools up and down ladders. Raise and lower them in buckets or other devices, or have someone hand them to you.

DRILLING

Mark your hole and set up the job so you can drill as straight as possible.

Don't hold a drill by the vents. An arc can burn your hands.

Use the handle that attaches to the side of the drill to reduce the chance of wrist injury as you break through the hole or if you have other high-torque demands.

Use a sharp drill bit that is appropriate for the material you are drilling.

Avoid turndown shanks. Using such shanks often causes you to exceed the capacity of the tool.

Use cutting fluid if appropriate.

Do not use a wood bit on a pre-existing hole. Doing so will bind the bit, and the twisting of the drill can injure-or even break-your wrist. It could also snap the bit and throw it in your face.

Make sure you are on good footing so you don't slip.

Use the right hole saw for the material, preferably one with a starter drill to reduce slippage. See the manual if in doubt.

If drilling masonry, use a masonry bit and a masonry drill or other tools made for that purpose. Do not use these tools for non-masonry holes.

De-burr any hole after making it.

CORDED TOOLS

Use corded tools with a GFCI, unless you have an assured grounding program. If you do have such a program, using a GFCI adds even more protection.

Avoid tripping hazards when laying out portable cords. Inspect portable cords before use. Never wrap a power cord or portable around your wrist, leg, or other body part. Keep cords out of water. Use industrial cords.

Match the capacity of the tool to the job.

Use tools or fixtures, rather than bare hands, to hold and support materials being worked on. For example, use clamps, pliers, vices, or pipe cutting tripods.

BATTERY TOOLS

A double-insulated battery-powered tool is very safe. It is not a license for carelessness. Drilling into a live conductor, even with such a tool, can be lethal.

Charge your battery before us, so you don't have to climb up and down ladders to get a replacement.

Don't use a battery-powered tool that is reaching the end of its charge. This is like using a worn screwdriver. Something will slip.

If you can use a self-locking chuck rather than key-tightened chuck, do so. This prevents slippage.

REVIEW AND DISCUSSION

- What is the minimum PPE for using power tools?
- What are some issues with work gloves and power tools?
- What do you need to do to avoid "catch" injuries from rotating parts?
- Why should you not use a dull drill bit or rounded screwdriver bit?
- When should you inspect a power tool?
- How should you get power tools to your work location if you are working on an elevation such as a ladder?
- If you need to set anchors in masonry, what kinds of power tools and attachments should you use? Not use?
- Why should you use the handle attachment when drilling? What are some drilling errors that can lead to injury?
- What are some rules for corded tools?
- What are some rules for battery powered tools?

SAFETY TRAINING TOPIC

The Safety Attitude

MYTHS vs TRUTH

Myth: Safety is someone else's responsibility. I just work here.
Truth: Safety is everyone's job.

Myth: Safety is a bunch of rules. I can do anything the rules don't prohibit.
Truth: The rules aren't there to punish you, they aren't perfect, and they can't cover every contingency. Safety is a matter of doing the job in a way that is safe. Coming up with novel ways to hurt yourself is not a mark of maturity or intelli-gence.

Myth: The foreman and safety director enforce the safety rules, so if they aren't looking, the rules don't apply.
Truth: The real enforcers of safety rules are injuries and death-why break the rules?

Myth: I shouldn't have to practice safety unless everyone else does.
Truth: If other people are foolish, that doesn't mean you must also be foolish.

Myth: Safety meetings are just a break from work.
Truth: Safety meetings are about helping you not get injured or killed.

Myth: Safety gear is just a hassle. Hardhats and safety glasses are a bother.
Truth: Getting your eye pierced with a copper wire is a hassle and a bother, to say the least. So are many other potential injuries.

Myth: Safety rules slow you down, and the company doesn't really want to sacrifice production.
Truth: Work accidents slow down work, and create time losses that are not recoverable. Your management has approved each safety rule with good reason, and all jobs are scheduled with time allowed for safety practices. If the schedule is off, work this out with your foreman rather than endangering yourself and others.

Myth: My foreman is talking about the other guy. It can't happen to me.
Truth: People with this attitude are the ones most at risk.

THOUGHTS TO KEEP IN MIND

The slogan "Safety is No Accident" means you eliminate accidents by purposefully putting safety in the front of your mind.

You are your brother's keeper, or sister's keeper as the case may be. This industry is a very dangerous one, and all of us must look out for each other. When you alert your co-worker to a safety concern, the implication is not that the other person is deficient. The expectation is that you are doing your part in keeping both of you safe.

The intelligent and mature person is always willing to benefit from the good safe- ty advice of others. If someone helps you see you were doing an unsafe act, thank that person. The life just saved may have been your own.

Keep yourself physically prepared, so you can stay alert. Get your rest. Don't take illegal drugs. Use other drugs, such as liquor and over the counter medications, responsibly and not on the job.

WHAT TO LOOK FOR, WHAT TO ASK

Look for unsafe conditions when entering an area or starting a task.

Always ask yourself, "Is this the safe way to do this task?" Think in terms of "what if," and take the appropriate actions.

Ask others, "Do you think you are doing that safely?" if you think they are not. Safety is everyone's responsibility, individually and collectively. A friend- ly reminder may save the life of a friend.

REPORT

Report unsafe conditions to your foreman, and take any emergency measures needed to prevent an immediate danger. For example, put markers on a spill or clean it up.

Remember that an unrepentant, unsafe coworker is an unsafe condition, worse than is bad lighting or an oil spill.

Report injuries to your foreman.

REVIEW AND DISCUSSION

- Who is responsible for safety?
- If safety rules don't prohibit an action, does that make it safe? Why or why not?
- What are the real enforcers of safety rules?
- What is the purpose of safety meetings?
- Why should you not break safety rules to meet production quotas?
- In what way are you "your brother's keeper?"
- What should you ask yourself, when doing a job?
- What should you ask others when you see an unsafe act in progress?
- What should you do about unsafe conditions?
- To whom should you report injuries?