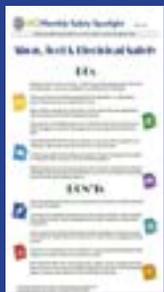


March 2014

Shop and Tool  
Safety/Electrical  
Safety

Poster of the Month

Shop, Tool &  
Electrical Safety  
Dos and Don'ts



No matter who you are or what you do, tools are part of your life at work and at home.

Following safe work procedures when using tools is a responsibility we all share.

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[Angle Grinder Safety](#)



# UC | Safety Spotlight

A UC System-Wide Publication of the Environment, Health & Safety Leadership Council



## Manuals at the Machines: Binder Pockets

All machines, new or old, have operator manuals. If you look online a bit, or sometimes if you just look in your shop offices file cabinets, you will often find what you are looking for. In my experiences, the manuals have never been at the machine where they can be immediately referenced. Tracking down the manual was never efficient. Asking a coworker is not always easy. Pointing out to a coworker a shortcoming with safety or use is usually uncomfortable. The local and visible information in a binder pocket makes things much easier.

A binder pocket holds a binder inside, allowing it to stick out a few inches, and provides a surface outside to mount a one-page set of key operating and safety points. Painted yellow and mounted conspicuously either on the machine or an adjacent wall, the binder pockets house multiple levels of information at a machine for quick access by trainers, newly trained operators, and experienced operators. Each binder contains the manufacturer's manual and other information that can include a parts listing, supplemental shop-specific information, and other documents from your campus or other entities around the country that can be of value to trainers and supervisors.

Benefits are numerous. One is the obvious visual reminder of safety as an operator works at the machine. Another is the easier means for a supervisor or a safety coordinator to bring a PPE or operating issue to the user. Machine trouble-shooting is helped. Infrequently used machine features are more likely to be looked up in the manual rather than pursued by trial and error. Teaching moments are much more easily guided by the official manual rather than someone's personal interpretation. Overall, binder pockets can be an important part developing and maintaining an improved culture of safety.

For any questions, feel free to contact the Safety Coordinator at your local EHS department.

By: Victor Duraj

## Electrical Safety Basics



- Read and follow the manufacturer's instructions
- Be sure power tools are clean and in good condition
- Use gloves according to the specific safety requirements of the tool that you are using
- Do not carry a tool by its power cord
- Power tools should be in the "off" position when they are carried from place to place
- Do not yank a power cord to disconnect it from the power source. Always disconnect a power cord by pulling on the plug itself
- Replace or repair tools if cords are frayed, cracked or have loose plugs
- Extension cords must be properly rated for the tools you are using
- Keep cords away from heat, oil and sharp edges
- Unplug tools when not in use, before servicing or when changing blades, bits or cutters
- Maintain stable footing and balance so you can control your tools
- When using power tools, avoid touching metal pipes, beams or posts. Current could flow to the ground through your body
- Never modify a grounded (3-prong) plug or a double-insulated plug (2 differently shaped prongs) in an attempt to fit them in outlets for which they are not designated

# Stud Finder - Don't Get Shocked by What's Behind

In some circles this might be a social app, but for shop and maintenance folks, a stud finder is an indispensable construction safety tool. Depending on technologies used, a stud finder provides physical, visual, and/or audible indications of a wall stud's location, which helps determine where to drive a screw to securely hang a whiteboard, case, cabinet, and so forth. Sometimes a stud needs to be avoided, to use specialized hardware such as expanding "molly" bolts or the ever popular screw-in drywall anchors. However, in either case the hazards lurking inside the wall can be very dangerous. Most notable of these is electrical wiring, but natural gas, compressed air, vacuum, industrial and potable water, and phone and internet cables can also be found inside walls. Building codes have evolved to add some physical protection to electrical wiring in particular, but a cordless drill and a motivated worker can easily unknowingly defeat the protections.



Stud finders use various technologies, including ones that can help sense the location of wires and in some cases metal piping as well. The devices range in price from around \$10 to over \$100, with varying capabilities that may or may not be proportional to price. Some have been recalled over the years for ineffectiveness. Some take more than nominal skill and practice to operate, including specific sliding motions that allow the electronics to sense a changing "landscape" behind the sheet rock. Some may not be as effective through plaster.

So, before you drill or screw into the walls of an office or shop, you must check with your department/college/school/campus' facility and safety experts to ensure that what you want to do is allowable. Depending on established policy and on the size and depth of your fastener, you may indeed be allowed to do the work yourself. This is one of the situations where asking permission first can be much less painful than forgiveness later.

*By: Victor Duraj*

## Avoiding Entanglements: Hair, Hand and Body Protection

Entanglement risks are prevalent when working in a shop environment. Serious injury, and even death has resulted from improper hair, hand and body protection. Below are examples of risks that can be avoided by taking the right precautions.

- **HAIR** - If hair is touching the shoulders, it should be tied back and preferably into a bun that will not unravel. A hat is recommended but not required. A pony tail that flops forward past the neck should be rolled up or otherwise kept securely behind the head. In certain situations, dropping it down the back of your shirt may be acceptable. Long hair over the forehead past the eyes may also be a hazard, and a hat or head band would be recommended or even required. A good number of our staff who work in shops have witnessed or know directly of a hair entanglement incident somewhere.
- **RINGS** - Rings are prohibited when working around machinery, especially rotating machinery. Without a ring on, similar incidents may result in merely a bad cut instead of a severe injury.
- **WATCHES** - Watches can catch on rotating or linearly moving machine parts. If you are lucky the band will break, and if you are not then serious injury is likely. Do not try to conceal your watch by wearing long-sleeved coats as this creates an additional safety hazard.
- **BRACELETS** - Loose or tight metal and leather bracelets are unacceptable, along with any plastic, silicone, string, bead, or other wrist wraps. If you have a medically required bracelet, then a tight fitting sleeve might be appropriate depending on the task, but please confer with the shop/course supervisor for special exemption that only the shop lead person can give.
- **NECKLACES** - Neck chains that dangle forward (with or without pendants) are not allowed. "Choker" style (snugly fitting) are okay except for in the welding area. Necklaces of any kind are allowed

## Machinery Safety Guidelines



1. Get trained before using machines.
2. Follow instruction manuals.
3. Select the appropriate machine/tool for the job.
4. Use required PPE and guards.
5. Set up before starting.
6. Change dull blades, clamp work, and secure bits, and remove chuck keys.
7. Make sure operating controls are clearly labeled and easy to reach.
8. Turn off machinery when unattended.

## Drill Press Safety Tips

1. Select round, hex, or triangular shank bits.
2. Secure bits and remove chuck before turning on machine.
3. Work at speed appropriate for bit size and material.
4. Position work to avoid drilling into table.
5. Clamp work to table.
6. Feed bit evenly into work piece.
7. Back out of deep holes.
8. Clear off chips with brush after turning off machine.
9. Never hold work piece by hand.
10. Always clamp sheet metal to table before drilling.

if the shirt is buttoned up to the neck or is in the “crew neck” style. V-neck shirts are inadequate to hold back a long necklace.

- **SCARVES/TIES** - Scarves and ties are prohibited. Ties must be removed. Head scarves must be managed properly. Head scarves of any sort must be tied in back and no part of one may come forward past the neck. Large scarves that may be part of larger integrated clothing are best managed by use of a machinist’s apron or very properly fitting coat with correct sleeve length and cuff tightness.
- **SLEEVES** - Sleeves may \*not\* be loose, unbuttoned, or beyond the wrist. Floppy sleeve cuffs are likely to get hooked on a lathe chuck, a mill cutter, or drill chuck. Jackets with elastic cuffs and tight sleeves reduce the likelihood of entanglement. Ideally, you should roll up your sleeves all the way to the elbows. An unbuttoned cuff that is folded back just once may be an even greater danger than buttoned. To reduce the risk almost entirely, many machine shops simply prohibit long sleeves altogether.
- **UN-TUCKED/UNZIPPED** - Un-tucked shirts present risk especially when the operator leans over or into a lathe, mill, drill press, pedestal wire wheel and so forth. The same goes for unbuttoned or unzipped coats and jackets. Unzipped coats can swing into rotating or moving machine parts, especially if one leans into the machine or if an air fan is running or compressed air is blown in the vicinity. Sometimes plain spinning chucks or work pieces have shape profiles that create a snag potential. Snug fitting t-shirts are okay, as are tighter button-down shirts and blouses.
- **GLOVES** - Gloves are a valuable type of personal protective equipment BUT they can also easily lead to entanglement. Gloves should be worn when handling sharp materials but removed before starting any machine. This applies to ALL gloves, be they leather, cotton, latex, nitrile, fingerless style, etc. Even seemingly thin gloves can wrap up and pull a hand in enough to badly injure it.
- **APRONS** - Aprons are common in machine shops. They protect clothing from coolant and chips, they provide convenient storage pockets for measures and markers, and when properly tied they keep clothing away from rotating parts.
- **EARRINGS** - Stud earrings around machinery are fine, but any earrings around welding operations probably are not fine. Very small hoop earrings whether through the ear, nose or lip are fine around machinery, but anything dangling more than an inch or so is not fine. The shop lead person has discretion in determining what is allowable.

Long pants and closed shoes must be worn while in the Shop when working with any machine tools or equipment, sheet metal or metal scraps and welding equipment. No exposed skin is allowed between the shoes and the pant legs. Tank-top or sleeve-less shirts are not allowed. Especially in the steel rack and sheet metal areas, there are significant risks of cuts and scrapes. In the machining and welding areas, there is greater risk of hot chips or slag or grindings coming in contact with or lodging inside the shirt, which can startle and/or burn you. No exposed skin is allowed between the pants and the neck along the shoulders and to but not including the elbow. V-neck shirts or unbuttoned shirts can expose a limited amount of skin. Hot sparks and grindings should not be able to enter and fall down the front of your body.

Machine guards provided for a machine must be in place whenever the machine is operated. Guards or shields removed for maintenance must be replaced before the machine is used.

*By: Victor Duraj*

## Band Saw Safety Tips

1. Clear tools, debris, and unnecessary materials off table.
2. Verify location of on/off switch and emergency power disconnect.
3. Check blade for tightness.
4. Adjust the blade guard as close as possible to the table without interfering with movement of the stock.
5. Adjust the travel guard down so that the blade will travel within the angle or channel.
6. Operate at manufacturer’s recommended speed.
7. Cut only those materials recommended for use with the machine.
8. Do not force material into the blade.
9. Unplug power cord before changing blade or servicing.
10. Lock power disconnect in “off” position when changing the blade or servicing the saw.
11. Test the saw after disconnecting power and before beginning service.



## Table Saw Safety Tips



1. Set blade height maximum  $\frac{1}{4}$ " (6mm) above stock. This ensures that if your hand slips, you will get a slight cut rather than lose a limb.
2. Position guides.
3. Make sure tabletop is smooth and polished. Dirty, rough tables require extra force to push the stock through the blade. This can increase your chance of slipping or losing your balance.
4. Stand balanced and avoid awkward movements to avoid falling into the blade.
5. Select seasoned, dry, flat wood for cutting.
6. Check stock for nails, knots screw, stones, etc. These items can become projectiles and cause injury.
7. Release work only after it has gone past the blade.
8. Use a push stick to cut stock that is less than 6" (150 mm) wide.
9. Make sure that the blade has stopped turning before you adjust the table.
10. Do not leave the saw until the blade has come to a complete stop.

## Bench and Pedestal Grinder Safety Tips

1. Stand to the side of the grinder when starting the electric motor.
2. Use the correct wheel for the material you are grinding, polishing, or buffing.
3. Adjust the tool rest as close as possible to the grinding wheel without touching it. It must have a gap of between  $\frac{1}{16}$  and  $\frac{1}{8}$  inches.
4. Keep the face of the abrasive wheel square. Use a dressing tool to remove some of the abrasive compound to square the wheel.
5. Never grind on the side of the wheel. This can cause the wheel to shatter.
6. Avoid overheating metal when grinding. If the metal becomes too hot and is allowed to cool too slowly, it may become soft. If it is cooled too quickly (quenched), it may become brittle.
7. Dip the metal into the water pot attached to the bottom of the grinder as you shape it to keep it from getting too hot.
8. If your grinder does not have a water pot, place a container of water near the grinder to cool the piece you are grinding.



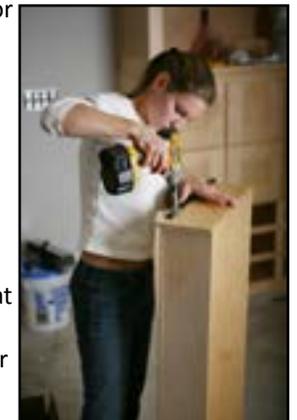
## Milling Machine Safety Tips

1. Keep area around machine clear of debris; wipe up any oil on the floor.
2. Clean and dry the table before setting up.
3. Secure any holding devices.
4. Select the right kind of cutter for the job.
5. Make sure that the machine is turned off before inserting the cutter.
6. Make sure that the arbor, cutter, and collars are clean before mounting them in the spindle.
7. Handle sharp cutters with a rag.
8. Securely set the work piece in the vise with a rubber hammer or mallet.
9. Be certain that the holding device clears the arbor and the over-arm supports.
10. Select the proper cutting speed, rpm, and rate of feed for the job.
11. Disengage the control handles when using automatic feeds.
12. Keep hands away from the revolving cutter at all times.
13. Never touch the metal chips with your fingers. Clear chips away from the cutter with a brush. After cutting is finished, vacuum or sweep debris rather than blowing with an air hose.
14. Release any automatic feeds after the job is complete.
15. Clean and wipe the machine when finished.



## Safety Guidelines for Electrical Tools

1. Inspect cords for defects such as cracks, frays, and other signs of wear or faults in the cord insulation.
2. Use properly grounded tools with three-prong plugs and double insulation.
3. Inspect the plug for cracks and for missing, loose, or faulty prongs.
4. Use manufacturer recommended guards and shields.
5. Switch off tools before connecting them to a power supply.
6. Disconnect the power supply before making adjustments or changing accessories.
7. During use, keep power cords clear of tools and away from the path that the tool will take.
8. Use approved extension cords that have the proper wire size (gauge) for the length of cord and power requirements of the electric tool that you are using.
9. Use appropriate PPE for the work you are doing. This may include items such as safety glasses or goggles, hearing protection, dust mask, gloves, safety boots or shoes, or rubber boots.



## Careless Chris

### Careless Chris Learns a Hard Lesson ...an Imag- inary Scenario



Rain was in the forecast, and fictitious employee Careless Chris planned to make the most of the few sunny days ahead. A warm spell had resulted in an untidy overgrowth of shrubs and an amazing proliferation of weeds, but Chris was up for the challenge. He considered himself very efficient in managing his property.

[Read the story](#)

## Feedback, Please

Send an email to [safetyspotlight@ucdavis.edu](mailto:safetyspotlight@ucdavis.edu) to submit your comments on the March 2014 issue or to suggest content ideas for future issues. We look forward to hearing from you!

## COMING SOON!

### Health & Wellness



Check out our April 2014 issue to learn how to maintain a happy and healthy work-life balance

# connect

Know where to turn on your UC campus for the information you need to keep yourself, your workplace and your environment safe and secure. Click on the campus links below to connect to local program, educational and informational resources.

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## Ladder Inspection Checklist

Loose steps or rungs (consider loose if they can be moved by hand)  
Loose nails, screws, bolts, or other metal parts  
Cracked, split, or broken uprights, braces, steps, or rungs  
Slivers on uprights, rungs, or steps  
Damaged, missing, or worn non-slip bases

### Stepladders

- Wobbly (from side strain)
- Loose or bent hinge spreaders
- Broken stop on hinge spreaders
- Loose hinges

### Trolley ladders

- Worn or missing tires
- Wheels that bind
- Floor wheel brackets missing
- Ladders binding in guides
- Ladders and rail stops broken, loose, or missing
- Rail supports broken or section of rail missing
- Trolley wheels out of adjustment

### Extension ladders

- Loose, broken, or missing extension locks
- Defective locks that do not seat properly when the ladder is extended
- Deterioration of rope

### Trestle Ladders

- Loose hinges
- Wobbly
- Loose or bent hinge spreaders
- Stop on hinge spreader broken
- Center section guide for extension out of alignment
- Defective locks for extension



*From UCLA Shop Safety Manual*