



# Electrical Safety

# Electrical Hazards/Injuries

Electrical equipment used in office areas is potentially hazardous and can cause:

**Shock** – most common hazard, occurs when the human body becomes part of the path through which the current flows

**Burns** – most common shock related nonfatal injury

**Fires** – enough heat or sparks can ignite combustible materials

**Explosions** – electrical spark can ignite vapors in the atmosphere

**Falls** – indirect or secondary injuries, worker falls off ladder when shocked

**Electrocution** – death due to electrical shock



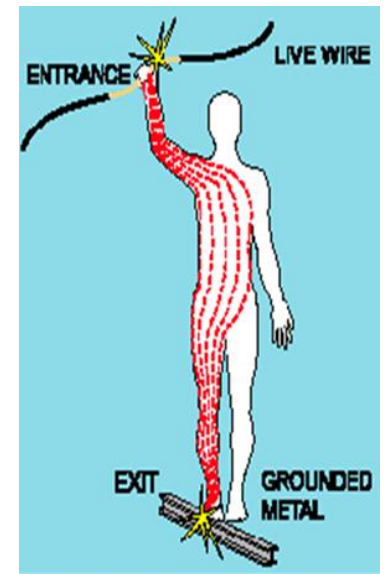
# Electrical Shock

occurs when the body comes into contact with:

- wires in an energized circuit
- one wire of an energized circuit and a path to the ground
- a “hot” metallic part that is a conductor

severity depends on:

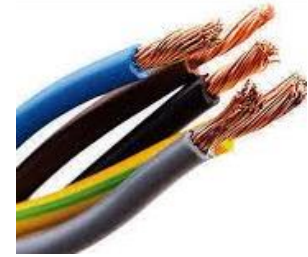
- the amount of current flowing through the body,
- the current’s path through the body,
- the length of time the body remains in the circuit, and
- the current’s frequency



# Conductors

Substances that have little resistance to electricity:

- Wires
- Metals – e.g. Cu, Al, Au
- Water
- People



# Insulators

Substances that have high resistance to electricity:

- Wood
- Rubber / Plastic
- Clay
- Glass



# Controlling Electrical Hazards

To keep you from becoming part of the circuit, electrical hazards can be controlled or safeguarded in several ways:

**Electrical Isolation** – keeping electricity away from us, preventing contact

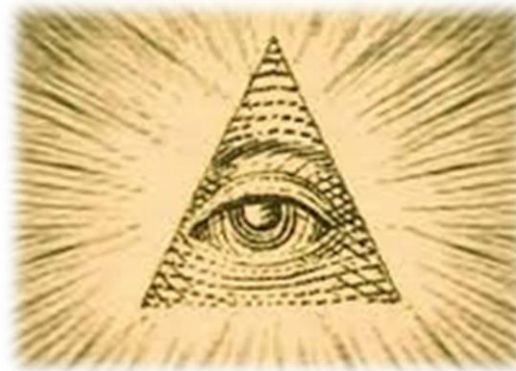
**Equipment Grounding** – a conductive connection to the earth which acts as a protective measure/pathway for stray current to go

**Circuit Interruption** – automatically shutting off the flow of electricity in the event of leakage, overload, or short circuit

**Safe Work Practices** – eliminating hazards, engineering and administrative controls, PPE, training, etc.

# Practical Applications

What to look out for!



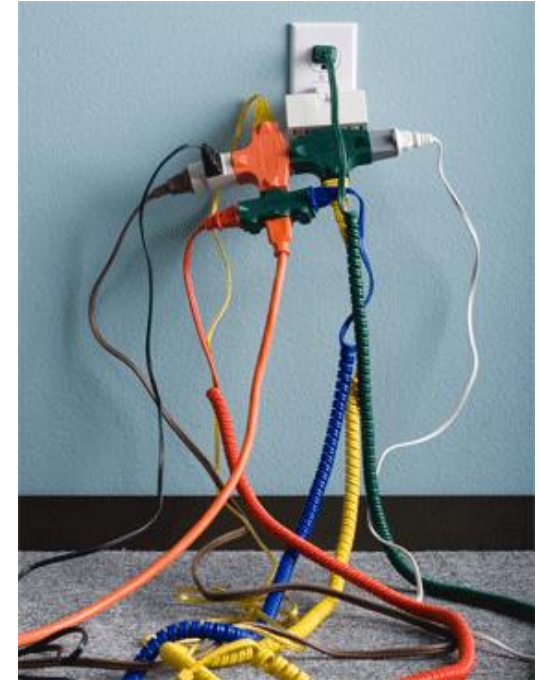
# Electrical Outlet Safety

## Hazards:

- Too many devices plugged into circuit = wires heat to very high temperature = potential fire
- Too many items plugged into a single circuit can cause circuit overload and tripping of the main breakers
- **WARNING SIGNS:** warm switches, blowing fuses, tripping circuits, flickering/dimming lights

## Safe Practices:

- Do not use adapters to add plugs into an outlet
- Do not overload the circuit
- Follow manufacturer's instructions
- Plug high-wattage *appliances* directly into a wall receptacle, only one at a time



# Extension Cord Safety

## Extension cords

- permitted only for temporary uses
- must be visually inspected before *each* shift use
  - damaged jacket/insulation
  - pinches/interruptions
  - grounding pin
  - safety instructions
- NOT for large *appliances*, for electronics/tools only
- black electrical tape does not provide suitable insulation, and is not an adequate repair
- If additional outlets are needed consult Facilities





# Power Strip Safety

## Power Strips

- Connect directly to outlet/wall
- NO extension cords plugged in; NO other power strips connected
  - No daisy-chaining or piggy-backing
- Number of outlets on the power strip does NOT indicate how many devices can be connected – do not overload
- Visually inspect *regularly*
  - damaged jacket/insulation
  - pinches/interruptions
  - grounding pin
  - safety instructions
- NOT for large *appliances*, for electronics only



# Cord Placement to Prevent Hazards

- Do Not run through doorways, windows, pinch hazards
- Do Not place (conceal) under floor mats or carpets
- Do Not use staples, tacks or nails to secure cords
- Do Not place cords where they can become an electrical or trip hazard
- Cords should not undergo severe bending, crimping, pressure, or use in high risk areas



# Placement and Use of GFCI's

## Ground-Fault Circuit-Interrupters



- Used when using electrical equipment in a wet or high risk environment
- Designed to detect any leakage of current in an electrical circuit
- Turn off or “trip” the circuit when there is a difference in current leaving/returning
- Test monthly using test button. Have something plugged into the circuit when testing
- Designed to protect the wiring/equipment from overheating and possible damage – NOT THE USER

# Is All Electrical Equipment in Good Condition?

- Electrical equipment must be maintained in good operating condition
- Equipment must have all panels and covers securely affixed
- Wall outlets must have the wall plate affixed
- Look for signs of damage or overheating
- If equipment is defective, take it out of service immediately; report the hazard!



# Is Equipment (>50 Volts) NRTL Approved?

- All electrical equipment greater than 50 volts should be certified by a [Nationally Recognized Testing Laboratory \(NRTL\)](#)
  - provide product safety testing & certification services to manufacturers
- Includes power strips, electrical cords, small appliances & electronics
- Typical NRTL logos to look for:



# Is Equipment Turned Off After Hours?

- Where possible, electrical equipment should be turned off during non-business hours
- Area motion sensors should be used when feasible to prevent lights being left on
- Use equipment with the EPA “Energy Star” logo affixed when possible



# Agricultural Electrical Safety Tips

- While 'In the field' electrical hazards may be above and below you
- Work safely to avoid accidents, isolate equipment from energy sources
- Keep equipment and extensions clear of power poles/lines
- Do not raise irrigation pipes into the air, carry/rotate them horizontally
- Buddy up! Work with a spotter
- Look Up! Always check for power lines before beginning work:
  - Before throwing tie-downs
  - Before parking vehicles with extensions
  - While near or under trees



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# Agricultural Electrical Safety Tips



- Energized Equipment
  - Any piece of equipment that comes in contact with a live power line will become energized; and any person who is on the ground within close proximity of this equipment is in the most danger.
- In an electric emergency, if your equipment contacts a power line:
  - Move the equipment away from the line if you can do so safely
  - Warn others to stay away, and have someone call 911
  - Stay on/within the equipment
  - If fire or other danger forces you off:
    - jump clear, keeping both feet together
    - without touching the ground and equipment at the same time





# Resources

- This month's UC Safety Spotlight & Poster of the Month  
[http://ucanr.edu/sites/ucehs/Safety\\_Spotlight/](http://ucanr.edu/sites/ucehs/Safety_Spotlight/)
- EH&S Safety Notes, Video Library & Training Materials  
(Safety Notes #19, #144, and Clover Safe Note #53)
- Your Supervisor and/or your location's Safety Coordinator
- EH&S
  - Visit us in person
  - Visit our website: <http://safety.ucanr.edu>
  - Use the EH&S Ask Button



# QUESTIONS?

**Please remember to Sign-in before leaving**

# Is a Portable Space Heater in Use?

- Space heaters should be limited to small personal office areas only.
- If possible, have Facilities make temperature adjustments to your area.
- If a portable space heater is used, it must have:
  - A grounded (three prong) plug.
  - ? A maximum rating of 1500 watts or 13 amps. ?
  - Auto tip-over shut-off feature.
  - 36” clearance in front and 18” on sides and back.
- Do not plug heaters into extension cords or power strips. They must be plugged directly into a wall outlet.

