

Laboratory Electrical Safety

information and slides taken from

www.esd.uga.edu/chem/pub/electricalsafety.ppt

http://web.mit.edu/environment/ehs/electrical_mechanical.html#1

- Yearly Statistics in the US involving Electrical Accidents

200,000 - Accidents

150,000 - Fires

700 - Deaths

Electrical Accidents are the third leading cause of industrial deaths in the US (NIOSH Alert, December, 1986, Publication Number 87-103.)

CURRENT IN MILLIAMPS

EFFECTS OF 60 HZ CURRENT PASSING THROUGH THE BODY

1 or less

May not be felt - Maximum harmless intensity

1 to 8

Sensation of mild shock, can let go at will

8 to 15

Painful shock, muscles contract, may still be able to let go

15 to 20

Painful shock, can NOT let go

20 to 75

Intense pain, breathing may be paralyzed

100 to 200

Ventricular fibrillation; holds unconscious victim to the circuit, could be fatal

200 or more

Heart stops, muscles contract intensely & could break bones, severe burns, breathing stops

Rules for Working Safely with Electricity

1. Don't attempt any work that you feel uncomfortable performing.
2. Wear proper insulating boots and gloves as necessary.
3. Follow Lock-out Tag-out procedures as required.
4. For higher voltage applications, keep one hand in your back pocket to keep a circuit from being completed across your heart.
5. Know the location of any kill switches and cut off switches.
6. Before working near capacitors, allow them to fully discharge.
7. Post emergency numbers by the telephone.
8. Never touch an energized person with your bare hands but rather use a wooden broom or other non-conductor to push them away from a source of current.

Power Strips



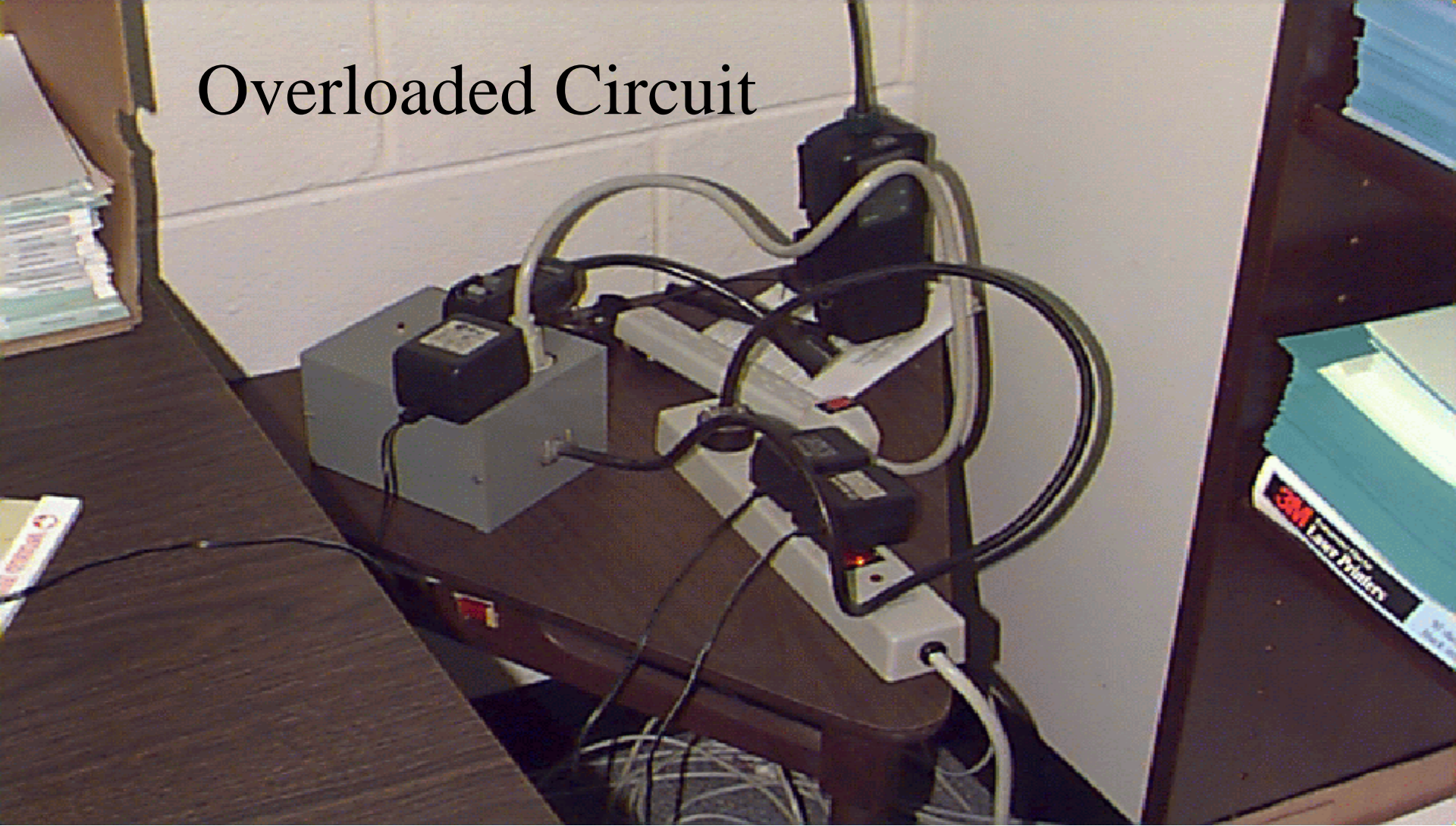
Power strips are approved for use only with computers and computerized equipment. Power strips should be used sparingly. Care must be taken not to overload power strips.

Extension Cord Hazards



Extension cords are approved for temporary use only. If extended use is required, hard wiring such as a new outlet should be installed. Extension cords are easily frayed, a condition which may expose bare wires. If not properly placed, extension cords may also become a trip hazard.

Overloaded Circuit



Another common way in which power cords can be overloaded is by plugging one power strip into another. All of the current drawn by any device plugged into any of the strips must flow through a single cord



Care must be taken to insure that power cords do not come in contact with hot surfaces such as the top of a hot plate where they may melt exposing bare wires. Frayed or melted cords should be replaced immediately before bare wires are exposed.



Variacs and other spark sources such as power strips must be located outside of any fume hood where flammable vapors are present.



Safety showers must not be located directly over switches, outlets, equipment, or other sources of electrical energy such as those shown in the picture to the left.

Also, do not leave surge protectors on the ground. If anyone has to pull the safety shower, this would be a huge problem.

Test tag
should be
current



Small
Nozzle

ABC
indicated
on label

Electrical Fires

Dry chemical extinguishers (also known as ABC extinguishers) are approved for fighting electrical fires. The label indicates the type of extinguisher that is present. Electrical fires should only be fought if the situation is well in hand. If you feel uncomfortable fighting a fire, pull the alarm and exit the building.



Type B or carbon dioxide (CO₂) fire extinguishers should also not be used to fight electrical fires due to the possibility of moisture condensing on electrical circuits. Carbon dioxide extinguishers are denoted by the large funnel nozzle.

Funnel
Nozzle