U.S. ARMY

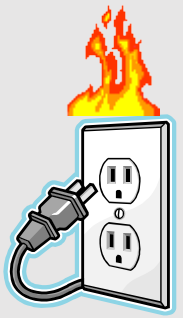
# Electrical Safety

WE ARE THE ARMY'S HOME

Garrison Safety Office (GSO)
U.S. Army Installation Management Command

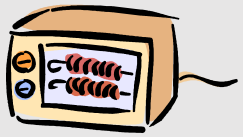
# U.S. Consumer Product Safety Commission Has Found:

- Electrical Fires
  - Majority Caused by Aging Wiring and Misuse of Surge Protectors
- Over 750 People Are Killed Every Year by Electrical Fires
- Extension Cords
  - Leading Cause of Home Electrical Fires in the U.S.
  - An Extension Cord Related Fire Occurs Every 6 Minutes



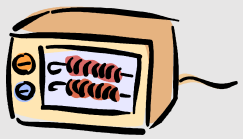
# General Electrical Safety

- Replace Damaged or Frayed Electrical Cords
- Do Not Run Electrical Cords Through Doorways and Under Carpets
- Avoid Overloading Electrical Outlets
  - Plug Only One High-Wattage Appliance into Each Receptacle at a Time
- If Switches/Outlets Feel Warm – Contact Facilities Management ASAP



# General Electrical Safety

- Do not "daisy chain" power strips or extension cords.
- Appliances with high amperage draws must be plugged directly into a wall outlet. I.e., microwave, coffee maker, refrigerator, etc.



# General Electrical Safety

- Appliances, Extension Cords, Power Strips, Surge Protectors – Certified By an Independent Testing Laboratory, Such as:
  - Underwriters Laboratories, CSA International, ETL Testing Laboratories
- Use Ground-Fault Circuit Interrupter (GFCI) Plugs Around Water
  - Test the GFCI Plug Every Month

# Power/Extension Cord Safety

- Never Splice or Repair a Cut Power Cord or Extension Cord
  - Electrical Tape Will Melt

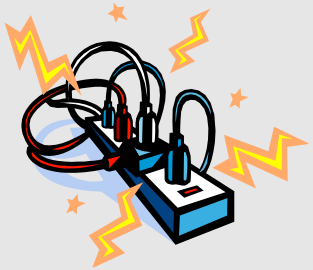
- Never Nail or Staple Extension Cords To Walls, Baseboards or Other Objects

# Power/Extension Cord Safety

- Never modify an electrical connection. (foreign plug to fit a U.S. plug)
- Never Remove the Ground Pin (3rd Prong) to Fit into a Two-Prong Outlet
- Extension Cords:  Use On a Temporary Basis – Not Intended for Use as Permanent Wiring
  - Heavy Use of Extension Cords Means There are Too Few Outlets to Meet Your Needs

# Surge Protectors

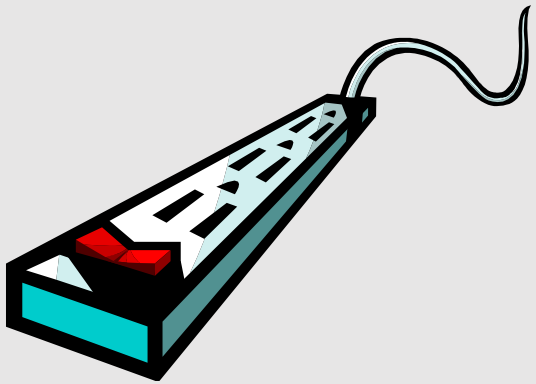
- Protect Against Small Surges & Spikes
- May Protect Against a Large Outside Surge
  - Need to Replace After a Large Surge
- Joules – How Much Energy the Surge Protector Absorbs Before It Fails – The Higher, the Better
- Look for Surge Protectors listed as a “Transient Voltage Surge Suppressor” – Would Typically Be Listed with an Underwriters Lab (UL) 1449



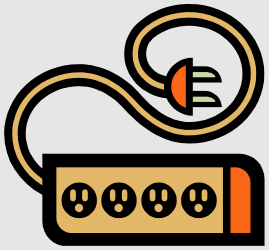
# Power Strips

- Only Allow the User to Plug in More Products into the Same Outlet

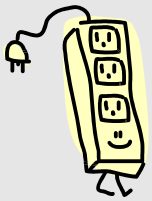
<u>Power Strips are Not Surge Protectors</u>

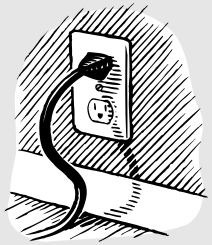


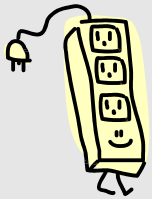
# Avoid Exceeding the Capacity of the Electrical Outlet



- Never Overload the Capacity of the Power Strip or the Surge Protector
- Only Plug One Surge Protector or Power Strip into a Single Duplex Electrical Outlet
- Never Plug a Surge Protector or Power Strip into Another Surge Protector or Power Strip





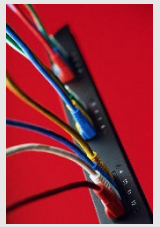


# How to Determine the Capacity of a Power Cord, Power Strip, or a Surge Protector

- Assume 125 Volts per Amp to Calculate the Conversion
- Total Watts Should Not Exceed 80% (0.80) of the Rated Capacity
- Example – Surge Protector Rated at 15 Amps

**15 Amps X 125 Volts/Amp = 1875 Watts**

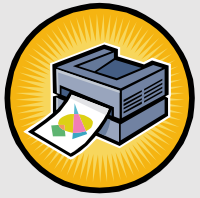
**1875 Watts X 0.80 = 1500 Watts Capacity of the Surge Protector**



# Example of Multiple Items Plugged into a Surge Protector

- Multiple Items Plugged into a 15 Amp Surge Protector:
  - **Computer – 2 amps = 250 Watts**
  - **Monitor – 1.2 amps = 150 Watts**
  - **Coffee Maker – 650 Watts**
  - **Laser Printer**
    - **Idle – 2 amps = 250 Watts**
    - **Printing – 9.4 amps = 1175 watts**






# Example of Items Plugged into a 15 Amp Surge Protector (Continued)

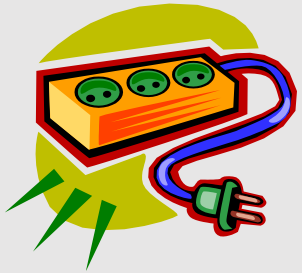
- Total Wattage While Printer is Idle:

  **250 (Computer) + 150 (Monitor) + 650 (Coffee Maker) + 250 (Printer in Idle) = <u>1300 Watts</u>**

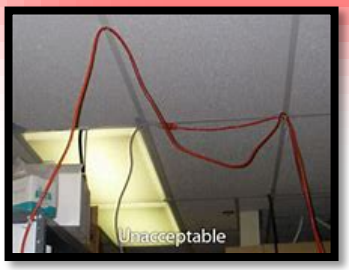
- Total Wattage While Printer is Printing:

  **250 (Computer) + 150 (Monitor) + 650 (Coffee Maker) + 1175 (Printer Printing) = <u>2225 Watts</u>**

- <u>While Printing, the 1500 Watt Surge Protector Capacity is Exceeded! – Plug the Printer into a Separate Surge Protector & a Different Duplex Plug</u>



# DEFICIENCIES





# REFERENCES:

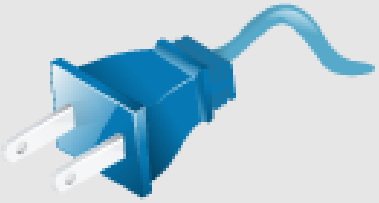
- **NFPA 1, para 11.1.5.6** Extension cords shall not be used as a substitute for permanent wiring.
- **NFPA 1, para 11.1.7.5** Extension cords and flexible cords shall not be affixed to structures; extend through walls, ceilings, or floors, or under doors or floor coverings; or be subject to environmental or physical damage.
- **NFPA 70, para 11.1.5.1** Multi-plug adapters, such as multi-plug extension cords, cube adapters, strip plugs and other devices shall be listed and used in accordance with their listing.
- **OSHA 29 CFR 1910.303 / 304** Power strips are designed for use with a number of low-powered loads, such as computers, peripherals, or audio/video components. Power strips are not designed for high power loads such as space heaters, refrigerators and microwave ovens, which can easily exceed the recommended ampere ratings on many power strips.
- **Army PAM 385-26 (o)** Use power strips only for low amperage equipment such as computer monitor, fan, computer, printer, and so forth and they will not be daisy chained. Do not plug extension cords into plug strips.

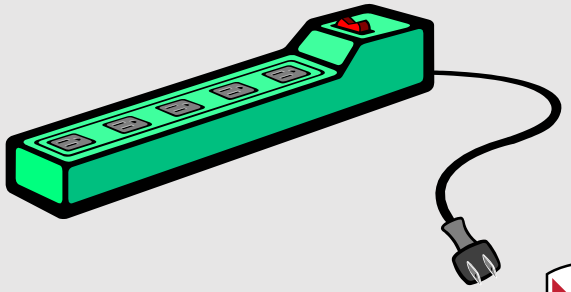
# CORRECTIVE ACTIONS

- Remove Extension Cord.
- Plug Object directly into outlet.
- Move operation so equipment can be plugged into outlets.
- Arrange furniture/Room so appliances can be plugged directly into outlet.
- Submit DMO to have more outlets added to operation. (last option).

# Summary

- Periodically Inspect Outlets, Appliances, Plugs and Cords
- Extension Cords are Only For Temporary Use
  - Do Not Nail or Staple to Objects
  - Do Not Run Under Rugs or Through Doorways
- Do Not Exceed the Capacity of the Electrical Outlet, Power Strip, or Surge Protector





# Questions?