



MAFES Dawg Tracks

February 6, 2012



General Electrical
Safety



Electricity is an integral part of our lives - once a luxury - now a dire necessity. When we experience a power interruption, it alters every facet of our lifestyle. On the flip side of the necessity is the fact that through accidents it can alter our lives with injuries and sometimes death. The National Safety Council states that **electrocutions** rank fourth in causes of industrial fatalities behind traffic, violence and construction).

The council estimates that:

- 600 people die each year from electrical causes. Most of these accidents involve low voltage, 600 volts or less.
- 3,600 disabling electrical contact injuries occur every year in the U.S.A., along with 4,000 non-disabling accidents.
- 60 percent of fires are caused by poor connections, faulty outlets, plugs and cords.

BODY EFFECTS- Summary of a chart showing milli-amps and their effects-

0.5-1.5 – Perception of shock

1.5 – Muscle contractions

3-10 – Pain

10-40 – “Let Go” threshold

30-75 – Respiratory Paralysis

75-100 – Ventricular Paralysis

250-300 – Heart Paralysis

5000-6000 – Organ Burns

TWO REASONS FOR UNSAFE ACTS-

- ✓ Know better but intentionally do something unsafe
- ✓ Don't know any better

AVOID THESE UNSAFE ACTS-

- Failure to de-energize, lockout & tagout hazards during maintenance, inspection or repairs.
- Use of defective and unsafe tools.
- Use of tools or equipment too close to energized parts.
- Not draining off stored energy in capacitors.
- Using three-wire cord with a two-wire plug.
- Removing the third prong (ground pin) to make a three-prong plug fit a two-prong outlet.
- Overloading outlets with too many appliances.
- Using the attached electrical cord to raise or lower equipment.
- Not verifying power is off when making repair (drilling into a 110-volt a.c. line can kill you).
- Working in an elevated position near overhead lines.

COMMON CAUSES OF UNSAFE EQUIPMENT-

- Loose connections
- Faulty insulation
- Improper grounding (loss of third prong)
- Use of homemade extension cords
- Defective parts
- Unguarded live parts

INJURIES CAUSED BY ELECTRICAL SHOCK-

Burns – Physical Injuries – Nervous System effects – all are dependent upon the amount of shock one receives.

HAZARDOUS ENVIRONMENTS-

You should use special precautions when working in potentially hazardous environments and situations. Even an accidental static discharge can cause a fire or explosion in some of the following areas:

- Flammable liquids, vapors and gasses
- Combustible dusts
- Corrosive atmospheres
- Explosive environments
- Poor housekeeping, blocked electrical boxes, flammable materials stored in equipment rooms, lack of proper hazard signage, excess clutter
- Special consideration should be given in wet or moist areas.

BASICS OF ELECTRICITY-

If we know the basics of electricity and how it can harm you, then we know better how to protect ourselves.

- Electrical current won't flow unless it has a complete path (circuit) that returns to its source (battery, transformer).
- Current flows through you and other conductors, such as metals, earth and concrete.
- Current can harm you when it flows through your body (electric shock).
- Insulators resist the flow of electricity. Insulating materials are used to coat copper conducting wires and are used to make electrical work gloves. Insulators help to protect humans from coming into contact with electricity flowing through conductors,
- Just as there is pressure in a water pipe, even with no water flowing, there is voltage at a receptacle, even if current is not flowing. Another word to use with voltage is “potential.”

SAFE WORK PRACTICES-

- ✓ Plan your work with safety practices in mind
- ✓ Avoid wet working conditions & other dangers
- ✓ Use Ground Fault Circuit interrupters – they protect your body from leaking currents. GFCIs should be used in all wet and moist areas
- ✓ Avoid overhead power lines
- ✓ Use proper wiring & connectors
- ✓ Use extension cords properly and **temporarily**
 - ~Cords must be UL approved and with three prongs
 - ~Power bars must have a fuse or breaker
 - ~No two-prong or ungrounded plugs in a lab
 - ~Do not repair cords - buy new ones
 - ~Make sure wattage does not exceed cord ratings
- ✓ Avoid jewelry, watchbands, bracelets, key chains, etc. as they may come in contact with energized parts.

Ted Gordon – Risk Mgmt. / Loss Control Mgr.
MAFES / MSU-ES (662) 566-2201
Excerpts: <http://ehs.okstate.edu>
1/5/2012