Household Electrical safety

NSSC Conference
March 2008
Household Electrical Safety

- Introductions
  - Facilitator
  - Students
  - Safety Services Nova Scotia

- Housekeeping
  - Emergency Procedures
  - Washroom Facilities
  - Break
  - Cell phones

- Handouts
  - Student Information
  - Registration Form
  - Course Evaluation Form
Safety Services Nova Scotia

- **Mission:** Delivering world class safety & health services.
- **Vision:** A Safe & Healthy Nova Scotia.
- Established – 1958: Private, Non Profit, Non-Government
- **Leading Provider:**
  - Community Safety Services (i.e. School Bus Safety)
  - Road Safety Services:
    - Professional Driver Programs
    - Driver Improvement Programs
    - New Drivers’ Ed Program
    - Motorcycle & Scooter
  - Occupational Health & Safety Services
    - Training
    - Consulting
    - Audits
    - Certificate of Recognition Program
    - First Aid Courses
    - Annual Safety Conference (March 26 – 28, 2008)
Agenda

Common Terms
Affects of Electricity on the body
Extension cords
Plugs/Outlets/GFCI’S
Appliances/ Outdoor Appliance
Breakers and Fuses
Stormy weather
Emergency Generators
Fire Extinguishers
Some common electrical terms.

**Ampere**
The amount of current that flows through a wire. This current can hurt or kill you.

**Volt**
The force that pushes the current along the wire. High voltage from the generating station, that is transmitted through tower lines (at up to 500,000 volts), is reduced to 120 volts when it enters your home.

**Ohm**
This is the measure of resistance to the flow of current. The human body, especially when wet, has low resistance and easily conducts electric current.

**Watt**
This is the electrical power, or rate of using a certain number of amperes pushed by a certain number of volts (watts = volts x amperes). Most electrical appliances list on their labels the watts and amperes they use.

**Kilowatt-hour**
This is how the electricity you use is measured. One kilowatt equals 1,000 watts. Using one kilowatt of power for one hour equals one kilowatt-hour. A 100 watt light bulb turned on for 10 hours would use one kilowatt-hour of electricity.
Basic Electricity

- **Measuring Electricity**
  - **Volts** – the measure of pressure. Voltage is the force that causes the flow of electricity.
  - **Amps** – the measure of current. Current is the flow of electricity (essentially the flow rate).
  - **Ohms** – the measure of resistance. Resistance slows down (or impedes) current flow.
Electrical Shock

Shocks happen due to electrical current (amperes) flowing through the human body. The current is trying to get to ground.

A fraction of one ampere can kill a human being. It takes one ampere (1000 milliamps) to light a 100-watt light bulb - it only takes 1/10th of an ampere to stop your heart.

Misunderstanding often plays a part in these unfortunate accidents in the home.

Many people think that when an appliance is turned to "off", there is no electricity in it. Not so!

As long as the appliance is plugged into an outlet, parts of it are still "live". Cleaning a switched-off, but still plugged-in coffee pot in the kitchen sink can be fatal.
Affects of Electricity
How Electricity Can Affect You
Effects Of Amperage On The Body

AVERAGE BODY TOLERANCE
ELECTRIC CURRENT IN MILLIAMPERES

5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
80
85
90
100

CAN JUST FEEL IT
CAN'T LET GO
INCREASING PAIN

A 100 watt LIGHTBULB USES 1000 milliamps OF CURRENT (1000 milliamps = 1 amp)

PROBABLY FATAL
Extension Cords
EXTENSION CORDS

- Do not overload cords.
- Use extension cords on a temporary basis; they are not intended as permanent household wiring.
- Purchase extension cords with safety closures to protect young children from shock hazards and mouth burn injuries.

Buy only cords certified by Underwriters Laboratory (UL), Intertek Testing Services (ITS), or Canadian Standards Association (CSA).
EXTENSION CORDS

Flexible cords must NOT be used as a substitute for permanent wiring, i.e. to make permanent extensions to circuits. These cords do not have the capacity to carry as much current as permanent wiring without becoming dangerously overheated. They are also continually exposed to strain or insulation damage.

Check all flexible cards for:
- Bare or badly deteriorated condition
- Cords running under rugs
- Cords nailed to baseboards, doors or window frames
- Cords running through partitions, walls and floors
- Cords permanently connected to permanent wiring by splices or joints
- Cords with splices/tape
Common Power Cord Problems

Exposed Wires

Power cords are doubly insulated and should be replaced if the outer layer of insulation becomes frayed exposing wires.
Power bars equipped with surges suppression are approved for use only with computers and computerized equipment. They must be UL 1449 rated (surge suppressed). Power bars are really simply fancy extension cords and should be used sparingly.
Outdoor Cords

- Make sure cords are in good condition - not frayed or cracked.
- Temporary use ONLY
- Arrange cords so they are placed out of traffic areas.
- Never nail or staple cords to the wall, under decks etc. or to another object.
- Do not place cords under ground or in conduits.

Damaged cords can cause fire or electrical shock.
Choose the right Extension cord for the job – Do Not use indoor cords for outdoor Christmas lights and decorations.
FOR IMMEDIATE RELEASE

The Electrical Safety Authority Warns Consumers about Unsafe 6-foot, 9-foot and 12-foot Household Extension Cords

Toronto, ON – The Electrical Safety Authority (ESA) is notifying consumers about electrical safety issues associated with non-certified 6-foot, 9-foot and 12-foot indoor extension cords being sold at various local discount and “dollar” stores in Ontario.

These extension cords are sold with a green paper sleeve (wrap) and identified as “6 ft, 9 ft and 12 ft household extension cord”. The cords are white and the sleeve is marked with the rating 10A-125V-1625W 16/2 SPT-2.

ESA’s investigation identified that the rating on the packaging of the extension cords misrepresents the load-capacity of the cord. The wire used in these products is undersized and may overheat, presenting a potential fire hazard. The extension cords are also wired with incorrect (reverse) polarity, presenting a potential shock hazard. These products have not been tested by a recognized certification agency and do not bear a certification mark.

Electrical Safety Authority encourages consumers to stop using this product immediately.

http://www.esasafe.com/Safety_Alerts.php
ALWAYS CHECK FOR CERTIFICATIONS

Canadian Standards Association = CSA =

Underwriters Laboratory = UL =

Electrical Safety Authority
Plugs and Outlets/GFCI’S
PLUGS

- NEVER FORCE A PLUG INTO AN OUTLET IF IT DOESN'T FIT. Plugs should fit securely into outlets.
- Never remove the ground pin (the third prong) to make a three-prong fit a two-conductor outlet; this could lead to an electrical shock.

The third prong grounds the appliance and prevents electrical shock.
OUTLETS

- Check for outlets that have loose-fitting plugs, which can overheat and lead to fire.
- Replace any missing or broken wall plates.
- Make sure there are safety covers on all unused outlets that are accessible to children.
- Avoid overloading outlets with too many appliances.
- Don’t create an ‘Octopus’
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.
Octopus
GROUND FAULT CIRCUIT INTERRUPTERS

- Use GFCIs in any area where water and electricity may come into contact.
- Test GFCIs regularly according to the manufacturer's instructions to make sure they are working properly.
APPLIANCES

- If an appliance repeatedly blows a fuse, trips a circuit breaker or if it has given you a shock, unplug it and have it repaired or replaced.

Even an appliance that is not turned on, can be potentially hazardous when left plugged in.
Clothes Dryers

One of the leading causes of fires. The dryer is potentially one of the most dangerous appliances in the home.
Clothes dryer fires account for about 15,600 structure fires, 15 deaths, and 400 injuries annually, in the US.

Eighty percent of clothes dryer fires in structures occur in residential buildings.

Annually, 12,700 clothes dryer fires occur in residential buildings resulting in 15 deaths and 300 injuries.

“Failure to clean” is the leading factor contributing to clothes dryer fires in residential buildings.
SPACE HEATERS

- Keep space heaters at least 3 ft. away from any combustible materials such as bedding, clothing, draperies, furniture and rugs.
- Don't use space heaters in rooms where children are unsupervised.
- Remember to turn off and unplug heaters when they are not in use.
ENTERTAINMENT AND COMPUTER EQUIPMENT

- Make sure equipment is in good condition and working properly; look for cracks or damage in wiring, plugs and connectors.

- DO NOT CREATE AN OCTOPUS

- Use a surge protector bearing the seal of a nationally recognized certification agency. eg UL1449
LIGHT BULBS

- Make sure all bulbs in light fixtures are the correct wattage for the size of the fixture.
- Make sure bulbs are screwed in securely; loose bulbs may overheat.

Bulbs with too high wattage may lead to fire through overheating.
Toronto, ON – The Electrical Safety Authority (ESA) is receiving increasing reports from concerned consumers regarding the end-of-life failure of Compact Fluorescent Lamps (CFLs). The end-of-life failure for CFLs may vary depending on the manufacturer of the CFL, and on the type and location of the lighting fixture being used. When CFLs fail they may emit smoke, an odour, or a popping sound; and the plastic base may become discoloured, charred or deformed. Certification agencies have advised that this failure does not present a shock or fire hazard for approved products.

ESA is concerned that it can be difficult for consumers to distinguish between what is normal and what may be a precursor to fire or some other hazardous condition. As a safety precaution, ESA encourages consumers to replace CFLs at the first sign of failure or aging. The early warning signs to look for include: flickering, a bright orange or red glow, popping sounds, an odour, or browning of the ballast enclosure (base).
ESA is also advising consumers that different CFLs are required for different applications and use. CFLs may lack information on the packaging, or provide conflicting information about safe product use. Consumers are encouraged to read the base of the lamp and to contact manufacturers for additional information if required.

Unless otherwise specified, CFLs should not be used: in totally enclosed recessed fixtures; with dimmer switches; in touch lamps, with photocells or with electronic timers; where exposed to weather; or where exposed to water.

ESA is encouraging product manufacturers to review packaging information to support consumers in making safe product decisions. Activities are underway to update the existing Canadian safety standard for CFLs to address consumers’ end-of-life product issues.

http://www.esasafe.com/Safety_Alerts.php
HALOGEN FLOOR LAMPS

➢ Never place a halogen floor lamp where it could come in contact with draperies, clothing or other combustible materials.

➢ Turn the lamp off whenever you leave the room for an extended period of time.

➢ Never use torchiere lamps in children's bedrooms or playrooms.

Halogen floor lamps operate at much higher temperatures than a standard incandescent light bulb.
STORMY WEATHER

During an electrical storm:

- Do not use appliances (i.e., hairdryers, toasters and radios) or telephones (except in an emergency).
- Do not take a bath or shower.
- Keep batteries on hand for flashlights and radios in case of a power outage.
- Use surge protectors on electronic devices and appliances.

Lightning can enter homes and buildings through a direct strike, through wires or pipes that extend outside the structure, or through the ground. Once in your home, lightning can travel through the electrical, phone, plumbing, and radio/television reception systems.
OUTDOOR SAFETY

- Do not use electric-powered mowers and other tools in the rain, on wet grass, or in wet conditions.
- Inspect power tools and electric lawn mowers before each use for frayed power cords, broken plugs and cracked or broken housings.
- Electric tools/mowers should be plugged into a GFCI.
CIRCUIT BREAKERS AND FUSES

- Make sure circuit breakers and fuses are the correct size current rating for their circuit. If you do not know the correct size, have an electrician identify and label the size to be used.

- Always replace a fuse with the same size fuse.

- Ensure all circuits are clearly identified.
Fuses

Fuses are safety valves in your electrical circuits, preventing wires from overheating and thus possibly causing fire. Fuses greater than 15 amperes should never be used in ordinary lighting and receptacle circuits, as the wires in these circuits can safely carry only 15 amperes. If fuses keep blowing, then the circuit is overloaded, defective or has a defective unit plugged into it and must be checked by a qualified electrician.

Check for:

Fuses with a rating greater than 15 amperes.
Fuses replaced with pennies, washers or metal foil.
Emergency Generators
Emergency Generators

August 16, 2007
ELECTRICAL SAFETY ISSUES WITH UNAPPROVED GENERATORS
Toronto, ON –

The Electrical Safety Authority (ESA) is receiving increasing reports from concerned consumers regarding unapproved generators purchased over the internet or sold at various outlets across Ontario. Ontario residents purchasing portable generators to use during a power outage are advised to ensure the generator has been approved.

Unapproved generators do not bear the mark of a recognized certification or field evaluation agency, and have not been tested to ensure they meet safety requirements.

ESA’s investigation of unapproved portable generators has identified they present the following potential electric shock and fire hazards:
Emergency Generators cont. –

• Receptacles and generator control switches do not match the generator rating

• Receptacles with inadequate over-current protection.

• Control switches do not shut off the generator.
• Improper bonding of the generator receptacle to the generator frame.

• Lack of bonding between the generator and the generator skid or frame.

• Missing nameplates to identify the generators rated voltage and output.

• Some suppliers are providing double male ended extension cords (two plugs with a length of cord between them) to allow the generator to be plugged directly into a house receptacle. This can cause potential “backfeed” onto powerlines exposing utility workers to electrical hazards. In addition, residents can be exposed to live blades when the cord is plugged into the generator.
Emergency Generators

- Smaller 1.5Kw – 3.5Kw typically use only 3 wire extension cords (120 volt)

- 5Kw and greater generally use a 30amp twist lock cord connection (125/250 volt)

- Should be used in conjunction with a Generator Panel/Transfer Switch --- Never back feed through a dryer or range outlet!!
Emergency Generators:

- Contact a licensed electrician for proper installation
- Never use indoors even in an attached garage, unless well vented (carbon monoxide)
- Store fuel well away from running generator
- Be very careful when refilling fuel tank (allow generator to cool down)
- Choose those circuits needed during an emergency carefully (e.g., heat if furnace, water, some general lighting and possibly microwave)
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.
CLASSES OF FIRES

**Class A** fires are those fueled by materials that, when they burn, leave a residue in the form of ash, such as paper, wood, cloth, rubber, and certain plastics.

**Class B** fires involve flammable liquids and gasses, such as gasoline, paint thinner, kitchen grease, propane, and acetylene.

**Class C** fires are those that involve energized electrical wiring or equipment (motors, computers, panel boxes)

*Note: if the electricity to the equipment is cut, a Class C fire becomes one of the other three types of fires.*

**Class D** fires involve exotic metals, such as magnesium, sodium, titanium.
Smoke Detectors

- Most older have only a 5 – 10 year life
- Two types: Ionization > detect flame (70% of fires); Photoelectric > detects smoke (30% of fires)
- Hard wired into the house system and interconnected
- Many have options such as hush buttons / night lights etc
- Check battery back ups each year
- Must be UL listed

CO Detectors

- Installed in furnace rooms/garages
Winter storm preparedness:
http://getprepared.ca/risks/winter_e.asp
http://www.gov.ns.ca/emo

Consumer Product Safety:
http://www.hc-sc.gc.ca/cps-spc/index_e.html
http://www.esasafe.com/Safety_Alerts.php

Gov of Canada:
http://www.safecanada.ca

Smoke detectors
http://www.hc-sc.gc.ca

Clothes Dryers
http://www.ul.com/consumers/dryers.html
http://www.dryerbox.com/links.htm