



# Summerland Amateur Radio Club Foundation Module 5

for the AMC Foundation & Practical Syllabus V10

## Safety

### Syllabus Assessment Objectives

9.1	Recall that high voltages and high currents are dangerous.
9.2	Recall that any mains operated equipment sold, hired or supplied must be approved by an Electricity Authority or other relevant authority. Recall that approved equipment will have an approval label.
9.3	Recall that it is necessary to check relevant requirements regarding unqualified persons wiring and testing mains operated equipment. This includes leads, plugs and sockets connected to the household mains supply.
9.4	Recall why most mains operated equipment should have a [safe] safety earth connection.
9.5	Recall that fuses prevent excessive currents that may cause heat damage or fires.
9.6	Recall that a correct fuse must be fitted to all electrical equipment.
9.7	Recall the precautions to be taken when replacing faulty fuses including the selection of a fuse rated in accordance with an equipment manufacturer's specifications or electricity supply authority requirements.
9.8	Recall that the layout of an Amateur station should take account of physical safety issues. Recall that trailing cables are trip hazards and dangerous.
9.9	Recall that frayed or damaged power leads are dangerous and should be replaced or repaired by an Authorised person.
9.10	Recall the desirability for a clearly marked switch to turn off all station equipment in case of emergency.
9.11	Recall that, in the event of an accident involving electricity, the first action is to safely switch off the power.
9.12	Recall that a casualty of electric shock must not be touched unless the power has been switched off.
9.13	Recall that emergency services need to be called immediately and that Cardiopulmonary Resuscitation (CPR) may need to be administered.
9.14	Recall that batteries contain chemicals and emit fumes and may explode if punctured or exposed to flames or sparks.
9.15	Recall that it is important for all persons (and animals) to be kept at a safe distance from antennas.
9.16	Recall that electromagnetic radiation (EMR) can be dangerous. Higher frequencies and power levels and proximity to the source increase the danger.
9.17	Recall that the distance from an antenna that is a safe distance depends on the ERP, operating frequency, antenna type and orientation.
9.18	Recall that antenna erection is potentially dangerous and should be carried out by suitably experienced persons.
9.19	Recall that antennas and their fittings must be suitably located and secured and must never be connected to, or sited close to, mains poles and lines.

9.20	Recall that it is good practice to install lightning protection on antennas, disconnect antennas from any radio equipment prior to a thunderstorm and never operate during a thunderstorm.
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## Resources

CARS Foundation Powerpoint slide -Safety download here - <http://www.g0mwt.org.uk/training/courses/foundation.htm>

WIA Foundation Manual Chapter 6

## SARC Education Module Content

### Electrical Mains Power

Do not remove the covers of any mains powered equipment.

Ensure that there is a clearly marked isolation switch for station mains power.

Approved Appliances – Mains powered equipment must have a compliance sticker with standards tick and compliance number.

Only suitably qualified persons are legally permitted to work on mains powered equipment.

Australian mains power was nominally 240V until 2000. It is now **230V** (AS 30068:2000)

**High voltages** = Electrocutation risk

**High Currents** = Fire risk

### Fuses

Fuses protect against excessive currents that may cause fires or heat damage and must be fitted to all electrical equipment.

Always replace fuses with one of the same type and current rating.

### Earth Connections

The earth connection is part of the AC mains power protection. Never remove a safe earth connection. They are a crude safety system designed to provide a better path to earth than through you and are needed to trigger protection devices that cut the power.

Don't use gas pipes for the earth connection.

Some newer devices use "Double Insulated" safety and may not have an earth connection.

### First Aid

In the event of an accident involving electricity, the first action is to safely switch off the power. DO NOT touch the person without turning off the power off first.

Emergency services need to be called immediately and Cardiopulmonary Resuscitation (CPR) may need to be administered.

### Battery Safety

Batteries usually contain hazardous / corrosive chemicals.

Keep away from children – Don't short circuit or burn – dispose of properly.

Some batteries need to be used in a well ventilated location.

Batteries may explode if punctured or exposed to flames or sparks.

### Radiation Safety

High levels of electromagnetic radiation can be very dangerous.

The **higher** the **frequency** and the **higher** the **power**, the **higher** the **danger**.

Particularly note the previous section on ERP.

Radiation levels are much higher in front of high gain antennas.

It is important for all persons (and animals) to be kept at a safe distance from antennas. Ideally they should be set up out of reach.



This type of warning sign is used at commercial transmitter sites

### Cables & Leads

Keep things neat, tidy and out of the way so there are no trip hazards. Frayed leads should not be used and repaired or replaced by a qualified person before returning to use.

### Erecting Antennas

Should only be attempted by experienced persons.

Consider what may happen if the antenna falls during erection and later in use.

Working at heights has safety (fall risk) and legal issues (OH&S – insurance).

DO NOT set up antennas near power lines.

### Lightning

Disconnect antennas before lightning arrives. In some areas it is advisable to disconnect equipment from main power as well. Don't operate in an electrical storm.

Provide a lightning earth for towers, antennas etc. This earth may also double as a signal earth for better antenna performance. Don't use gas pipes for the earth.

### Headphones

Loud noises – both wanted signals and unwanted 'noise' in headphones can damage your hearing.

**Question 1:**

**The standard Australian mains voltage is:**

- A) 12V
- B) 240V
- C) 110V
- D) 230V

**Question 2:**

**If you find a blown fuse:**

- A) you should check your equipment for shorts and replace the fuse with like for like.
- B) put in a higher rated fuse to overcome the problem
- C) replace the fuse with a piece of wire
- D) lower the power from the power supply and continue.

**Question 3:**

**When planning to erect an antenna, you should consider:**

- A) its position regarding high voltage power lines
- B) the consequences of the antenna falling
- C) the ability to lower the antenna to a safe maintenance height
- D) all of the above

**Question 4:**

**When a lightning storm is getting close to the station, consider:**

- A) changing to battery power
- B) disconnecting antennas
- C) removing the highest antenna from the mast
- D) wait for the first strike then turn off all radios

**Question 5:**

**A person is found lying on the floor of the station near an electrical cable. You should first:**

- A) commence CPR
- B) call mayday on the local repeater
- C) check you are not in danger, then turn off the mains power
- D) pull the person away from the radio equipment

**Question 6:**

**If a battery is exposed to excess heat or a fire, it may cause:**

- A) An explosion
- B) An implosion
- C) A breakdown of the internal diodes
- D) A dangerous voltage increase

**Question 7:**

**If antenna cables are run across the floor of the station, it may result in:**

- A) audio noise from earth loops
- B) feedback via underfloor plumbing
- C) a trip hazard
- D) interference to your home appliances