

South Bristol Amateur Radio Club

Lesson 8 – Safety

Syllabus Sections 9a.1 – 9a.6, 9b.1, 9c.1 – 9c.6, 9d.1

Safety

(Syllabus Section 9)

Lets start by being positive. Amateur Radio is a safe hobby. That said there are aspects of our hobby that must be treated with respect and common sense.

High Voltages are potentially lethal and mains voltages are capable of killing. Unless you are 100% sure of your skills and abilities do not delve inside equipment, leave repairs to qualified people.

It is also possible to generate high currents with low voltages. These high currents are equally dangerous. A high current can overheat wires, cause burns or start a fire. High currents can occur if short circuit faults develop. Many batteries can develop surprisingly high currents when short circuited, sufficient to allow wires to become red hot and insulation to burn off exposing the inner conductor. 12Volt car batteries are particularly hazardous in this respect.

In order to reduce the risk of causing an inadvertent short circuit; rings, metallic wrist watches, bracelets etc. should be removed if working on equipment.

All mains powered equipment should have an earth connection. This will protect you if a fault develops which would otherwise cause the metal casing to become live. Be careful however, if your house has PME it is possible for the potential of a local earth spike to be different to the earth potential at the sub station supplying the property.

If you are in doubt you should consult a local electrician or your electricity supply company.

All mains plugs should be fitted with the correct rating of fuse. This does not mean that every mains plug should have a 13Amp fuse. The fuse should be of the **value recommended by the equipment manufacturer**. As an example a typical TFT monitor would require a 3Amp fuse whilst a heavy duty appliance such as a washing machine would require a 13Amp fuse.

Fitting a 13Amp fuse to the TFT monitor would allow currents well in excess of the design to pass through the monitor and do irreversible harm whilst a 3Amp fuse in a washing machine would blow every time the appliance was switched on. A fuse is a safety device, it is there to protect the equipment being plugged into the mains and therefore, as illustrated above, should be fitted with the fuse recommended by the equipment manufacturer.

If you do determine that it is necessary to work inside mains powered equipment, ensure that the device is completely disconnected from the mains supply. This doesn't just mean that it should be switched off at the supply socket, it also means that the plug should be removed from the supply socket whenever the device is being worked on.

Take some time to examine Page 28 of the Foundation Licence Now! Booklet, as well as the inside back cover. This demonstrates the correct wiring of of a UK mains plug and you need to be able to recognise a correctly wired plug for your own safety.

When developing a shack layout always include a single clearly marked power switch to turn off all

station equipment in case of emergency.

In the event of an accident involving electricity the first actions is ALWAYS SWITCH OFF THE POWER. Do not touch the casualty unless the power is off. Anyone that has received a shock should be given prompt medical attention.

Again, when considering the layout of your shack do not allow wires to trail across the room or the work area. These are a trip hazard to you and those visiting your shack, and the occurrence of a trip, aside from being a potential source of injury to you or your visitor may also damage the equipment by ripping leads from the unit or pulling the unit onto the floor. In addition constant walking over trailing wires will lead to frayed insulation exposing the conductors and possibly resulting in a short circuit.

Whilst it is best practice to mount antennas as high as possible, remember that antennas can be particularly large and heavy items. Ensure that they are sufficiently supported and robustly guyed for typical wind loads. Remember to tie feeders back to a suitable support. Both can cause significant damage and/or injury in the event that they come away from their mountings. Do not position antennas or feeders close to overhead power cables.

Erecting an antenna is a difficult operation which can be quite demanding. Do not attempt to erect any antenna alone unless you are completely certain you have all of the necessary equipment and that you are physically capable of safely undertaking the task. It is best practice to always have someone with you to help.

RF burns are a particularly nasty injury and should be avoided at all costs. The simplest precaution is to ensure that you do not touch any antenna elements whilst transmitting and mount the antenna in such a way as to make accidental contact by third parties impossible. Note: This does not apply to low power hand held equipment.

Lightning always takes the easiest path to earth, and whilst lightning strikes in this country are rare a particularly high antenna will provide an easy path to ground. If you are contemplating particularly high antennas in your installation, take extra time to research the special precautions needed to protect the antenna and associated equipment from lightning.

Headphones are often used in a typical amateur shack. Their use often allows the operator to discern weak signals that simply are not readable using a speaker. It also allows the operator to concentrate fully on the received signal without the distractions of background noise or to operate in a shared space without disturbing the other occupants or users of that space.

However headphones are not without their own risks. Firstly excessive volume when wearing headphones may damage your hearing, and secondly the headphones may provide a current path from equipment being serviced to the wearer that otherwise wouldn't exist increasing the possibility of an electric shock. It is advisable not to wear headphones if you are working on equipment.

Many shacks incorporate or even rely on one or more 12Volt car batteries as a backup or even a main power source. Again if approached correctly this shouldn't be a problem, but remember: Car batteries provide a very high current, ensure that the correct thickness (gauge) of wire is employed to provide current to the attached equipment.

Charging them releases hydrogen, so only charge in a well ventilated area and don't smoke nearby.

If tipped over, car batteries may leak a highly corrosive acid. Mop up spills immediately, and ideally use a stand or similar arrangement to reduce the risk of tipping and provide a reservoir to contain any spillage even if only for a limited time.

Next Lesson

Mock Exam

Lesson 8 – Summary

At the end of this lesson you should be able to:

- Recall that high voltages carry a risk of electrocution and high currents carry a risk of overheating and fire
- Recall why a mains station should have a safety earth
- Recall that special care is needed with earthing arrangements if your house has PME
- Recall that details of PME earthing can be obtained from the local electricity supply company and are covered in a separate leaflet
- Recall that correct fuses must be fitted to all electrical equipment and that this is in the live wire of mains powered equipment and according to the manufacturers' instructions in low voltage equipment
- Recall only to work inside equipment that is disconnected from the mains
- Recall the correct way to wire a three pin mains plug
- Understand the need for a clearly marked switch to turn off all station equipment in case of emergency
- Recall that in the event of an accident involving electricity the first action is to switch off the power
- Recall that the casualty must not be touched unless the power has been switched off
- Understand the reasons for not having wires trailing across the floor, trip hazards and the risk of frayed insulation
- Recall that elevated wires and antennas must be suitably located and secured
- Recall that antennas and feeders should not be sited close to overhead power cables
- Recall that antenna erection is potentially hazardous and that it is advisable to have someone to help you
- Understand the need for at least one adult to be present
- Recall that antenna elements should not be touched whilst transmitting and should be mounted to avoid accidental contact. NOTE: This does not apply to low powered devices such as hand held equipment
- Recall that particularly high antennas may need special protection against lightning
- Recall that excessive volume when wearing headphones can cause damage to hearing