

Safety in the Radio Shack

Electric shock

The Human body can be damaged by current flowing through the skin and muscles. The muscle can spasm severely. If the heart muscle spasms severely, the heart the most dangerous condition is when the current is sufficiently high to cause the heart may go into ventricular fibrillation. Fibrillation is when the heart is not pumping normally, and the blood is no longer circulated. This can lead to death.

Our skin resistance will determine the amount of current which will flow through our body if we touch a live conductor. If the voltage is high enough, burns may also result.

As radio operators, we need to be cautious when dealing with 240V AC mains equipment. If the equipment also is fitted with valves and transformers, the voltages may be in the thousands.

Some tips when working with mains equipment are:

- Wear insulated shoes Not bare foot.
- Isolate the power.
- Ideally have a co-worker.
- Ensure the equipment is grounded.

Current level and affects

- At 0.001 amps the sensation is discernible.
- At 0.01 amps pain is experienced
- Between 0.01 amps and 0.1 amps breathing will become difficult and severe shock will be experienced.
- From 0.1 to 1-amp severe burns can occur, breathing stops and death almost certainly can result.

Disconnected earths

Deliberately disconnecting the earth is an extremely dangerous practice. When working on mains equipment, the earth is the last wire removed and the first wire to be replaced.

Bare conductors

Keep body parts away from any bare conductors in equipment.

Capacitors

Capacitors look innocuous but can still retain a deadly charge. A charged capacitor which can supply sufficient current to kill. Discharge any unknown capacitors with an insulated screwdriver before handling.

Mains wiring

The standard power point (often referred to as a GPO- General Purpose Outlet) supplies 240 Volts at 50 Hz to our equipment and are usually rated at 10amps. Loads on these power points should be monitored and overloading prevented.

Mobile or Portable antennas

Before erecting any antenna at a mobile or portable site, look up. Ensure the antenna will not contact any overhead power lines.

Flexible Mains Cords

The Active conductor, coloured brown, is the dangerous wire.

The neutral conductor, coloured blue, is at or near-earth potential. The neutral carries the return current from any piece of equipment plugged into the GPO.

The Earth conductor, coloured green with a yellow trace, must be connected to the metal case of any equipment.

Earth connector

If the equipment fails and the equipment case becomes live, the earth lead will shunt the current to earth. The circuit breaker will trip, and the hazard is removed from the equipment.

Fuses

A fuse is designed to melt when the current exceeds the fuse ratings. This will open the circuit and stop the supply of electricity. If your house or shack is fitted with main fuses, have them replaced with circuit breakers.

Circuit breakers (CBs)

CBs come in various names and types. They are quicker to operate than fuses and require far less leakage current.

Lightning

Lightning is not friendly with antennas and radio equipment and can cause extensive damage. If lightning is predicted in our area, close the station, disconnect radios from antenna and earth all the antenna cables coming into the shack.

Lightning arrestors can be installed if lightning is a constant hazard.

Surges or spikes from a lightning strike can induce spikes in cabling and wiring. Insulation breakdown and damage can often be caused this way.

RF hazards

The high RF power levels in transmitters and amplifiers are a risk in themselves. Shielding of the high-power compartments helps to contain the RF energy and to prevent unwanted exposure to RF fields.

At Microwave frequencies, RF fields can become a hazard to eyesight as the concentrated energy can affect the eyes.

Hazardous chemicals

Items include:

- acids such as sulphuric acid in batteries
- alkalis such as caustic soda,

- Polychlorinated Biphenyls. (PCB) in transformer insulating oils,
- etchants such as ferric chloride
- ammonium persulphate,
- insulators such as
- beryllium oxide
- asbestos

Precaution should be taken when handling any chemical

- Wear gloves
- Wear eye protection
- Wear breathing apparatus if needed.
- Have soap and water on hand in case of a spill.

Gases

Charging a lead-acid battery generates gases. Only charge lead acid batteries in open spaces or well-ventilated areas.