Commo Brief: Radio Safety

Radio Frequency (RF) Safety

Electromagnetic radiation from antennas and transmission lines is generally of insufficient strength to electrocute personnel, but can lead to serious injury or can trigger other problems.

Voltages can be induced in ungrounded metal equipment and objects such as guy wires, ladders, masts, and towers. Shocks are possible when handling this material, and care should be taken to properly ground and de-energize equipment.

RF Burns

Antennas should not be approached or handled when there is a possibility that they are energized by transmitters. Direct contact with transmission lines or antennas can result in RF burns. These can be deep, penetrating third-degree burns that must heal from the inside out, and require medical attention to prevent infection.

Antennas, towers, transmission lines, guys, and other components in the immediate RF field should be clearly marked with warning signs or made off-limits to prevent accidents or injuries. In field conditions, wire antennas may not be readily apparent, and should be clearly marked to prevent personnel from straying too close.

Dielectric Heating

Dielectric heating occurs in insulating material exposed to HF radiation fields due to the rapid reversal of the polarization of molecules in the material. When people enter the RF field, their bodies act as a dielectric. If the power in a field exceeds 10 milliwatts per centimeter, a noticeable increase in body temperature can occur.

The eyes are highly susceptible to dielectric heating, as are internal organs. Care should be taken not to look directly into the RF source or to stand directly in front of one. While typical CAP communications power levels may not create very intense fields, it should be remembered that some equipment and antennas are located on commercial towers with high-power equipment and microwave sources. Waveguides and other sources of intense RF should be noted and avoided at all times.

Portable Communications

Although controversy still exists concerning the effects of portable devices such as handheld radios and cellphones when used in close proximity to the head, it is best to err on the side of caution.

Manufacturers include RF warning notices with their equipment, and each operator should be familiar with the warnings and proper procedures to minimize exposure from the equipment.

Physical Hazards

Physical hazards exist around most radio stations. Antennas are preferably mounted high, exposing workers to falls and climbing or ladder injuries. All climbers and workers should wear climbing belts and be secured to the supporting structure at all times. Ladders should be tied to the structure to prevent slipping or movement. Tools should be raised or lowered in a bucket or other suitable device by rope. Workers should never climb without having assistance standing by on the ground.

Rotating antennas present hazards as they may be rotated without notice or warning. Motor safety switches should be locked out prior to climbing or working in the vicinity of a rotatable antenna.

Ground workers should be aware of the potential for tools and hardware such as nuts and bolts to fall from a tower while workers are aloft. Hard hats and attention to operations should prevent injuries.

Electrical Safety

Communications equipment operates on electrical power, and appropriate electrical safety procedures should be used. Lockouts at a main switch or panel ensures that someone does not inadvertently restore power to a circuit under repair or that powers equipment that is being worked on.

Only qualified personnel with electrical experience should attempt wiring, installations, or repairs involving high voltage. Additionally, equipment should be properly grounded and installed in accordance with applicable building codes.

Storage batteries, used for emergency or portable communications, should be handled carefully to avoid burns from electrolytic acid.

Fire Hazards

Fire extinguishers should be present in every radio station in the event of a fire. Generators, which use gasoline, and storage batteries, which contain acid and combustible fumes, create a potential for fire when exposed to sparks or other sources of ignition.

Care should be exercised when installing radio equipment in vehicles or aircraft to prevent electrical shorts and other conditions than could cause fires.

First Aid

Communicators should be trained in first aid and CPR in order to respond appropriately to injuries or accidents. First aid supplies and a method to summon professional assistance should be present at every operating location.