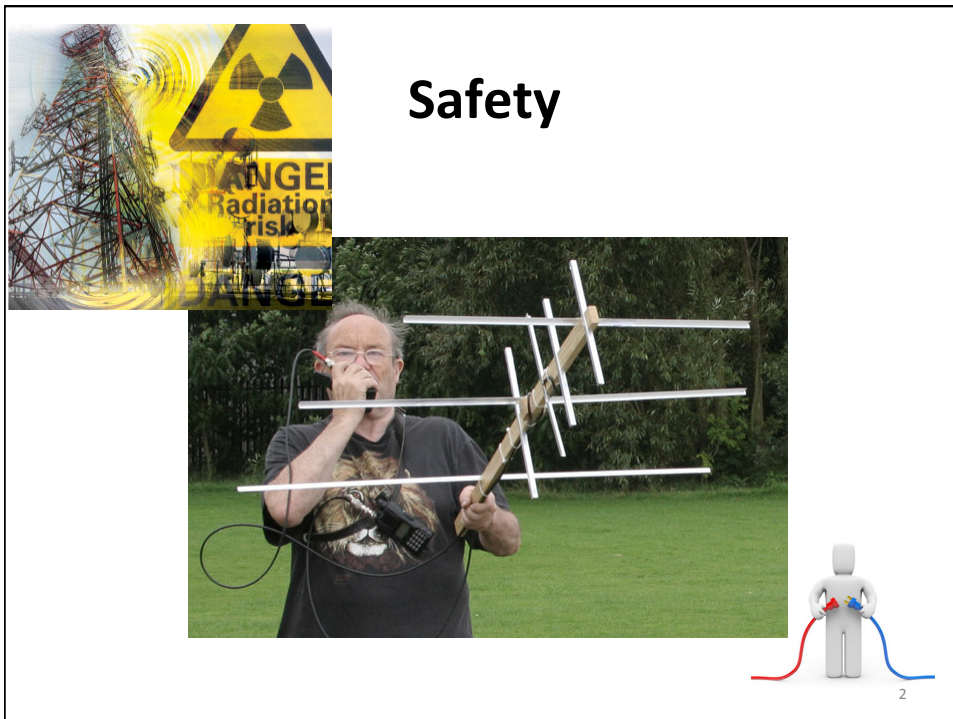


CHAPTER 16

SAFETY

A collage of safety-related images. On the left, a yellow radiation warning sign with a black trefoil symbol is overlaid on a photograph of a radio tower. Below the sign, the text 'DANGER Radiation Risk' is visible. In the center, a man with glasses and a black t-shirt is holding a wooden structure with several horizontal white rods, possibly a radio antenna or a safety device. On the right, a small white 3D figure is holding a red and blue cable. The word 'Safety' is written in a large, bold, black font in the upper right quadrant of the collage.

Safety

Safety

Building and operating a “ham” radio station is a perfectly safe pastime

- However, carelessness can lead to severe injury, burns, or even death by electrocution

Antenna Safety – Look Up and Live!

3

Safety

- **Assume that all overhead power lines are energized and dangerous. They are often not covered!** This sometimes includes the service drop, which typically runs from the power pole to your home or shack.
- **Watch out for power lines** which may be hidden by trees and buildings
- **Plan the work and work the plan.** Before you put up or take down an antenna, assess the job. Discuss the project’s activities with your helpers and agree on specific assignments. Ask yourself, “At any time can arms, legs, head, the antenna, wires or tools come in contact with power lines?”
- **Use a safety spotter.** Nobody can do the work alone and assess safety distances. A safety spotter’s *only* job is to keep people and equipment safely away from power lines
- **Remember the 10-foot rule.** Keep all equipment, tools, your antenna, guy wire and tower at least 10 feet away from power lines.

4

Safety

- **Never use metal ladders or long-handled metal tools** when working near power lines
- **Make sure the antenna cannot be rotated into power lines** or that it cannot fall into a power line if the guy wires fail and the tower falls
- **Use non-conductive guy ropes**
- **Have a solid earth ground for your antenna and operating equipment.** This helps reduce the risk of electrical shock and also provides a low-impedance path to ground for stray RF.

5

Safety

- Outdoor antennas should be grounded with an approved lightning arresting device. Local codes may apply.
- The radio should also be grounded to an earth ground to help protect both the radio and its user
- Antenna mast, cable, and guy wires are all excellent conductors of electrical current
- If the tower assembly starts to drop... get away from it and let it fall
- DO NOT use hot water pipes or gas lines as a ground source
- DO NOT place antennas where people or animals are likely to run into or encounter them
- **Don't be afraid to ask questions or ask for assistance – most other amateurs will be very happy to assist you**

6

Safety Code 6

- The regulations and guidelines covering the subject of RF Safety are published by Health Canada in the federal government, in a document we call "**Safety Code 6**"
- The document describes the limits of human exposure to radiofrequency electromagnetic fields in the Frequency Range from 3 KHz to 300 GHz
- Amateur radio stations are technically required to comply
- All but our most-high-powered transmissions do comply in most well-designed stations
- Some very high-powered transmissions require extra care and attention to antenna placement and protection

7

Safety Code 6

- RF energy has *thermal effects* (i.e., it can cause body heating) if the power density is high enough
- The thermal effects of RF energy can include blindness and sterility, among other health problems
- Effect varies with power and with frequency

8

Installing Antennas – Good Practices

- At least two people to do the job. Three is better.
- Equipment
 - Safety Belt
 - Safety Rope / use of it while climbing, no mould inside (twist open to inspect it), proper length
 - Tool Pouch (roomy, not packed full)
 - Tools carefully selected for the task (how many times do you want to climb the tower?!)
- Clothing
 - Close fitting, not sloppy, but not too tight
 - Gloves (for protection and warmth)
 - NO Sneakers; use hard soled boots with a good fit

9

Safety Belt

- For your safety it is of the utmost importance that you borrow or buy a **safety belt**
- “Safety belt” is a generic term that describes a two-part device:
 - First a heavy leather belt, at least 5 cm (2”) wide or 2”, which is long enough to loosely encircle the perimeter of the tower
 - Second, an independent security harness system, at least 10 cm (4”) wide with a waist belt **and** a seat harness. This security harness must be attachable with locking steel hooks to the first belt (the one you put around the tower.)
- **The above is a minimum safety requirement**
Ideally, a full fall-protection safety body harness with chest straps and back-mounted snag hook should be used with appropriate hardware

10

Fall Protection Harness



11

What is a Gin Pole?

- A gin pole is a tower / antenna raising fixture, a pole with tip-mounted pulley on one end and a fixing clamp on the other end
- It provides safety by giving the installers improved heavy lifting ability from the ground
- A gin pole consists of 3 basic parts:
 - a pulley assembly to provide mechanical advantage when lifting,
 - a pole to gain height needed for the lift, and
 - the clamp assembly to attach everything to the tower
- Typically, the ground person does the heavy lifting while the tower person above guides and fastens the tower and antenna components together
- Proper use of a gin pole provides a controllable and safe method to erect and maintain a tower and antenna assembly, use it!

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What is a Gin Pole?

