

TECHNICAL ADVISORY

Exposure to Electromagnetic Radiation from Rooftop Antennas

Many building owners are leasing their rooftops to telecommunication companies. However, the building owner may not be aware of the hazards the equipment used on rooftops can create for workers. Rooftop antennas can create hazardous levels of electromagnetic radiation and any person working in close proximity to the antenna can be exposed to harmful radiation.

Microwave (MW) Radiation refers to electromagnetic fields with frequencies between 300 MHz and 300 GHz; typically produced by microwave ovens, parabolic dish antennas, and radar equipment.

Radio Frequency (RF) refers to electromagnetic fields with frequencies between 300 kHz and 300 MHz; typically produced by radio and TV transmitters, and some industrial equipment.

RF/MW energy of sufficient intensity can cause materials, including biological tissue, to heat up.

Overview

Health Canada publishes a document commonly referred to as “Safety Code 6”. It is titled *Limits of Human Exposure to Radiofrequency Electromagnetic Energy in the Frequency Range from 3 kHz to 300 GHz*. This is one of a series of safety codes that specify the requirements for the safe use of, or exposure to, radiation emitting devices.

Industry Canada sets guidelines to determine the hazard level on a site regardless if there is one or many antennas, and for any shape and size. Industry Canada regulates broadcasting and radio communication installations and apparatuses in Canada.

Safety levels for RF/MW energy are established by calculating specific absorption rates (SARs), which is a measure of the rate of energy deposition (the accumulation of materials by a gradual process) per unit mass of body tissue. Through these calculations, hazard levels around the transmitter(s) are established and a determination can be made on how the area should be treated.

Safety Code 6 makes distinctions for two different environments. One is *controlled environments* where exposure levels are considered safe for the general public. The second is *uncontrolled environments* where access is restricted to persons with specific RF/MW awareness training. Personnel with specific awareness training are able to assess the hazards, determine safe work procedures, and select the appropriate personal protective equipment.



Figure 1: Paddle-type Microwave Antennas



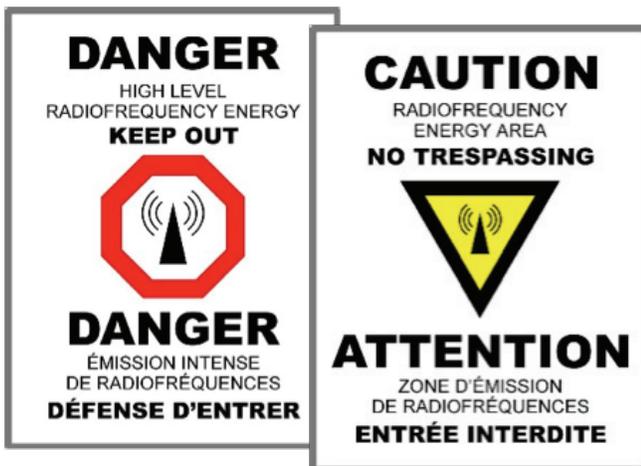
Figure 2: Drum-type Cell Antennas

Equipment/Protection

Typically, there are two types of RF/MW equipment mounted on rooftops:

1. Paddle-type microwave antennas (Figure 1)
2. Drum-type cell antennas (Figure 2).

As a guideline, personnel should maintain a minimum distance of 2 metres (6.5 feet) from these devices and not stand directly in front of them. If an area is considered uncontrolled as per Safety Code 6, then caution or danger signs similar to those below will be displayed in the area.



Do not enter these areas. Areas with no sign will either be safe for the general public or it is possible an attestation may not have been carried out. If an attestation has not been carried out, there will be no sign and no way to verify the area is safe.

Radio transmitter towers are typically above the roof and out of reach. Towers can generally be considered safe unless you are working on the tower. Signage should appear, prohibiting entry and identifying who to contact in order to safely gain entry.

Satellite dishes are typically fenced off when they are transmitting. Similar to a tower, signage should appear for both transmitter towers and satellite dishes.

Uncontrolled environments have restricted access and are locked with signage indicating who to call if access to the area is required. Uncontrolled environments are further broken down into two hazard levels:

1. Areas that can be entered by persons with RF/MW awareness training
2. Areas that cannot be entered unless the equipment is powered down to a safe level or completely shut off.

RF/MW industry contractors must submit an attestation for their installations. This attestation incorporates all sources of RF/MW energy at the site, including the energy produced by other installations, such as a competitor's tower. The owner of the site should maintain a copy of the most recent attestation and be able to provide it upon request.

When the attestation is not available or is not current, the equipment owner of the latest installation should be contacted and a request made to provide a current attestation.

Although a site may be considered controlled and safe for the general public, this does not mean that hazards are not present. The energized equipment may be safe to work near. However, you must not tamper with the equipment or position your body closer to the equipment by climbing a ladder, for example.

Roles & Responsibilities

Manager(s)/Supervisors: Managers and supervisors can ensure that the work environment is safe for employees by communicating with building occupants, clients, etc., to assess the safety of the rooftop and ensure safety precautions are in place before workers arrive. Ensure workers receive adequate training. Also, ensure worker concerns are addressed and proper documentation is available.

Worker(s): Follow the employer's policies and training, and assess the work environment. Before entering a site where there is a safety concern, request information from the site owner or owner representative. Contact your supervisor if hazards are not adequately addressed.

Employer health and safety department: Ensure the employer's training and policies are current.

Summary

When accessing a rooftop, most locations can be considered safe by maintaining a 2 metre clearance from devices and not standing directly in front of emitting devices. If there is signage that indicates restricted access, do not enter the area and contact your immediate supervisor to ensure safe access is arranged.

Where safety concerns arise, contact your supervisor to request a Safety Code 6 attestation for the site.

Note: *There are other sources of RF/MW energy that may be encountered. For example, industrial machines can utilize RF/MW energy for heating and sealing operations.*

Supporting Documentation

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| Health Canada | <i>Limits of Human Exposure to Radiofrequency Electromagnetic Energy in the Frequency Range from 3 kHz to 300 GHz Safety Code 6</i> |
| Industry Canada | <i>Spectrum Management and Telecommunications Guideline 01</i> <i>Guidelines for the Measurement of Radio Frequency Fields at Frequencies from 3kHz to 300GHz</i> |
| Industry Canada | <i>Spectrum Management and Telecommunications Guideline 02</i> <i>Guidelines for the Protection of the General Public in Compliance with Safety Code 6</i> |
| Industry Canada | <i>Spectrum Management and Telecommunications Guideline 08,</i> <i>Guidelines for the Preparation of Radio Frequency (RF/MW) Exposure Compliance Reports for Radiocommunication and Broadcasting Antenna Systems</i> |
| Ontario Ministry of Labour | <i>Health & Safety Guideline</i> <i>Radiofrequency and Microwave Radiation in the Workplace</i> |

Web links

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| Health Canada | www.hc-sc.gc.ca www.hc-sc.gc.ca/ewh-semt/radiation/index-eng.php |
| Industry Canada | www.ic.gc.ca/ www.ic.gc.ca/eic/site/smt-gst.nsf/eng/h_sf01841.html |
| Ontario Ministry of Labour | www.labour.gov.on.ca www.labour.gov.on.ca/english/hs/pubs/radiation/index.php |

A publication of the Elevator/Escalator Labour-Management Health and Safety Committee
in partnership with IHSA

October 2018