10. Electrostatic and Electromagnetic Energy in the Buildings

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Electrostatic microclimate

- **Static electricity** refers to phenomena caused by the accumulation of electrical charge on the surface of various bodies and objects and their replacement in contact with one another.

- **Static charge** is created when two materials met and is separated again, or friction. This causes the distribution or transfer of negative electrons from one atom to another. The size of the charge depends on a number of factors, such as material, temperature, humidity, pressure and material separation rate.

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Sources of Static Electricity

- **Internal sources:**
  - Low air humidity
  - Insufficient grounding of the building / floors
  - All metals
  - Water flow in the heating system piping
  - Electrical wiring
  - All electrical appliances
  - Fire and others

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Sources of Static Electricity

- **External sources:**
  - Building location (crossing of static zones)
  - Wind
  - Building size and building mass
  - Effects of static electricity
  - Infringement of electronics
  - Increased tension on brain cells
  - Unpleasant shocks
  - In healthcare and in industry (material behavior)

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Electromagnetic Microclimate

- **An electromagnetic microclimate** is a component of an internal environment created by an electromagnetic alternating field of electromagnetic waves with a wavelength greater than 1 mm (3.1011 Hz) in the space considered and affecting the overall state of the human. Magnetic induction should not exceed 25 nanotesla, ie 0.025 μT (microtesla) in areas designed for frequent people and sleep.
- Electromagnetic radiation occurs both in the wild and in the indoor environment.
- **Electromagnetic radiation** can penetrate the interior from the outside, or it can be produced by internal sources. In the exterior, atmospheric discharge and solar activity are the natural source of electromagnetic radiation. **Artificial sources** are transmitters and high voltage lines.

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Electrosmog

- **Electrosmog** is all the invisible radiation emitted by household electrical appliances. Depending on the frequency, the electrosmog is divided into low-frequency and high-frequency.

- Electromagnetic radiation affects both living organisms and non-living objects. The most sensitive parts include eyes, nervous systems and sexual organs. Non-living objects are endangered if they are not shielded enough.

- **Electromagnetic compatibility** (EMC) is a scientific field dedicated to protecting users from electromagnetic radiation. Its application is not only in specialized workplaces but also in all areas where people come into contact with electromagnetic radiation.

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Criteria of Electromagnetic Microclimate

- The basic criterion is **irradiation**, which is dependent on **field strength and exposure time**.

- The field strength depends on the distance from the source and its size.

- Optimization of electromagnetic microclimate can be done by intervention to the sources of electromagnetic radiation, or by intervention in the field of transmission or by use of personal protective equipment.

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