How to ensure low radon concentrations in indoor environments

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Introduction

WHO 2009: Exposure to radiation from natural sources in the home and workplace is one of the main risks of ionizing radiation causing deaths from lung cancer.
Radon in buildings, BR2010

- In Denmark the natural sources of radiation is radon
- Radon originates in the ground, from building materials and water (ground is the primary source in Denmark)
- Radon is a radioactive noble gas
- When radon decays into different radon daughters, it generates radiation. It is the radiation from the radon daughters that is harmful to human beings.

BR10: For new buildings 100 Bq/m³
Recommended solutions

By combining three initiatives the radon penetration and concentration indoors can be controlled.

1) Establishing a shield that prevents radon from penetrating into the building.
2) Lowering the pressure difference over the building envelope facing the ground.
3) Diluting the indoor air in the building with outdoor air.
Radon Shell
Lowering the pressure difference over the building envelope facing the ground.
Ending remarks

- There is no lower limit for when the radon concentration is low enough to be harmless for human beings.
- Through the combination of three methods, high levels of radon in the indoor air can effectively be prevented:
  - In this way the radon concentration in the indoor air of a building can be controlled and kept at an acceptable level.

Methods
1. A radon shell, either as a) an airtight shell within the building envelope facing the ground or as b) a radon membrane underneath the ground of the building.
2. Lowering the pressure of the zone underneath the ground of the building.
3. Effective dilution of the indoor air of the building with air from outdoors.