Abstract

The aim of the research reported in this thesis was to determine the influence of building heights on radon and thoron concentration via permeation and diffusion into the individual apartment units in a multi-storey apartment building. The hypothesis assumes that the bottom floor of the structure, similar to most any low-rise structure indoor radon experiments, has highest level of radon due to subsoil emanation. Subsequent increasing floor height, which constituted higher floor level in this fifteen floor level multi-storey building, depicts opposite relationship to indoor radon concentration. That is to say, subsoil radon gas diffusion reduces.

A correlation can be determined between radon concentration and building height as a function of floor level.

Being in a real-life habited residential building, control on environmental measurement is limited. Equipments used were standalone dosimeters without electricity or battery needs. Multiple on site experiments were conducted over a period of at least 30 days.

Measurements of radon ranged from 11.4 - 42.2 Bq/m^3 (arithmetic mean values), and 11.0 - 42.1 Bq/m^3 (geometric mean values). Measurements of thoron ranged from 0.1 - 0.5 Bq/m^3 (arithmetic mean values), 0.0 - 0.3 Bq/m^3 (geometric mean values).

The pattern of radon concentration was overall decreasing from the bottom floor level to the higher floor levels. When compared to radon concentration, there is no sharp decrease in thoron concentration as a function of floor level. They are both physically

different in nature. The thoron concentration would have been low due to short half-life at 55.6 second and become depleted after incurring many half-lives since.

Implications of this study include the need for environmental housing policy development, and improved education and awareness to radiation risks in dwellings.

Abstrak

Tujuan kajian yang dilaporkan dalam tesis ini adalah bagi menentukan pengaruh ketinggian bangunan terhadap kepekatan radon dan thoron dalam apartmen individu suatu bangunan perbagai tingkat, melalui proses resapan dan serapan. Hipotesis menganggapkan bahawa struktur tingkat terbawah yang sama seperti bangunan rendah mempunyai tahap radon tertinggi disebabkan resapan dari bawah tanah. Penambahan ketinggian tingkat dalam bangunan lima belas tingkat ini melihatkan perhubungan bertentangan terhadapan kepekatan radon. Ini bermakna pengaruh resapan dari bawah tanah telah berkurangan.

Suatu saling hubungan boleh didapati antara kepekatan radon dan ketinggian banguanan iaitu sebagai fungsi tahap tingkat.

Sebagai bangunan penginapan sebenar, kawalan terhadap persekitaran pengukuran adalah terbatas. Kajian ini mengunakan dosimeter tanpa memerlukan tenaga elektrik. Pengukuran menghasikan bacaan radon dari 11.4 – 42.2 Bq/m^3 (min arithmetic) dan 11.0 – 42.1 Bq/m^3 (min geometri), manakala bagi thoron pula bacaan adalah 0.1 – 0.5 Bq/m^3 (min arithmetik) dan 0.0 -0.3 Bq/m^3 (min geometri).

Secara keseluruhannya kepekatan radon menunjukkan pola menurun dari aras bawah kepada aras lebih tinggi. Apabila dibandingkan dengan kepekatan rdon, tiada perubahan ketara dalam kepekatan thoron sebagai fungsi aras lantai. Kedua-dua berbeza dari segi fizikal. Ketumpatan thoron rendah kerana nilai separuhnya hayat yang rendah iaitu 55.6 saat dan terhapus setelah melalui banyak separuh hayat.

Implikasi kajian ini termasuklah keperluan pembangunan polisi persekitaran perumahan serta penambahbaikan pendidikan terhadap bahaya radiasi dalam kediaman.

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I am all set for a new chapter.

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