THE IMPACT OF BUILDING MATERIALS ON RADON ACCUMULATION IN TASHKENT RESIDENTIAL AREAS

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Introduction

Radon is a naturally occurring radioactive gas formed through the decay of uranium present in rocks and soil. It is colorless, odorless, and tasteless, making it difficult to detect without specialized equipment. Long-term exposure to elevated radon levels is recognized as a leading cause of lung cancer after smoking. According to the World Health Organization (WHO), radon exposure accounts for a significant proportion of lung cancer cases worldwide. In Uzbekistan, especially in urban areas like Tashkent, limited studies have been conducted to investigate the influence of building materials on radon accumulation indoors. However, this issue remains crucial, given the diverse types of construction materials commonly used in residential buildings and the varying geological conditions of the region. Building materials play a pivotal role in influencing indoor radon levels, as certain materials have a greater propensity to emit or trap radon. For instance, materials such as concrete, brick, and clay, which are frequently used in Tashkent's residential construction, vary significantly in their permeability and uranium content. Understanding the correlation between these materials and radon concentration is essential to mitigate health risks and establish safer building practices. This study, therefore, aims to analyze the relationship between construction materials and indoor radon levels in residential buildings across different districts of Tashkent.

Main Part

The research will involve a comprehensive assessment of residential buildings constructed with a range of materials, including concrete, brick, and clay. Data will be collected from at least 50 residential structures located in various parts of Tashkent to ensure representative sampling. Radon levels will be measured using high-precision radon detectors placed in living rooms, bedrooms, and basements, where radon concentration tends to be higher.

In addition to measuring radon levels, the study will assess the ventilation systems used in these buildings, as inadequate ventilation is known to exacerbate radon accumulation. Analytical methods, including correlation analysis and regression modeling, will be employed to determine the relationship between building materials and radon concentration. Geological surveys will also be conducted to identify soil composition and the presence of uranium-rich formations, which may significantly affect indoor radon levels.

Furthermore, previous studies conducted globally suggest that porous materials, such as brick and clay, may allow for greater radon infiltration compared to dense concrete structures. However, cracks and structural defects in concrete can still serve as entry points for radon gas. Thus, the study will not only examine the material

composition but also the structural integrity and maintenance practices of residential buildings.

Conclusion

By identifying which building materials contribute most to radon accumulation, this study will provide valuable insights for architects, engineers, and public health officials. Implementing safer construction practices, such as selecting low-emission materials and enhancing ventilation systems, will significantly reduce radon exposure risks. Additionally, the findings will inform the development of updated building codes and regulations that prioritize health and safety in residential construction. Addressing radon risks at the construction phase will ultimately lead to healthier living environments and reduce the incidence of radon-induced lung cancer.

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