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STUDIES ON THE ATTENUATION COEFFICIENT OF LOCAL CONCRETE FOR GAMMA-RAYS

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Lead is supposed to be the best shielding material for gamma-rays. However, concrete (cement mixture) is widely used as a shielding material because of its easy preparation, low cost, and possibility of construction of shields of desired shape without much difficulty.

This paper reports the results of a study on the attenuation coefficient (absorption coefficient) of local concrete for ^{137}Cs;(662 keV) and ^{60}Co;(1173 and 1333 keV) gamma-rays. The concrete has been in the form of bricks and three groups of bricks have been used in the study. Group one has been a mixture of cement and sand, group two a mixture of cement and rubble dust, and group three a mixture of cement and a rock sample rich in manganese. The concentration of cement in the mixture has been varied from 11% to 66%.

The results show that the attenuation coefficient, (a) has a maximum value when the mixture materials are present nearly in the same proportion, (b) has a higher value in the mixture containing the rock sample, and (c) decreases with energy in accordance with the accepted results.

These findings indicate the significance of the concentration of the mixture materials and the requirement of materials of high density, in obtaining higher attenuation coefficients.

References

1. Lamarsh, John R. (1975) Introduction to nuclear engineering, Addison-Wesley 74-87.
2. Stoddard, D.H., Hootman, H.E. (1971) ^{252}Cf shielding guide. Du Pont report 1246, Du Pont, Savannah River laboratory, USA.