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# Assessment of (90)sr and (137)cs penetration into reinforced concrete (extent of "deepening") under natural atmospheric conditions.

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## Abstract

When assessing the feasibility of remediation following the detonation of a radiological dispersion device or improvised nuclear device in a large city, several issues should be considered, including the levels and characteristics of the radioactive contamination, the availability of resources required for decontamination and the planned future use of the city's structures and buildings. Currently, little is known about radionuclide penetration into construction materials in an urban environment. Knowledge in this area would be useful when considering costs of a thorough decontamination of buildings, artificial structures and roads in an affected urban environment. Pripyat, a city substantially contaminated by the Chernobyl Nuclear Power Plant accident in April 1986, may provide some answers. The main objective of this study was to assess the depth of (90)Sr and (137)Cs penetration into reinforced concrete structures in a highly contaminated urban environment under natural weather conditions. Thirteen reinforced concrete core samples were obtained from external surfaces of a contaminated building in Pripyat. The concrete cores were drilled to obtain sample layers of 0-5, 5-10, 10-15, 15-20, 20-30, 30-40 and 40-50 mm. Both (90)Sr and (137)Cs were detected in the entire 0-50 mm profile of the reinforced cores sampled. In most of the cores, over 90% of the total (137)Cs inventory and 70% of the total (90)Sr inventory was found in the first 0-5 mm layer of the reinforced concrete. Strontium-90 ((90)Sr) had penetrated markedly deeper into the reinforced concrete structures than (137)Cs.

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