

Temperature Controlled Radiological Decontamination

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For an effective recovery effort following a nuclear or radiological release event, there is need for an immediate response plan to reduce or eliminate contamination in a quick and efficient manner. The Integrated Wash Aid Treatment Emergency Reuse System (IWATERS) has been described at this conference and in the open literature. IWATERS uses water wash down techniques to quickly reduce contamination levels. To improve the efficacy of the wash down techniques. This study tested the effect of temperature the decontamination of urban materials.

The approach of this study was to use the IWATERS system to decontaminate Cs-137 from Concrete at 5°C, 20°C, 40°C, 60°C, and 90°C, in order to establish the most effective temperature. This study was performed primarily on concrete coupons and separated components of concrete. When separating the components of concrete, they were sifted into 2 measurements: coarse aggregate, which was anything above 2mm sieved out, and fine aggregate, which was anything between 710 µm to 2 mm. Studies have shown these sizes of aggregate most conducive to the sorption of Cs-137.

This study also used temperature control to establish the most effective means to clean concrete, in order to create a detailed explanation to how one would perform decontamination when on site. A static test was performed at the same temperature intervals was performed on concrete coupons, as well as a flow test. This study will inform on the best practices when decontaminating a concrete surface.

All studies were established following guidelines of realistic situations. Temperature were chosen to be minimum and maximum values that could realistically be chilled or heated to if necessary. Concrete coupons were made under the same guidance that one would use when creating a driveway or sidewalk. These precautions were made to eliminate as many unrealistic methods for emergency decontamination, so that results could be achievable in actual situations.

To that end, this study evaluates methods of decontamination to develop a clear and orderly approach to emergency radiological decontamination in urban environments, as well as establish a clear procedure to implement an effective plan.