Mikael Westin

Structure shielding against gamma radiation – shielding factors

From the late 1950s until the mid-1970s, the United States spent a lot of effort to determine the protection that different types of buildings would provide against radiation from nuclear fallout. To this day, several radiation protection agencies around the world rely on the so called Standard Method that was the result from these early efforts.

The protection that a structure can offer against fallout gamma radiation is quantized in the so called *shielding factor*. This factor gives an estimate on the reduction of radiation exposure a building provides as compared to the unshielded case for the same position.

Knowing the shielding factor for a given building may be useful since it can be used together with data on the radiation environment to assess radiation exposure to populations residing in areas contaminated by fallout. Depending on the result, this might lead to decision whether or not to relocate the population from the contaminated area.

Computer simulations have mainly been used to determine the shielding factors for different type of buildings. However, few field measurements have been performed due to the complexity of arranging the experimental setup. Earlier performed experiments with simulated fallout have shown that such *in situ* measurements require a lot of resources and might in some cases potentially expose the personnel to unacceptable levels of radiation.

In this thesis the prospect of using a simplified version of the *in situ* spectrometric method of determining shielding factors, together with sealed radiation sources, has been investigated for one specific house.

Even though several issues need to be addressed, this method of determining the shielding factor has the advantage of being less resource demanding than previous experiments and may provide valuable information on how different areas contribute to the exposure inside a building. Furthermore, the method keeps the radiation exposure to personnel working with the experiment below recommended exposure levels and leaves no activity behind at the test site.

Advisor: **Christian Bernhardsson**
Degree project: 15 credits in Physics, 2014
Department of Medical Radiation Physics, IKVM, Malmö, Lund University