

MONTE CARLO SIMULATION OF BUILDUP FACTORS FOR SINGLE AND MULTI-LAYER SHIELDS BY USING PENELOPE CODE

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Abstract – A historical overview of the development of buildup factor estimation techniques for single and multi-layer shields is presented. The buildup factors for lead, water and iron, as well as for various combinations of these materials for point isotropic source and pencil beam of photons with energies of 1 MeV and 3 MeV, for different thicknesses of the layers, are calculated by using the computer code system PENELOPE. It is shown that there is a good agreement between the values for the buildup factors for multi-layer shields obtained by Monte Carlo simulation and by using different approximation formulas. It is obtained that the values for the buildup factors by using the Blizzard method can be used as rough approximations in the shielding design.