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OPTIMUM SHIELDING DESIGN FOR ELECTRON LINAC ONCOLOGY FACILITIES INCORPORATING SEISMIC BASE-ISOLATION STRUCTURE

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Recently electric linac oncology facilities incorporating seismic base-isolation structure have become very popular in Japan to prevent strong impact to the equipments by the earthquakes. When the boundary of the registered area is set below the base-isolated foundations, additional shielding of iron plate is needed and the cost for shielding increases up to \$100M. Since no one usually accesses underneath the base-isolated foundation, except short maintenance period for base-isolation structure, it is reasonable to set the boundary around the downstairs room. However, it is very difficult to estimate the dose rate of new boundary by using the simple shielding calculation method because of effect of streaming and scattering radiation in the base-isolation floor. In this study detail calculations by using Monte-Carlo calculation code MCNP5 have been performed and found out the expensive iron plate free optimum shielding design for the electric linac facilities with seismic base-isolation structures. Measurements of the dose rate distribution in the practical facility have also been performed and very good agreements between measured and calculated results were obtained.

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