**E1 – 03**

**Natural radioactivity in bricks used in Sri Lanka**

Building materials act as sources of radiation and also shields against outdoor radiation. In wooden and lightweight house the building materials do not act as significant sources of radiation in contrast in house made of brick, concrete or stone the indoor-absorbed dose depends mainly on the activity concentrations of natural radionuclides in the building materials. The indoor radiation comes mainly from the activity concentration of the natural radionuclides of the $^{226}$ Ra series $^{232}$ Th series and $^{40}$ K in the building materials. For centuries brick has been the predominant component of the walls of public and urban buildings in Sri Lanka. Bricks are made mainly of clay originating from sediments deposited by the rivers. Cement bricks are fabricated and used at present to construct low cost dwellings.

The objective of the present study was to determine the specific radioactivity concentrations of $^{226}$ Ra,$^{232}$ Th and $^{40}$ K in brick samples collected from different areas and compare with the corresponding results for bricks of different countries given in the literature. This would enable to study any radiation hazard if present due to the natural radioactivity in buildings.

Sixteen clay and four cement brick samples were collected from kilns in different areas in Sri Lanka. The gamma ray spectra of the prepared samples were measured using a

typical high resolution gamma spectra of the prepared samples were measured using a typical high resolution gamma spectrometer based on a shielded HpGe detector. The spectrometer was calibrated for energy and efficiency over the experimental energy range 186 – 2700 keV using IAEA reference materials RGU-1, RGTH-1 and RGk-1. GANNS software was used to analyse the photopeaks. The measured average specific radioactivity concentrations of $^{226}$ Ra series $^{232}$ Th and $^{40}$ K in the clay bricks were35, 69 and 604 Bqukg-1 respectively. For cement bricks these values were 17, 42 and 525 b kg $^{-1}$ The corresponding world average values are 50, 50 and 500 b kg $^{-1}$ for the said radionuclides.

All three radioonuclides were greater than the world average in clay bricks measured from Mahiyangana. Clay bricks from Ampitiya, Anuradhapura and Nikaweratiya measured values less than the world average for all three radionucludes. Data on concentrations of natural radionuclides can be used to determine dose rates in relation to building materials.