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SUKJAI KIATISAKWATANA : DEVELOPMENT OF A PERSONAL DIGITAL
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A compact size personal dosimeter was developed using electronic parts mainly available locally with the aim of having a low cost dosimeter capable of operating in local ambient conditions with ease of maintenance. Besides, the use of CMOS IC's reduces power consumption considerably. The dosimeter has a measuring range of 0-9999 mR using 7 segment LED display clearly readable even in the illuminated area. It is also equipped with alarm system to monitor presettable dose accumulation, dose rate at each 1 mR, saturation of GM detector at high level dose and the radiation surpassing levels selectable in steps of 2.5, 10 and 25 mR/hr. The dosimeter has a size of 7.4 x 12 x 3 cm³ with a weight of 300 g and is powered with four 1.2 V AAA size rechargeable Ni-Cd batteries with an energy capacity of 180 mAh each. A miniature GM tube for gamma and X-ray measurement is used as radiation detector.

The results of performance testing and calibration show that the dosimeter can measure a dose rate upto 2.5 R/hr with an error less than of + 20 % in energy range of 100-1330 keV. Using Cs-137 standard calibration source, the accuracy and precision of the dosimeter at dose limit of 2.5 R/hr are + 14 % and 3 % respectively. The dosimeter can be continuously operated for 7 hr with fully charged batteries at 300 mW power consumption, while at the lowest operational battery voltage of 4.53 V the dosimeter shows an error less than + 15 % .