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KEY WORD : DENSITOMETER DEVELOPMENT / MEDICAL APPLICATIONS

BUDSAPAPAT NATWONG : A DEVELOPMENT OF DENSITOMETER
FOR MEDICAL APPLICATION BY INTERFACE TO COMPUTER. THESIS

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It is normal practice for workers in radiation areas to wear a film badge. Radiation exposure of the film produces film blackening or film density. The degree of blackening is determined using a densitometer. However, the imported device is costly and few of them could be provided for routine use.

The purpose of this study was to develop a computer-interface densitometer for medical applications along with the determination of its performance characteristics and operational limitations.

Electronic circuitry of the densitometer were designed, constructed and tested until a suitable combination circuit was achieved. Most of the materials used were locally available. The MCS-51 microcontroller was used to control the operation systems of the densitometer and the Visual Basic 6.0 was used in programming for user interface via RS-232 serial communications interface.

The densitometer was tested for accuracy and precision as well as its compatible with standard device, a Victoreen densitometer. An acceptable accuracy of 0.53% and a precision range of 0 to 6.09% were found. Studies in a parallel manner to the Victoreen densitometer showed that our present instrument could respond to not more than 14 steps of densities, with OD values ranging between 0.05 to 2.31 while the Victoreen could cover a wider range up to 21 steps of densities, with OD values ranging from 0.05 to 3.04.

The development of a densitometer as presented in this study could provide satisfactory information on film densities in the useful range in diagnostic radiology and radiation protection. Further research needs to be conducted to obtain the most appropriate computer-interface densitometer with better performance characteristics for the most benefit to people concerned with radiation.