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BUSSABA SAELIM : DEVELOPMENT OF A TWO-DIMENSIONAL IMAGE RECONSTRUCTION SYSTEM FROM GAMMA TRANSMISSION USING MICROCOMPUTER. THESIS ADVISOR : ASST.PROF. SUVIT PUNNACHIYA, ASST.PROF.NARES CHANKOW, Ed.D. 89 PP. ISBN 974-581-725-2.

The purpose of this research work is to develop a two dimensional projection image reconstruction system using microcomputer which based on gamma scanning transmission technique, instead of the radiographic nondestructive testing. This system can use low exposure dose and the image can be seen directly on screen. Besides, a recorded image can be replayed for image quality improvement by digital filter techniques. The development is devided into two parts. The first part consists of an object driving mechanism with a controller and interfacing card for IBM PC microcomputer with EGA or VGA colour monitor. The second part consists of a package program for nuclear data acquisition and image reconstruction which is displayed at 160x120 pixels resolution and 16 contrast colour levels, both linear and logarithmic type of display can be selected.

A 100 mCi ($3x10^9$ Becquerel) Am-241 source and a 1"x1" NaI (T1) detector contained in collimator of 3 mm and 1mm, respectively, are used. The distance between source and detector is set at 10 mm for the transmission measuring system. The system is tested to reconstruct image using a ratemeter with 15% standard deviation setting and 5.48 cm/min scan speed. The image of 1 mm IQI test wire shows a good resolution with sufficient contrast.