MEASUREMENTS AND DETECTIONS OF RADIATION DOSE FIELD IN X-RAY GENERATOR ROOM

INSTITUTE OF RESEARCH, DEVELOPMENT AND COMMERCIALIZATION (IRDC)
UNIVERSITI TEKNOLOGI MARA
40450 SHAH ALAM, SELANGOR
MALAYSIA

PREPARED BY:

ROBIN CHANG YEE HUI
MOHD ASRI TERIDI

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Assistant Vice Chancellor (Research)
Institute of Research, Development and Commercialization (IRDC)
Universiti Teknologi MARA
40450 Shah Alam

Dear Professor,

FINAL RESEARCH REPORT "MEASUREMENTS AND DETECTIONS OF RADIATION DOSE FIELD IN X-RAY GENERATOR ROOM"

With reference to the above, I am pleased to submit three copies of the final research reports entitled "Measurements and Detections of Radiation Dose Field in X-ray Generator Room". This report will be used to fulfill one of the requirements for my post confirmation in the service.

Thank you.

Yours truly,

ROBIN CHANG YEE HUI
Leader
Research Project

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ABSTRACT

This research project attempts to find out whether the radiation doses at points of identical perpendicular distance from vertical axis of a diagnostic x-ray tube are similar or different. It consists of two parts. A Geiger Muller tube was used as a detector to measure dosages at several points along the x-axis and y-axis of a plane 100 cm below the x-ray tube. The Geiger Muller tube was then replaced by a few thermoluminescence dosimeters. These dosimeters were hung in a circular contour surrounding the x-ray tube. Measurements were taken for different plane levels and radius. Analysis from the obtained readings has shown that the doses are actually different, even at equal right angle lengths measured from vertical axis of the x-ray source. Factors contributing to the above result are listed in the final chapter of this report.

CHAPTER 1

1.0 LITERATURE REVIEW

1.1 X-rays discovery

High voltage discharges had been monitored and observed by quite a number of physicists since hundred over yeas ago. The discharges that they had seen are produced by the vacuum tubes. In the year 1895, a German physicist named Sir Wilhelm Conrad Roentgen discovered some kind of lights which later are known as x-rays. The discovery was made by him during a study of high voltage discharges in Crookes tube that was operated at high voltage in a darkened room. He found out that the invisible radiations had caused the pieces of barium platinocyanide to glow or fluorest. Besides, he also discovered that the radiation could pass completely through materials such as wood, paper, clothes, cardboard and so on.

To prove this statement, Roentgen placed these mentioned materials between the tube and barium platinocyanide. As a result, the barium platinocyanide still produced fluorescence. But, this statement becomes not true if more dense material such as lead is used to replace those materials above. This is because the radiation is stopped by lead and no penetration occurs.

Later on, Roentgen found out that an image of hand bones are displayed on a cardboard coated with barium platinocyanide when he put the hand of his wife in between the tube and cardboard. This discovery was indeed a great breakthrough to the medical fields. Doctors and physicians were able to understand deeper regarding the internal condition of their patient without doing any surgery. Roentgen named these invisible lights as *X-rays*. The alphabet *X* is meant unknown in terms of mathematics.

For that discovery Wilhelm Roentgen was awarded the first Nobel Prize in physics in 1901.As a conclusion, this fundamental discovery has had a tremendous impact on several fields, for instances in sciences, medicines and finally industry. Medicine field that deals with the application of x-rays can be categorized into a few branches.