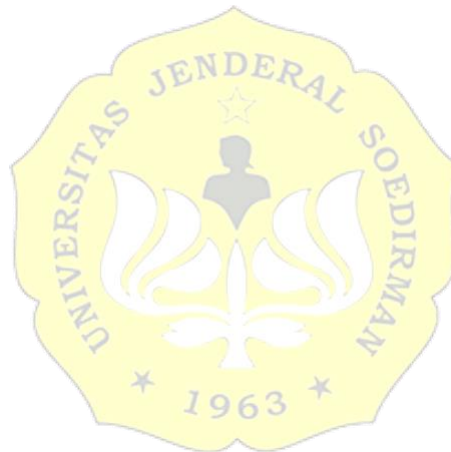


## ABSTRAK

Setiap pekerja radiasi mempunyai resiko paparan radiasi selama menjalankan tugasnya. Salah satu cara menurunkan resiko paparan radiasi adalah menggunakan *shielding*. Tujuan dari penelitian ini yaitu mengetahui karakteristik spektrum sinar-X, karakteristik interaksi sinar-X dengan *shielding* dan menentukan tebal efektif dari kombinasi Pb dan beton dalam memproteksi radiasi sinar-X diagnostik. Penelitian dilakukan secara simulasi menggunakan program PHITS. Hasil penelitian menunjukkan sinar-X menghasilkan spektrum sinar-X dengan puncak karakteristik 2, 10, dan 60 keV serta puncak bremsstrahlung 30 keV. Beton, Pb, dan kombinasinya mampu mereduksi sinar-X melalui mekanisme absorpsi. *Shielding* yang mengkombinasikan Pb dan beton pada kombinasi tebal Pb=0,075 cm dan beton 10 cm mampu digunakan sebagai bahan proteksi radiasi yang handal.

**Kata kunci :** *Shielding* Pb dan beton, reduksi radiasi sinar-X, pemrograman PHITS.



## ABSTRACT

*Every radiation worker has a risk of radiation exposure while carrying out their duties. One way to reduce the risk of radiation exposure is to use shielding. The purpose of this study was to determine the characteristics of the X-ray spectrum, the characteristics of the interaction of X-rays with shielding and determine the effective thickness of the combination of Pb and concrete in protecting diagnostic X-ray radiation. The research was conducted in a simulation using the PHITS program. The results showed that X-rays produced an X-ray spectrum with characteristic peaks of 2, 10, and 60 keV and bremsstrahlung peaks of 30 keV. X-rays interacted with concrete, Pb, and their combination showed that they were able to reduce X-rays through an absorption mechanism. Shielding which combines Pb and concrete in a combination of  $Pb = 0.075$  cm and 10 cm concrete can be used as a reliable radiation protection material.*

**Keywords :** *Pb and concrete shielding, X-ray radiation reduction, PHITS . programming*

