

RADIATION SHIELDING DESIGN AND SURVEYING OF  
RADIO DIAGNOSTIC AND RADIOTHERAPY INSTALLATIONS  
BASED ON SEVERAL COMPUTER CODES

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ABSTRACT

Radiation shielding is the most important tool for radiation protection of the public and the worker around radiation installation.  
The shielding design of existing irradiation facilities require the use of a computerized approach for calculating the shielding for any medical installation.

The limitation of probable genetic effects is achieved by recommendation known as the ALARA concept. This requirement implies that further shielding additions, lead to exposure reductions which are not significant when compared with the increasing costs involved - "Optimization of radiation protection".

The starting point for our computerized approach will be the NCRP 49 and NCRP 51 protocols, while adopting several modifications needed by the ALARA concept and for multiple sources of radiation.

The method described should help develop framework and uniform approach for design shielding and prevent overshielding of radiation protection.

Irradiation facilities included in the present research are:

- A. X-Ray Diagnostics - Radiography + Fluoroscopy units, CT scanners, Panoramic Dental Radiography units.
- B. Radiotherapy - X-Ray Therapy Apparatus (50-500 kVp) Electron Linear Accelerators, Cobalt-60 Teletherapy Machines.
- C. Industrial Radiography - X-Ray: Portable Directional Apparatus ( $\leq 300$  Kv), Electron Linear Accelerators.

Gammagraphy: Co-60, Ir-192, Cs-137 .

To perform the calculations, workloads are acquired for each of machine used in the room. Each source should be considered separately because of the different parameters associated with each source at its location in the room.