



Islamic University / Najaf
College of Medical Technology
Department of Radiology Techniques



Radiation Protection 1

Stage 2

Lecture 9

Principles of Radiation Protection

By

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External exposure is radiation that comes from outside our body and interacts with us. The source of radiation can be, for example, a piece of equipment that produces the radiation like a container with a radioactive material, or like an x-ray machine. In radiation protection there are three ways how to protect people from identified external radiation sources:

1-Time

The amount of radiation exposure depends directly on the time people spend near the source of radiation. The dose can be reduced by limiting exposure time.

2-Distance

A greater distance from the radiation source can reduce radiation exposure. Maintaining a greater distance from the X-ray generator is a very effective method for radiation safety. Emphasize the importance of distance from the radiation source, because the longer distance from the radiation source may be more effective than reducing time or the use of shielding devices.

3-Shielding

There are many shielding devices such as caps, lead glasses, thyroid protectors, aprons, radiation reducing gloves, and so on. In reality, the most effective shields are often nothing more than small well-placed plates made of materials

appropriate for the application.



When shields designing, take into account the following points:

1-

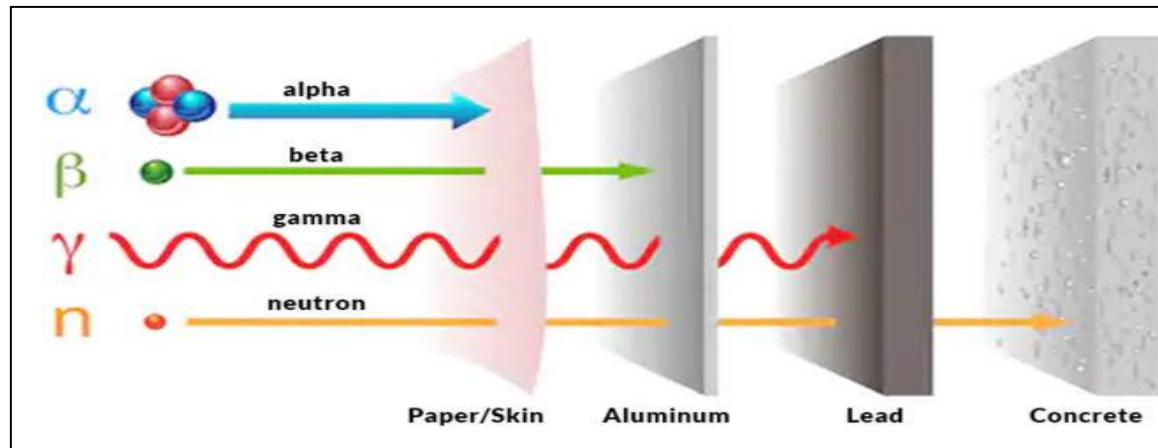
The distance from the radiation source to the occupied location.

The maximum amount of time the source is “ON” per day, week, or year. 2-

3- What portion of the time when the source is “ON” that the location of interest is occupied by the person who most commonly occupies that location.

4- Are the people who occupy the location considered “members of the public” or some kind of designated “radiation workers”

5- What are the characteristics of the emitted radiation - how intense is the radiation hitting the wall, what is its energy and how different types of shielding will be with this radiation.



Dose Limitation. “The total dose to any individual ... should not exceed the appropriate limits”.

Justification. “Any decision that alters the radiation exposure situation should do more good than harm”.

Optimisation of Protection. “Doses should all be kept as low as reasonably achievable, taking into account

economic and societal factors”.

Controlled area: A defined area in which the exposure of persons to radiation is under the supervision of a Radiation Protection Supervisor (the area requires control of access, occupancy and working conditions).

Uncontrolled area : an area to be occupied by public.