Today, with the increasing use of various forms of radiation, all biological organisms are at risk. Radiation science for medicine, agriculture, industry and military purposes has grown wide. To be protected from the harmful effects of radiation, attention should be paid to the time, distance and shielding rules. Shielding process varies according to the types of materials to be used. Turkey has the most abundant reserves of barite, which is a kind of heavy aggregate. Barite is experimentally used as a heavy concrete aggregate for radiation shielding purposes. In the present study, at first the shield thickness of the designed radiotherapy centre is computed according to the normal and heavyweight concretes. Then, the effect of type of material on the design of the radiotherapy centre is examined carrying out static and structural analyses.