

Assessment of X-ray field congruence and beam perpendicularity testing for diagnostic equipment by medical physicists and radiographers in various hospitals in Albania

Institute of Applied Nuclear Physics (IANP) is the first government authority performing QC tests for radiological equipment used in every radiology department in Albania involving adherence to international guidelines and approval by our regulatory authorities. This study aimed at investigating the challenges facing the implementation of the QC program by radiographers and medical physicists in diagnostic radiography and fluoroscopy units used in our country including x-ray projection tests. QC tests results are presented for 23 radiographic and 10 fluoroscopy systems assessing the X-ray-light beam alignment and X-ray beam perpendicularity tests using a collimator test tool, a beam alignment - cylinder test tool, a Leeds Test Objects' FLUORO-4 phantom and coins method. Both tests are performed at a source-to-image distance (SID) of 100 cm. Analysis of the results showed that only 86 % of the radiographic devices evaluated in this study were within acceptable criteria for the light and X-ray field misalignment test being lower than 2% of the SID. For the perpendicularity of X-ray beam test 95.5% of the radiographic devices evaluated were within acceptable criteria showing an angle between the central axis of the X-ray beam and the plane of the image receptor lower than 1.5 degree. All fluoroscopy systems were found to be within acceptable criteria for both tests. It was found that many of the radiological devices included in this study were not under a regular QC program by radiographers due to lack of training and available test tools. It was emphasized to all the radiographers that conducting a regular QC test should be part of their routine work so they can detect at an earlier time any possible defect in the operation of the radiological equipment in use. For the X-ray beam alignment tests they were recommended to use the coins method. It was also suggested to the hospital's management teams that all radiological devices in use should have performance supervision at a proper periodical time and not take place only during inspection or licensing process.

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