Performance study on image contrast evaluation of Thai neutron tomography system

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A digital-based neutron tomography (NT) has been established at Thai Research Reactor-1/ Modicifation1 (TRR-1/M1) of Thailand Institute of Nuclear Technology in 2017. The NT facilities have been continually improved. A compact CCD camera and a rotation stage were installed to carry out 3-dimentional information of a specimen. Recently, an inexpensive internet of things (IoT) device was equipped with shutter control panel for the remote access to get more safety and convenience on radiation concerns. Several standard samples have been used to determine quality of our neutron imaging facilities. In this work, quality of tomographic image has been investigated via a contrast standard specimen and other bulk samples, containing different materials. These materials are, on purposes, used to obtain distinguishable contrast on the image due to difference in thermal-neutron attenuation coefficient. A reconstruction process together with visualization has been routinely carried out via Octopus version8.0 software. Also, image processing is generally performed on ImageJ software. The 2D and 3D neutron images were obtained as well as contrast features. The smallest voxel size as well as sharpness of the image have been found, while a post-reconstruction process is subsequently performed to generate an iso-surface 3D image, which can be read out for creating a 3D model of the object via, for instance, 3D printing process.