عنوان مقاله:

Comprehensive Monte-Carlo Simulator for Industrial X- ray Radiography in Non-destructive Testing

محل انتشار:

کنفرانس دو سالانه بین المللی مکانیک جامدات تجربی (سال: 1396)

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خلاصه مقاله:

In the present investigation, a monte-carlo (MC) simulator for conventional industrial radiography has beenintroduced. Acquiring the acceptable precise simulated radiographic image respecting of the object geometrical shape,atomic number, density etc. was the main purpose of this study. Although there are some commercial softwares availablefor this purpose, all of these softwares have been using analytical or finite element methods for simulating theradiographic images. They don't influence the complicated random behavior of X-ray photons due to not affecting thephotons' cross-sections with different matters in different energies. We have utilized a monte-carlo code MCNPX2.7e fortransporting x-ray photons. X-ray spectrums have been derived by another monte-carlo code and its output has been putas an input in the second monte-carlo code for energy distribution of the geometrical pair code. MC Results validated byexperimental data and demonstrated very accurate agreement. Final outcomes showed our technique for simulatingradiographic testing can strongly be accurate even for exact simulations. Unlike the other models, our monte-carlomodeling observations showed it is able to measure and able to map the scattered photons as well as primary ones. It isvery crucial if we want to investigate the effective parameters on our radiographic testing in order to optimize thembefore implementing experimental set-up.

کلمات کلیدی:

Non-destructive Evaluation, Industrial Radiography, Monte-Carlo simulation, MCNPX2.7e