

# **Discussion on scattered X-ray for thick weld with reinforcement in digital radiography**

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The methods to reduce scattered X-ray on film radiography are useful on digital radiography, but are not described detail quantitative estimation of their effects caused different responses to X-ray spectrums between digital detectors and X-ray films. In this study, the effects of scattered X-ray on the images of reinforced welds were analyzed with Monte Carlo simulations of radiographic testing for thick steel welded joints. The penetrated X-ray included scattered X-ray were analyzed at some rear positions from 12 test specimen models of steel weld joints consisted of 3 shapes of reinforced weld (semi-ellipse, triangle, square) paired with 3 thicknesses of parent materials (9.0, 15.1, 25.5 mm) or 1 narrow groove with 25.5 mm thickness. As results, the scattered X-ray doses on images of reinforced welds were increased with increasing of material thickness compared with doses on parent material images. The shapes of reinforced welds affected to produce scattered X-ray in order of triangle, semi-ellipse, and square. Furthermore, larger areas of regions enclosed with both edges of reinforced welds and center of their images were produced larger scattered X-ray uniformly without for narrow groove specimens. On the other hand, the mean angles of scattered X-ray were uniformly decreased with distances from specimens at parent materials, whereas increased once at some reinforced welds kept half of thickness from detector. In addition, the scattered X-ray on reinforced welds were uniformly increased with the mean angles of scattered X-ray from both specimens had normal grooves and narrow grooves.