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TITLE: ON THE IMPROVEMENT OF HEIGHT INDICATION MEASUREMENT IN WELDS

ABSTRACTS

Phased Array Ultrasonic Testing (PAUT) is one of the most mature Non-Destructive Testing (NDT) imaging techniques in industrial activities. As all ultrasonic-based techniques, one of its main advantages over other NDT imaging techniques lies on its detection capability deep within materials. However, PAUT is subjected to beam spreading phenomenon within materials under test, which introduces an overestimation of the height and length of an indication during the sizing operation. In some applications, such as fatigue tests, this overestimation can severely impact the conclusion of a study. In this contribution, a two-step algorithm is proposed in order to automatically measure the indication height in weld-beads. This is performed by considering sectorial scanning images (S-Scan) and applying a correction method to get closer to the existing height. The first step includes the measurement of beam spread in PAUT data collected on a calibration block in the same environmental conditions and using the same probe, wedge and acquisition chain. The second step aims at detecting an indication and measuring its height. The indication’s height is then corrected by considering the beam spread of the different focal laws and the indication depth as well. To validate the present algorithm, two PAUT databases collected on carbon steel welded samples containing several types of real and artificial welding defects were used to quantify the sizing error in correlation with the type of defects. In addition, the comparison is also performed between the proposed algorithm height sizing and the human interpretation of conventional phased array ultrasonic images.

KEYWORDS

PAUT | Automation | Height size | Beam spread | Weld-beads |