

1.3.61. ON COMPARABILITY OF RESULTS OF ECHO-PULSE ULTRASONIC FLAW DETECTION

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Paper considers matters of difference in results of ultrasonic (US) testing of butt welded joints when it is carried out by different specialists in accordance with just the same applicable normative document. One operator can discard the given welded joint, while other one – give a conclusion on its suitability. In this case, they will be both legally right, though there were no deviations from procedures described in the document. Variation of piezoelectric element size is one of the factors causing such a phenomenon.

Author has examined graphically, analytically and experimentally the influence of piezoelement size on testing results. It is proved that with equal operational frequency, the same entry angle of US beam, sensitivity adjustment using the same calibration block with a notch, but with different transversal dimensions of piezoelement, different testing results are obtained. This difference manifests itself during evaluation of both equivalent size of concentrated defect and conventional length of extended defect. When piezoelement area varies as much as twice, amplitude of echo-signal from a defect can vary by 4 dB, while conventional length – in 2 times.

Though main Russian normative documents allow variation of piezoelement area in 6 times or do not specify at all limits of such variations, considerable incomparability of US testing results is possible. It is proposed to review normative documents and to include in them obligatory indication of dimensions of piezoelectric element included in composition of the angle US piezoelectric probe. Such a measure will make it possible to attain the higher comparability of testing results. In this case, objectiveness of certification of specialists in nondestructive testing by the results of practical exams will be improved as well.