

1.3.85. NEW POSSIBILITIES OF APPLICATION OF DGS-DIAGRAMS IN ULTRASONIC INSPECTION BY MEANS OF SYSTEM “ARD-UNIVERSAL”

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DGS-diagrams are widely used in ultrasonic NDT on the one hand, as the tool for flaw detector sensitivity adjustment, and with another – as a way of evaluation of the equivalent sizes found out discontinuities. Transition to the computer form of construction of diagrams (the first version of system “ARD-universal” has appeared in 1995) has increased a number of users DGS-diagrams thanks to universality (it is applicable for any combined probes), conveniences of application and high speed of calculations and transformations. However in available versions there are no some functions necessary for monitoring procedure, since a probe choice, finishing estimations of the flaw sizes.

Offered third generation of system “ARD-universal” substantially has expanded settlement possibilities and quantity of necessary options that has allowed it to carry out:

- 1) Construction of DGS – diagrams and scales both of straight and inclined probes;
- 2) Construction of the generalized DGS-diagrams;
- 3) The decision of a return problem – definition of the flaw equivalent sizes by means of the measured values of their amplitude and flaw depth;
- 4) Estimation of attenuation of ultrasonic longitude and transversal waves;
- 5) Estimation of influence of a variation of initial data and control basic parameters on an error of definition of the flaw equivalent sizes.

In comparison with the previous versions the offered system (the third version) possesses a number of advantages:

- 1) The using of possibilities of programming in the windows, allowing at any moment to receive on the screen a graphic representation simultaneously with all necessary parameters. It gives the chance to observe dynamics of changes of DGS-curves under the influence of various factors;
- 2) Essential increase in amount of solved methodical problems (a return problem, an attenuation estimation, an estimation of influences of variations of ultrasonic inspection basic parameters – frequencies, a corner of input, etc. – on sensitivity adjustment);
- 3) Addition of new types of probes: the inclined probes of the longitudinal waves, the generalised probes;
- 4) Expansion of a range of the sizes of reflectors (approximately in 5 times in recalculation for the linear size) for which the DGS-diagrams can be constructed;
- 5) Specification of behaviour of DGS – diagrams in a near field of the probe;
- 6) Expansion of possibilities of graphic representation of DGS-diagrams (linear and dB – for amplitudes, both linear and logarithmic – for distances).

The system “ARD-universal” will be useful both at carrying out of the ultrasonic testing, and in accompanying kinds of activity: by working out of means and control techniques, training of controllers. By means of system it will be possible to conduct comparative tests of probes, ultrasonic technologies, to estimate efficiency of application of difference methodical receptions and NDT devices.