

1.1.28. PROBLEMS OF DATA ANALYSIS AUTOMATION IN MFL NONDESTRUCTIVE TESTING

Slesarev D.A., Intron+, Moscow, Russia

Automation of data processing in MFL-Defectoscopy corresponds to one of the main trends of NDT development of last years. It ensures increasing of efficiency and reliability of defect detection and evaluation. It serves as necessary prerequisite for prediction of technical condition of evaluated objects, which is essential for safety and security of industrial objects.

In the broad sense automation of NDT includes automation of measuring system calibration procedure, automatic preliminary and general processing of measurement signals, automation of tested objects condition classification and proposal of further actions. In this report we consider questions of data analysis automation in MFL nondestructive testing.

Typical phases of diagnostic MFL-data processing are shown on the fig. 1.

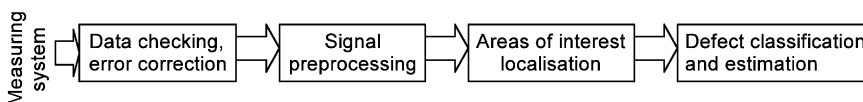


Fig. 1

Automation of data processing includes automatic detection and correction of measuring systems errors (caused, for example, by distortion of measuring system path), automatic localization of areas of interest (defects and constructs), automatic defect detection/classification and estimation of defects parameters.

General automation problem can be solved only on the base of comprehensive approach with consideration of interconnection between different phases of data processing. One should consider the influence of signal preprocessing parameters on the result of defect localization and classification. Results of datachecking should be concerned while defect classification and estimation of defects parameters. The way of its realization at some phases lies in iterative data processing, for example, iterative defect localization.

Key role in automation of data analysis in NDT application plays automatic defect detection and classification. Finally it defines number of missed defects and false detection. Application of adaptive algorithms gives an opportunity for significant improvement of defect detection [1]. These algorithms are base on the consideration of typical defect model and distribution of its parameters as well as on the consideration of local noise characteristics.

Another important aspect of data processing automation consists in optimized defect classification. This presumes optimal construction of the set of classes in the framework of specific problem, regarding additional restrictions [2], as well as learning of the classifier with consideration of real data with regular correction during system operation.

References:

1. **Slesarev D.** Adaptation of signal processing algorithms while automatic detection of defects signals in MFL nondestructive testing – 54.IWK, Ilmenau (Germany), 2009. – P. 51–52.
2. **Barat V., Slesarev D.** Application of statistical methods for signal evaluation in mfl non-destructive Testing – 54.IWK, Ilmenau (Germany), 2009. – P. 153–154.