

1.1.17. SOFTWARE-HARDWARE COMPLEX FOR AUTOMATIC RECOGNITION OF CONTINUITY DEFECTS DURING MAGNETIC PARTICLE TESTING

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Paper describes software-hardware complex for automatic recognition of continuity defects during magnetic particle testing intended to improve reliability of magnetic particle testing method.

The necessity of visual inspection of tested surface in order to find places of magnetic particles deposition over continuity defects with further determination to be made whether this detected defect is real or false is one of disadvantages of the magnetic particle testing method. Long-lasting process of inspection and search of small defects affects negatively the vision of flaw detector operator and reduces his attention, thus increasing probability of omission of real defects during inspection. In order to improve reliability of magnetic particle testing and eliminate the reduction of attention of operator, software-hardware complex for automatic recognition of continuity defects during magnetic particle testing was developed.

Software-hardware complex consists of high-resolution video camera with variable-focus lens, monitor, system unit with specialized frame-capture card and software.

Software-hardware complex allows color image from 4 cameras with real resolution of every camera of up to 768×576 dots to be outputted on the display simultaneously and obtained video image to be processed in real time. Both image from all 4 cameras simultaneously and enlarged image from one camera selected by operator can be displayed on screen with continuing processing of video images from all cameras. When continuity defect in the form of deposited magnetic powder is detected in the testing zone, audio alarm is activated and location of defect is marked out on the display with flashing frame. If operator desires, audio signal can be switched off. Obtained image is stored on the hard disc in the form of a report indicating the date of testing, shift index, operator's surname, number of normative document on testing, number of test object, dimensions of defect. Report can be stored both by the operator's command and automatically.

Software makes it possible to view and analyze obtained reports, to write up comments, to measure all interesting dimensions (for example, from some reference point to a defect) with accuracy of at least 0.1 mm and to produce subsequently final conclusion on the presence of real defect, rather than false one.

Software allows operation with quickly moving test objects tracing their position with regard to video camera. Adjustment of software-hardware complex by brightness and contrast of detected continuity defect in automatic, semi-automatic and manual modes allows operation with different levels of ultraviolet and visible illumination.

Application of the developed software-hardware complex makes it possible to improve reliability and rate of the magnetic particle testing of continuity defects like delaminations and cracks of any configuration outcropping on the test object surface.