

1.2.27. COMBINED TESTING OF FERROMAGNETIC OBJECTS BASED ON EDDY-CURRENT, MAGNETIC AND ELECTRIC POTENTIAL METHODS

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For detection of defects in ferromagnetic objects and evaluation of their parameters, it is proposed to apply combined testing based on eddy-current, magnetic and electric potential methods. Proposed approach is of especial efficiency for ferromagnetic objects with protective layer of non-magnetic metal. Eddy-current flaw detection is based on deformation of eddy-current loops flowing over defect and corresponding variation of eddy-current secondary electromagnetic fields (H_{sec}). Magnetic flaw detection is based on re-distribution of magnetic flux due to increasing of magnetic resistance of defective section. Herewith, increasing of magnetic leakage field (H_m) is observed. Simultaneous recording and joint processing of H_{sec} and H_m makes it possible to detect defects with higher probability and to obtain additional information on their parameters. In one of the options of combined method, common ferromagnetic core is used for creation of both eddy-currents and magnetic leakage fluxes. In other option, magnetic biasing module for eddy-current system is used for magnetic testing.

During magnetic testing, circuit with circulation magnetization is used by means of current passing through tested section. In this case, it is reasonable to obtain additional information on detected defects by electric potential method. To that end, it is sufficient to measure additional potential on defective section using current passed during circulation magnetization.