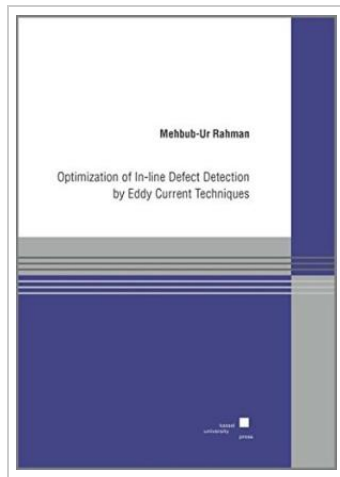


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Optimization of In-line Defect Detection by Eddy Current Techniques

By Rahman, Mehbub-Ur

Condition: New. Publisher/Verlag: kassel university press | This thesis presents innovative and advanced electromagnetic techniques for the in-line inspection of hot wire steel. The hot wire inspection procedure is performed with the eddy current (EC) sensor technique. Any type of crack on the upper surface of the steel wire disturbs the eddy current distribution which can be detected by the eddy current sensors. However, the eddy current distribution is only weakly influenced by cracks which are parallel to the wire, so-called longitudinal cracks. The conventional eddy current sensors cannot detect these cracks properly. To detect such longitudinal cracks a number of new EC sensors have been developed and successfully tested. The modeling of the EC sensors and inspection techniques are numerically performed by setting up the governing equations for eddy current problems and then the differential, as well as the integral equations are solved with a suitable numerical method. A proper selection of the numerical technique plays an important role in successful simulation of the eddy current inspection procedure. Different numerical methods - the finite integration technique (FIT), the finite element method (FEM) and the boundary element method (BEM) are used to model this NDT (non-destructive testing) situation. The presented work...



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