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Abstract： In this paper, the lock-in vibrothermography(LVT) is utilized for defect detection. Specifically, for a metal plate with an artificial fatigue crack, the temperature rise of the defective area is used for analyzing the influence of different test conditions, i.e. engagement force, excitation intensity, and modulated frequency. The multivariate nonlinear and Logistic regression models are employed to estimate the POD (probability of detection) and POA (probability of alarm) of fatigue crack, respectively. The resulting optimal selection of test conditions is presented. The study aims to provide an optimized selection method of the test conditions in the vibrothermography system with the enhanced detection ability.

Keywords: lock-in vibrothermography; optimization method of test conditions; temperature rise; fatigue crack

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