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A Non-Linear Model for Estimating Reliability in a Degradation Test

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Abstract: Material components follow non-linear degradation because the material loss with time is non-linear; the components present different levels of resistance during a degradation process. Constructing predictions of the component life span and performing reliability analyses regarding degradation is possible by non-linear regression. In this paper, we propose new means for predicting time to failure of the components, using an extrapolation process of a calibration regression method for measuring the error prediction; an accelerated test of a polymeric coating process was performed. Results showed that the proposed model has the ability to estimate component reliability to a certain trust interval and a clear error measurement.

Keywords: Degradation Process, Non-Linear Regression, Calibration Regression, Reliability Analysis