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Fuzzy Weibull Regression for Estimating Reliability of Refractory Cement

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Abstract: Refractory cement is one of the essential materials for manufacturing thermocouples; cement viscosity affects greatly the quality and functionality of the component manufactured. In this sense, there is a viscosity range in which the refractory cement must be applied; this range is termed the pot life. So that is of interest to model the cement setting process for predicting it's life, considering some operational factors; this behavior is represented by growth non-linear model. Hence, as the failure times are estimated, it is necessary to consider the prediction error. In this paper, it is proposed to use a, inverse prediction method for measuring the error prediction. Moreover, in order to consider all uncertainty information, performing the estimated times by a triangular fuzzy numbers is proposed, providing a more reliable prediction without loss of information. Therefore, it was adapted the fuzzy theory to the reliability analysis for estimating fuzzy reliability of cement.

Keywords: Refractory Cement, Viscosity, Growth Models, Inverse Prediction, Fuzzy Numbers, Fuzzy Reliability Analysis.