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Comparison of Models to Predict Lifetime of Joints Welded by GMAW Process

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Abstract: Accelerated life testing is a technique that is widely used to get timely reliability information on materials, components, and systems. The probabilistic models related to accelerate testing have been developed during the last years. Commonly, the Weibull distribution model is used to make inference and reliability analysis about systems due to its characteristics. However, it exists other useful probabilistic models to perform the lifetime's behavior: the positive support probabilistic models. In some cases, the goodness of fit tests used to select an adequately model suggests that more than one model can be used. Hence, it is of interest to analyze the effects, advantages and disadvantages of using the Weibull model even if another probabilistic model fitter. In this paper a comparison of using the Weibull model instead of a model with better fit is shown. Fatigue testing data of welded joints by Gas Metal Arc Welding (GMAW) process are used. Results goodness of fit test suggests that Gamma model fitter than the Weibull model, but both models can be used. Additionally, the effect to use a model with better fit than other with less fit over the inference and lifetime predictions is analyzed.

Keywords: GMAW, Fatigue, Accelerated Life Test, Reliability, Goodness of Fit Test