Contribution ID: **75** Type: **not specified**

Inference and Design Optimization for a Step-Stress ALT under a Log-Location-Scale Family

Monday, 17 May 2021 10:20 (20 minutes)

We investigate the inference and design optimization of a progressively Type-I censored step-stress accelerated life test when the lifetime follows a log-location-scale family. Although simple, the popular exponential distribution lacks model flexibility due to its constant hazard rates. In practice, Weibull or lognormal distributions, which are members of the log-location-scale family, demonstrate better model fits. Therefore, our study considers the general log-location-scale family, and our inferential methods are illustrated using popular lifetime distributions, including Weibull, lognormal, and log-logistic. Assuming that the location parameter is linearly linked to stress level, an iterative algorithm is developed to estimate regression parameters along with the scale parameter. Allowing the intermediate censoring to take place at the end of each stress level, we then determine the optimal stress durations under various design criteria such as D-, C-, A-, E-optimalities. The effect of the intermediate censoring proportion on the design efficiency is also assessed with a real engineering case study for analyzing the reliability characteristic of a solar lighting device.

Primary authors: JAYATHILAKA, Aruni; HAN, David

Presenter: JAYATHILAKA, Aruni

Session Classification: Sensitivity/design optimization

Track Classification: Data Science in Process Industries