

Effect of Progressive Type-I Right Censoring on Bayesian Statistical Inference of Simple Step-Stress Acceleration Life Testing Plan under Weibull Life Distribution

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Abstract : This paper discusses the effects of using progressive Type-I right censoring on the design of the Simple Step Accelerated Life testing using Bayesian approach for Weibull life products under the assumption of cumulative exposure model. The optimization criterion used in this paper is to minimize the expected pre-posterior variance of the PTH percentile time of failures. The model variables are the stress changing time and the stress value for the first step. A comparison between the conventional and the progressive Type-I right censoring is provided. The results have shown that the progressive Type-I right censoring reduces the cost of testing on the expense of the test precision when the sample size is small. Moreover, the results have shown that using strong priors or large sample size reduces the sensitivity of the test precision to the censoring proportion. Hence, the progressive Type-I right censoring is recommended in these cases as progressive Type-I right censoring reduces the cost of the test and doesn't affect the precision of the test a lot. Moreover, the results have shown that using direct or indirect priors affects the precision of the test.

Keywords : reliability, accelerated life testing, cumulative exposure model, Bayesian estimation, progressive type-I censoring, Weibull distribution

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