Proceedings of the 2nd Annual World Conference
of the Society for Industrial And Systems Engineering
Las Vegas, NV, USA
November 5-7, 2013

Characterization of Knock Sensor Using Accelerated Life Testing

MI Rodríguez-Borbon[1], MA Rodríguez-Medina[2], A Alvarado-Iniesta[1], and A del Valle-Carrasco[3]

[1]Manufacturing and Industrial Engineering Department
Engineering and Technology Institute
Universidad Autónoma de Ciudad Juárez
Cd. Juárez Chih. México, C.P. 32310

[2]Research and Graduate Studies Division
Instituto Tecnologico de Ciudad Juarez
Ave. Tecnologico
Cd. Juarez Chihuahua, Mexico

[3]Industrial Engineering Departments
New Mexico State University
Las Cruces New Mexico 88003-8001

Corresponding author's Email: ivan.rodriguez@uacj.mx

Abstract: This article presents a reliability model for knock sensors using a life stress relationship and numerical approach. Nowadays, modern and reliable products capable of having a long-lasting life, have caused a need for models capable of predicting the life of the product using Accelerated Life Testing. In this paper we investigate Arrhenius Life-Stress relationship using numerical approach on the study of Accelerated Life Testing (ALT) for automotive sensors. We apply this method to the analysis of newly designed automotive components using temperature accelerating variable, in which some observations in the data are censored. Accelerated Life Test is achieved with constant stress level and resulting failure times are assumed to be from a Weibull distribution. Finally, estimation of reliability is presented using the estimated reliability function. The analysis of the data resulting from Accelerated life testing (ALT) is made for the posterior estimation of parameters and the prediction of the reliability function.

Keywords: Accelerated Life Testing, Reliability, Arrhenius Life Stress Relationship, Weibull Distribution.