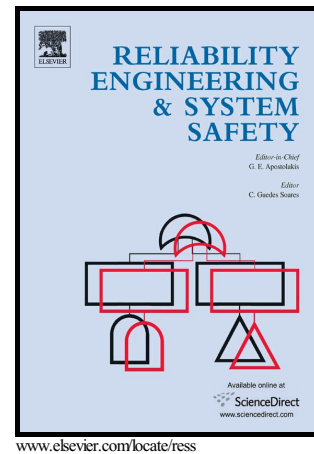


Author's Accepted Manuscript

Reliability Assessment of Competing Risks with Generalized Mixed Shock Models

Koosha Rafiee, Qianmei Feng, David W. Coit



PII: S0951-8320(16)30665-2
DOI: <http://dx.doi.org/10.1016/j.ress.2016.10.006>
Reference: RESS5653

To appear in: *Reliability Engineering and System Safety*

Received date: 5 February 2015
Revised date: 15 September 2016
Accepted date: 22 October 2016

Cite this article as: Koosha Rafiee, Qianmei Feng and David W. Coit, Reliability Assessment of Competing Risks with Generalized Mixed Shock Models
Reliability Engineering and System Safety
<http://dx.doi.org/10.1016/j.ress.2016.10.006>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Reliability Assessment of Competing Risks with Generalized Mixed Shock Models

Koosha Rafiee¹, Qianmei Feng^{1,2*}, David W. Coit³

¹*Department of Industrial Engineering, University of Houston, Houston, TX 77204*

²*College of Mechanical Automation, Wuhan University of Science and Technology, Hubei, China*

³*Department of Industrial & Systems Engineering, Rutgers University, Piscataway, NJ, 08854*

*Corresponding author: Tel.: +1 713 743 2870. qmfeng@uh.edu

Abstract

This paper investigates reliability modeling for systems subject to dependent competing risks considering the impact from a new generalized mixed shock model. Two dependent competing risks are soft failure due to a degradation process, and hard failure due to random shocks. The shock process contains fatal shocks that can cause hard failure instantaneously, and nonfatal shocks that impact the system in three different ways: 1) damaging the unit by immediately increasing the degradation level, 2) speeding up the deterioration by accelerating the degradation rate, and 3) weakening the unit strength by reducing the hard failure threshold. While the first impact from nonfatal shocks comes from each individual shock, the other two impacts are realized when the condition for a new generalized mixed shock model is satisfied. Unlike most existing mixed shock models that consider a combination of two shock patterns, our new generalized mixed shock model includes three classic shock patterns. According to the proposed generalized mixed shock model, the degradation rate and the hard failure threshold can simultaneously shift multiple times, whenever the condition for one of these three shock patterns is satisfied. An example using micro-electro-mechanical systems devices illustrates the effectiveness of the proposed approach with sensitivity analysis.

Keywords: Dependent competing risks, changing degradation rate, shifting hard failure threshold, generalized mixed shock model

Download English Version:

<https://daneshyari.com/en/article/5019597>

Download Persian Version:

<https://daneshyari.com/article/5019597>

[Daneshyari.com](https://daneshyari.com)