

Department of Systems Engineering and Engineering Management

Seminar Series

Monitoring the Weibull Renewal Process

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Date	02 February 2016 (Tuesday)
Time	2:30pm - 3:30pm
Venue	P6921, 6/F, AC1

Abstract

This research has arisen from a challenge faced in real practice—monitoring changes to the Weibull parameters. From first-hand experience we understand that a mechanism for such a purpose is very useful. This study is primarily focused on monitoring the shape parameter of a Weibull renewal process. We derive a novel statistic on the Weibull shape parameter making use of the maximum likelihood theory, which is demonstrated to follow an approximately normal distribution. This desirable normality property makes the statistic well suited for monitoring the Weibull shape parameter. It also allows for a simple approach to constructing a Shewhart-type control chart, named Beta chart. The parameter values necessary for designing a Beta chart are provided. A procedure based on sequential sampling is also proposed for establishing a Phase I Beta chart. The average run length (ARL) performance of the Beta chart is evaluated through Monte Carlo simulation. A comparison with the moving range EWMA chart proposed in Akhundjanov and Pascual (2015) shows that the Beta chart has much better ARL performance when properly designed. Application examples using simulated and real data demonstrate that the Beta chart is effective and makes good sense in real practice.

About the Speaker

Cai Wen Zhang is an Associate Professor at the Department of Management Science in the Business School, Sun Yat-sen University, Guangzhou, China. He received an M.Eng. and PhD both in Industrial & Systems Engineering from the National University of Singapore. Prior to joining Sun Yat-sen Business School, Dr. Zhang worked for five years as a statistician for the Hitachi Global Storage Technologies (Singapore). He has published papers in international peer-reviewed journals including IIE Transactions, European Journal of Operational Research, Computers & Operations Research, International Journal of Production Research, International Journal of Production Economics, Quality Engineering, Reliability Engineering and System Safety, Quality and Reliability Engineering International, etc. His current research interests include statistical quality control, quality management, reliability, and operations management.

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