

ABSTRACT

Optimal Maintenance Policies for Multicomponent Systems
with Weibull Failure Times. (May 1986)

Mark L. Spearman, B.S., Sam Houston State University;
M.E., Texas A&M University

Chairman of Advisory Committee: Dr. Joseph W. Foster

The objective of this research is to investigate various methods for computing reliability parameters for a multicomponent system and, based on these parameters, determine an appropriate maintenance policy; in short, to develop a means of implementing an effective preventative maintenance policy in a realistic system using historical data. Because the Weibull probability distribution function is popular among those engaged in reliability modeling, it is used as the probability model for individual components in a system where any component failure causes a system failure. Before this work, the Weibull was not considered convenient for use in maintenance models because of the intractability of its corresponding renewal function. This work seeks to remedy this problem by providing an accurate and easy to implement approximation to the Weibull renewal function. Also contained in this work are the implementations of several popular maintenance policies using the Weibull in a multicomponent setting. Finally, a comparison of these policies is offered and the effect of using parameter estimates (versus known values) is examined.