

Reduced Total Program Test to Failure Time with Weibull-Johnson Sudden Death Testing

Brian L Vlcek, PhD
Professor and Department Chair
Department of Mechanical Engineering
Georgia Southern University
Statesboro, Georgia 30460-8045

ABSTRACT

Bench-top testing of systems, components, or materials to failure is expensive and time consuming—often requiring hundreds if not thousands of hours of test time. In the 1960s, Leonard Johnson of General Motors presented a techniques by which tests carried out simultaneously on multiple testers could be stopped at the first failure on one of the testers, and the Weibull parameters treated such that the information from the non-failed or suspended tests was not lost. As a result, total program test time could be reduced significantly. A Weibull-Johnson based Monte Carlo “bin” failure model was used to demonstrate the effectiveness of this Sudden Death Testing Methodology. A wear testing overview and a case study of Weibull-Johnson Sudden Death Testing will be presented.