

Mechanical Reliability – These Failures Can Be Disastrous

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Abstract:

Analyzing the stresses in Mechanical Equipment and Mechanical Designs is relatively easy compared to predicting the Reliability of the Equipment. This presentation provides an incite into calculating reliability estimates and providing a better design. It is sometimes the little parts that create the biggest problems.

Mechanical Reliability analysis is a technique for predicting the expected life and reliability of a mechanical system based on the reliability of the individual mechanical components. Mechanical designs are often one of a kind; therefore historical data from "similar" equipment is not always readily available for predicting performance reliability of the new equipment or its new application. The intent of this tutorial is to guide one through the basic steps of performing a mechanical reliability analysis. However, it is left up to the reliability analyst to select the most applicable techniques to use and which probability function best fits the mechanical equipment that is under evaluation. These techniques may be used to determine reliability improvements based on design changes if the design is not meeting the reliability goals. The most current mechanical reliability model selection guides will be provided. Also, small systems and Micro-mechanical reliability applications will be discussed.

Bio:

Richard Doyle is a Registered Electrical and Civil Engineer in California and has a B.S. in Mechanical Engineering from Oregon State University and a M.S. in Engineering from the University of California, Irvine. Mr. Doyle has more than 30 years of experience in the theoretical analysis and design of electrical and mechanical systems. Mr. Doyle's recent experience includes consulting for the past 20 years in Aerospace, Commercial Electronics, and Nuclear Power Industries. He performed thermal/reliability analysis using computer simulations for different electrical systems including: Digital TV set top boxes, numerous power supplies (a major problem), and Microprocessor, DSP, and ASIC ICs. Previous consulting work included teaching Mechanical Reliability and Thermal Analysis of Electronics to graduate engineers working for the US Navy (Civil Service). These tutorials were taught as a 3 to 5 day seminars and have been presented at many different locations including Washington DC, Louisville, KY, and Port Hueneme, CA. He also presented a course in System Safety Engineering at George Washington University. He is a past president of the IEEE Reliability Society and is the Past Region 6 Director and Past Division VI Director and has served on the IEEE Board of Directors for four years. He has presented this tutorial numerous times.