

Accelerated Reliability Test Plans and Procedures

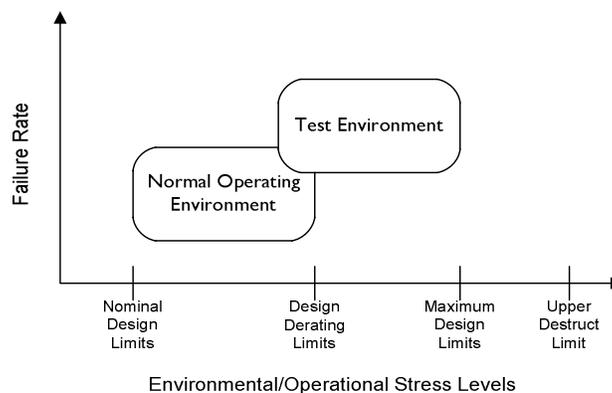
DESCRIPTION

Product reliability is a prime contributor to quality and competitiveness. Manufacturers spend millions of dollars improving product reliability every year with much effort going into evaluating reliability through testing and data collection. Major design and production decisions are based on life test data, often from only a few units. For some products, the test time necessary to provide adequate reliability assurance under normal operating conditions might be inordinately long and very expensive. Reliability-data gathering should not hold up development, and should be as economical as practicable, so it is important to be able to conduct reliability tests as quickly as possible consistent with obtaining meaningful results.

Accelerated life testing employs a variety of high stress test methods to shorten the life of a product or quicken the degradation of the product's performance. The goal is to efficiently obtain performance data that, when properly analyzed, yields reasonable estimates of the product's life or performance under normal operating conditions. In developing such tests, engineers are often faced with two problems:

- What is the equivalent operating time under normal stress?
- Are the failures induced under the accelerated test conditions the same as those which might occur under normal conditions?

To develop accurate and legitimate accelerated test models that answer the preceding questions, the stress levels must be near or overlap the normal operating range. By having overlapping envelopes (as illustrated), extrapolations of test results can be performed using empirical stress models, rather than theoretical models.



The Alion SRC staff has the experience and knowledge required to develop, implement, support, and analyze reliability tests. We have worked with commercial and government customers to design reliability tests for electrical, mechanical, electromechanical systems and components. We have defined effective acceleration methodologies to shorten reliability tests and can develop stress models tailored to the accelerated life testing of customer systems or components. SRC engineers work directly with a customer to develop a test strategy that matches the overall objectives and requirements of their reliability program within resource constraints. Our statisticians can effectively analyze accelerated life test results to provide definitive answers about the long-term reliability of systems or components.