



Attendees enjoying
an open Seminar

April 14-15, 2005, Minneapolis, MN

4. Demonstrating Reliability Requirements with Accelerated Testing

presented by Mr. Larry Edson, BSME, CQE, the engineer who introduced HAST,
an accelerated humidity/temperature test.

Hobbs Engineering offers 20 how-to seminars on accelerated reliability presented by
recognized leaders in their respective fields.

These are the famous seminars that teachers, engineers and managers have been speaking about.



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4. Demonstrating Reliability Requirements with Accelerated Testing

This class uses extensive real life examples to teach the practical "How To" of the most efficient accelerated test methods available today. Accelerated test methods for mechanical and electrical devices will be explained and practiced in class following an explanation of the sciences that support their use. Class time is organized by failure mechanism. The physics of each failure mechanism is explained, both at a science level and at a practical level. The major Stress-Life models that apply to each of the failure mechanisms will be explained through example in class. The majority of the class time will be spent learning exactly how to apply the accelerated test methods and their associated Stress-Life models to common test requirements. Class exercises along with video of product testing will reinforce all concepts taught. Methods for converting from "reliability on test" to "expected reliability in the field" will be explained by example. Explanation of the underlying concept of Stress-Strength-Interference will form the foundation for tying it all together. The following will be covered in depth: Statistical methods; decrease in sample size using the Weibayes method (and various alternatives); CALT (extrapolation to normal stress from the outcome of increased stress tests; degradation analysis for wear (video example); HALT (receiving special attention, with videos of actual HALT tests; failure modes including fixturing, test profiles, and supplier involvement; practical use of HAST; (an accelerated humidity test with video examples); Arrhenius-Peck model (to calibrate HAST to normal use).

CONTENT

Stress-Strength Interference as the basic concept for addressing reliability requirements

Explanation of the physics of failure for each of the major failure mechanisms, electrical and mechanical

Life-Stress models most suitable for each of the failure mechanisms

Inverse Power Model for fatigue and voltage effects

Arrhenius Diffusion Model for elevated temperature testing

Coffin-Manson Model for thermal cycling based thermal fatigue

Norris-Landzberg Model for high ramp rate thermal cycling

Arrhenius-Peck Model for accelerated humidity testing

Filling in the missing parameters for the Life-Stress models

The Calibrated Accelerated Life Test methodology using accelerated test extrapolation (CALT)

Using established parameters developed by others

Degradation Analysis using accelerated test methods for quantifying failure through degrading parametric measurements (without failure)

Especially suited to wear as a failure mechanism

Applying reliability statistical methodologies to the life-stress models to demonstrate reliability requirements

CALT

Success-Run

Over-Cycling Testing (WeiBayes)

Weibull Analysis

Stepped Stress Methods

Converting reliability on test to expected reliability in the field

Developing the overall Reliability Program Plan through integration of all methods taught

Where and how HALT fits into the Reliability Program plan

HAST – the humidity corollary to HALT

How to use, where to use, and how to calibrate to normal usage

Sequential test planning examples

Cumulative damage strategies and the use of pre-treating

Example test plans will be provided for electrical and mechanical systems

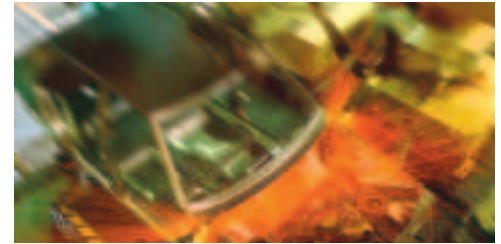
This class will be a mixture of lecture and workshop to insure that each student develops competent use of the methods being taught.

The student who completes this class should be able to quickly develop a well-balanced reliability plan that will be optimally efficient for any type of product or time constraint. The student will gain insightful knowledge in all forms of accelerated testing in order to demonstrate reliability requirements faster and more efficiently than ever before.

PLEASE BRING A CALCULATOR TO CLASS

WHO SHOULD ATTEND

This class/workshop is designed for the manager or working engineer with the task of designing and executing reliability program plans. The class maintains a focus on validating the reliability requirements of highly reliable products as quickly as possible, and with the fewest resources. This is not a management overview, but rather provides detailed and complete working knowledge in the use of accelerated testing.



INSTRUCTOR

Larry Edson has 33 years of experience in the Quality and Reliability field working for General Motors. In the last six years, he has also become a Teacher/Consultant for the Hobbs Engineering Corp. and has launched his own consulting company in Northville, Michigan. Larry's educational background includes a BSME from Kettering Institute, certification as a Quality Engineer through ASQ, and continued graduate work through the University of Maryland, and the Illinois Institute of Technology.

Larry's career at GM has progressed from junior quality engineer with personal interaction with Dr. Edwards Deming, to his current position overseeing new reliability method development and global implementation within GM and its supplier base. Larry is responsible for introducing and implementing HALT, HAST and Calibrated Accelerated Life Testing (CALT) within GM. He is now teaching and expanding the use of these methods for rapid product development of electrical and mechanical systems for the automotive environment.

Outside of General Motors, Larry has consulted for telecom companies, medical companies, motorcycle companies, power tool companies, home appliance companies, and PWB fabrication companies. Larry continues to teach accelerated testing methods, internationally, for Hobbs Engineering Corporation. Larry and his wife Debra live in the quaint historical town of Northville, Michigan, where they enjoy raising their two children and share in many hobbies.