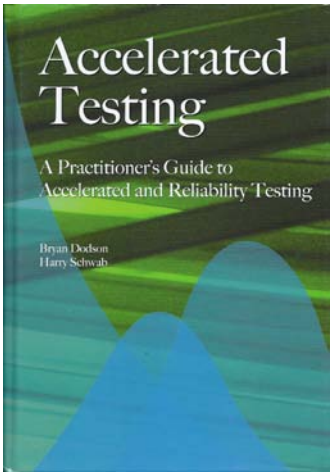
THE CENTER FOR
PROFESSIONAL STUDIES



Test to Failure (TTF)

and Other Methods of Accelerated Stress Testing

This course focuses on the theory and practical methods of obtaining accurate prediction of product life in the minimum amount of time. This can be accomplished by understanding the product environment and designing tests that dramatically overstress the product to produce failure modes rapidly. Following these accelerated test methods can reduce test time, save cost and potentially provide opportunity to improve the product. At the completion of this course the participant will have a good understanding of how to set up an accelerated stress test schedule, collect data, and interpret the data.

Participants will review information on specific company projects and run in-class experiments to generate data for reliability analysis to experience real application of these concepts, tools and techniques.

- First, the history and the basics of reliability testing will be reviewed. We will gain a common understanding of the terminology and methods for setting up and evaluating standard test techniques.

- Next, the class will focus on different methods of accelerated stress testing and data analysis by considering more complex components and systems in real world examples.

- Finally, the class will tour a local test lab where they will see mechanical testing methods being used on small parts and large complex assemblies. They will see real world application of the principles discussed in class.

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Course Syllabus

I IDENTIFYING INFORMATION

Course:	Test to Failure (TTF) & Other Methods of Accelerated Stress Testing
Prerequisite:	Basic understanding of statistics and product testing
Time Frame:	40 total contact hours, 3 modules will be covered One module will be covered every week for 3 weeks
Schedule:	Meet three times per week for 4 hours per session
Instructor:	Dave Fiddes BS in Mechanical Engineering Multiple patents Co-Author, SAE technical paper 22 years in the test and product design engineering profession
Mobile:	(734) 502-6731
E-mail:	lakeoriondave@gmail.com

II REFERENCE MATERIALS

1. Accelerated Testing: Statistical Models, Test Plans and Data Analysis, by Wayne B. Nelson
2. Accelerated Testing: A Practitioner's Guide to Accelerated and Reliability Testing, by Harry Schwab Bryan Dodson
3. Potential Failure Mode and Effects Analysis, 4th Edition by AIAG

III COURSE GOALS AND OBJECTIVES

1. Understand the theory behind accelerated test methods
2. Understand data types and analysis
3. Learn how to interpret the data and take action on the design of the part
4. Prepare student to design their own accelerated tests

IV METHODOLOGY

This course is designed to introduce the concept of Accelerated Testing and prepare the student to have the skills and tools required to apply this technique in a wide range of applications in all types of industry.

Lectures

Concepts will be presented in a lecture format outlining the theory and application of Accelerated Testing and data analysis. A booklet that contains the lecture material will be provided for the student's personal use as reference material.

Specific Industry Examples

Real life industry examples will be covered that detail the application of the theory to demonstrate how different companies apply these tools and techniques. This will give the students a clear understanding of how to set up tests and analyze the data.

In-Class Assignments

Using the theory and industry examples the student will conduct a few simple projects that demonstrate the benefits of accelerated testing. The data generated with these in class tests will be analyzed with ALTA7, a premier software package from Reliasoft used in test labs around the world. We will also set up and evaluate real world examples of more complex component or product tests to further develop our skills in applying these tools and techniques. The students will present their work to the group for review and discussion.

Specific Company Application

We will also apply these tools and techniques on a specific company project that is currently in development by one or more of the students. This will help build a standard methodology on how to appropriately approach a broad range of validation testing methods.

V COURSE OUTLINE & ASSIGNMENTS

Module 1

Introduction to Accelerated Testing	PowerPoint lecture
Engineering considerations and statistics	PowerPoint lecture
Modeling distributions and applications	PowerPoint lecture
Students will set up test examples	Complete and discuss

Module 2

Models for life test with constant stress	PowerPoint lecture
Models for life test with step and varying stress	PowerPoint lecture
Analyze various real world examples	Complete and discuss
The role of the DFMEA	PowerPoint lecture

Module 3

In-class fatigue experiments. Analyze data.	Complete and discuss
Integration of accelerated testing into the design process	PowerPoint lecture
Practice setting up tests using real world examples	Complete and discuss
Environmental testing and Fault Tree Analysis	PowerPoint lecture
Tour of local test lab incorporating TTF	Class project
Detailed presentation on Simulation Testing	PowerPoint lecture