Environmental Stress Screening (ESS) for COTS & Improved Reliability

February 22, 2013
Los Angeles, CA
Radisson LAX
In conjunction with CMSE Conference

Seminar on How to
Boost Reliability, Productivity and Profits

Increase Product Reliability
Decrease Manufacturing Costs
Optimize Production Cycle Times
Improve Market Share
Increase Profitability

Presented by: Dr. Andrew Kostic

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Environmental Stress Screening (ESS) for COTS & Improved Reliability

About This Course:
This course teaches practical ways that manufacturing cost can be reduced and product reliability improved. It explores ways to reduce or eliminate the impact of life limiting failure mechanisms in design and manufacturing processes. Participants will have opportunities to review actual reliability case studies and to develop solutions for their own products.

What You Will Learn:
The basics of reliability and how to apply them in your company’s screening, quality enhancement and reliability improvements programs.

Why, how and when to perform environmental stress screening (ESS) and other forms of accelerated testing.

How to use ESS to enhance product robustness and manufacturability.

How to evaluate and specify supplier reliability performance.

Leading edge reliability improvement approaches including Parametric Screening and STRIFE (Stress Testing for Reliability Improvement).

Who Should Attend:
Designers, Manufacturing Engineers, Quality Engineers, Reliability Engineers and others involved in improving product quality and reliability will benefit from attending this course.

Course Materials and Notes:
Each student will receive a copy of the seminar notes, reference to materials used and CD of reliability software used in the course.

Principal Instructor:
Dr. Andrew D. Kostic has been in electronics industry for over 35 years. Andy has been involved in semiconductor production, medical electronics, computer manufacturing, and aerospace systems. He has participated in all phases of the product life cycle, including: design/development, component sourcing, manufacturing, failure analysis, supplier auditing, testing and reliability.

Dr. Kostic holds B.Sc. & M.Sc. degrees in Physics and a Ph.D. in Engineering with Reliability Specialization. He is a Senior Member of the IEEE and has been the chair of local IEEE Reliability Groups and has authored over thirty technical papers.

He is a recognized authority on environmental stress screening (ESS) and has taught classes in screening of electronics for over 20 years for many organizations including Motorola, University of Wisconsin-Milwaukee and Hong Kong Productivity Council.

Schedule:
Class runs from 8:00 AM to 4:30 PM.

NOTES:
1) The schedules will vary according to individual class need.
2) Software will be demonstrated as the relevant concept is discussed.

Registration:
Register before January 18 for discount and assure enough attendees to hold the Seminar.

Do not book non-refundable services until you receive notice the Seminar is definite.
Environmental Stress Screening (ESS) is a process used by factories to precipitate process related defects from latent to patent for detection by a product verification test. For most processes, the product verification tests are electrical tests but may include other forms of testing which are non-electrical. To conduct an effective screen, the product must be capable of surviving the high stimulation levels needed to accelerate the failure mechanism of assembly related defects. The participation of design and reliability engineering is to determine the limits of environmental stimulation which the product can endure before its performance is permanently degraded. A mechanically “weak” design may be changed to improve its margins with respect to a specific form of environmental stimulus. A by-product of this activity a more rugged product which may enjoy a higher demonstrated MTBF. The form of ESS chosen by the factory is dependent on the failure mechanisms for the relevant field failures. An ESS program is faulty when it does not expose the locus of faults seen by the customer. The ESS process is a dynamic process which must change as product failure behavior changes. For this reason, it is not appropriate to “spec” an ESS regimen and leave the regimen unchanged throughout product life.

Again, the purpose of any environmental stress screening (ESS) regimen is to expose the hidden defects that were introduced during the manufacturing process. More succinctly, manufacturing defects are precipitated from latent to patent. ESS, however, is not designed to find deficiencies in product design although in many cases it does expose design deficiencies. Rather than design an ESS program to find design weaknesses, an important ingredient of product qualification must be the undertaking of environmental testing to ensure that the design is robust enough to meet its design goals. This is especially useful in proving COTS components and subassemblies.

- Electronic Product Reliability Life
- Infant Mortality - Its Causes and Duration
- Random Life - Its Causes and Duration
- Wearout - Its Causes and Duration
- Mechanical Product Reliability Life - Its Causes and Duration
- Physics of Failure
  - Arrhenius equation & its proper application
  - Electromigration
  - Voltage accelerated mechanisms
  - Humidity
  - High cycle fatigue
  - Low cycle fatigue
  - Crack growth
  - Random vibration and related types
- Mechanical Failure Mechanisms
  - Thermal cycling
  - Solder cracking
  - Thin film cracking
  - Creep
- Basic Screening Concepts
- Benefits of Stress Screening
- Effects of Bad Parts on a PCB Yield
- Destruct Limits of Products
- Why Good Units aren’t Harmed During Stressing
- Cost of Failure
- Types of Screening
- Screen Levels - Pros & Cons
- Designing a Good Screen