Achieving Reliability Excellence
Managing and Improving Reliability across the Entire Life Cycle

2025 Agenda

Martin Shaw – Reliability Solutions
www.reliabilitysolutions.co.uk

Reliability Solutions – Background

Biography

Martin Shaw (BSc Hons), Reliability Solutions

18 Hillside, Houston, PA6 7NT, Scotland, UK

Reliability Solutions focuses on providing the complete range of Reliability Improvement tools and Application Solutions to Significantly Reduce your product failure levels at the most expensive end of the product cycle , the Consumer

Reliability Solutions was formed in 1997 by Martin Shaw, previously of IBM as Quality and Reliability Specialist within PC business unit. Martin Shaw worked as specialist in Product and Commodity Quality / Reliability optimisation for the Electronic Product Suppliers to IBM between the years of 1982-1997. During this time he worked extensively throughout Asia, USA and Europe with wide range of suppliers. Since 1997 he has worked with a wide range of companies Worldwide and provided solutions to ensure RAPID improvement in a dynamic environment. These companies include many Blue-Chip companies: Daewoo Electronics, LiteOn, Astec Power, Philips, TPV, Vestel, Acer, LiteOn Power, LG, Amtran, Fairchild Semiconductors, Atmel Semiconductors, Wolfson Microelectronics, ULTRA Electronics, Melexis, IDEAL Heating, SKY TV, Hua Wei, Emerson Power, EE Phones, TCL, SMART Technology, Singapore Technology Kinetics, Eetc.

He provides a range of 2-3 day Reliability Improvement Seminars and Application consultancy to meet the exact needs of any Electronic Manufacturer. He can be contacted at

www.reliabilitysolutions.co.uk

reliabilitysolutions@yahoo.co.uk
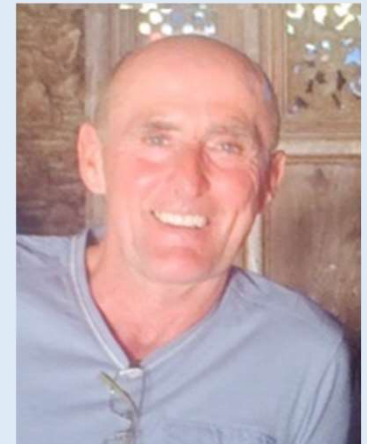
Reliability Solutions – Background

For achieving World Class Reliability and Customer Experience we should always think of 2 famous phrases ;

1. *You cannot manage something you cannot control and you cannot control something you cannot measure*
    - *Main reasons is most complex Product Manufacturers commonly LACK GOOD OBJECTIVE MEASUREMENT of their design and Reliability / Quality levels*

2. *Transform data into information and information into strategic decision*
    - *Any Reliability Improvement Programme requires deeper thinking and making some major changes in how we use a wide range of information and measurements to drive improvement*

DAY 1 - Agenda

- Introduction to Basic Reliability Understanding   *Mod 1a*

- Understanding Accelerated Testing to set up Predictive Testing Models at Design Stage   *Mod 2a*
    - High Temp Arrhenius model and Activation Energies used for key component failure modes
    - Maximising Acceleration Factors by combining Temperature, Thermal Cycling, Power Cycling and Humidity
    - Real Life examples of how to calculate Activation Energy level from experimental work at Product and Component level

- Component level Stress Testing and the typical methods for Key device qualification *Mod 2c*

- Evaluating the effectiveness of different stress test types with the Hughes Test Strength Equation to optimise Early Life Test programmes   *Mod 3*
    - Developing an Effective Reliability test Strategy , using Modern stress techniques, including Random Vibration and Thermal Cycling
    - Product Level Case Study with real life examples using the FREE Reliability Solutions calculation models

- Understanding the Statistics and Probability of Failure to define optimum Reliability test Sample Sizes   *Mod 15*
    - When is a sample size TOO SMALL to evaluate and qualify product reliability
    - Understanding WHY JEDEC test specs and sample sizes are OUT OF DATE !

- Life Test Planning   *Mod 6*
    - Theory behind classical Life Testing set up
    - Using the FREE Reliability Solutions calculation models to combine Acceleration Factors / Sample Sizes / %   confidence predictions

DAY 2 - Agenda

- Relationship of Manufacturing Yield with Early Life Failure Rate   *Mod 4*
  - Using yield performance data from PCBA and Product Assembly processes to Predict Warranty Field Fail Rates
  - How to predict and control Early Life Failure Rates using manufacturing data , Case Studies using the FREE Reliability Solutions calculation model

- The benefits of Sequential Reliability Stress Testing and how gradual cumulative stress testing finds more 'real' defects *Mod 7b*
  - LCD Panel Accelerated Stress Testing using a more effective sequential stress test approach with failure rate prediction modelling

- Developing a strong Sequential Reliability Stress Test Approach   *Mod 12*
  - Applying a matrix approach to select MOST EFFECTIVE SEQUENTIAL STRESS TEST approachwith examples of semicon packaged devices and electro mechanical modules
  - Making Reliability Testing EFFECTIVE compared to INEFFECTIVE JEDEC non sequential stress test approaches

- Weibull Analysis of Failure data and how to apply to any product failure data and understand how standard software packages actually work   *Mod 9*

DAY 2 - Agenda

- Developing an *HOLISTIC RELIABILITY* model to <u>truly predict Product Reliability</u> at NPI stage using all the key contributors which directly impact Reliability   *Mod 13*
  - ➢ Learn from Reliability Solutions unique model and how it could fit into your own company
  - ➢ Build your own model and understand how to make use of much information which already may be available but never used when making Reliability Predictions for new products

<u>Class Activity</u>

Classroom session where students split into groups and develop their plan for New Product Reliability Management from Design Stage using the FREE Reliability Solutions measurement and prediction models they have learned in the training

  - ➢ Developing Eng Level stress testing with confidence
  - ➢ Setting Longer Life Test model for predicting failure levels
  - ➢ Acceleration Modelling and Acceleration Factor calculations