



# Managing & Improving Electronics Product Reliability across the Entire Lifecycle from Prototype into Volume Manufacture

**9<sup>th</sup> - 10<sup>th</sup> October 2018 - Stonehouse Court Hotel, Bristol Road, Stroud, Gloucestershire**

*Set up and manage World Class Electronic Reliability Improvement Programmes to drive Failure Rate Reduction*

## Comments from past participants:

"The course really applicable to most company. Not only necessarily for, reliability guy only. Designer should know also."

Plexus Manufacturing

"Martin is surely an expert in this field. I would recommend it to others who would need this training."

NI Malaysia

"Instructor credentials and evident in training"

Infineon Technologies

"Good presentation skills and have a lots of experience in this course."

Premium Sound

"Learn a lot of new knowledge "

Clarion

"Im specialist of statistical analysis, I know theory background. However martin can share some points in practical that make me more understand and, find out the way to apply in future"

Sanmina (Thailand)

"Fantastic. Gain a lot of knowledge from the course."

Finisar

"Very good! Definitely learn new things"

Bose System

"Very good! Definitely learn new things"

Bose System

"Martin is a serious guy and in reliability testing and with his last experience able give better insight and approach for NPD/NPI reliability testing."

Dyson Manufacturing

"Course was informative, new technique and modeling Instructor is very affective"

Sandisk Storage

"Well-versed with the training course and able to learn from its experience"

QAV Technologies

"The instructor have in depth knowledge in Reliability and Management"

Sandisk Technologies

"Very Knowledgeable on the topic and have increased my overall understanding of importance of reliability "

Dominant OPTO Technologies

"Actual cases sharing good for audience. Trainer very knowledgeable in the topic that being addresses "

Amkor Technology

"Good Knowledge on the industry and the needs to improve design for cost effectiveness"

Muehlbauer Technologies

"Simplify complicated reliability subject into practical model for electronics industry"

EDMI Meters

# Reltech Limited Independent Test Laboratory

Reltech Limited founded in 1976 is an ISO/IEC17025:2005 and AEC-Q100 Accredited Independent Test Laboratory serving the Semiconductor and Microelectronics industries. Reliability and Qualification test services are provided to industry leading Fabless Semiconductor companies and Integrated Device Manufacturers. Reltech's vast experience in qualification testing and HTOL system design and manufacture enables it to offer its customers full turn-key solutions covering all aspects of semiconductor reliability, including qualification planning, die and package level testing such as High Temperature Operating Life (HTOL), Highly Accelerated Stress Test (HAST), Low temperature Operating Life (LTOL) and Temperature Humidity Bias (THB). Reltech develops, designs and manufactures all of the required test hardware and software used for the complete qualification testing of its customer's products prior to volume manufacture. For Board Level Reliability, Reltech provides a full turn-key solution including consultancy with our partner – Martin Shaw of Reliability Solutions, training, product analysis, strategy, HALT and Qualification testing.

High Temperature Operation Life (HTOL) testing is performed to determine the effects of electrical bias and temperature on devices over extended periods during which potential inherent failures are accelerated. HTOL is used for both device qualifications prior to product release and volume manufacture.

Reltech has been designing and manufacturing HTOL systems including high performance thermal chambers, HTOL (Burn-In) boards, driver boards and system software for over 30 years and employs the use of these systems for performing HTOL testing of its customers products.

The Reltech HTOL laboratory provides multiple chambers with over 15,000 device test positions allow many qualifications at different temperatures and electrical stimulus to be performed simultaneously.

During the past 10 years Reltech has invested in the latest HTOL system technology, providing temperature control at individual device level. This enables reliable operation of HTOL testing on low geometry devices (sub 28nm) where leakage currents vary from device to device greatly. Devices with DUT power up to 150W are accommodated.

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## Program Overview

### What could an unreliable product really cost your company?

#### Your credibility? Your reputation? Your future?

Markets are demanding cheaper, more reliable electronic products and systems and many manufacturers find that traditional, established procedures and processes. Yet in today's market-driven climate you need, even more, to review procedures, examine options and pursue cost-effective solutions that will allow you to stay competitive and profitable, and increase your market credibility.

#### Reliability enhancement is now within everyone's reach

Leading-edge reliability enhancement technologies used to be regarded as solely the province of safety-critical avionics and aerospace applications.

But things change. These technologies are now within the grasp of all electronic designers and manufacturers; crucially the benefits in reliability that they bring are now expected by the market are now being questioned.

The idea of running months of extensive reliability testing is fast becoming a luxury – and one that few can justify.

Global customers seek out suppliers whose enhanced reliability performance improves their own market penetration and consolidates their own position – the rewards are substantial for those suppliers ready to meet the new demands.

### How will this course benefits your company?

- Streamline your Reliability Testing and ensure only the most effective testing is performed
- Greatly Increase your capability of defect detection
- Drive Lowest field failure rates very quickly
- Drive Down cost of Failure in the field
- Lower the cost of your Reliability testing
- Bring engineers together in their understanding of reliability and how to improve it at all levels
- Provide a focused approach to Continual Improvement
- Bring BETTER quality new products into the market quicker
- Improve Customer Satisfaction

These 2 days masterclass will have a good balance of Practical and theory. Initial theory to set the scene goes quickly into multiple case studies so participants learn quickly how to do similar on their own product types.

### Why you should attend Reliability Solutions Seminar

- Learn about the REAL EFFECTIVE ways to test out your product reliability.
- Realize you should NOT rely on old standards to qualify your product reliability.
- Mix with like-minded engineers and managers interested in understanding more about reliability.
- Understand how NOT to miss defects in your reliability test.
- Understand how to get an edge on your competitors.
- Learn how to improve reliability at lowest cost.
- Discover what reliability means to the world's most successful companies.

#### The Course is designed for:

- Reliability engineers /Test engineers
- NPI engineer / Manager (New Product)
- Electronic and electro mechanical designers / manufacturers
- Quality Assurance/Quality Lab/Quality Engineers / Departments.
- Design Team / Hardware engineer / Product engineer
- Manufacturing
- Testing companies provides reliability stress testing.
- Anyone who is doing reliability testing at design stage.

**Seminar Cost : £850 + VAT per person**

## DAY 1 (AM Agenda)

### Understanding Basic Reliability Theory

- Application of Bathtub Curve theory
- Importance of Early Life Reliability and the Importance of Exponential and Normal Distributions in Reliability Prediction
- Definition of Hazard Rate and its importance in Reliability estimation at RD stage
- Understanding MTTF and effect on Product Level Fail Rates

### Understanding Accelerated Testing to set up Predictive Testing Models for all products at Design Stage

- 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

### Evaluating the effectiveness of different stress test types with the Hughes Test Strength Equation to optimise Early Life Test programmes

- 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**

### Life Test Planning

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

## Day 1 (PM Agenda)

### Activity 1

- **Classroom session where students use the Reliability Solutions calculation models to define an Early Life Reliability Test for their own products and share experience with class**
- Relationship of Manufacturing Yield with Early Life Failure Rate
  - 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**
- Semiconductor Defect Types Review
  - Summary of defect types and types of Reliability Tests that are most effective in stimulating Latent Semicon defects
  - Understanding why JEDEC test standards alone are simply not enough
- TOUR OF RELTECH RELIABILITY TEST LAB FACILITIES

## **DAY 2 (AM Agenda)**

### **Electronic Sub-Assy Reliability Stress Testing**

- Making Reliability more effective at Sub-Assy level
- How to Accelerate Failures by stress testing at PCBA levels to drive FAST, EFFECTIVE, LOW COST, Reliability Testing that provides FAST RESULTS - Control Board and Power board case studies
- Mechanical and Electro Mechanical device application Case Studies

LCD Panel Accelerated Stress Testing using a more effective sequential stress test approach with failure rate prediction modelling

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

Setting up strong Design Quality Test Programme and using Design Maturity Measurement to measure Design Capability

- Understanding how this will benefit your organisation
- Making use of the FREE Reliability Solutions calculation model to measure and monitor your own Design Maturity during the critical development cycle

## **Day 2 (PM Agenda)**

Predicting Field fail Rates using development test Information from a Design Quality Engineering Test programme

- Combining Electronic simulation predictions with Accelerated Test data and Design Maturity Measurements to make efficient Reliability Predictions BEFORE Mass Production

Setting up 'Holistic' approach to New Product Introduction scoring and the scoring model used to manage NPI more effectively and Objectively

- Multiple Case Studies of Electronic and Electro Mechanical products
- Automotive Sensor products, LCD TV, Power Supply, etc Case Studies
- Using the FREE Reliability Solutions calculation model to measure the % NPI Score

Q & A Session with Martin



[www.reliabilitysolutions.co.uk](http://www.reliabilitysolutions.co.uk)

# Principal Program Facilitator

## Martin a 34 years veteran expert:

Developed wide range of solutions for many companies on how to perform effective Reliability testing very unlike traditional standard approaches which are very weak and ineffective, his solutions have been applied at multiple World Class Companies; Artesyn Power, Acbel Power (Worlds 3rd biggest Power Supply maker), TPV China (World's biggest contract TV / LCD Monito maker), Melexis Germany (Supplier of sensor devices to top Auto makers BMW, Mercedes, Porsche, Audi), GE , Bosch Automotive Products, Hua Wei Telecommunications , Range of semiconductor manufacturers including Renesas, Toyota, Hyundai Electronics, Fairchild, Atmel, etc)

Provides solutions to the problems electronic and electro mechanical designers / manufacturers face when not being able to stimulate failure of design or manufacturing weaknesses which are later found in the field as major failing items

Focuses on applying UNIQUE measurements in Design Cycle and during manufacture to accurately estimate and predict future failure levels. Enables designers and manufacturers to OPTIMIZE time spent on Reliability testing and REDUCE costs and avoiding old style wasteful testing, replaced by his more effective and lower cost proven methods

Is an energetic and enthusiastic teacher who is able to inspire students to think totally differently and be able to quickly add real value to their own businesses.

Works with range of low cost test companies who can provide services to companies which do not have relevant equipment to do proper and effective Reliability Stress Testing, enables companies to perform best possible testing at lowest cost based on reliability Solutions models

Previously of IBM as Quality and Reliability Specialist within PC business unit. 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. 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.

## Reliability Solutions

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.

## Martin's Blue Chips Clients:

Daewoo Electronics, LiteOn, Astec Power, GE, Bosch Automotive products, Philips, TPV, Vestel, Acer, LiteOn Power, LG, Amtran, Fairchild Semiconductors, Atmel Semiconductors, Wolfson Microelectronics, ULTRA Electronics, Melexis Germany, IDEAL Heating, SKY TV, Hua Wei Telecommunication, Emerson Power, EE Phones, TCL, SMART Technology, Singapore Technology Kinetics, Artesyn Power, Acbel Power, Range of semiconductor manufacturers including Renesas, Toyota, Hyundai Electronics, Fairchild, Atmel, etc) and etc.

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## Delegate Details

1. Name: \_\_\_\_\_ Mr  Mrs  Ms  Dr

Job Title: \_\_\_\_\_

Email : \_\_\_\_\_

Contact No: \_\_\_\_\_

Department: \_\_\_\_\_

2. Name: \_\_\_\_\_ Mr  Mrs  Ms  Dr

Job Title: \_\_\_\_\_

Email : \_\_\_\_\_

Contact No: \_\_\_\_\_

Department: \_\_\_\_\_

3. Name: \_\_\_\_\_ Mr  Mrs  Ms  Dr

## Invoice Details

Invoice Attention to: \_\_\_\_\_

Company: \_\_\_\_\_

Industry: \_\_\_\_\_

Address: \_\_\_\_\_

Postcode: \_\_\_\_\_ Country: \_\_\_\_\_

Telephone: \_\_\_\_\_ Fax: \_\_\_\_\_

Email: \_\_\_\_\_

### Payment Method

By Direct Transfer: Please quote invoice numbers on remittance advice.

RELTECH ACCOUNT NAME: Reltech Limited

BANK : Barclays Bank

ACCOUNT NO : 10342084

SORT CODE: 20 33 83

Payment Policy: Upon receipt of a completed registration form, it confirms that the organization is registering for the seat(s) of the participant(s) to attend the conference or training workshop. Payment is required with registration and must be received prior to the event to guarantee the seat. Payment has to be received no later than 01 Sept 2018

### Venue: .

The course fee does not include accommodation or travel cost. It's recommended to book the hotel room early as there are only limited rooms available.

DATA PROTECTION: The information you provide will be safeguarded by Petro1 that may be used to keep you informed of relevant products and services. We take it seriously when it comes to protection of our client data.

### Cancellation & Substitutions:

Upon receipt of a completed registration form, it confirms that the organization is registering for the seat(s) of the participant(s) to attend the conference or training workshop. Should you be unable to attend, substitutes are always welcome at no additional cost. Please inform us as early as possible. Payment is non-refundable if cancellation