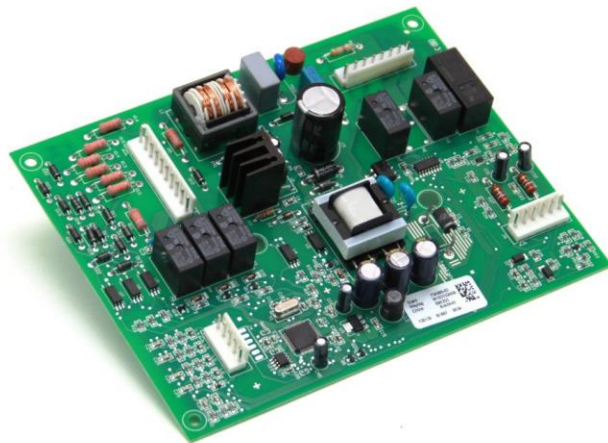


# **Managing & Improving Reliability within Electronics Product Design**

**30<sup>th</sup> – 31<sup>st</sup> March 2017 – Taipei, Taiwan**

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



“

Very practical and useful to develop in reliability concept.”

“

Excellent. Good mix of theory and real life experiences.”

**In collaboration:**

## Program Overview

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**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.

**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.**

### **Attend this course to Master:**

- Understand how to develop Unique and Effective Low Cost Accelerated Stress Test programmes.
- Predict Reliability from Accelerated Testing.
- Understand how to focus on Early Life Reliability Testing and Improvement to drive Customer Satisfaction improvement.
- Realizing the need to develop unique Reliability Test programmes as opposed to following old ineffective Military Standards for Reliability Testing.
- How to set up a World Class Reliability Test approach to suit all product types.
- Changing company culture from Retrospective to Predictive.
- Giving engineers and management the ability to control and predict Process Reliability.
- Learn how to improve and manage Design Quality.

### **CASE STUDIES & PAST PARTICIPANTS ACHIEVEMENT:**

- Realize how world class companies manage Reliability and make major cost savings in Field Failure costs.
- Understand how to make your Accelerated Testing most efficient and low cost.
- Making Reliability Testing much more effective and NOT generic according to Military Std specs which many companies follow due to lack of knowledge.
- Realizing the need for making Accelerated Testing unique to the product type to maximise effectiveness.
- Ability to drive 50% REDUCTION in Field Failures within 12-18 months once a new and effective low cost programme set up.

## **This program is intended**

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The Course is designed to:

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

# Managing & Improving Reliability within Electronics Product Design

(2 Days)

## DAY 1 (AM Agenda)

### Understanding Basic Reliability

- 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

- Realising the Importance of Component Reliability and MTTF spec
- Combining different MTTF levels for Different Components / Sub-Assemblies

### Accelerated Stress Testing and effect of Activation Energy

- Real Life examples of how to calculate Activation Energy level from experimental work at Product and Component level

### Understand Accelerated Testing to set up Predictive Testing Models for all products at RD 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

### Semiconductor Defect Types Review

- Summary of defect types and types of Reliability Tests that are most effective in stimulating Latent Semicon defects

## Day 1 (PM Agenda)

### Brainstorming session to define most effective Sequential Stress Test programme for packaged device reliability evaluation

- How to develop matrix of stress test types to apply and comparison with JEDEC

### Statistics involved in Reliability Estimation and Decision Making

### Evaluating the effectiveness of different stress test types with the Hughes Test Strength Equation

- Developing an Effective Reliability test Strategy , using Modern stress techniques, including Random Vibration and Thermal Cycling
- Product Level Case Study with real life examples

### Relationship of Manufacturing Yield with Early Life Failure Rate

- Component Level prediction from Yield data
- Using yield performance data from Board and Assembly processes to Predict Warranty Field Fail Rates
- How to predict and control Early Life Fails using manufacturing data

## **Day 2 (AM Agenda)**

### **Life Test Planning**

- Setting up most effective Design Quality Life Testing to evaluate Design Reliability and using the appropriate Stress Model to maximise defect detection
- Predicting MTTF from reduced Sample Sizes

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

- Making Reliability more effective at Sub-Assy level
- How to Accelerate Failures by stress testing Control boards, Power boards,
- Combining Rel predictions of different Sub-Assemblies to make Total product
- Understanding stresses involved at board level and how to simulate at packaged device level

### **Weibull Analysis of Failure data and how to apply to any product failure data**

#### **Applying DOE using Fractional Factorial techniques to maximise effect of Stress Test with reduced samples**

- Developing best mix of Stress Testing for a Packaged Device

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

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

- High Design Maturity controls Design Reliability
- Workshop to define methodology for Packaged Device Design Quality Testing

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

- Combining Mil-217 predictions and using Design Maturity Ratings to form an efficient model

### **Setting up New Product Introduction scoring model to deliver strongest Design Quality into Mass Production to maximise Reliability**

### **Workshop / General Q&A**



Energy1 is a sub-division of PETRO1 focus on provide trainings & technical Consultancy services ranging from Revenue losses reduction, Maintenance & reliability, spares parts optimization, electrical & electronics and business related activities in the Energy & Utilities industry. We had successfully made impact to energy & utilities professional mainly the top players in the South East Asia Region.

- |   |                                       |                              |
|---|---------------------------------------|------------------------------|
| ▪ Metropolitan Waterworks Authority Thailand. | ▪ Star Energy Geothermal              | • Sandisk Storage            |
| ▪ Tenaga nasional berhad.                     | ▪ Perbadanan bekalan air pulau pinang | • Muehlbauer                 |
| ▪ San Fernando Electric Light & Power co, Inc | ▪ Aliran ihsan resources berhad       | • Dominant OPTO Technologies |
| ▪ Sarawak Energy                              | ▪ Visayan Electrical company          | • Finisar Malaysia           |
| ▪ SP Powergrid ltd.                           | ▪ Glow Company                        | • Sanmina System             |
| ▪ Power Seraya                                | ▪ Suruhanjaya Tenaga                  | • Bose System                |
| ▪ SMT Technologies                            | ▪ Indah Water Konsortium              | • Amkor Technology           |
|   | ▪ Jimah O&M                           | • EDMI Electronics           |
|   | ▪ Renesas Semiconductor               | • AUO SUNPOWER               |



## Comments from past participants:

"Excellent. Course is very helpful to my daily Task "  
Sandisk

"Good Instructor. He gave clear answering. Very knowledgeable and expert in the related filed."  
Sanmina

"Very knowledgeable on the topic and have increased my overall understanding of importance of reliability. Instructor is very knowledgeable & Experience"  
Dominant OPTO Technologies

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

"I'm 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

"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

"Very Good! Definitely learn new things."  
Bose System





# Principal Program Facilitator



## Martin Shaw (BSc Hons), Reliability Solutions

- Have made multiple presentations at International conferences and had papers published in reliability journals.
- Received gold award for best paper presentation at Reliasoft reliability conferences in Singapore and Amsterdam in 2010 and in Poland, 2012.

### Martin's 34 years Professional Achievements

- ✓ Success with several of the top 3 LCD TV makers and Personal Computer power supply makers in implementing strong Design Quality / Reliability Testing to reduce no. of Design Repeat Testing by more than 2X, saving significant costs and more importantly reducing overall development cycle.
- ✓ Reduction in Field Return Rates of more than 60% within 18 months period of starting to implement Reliability Solutions unique Reliability Test and Defect Prevention processes.
- ✓ First 30 day Customer Failure Rates reduced by 50% within 12 months period.
- ✓ Cost Reduction by removal of wasteful testing such as ineffective ORT and low stress ALT programmes which rarely stimulate Early Life Defects.
- ✓ Development of Sub -System Reliability Test programmes for complex products to guarantee stimulating wide range of latent defects and reduce excessive full assy test costs.

### 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 (World's 3rd biggest Power Supply maker), TPV China (World's biggest contract TV / LCD Monitor 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 OPTIMISE 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.
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### 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.

## Investment Packages

Managing & Improving Reliability within electronics product design	Early Bird Full 2 Days	Standard Price Full 2 Days
Per Delegate	USD 1799 ( )	USD2000 ( )
3 or more	USD 1599	
<b>REGISTER 3 AND SENT THE 4<sup>th</sup> FREE</b>		
<ul style="list-style-type: none"><li>Please note that all registrations must be made at the same time to qualify.</li><li><b>Early Bird Promotion Deadline – 28<sup>th</sup> Feb 2017</b></li></ul>		

## 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

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

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

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

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

## Invoice Details

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

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

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

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

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

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

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

Authorized Signature : \_\_\_\_\_

## REGISTRATION FORM

### PROGRAM DETAILS

Venue: Taipei, Taiwan  
Date: 30<sup>th</sup> – 31<sup>st</sup> March 2017

#### REGISTER NOW

CONTACT: kelvin

MAIN: +603 7727 3952

FAX: +603 7727 5278

Email: registration@petro1.com.my

### Credit card Payment

Please Debit my credit card:

VISA  MASTERCARD

Card Number: \_\_\_\_\_ - \_\_\_\_\_ - \_\_\_\_\_ - \_\_\_\_\_

Security Code:       Expiry Date:

Named printed on card: \_\_\_\_\_

Signature: \_\_\_\_\_

#### Payment Method

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

ACCOUNT NAME : PETRO1 LIMITED

BANK : MAYBANK

ACCOUNT NO : 715120013353 (USD)

**All bank charges to be borne by payers. Please ensure that PETRO1 SDN BHD received the full invoice amount.**

**\* Credit card payment will include a charges 2.8%**

**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 7 working days prior to the event date to confirm registration.

**Venue:** All of our training courses are held in 4 – 5 star venues.

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

#### 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 occurs 7 working days prior to event commencement. However a substitute is welcome at no additional charges. If cancellation occurs 5 working days prior to the registration date and there is no substitute, the organizer reserves the right to charge 50% of the total investment from your organization.

PETRO1 SDN BHD is not responsible for any loss or damage as a result of a substitution, alteration or cancellation/postponement of an event. PETRO1 SDN BHD shall assume no liability whatsoever in the event this training course is cancelled, rescheduled or postponed due to a fortuitous event, Act of God, war, fire, labor strike, extreme weather or other emergency.

**Walk in Registration:** Walk-in participants with payment will only be admitted on the basis of seat availability at the event and with immediate full payment.

**Program Change policy:** The organizer reserves the right to make any amendments and/or changes to the workshop, venue, facilitator replacements and/or modules if warranted by circumstances beyond its control.