

Plan to Attend...



**International
Applied Reliability Symposium**

OCTOBER 20 - 22, 2010

SINGAPORE

Global Issues, Local Perspectives!™

South America ● North America ● Asia Pacific ● Europe ● India

PROGRAM HIGHLIGHTS

THEME: Sharing applications, success stories and lessons learned in reliability and maintainability engineering.



KEYNOTE: The keynote address will be delivered by Rear Admiral (Retired) Richard Lim, Chairman of ST Logistics.



20 PRESENTATIONS: The program offers twenty results-oriented presentations by actual practitioners in industry and government. Topics include: Reliability Program Planning, Reliability Testing, Life Data Analysis, Warranty Predictions, Root Cause Analysis, System Reliability and Availability Analysis, Asset Management, Maintenance Planning and much more.



2 TUTORIALS: The program also includes two tutorials by experts in the field of reliability analysis:

Structural Reliability for Mechanical Components Under Road and Self Induced Vibration Loading by Julio Pulido of Ingersoll Rand

Essential Elements and Activities for a Successful Reliability Program by Pantelis Vassiliou of ReliaSoft Corporation

VENUE

The 2010 International Applied Reliability Symposium, Asia Pacific will be held at the **Orchard Hotel Singapore** (<http://www.OrchardHotel.com.sg>). For additional details, please see page 6.

INDUSTRY

AND

GOVERNMENT

SHARING

SUCCESS

STORIES

AND

LESSONS

LEARNED

OTHER SYMPOSIA

The Symposium is held annually at locations throughout the world. Other scheduled events include:

India

October 2010

Europe

March 2011

South America

May 2011

North America

June 2011



<http://www.ARSymposium.org>

REGISTER NOW...

2010 INTERNATIONAL APPLIED RELIABILITY SYMPOSIUM - ASIA PACIFIC

The **International Applied Reliability Symposium** provides a forum for expert presenters from industry and government to come together with reliability practitioners from all over the world to discuss the application of reliability principles to meet real-world challenges. The majority of the presenters have been applying reliability, maintainability and related techniques in their day-to-day work for years, and the Symposium has been designed to encourage results-oriented presentations with interactive discussions about best practices, success stories and lessons learned.

Symposium Theme: "Sharing applications, success stories and lessons learned in reliability and maintainability engineering."

The Symposium's 20 presentations and 2 tutorials cover a range of subjects, such as:

- | | |
|--|---------------------------------------|
| ◆ Reliability Program Planning | ◆ Root Cause Analysis |
| ◆ Specifying Reliability and Reliability Metrics | ◆ System Reliability and Availability |
| ◆ Reliability Testing | ◆ Asset Management |
| ◆ Life Data Analysis | ◆ Maintenance Planning |
| ◆ Warranty Predictions | ◆ Risk Hazard Models |

OCTOBER 20 - 22, 2010
SINGAPORE

<http://www.ARSymposium.org/asia/>

The 2010 event is organized by ReliaSoft Asia Pte Ltd (www.Reliasoft.com) with additional support from the Singapore Quality Institute (www.SQI.org.sg), the Association of Aerospace Industries, Singapore (www.AIAS.org.sg) and the Institution of Engineers, Singapore (www.IES.org.sg).



ReliaSoft®



2010 ARS, ASIA PACIFIC PROGRAM MATRIX

These two pages provide a summary of the presentations and tutorials scheduled for the 2010 International Applied Reliability Symposium, Asia Pacific. Abstracts are included on the pages that follow. For registration, please use the form provided at the end of this booklet or visit the Web site.

2010	Wednesday - October 20th		Thursday -
	Track 1	Track 2	Track 1
7:30-8:20	Registration and Check-in		
8:20-8:50	Welcome Address and Keynote Address (in Track 1 Room)		
8:50-9:00	10 Minute Break		
9:00-10:00	Electrical Reliability: A Benchmarking Case Study Lam Sing Yew <i>ABB Malaysia Sdn Bhd</i> T1-S1 <input type="checkbox"/>	Using Life Data Analysis to Validate the Effectiveness of a Corrective Action Mervyn Lim Sohn Hui <i>Rockwell Automation Asia Pacific Business Ctr Pte Ltd</i> T2-S1 <input type="checkbox"/>	Applications of Discrete-Time Competing Risk Hazard Models for the Consumer Lending Industry Balakerthy Punyakoti <i>HSBC Bangalore</i> T1-S5 <input type="checkbox"/>
10:00-10:20	20 Minute Break		
10:20-11:20	Building Reliability in Electronics Design Through Derating Analysis Nabajit Deka <i>Honeywell Technology Solutions Lab</i> T1-S2 <input type="checkbox"/>	Aircraft Reliability Modelling for Operations Planning Timothy Ng <i>Republic of Singapore Air Force</i> T2-S2 <input type="checkbox"/>	How to Model the Bathtub Curve with the Weibull Distribution Xie Min <i>National University of Singapore</i> T1-S6 <input type="checkbox"/>
11:20-11:30	10 Minute Break		
11:30-12:30	Root Cause Failure Analysis: Fact or Fiction Namik Kosaric <i>Norcan Reliability Engineering</i> T1-S3 <input type="checkbox"/>	Measures of Reliability: Developing Reliability Requirements Sharon McKechnie <i>Cochlear Limited</i> T2-S3 <input type="checkbox"/>	Early Detection of Field Risk Potentials After Market Launch: Processes and Case Studies in the Automotive Industry Stefan Bracke <i>Cologne University of Applied Sciences</i> T1-S7 <input type="checkbox"/>
12:30-1:40	70 Minute Lunch Break Lunch is provided by the Symposium on Wednesday and Thursday		
1:40-2:40	Data Analysis Made Easy Serene Tay Poh Choo <i>Advanced Material Engineering Pte Ltd</i> T1-S4 <input type="checkbox"/>	RCA: Things You Thought You Knew Mohd Sahrul Harun <i>MTBE/PP (Malaysia) Sdn Bhd</i> T2-S4 <input type="checkbox"/>	Predict Bearing Lifetime Khalid A. Al-Jabr <i>Saudi Aramco Company</i> T1-S8 <input type="checkbox"/>
2:40-3:00	20 Minute Break		
3:00-4:00	Structural Reliability for Mechanical Components Under Road and Self Induced Vibration Loading Julio Pulido <i>Ingersoll Rand</i> Tutorial 1 <input type="checkbox"/>		Improving Reliability and Maintainability Using Statistical and Team Based Techniques Dave Thompson <i>RAMsoft Ltd</i> T1-S9 <input type="checkbox"/>
4:00-4:30			

International Applied Reliability Symposium Asia Pacific 2010



October 21st	Friday - October 22nd	
Track2	Track 1	Track 2
	7:30-8:30	
	8:30-9:00 Attendance Certificates Issued	
Evaluation and Extension of Useful Life of Electronic Equipment Ganesh Chaturvedi <i>Honeywell Technology Solutions Lab</i> T2-S5 <input type="checkbox"/>	LCD TV Reliability Testing: An Effective Approach Martin Shaw <i>Reliability Solutions</i> T1-S10 <input type="checkbox"/>	Application of Reliability Analysis for the Assessment of a Transmission Line Protection System Mohd Iqbal Ridwan T2-S10 <input type="checkbox"/> <i>TNB Research Sdn Bhd</i>
	10:00-10:20 20 Minute Break	
Asset Information Management: A Stepping Stone to Reliability Centered Maintenance (RCM) Saumya Lohani <i>Larsen & Toubro Integrated Engineering Services</i> T2-S6 <input type="checkbox"/>	Essential Elements and Activities for a Successful Reliability Program Pantelis Vassiliou <i>ReliaSoft Corporation</i> Tutorial 2 <input type="checkbox"/>	
	11:50-12:00 Excellent Presentation Awards	
Predict Availability of Vehicle Servicing Using Simulation Joyce Won <i>ST Kinetics</i> T2-S7 <input type="checkbox"/>		
Reliability Curves in Extended Warranty Space Andrew Scott <i>IFC (Australia) Pty Ltd</i> T2-S8 <input type="checkbox"/>		
An Application on Accessing Reliability of Wire Bonding in Semiconductor Industry -- Degradation Analysis of Wire Pull Testing Bryan Liang <i>ReliaSoft Asia</i> T2-S9 <input type="checkbox"/>		

Use this matrix to mark the presentations/tutorials that you plan to attend. It is not necessary to pre-register for selected sessions.

HOTEL ACCOMMODATIONS

The 2010 Asia Pacific Symposium will be held at the Orchard Hotel Singapore. Through a special arrangement with the hotel, the reduced rate of SGD 250.00+++ per night is available for Symposium participants. Participants must use the form found at the ARS Asia Web site (<http://www.ARSymposium.org/asia>) and contact **Ms. Lily Wong** at the hotel directly to make reservations. The special rate is subject to room availability and participants are encouraged to book early.

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WEDNESDAY OCTOBER 20, 2010

Welcome Address and Keynote Address 8:20 to 8:50 a.m. on Wednesday, October 20th

WELCOME ADDRESS

Pantelis Vassiliou - ReliaSoft Corporation

To begin the event program, Pantelis Vassiliou will represent the Symposium's organizers by delivering a brief welcome address. Mr. Vassiliou is President and CEO of ReliaSoft Corporation. He directs and coordinates ReliaSoft's R&D efforts to deliver state-of-the-art software tools for applying reliability engineering concepts and methodologies. He also consults, trains and lectures on reliability engineering and related topics to Fortune 1000 companies worldwide. Mr. Vassiliou is the original architect of ReliaSoft's Weibull++® software and is ReliaSoft's founder.

KEYNOTE ADDRESS

Richard Lim - ST Logistics

Too Complex to Be Allowed to Exist?

Many critical systems that support the proper functioning of our global village are susceptible to catastrophic failure, with unimaginable consequences. From the reliability management perspective, are these systems too complex to be allowed to exist? Are catastrophic failures just waiting to happen, or are we now able to field highly reliable and resilient systems?

Rear Admiral (Retired) Richard Lim has spent more than three decades in the business of defence. As Director of Joint Operations and Planning, Chief of Navy, Deputy Secretary (Technology) and Chief Executive Defence Science and Technology Agency, his career has spanned the fields of operations, strategic planning, capability development, defence procurement and the development and technological support of deployed defence and security systems in the Singapore Defence Establishment. After retirement from public service, Mr. Lim now has a consulting practice, is Chairman of ST Logistics, is a board member of ST Marine and is Adjunct Professor at Nanyang Technological University.

Session 1 9:00 to 10:00 a.m. on Wednesday, October 20th

TRACK 1

Lam Sing Yew - ABB Malaysia Sdn Bhd

Electrical Reliability: A Benchmarking Case Study

When electrical equipment failures occur, services may be interrupted, availability (uptime) may be affected and production time may be lost along with lots of opportunities to do business. Under normal circumstances in plant operation, electrical equipment will not get full attention from top management because the probability of failure is very low. However, the consequences can be very serious and may cause the plant to shut down if poor electrical reliability performance is profound. This presentation will examine how electrical equipment reliability performance is measured, where the reliability implementation weakness exists and what are the "soft" and "hard" challenges ahead to overcome. The simplified Electrical Reliability and Maintenance (ERM) assessment tool was developed and used to audit installed electrical equipment reliability practices and to identify the existing maintenance practice culture for electrical assets in plants. Eight classified elements of the benchmark criteria will be highlighted and reviewed. A case study of the ERM benchmarking of the data collection, technical management and results of the analysis will be presented.

TRACK 2 Mervyn Lim Sohn Hui - Rockwell Automation Asia Pacific Business Center Pte Ltd
Using Life Data Analysis to Validate the Effectiveness of a Corrective Action

Despite having a black epoxy coating on the surface of the trimmable resistors, the trimmable resistors were cracking and that resulted in product anomalies. These trimmable resistors were cracking without a trend. With the use of ReliaSoft's Weibull++ software, the product anomaly data were statistically fitted to a distribution. Various experiments were conducted to quantify the best solution. Weibull++ was used to quantify the failure rate for the various experiments at various time intervals. With the results from Weibull++ and the experiments conducted, a permanent solution was selected. The selection criteria were: 1) Expected number of failures over time. 2) Cost of solution. 3) Ease of implementation. 4) Experience of process. 5) Predicted cost of warranty.

Session 2**10:20 to 11:20 a.m. on Wednesday, October 20th****TRACK 1****Nabajit Deka - Honeywell Technology Solutions Lab****Building Reliability in Electronics Design Through Derating Analysis**

With the ever-increasing complexity and functional density of electronic products, achieving product reliability is highly rewarding as it adds a significant competitive advantage. Therefore, building reliability into complex designs is one of the critical challenges continuously encountered by design teams. It is typically found that more than 70% of the common reliability concerns in electronics design are primarily due to component ratings, while factors such as incorrect requirements and architectural issues only contribute to poor reliability to some extent. Therefore, a proactive approach is needed to uncover the concerns early in the program development instead of relying on the Test-Analyze-And-Fix (TAAF) approach. Derating analysis is one of the most powerful reliability tools and, when deployed in the early design stage (preferably prior to realization of hardware), the analysis unearths critical component stress-related issues and thereby avoids significant efforts spent in multiple design spins.

TRACK 2**Timothy Ng - Republic of Singapore Air Force****Aircraft Reliability Modelling for Operations Planning**

An aircraft reliability model was created to provide our planners with a tool to: 1) Facilitate selection of the best (most reliable) aircraft or component spare for operations. 2) Determine critical and non-critical components using system block diagrams. 3) Project system failure and determine the number of spares needed in support packages for predefined missions. 4) Purge poor reliability component spares.

Session 3**11:30 a.m. to 12:30 p.m. on Wednesday, October 20th****TRACK 1****Namik Kosaric - Norcan Reliability Engineering****Root Cause Failure Analysis: Fact or Fiction**

This presentation will elaborate on how to detect the root causes of failures and how Process Safety Management (PSM) systems can migrate toward states of decreasing risk to prevent future accidents.

TRACK 2**Sharon McKechnie - Cochlear Limited****Measures of Reliability: Developing Reliability Requirements**

There are several approaches to the development of reliability requirements; this presentation identifies some of the tasks that should be considered. A thorough understanding of the market or customer needs for the product is a key principle behind developing reliability performance expectations that may be expressed explicitly, or not at all. The importance of selecting the appropriate tasks is paramount in detailing the scope and magnitude of work needed to measure requirements and ensure that the reliability performance of the product for the market or customer is realised.

Session 4**1:40 to 2:40 p.m. on Wednesday, October 20th****TRACK 1****Serene Tay Poh Choo - Advanced Material Engineering Pte Ltd****Data Analysis Made Easy**

To determine the characteristics of a critical component, we conduct tests and collect data. The data are useful only when analyzed, and when the information is used to predict system reliability. During system tests, the number of failures due to the component under study is recorded. When a system fails due to other causes, the failure is censored. All the failure events are subjected to a specific methodology and plotted. First, they are plotted in different graphs to determine the appropriate distribution. Data are read off the distribution chart to give the straight line fitting. The shape parameter, characteristic life and others are read from the chart. The shape parameter gives an indication as to whether the failure rate is decreasing, constant or increasing. The characteristic life indicates the time by which 63.2% of the population for the specific critical component under study has failed. These data are used for reliability prediction. Manual plotting is laborious and using a software tool for data analysis frees up one's time to do other value-added work. This presentation compares the manual step-by-step procedure with using ReliaSoft's Weibull++® software tool. With Weibull++, a click of the mouse shows which distribution gives the best fit of a straight line. Several distributions will be named, in order from the best to the worst. With a click of the mouse, we can determine metrics such as: 1) What is the reliability at a specific life? 2) Given that the system is working now, what are the possibilities that it will work during the next period of time? 3) What warranty period can be provided?

TRACK 2**Mohd Sahrul Harun - MTBE/PP (Malaysia) Sdn Bhd****RCA: Things You Thought You Knew**

This presentation will give the audience an overview of how to have an effective and practical root cause analysis (RCA) exercise. The main objective is to outline the dos and don'ts when performing RCA as told from the practitioner's point of view. It will combine both experience and formal learning on RCA and will touch on the fundamental approach for a comprehensive yet practical analysis. The presentation will deliberate on the soft skills required (on top of technical know-how) as well as mastering the soft issues while doing the analysis and having the correct mindset. It also includes common mistakes encountered in doing RCA and how good facilitation and quality assurance exercises will ensure that the thinking process is done systematically and correctly. The presentation will give tips on how detailed an RCA should be, how to define the boundary and, most importantly, what type of RCA tool should be used to suit various needs. The audience will have a glimpse of the available RCA tools in the industry, the different strengths of each tool, and the caution needed to address specific flaws of each tool. Suitability of the technique to fit different scenarios or investigations will be revealed. The presentation is tailored to cater to general audiences. Nevertheless, it serves as a quick and practical guide for RCA "dummies" and gives a fresh perspective for RCA experts.

Structural Reliability for Mechanical Components Under Road and Self Induced Vibration Loading

Fatigue is a complex phenomenon that is affected by a number of factors, such as the surface finish of the component, environmental effects, heat treatments, presence of stress concentration factors, etc. It is therefore important to carefully analyze components subjected to fluctuating loads so that the desired reliability can be built into these components and so that over-designed or under-designed components can be avoided.

This tutorial will cover examples of mechanical structures under road and self induced vibration inputs, and correlate them to actual vibration testing using finite element techniques associated with several live fatigue models. The presentation will also cover practical testing considerations from the selection of fatigue testing equipment and fatigue cycle counting methods to actual testing.

THURSDAY OCTOBER 21, 2010

Applications of Discrete-Time Competing Risk Hazard Models for the Consumer Lending Industry

An accurate and dynamic assessment of profitability (risk and returns) that is sensitive to external market conditions is crucial for the success of any lending business. In particular, in the case of a consumer loan business, a reasonably accurate and dynamic assessment of a customer's future payment behavior is necessary to price a loan product optimally and to plan corrective loss mitigation initiatives. This necessitates estimation of the life of the loan, which in turn requires predicting the times when the loan will be experiencing default and prepayment events. Although there are a good number of robust statistical methods in use for estimating the life of a consumer loan, institutions often do not prefer these approaches due to greater risk of errors and a larger complexity. This presentation discusses applications of discrete-time competing risk hazard models for estimation of the life of a consumer loan by considering product, customer and market conditions. The following topics will be covered:

- A brief introduction to the consumer lending business and industry loan product life estimation practices.
- A competing risk hazard modeling approach for simultaneous estimation of loan default and prepayment incident timings.
- Various applications of these models in the consumer lending industry. Sharing model simulation results.
- Potential modeling errors and their impacts.
- Sharing best practices across the industry.

Evaluation and Extension of Useful Life of Electronic Equipment

The use of electronic equipment is increasing in industries such as aerospace, automotive, home automation, plant automation, etc. These industries demand higher total technical life, typically in the range of 10 - 20 years. This dictates the need to ensure that these types of equipment are capable of enduring the intended service life without a compromise in their specified performance criteria. Hence, it becomes a design requirement to have a process in place to ensure that all parts and materials that go into the design are capable of enduring the full desired target life. This presentation addresses a scientific methodology using physics of failure techniques for evaluating and extending the technical life of electronic equipment.

How to Model the Bathtub Curve with the Weibull Distribution

The Weibull distribution is widely used in reliability engineering. However, the basic Weibull distribution with two parameters is still not flexible enough as it is unable to model the so-called "bathtub curve" that we usually talk about. In this presentation, we will discuss different ways to model the bathtub curve. It is recommended that a Weibull plot could be used to select suitable models for the data set concerned. Approaches for the estimation of model parameters based on the Weibull plot will also be discussed.

Asset Information Management: A Stepping Stone to Reliability Centered Maintenance (RCM)

Methodologies such as Reliability Centered Maintenance (RCM), Failure Modes, Effects and Criticality Analysis (FMECA) and Six Sigma are widely used among maintenance personnel. The basis of these tools is data. That is, having an Asset Information Management System in place. This presentation covers the practical implementation of an Asset Information Management System in oil and gas industries, as well as its applicability in accomplishing the goal of optimizing maintenance through methodologies such as RCM. The presentation covers real-life examples that focus on the importance of maintaining information pertaining to assets. The absence of such information may lead to major failures, despite having all standard practices in place.

Session 7 11:30 a.m. to 12:30 p.m. on Thursday, October 21st

TRACK 1 **Stefan Bracke - Cologne University of Applied Sciences**

Early Detection of Field Risk Potentials After Market Launch: Processes and Case Studies in the Automotive Industry

Added values to maintain customer satisfaction, especially within the automotive industry, lead to increasing product functionality and, as a result, to escalating component complexity. Besides reduced development phases, this results in complex damage caused in the field during the product use phase. A key element to ensure product reliability lies in a precise and economical reliability analysis during the customer's use phase. This presentation shows approaches in current research work for statistical and technical damage analysis of field damage cases. The field damage analysis (FDA) process, developed by the Cologne University of Applied Sciences in cooperation with leading automotive companies and suppliers, integrates these approaches with the goal of:

- Detection and differentiation of major damage causes (statistical and technical analysis of the field damaged components).
- Prediction of possible future damage causes in the use phase (through statistical analysis).
- Reduction of costs for the reliability analysis.

TRACK 2 **Joyce Won - ST Kinetics**

Predict Availability of Vehicle Servicing Using Simulation

This presentation describes a project with the objective to predict the availability of a vehicle after performing preventive maintenance at six years of service. The analysis is done using statistical models to predict the failure trends of a system based on historical data.

Session 8 1:40 to 2:40 p.m. on Thursday, October 21st

TRACK 1 **Khalid A. Al-Jabr - Saudi Aramco Company**

Predict Bearing Lifetime

Most current rotating equipment failures are due to bearing and mechanical seal problems that can be avoided. Predicting bearing lifetime depends on the number of failures and bearing replacements, and using statistical functions that will alert reliability engineers to make changes to the maintenance schedule and avoid equipment trips. This presentation will show a simulation program that has been created by using Microsoft Excel® to predict the expected lifetime of the bearing and its failure date. The presentation will show how this simulation will be applicable for other purposes, such as failure investigations and suggested inspection intervals. Moreover, the suggested technique can be used for other components, such as mechanical seals.

TRACK 2 **Andrew Scott - ICF (Australia) Pty Ltd**

Reliability Curves in Extended Warranty Space

In this session, we will take a look at the application of reliability analytics and theory to an extended warranty operation in practice. This includes the management of very large data sets, building models of failure rates, the detection of bad products and, finally, the construction of cost estimates needed for assessing adequate insurance coverage and/or the level of self-insurance.

Session 9 3:00 to 4:00 p.m. on Thursday, October 21st

TRACK 1 **Dave Thompson - RAMsoft Ltd**

Improving Reliability and Maintainability Using Statistical and Team Based Techniques

The presenter has developed a number of models that use a mix of hands-on teams and experts coupled with statistical techniques adapted from manufacturing industries. Reliability starts with the design and this is where the reliability engineer can review what he is receiving. It is no good waiting until the equipment has had a major failure to find that the lifting facilities are far from adequate and cause excessive downtime. There are many processes to be put in place to ensure integrity of the assets. A common problem in process plants is the quality of the data collected and there are many reasons for this. Even after 20 years, some well-known companies in the oil and gas sector have not improved. A well-structured reliability management system must be put in place and it needs to be audited to ensure compliance and fit for purpose. Finally, the presenter will show models that demonstrate what reliability and maintenance engineers can do with good data, poor data and for a single piece of equipment or a group of similar equipment.

TRACK 2 **Bryan Liang - ReliaSoft Asia**

An Application on Accessing Reliability of Wire Bonding in Semiconductor Industry -- Degradation Analysis of Wire Pull Testing

Degradation data analysis is an important technique for extrapolating failure data from the degradation history of a quality or performance characteristic that is associated with the reliability of the product. This approach typically requires multiple degradation measurements for each unit over time. However, in some cases, a destructive test, such as the Wire Pull Test in the semiconductor chip packaging industry, is necessary to obtain degradation measurements. In such cases, it is not feasible to take multiple measurements over the life of the same unit. This presentation describes an approach, using ReliaSoft's Weibull++® and ALTA® software, to handle such a data analysis problem and predict a failure distribution model.

TRACK 1

Martin Shaw - Reliability Solutions

LCD TV Reliability Testing: An Effective Approach

The cost of LCD TV warranty replacement is extremely high, making reliability a key factor in the profit margin of LCD TV manufacturing. Having the ability to perform accelerated life testing at key subassembly levels (power board, main board and LCD panel) and also at the LCD TV level makes it possible to predict future warranty costs and measure the true benefit of new technology and enhanced manufacturing processes. This presentation illustrates the types of defect mechanisms induced by applying different sequences of stress test types over short test durations and discusses how warranty failure rate predictions can be made. Acceleration modeling is used to calculate simulated operational time periods for failure rate calculations. In this presentation, acceleration modeling with thermal cycling, humidity, thermal shock and elevated temperature will be explained in detail with test results compared with real life failure rates to understand acceleration factors and the validity of assumptions made for each acceleration model. The presentation will discuss the importance of separating a product into key subassemblies and the benefits of being able to perform subassembly level accelerated stress testing compared to product level testing that is governed by the capability of the weakest subassembly or component to withstand stress levels above normal operating conditions.

TRACK 2

Mohd Iqbal Ridwan - TNB Research Sdn Bhd

Application of Reliability Analysis for the Assessment of a Transmission Line Protection System

In Malaysia, high voltage transmission overhead lines that carry 132kV, 275kV and 500kV voltage levels serve as an important backbone for the country's electrical power supply. These overhead lines are made of aluminum alloys and are exposed to the outside environment. In addition to that, these lines are exposed to external threats such as lightning, flora and fauna encroachments, man-made activities, etc. To protect the lines from such threats, a line protection system is designed and implemented by power utility companies. One of the main components inside a line protection system is the protective relay. Failure of the protective relays may reduce the integrity and reliability of the protection system and that will impact the overall performance of the power system. This could lead to power system interruptions of the electrical power supply, which may result in blackouts. Hence, it is imperative for power utilities to assess the reliability of protective relays. This presentation will discuss how reliability analysis is implemented to assess the reliability of protective relays vis-à-vis a line protection system.

Tutorial 3

10:20 to 11:50 a.m. on Friday, October 22nd

Pantelis Vassiliou - ReliaSoft Corporation

Essential Elements and Activities for a Successful Reliability Program

Most companies realize they have to ensure that their products meet reliability requirements; however, this objective can be compromised by budget and timing constraints. A good reliability program plan that focuses and integrates reliability efforts early in the design process, as well as integrates the overall product development/support cycle, can assure that these reliability goals/requirements are met within these constraints. This tutorial highlights the elements and steps needed for a successful reliability program plan and it includes examples of successful implementations and foreseeable pitfalls.

Awards Presentation

11:50 a.m. to 12:00 p.m. on Friday, October 22nd

In order to recognize outstanding contributions to the discussion at the event, "Excellent Presentation Awards" will be granted to the primary authors of the top three presentations (as voted by attendees). Ballots and voting instructions will be distributed during Registration and will be collected throughout the Symposium. The awards will be presented during this short session at the conclusion of the Symposium.

MAKE THE MOST OF YOUR SYMPOSIUM EXPERIENCE

Meet Colleagues, Share Ideas, Explore Available Solutions

Choose the sessions that you will attend.

The Symposium offers a choice of 20 presentations and 2 expert tutorials. You can use the matrix on pages 4 and 5 to mark the presentations and tutorials that you plan to attend. It is not necessary to pre-register for selected sessions.

Take advantage of opportunities to converse with colleagues.

The catered lunch and breaks between sessions provide good opportunities to talk with, and learn from, fellow reliability practitioners.

Learn about available software tools and services.

We encourage you to spend some time visiting the exhibit booths to learn about a variety of available products and services.

2010 International Applied Reliability Symposium, Asia Pacific

Industry and government
sharing applications,
success stories and lessons learned.

October 20 - 22, 2010
Singapore



Registration Information - One Form Per Attendee

- | | |
|--|---------------------|
| <input type="checkbox"/> Advanced Registration (must be received by August 2, 2010) | SGD 1,495.00 |
| <input type="checkbox"/> Standard Registration | SGD 1,695.00 |
| <input type="checkbox"/> Full-Time Student (Student ID Required) | SGD 360.00 |
- Please add 7% GST.

Submit Registration Via Phone, Fax or Mail:

Phone: +(65) 6272 7422 Fax: +(65) 6272 6687

Mail: ReliaSoft Asia Pte Ltd, No.2 Bukit Merah Central #14-02, Spring Building, Singapore 159835

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Company:		Company:	
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City, State, Zip: (Province, Country)		City, State, Zip: (Province, Country)	
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Additional Details

ARS reserves the right to cancel/reschedule the Symposium at any time up to 4 weeks prior to its start date. In the event of cancellation, all registration fees will be refunded. ARS is not responsible for any other charges, such as non-refundable airline tickets.

- **Hotel Reservations:** You will need to make reservations on your own. Please contact the hotel directly.
- **Substitutions:** Substitutions are allowed provided that ARS is notified 7 days prior to the Symposium start date.
- **Cancellations:** Cancellations received up to 15 working days prior to the Symposium start date will be entitled to a full refund of the registration fee minus a SGD 85 administration fee. After this period, all cancellations will be subject to the full registration fee.
- **No Shows:** Registrants who do not attend and who do not notify ARS of cancellations are subject to the full registration fee.

Registration fee includes attendance to all presentations, copies of the proceedings and any other handouts, daily lunch and refreshments provided during the breaks. A certificate of attendance will be provided. Attendees are eligible for 1 CRP Course Credit.



**INTERNATIONAL
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