



Learn methods, practices and techniques for successful plant reliability improvement and use them to reduce plant failures and increase uptime of your equipment

## **Applied Reliability Engineering for Operating Plant and Equipment Training Courses 2012**

*“Turns sound theory into great practices that improve reliability in every operation.”*

**Sydney, New South Wales – 28, 29, 30 March, 2012, Saxtons, 10 Barrack Street**

*(Save money and run the course in-house if you have 4 or more people.)*



### **The reliability engineering best practices you use every day to improve your operating asset uptime, boost output, and lift plant and equipment reliability**

A course packed with vital reliability insights and powerful reliability improvement techniques, this 3-day training course in ‘Applied Reliability Engineering for Operating Plant and Equipment’ is for people who want to lift the efficiency, productivity and output of their operating assets with successful reliability engineering methods. The course is a very good introduction to the practical aspects of using reliability engineering concepts in the workplace. It takes the understandings of reliability engineering and shows

you how to apply them to get better production plant performance. If you are not a university trained reliability engineer it will help you appreciate how much good reliability engineering principles can do for your business.

You learn practical, effective reliability improvement methods and tools that help you boost your equipment reliability, lift plant availability, and gets you higher production output. The reliability math is kept to the bare essentials, just so you can see the scientific foundations on which reliability engineering is based. The real focus of the course is on the useful techniques of reliability engineering that you use every day to improve operating and production performance through lower maintenance costs, less downtime, fewer equipment failures and higher production output.

### **From reliability basics to improved equipment performance and smart maintenance optimisation**

For a highly effective maintenance program you use reliability engineering to understand the cause and effect relationships of equipment and operational problems. Where the consequence of failure is important you put into place the right actions to prevent the failure. These include introducing defect eliminating practices, timely overhauls of parts suffering usage-based failures, replacement of equipment when key parts approach end-of-life, and equipment redesign to remove failure modes. The Applied Reliability Engineering for Operating Plant and Equipment Course will help you make effective and good maintenance and reliability decisions. With the

#### **MORE TRAINING**

NSW – VIC – QLD – WA

**Mastering Maintenance Management the Plant Wellness Way**

**Maintenance Planning and Scheduling for Reliability**

**Success with Life Cycle Enterprise Asset Management**

**Applied Reliability Engineering for Operating Plants**

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[www.lifetime-reliability.com](http://www.lifetime-reliability.com)



training you get you learn how and what to do to optimise your maintenance interventions and apply sound maintenance and reliability strategy that is sure to produce improved operational performance.

**Attend the course and learn how to:**

- Improve operating and maintenance methods and practices to get least life cycle cost (LCC) from your assets.
- Optimise and develop reliable, low LCC plant and equipment designs to give you higher plant and equipment availability.
- Identify how your equipment parts and systems fail so you can select the ideal maintenance strategies for your operation.
- Apply Reliability, Availability and Maintainability (RAM) modeling for production improvement.
- Improve reliability of equipment designs with data analyse of the historic failure patterns affecting your equipment.

**You will benefit from:**

- Understanding the practical methods and useful features of Reliability Engineering and how they can help you.
- Knowing when to use reliability engineering to get the most benefit for your operation.
- Learning which reliability engineering techniques to use to improve your operating equipment performance and profits.
- Recognising how to use reliability professionals to deliver better operating outcomes and plant availability.
- Realising where reliability engineering can deliver simple and low-cost reliability improvements to you.
- Recognising and solving the root causes of your equipment failures

Learn how to deliver equipment reliability improvement using every-day reliability engineering to enrich your operating and maintenance processes. The training provides you with valuable and insightful knowledge, along with practical case studies and hands-on data analysis activities you learn from. After a basic introduction to reliability engineering and equipment operational risk you see how reliability engineering is practically applied and used to achieve equipment reliability growth and optimise your maintenance management strategy



**Overview of Training Course Content**

**Day 1 – Reliability Engineering Basics**

- Definitions of Reliability
- Measuring Reliability of Operating Plant
- MTBF/MTTF/MTTR/Availability
- Reliability Availability Maintainability explained
- Physics of Equipment Failure
- Activity – Component failure causes*
- Developing failure curves
- Failure Mode Effects Analysis
- Activity – FMEA example*
- Reliability terms explained
- Probability and Distributions simplified
- Explaining Reliability Math simply
- Reliability and Hazard Functions
- Failures and Survivors
- Prioritising with Pareto Charts
- Understanding failure mode distributions
- Timelines and failure modes
- Separating failure modes
- Activity – Graphing reliability*
- Stability of data
- Data goodness-of-fit
- Activity – Analysing data and planning improvement*

**Day 2 – Creating Reliability Improvement**

- Series / Parallel arrangements and systems
- Reliability block diagrams
- Total business-wide cost of failure
- Risk Analysis methodology
- Frequency and Consequence

- Risk Matrix and Risk Triangle
- Equipment Criticality
- Acceptable risk boundaries
- Operating Risk Management
- Defect creation
- Defect elimination
- Activity – Using Ichikawa diagrams*
- Precision and Quality Control
- Root Cause Failure Analysis
- Event Trees and Fault Trees
- RCFA / 5-Whys with Evidence
- Activity – Using 5Why root cause analysis*
- Human Factors and Human Error
- Adding quality control and proof testing to procedures
- Activity – Applying work quality assurance*

**Day 3 – Apply Reliability Improvement Tools**

- Designing a Reliability Improvement Process
- FRACAS
- Monitoring and Measuring Reliability Improvement
- Crow-AMSAA reliability growth plots
- Life Cycle Cost Management Explained
- Overview of Life Cycle Cost Simulation Modeling
- Maintenance Strategy selection using Reliability Analysis
- Reliability Centered Maintenance methodology
- Introduction to Weibull Analysis
- Weibull graphs and parameters
- Activity – Weibull Plotting example*
- Optimising Preventive Maintenance
- Activity – Investigate PM optimisation*
- Optimising Predictive Maintenance (Condition Monitoring)
- Activity – Investigate PdM optimisation*



Repair-Replace decisions

Activity – Investigate Replacement decisions

Cost Benefit Analysis of Improvement Projects

Activity – Cost-Benefit examples

Overview of Culture Change and Change Management

## Details of Your Course Presenter:



**Howard Witt** B Eng (Hons), MSc, CP Eng. A consultant engineer with extensive experience in reliability analysis within the nuclear, transport, mining and process industries. Howard has detailed knowledge of reliability concepts and application of these concepts to real world situations. He is an expert in developing and peer reviewing reliability studies of equipment in process operation. His demonstrated analytical abilities in the application of event and fault tree techniques, simulation, risk ranking, Failure Mode Effect and Criticality Analysis, Hazard and Operability (HAZOP) studies has been used extensively by industrial companies. His deep experience in developing appropriate models of operational and plant processes to support reliability improvements within industrial organisations have saved companies great amounts of time and money. He shows you how you and your people can make wise reliability improvement decisions, effectively use your resources, work expertly in the least time necessary, and continually improve your operation's productivity, efficiency and effectiveness.

## Book yourself into the course early to get a seat

Register for the course today if you want to be sure of a seat. Seating is limited to a maximum of 10 people and seats are allocated on a first-come-first-served basis. Complete your registration form, then chose your payment option and fax it to us at (+61 8) 9457 8642 or scan it and email to [info@lifetime-reliability.com](mailto:info@lifetime-reliability.com). Book yourself and your key people into the course now; don't delay. Contact us now on mobile 0402 731 563 to confirm that places for you and your people are still available.

## A 100% Money Back Guarantee

All Attendees are afforded maximum protection at our seminars, courses and workshops by a 100% Money Back Guarantee. If, for whatever reason, you believe your expectations have not been met, your attendance fees will be totally refunded in full. As further compensation you are also allowed to keep all materials handed out during the presentation. (Guarantee is subject to booking fee being received by the due date.)

## Course Information Details

Unless otherwise advised, courses in Perth, Western Australia are at Technology Park, Bentley (Opposite Curtin University). In Brisbane courses are at the Regatta Hotel, Toowong. In Sydney the Saxton training rooms on Barrack Street. Confirmation of registration will be emailed to the email address on the registration form and includes all venue details.

On the first-day venue doors open from 8.00am with the course starting at 8.30am and finishing at 4.30pm each day. Included in the price are course notes, arrival tea/coffee, morning and afternoon tea/coffee with finger food and lunch is a light buffet. Morning and afternoon teas are 15 minutes and lunch is 45 minutes duration.

Parking is available free at the Perth venue. Please check local road maps, or the venue website, to find parking locations at other venues.

A certificate of training is sent to participants following the course.





## Your Course Registration Form and Payment Details

**1 - Select Your Course: Applied Reliability Engineering for Operating Plant and Equipment 3-day Training Course**

**Sydney, New South Wales – 28, 29, 30 March, 2012, Saxtons, 10 Barrack Street**

**2 - Registration Fee:** AUD\$2,700 plus GST \$270  
**Total payment is \$2,970**

Attendees get a full set of course notes and workbook, a softcopy of the PowerPoint course and workbook with unrestricted usage rights within their company, along with morning tea, lunch, afternoon tea provided each day.

**3 - Register:**

**By Phone:** (+61) 0402 731 563  
**By Email:** [info@lifetime-reliability.com](mailto:info@lifetime-reliability.com)  
**By Fax:** (+61 8) 9457 8642  
**By Post:** General Training Pty Ltd,  
 PO Box 2091,  
 Rossmoyne, Western Australia, 6148

**4 – Your Payment Options to Make Payment:**

**A. Electronic Fund Transfer to:**

Bank: National Australia Bank  
 Branch: Bull Creek Branch Office  
 Shop 33 Stockland Bull Creek  
 Cnr South Street and Benningfield Road  
 Bull Creek, WA 6149  
 Account: General Training Pty Ltd  
 BSB No: 086-138  
 Account No: 580663221  
 Swift Code: NATAAU3306P

**B. Cheque** in favour of ‘General Training Pty Ltd’ sent to postal address

**C. Credit Card** secure online at [www.paypal.com.au](http://www.paypal.com.au) with Visa or MasterCard (*fee applies*)

PayPal On-line Payment

Email address: [info@lifetime-reliability.com](mailto:info@lifetime-reliability.com) for

Order/Item # - **Applied Reliability Course**

**D. Purchase Order:** .....  
 (*Only in Australia*)

**Cancellation Policy:** Substitute delegate welcome. 80% refund prior 14 days, 70% refund 7-14 days prior, 50% refund within 7 days. Full refund if course cancelled, or free registration to next, or another course of equal value.

**5 - Delegate Details (One form per person attending):**

Name: .....

Job Title: .....

Company: .....

Street/Box: .....

Suburb: .....

Zip/Post Code: ..... State/Country: .....

Email: .....

Phone No: .....

**6 - How did you find out about the course?** .....