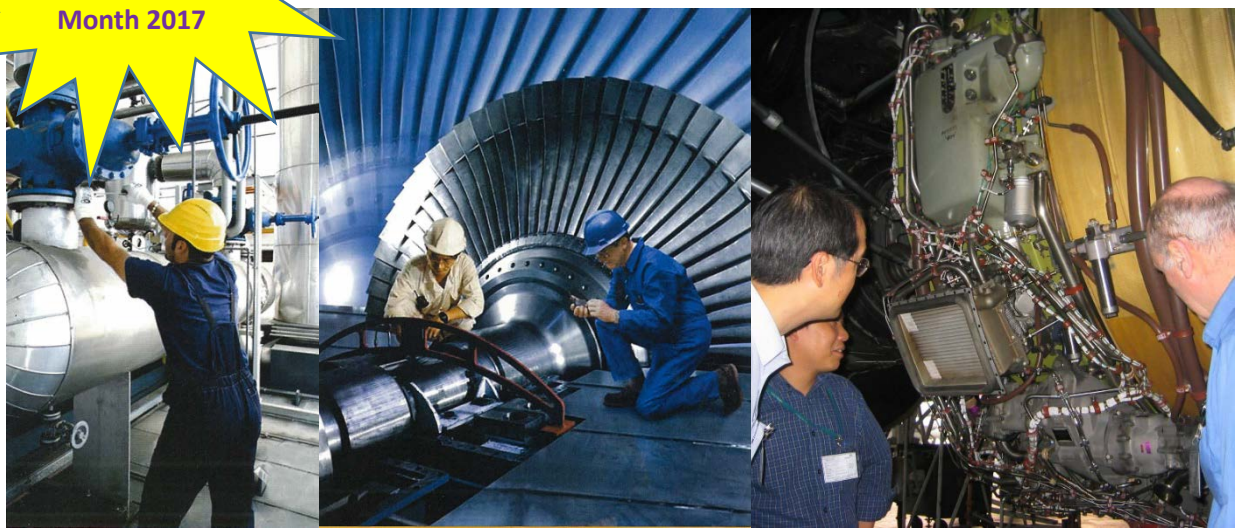
香港品質學會
Hong Kong Society for Quality
Limited by Guarantee

WorldPartner of American Society for Quality (ASQ)
Founding member of Asian Network for Quality (ANQ)
Founding member of World Alliance of Chinese Quality (WACQ)

Workshop on Reliability & Maintenance Analyses

18 November – 16 December 2017
(4 Saturdays)

Activity of World Quality Month 2017



Industry 4.0 principles not only demand the availability of machines, they also recommend collection and analysis of machine data through shop-floor communication and cloud computing to enable optimization of reliability and maintenance (R & M) management. ISO 55001 specifies the requirements for processes that must be in place to optimize an organization's R & M management. It prescribes what has to be done, but not when to do it. Typically, asset managers, reliability and maintenance practitioners in industry strive to cope with the challenges of R & M management without seeking to optimize the related decisions. This Workshop will present the way in which asset management decisions can be optimized by resolving the conflicts of a decision situation. Participants will also learn techniques for analyzing reliability of assets, and designing reliability testing plans. The data-driven procedures and tools that will be introduced have been field-tested and proven to be effective for real-world applications.

Each participant will receive a copy of **Maintenance, Replacement, and Reliability: Theory and Application**, 2nd edition, co-authored by Dr. Albert Tsang, the Workshop Leader

A Special Workshop Feature

Two user-friendly software programs will be demonstrated during the Workshop.

WeibullSoft, an application that supports self-learning of Weibull analysis, and **RELCODE**, an application that aids in component replacement decisions – do you replace preventively, or only on failure? Which policy will cost you less? How often should we replace a given component? How many spare parts will be required?

You will receive a copy of **WeibullSoft**, an educational version of **RELCODE**, and a full set of the e-learning materials demonstrated in the Workshop to take home with you.

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The Program

Maintenance Analysis

Maintenance Management

- The goals of a good maintenance program
- The "scientific" approach versus "intuition"
- Problem areas - purchasing, maintaining and replacing equipment

Important Fundamentals

- A brief review of relevant probability and statistics principles; hazard rate, mean-time-to-failure (MTTF), mean-time-between-failure (MTBF)

Equipment Component Replacement

- Analysis of equipment component failures
- Using the right formula – Weibull Analysis
- Graphing your Weibull curves
- The reliability function
- The hazard function and the composite "bath-tube" curve
- "Infant mortality" of components – what it means
- Using median ranks to estimate the risk of a component failure
- Testing the Goodness-of-Fit of your curves
- Reducing the number of failures while equipment is running

Component Preventive Replacement

- Alternative policies explained – Age versus Block replacement
- Opportunistic preventive replacement
- Using Glasser's graphs – explanation and examples
- Case studies, including boiler plant, drive motor of screen doors

Reliability Analysis

System Reliability

- Using Reliability Block Diagrams (RBD) to model system reliability
- Series, parallel, and complex systems.
- Active and stand-by redundancy
- MTTF of systems with components that have constant failure rates

Reliability Estimation

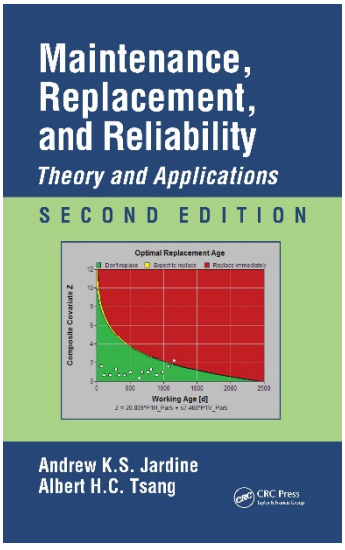
- Estimating MTTF/MTBF of items with constant failure rates
- Using test results to estimate the lower bound of the reliability of one-shot devices

Reliability Testing Plans

- Life testing plans: time truncated and failure truncated tests
- Using the χ^2 statistic to design a testing plan; interval estimates of MTBF
- Probability ratio sequential testing (PRST) plans
- MIL-STD-781C; test plan selection guidelines

Reference Text

Each participant will receive a copy of the book shown to the right, plus WeibullSoft, RELCODE, and the e-learning materials demonstrated in the Workshop



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Workshop on
Reliability & Maintenance Analyses

Workshop Leader:	Dr. Albert Tsang, ASQ Country Counselor (Hong Kong) and Former Chairman of HKSQ, author of "WeibullSoft", a software tool that teaches Weibull analysis, and co-author of "Maintenance, Replacement, and Reliability: Theory and Application"
Other speaker:	Mr. Y.C. Tsim, an academic with extensive industrial and teaching experience in Design of Experiments, Statistical Quality Control, Reliability Engineering and Product Safety. He also actively involves in offering advice and training for industries.
Dates & time:	4 Saturdays: 18, 25 November; 9, 16 December 2017 All sessions are from 9:00 am to 5:30 pm, with one-hour lunch break
Venue:	PolyU, exact location to be confirmed
Course fee per participant:	**HK$5,300 for HKSQ/ASQ members and clients of TQM Consultants Co., Ltd., HK$5,600 for others**. The course fee covers a copy each of **Maintenance, Replacement, and Reliability: Theory and Application**, 2nd ed., **WeibullSoft**, an educational version of **RELCODE**, and a full set of the e-learning materials demonstrated in the Workshop.
Registration:	1. Complete the registration form and prepare a crossed cheque for the appropriate course fees payable to "The Hong Kong Society for Quality Ltd." Fees paid are not refundable. 2. Send the registration form and the cheque to the following address: Dr. Albert Tsang Hong Kong Society for Quality c/o Department of Industrial & Systems Engineering, The Hong Kong Polytechnic University, Hung Hom, Kowloon 3. Registration form should reach us by 13 November 2017
Certificate:	Participants with at least 70% attendance will receive a Certificate of Attendance
Who should attend:	Managers of plant operations, facility managers, engineers, or professionals with responsibility for assuring reliability, maintaining and managing physical assets under their care. Executives and decision makers interested in updating their professional knowledge in field-tested and proven procedures and tools for assessing reliability, and managing physical assets cost-effectively.

Deadline for enrollment: Monday, 13 November 2017

Seats are limited and will be allocated on a first-come-first-served. ***ACT NOW!***
We reserve the right in cancellation (in such case, the paid course fees will be refunded) and re-arrangement of the course details when necessary.

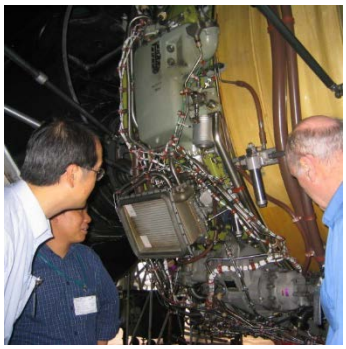
For enquiries: Call Dr. Albert Tsang at 2766 6591 (phone) or email albert.tsang@polyu.edu.hk

Supporting body: TQM Consultants Co., Ltd.
http://www.tqm.com.hk

HKSQ Workshop
on
Reliability & Maintenance Analyses
18 November – 16 December 2017

(Deadline for registration: 13 November 2017)

Registration Form



Mr./Ms.* _____ (in Chinese) _____

** Delete whichever is inappropriate*

Correspondence Address:

_____

_____ _____ _____

(Private E-mail) (Telephone) (Fax)

Company Name: _____

Position: _____

Department: _____

Company Address:

_____

_____ _____ _____

(Office E-mail) (Telephone) (Fax)

Please ☒ whatever appropriate

☐ Self-financed ☐ Company Sponsored

☐ HKSQ member ☐ ASQ member ☐ Membership No: _____

☐ TQM Client ☐ Others

A cheque payable to "The Hong Kong Society for Quality Ltd." for the amount of HK$ _____ is enclosed. (The registration fee per participant is HK$ 5,300 for HKSQ / ASQ members, and clients of TQM Consultants Co., Ltd., HK$ 5,600 for others.)

Signature: _____ Date: _____ (dd/mm/yyyy)

Please send completed registration form with payment to: Dr. Albert Tsang, c/o Department of Industrial and Systems Engineering, The Hong Kong Polytechnic University, Hung Hom, Kowloon.

For enquiries, please call Dr. Albert Tsang at 2766-6591, or send email to albert.tsang@polyu.edu.hk or info@hksq.org