

A THREE DAY CONFERENCE

16 – 18 August 2000

GUEST SPEAKERS:

Andrew Jardine
University of Toronto

Prof W.M.J. Geraerds
President IFRIM

Harry Ascher
Harry Ascher and Associates

Harry Martin
Erasmus University

Jasper Coetzee
M-Tech Consulting Engineers
(Pty) Ltd

John Sharp
University of Salford

Ludo Gelders
University of Leuven

Nick Hastings
Queensland University of
Technology

Riaan Breedt
Vibrakon

Richard Dwight
University of Wollongong

Roald Rodseth
Radiant Operations
International



World Trends in Maintenance



Venue:
CSIR Conference Centre,
Pretoria

16 – 18 August 2000

Web site information at:

<http://www.m-tech.co.za/worldtrends>
with online entry available

Short description of topics at:

<http://www.m-tech.co.za/worldtrends/online.entry/topics>



Maintenance Technology People

Why you should attend

Maintenance Technology and Management advances are made at a pace commensurate with the pace at which the equipment and facilities being maintained is developing. At the forefront of this, there are a number of people and organisations that are driving maintenance technology and management solutions development. One of these is the International Foundation for Research in Maintenance (IFRIM), an international organisation of academic researchers in maintenance. We are fortunate that the annual IFRIM workshop this year takes place in South Africa and coincides with this conference. This makes it possible for maintenance people to listen to some of the world's leading researchers in the field of Maintenance Engineering and Management. For flavour, we have also included other international and local maintenance experts.

Limited registrants will be able to take part in the Round Table Discussion. The idea is to get the South African maintenance opinion makers and the IFRIM members together for mutually beneficial discussions.

It is a feature of a world class organisation that it keeps up with new developments in its field. This "World Trends in Maintenance" conference is aimed at assisting the South African maintenance fraternity to achieve that.

Our past conferences have attracted large numbers of maintenance people. The comments from these people are an indication of the success achieved.

This three day conference will ensure that you are updated in most of the main areas of Maintenance Engineering and Management. These include papers in areas such as:

- Continuous Improvement
- Design of maintenance concepts (or maintenance plans)
- Developments in maintenance
- Inventory Management
- Knowledge Based Maintenance
- Maintenance Outsourcing
- Optimising RCM decisions
- Overall Equipment Effectiveness
- Quality in maintenance
- Repairable Systems reliability
- The academic contribution to maintenance
- The strategy gap in maintenance

The information gained from listening to this array of internationally acclaimed speakers will provide you with international benchmarks and will afford you growth on your path to achieving new heights of maintenance effectiveness.

Round Table Discussion

Because the IFRIM workshop takes place in South Africa this year (see discussion under the heading "why you should attend", the South African maintenance fraternity is afforded a very special opportunity to gain international insights. We are further adding value to this by a very special and limited opportunity to discuss maintenance solutions directly with the world's experts. **ONLY 30 REGISTRANTS WILL BE ABLE TO MAKE USE OF THIS OPPORTUNITY** to discuss maintenance affairs in a relaxed atmosphere and with cocktails/snacks available. The idea is to get the South African maintenance opinion makers and the IFRIM members together for mutually beneficial discussions. Registration for these 30 places will thus take place on a first come, first served principle. Because we want to reserve these places for the top interested South African maintenance people, we will only confirm these bookings at a later stage.



About the Speakers

ANDREW JARDINE

Ph.D., C.Eng., M.I.Mech.E., M.I.E.E., P.Eng., is a Professor in the Department of Mechanical and Industrial Engineering at the University of Toronto and principal investigator in the Condition-Based Maintenance Laboratory where the EXAKT Condition Based Decision Making software has been developed. He also serves as a Senior Associate Consultant to the Global Leader of the Physical Asset Management Practice of PricewaterhouseCoopers. Dr. Jardine is the author of the AGE/CON and PERDEC life-cycle costing software licensed to British Airways, Canada Post, the Hong Kong Mass Transit Authority and other organisations in North America and globally. Dr. Jardine was the 1993 Eminent Speaker to the Maintenance Engineering Society of Australia and was the first recipient of the Sergio Guy Memorial Award from the Plant Engineering and Maintenance association of Canada in recognition of his outstanding contribution to the Maintenance profession. He is a regular visitor to South Africa where he presents his Decision-Making in Maintenance course on a bi-annual basis. He is a member of the Board of Advisors of the

International Foundation for Research in Maintenance (IFRIM).

PROF. W.M.J. (BILL) GERAERDS



M.Sc., started his career as an officer in the Royal Netherlands' Airforce, serving in a diversity of logistic functions, such as T.O. on the flight line, C.O. of a depot and Head of the

Logistic and Maintenance Systems Section at Air Material Command. This followed studies in Mechanical Engineering - Industrial Organisation - at the University of Technology in Delft (he received his MSc (hons) in 1961). At his honourable discharge in 1971, he was knighted by the Queen of the Netherlands as Officer in the Order of Oranje Nassau.

After a short period with Fokker Aircraft as Departmental Director Organisation and EDP he was appointed full time professor in Production and Maintenance Planning and Control at Eindhoven University of Technology. His attention was primarily directed at improvement of maintenance through scientific research. He was also invited as visiting professor at the University of Brabant (applied EDP), at the University of Manchester (Terotechnology) and at the University of Wollongong (Maintenance). At his retirement in 1991, he was awarded the Medal of Honour of the university.

He is an Honorary Member of the Netherlands' Maintenance Society, of which he was the President for 16 years. He took the initiative to start the European Federation of National Maintenance Societies (EFNMS) in 1971, and was a member of its Board for 16 years, serving as Honorary General Secretary and as President. Prof. Geraerds gave presentations in many countries all over the world, apart from in Europe also in USA, Canada, Australia, Japan, Malaysia, Singapore, Abu Dhabi and India. He was appointed Honorary Fellow of I.I.P.E. in 1971. He is President of the International Foundation for Research in Maintenance (IFRIM), which he founded in 1986, and in which he continues his promotion of maintenance.

HARRY ASCHER

M.S., S.M.W.E.E., M.A.S.A., M.S.R.E., M.I.N.F.O.R.M.S., received his BS in Physics from City College of New York in 1956 and his MS in Operations Research from New York University in 1970. He is a reliability consultant and lecturer and is presently completing a book (his second) on Statistical Analysis of Systems Reliability. He co-authored the first book which provides extensive coverage of repairable systems (Repairable Systems Reliability, published by Marcel Dekker, New York and Basel). This



book has received exceptionally favourable and emphatic reviews in a wide variety of journals. He is also the author of over 30 reliability-oriented

papers and of the Encyclopedia of Statistical Sciences articles on Repairable Systems Reliability and Laplace's Trend Test. He received the ASQC's (now ASQ) Allen Chop Award for exceptional technical achievement in reliability.

During March to May 1992 he was a Visiting Research Fellow in England and Scotland under a grant from the British Scientific and Engineering Research Council. From April to June 1995 he lectured at 15 academic and commercial sites throughout Western Europe. He has taught reliability courses in the USA, Canada, UK, Europe and Israel for many academic, industrial and defence organizations. Formerly, he was employed as an Operations Research Analyst at the Naval Research Laboratory where he participated in reliability programs on a wide variety of strategic and tactical Naval Systems.

HARRY MARTIN



Ph.D., studied in Industrial Engineering at the Technical University of Eindhoven. Since his M.Sc. thesis, his primary interest concerns information systems

for maintenance management. In 1986, he was appointed an assistant professor at the faculty of Technology Management of the Technical University of Eindhoven. He continued his research, which resulted in a Ph.D. thesis. After the retirement of prof. Geraerds, he was responsible for maintenance management lecturing, for both Dutch as well as foreign students and he supervised numerous M.Sc. projects on maintenance management.

He has been also active as a senior consultant at KEMA and he is currently a visiting professor at the Erasmus University in Rotterdam, where he contributes to research in the area of contracting-in and contracting-out maintenance. In 1999 he was appointed associate professor at the Open University in Heerlen, where he concentrates on the design of distant learning material on business process (re)design and operation management.

He is the treasurer and secretary of IFRIM, the

International Foundation for Research in Maintenance.

JASPER COETZEE

Pr.Eng., M.Eng., B.Com., M.S.A.I.I.E., S.M.I.C.M.E.E., M.Akad.SA., has been actively



involved in maintenance practice in industry for the last 27 years. He started his working life as a Millwright apprentice. This was followed by studies in Mechanical

Engineering at the University of Pretoria. He received the degree B.Sc. (Eng.)(Mech.) in 1973. Following a short training period as pupil engineer, he was appointed as Assistant Resident Engineer at a major iron mine in late 1974. He joined a major petrochemical group as Resident Engineer of one of their major collieries in late 1979. From late 1982 to the middle of 1985, he was responsible for all mechanical maintenance of one of the major petrochemical plants of the same group. This was followed by a period of 2 years during which he headed the project team that designed and chose a maintenance information system for the various plants/mines of the group.

He left in 1987 to set up a consultancy in the maintenance field. The main interest of his consulting work lies in the fields of failure analysis and maintenance systems. He joined the University of Pretoria in 1993 as Senior Lecturer in Maintenance Engineering. In this (last) role, he was responsible for the administration and co-ordination of all courses in Maintenance Engineering presented by the University of Pretoria up to February 2000. He is managing director of M-Tech Consulting Engineering (Pty) Ltd, an organisation involved in maintenance knowledge development and transfer, maintenance consulting and maintenance analysis software manu-



facture and distribution. He is a member of the Board of Advisors of the International Foundation for Research in Maintenance (IFRIM).

JOHN SHARP

Ph.D., is a reader in organisational excellence, formerly in the Department of Aeronautical, Mechanical and Manufacturing Engineering and more recently in the Business School at the

University of Salford in the UK. He carried out an apprenticeship with Rolls-Royce Aero Engines, after which he completed a thin sandwich B.Eng. degree in Mechanical Engineering at Bradford University. This was followed by an industrial Ph.D. in high-speed textile machinery. He then joined Unilever where he was a Manager responsible for introducing new technology, manufacturing and maintenance systems into Unilever operating companies. Dr. Sharp has been at the University of Salford for the past eleven years and teaches manufacturing management subjects. He leads a research group investigating the key enablers for High Performance Organisations (HPOs). The research is centred on the role of the People-Process interface in order to make improvements in business performance, with particular emphasis on quality (including continuous improvement), business and maintenance processes. He has been involved in research projects valued at over £3.1 million and has published over 70 papers in books, journals and conferences related to his research and consultancy interests.

He is a member of the Board of Advisors of the International Foundation for Research in Maintenance (IFRIM).

LUDO GELDERS



Ph.D., holds degrees in electro-mechanical engineering (University of Ghent) and industrial management (Université Catholique de Louvain). After work experience

in jet-engine manufacturing, he studied at the MIT-Sloan School (USA) and got his doctoral degree in industrial management at K.U.Leuven. Currently he is full professor at the Centre for Industrial Management at Katholieke Universiteit Leuven (Belgium). He served as chairman of the department of Mechanical Engineering and as chairman of the Centre for Industrial Management, both at K.U.Leuven. He published over 100 articles on logistics, quality, and maintenance and holds editorial responsibilities in several international journals. He co-authored the textbook "Maintenance Management", published by Acco. He also serves as vice president of the Belgian Academy Council for Applied Sciences and as vice-president of the University Centre Limburg. He has performed consultancy work for many international corporations. He is a member of the Board of Advisors of the International Foundation for Research in Maintenance (IFRIM).

NICK HASTINGS

Ph.D., M.A., C.Eng., F.I.E.Aust., M.I.Mech.E. is Mount Isa Mines Professor of Maintenance



Engineering at Queensland University of Technology, Brisbane, Australia. Dr Hastings graduated in mechanical engineering from the University of Cambridge in 1961 and sub-

sequently obtained his Ph.D. in engineering production from the University of Birmingham. He worked for 10 years in the Royal Electrical and Mechanical Engineers in maintenance and logistics roles in the United Kingdom, Germany and Hong Kong. Subsequently he has been involved in education, research and consultancy in maintenance, asset and manufacturing management in Australia and other countries. His interests lie primarily in the development and practical implementation of techniques which improve business profitability in maintenance and related areas. Dr. Hastings has contributed a number of key developments in maintenance engineering management. In particular, he pioneered the repair limit replacement method, a widely accepted technique for the economic replacement of long life equipment. He has also developed improvements to Weibull Analysis, which result in more accurate distribution fitting and better estimates of reliability. He has published research papers on these topics in leading research journals, as well as several books on quantitative management techniques. He has also been active as a software designer and developer, and is the author of several PC based software packages widely used in maintenance engineering and management. He is active as a consultant and short course presenter, and is heavily involved with maintenance engineering and management in such industries as mining, oil production and refining, chemicals, transportation and manufacturing. He is a member of the Board of Advisors of the International Foundation for Research in Maintenance (IFRIM).

RIAAN BREEDT

B.Sc. Eng. (Mech.)(Hons.), obtained B.Sc. Eng. (1973) and B.Sc. Eng. (Hons.) (1981) degrees in Mechanical Engineering from the University of Pretoria. He worked for the CSIR Defence



Research Institute from 1974 to 1977, being involved with the development of defence systems; in particular with the acceptance and qualification tests of air to

air missiles. As such he attended to aspects such as environmental and more specific vibration testing. From 1977 to 1984 he was responsible for the development of two centrifugal compressors, attending to the mechanical, aerodynamic and rotor-dynamic design as well as the manufacture and commissioning of the production units.

He founded the company Vibrakon in 1984 and dealt mainly with rotor-dynamic design related projects and industrial vibration monitoring. Currently he concentrates on the implementation, operation and integration of vibration monitoring programs into maintenance strategies. Typical clients are in the paper manufacturing, diamond mining and petrochemical industries. He is the South African licensee of the Vibration Institute of America's courses.

RICHARD DWIGHT



Ph.D., is Director of Studies of the University of Wollongong's Post-Graduate Coursework programs, which include programs in Maintenance Management and Systems

Engineering. He has taught widely in maintenance management, both in Australia and Hong Kong. His interests include the development and promotion of sound maintenance management practices world-wide.

His doctor thesis was concerned with measurement of the performance of the maintenance system and he holds interest in the broad set of issues that is maintenance engineering and management. Prior to his appointment at the University of Wollongong in 1994, he spent over 19 years in BHP Steel's Port Kembla works, NSW, Australia, where he held engineering and management positions.

He is a member of the Board of Advisors of the International Foundation for Research in Maintenance (IFRIM).



Web site information at:
<http://www.m-tech.co.za/worldtrends>

Online entries available at:
<http://www.m-tech.co.za/worldtrends/online.entry/>

See our Web site for more information on M-Tech – a company for Maintenance Technology People:
<http://www.m-tech.co.za>

ROALD RODSETH

Pr.Eng., B.Sc. Eng., M.D.P., studied in electrical engineering at Natal University and graduated in 1975. He worked for 22 years in the maintenance engineering and management field in heavy industry and at the end of 1998 formed a company, Radiant Operations International,



which has as its focus engineering and management in the field of maintenance and projects. This was done in response to the changes brought about in the information age.



Full Day Workshop Topics (18 August)

Preventive Replacement and Condition Based Maintenance optimisation

Dr Andrew Jardine

■ This workshop firstly deals with optimum Equipment Component Preventive Replacement based on the analysis of equipment component failures using Weibull Analysis. It explains alternative policies such as age replacement, block replacement and opportunistic preventive replacement and covers case studies including boiler plant, bearings, transmissions, pumps and centrifuges. It also discusses the hazard function and its relationship to the composite "bath-tub" curve as well as ways of reducing the number of failures while equipment is running.

■ It secondly deals with the enhancement of the above decision-making techniques, using Condition Monitoring information. It discusses the interpretation of information from oil and vibration monitoring and the blending of classical age-based replacement with CBM optimisation and condition-based maintenance procedures. It finally introduces the EXAKT software as a computerised means for doing such analyses.

The Systematic design of the maintenance concept for a technical system

Prof Bill Geraerds and Dr Harry Martin

■ This workshop explains the use of a technique which is an alternative for RCM in setting up a maintenance plan (or "maintenance concept" as they would have it).

■ Following the review of the original, conventional, approach to maintenance, new insights on the fundamentals of maintenance will be presented. Some maintenance myths will be unveiled, followed by the introduction of the revised fundamentals directed at the effectiveness and efficiency of possible maintenance actions.

■ Using these fundamentals the design procedure for the maintenance concept for a technical system will be explained, and how to check a maintenance concept in use for its correctness. The importance of the maintenance concept as a necessary basis for many logistic decisions will be shown in the form of a format for the introduction and for the disposal of a technical system.

■ Finally, a failure analysis PC program ("Fail Rate") will be explained and demonstrated to use in the decision making process. Participants will receive a copy of the program for personal use.

Statistical Analysis of Repairable Systems Reliability

Harry Ascher

■ The analysis of the failure data of systems, using conventional probabilistic techniques, mostly leads to completely wrong analyses. Harry Ascher is certainly the strongest proponent for the correct analysis of Repairable Systems' reliability in maintenance decision making. The present course has been presented to organisations, such as General Motors, IBM (Three courses), Kodak, John Deere (Two courses), Royal Military College of Canada (Eight courses), British Aerospace (Two courses) and many more. The course outline is as follows (a more detailed version is available on request):

Overview of course

- Review of basic concepts and introduction to misconceptions
- Terminology, Notation, and Introduction to Basic Models
- Probabilistic Modelling of Repairable Systems
- Shortcomings of Probabilistic Modelling of Repairable Systems
- Statistical Analysis of Repairable System Failure Data
- Misconceptions and Terminology of Reliability Workshop

The Role of Overall Equipment Effectiveness (OEE) in Modern Maintenance

Dr John Sharp

■ In today's competitive markets companies need to effectively utilise resources, which includes the equipment and the labour. To satisfy customer demands companies need to optimise equipment operating conditions; process availability needs to be maximised by increasing up-time; productivity needs to be maximised by reducing cycle times; and quality needs to be right first time every time.

■ Overall equipment effectiveness (OEE) is a total measure of performance that relates the availability of the process to the productivity and quality of the product and is therefore appropriate to all companies operating plant and machinery. In the past many companies have concentrated on productivity without improvement in the effectiveness of equipment in terms of availability, this approach is no longer sufficient.

■ This workshop looks at Overall equipment effectiveness (OEE) and how it can be used by maintenance to improve the competitiveness of a business.

Managing Spare Part Inventories

Drs Ludo Gelders and Nick Hastings

- Basics of inventory theory: ABC analysis and other current models.
- Specific models for spare parts (e.g. slow

moving items) and some special cases (e.g. pooling).

- Forecasting of stock usage.
- Examples using Stockex.
- Application of theory to practical stock situations.
- Exercises.

Analysing Your Maintenance Requirements

(RCM and all that stuff...)

Dr Richard Dwight

■ A considered, logical, and scientific approach to the setting of maintenance programs is promised by the RCM methodology. No doubt, the basic logic has merit. Many organisations have applied RCM type approaches with varying success. This workshop will allow you to explore approaches to the development of a logical maintenance program. It will explore ways that the process can be practical and results oriented.

Topics covered:

- Fitting requirements analysis into an overall improvement program
- A basic requirements analysis approach.
- Alternatives tailored to the particular problem being addressed
- Typically useful maintenance interval models
- Working with your case-studies
- Participants are encouraged to bring along samples of their existing maintenance programs for a technical system so that they can work with them during the day.

Registration Procedure

Complete and fax the registration form to M-Tech Consulting Engineers (Pty) Ltd. (see payment details below).

Use fax numbers (012) 362 0804 (Pretoria) or (016) 932 2810 (Vanderbijlpark).

Please note that the number of delegates is limited. Pay the required fee plus VAT at 14% into the M-Tech bank account and fax the deposit slip to one of the above fax numbers with the registration form.

BANK DETAILS ARE AS FOLLOWS:

Bank: ABSA, President Kruger street, Vanderbijlpark.
Account number: 9052663722
Branch number: 632005

Acknowledgement of your enrolment will be faxed as soon as both your form and payment have been received.

Registration will only be confirmed once payment has been received – remember

- (i) **there is a limited number of seats available,**
- (ii) **early bird discounts** lapse if payment is received too late.

Where companies request invoices, payment should not be delayed until the invoice is received, as this can cause losing discounts and/or reservations.

CONTINUED ON NEXT PAGE



M-Tech issues tax invoices for courses on a routine basis, so each booking goes hand in hand with an invoice being sent to the client company (care of the person identified on the registration form).

Mr Johan Nel (telephone (082) 322 6002) of Reservation Zone can be contacted for assistance in finding hotel accommodation if necessary. **Alternatively, contact M-Tech.**

A map will be faxed to you on request.

Inquiries should be directed to Marié Jones at (012) 362 0822/9 or Sandra Breytenbach at (016) 932 1629 (the latter can be contacted mornings only).

The conference fee includes conference notes, refreshments, lunches and cocktails.

Please note that M-Tech Consulting Engineers (Pty.) Ltd. reserves the right to use alternative speakers if necessitated by unforeseen circumstances as well as to cancel the conference (with full repayment) on lack of interest.

Cancellations without penalty (if in writing) will be accepted up to 10 working days prior to the conference. Thereafter, a 30% cancellation fee will be payable on written cancellations received prior to the conference. Delegates that do not cancel in writing will be liable to pay the full conference fee.

Registration Details

The cost of attending the conference is as follows:

Description of part attended	Cost (ex VAT)
Complete conference, including a workshop on Friday 18 August	R3 995,00
Only conference (16, 17 August)	R2 850,00
One conference day (16 or 17 August)	R1 595,00
Workshop only (18 August)	R1 795,00
One conference day (16 or 17 August) plus workshop (18 August)	R2 995,00
Round Table discussion (evening of 17 August) – see programme	R345,00
Special Discounts: #	
Early Bird Discount (registration before 21 July 2000)	20%
Registration of three or more delegates before 21 July 2000	30%*
Registration of three or more delegates after 21 July 2000	15%
# Does not apply to round table discussion	
* Includes early bird discount	

Programme

Wednesday 16 August

07:30 – 08:30

08:30 – 09:30

Registration / Coffee

Keynote Speaker

The Academic Contribution to Maintenance
Prof Bill Geraerds, President IFRIM

09:40 – 10:30

Stream 1

Maintenance Outsourcing

Roald Rodseth

Stream 2

Optimising RCM Decisions

Dr Andrew Jardine

10:30 – 11:00

11:00 – 11:50

Using Condition Based Maintenance for Continuous Improvement

Riaan Breedt

Tea

Good data in – Garbage out!

12:00 – 13:00

13:00 – 13:50

The Maintenance Strategy Gap

Jasper Coetzee

Lunch

Harry Ascher

Inspection and Replacement Intervals for RCM

Dr Nick Hastings

To IID or not to IID, that is the question!

Harry Ascher

15:00 – 15:30

15:30 – 16:30

16:30 – 17:30

Topic to be announced

Coffee

Panel Discussion

Cocktails

Thursday 17 August

08:00 – 08:30

08:30 – 09:20

09:30 – 10:20

10:30 – 11:00

11:00 – 11:50

12:00 – 13:00

13:00 – 13:50

14:00 – 15:00

15:00 – 15:30

15:30 – 16:30

Coffee

Capital Replacement Decisions: The Application of a Detailed Modelling Approach

Dr Richard Dwight

A stepping stone towards KBM (knowledge based maintenance)

Dr Ludo Gelders

Tea

Striving for Quality in Maintenance

Dr John Sharp

Lunch

Designing maintenance concepts: An evaluation

Dr Harry Martin

Panel Discussion

Coffee

Keynote Speaker

Developments in Maintenance – Past, Present, Future

Prof Bill Geraerds, President IFRIM

Round Table discussion with IFRIM

– separate booking – maximum 30 registrants

Friday 18 August

Workshops on various topics – see separate descriptions and booking details



Short description of topics at:

<http://www.m-tech.co.za/worldtrends/online.entry/topics>

Enquiries

Marié Jones (012) 362 0822/9
Sandra Breytenbach (016) 932 1629 (mornings)

Fax Registration

(012) 362 0804
(016) 932 2810

Accommodation

Johan Nel 082 322 6002
(012) 998 7202

e-mail:

reservationzone@worldonline.co.za

