A THREE DAY CONFERENCE

18 – 20 August 1999

GUEST SPEAKERS:

Richard Dwight
Immediate Past National Chairman
Maintenance Engineering Society of Australia

John M. Sharp
Department of Aeronautical, Mechanical and Manufacturing Engineering
University of Salford, UK

Basim Al-Najjar
Institute of Technology
Växjö University, Växjö, Sweden

Laza T Lazarevic
Anglogold Vaal River Business Services

Jan Myburg
Crux Systems Technologies (Pty) Ltd

Pieter-Jan Vlok
M-Tech Consulting Engineers (Pty) Ltd

Keynote speaker:
Harry Wichers
President of the Southern African Maintenance Association

World Trends in Maintenance Engineering

Venue:
Human Sciences Research Council
Conference Centre,
Pretoria

18 - 20 August 1999

SAMA Southern African Maintenance Association

IFRIM International Foundation for Research in Maintenance

M-TECH EDMS BPK PTY LTD Raadgewende Ingenieurs Consulting Engineers

Why you should attend

One of the most important features of a world class organisation is that it keeps up with new developments in its field. The bi-annual World Trends in Maintenance Engineering conference is aimed at putting the South African maintenance fraternity in a position to do just that.

The first of these conferences, held in August 1997, was an indisputable success. South African maintenance people (135 of them) was afforded the opportunity to gain new insights provided by listening to some of the world's leading researchers in the field of Maintenance Engineering.

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

- Maintenance Improvement drives
- Maintenance Performance Measurement
- Development of Maintenance Engineers
- ISO 9000, ISO 14001 and their impact
- Maintainability assessment
- Maintenance Plan Development
- Condition Monitoring
- Maintenance Information Systems
- Failure Analysis
- Reliability Centred Maintenance

You will be able to set new goals and benchmarks and optimise maintenance effectiveness using the information gained. Two of the three international speakers are members of the International Foundation for Research in Maintenance (IFRIM), an organisation with a membership consisting of leading maintenance researchers from all over the world.

About the speakers

RICHARD DWIGHT, B.E.(hons), M.I.E.Aust. C.P.Eng., M.I.F.R.I.M., M.M.E.S.A. is Senior Lecturer and Co-ordinator of the Maintenance Management and Systems Engineering Programs at the University of Wollongong, Australia. He holds a First Class Honours Degree in Engineering (Mechanical) from the University of Wollongong and has submitted his thesis for the Degree of Doctor of Philosophy. The focus of this research is maintenance performance measurement. Prior to his move to a position with the University of Wollongong, in 1994, he spent over 19 years in BHP Steel's Port Kembla works, NSW Australia, where he held various positions within the maintenance organisation.

His interests include the development and promotion of sound maintenance management practices world-wide. He is a member of the Board of Advisors of the International Foundation for Research in Maintenance (IFRIM). He was the Founding Chairman of the Illawarra Chapter of the Maintenance Engineering Society of Australia (MESA) and a Founding Member of National Committee. He is Immediate Past National Chairman of the Maintenance Engineering Society of Australia.

DR JOHN M. SHARP, Ph.D., C.Eng., M.I.F.R.I.M., M.I.Mech.E. is a senior Lecturer in the Department of Aeronautical, Mechanical and Manufacturing Engineering at the University of Salford in the UK. He carried out an apprenticeship with Rolls-Royce Aero Engines after which he completed a B.Eng. (Hon) degree in Mechanical Engineering at Bradford University. An industrial Ph.D. followed this. He then joined Unilever where he was part of a small multidisciplinary team who acted as consultants to Unilever overseas factories with the objective of applying organisational and technical measures to reduce operational and engineering costs and to raise standards.

He has been at the University of Salford for the past eight years and teaches in manufacturing management. This includes teaching in Maintenance/Facilities Management, Quality, Reliability & Terotechnology and Total Quality Management. He has built up a large research group where the focus is on the development of High Performance Organisations (H.P.O.'s). This research looks at several key enablers for H.P.O.'s with particular emphasis on quality (including continuous improvement), business and maintenance processes. He has jointly published over 70 papers in books, journals and conferences related to quality and maintenance.

DR BASIM AL-NAJJAR, Ph.D., is an assistant professor at Växjö University, Växjö, Sweden. He graduated in mechanical engineering from the Mousel University in Iraq in 1977 and later (1997) obtained his Ph.D. from the Lund University, Sweden. He has, over a period of 7 years following his first degree, been involved in the maintenance of vehicles in Iraq, Syria and Lebanon. Subsequently (the last 15 years) he has been involved in education, research and consultancy in vibration analysis and problem solving in Sweden. He also developed a new technique for detecting damage in rolling element bearings. This technique has been implemented in three measurement instruments, which has been marketed.

Dr Al-Najjar is a member of the Scandinavian centre for maintenance management (SCEMM), the Swedish Maintenance Society and the Scandinavian Chapter of the International Society of Logistics (SOLE). He is also the author of two textbooks, which is used for courses at Växjö University. These are 'Condition monitoring and condition-based maintenance' and 'Measurements and failure analysis'.

LAZA LAZAREVIC, Pr. Eng., B.Sc. (Eng.) (Mech.), G.C.C., M.S.A.I.M.E., M.I.C.M.E.E., M.A.M.R.E. holds the position of Engineer, Special Assignments at Anglogold Vaal River Business Services. He graduated at the Mechanical Engineering University in Yugoslavia in 1982. He also obtained a Government Certificate of Competency - Mines and Works and is registered as a Professional Engineer with E.C.S.A.

After completing his military training, he worked at the Mechanical Industry Engineering Institute as Design Engineer on projects in Russia, China and South America. In 1988 he was transferred to the Middle East Division, as a Project Engineer and has been involved in a number of a big capital projects for the Middle East countries, Iraq, Iran, Turkey, Jordan and Egypt in particular. He immigrated to South Africa in 1992 and worked at Mellor Pumps and Vaal Reefs before taking up his present position. He has published 20 papers at various International conferences all over the world. Recently he was a runner up for The Best Technical Achievement Award from the S.A. Institute of Tribology.

JAN A. MYBURG obtained a Certificate in Business Management and a Certificate in Business Consultancy, both from

Potchefstroom University for C.H.E. where he also spent two years in engineering studies. To round off the latter he obtained a Diploma in Machine Drawing, Design and Construction from ICS.

He has been actively involved in maintenance information systems for the last eighteen years. He started his career at SASOL as Senior Planning Officer at Sigma Colliery and was from there promoted to Senior Systems Analyst and subsequently Project Manager at SASOL's Group Information Services. After a spell of owning his own printing business, he joined QDATA as Management Consultant and was involved in the design, building and marketing of QPLAN4. He presently works for CRUX where he is involved in the installation of the maintenance information system EMPAC at METRORAIL. Jan has substantial experience in the areas of functional design, database design and structured systems implementation.

PIETER-JAN VLOK (PJ), B.Eng. finished his bachelor's degree in Mechanical Engineering at the University of Pretoria in 1997. During his studies he did practical training at ISCOR, Vanderbijlpark. He is presently busy with a full time Masters degree in Maintenance Engineering at the University of Pretoria. He has successfully completed most of his course work and is busy with a reliability-modelling dissertation, which will be finished by the end of 1999. He is also involved with M-Tech Consulting Engineers (Pty.) Ltd. where he has successfully demonstrated the ability to handle maintenance consulting projects. He is also in charge of the company's network administration and web site activities.

His research involves using Condition Monitoring data (in his case specifically vibration data), together with failure data for maintenance strategy setting and failure prediction. In this he liases closely with the CBM laboratory at the University of Toronto, Canada, a facility which he has visited at the beginning of 1999.

Programme

Wednesday 18 August

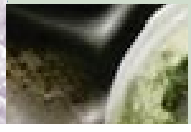
08:00	-	09:00	Registration
09:00	-	10:00	Keynote speaker Dr Harry Wichers, President, SAMA
10:00	-	10:30	Tea
10:30	-	11:50	Fads and false dawns in Maintenance Management Richard Dwight
12:00	-	13:00	The use of Virtual Reality in Maintenance Dr John Sharp
13:00	-	14:00	Lunch
14:00	-	15:00	Integrated vibration-based Maintenance Dr Basim Al-Najjar
15:00	-	15:30	Tea
15:30	-	16:30	PANEL DISCUSSION
16:30	-	17:30	Cocktails

Thursday, 19 August

07:30	-	08:00	Coffee
08:00	-	09:20	International Standards affecting Maintenance Engineers Dr John Sharp
09:30	-	10:30	Integrated Total Maintenance Management Laza Lazarevic
10:30	-	11:00	Tea
11:00	-	11:55	The impact of the lack of real-time measurement of performance parameters on Vibration-Based Maintenance accuracy and effectiveness Dr. Basim Al-Najjar
12:05	-	13:00	New advances in Maintenance Information Systems Jan Myburg
13:00	-	14:00	Lunch
14:00	-	15:00	Staying in control of Maintenance Requirements Analysis Richard Dwight
15:00	-	15:30	Tea
15:30	-	16:30	PANEL DISCUSSION

Friday, 20 August

07:30	-	08:00	Coffee
08:00	-	09:20	Review of Maintenance Concepts Dr. Basim Al-Najjar
09:30	-	10:30	Replacement decisions based on the integration of Vibration Information and Failure Time Data Pieter-Jan Vlok (PJ)
10:30	-	11:00	Tea
11:00	-	11:55	Measuring the Performance of the Maintenance function Richard Dwight
12:05	-	13:00	Future Skills required for Maintenance Engineers Dr. John Sharp
13:00	-	14:00	Lunch
14:00	-	15:00	PANEL DISCUSSION
15:00	-	15:30	Tea



Short descriptions of topics

Richard Dwight

1. Fads and false dawns in maintenance management

Too often the promise of a quick fix to an organisation's problems seem attractive. Improvement strategies like TPM and analysis methods like RCM are proposed as solutions to the 'maintenance problem'. The outsourcing of maintenance seems to be accepted as a modern approach. Rarely are the requirements of the technology employed or the business environment compared against current resources with the objective to identify an agreed direction for improvement.

This paper suggests simple methods for identifying improvement direction and for the selection of improvement tools that can be developed and utilised.

2. Measuring the performance of the maintenance function

Too often organisations focus on measures of performance that do not encompass the total impact of activities on sustainable business performance. Measures of performance become ends in themselves. Care must be taken to ensure that measures are reasonable proxies for business success.

A number of approaches to the development of appropriate performance measures including the audit and the value measurement approach offer a solution to this problem.

3. Staying in control of maintenance requirements analysis

RCM and similar techniques for determining maintenance requirements have been used in general industry with limited success. The need to logically identify maintenance tasks seems reasonable. But the burden of analysis is often overcome with shortcut techniques that also negate the basic benefits of undertaking the analysis.

There are methods of working from the objective of undertaking the analysis, and which accounts for the available knowledge. These methods lead to feasible analysis and short and long-term benefits.

Dr. John Sharp

1. International Standards affecting Maintenance Engineers

Due to global competitiveness businesses are now trading internationally and are expected to have international standards to enhance customer-supplier relationships and stakeholder perceptions. This presentation discusses several international standards such as BS8800 Health and Safety (soon to be ISO18000), ISO9000 Quality Management and ISO 14001 Environmental Management and how they might affect maintenance engineers in the future.

2. Future Skills required for Maintenance Engineers

In many organisations maintenance is changing, in that operators and other employees (i.e. TPM) carry out many basic maintenance activities. This means that the maintenance engineer needs to take on new skills and competencies such as mentoring and training. This allows them to concentrate on new competencies such as problem solving, diagnostics and advanced maintenance techniques.

This presentation will look at these issues and how they affect maintenance engineers in the future.

3. The Use of Virtual Reality in Maintenance

For large pieces of equipment, assessing maintainability requires physical prototypes, which is expensive and time consuming. Software environments, using virtual reality, can be used to assess physical access, part handling, mobility around equipment parts and difficulty in removing/replacing parts etc.

This presentation looks at the progress of a research project to use virtual reality for assessing aero-engines maintainability.

Dr Basim Al-Najjar

1. Review of maintenance concepts

Maintenance people often find themselves baffled by the seemingly boundless array of maintenance concepts. These include Total Productive Maintenance (TPM), Reliability Centred Maintenance (RCM), Condition Based Maintenance (CBM), Preventive Maintenance (PM), Pro-Active Maintenance and many more. This paper will try to make sense of the bewildering range of maintenance concepts. It will give attention to:

a) Maintenance concept development during the last 50 years.
b) Maintenance concepts and their impact on:
   - Product quality
   - Productivity
   - Maintenance competence and experience
   - Profitability
   - Information

2. Integrated vibration-based maintenance (VBM)

Vibration Analysis is, next to Oil Analysis, certainly the most widely used Condition Based Maintenance technique in industry. But, although this is the case, much more can be made of vibration measurement as a means to improving maintenance effectiveness. This presentation will give attention to:

- Selection and improvement of the most cost-effective VBM policy.
- Maintenance cost-effectiveness: case study.
- Vibration signal analysis as quality assurance tool: case study.

3. The impact of lack of real-time measurement of performance parameters on VBM accuracy and effectiveness

Vibration Based Maintenance (VBM) case study

Laza Lazarevic

1. Integrated Total Maintenance Management

There is a number of well-established maintenance strategies / techniques in world-wide use. Examples of these are R.C.M., Predictive Maintenance, R.A.M., T.P.M., etc. Their objective is to ensure optimum efficiency and maximise life expectancy of the equipment used through timeous and cost effective maintenance intervention.

Unfortunately in today's dynamic, modern and technologically advanced world, one single maintenance strategy/ technique is not sufficient any more. The Engineer is faced with the challenge to integrate and implement various maintenance theories, philoso-

phies, strategies, techniques and systems, with non-maintenance factors playing a role as well. This is called Integrated Total Maintenance Management (I.T.M.M.). This is achieved by integration of Information Technologies, Risk Management principles, Traditional Maintenance techniques and Engineering Auditing systems.

Jan Myburg

1. New advances in maintenance information systems

During the last five or so years, we have witnessed how most commercially available maintenance information systems have matured and stabilised. Concepts and approaches, which were to a certain extent 'experimental' prior to this period, were tested. Those that proved to be sound and to the benefit of the harsh realities of the maintenance world were retained and refined. The effect of this maturing process was that most developers could shift the focus of further research towards better utilisation of state-of-the-art communications and database technology.

This holds the promise of designing and building information systems that properly reflects both the management and operational aspects of maintenance. It also implies that we as maintenance people should look at our discipline in a much more holistic fashion.

This paper summarises the current developmental state of maintenance information systems and focuses on some of the exiting new developments.

Pieter-Jan Vlok (PJ)

1. Replacement decisions based on the integration of Vibration Information and Failure Time Data

Replacement decisions are normally done on the basis of the minimisation of long-term cost of equipment ownership. One of the ways of solving this problem is by trying to establish when failure will take place based on the results of vibration measurements or some other condition parameter. Another way is by analysing the machine's failure time data using statistical techniques, so to determine the optimal time for repair or reconditioning. Both these methods have certain benefits and some areas in which they lack. Recently the best qualities of these two approaches were integrated successfully using the proportional hazards model, originally proposed by Cox (1972). This combined approach enables engineers to make much improved replacement decisions.

Registration Details

1. Complete and fax the registration form to M-Tech Consulting Engineers (Pty.) Ltd. (see payment details below).
   Use fax numbers (012) 667 4365 or (016) 932 2810. Please note that the number of delegates is limited.
2. Pay the required fee (R 3 000.00 plus V.A.T. per delegate) 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 Alternatively supply the necessary credit card details on your registration form.
3. Acknowledgement of your enrolment will be faxed as soon as both your form and payment have been received.
4. Mr Johan Nel (telephone (012) 998 7202) of the HSRC conference centre will assist you in finding hotel accommodation if necessary. Alternatively contact M-Tech. A map will be faxed to you if you request us to do so.
5. Inquiries should be directed to Suzette (012) 667 4013 or Sandra (016) 932 1629 (mornings only).
6. The conference fee includes conference notes, refreshments, lunches and cocktails.
7. 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.
8. 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.

World Trends in Maintenance Engineering
18 -20 August 1999

Registration Form

Delegate information

Title:..... Initials:..... First Name:.....

Surname:..... Position:.....

Conference fee payment details:

Person / Organisation responsible for payment: .....

Postal Address: .....

..... Postal Code:.....

Telephone:..... Fax:.....

Invoice for the attention of:.....

M-Tech to confirm registration to:.....

Person: .....

Telephone:..... Fax:.....

Payment amounting to R..... (R3 000,00 plus VA.T. per delegate) has been made to M-Tech's bank account Deposit slip attached

OR

Debit my / our credit card account

Master	VISA	Maestro

with R..... (R3 000,00 plus VA.T. per delegate)

1. I have read and agree to the conditions of entry as stipulated on the brochure.
2. I /We authorised my / our credit card company to debit my / our account as shown above with the amount specified. Alternatively, proof of payment into M-Tech's bank account is attached.

Signature of authorised person:.....

Date: .....