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Asset Management Study Tour to the UK, Canada and the USA
By Ken Gray, Manager Reliability Systems(?) , HEC **p.202**

'Tis the Season to be Jolly!

Greetings!

I hope that you have enjoyed and benefited from the SAM newsletter this year, and that you found our special "Showcase Season" of Guest Editorial Issues of interest. Our guest editors have made it possible to bring you a wider range of perspectives and I thank each and everyone of them. If you would like to consider the possibility of being a Guest Editor next year, please write to me for format and guidelines, I would welcome your interest.

Last year, at this time of joy, I brought you a special "Schadenfreude" issue – for those of us who take our joy in other people's (asset management) misfortunes. This year I address those of you who have it in your heart to be glad when someone, most deserving, gets the best of good fortune. And our two winners of the *1999 International Asset Management Competitions first prize and overseas study tour*, Ken Gray and Robert Houbaer, are definitely most deserving—and thoroughly nice people too.

In this issue, Ken tells us what his overseas study tour was like and what it has enabled him to do since his return.

Those of you planning an overseas study tour for yourselves may wish to get in touch with me for possible contacts in your field of interest. But please give me plenty of warning!

So enjoy Ken's report, have a great holiday, and come back refreshed for the true start of the Millennium in 2001. Now that I am fit again, I am determined to make the most of this break and I have lots of interesting ideas for you in the New Year.

Best Wishes,
Penny

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How do you get the most out of a study tour?

This is an annotated report by Ken Gray, Principal Engineer Reliability, Hydro Tasmania, on his overseas study tour, first prize in the AMQ International Asset Management Competitions 1999

Ed: Ken took detailed technical notes and, on his return he presented his organisation with a report covering (a) his general findings and action recommendations and (b) the technical notes that were taken during various meetings and presentations. This report for SAM readers is taken from part (a) of Ken's report.

"Hydro Tasmania entered an international competition based on a transformer asset management study and was unanimously selected by an international judging panel as the "AMQI (Asset Management Quality International) 1999 International Asset Manager of the Year". The prize for each of the joint authors of the paper was an overseas study tour.

For myself the UK was selected for a two-week study tour and this period was extended to include attendance at a CEA meeting and presentation of the "Power Transformer Asset Management" paper at HydroVision 2000 both in the USA. The opportunity was also taken to exchange views on asset management development with BC Hydro in Canada".

Ed: Shortly before his trip, Ken was promoted to the position of Principal Engineer, Reliability in the Generation Division of Hydro Tasmania; it is, therefore, fortuitous that his first stop in the UK, arranged by AMQ International, was with the Research Centre for Management of Industrial Reliability, Cost and Effectiveness (MIRCE) at the University of Exeter. MIRCE has been a sponsor of the Competitions since 1996 and has always given a warm welcome to our Competition winners, including them in its own program and arranging visits to companies relevant to the winner's interests. But this year was especially interesting as MIRCE have just moved into new premises owned by Nigel Mansfield!

The MIRCE Centre

"The Centre runs a number of short courses, a part time MSc Course in Logistics Engineering, a full time MSc Course in Reliability and Maintainability as well as an annual International Symposium and Industrial Summer School.

As an example the MSc Course in Reliability and Maintainability aim is:

- to provide an academically rigorous education in Reliability and Maintainability engineering
- to provide participants with an appropriate theoretical background against which they can examine their own work experience and practice
- to provide participants with a thorough understanding of the underlying principles of the science of Reliability engineering in order to improve their performance and effectiveness
- to introduce and develop the tools and techniques necessary to enable participants to effectively integrate the elements of Reliability and Maintenance based on a life cycle engineering approach

As a guest of the University I attended some of the lectures during the week on Design for Supportability, one of the modules that make up the Master of Science in System Operational Effectiveness.

Sixteen postgraduate students were in attendance from various private companies including Rolls Royce and British Aerospace. The students are all practicing engineers and study, on a part time module basis, the design for Reliability, Maintainability and Supportability (RMS) of assets with guest speakers for this particular module from the USA.

Students also made project presentations during the week that were open for critique. Further information on the centre for MIRCE and the Masters program are available on the Web.

MIRCE is a major sponsor of the AMQI overseas study award and the people at Exeter made me feel particularly welcome and special.

A feature of the week with MIRCE were the two field visits arranged for students and guests to link the concepts of the course, particularly reliability and maintainability, to some of man's most exciting, challenging and demanding endeavours."

"A visit to the Goss Challenger, Britain's biggest, fastest most hi-tech racing yacht under construction at Totnes near Exeter included. a presentation of the technical challenges facing the revolutionary designed catamaran.

The catamaran will compete in the non-stop dash round the world starting on 31 December 2000 to celebrate the Millennium.

The presentation emphasised the required reliability of the 115 foot craft that has a 60 foot beam.

A disastrous failure of one of the hulls occurred during sea trials earlier this year and an inspection of the repairs and strengthening to both hulls was made.

The second visit was to Nigel Mansell's world of Racing at Woodbury Park.

It was an inspiring and fascinating insight into the rise of the Formula 1 World Champion who is recognised as the most successful British driver in history.

Again the link was made between the required reliability and maintainability of a car and its components, enabling it to compete and win Formula 1 races.

Formula 1 is probably the ultimate form of high tech competition and this was vividly demonstrated with an expert talk surrounded by several of Mansell's Formula 1 cars and his numerous trophies.

Other Visits at Exeter

1. Time was spent with Dr Dragan Savic Director of the University of Exeter Water Systems Centre. This most interesting session described a research project to select an optimal design for the expansion, rehabilitation, reinforcement or rezoning of water distribution systems. The developed software provides a systematic examination and evaluation of a multitude of design alternatives.

The development and adoption of a genetic algorithm (GA) as the search technique was explained, together with some practical examples to demonstrate the power of the methodology. Very significant cost savings became obvious when design through genetic algorithm optimisation was applied to the expansion of large water distribution systems.

I left the session with Dr Dragan Savic wondering if the same methodology could be applied to the expansion, rehabilitation or reinforcement of power distribution or transmission networks.

2. Representatives from the Pall Corporation, a company based in Portsmouth, visited Exeter to demonstrate their vacuum process to remove moisture and particles from transformer oil. The "on-line" oil treatment process outlined in an excellent presentation by Pall Corporation representatives described the benefits, requirements and process for the "on-line" and "on load" treatment of transformers. Case histories to support the long-term benefits of this contemporary process were supplied.

The advantages of this mobile process together with other oil reclamation processes recently available on the Australian market deserve closer attention. Early implementation has the potential for significant benefit to Hydro Tasmania over the next couple of years and beyond."

Ed: Much can be learnt from those who do things differently, sometimes it provides new ideas for adoption, other times it confirms the direction your company is already taking.

Second Week in the UK

"The second week in the UK commenced with a visit to Castrol Burma's Head Office at Swindon, 75 miles West of London. Electrical Oil Services (EOS) representatives, who are associated with Castrol Burma, presented their process to reclaim transformer oil using an external heat vacuum process and molecular sieve.

Different to Australia, and Tasmania in particular, the UK transformer oil is normally transported to static processing depots for reclamation and then returned to the transformer.

As mentioned earlier an Australian process is available that uses a fully self-contained mobile rig to connect to an on site transformer and reclaim oil while the transformer remains on load. For Hydro Tasmania's needs this method of transformer oil reclamation is well suited."

Ed: And while some things do not always work out as you would hope, there are sometimes unexpected benefits.

"EOS UK representatives were unable to provide information on the long-term benefits of their type of oil processing, nor did they have any experience with mobile oil reclamation. Two issues I was hoping to discuss and confirm.

My second visit was to Alstom Transmission and Distribution, located at Stafford some 125 miles North West of London. *This was originally the home of English Electric from where many of Hydro Tasmania's mature power station electrical assets originated.*

Today the vast Alstom work site is home to an impressive assembly of designers and the manufacture of large power transformers and electrical protection equipment. Together with the assembly of high voltage switchgear Alstom employs a total of over 1500 people."

Ed: Australians are often well treated overseas and it pays to do your homework before you leave so that your hosts gain as much from you as you do from them.

"The General Manager of Alstom Transformers had arranged a full day of presentations on his company profile and he personally accompanied me on a detailed inspection of the transformer manufacturing works.

During the day a meeting had also been arranged to discuss asset management of aging English Electric switchgear that Hydro Tasmania want to maintain in a safe and reliable condition for five more years.

This discussion was very fruitful and has led to contact with owners of the same equipment in England. The owners have supported our suspect "root cause of failure" for these aging circuit breakers and a remedial option from England is under investigation. There is a high expectation that the desired reliable life extension to the switchgear can, and will, be safely achieved."

My final stop in England was a visit to a power distribution company that is applying innovative asset management to their transformers. "24 Seven" is the new name for London Electricity. Their business card states "brilliant people running world class utility services". I was advised that the name was to indicate that the company never shuts down in its endeavour to maintain service and continuity of supply.

24 Seven, is responsible for the management of 480 transformers in the London area rated from 15 to 90MVA with a voltage range from 132kV down to 6.6kV.

An innovative South African device has recently become available and can be installed on a new power transformer to reduce moisture absorption into the internal paper insulation. 24 Seven have been trialing this system on a 40 year old transformer to see if it can also remove the moisture that has gradually been absorbed over many years of operation into the transformer's internal paper insulation.

Following an inspection of a transformer under trial in London, a healthy exchange of information on transformer asset management took place. The six-month trial on the 40 year old transformer is not yet conclusive. It is interesting to note however that the company believes moisture is being removed and has ordered a further 15 systems for installation on other transformers.

24 Seven are also trialing "on line" moisture removal systems supplied from an English company that use crystals instead of molecular sieves.

Further investigation and implementation of this option, or other "on line" options, can provide higher transformer availability and reliability. A significant cost reduction would also be expected to Hydro Tasmania's present transformer refurbishment program, estimated at $6 million over the next 10 years.

Visit to the USA

HydroVision 2000

HydroVision 2000 was marketed as the year's single most significant gathering of Hydro professionals and practitioners from around the world.

Held over three days in Charlotte, North Carolina, HydroVision attracted nearly 1500 delegates and is actually seven conferences in one. Individual concurrent sessions are organised into "tracks" that enable a focus on a particular area of interest, or a mix and match of the sessions to address the issues most pertinent to your needs. In addition the spectacular Exhibit Hall housed nearly 200 hydro exhibitors and service providers all very eager to showcase their products and capabilities.

I attended a number of sessions in each track as well as presenting Hydro Tasmania's paper "Power Transformer Asset Management" (the basis of the winning AMQ International Asset Management Competition) to an audience of approximately 150 people. Hydro Tasmania's entry was one of four presentations accepted from over 50 entries submitted.

Discussion with the many exhibitors, networking with people from other hydro organisations and some assistance manning our own Hydro Tasmania booth completed the three days.

The most significant impression I had at the end of the conference was the contribution that new technology has made towards the development of smarter asset management. A number of initiatives discovered during the conference will be investigated further and recommended for management consideration.

Visit to Canada

My last stop was a visit to BC Hydro in Vancouver Canada where an excellent three-day program had been arranged to discuss asset management issues of common interest to both Companies."

Ed: Note BC Hydro has been very innovative in asset management and no doubt leads the hydro industry in North America. BC Hydro was also the first Canadian organisation to subscribe to the SAM newsletter!

"On the first day, at BC Hydro's Edmond office, presentations from a number of experts covered BC Hydro's methodology to develop an Equipment Health Index for generator, transformer and circuit breaker assets. Information was shared, and discussion established that both companies are following similar paths to understand asset life cycle curves and management."

"Of particular interest was:

BC Hydro's decision to use MICCA, a commercial software package developed by Iris Power Engineering, to determine the health and compare the condition of different generator components.

Also, the development by Powertech Labs of innovative software (Labsys) to determine the health of transformers from DGA and other data to produce condition reports. I was particularly impressed with this software that has been developed to meet a BC Hydro need and to my knowledge is not available elsewhere. More information is to come on this product that is in the development stage. The software is expected to be commercially available by late 2000.

A presentation from BC Hydro's Power Facilities group on "RCM - Enhanced Maintenance Program" concluded the day.

The most valuable time was an exchange of views on the asset management of SF6 switchgear and transformers. It was also established that both Powertech and Hydro Tasmania have come to the same independent view on the use of Furans to assess transformer condition.

Powertech's development of condition assessment software for transformers (Labsys), that was presented on day one, was discussed further with agreement that a beta copy of the condition assessment and reporting software would be forwarded to Hydro Tasmania for further assessment.

The Hydro Tasmania Stand at HydroVision 2000

From left to right: Roger Gill (GM Generation), Ken Gray (Asset Strategy Planning), Christina Giudici (Consulting Division), David MacGillivray (TimeStudio Rep, USA)

Recommendations

Apply the collective knowledge from this recent overseas study and earlier studies to review the 1999 Asset Management Plan for Power Transformers and incorporate the "on line" reclamation of transformer oil as the preferred refurbishment option. Significant potential savings can be expected from this review to reduce the planned $6million capital program for transformer refurbishment's over the next 10 years.

Carefully assess an RCM approach to maintenance and trial a pilot program. The trial would also assess the ability of an RCM package to integrate with our Works Management System.

Further study and assess for potential benefits the new ideas and software and hardware tools under development or now used by other Hydro companies visited. Assessment should also include the innovative ideas and tools demonstrated at HydroVision2000.

Foster and maintain the contacts and relationships established with people from various overseas companies and where possible encourage a visit to our Island State during future visits to Australia.

Conclusion

This extended study tour has provided stimulation and exposure to new ideas and techniques that are being developed or have been implemented in other organisations. These new ideas and techniques can also be applied with a potential cost benefit to Hydro Tasmania. Further study tours should be encouraged.

Thank you list

Dr Penny Burns of AMQI for organising the International asset management competition and making this overseas study tour possible. Penny's enthusiasm and passion for asset management is so infectious that you become part of her vision. Thank you so much for the opportunity to share a little of that vision.

Sinclair Knight Merz who sponsored the initial award that Hydro Tasmania won for Asset Management Excellence. Winning this award placed Hydro Tasmania in the running for the major International award.

To all the sponsors who contributed to the AMQI "1999 International Asset Manager of the Year" award to Hydro Tasmania, and the grand prize of an overseas study tour.

Dr Jezdimir Knezevic, Director of MIRCE, who sponsored the study week at the University of Exeter. A major sponsor of the AMQI study award, Dr Knezevic, together with Clive Nicholas and staff, provided a very special and memorable time into this UK University course and other organised activities.

Footnote

Ed: I asked Ken what were the major benefits that he had already had a chance to use. He said that his recommendations were already being put into practice, and in addition:

The assessment of various options to extend the reliable life of a particular type of aging switchgear. During my visit to the UK I discovered that one power company has developed and is presently installing a modification to overcome a design weakness in identical switchgear. Adopting this low cost option is one of several options presently under consideration by Hydro Tasmania.

The second benefit also under consideration applies a new technique for refurbishment of transformers. Discussion overseas has strengthened the concept to apply this technique to all Hydro Tasmania transformers with the potential for considerable savings over conventional methods.

Ken Gray (right) and his co-winner, Robert Houbaer