



EURODOBLE 2006

***Kensington Hilton Hotel,
London, UK***

The Doble conferences, colloquia and seminars are held throughout the world, the first meeting being 70 years ago in Boston, USA. Their common focus has been the exchange of information relating to the whole life care of power equipment. This colloquium follows this theme and attendance is open to all sectors of the power industry.

Key words- *Utility asset management, Regulation, Asset risk management, Diagnostic systems, Data collection, Database integration, and Decision support tools*

PROVISIONAL PROGRAMME

DATES

Sunday Tutorials - 15th October (am) and London tour (pm)

Open Colloquium- 16, and 17th October

Utility session- 18th October

Best practice workshops (members only)- 19th October (am),

EuroDoble committee meeting 19th October (pm),

The 2006 European colloquium is an opportunity to evaluate extent and outcomes of implementing asset management practices into utility procedures. The open market with its supply contracts has led to a greater focus on availability and performance of the installed assets. Yet much of the installed capacity is old, perhaps reaching times of increasing unreliability -when the climate is to maximise business value of the assets by ensuring adequate availability, safety and environmental care. This has led to a greater interest into asset management processes. But what is the progress in implementation and is it leading to measurable gains?

Whilst the core is asset-based, the range of interested parties is wide- from maintenance engineers, asset managers, OEMs, insurers and regulators. Consequently the meeting remit is intended to be broad ranging review of progress and involving HV equipment in all sectors of transmission, distribution and power generation. The focus is to provide technical papers and open discussion from the utilities, equipment suppliers, Presentations will be intended from key specialists in the area, but with interaction from all participants in order to achieve a rounded consensus in all areas.

**Sunday activities
15th October 2006**

- 10.00- 11.00** **Partial Discharge tutorial**
- 11.15- 12.15** **Forensic analysis during scrapping as an to aid transformer life management**
- 13.30- 17.30** **Coach tour of London**
- 18.00- 20.00** **Registration**
18.30- 20.00 **Reception**

Day 1

Formal opening 08.30h, 16th October 2006

WELCOME

- From Doble, Vegard Larsen, Doble TransiNor, Norway
- From the chair of the EuroDoble client group (Eddie Brynjebo, ElectroSandberg, Sweden)

OPEN SESSIONS

Theme 1-Keynote addresses– Managing the stakeholder interface

Our invited speakers will describe their perspectives on industry performance. This may range from the high cost of business interruption with influence on insurance and regulatory intervention to wider impact from shareholders, politicians and press.

- John Scott, Technical Director of OFGEM- “The regulators expectations- asset management challenges for the longer term”
- John Pettigrew, Director of Asset management, NGC- “Implementing asset management in a major utility”
- Don Schubert, Sr. Vice-president, Marsh- “ The evidence of best practice- the insurance viewpoint”

Theme 2 - Managing asset performance-

Asset management was introduced as a process to improve the utilisation of the assets and to maximise business value. **Both utilities and their stakeholders want to see the benefits – and to have methodologies to assess activities.**

Towards operational excellence- certifying asset management

JG Slootweg and GJMB Clemens, Essent Network, BV, Netherlands

Essent has implemented risk based asset management and has had its approach certified as PAS 55 compliant. The experience adopting changes and PAS certification will be described.

Benchmarking within Transmission Asset Management

Phil Haywood, National Grid, UK

In the absence of any or direct comparisons, governing bodies need to assess market rates, quality, and value for money. Benchmarking is used as an aid in making these value judgements. By systematic comparison against other transmission monopolies the evaluation of policies, strategies, process and practices can take place. Leading performers can be identified, and by sharing knowledge participants can accelerate along the continual improvement journey.

Asset Management in Perspective – Does it Work?

Peter Jay and David Gooda – Consultants, UK.

This paper reviews the real progress in asset management achieved by leading organisations, and discusses the successes and failures. It takes a practical look at some of the problems of implementing the theory, and identifies the initiatives that have really worked.

Network Risk analysis

Ursula Bryan, Zac Richardson, Michelle Clark, Gordon Wilson, National Grid, UK

Understanding and defining the risks to the Network are critical to performance.

Fundamental aspects of this work are embedded throughout National Grid's asset management processes. The approach and examples will be outlined in this presentation.

Linking Condition Assessment to Work Management a Critical Step

John Stead and Joe S Gilbert, AltaLink, Canada

Far too often work management systems are selected for the efficient manner in which they track cost, and provide reports but are traditionally weak in their ability to assess and track the changing conditions of our assets. Altalink has employed SAP to provide all aspects in the management of our maintenance program. This presentation will identify and quantify the value gained in the linking of an external algorithm and rules engine module complete in order to truly apply condition based maintenance.

Centralized system for automatic collection and evaluation of monitored HV equipment service conditions

D. Kopejtkova (CEPS, a.s.), P. Kopejtko (EGU HV Laboratory, a.s.), J. Velek (CEPS, a.s.)

The paper will describe the present state and the future of a centralized data collection and evaluation system (interconnected with SAP) being developed at CEPS. The system automatically collects data from substation control systems, transformer monitors and fault recorders. Special attention is paid to fault recorders data and to the associated expert system especially its module that makes possible to discover and to register circuit breaker re-strikes occurring both during their faults and during normal CB operations.

Power Transformers life extension through centralised, on-line monitoring of their functional parameters

Gabriel Tanasescu, CN TRANSELECTRICA – Romania

An accurate assessment of the remaining lifetime can therefore be an important tool in improving the reliability of transformers in service. The installation of a comprehensive monitoring system to warn in case of an oncoming fault is advisable for strategically important units. The paper presents a pilot project in one of Transelectrica's Subsidiary, (Sibiu), consisting in a centralized on-line monitoring system of power transformers parameters at the following levels: - Substation level - Subsidiary level - Regional Dispatching Centre - Company level

Theme 3- Implementing Change in Maintenance Strategies.

The evidence of implementation of condition based maintenance in networks

Changes in maintenance strategy are often proclaimed, but there seems little evidence that these are actually being implemented. This presentation is intended to promote discussions as to why progress is so slow.

- 1- The UK perspective- Martin Clayton, National Grid, UK
- 2- The Spanish experience- Santiago Ibañez López, Applus, Spain

Reliability Centred Asset Management for Electric Installations- from Theory to Practice.

Chris Jones, Siemens Transmission and Distribution, UK

Changes in maintenance and reinvestment strategies lead to immediate economic results and are therefore a favourable choice for cost savings. Asset management methods consider all these different aspects and try to find an optimal solution in the given framework. This paper presents an approach considering both component importance and component condition in a practice-oriented way concerning data extent and availability.

New Maintenance Strategies and Concepts for the Preservation of Operational Equipment

Andreas Busch Maschinenfabrik Reinhausen, Germany

The paper describes the main maintenance strategies and conclusions for the asset high voltage transformer and especially for the on-load-tap-changer itself. Examples for the different kinds of maintenance strategies are given by the author.

DAY 2

Session start 08.30h

Theme 4 Capital purchase -the Processes

Introducing the session- The need for effective capital purchase strategies

Alan Wilson, Doble PowerTest, UK

For some utilities the need is to obtain timely renewal of aged equipment; for others it is to provide a new infrastructure for national growth. For both the need is to ensure sound capital purchase, particularly where the factories are remote.

Quality Assurance of HV equipment in Union Fenosa Distribucion

Angel Ramos Gomez, Union Fenosa Distribucion, Spain

In the belief that the quality of manufacture has a very significant influence on lifetime reliability, UEF pay particular attention to the quality of the design and manufactures of its suppliers. This involves a defined QA process covering supplier approval and assessment of materials, handling, design, and confirmed through effective factory and post delivery testing.

Purchasing practices to ensure the quality for delivery of HV equipment

Oscar Martinez, Iberdrola, Spain

Reliability of Power Transformers

Wolfgang Knorr and Johannes Schnieders, Siemens Power Transformers, Nuernberg, Germany

Improving the reliability of power transformer materials

Francois.Devaux, Areva, France

The interaction of paper, wood and oil with moisture is one of the major deterioration processes in power transformers. Materials development is one way of improving the reliability of the generation of new transformers.

Life assessment techniques for rotating electrical machines

Chaturvedi Dhananjay, NTPC Ltd. India

The presentation will cover a few of the methods adopted for determining the thermal life of electrical insulation of rotating machine: -thermal endurance relationship, -operating voltage versus insulation life, -load versus temperature rise. It further suggests the monitoring of 'temperature rise' instead of 'absolute temperature' for electrical machines. It is prudent to note that the provisions in international standards facilitate us to increase the rating of existing machines by 5-20% just by adoption of provisions and guidelines and so leading to huge cost savings.

Post delivery support agreements

Martin Waller, National Grid, UK

A PDSA is a long-term agreement with a supplier to manage the in-service support for an asset. The issues of spares and obsolescence management are integral to the agreement, which is in effect a partnership with the suppliers to manage lifetime costing. National Grid now has 10 years of experience developing and using these contracts. The presentation will cover the constitution of a PDSA, differences between it and a maintenance contract and will explain their experience and some of the pit falls..

Acceptance testing for substation equipment

Adalsteinn Gudmannsson, Landsnet, Iceland

The Iceland transmission company has developed formal acceptance tests for new equipment. These are to be used by contractors on new or refurbished substations after installation and/or implementation.

Theme 5 –Diagnostics and maintenance for enhanced reliability.

Introducing the theme – Paul Jarman, National Grid, UK

One key role of asset management is to optimise the maintenance and replacement strategies. On-line continuous condition monitoring can provide valuable input to this process, but to be economic and effective it must be targeted and maintainable. When and what to install and the communications and hardware required are questions that can lead to differing perspectives between monitoring system suppliers and utilities.

A new method for Drying Power Transformers at Site - Example of a drying process used on a 315 MVA - 400 kV Step-up Transformer.

Michael Lukas, Vattenfall Europe Generation, Dipl.-Ing. Henryk Stürmer, BTU Cottbus, Center for Energytechnology Brandenburg, Dr.-Ing. Karl-Heinz Häger, Dipl.-Ing. (FH) Andreas Naundorf, AREVA T&D and , Dipl.-Ing. Benedikt Schmitz, AREVA T&D,

A new method for field drying oil-immersed cellulose insulation has been developed and results from the first experiences will be discussed. This process is called MVPA – Mobile Vapour Phase Process- and attempt to create conditions around a transformer in such a manner that a drying and regeneration of active parts can take place at site, similar to what was usually done in the factory and in major repair facilities.

Partial Discharge Measurements on Rotating Machines – facilitating enhanced maintenance strategies and asset management

A. Bolliger, E. Lemke, T. Strehl, S. M. Markalous, Lemke Diagnostics, Switzerland and Germany

The insulating system, amongst others, plays a decisive role for rotating machines reliability. Relevant diagnosis of the insulation condition is valuable indicator of integrity of installed assets and to ensure maximum availability and reliability of the equipment are the basis for asset management. Partial discharges (PD) is regarded a powerful, non-destructive and sensitive diagnostic tool to achieve these aims and can be carried out in an on- or off-line manner. Information can then be used for condition-based maintenance approaches, asset appraisements, support continuous risk assessment and help in the early detection of failures.

Partial discharge monitoring of distribution voltage switch rooms

Colin Smith and Patrick Fleming, IPEC, UK and Matthieu Michel EDF Energy, UK

Distribution Network Operators are driven by the need to prioritise the replacement of an ageing asset base whilst reducing Customer Minutes Lost (CML). This paper looks at recent developments that have made it economically viable to use permanently installed monitoring to achieve these goals. The case studies presented show examples where costly unscheduled outages have been avoided through the detection of insulation failure at an early stage and where an asset replacement program can be driven by data from permanent monitors.

Reliability Improvement for High Voltage Oil Transformers by Predictive Plan

Marius Grisaru & Kahalani Alon Israel Electric & Intel Jerusalem

It is important for mature factories to have effective preventive maintenance programs to avoid down time and production halt on time. This led Intel's Fab8 in Jerusalem to create a special aging excursion plan for their high voltage oil filled transformers. The breakthrough in this methodology is twofold: A) We have found a way to corroborate lab findings with actual physical evidence in the transformers and have thereby been able to make an accurate prediction of the urgency of maintenance. B) The lab results together with trend charts and the physical evidence provided management – which allocates the resources for the overhaul and decides on the timing of the treatment – sound data on which to base its decision.

Monitoring of Axial Clamping Forces at Power Transformers

Andrei Marinescu, ICMET, Romania

This presentation will describe a method to monitor clamping forces in a transformer during normal operation. In this way any changes occurring with relaxation during ageing, or as a result of fault current, can be identified on line.

Condition Based Ranking - A New Technique for the Management of Transformer Assets

Viktor Sokolov, ZTZ, Ukraine

Condition-Based Ranking is a method whereby a population of transformers is evaluated and then ranked in order of priority for maintenance, refurbishment or replacement. This is done on the basis of current condition, test data, transformer design and service history.

Condition-Based Ranking is a two-step procedure; an initial evaluation of the entire population is followed by more in-depth analysis of those transformers that have been identified as most at risk.

END OF 2-DAYS OF OPEN SESSIONS

**CLOSED SESSION,
FOR UTILITY GROUPS ONLY**

DAY 3

Session start 08.30h

Theme 6 Best practice

Delegates are invited to share some recent development that has led to improved performance. This could be some improved maintenance task, diagnostics or management practice.

CIGRE A2-27 Recommendations for condition monitoring and condition assessment facilities for transformers.

Paul Jarman, National Grid, UK

This CIGRE group has now completed a draft report and recommendations for what sensors and facilities should be fitted to new transformers to allow the easy application of condition monitoring and condition assessment testing. Some consideration has also been given to the outputs of condition monitoring systems.

Transformer asset life- the evidence from tear downs

Richard Heywood and Alan Wilson, Doble PowerTest, UK

Over the years Doble has been undertaking forensic examinations during scrapping. This has enabled a practical review of what elements within a transmission transformer age- and as a consequence the extent to which a simplistic time at temperature ageing model is substantiated

Shining Light on Transformer Insulation Condition

Gary Stevens, Henryk Herman, Patrick Baird - GnoSys UK Ltd and University of Surrey

TranSpec is a new technique to examine power transformer and other power plant electrical insulation condition using wide wavelength spectroscopic methods. This spectral response is directly related to the molecular properties of the paper and oil in the presence of water and this is strongly correlated to physical properties and readily gives a measure of paper DP, mechanical properties and water content and oil characteristics including PIONA and water content. The equipment is readily portable, and the results from laboratory measurements and a number of field trials will be presented.

Transformer diagnostics to ensure secure operation of transformers

Eddie Brynjebo, ElektroSandberg, Sweden

Business interruption costs and strategic impact of failure are increasingly important. The presentation will describe using a series of case studies how this is being used in Sweden.

Diagnostics Case studies –investigating transformer malfunction

John Lapworth, Doble PowerTest, UK

One of the key roles for off line diagnostics is to investigate trips or unusual oil tests. This presentation will describe a number of case studies demonstrating the effectiveness.

Theme 7 - Failures and malfunctions

Delegates are all expected to share the learning experience of one type of failure, within the categories listed below. Ideally they should be complete stories where the problem causing failure is known and, if appropriate, what consequent action is to be implemented.

The aim is to alert others of the problems being encountered. Presentations may be:

- A detailed description of one failure
- An overview of list of failures or significant malfunctions encountered in the year
- Failure rate statistics on some type of equipment
- How failures and troubles link to changes in strategies for maintenance or asset replacement

Within this context failures may be those listed:

- Failures during acceptance testing in the factory or during commissioning
- Failures early in the lifetime
- Failures associated with unusual operating conditions
- Failures associated ageing (premature or normal wear out)
- Failures avoided by some intervention

Doble Advice On testing for corrosive sulphur in Transformer Oil

Lance Lewand, Doble Engineering

Over recent months there has been considerable research into the best tests to reveal the likelihood that a new oil will turn corrosive and attack the conductor or deposit copper sulphide in the paper insulation. The traditional D1275B has a role but importantly there are new tests. One involves ageing covered conductor, oil and an amount of air in a sealed or breathing environment. The other looks for a particular sulphur compound that has been shown to break down and cause corrosive effects.

Failure of a 66kV transformer

Adalsteinn Gudmannsson, Landsnet, Iceland

Failure of a DC converter transformer

Trond Ohnstad, Statnett, Norway

This 3-month old unit failed recently- and the reason was very traditional- not due to corrosive sulphur.

Investigation of HV equipment composite insulators ageing phenomenon

Dagmar Kopetjkova, CEPS, V. Sklenicka (EGU HV Laboratory, a.s) Czech Republic
Silicone rubber is being increasingly used as a replacement for porcelain. CEPS-EGU HV Laboratory has evaluated the various ageing process, particularly the influence of location.

Case studies –using pollution monitoring to indicate insulator maintenance and cleaning intervals.

Vegard Larsen and Eirik Fornes, Doble TransiNor, Norway.

Insulator cleaning is an expensive activity and it is important to identify the timing for any requirement. Experience using surface leakage current measurements in several locations will be described.

DAY 4 (DOBLE UTILITY CLIENTS ONLY)
Session start 08.30h
MORNING ONLY

BEST PRACTICE WORKSHOPS

These two projects will have meetings run in parallel

PROJECT 1- CAPITAL PURCHASE

A questionnaire has been completed and returns will be examined. The questions covered types of specification, current scheme process, assessment of tenders, factory performance and capability assessment.

PROJECT 2- DGA SCORING

The group will be evaluating a method for assessing oil dissolved gas analysis. Members are expected to be bringing the calculations based on their past failures.

AFTERNOON

EURODOBLE CLIENT COMMITTEE MEETING