



Present their 5th Annual

2007 IndiaDoble Power Forum

“Optimising the Management of Assets Within the Power Sector”

16-18 January, 2007

The Taj Residency, Vadodara, India

The Doble conferences, colloquia seminars are held throughout the world, the first nearly 75 years ago in Boston, Massachusetts, USA. Their common focus has been the exchange of information relating to the whole life care of power equipment. This meeting follows the same theme, and attendance is open to all sectors of the power industry. You too, can contribute to the development of this important all-India event.

The 2007 IndiaDoble Power Forum is an opportunity to evaluate extent outcomes of implementing asset management practices into the procedures practiced by the power sector. Much of the utility industry's installed capacity is old, leading to questions about reliability. To maximise the business value of these assets, the company must ensure availability, safety, environmental care; hence, the need for processes to manage the asset risks.

The Indian economy is developing so rapidly that the need for reliable adequate power is critical to reaching the country's potential. The industry must invest rapidly effectively, for both expansion and replacement.

Rapid action creates stress not only in India, but worldwide as both India and China make demands on the international manufacturing base. These issues have led to a greater interest into asset management processes to ensure that the investment is effective and correctly focused. But what is the progress in implementation? Is it leading to measurable improvements?

The range of interested parties in this meeting is wide - includes maintenance engineers, asset managers, OEMs, insurers, regulators. Consequently, the meeting is intended to be a broad-ranging review of progress issues involving HV equipment in all sectors of transmission, distribution and power generation. The focus is to provide technical papers open discussion from the utilities equipment suppliers.

OPEN SESSIONS

Keynote address– Managing system growth performance

The Indian Government has set exacting challenges for the power industry, rightly so, since the growth of the economy is interlinked to availability of power. The issue is, however, broader than commissioning of new generation. It is to ensure a reliable adequate power delivery across the country, to load centres for industry commerce, whilst providing electrification to communities – all with due care for safety the environment.

Achieving the planned target also involves optimal loading or/and replacing aged equipment ensuring that both new and old meet their required performance. The speaker will describe the progress in implementing these plans for expansion of new build at all levels: in generation, transmission and distribution. Of particular interest to the attendees at our meeting will be a summary of how the government will assess the industry's performance.

Theme 1: Equipment manufacture

Government targets to meet India's power needs involve a massive capital investment programme. We especially welcome presentations from the equipment manufacturers describing how they are changing to meet this increasing challenge, for example:

- Improved design build in new power equipment. This may involve technologies new to India, such as Gas Insulated Substations, flexible power flow controllers, distributed generation, etc.
- Design solutions – or developing improved specifications - to problems more common to India, for example high ambient temperatures, altitudes, earthquakes, increasing per-capita consumption of power.
- Design solutions to overcome key types of equipment with specific high failure rates.

Theme 2: Power circuits

The lines cable circuits are the backbone of the transmission distribution network. Presentations are invited on topics such as:

- Developing the distribution network
- Designs conductor constructions to enhance transmission power flow
- Ratings thermal models for lines cables
- Tower design maintenance/ repair/ replacement of structures
- Diagnostics for identifying deterioration in cables accessories, or locating failures.

Theme 3: Substation Automation Protection

The powerhouse of the network lies in its substations, protecting them under adverse conditions is therefore extremely crucial. As the pressures on availability of power increase, so does the demand for efficient correct fault discrimination. Today, protection substation automation has seen considerable developments that help achieve active control data management. Presentations are invited on topics such as:

- Implementation of Substation automation IEC 61850 protocols
- Protection control systems, reliability, modernizing electromechanical relays with modern IEDs
- Commissioning testing protection systems.

Theme 4: Power transformers

The most expensive asset remains the power transformer, together with its tap changer bushings. Presentations are invited on topics such as:

- Methodologies for ensuring good capital purchase of equipment that can be installed for a long reliable life; appropriate process for evaluating tenders; the development of a basket of life cycle management features beyond first-time cost.
- Assessing the asset life of transformers - evidence from furans, forensic investigations degree of polymerisation testing.
- Assessing the influence on asset life from ambient temperatures, operating loads, oil condition (including moisture, corrosive sulphur), together with accessory performance (tap changers, bushings, cooling systems protection).
- Life management of ageing transformers, including assessment methods, comparison with new for units having had rebuilds or major refurbishment.
- Development use of diagnostics for on-line or off-line use, diagnostic databases, expert systems for analysis – their relationship to the range of defects found in transformers accessories.

Theme 5: Substation equipment

As the asset base has aged, we are learning more about the factors affecting asset life of key equipment types, quantifying the risk exposure through condition assessment health reviews business impact analysis, mitigation through focusing operating capital expenditure. Contributions are invited on these aspects as they relate to the wide range of substation equipment: circuit breakers, disconnectors, instrument transformers, capacitor banks, arresters, insulators, substation earthing.

- Materials issues- SF6 use management, silicone rubber, porcelain
- Most types of equipment are ascribed much shorter asset lives than in Europe. Papers are invited describing evidence that this is valid.
- Residual life assessments partial or mid-life refurbishments
- Advance purchase programmes to provide for spares cover, of relationship contracts for spares support.
- Progress in implementing maintenance strategies to improve business performance- the use of reliability condition based maintenance, improved diagnostics, outage management, energised working, outsourcing.
- Increased surveillance through developments application of diagnostic testing or on-line monitoring.

Theme 6: Power station equipment

One of the biggest international issues, certainly one attracting largest insurance claims, is the reliability of the generators:

- Reliability of rotating machines, diagnostics maintenance strategy
- Designs for machines their impact on performance- global VPI, resin rich, ability to use class F materials, core build, rotor materials their reliability
- Power station auxiliary supplies
- Life management of generators, including linking deterioration to diagnostic methods
- Development experience using diagnostics for on-line or off-line use, developing diagnostic databases, expert systems for analysis.

DAY 3

CLOSED SESSION, FOR UTILITY GROUPS ONLY

Theme 7: Reliability Analyses

This session provides for discussion regarding the collection analysis of failure or performance data and how this may be used for focusing expenditure in maintenance capital replacement:

- Reliability studies, failures, diagnostics, detection repair of lines cables
- Collection analysis of performance data for transformers in service- such as in service defects failure rates, (including problems arising in the first few years of use).
- Reliability data collection for circuit breakers, bushings, instrument transformers, surge arresters etc
- Collection analysis of reliability data for generators motors in service

Theme 8: Failures malfunctions

All delegates are 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 remit is wide: transformers, circuit breakers, instrument transformers, bushings, surge arresters, cables line fittings, insulators. On the power station, it may cover the generators, motors, cables switchgear.

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 selected type of equipment
- How failures 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 with ageing (premature or normal wear out)
- Failures avoided by some intervention