

# Doble has the answers.



**Global Power Services**  
Doble's Expert Consulting Division



**Doble Global Power Services<sup>SM</sup> is the name you trust with confidence for your Transformer, Rotating Machinery and Circuit Breaker needs.**

Doble Global Power Services<sup>SM</sup> is Doble's expert consulting engineering division. It was founded in 2002 in response to the electric power industry's need for knowledge-based solutions. Due to deregulation, downsizing and an ever shrinking experienced workforce, companies are increasingly looking to outsource to subject matter expertise based engineering firms for answers to their tough in-house problems. Doble Global Power Services leverages the resources of Doble's extensive library and experienced team of engineers in order to deliver the highest level of consulting services and knowledge-based solutions.

Doble has been the electric power industry's trusted information resource for over 85 years. Our knowledge base contains many decades of statistically significant data, including test data results on over 100,000 types of apparatus, manufacturers' service advisories, and thousands of documented client experiences in the form of case studies, technical reports and presentations. This information is invaluable to the Doble Global Power Services team when evaluating a client's situation.

Services have been provided for power plant applications (e.g., fossil, nuclear, hydro, geothermal), transmission & distribution substations (all voltages), industrial applications (e.g., aluminum, steel), and petrochemical applications.



**Doble Global Power Services offers the following for Transformers, Rotating Machinery and Circuit Breakers** (*see specifics within for each service*):

- Engineering Consultation
- Field Support
- Forensics Analysis/Root Cause Analysis
- Seminars & Training Events
- Testing Service
- Reference Library Material and more....



**Doble Global Power Services works in conjunction with other departments at Doble and other Doble offices worldwide, bringing together the resources necessary for the job.**





## Ensure Long Term Safe Operation & Reliability of your Circuit Breakers

Whether under normal operating conditions or abnormal fault conditions your breakers must function successfully when called upon. Failure to operate properly can have devastating effects on equipment and the power grid including black outs and browns outs.

Doble Global Power Services offers expertise for your circuit breaker needs including 75 years of insulation testing experience, 35 years of circuit breaker timing test experience and a staff of engineers specially trained in breaker maintenance, testing, and condition assessment.

For reliability performance of your electrical equipment, call Doble Global Power Services.



### Doble offers the following Circuit Breaker services:

- Power Factor (PF) Testing
- Motion & Timing Testing
- Acoustic Emission
- Partial Discharge (PD) Testing
- Dielectric Loss & Capacitance Testing
- Ductor Testing
- DGA on Oil Circuit Breakers
- Condition Assessment
- Acceptance Testing and more...



### Life of a Transformer Seminar

*"We had a 24-year-old transformer with some historical oil degradation and heating problems. That was before I attended Doble's "Life of a Transformer" Seminar in 2006 and gained useful transformer knowledge as well as a better understanding of Doble Global Power Services' capabilities. A worsening oil sample prompted me to have Doble Global Power Services evaluate the transformer. They conducted a series of tests: Power Factor, Sweep Frequency Response Analysis, Leakage Reactance, Dissolved Gas Analysis and other Laboratory tests. They also did an on-site internal inspection of the transformer and reviewed our historic test data. As a result, Doble Global Power Services was able to identify the issues the transformer was having. They also put me in contact with a substation service company to help with the internal inspection and the oil reclamation. Thanks to Doble we now know what needs to be done to keep our transformer going for at least another fifteen years."*

**Joe Morley, Engineering & Operations Manager of Braintree Electric Light Department**

### The Best Training Seminars in the Industry

Doble Global Power Services is also responsible for the creation of the "Life of a Transformer" Seminar—now considered the industry's Gold Standard for comprehensive knowledge on large power transformers. Over the last five years, over 2,000 delegates from 30+ countries have attended this one-of-a-kind intensive training event. Attendees come from all corners of the world, serving as proof of the incredible need for this information.

"According to a recent industry publication, 40% of electric utility engineers will reach retirement age over the next 5-10 years," remarked Richard Ladroga, General Manager of Doble Global Power Services, "While attending the IEEE Transformers Committee Meetings in Niagara Falls back in 2001, I looked around the room and it became startlingly clear to me: an entire generation of expert engineers would soon vanish from the workforce. How could we make sure their knowledge wasn't lost?"

In the United States, over the course of the past 100 years, critical knowledge concerning large power transformers was primarily gained through the interactions of electric utility engineers with US-based transformer manufacturers. "That landscape has changed dramatically over the past twenty years or so" according to Ladroga. Industry pioneers such as Westinghouse, General Electric, Allis Chalmers, McGraw Edison and others have dramatically decreased or ceased manufacturing large power transformers in the United States. The vast majority of large power transformers purchased for use in the USA are now supplied by manufacturers outside the US borders. Therefore the mechanism used to transfer tribal knowledge was altered significantly, and a large educational void appeared and continues to expand.

To meet this need, Doble Global Power Services developed the world's first—and best—knowledge crash course on all aspects of large power transformers, from cradle to grave. The course has developed a reputation for excellence, attracting the top experts in the world who present their knowledge in a rather intense fashion. The topics are arranged in a natural flow pattern, beginning with specification and design of a new unit, and finishing at failure analysis and end-of-life issues, while encompassing virtually every relevant topic in between. There is no other seminar in the world like "The Life of a Transformer"!



Illustration courtesy of Waukesha

Contact us at 1-617-926-4900 or [DobleGPS@doble.com](mailto:DobleGPS@doble.com).



## Transformer Expertise & Knowledge

Doble Global Power Services has been an entrusted name for over 85 years for your transformer needs. Doble's expertise in this field covers all aspects necessary to ensure the safe and reliable performance throughout the transformer's operational life cycle. A successful preventive maintenance program is one of the single most important elements to ensure equipment reliability. Improved equipment reliability yields returns on your investments, expands your bottom line and allows you to remain competitive in today's global economy. To help you with your equipment reliability and remain ahead of your competition Doble Global Power Services has three experienced transformer design experts on staff with the world's largest repository of knowledge at your disposal. The Doble data base has over 3 million sets of test records on file which provides valuable benchmark data.



When you think Transformer efficiency & reliability, think Doble Global Power Services.



## Prevent Failures and Optimize the Performance of your Rotating Machinery.

Rotating machinery operating under degraded conditions will only worsen over time; machines do not heal.



Doble Global Power Services has 25 years of Electromagnetic Interference testing experience, 75 years of Power Factor testing experience and a staff dedicated to testing and assessment of rotating machinery. Doble Global Power Services offers both on-line and off-line testing to supplement your maintenance strategies that can help save time and money by identifying specific areas that require maintenance, repair, replacement or validation of successful maintenance activities. On-line Electromagnetic Interference (EMI) testing and Partial Discharge (PD) testing has the ability to detect equipment degradations before they become issues after the very first test. The ability to determine what equipment may or may not require maintenance well in advance of planned scheduled outages can prove to be highly cost effective for the company's O&M budgets, and profitability.

## Doble offers the following Transformer services:

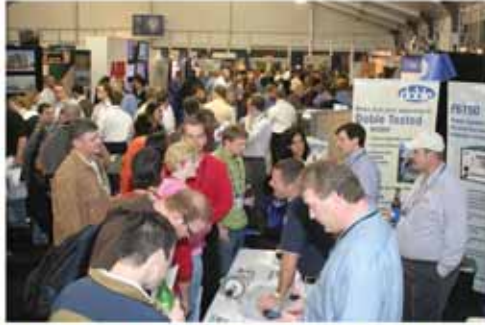
- *Specification Writing & Review*
- *Design Review*
- *Bid Coordination Services*
- *Owners Engineers*
- *High-level Field testing*
- *Electromagnetic Interference (EMI) Diagnostics*
- *Dissolved Gas-in Oil Analysis*
- *Factory Audits*
- *Factory Inspections*
- *Witnessing of Factory Tests*
- *Field Commissioning*
- *Condition Assessment*
- *General Consultation*
- *Forensic Analysis/Root Cause Analysis of failures*
- *World class "Life of a Transformer" Seminar and more...*

## Doble offers the following Rotating Machinery services:

- *Electromagnetic Interference (EMI) Diagnostics*
- *Power Factor (PF) Testing*
- *PF Tip-up on Stator & Rotor Windings*
- *On-line Partial Discharge (PD) Testing on Stator Windings*
- *Polarization Index*
- *Coil Dissection*
- *Root Cause Analysis on Failures*
- *World Class "Revolutionary Machines" Seminar and more...*

# Revolutionary Machines Seminar

Expanding on the continued success of the "Life of a Transformer" seminar Doble Global Power Services created the "Revolutionary Machines" Seminar in 2007. This is a 4-day technical event filled with sessions on theory, fundamentals, operating experience, maintenance practices, condition assessment, safety, forensic investigations/root cause analysis, vendor exposition and much more.



Doble Global Power Services and Doble Client Service Group – the Best in the Industry.

One of the goals for the seminar is to bring highly skilled and qualified subject matter experts together with engineers, technicians and managers from all industries to share knowledge and experiences. The presenters for this event are the leading representatives from OEMs, aftermarket, repair, testing services and insurance companies,

just to name a few. With an aging work force beginning to retire and rotating equipment reaching its end of life, finding experienced personnel with knowledge on designs and operations of rotating machinery is becoming increasingly difficult. The once readily available reference of engineers and specialists tribal knowledge is now on the wayside. Participants from all over the world attend this event. This seminar presents a unique opportunity to not only share this knowledge and experience, but also establish new contacts with colleagues and specialists. The information exchange promotes better understanding of rotating machinery and leads to better informed decisions for proper maintenance strategies. The expertise gained from this seminar has significant positive economic impacts on plant equipment and reliability in the competitive global market.

Lastly, you can earn IACET CEUs for this event by completing a quiz on the topics presented at the end of each day. A minimum accuracy of 70% is required to ensure the learning objectives have been understood.



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To be the "Best of the Best"  
in today's global economy,  
choose Doble Global Power  
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