



## “THE LIFE OF A TRANSFORMER” SEMINAR & EXPOSITION

Buena Vista Palace  
Lake Buena Vista, Florida  
Seminar: February 18-22, 2008  
Industry Expo: February 18 & 19, 2008

Saturday, February 16, 2008

2:00 PM – 7:00 PM      Registration Open

Sunday, February 17, 2008

8:00 AM – 5:00 PM      Registration Open

6:30 – 10:00 PM      Optional Activity *Sponsored by ABB*



TOGETHER WE POWER THE WORLD

Come and enjoy one of the finest movies ever made, in twin giant screens and surround sound!! We will show the movie in it's entirety on two large 13' X 17' screens, using state-of- the-art audio and visual systems. Grab your popcorn, and visit TITANIC again, in the quiet comfort and surroundings of your own movie theatre!! Screens so big, you'll feel like you're there!!



**Monday, February 18, 2008**

- 6:00 – 7:30 AM**            **Breakfast**
- 7:30 – 8:00 AM**            **Welcome Introduction & Opening Remarks**  
**Richard K. Ladroga, Doble Engineered Strategies**
- 8:00 – 9:00 AM**            **Transformer Specifications Writing, Standards, Economics**  
This popular presentation covers all aspects of specifying and purchasing a transformer. Key topics include standards, required information, unusual service conditions, ratings, vector relationships, loading, impedance, BIL, tap changers, operations, accessories, and much more. Additional topics include applications, operations, overloading, overexcitation, physical constraints, paralleling, short circuit capability, and shipping concerns. ANSI/IEEE, IEC, and CIGRE standards will be discussed.  
**David Harris, P.E., Waukesha Electric Systems**
- 9:00 – 10:00 AM**            **Materials**  
Materials and the manufacturing practices used to prepare and assemble them are the link between the engineer's conceptual design and the physical product that is actually built. Core steel, metal windings, insulating papers, cellulose products, insulating fluids, tank steel, shielding materials, adhesives, phenolics, rubber, and other materials will be discussed.  
**H. Jin Sim, P.E., Waukesha Electric Systems**
- 10:00 – 10:15 AM**            **Break**
- 10:15 – 11:30 PM**            **Special Presentation - The Making of a Transformer**  
A very in-depth, step-by-step look at the construction of a transformer, from raw materials to finished product. A large number of photos and illustrations will be used to graphically display each step in the process. Design principles and calculations will be also presented, including mechanical, electrical, and material design considerations.  
**Note: This presentation will be highly enhanced by an actual tour of a working transformer manufacturing facility later in the week.**  
**H. Jin Sim, P.E., Waukesha Electric Systems**
- OR**
- 10:15 – 11:30 PM**            **Corrosive Sulfur Focus Group Discussion – NEW!! (Parallel Offering)**  
Come and see what's new at the Life of a Transformer Seminar! We have added focus group "breakout" discussions this year, in every morning and afternoon period. Perhaps you have already heard the scheduled presentation, and wish to learn something new in an intense, relevant format. These focused sessions will allow for more in-depth discussion on the most important topics facing our attendees in the day-to-day performance of their duties related to transformers. Come learn and interact with our panel of experts and your industry colleagues, while discussing anything and everything that you wish to learn about. This is sure to be a big hit, don't miss out!!
- 11:30 – 12:30**                **Lunch**
- 12:30 – 1:15 PM**            **Comedian & Entertainer Adam Christing**  
***Sponsored by Waukesha Electric Systems***
- 1:15 – 3:00 PM**            **Special Presentation - The Making of a Transformer** *continued*  
**H. Jin Sim, P.E., Waukesha Electric Systems**



- 3:00 – 3:15 PM**      **Break**
- 3:15 – 4:15 PM**      **Special Designs – Generator Step-Up (GSU) Transformers**  
**Alfons Schrammel, Siemens Austria**
- OR**
- 3:15 – 5:15 PM**      **Electrical Diagnostics Focus Group Discussion – NEW!! (Parallel Offering)**
- 4:15 – 5:15 PM**      **Transformer Procurement & Factory Acceptance**  
**Anthony McGrail, Ph.D., National Grid US**  
Learn how to determine the requirements needed for your transformer, develop a bidder's list, and evaluating bids for manufacture. It is common to have an approved bidders list based on information from many sources: bidders who meet criteria for quality, have appropriate manufacturing processes and meet specified requirements make it on to the list; site visits and tours are an integral part of such an evaluation. There are many interfaces and criteria to specify, including timeliness of delivery for any single unit and ability to supply a series of units – and not every supplier may be able to meet those needs. Finally we must evaluate bids for a transformer: lowest cost, lowest cost with lifetime losses, another system? How do we factor in the manufacturers reputation, their ability to make transformers that do not need repair or their ability to meet acceptance tests without rework? These factors can all be added into the evaluation to reduce risk both to the buyer and to the seller
- 5:15 – 6:00 PM**      **Question & Answer Period**  
Pre-submitted and new questions from the floor will be presented and answered by a panel of experts. **“ASK DOBLE” questions & answers will be presented as well.**
- 5:30 – 8:00 PM**      **Manufacturer’s Exposition**  
Approximately fifty (50) of the industry’s top manufacturers will be on hand to provide answers to your questions, increase your knowledge with demonstrations, present you with promotional materials and product catalogs, and help you develop new contacts. Don’t miss this opportunity!
- 7:30 – 10:00 PM**      **Hospitality Suites – By Invitation**  
Hospitality Suites offering informative presentations and dinner are being offered by:
- TBEA Transformers – a Chinese transformer manufacturer
  - Doble Engineered Strategies (DES) – Doble’s expert consulting and Condition Assessment service.
- Space is limited for these so stop by the Doble Registration Desk to sign up in advance.

**Tuesday, February 19, 2008**

- 6:00 – 7:45 AM**      **Breakfast**
- 7:45 – 8:45 AM**      **Special Presentation –**  
**Factory Inspections and Factory Approval in a Global Market Environment**  
Learn about the need for factory visits. Different stages of manufacture will be discussed, including Core & Coil, Pre/Post Vapor Phase, Pretanking, and Factory Test. This presentation will teach you the details of each of these critical manufacturing milestones, and more importantly, what you should be looking for when you conduct an inspection, including how to assess a manufacturer’s Quality Assurance program.  
**Axel Kalt, ABB Germany**



- 8:45 – 9:45 AM**      **Factory Testing**  
Learn about the various tests specified and performed to ensure a quality product. Learn **why** you need to attend and witness factory testing, and learn **what** you should be looking for. ANSI/IEEE C57.12.00, C57.12.90 standards will be presented.  
**William R. Herron III, ABB**
- 9:45 – 10:00 AM**      **Break**
- 10:00 - 11:00 AM**      **Site Design**  
Site selection, soil mechanics, grading, bearing and jacking loads, transformer foundation and containment design, SPCC guidelines, 40CFR112, deluge systems, blast walls, cooling considerations. New code guidelines will be presented!  
**Curtis Smith P.E. & Mark Juneau, Black & Veatch**
- OR
- 10:00 – 11:00 AM**      **Transformer Bushings Focus Group Discussion - NEW!! (Parallel Offering)**
- 11:00 - 1:30 PM**      **Lunch & Manufacturer's Exposition** Up to 50 of the industry's top manufacturers will be on hand to provide answers to your questions, increase your knowledge with demonstrations, present you with promotional materials and product catalogs, and help you develop new contacts. Don't miss this opportunity!
- 1:30 - 2:30 PM**      **Transportation & Rigging**  
Today's large units typically come from overseas or across US borders. Learn about oceanic, rail, barge, and flatbed shipment and handling. Topics also include safe rigging methods, permitting, US rail issues and restrictions, and much more.  
**Shaun Sipe, P.E., Barnhart Crane**
- 2:30 – 3:15 PM**      **Impact Recorders, Transformer Acceptance, Transformer Installation, Oil Processing, Commission Testing**  
Shipment receipt, impact recorders, acceptance testing, internal inspections, field dressing – pumps/radiators/coolers/gauges/controls, equipment requirements, oil filling, hold times, energization - includes presentation of oil processing techniques, core/coil heating, vacuum requirements, moisture limits, water removal, cold traps, filtration, field processing rigs, site requirements, and much more!  
**Troy Kabrich, Waukesha Electric Systems**
- 3:15 - 3:30 PM**      **Break**
- 3:30 – 4:30 PM**      **Impact Recorders, Transformer Acceptance, Transformer Installation, Oil Processing, Commission Testing *continued***  
**Troy Kabrich, Waukesha Electric Systems**
- OR
- 3:30 – 5:00 PM**      **Distribution Transformers Focus Group Discussion – NEW!! (Parallel Offerings)**
- 4:30 – 5:00 PM**      **Question & Answer Period**  
Pre-submitted and new questions from the floor will be presented and answered by a panel of experts. **“ASK DOBLE” questions & answers will be presented.**
- 5:15 PM – 5:45 PM**      **Bus transfer to the Orlando Science Center**

5:45 PM – 9:00 PM

**TITANIC – THE EXPERIENCE at the Orlando Science Center**

*Sponsored by ABB*

Dinner provided



This world-famous exhibition features full-scale recreations of the ship's most famous locales along with historians in period costume portraying the ship's designers, officers, crew and passengers; Titanic – The Experience will offer a rich interactive examination of the history and science behind the "ship of dreams."

**Wednesday, February 20, 2008**

6:00 – 7:45 AM

**Breakfast**

7:45 – 8:45 AM

**Transformer Oils**

This presentation will discuss the origins of transformer oil from crude to refined oil, various types, manufacturing processes, inhibitors, and oil quality.

**Helene Odelius, Nynas Naphthenics**

8:45 – 9:45 AM

**Natural Ester Based Dielectric Fluids**

This presentation discusses the use of vegetable based transformer oils. Thermal operation, viscosity, dielectric strength, voltage classes, use of organic oils in new units, and also conversion of existing units from petroleum based products will be discussed.

**Don Cherry, ABB**

**Patrick McShane, Cooper Power Systems**

9:45 – 10:00 AM

**Break**

10:00 – 12:00 AM

**Special Presentation – Load Tap Changers**

This special presentation has been expanded to almost 2 hours due to the high interest and demand of previous attendees. The various types of LTCs are presented, along with operational principles, pros and cons, maintenance practices, common failure mechanisms, testing, repairs, and replacement.

**Craig Stiegemeier, ABB**



OR

- 10:00 – 12:00 AM **Transformer Maintenance, Repair, Operations, & Loading Focus Discussion Group - NEW!! (Parallel Offering)**
- 12:00 – 1:00 PM **Lunch**
- 1:00 – 2:00 PM **Power Transformers – Drying By Hot Oil Spray**  
**António Ferreira da Silva, EFACEC Portugal**
- 2:00 – 10:00 PM **GENERAL ELECTRIC FACTORY TOUR**

**Thursday, February 21, 2008**

- 6:00 – 7:45 AM **Breakfast**
- 7:45 – 8:45 AM **Surge Arresters**  
Surge arresters are a very valuable but often overlooked consideration of transformer protection. This presentation will feature ANSI/IEEE C57 arrester standards, selection criteria, types and classes, characteristics, problems, test methods, affects of lightning, surges and pollution, life expectancy, and failure modes.  
**Michael Comber, Hubbell**
- 8:45 – 9:45 AM **Transformer Cooling Systems**  
This presentation includes discussion of pumps, coolers, fans, unit uprating, US and International standards, ancillary and auxiliary systems, thermal constraints, ambient conditions, loading, dynamic modeling, design limitations, leak repairs, and maintenance.  
**Richard Amos, Unifin**
- 9:45 – 10:00 AM **Break**
- 10:00 – 11:00 AM **Control Cabinets & Gauges**  
Today's control cabinets are highly complex components filled with a multitude of monitoring and control equipment. This presentation reviews the various monitoring systems available, along with controls, cabinet layouts, gauges, alarms, and operations.  
**Bill Griesacker, Pennsylvania Transformer**

OR

- 10:00 – 11:30 AM **Field Repair, Failure Analysis, Teardown, Scrapping Focus Group Discussion – NEW!! (Parallel Offering)**
- 11:00 – 12:00 PM **On-Line Transformer Monitoring Systems**  
This presentation discusses the latest systems used to monitor transformers while in operation, including gas analyzers, moisture detectors, fiber optic winding temperature measurement, tap changer monitoring, cooler control, fan operation, an alarm indication.  
**Mark Tostrud, Dynamic Ratings**
- 12:00 – 1:00 PM **Lunch**  
**Harley-Davidson Giveaway!!**  
**Sponsored by A-Line EDS**



- 1:00 – 3:00 PM**      **Special Presentation - Transformer Field Diagnostics & Condition Assessment**  
Including Oil and Dissolved Gas analysis, Transformer Turns Ratio, Megger, Power Factor, Capacitance, Leakage Reactance, Winding Resistance, Excitation Current, Sweep Frequency Response Analysis, Thermography. ANSI/IEEE standards will be presented. Diagnostic case studies will be presented.  
**Paul Griffin & Robert Brusetti, PE; Doble Engineering**  
**Jon L. Giesecke, JLG Associates, LLC**
- 3:00 – 3:15 PM**      **Break**
- 3:15 – 5:00 PM**      **Special Presentation - Transformer Field Diagnostics & Condition Assessment**  
*Continued*  
**Paul Griffin & Robert Brusetti, PE; Doble Engineering**  
**Jon L. Giesecke, JLG Associates, LLC**
- OR**
- 3:15 – 5:00 PM**      **Open Forum – Anything Transformer Related Focus Group Discussion - NEW!!**  
**(Parallel Offering)**
- 5:00 – 5:30 PM**      **Question & Answer Period**  
Pre-submitted and new questions from the floor will be presented and answered by a panel of experts. **“ASK DOBLE” questions & answers will be presented.**
- 5:30 PM**      **Adjournment**



## Optional Fifth Day Lab Seminar –

### “Electrical Apparatus Condition Assessment Using Laboratory Diagnostics”

Friday, February 22, 2008

6:30 – 7:30 AM

**Breakfast**

7:30 – 4:15 PM

#### **Transformer Condition Assessment Using Laboratory Diagnostics**

Provides a thorough understanding of how to assess the condition of electrical insulating materials and transformers.

**Paul Griffin & Lance Lewand, Doble Engineering Company**

**Dissolved gas-in-oil analysis** – This is the single most important diagnostic test for transformers. This presentation reviews how the test is performed, how to distinguish between normal gassing behavior and problems, and how to evaluate trends. Practical case studies and examples are used to illustrate theoretical concepts. Seminar participants will be quizzed (with class participation) on their understanding in diagnosing 12 cases. Dissolved combustible gases in oil do not typically cause problems but can form flammable mixtures. This session discusses how to determine the flammability of combustible gasses and precautions to take.

**Water in Transformer Oil** – Assessing how dry a transformer is requires more than a water in oil test. Learn how to assess the wetness of the transformer insulation system and why you need to know the operating temperature at the time of sampling. This session discusses water migration in transformers and how water affects the ability to overload them. Examples are provided.

**Condition assessment of cellulosic insulation** – The analysis of the condition of the paper insulation has changed quite a bit in the past 10 years. Learn how the solid insulation ages and how to assess the condition of the paper and pressboard insulation and its remaining life. Case studies are given to illustrate the distribution of paper aging in transformers and how operation and maintenance can influence it.

**Metals in oil** – This presentation provides an understanding of the importance of metal-in-oil tests as a diagnostic. To be able to use the information, the correct test must be specified – learn the difference between dissolved and particulate metals and when to choose each test. Case studies are given.

**Quality of new and service aged oils** – Background information is provided on the properties of transformer oil including how to specify and evaluate new oils, what tests to perform and how to evaluate in-service oils.

**Aging characteristics of insulating materials** - This part of the session provides information on how to increase the life of transformers. There are a number of factors that accelerate the aging of the insulation system that can be controlled. This session provides information on when to reclaim or replace oil and gives specifications for reclaimed oil.

**Load tap changer and bulk oil circuit breaker diagnostics** – This presentation gives the latest information on diagnostics for LTCs and OCBs, how to diagnose DGA results and some of the pitfalls to avoid. Case studies are provided.



**Sampling** – The presentation discusses how to save money on your sampling program through proper training and what common pitfalls to avoid. Proper sampling preparation, practices, and equipment are given.

**Note:** *There will be a coffee break mid-morning, a lunch and a mid-afternoon coffee break.*

**4:15 – 4:45 PM**

**Question & Answer Period**

Pre-submitted and new questions from the floor will be presented and answered.

**4:45 – 5:00 PM**

**Adjournment**