



Circuit Breaker Seminar

Test & Maintenance Training

October 2-6, 2017 | Pittsburgh, Pennsylvania USA



PRELIMINARY AGENDA*

**subject to change*

Sunday, October 1, 2017

12:00 PM - 6:00 PM **Registration & Information Desk**
William Penn Ballroom Foyer

Monday, October 2, 2017

7:00 AM – 6:00 PM **Registration & Information Desk**
William Penn Ballroom Foyer

7:45 AM - 9:00 AM **Opening Breakfast**
William Penn Ballroom

9:00 AM – 9:15 AM **Welcome & Opening Remarks**
Bryan Sayler, President
Doble Engineering Company

9:15 AM – 10:45 AM **Circuit Breaker Fundamentals – An Introduction**
Jozef Levi, Application Engineer
Doble Engineering Company

The fundamentals of circuit breaker testing will be discussed - including test planning and preparation, best practices for setup and testing, some common issues encountered, and key points of test result analysis. Selected lessons learned over years of field experience will be included throughout the presentation, and using several case studies.

Jozef Levi is an Application Engineer for circuit breaker testing and TDR test instruments at Doble Engineering Company. He earned a diploma in electrical engineering from the Electro-technical Faculty of the University of Sarajevo in 1973. A designer of SF6 circuit breakers and high voltage disconnects switches, Mr. Levi's career spans more than 30 years. Before joining Doble in 1999, he worked with the Energoinvest Electrical Institute in Sarajevo; Energomex in Mexico City; and E Manufacturing in Mentor, Ohio. Mr. Levi has special interests in the fields of electrical contacts for high voltage circuit breakers and disconnecting switches. He is the holder of a US disconnecting switch patent and teaches courses in the mechanical testing of circuit breakers.

10:45 AM – 11:15 AM **Morning Break**
William Penn Ballroom

11:15 AM – 12:00 PM **To Be Announced**

*as of June 27, 2017. Subject to change.



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12:00 PM - 1:00 PM

Lunch

Sternwheeler & Riverboat

1:00 PM - 2:00 PM

Testing Circuit Breakers – What’s in Your Toolbox?

Joseph Brown, Technical Application Engineer

Doble Engineering Company

Most of us are probably familiar with the basic concepts of breaker timing and motion analysis – but there are other tools in the toolbox when it comes to testing circuit breakers in the field. This session will provide an overview of a number of testing methods that can be used to analyze the health of your breakers.

Joseph Brown is a Technical Application Engineer for Doble Engineering Company. During his twelve years with Doble he has worked primarily the area of client support, providing on-site training and over-the-phone technical support to Doble’s clients. Prior to joining Doble, Mr. Brown held positions in an aluminum mill where he worked as a Plant Engineer, in a steel mill where he was a Power Department Supervisor, and at a transformer manufacturing plant where he was a Core-Form Transformer Design Engineer

2:00 PM – 3:00 PM

Testing and Maintaining Oil Circuit Breakers

Mike Wolf, Senior Engineer

Doble Engineering Company

This presentation will cover oil circuit breaker basics and what the normal, routine maintenance tests tell us about the breaker. Most of the focus will be on the question "what now?" after initial testing is complete. If test results aren't acceptable, what steps should be taken and where should the remaining maintenance be focused? Depending on which tests results are poor, specific diagnostics can be performed to identify what components are influencing the results. Many other considerations that need to be made throughout the testing and repair process will be reviewed.

Michael Wolf, PE has a BSEE from Clarkson University, a MEPSE from Worcester Polytechnic Institute, and is a licensed electrical engineer. He has been in the power industry since 2008, working on the design, operations and maintenance, and commissioning of power substations and substation equipment. He worked as an Engineer IV in FirstEnergy's Transmission and Substation Services department in Greensburg PA prior to joining Doble Engineering Company in 2017.

3:00 PM – 3:30 PM

Afternoon Break

William Penn Ballroom

3:30 PM – 5:00 PM

Understanding Apparatus Controls – Part I

Rick Youngblood, Principal Engineer

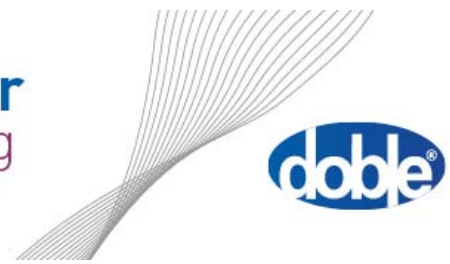
Doble Engineering Company



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This two-part class begins with the development of control circuitry including control theory fundamentals, parts identification and understanding how the physical action of position, pressure, time and flow is converted into electrical signals.

The second section of the class will be offered on Wednesday morning and include control schemes and how the development of trip, close, and reclose circuits work. You will learn how to troubleshoot each circuit to determine the bad action or component to reestablish proper breaker function.

Rick Youngblood's engineering career spans more than three decades. After leaving active duty from the Air Force he joined Cinergy Corporation (then known as Public Service of Indiana) as an entry level engineer. After receiving his BSEE from Purdue University he was promoted to Project Engineer and then Manager of Technical Services in their Northern Division responsible for construction, maintenance and metering. After merging with Cincinnati Gas and Electric and forming Cinergy Corporation, Mr. Youngblood became Senior Engineer responsible for implementing their CMM System "Maximo" and developing their condition-based maintenance program. He went on to become Supervising Engineer for Substation Services. In 2004 Mr. Youngblood joined American Electrical Testing Company as Regional Manager of their Midwest office. He obtained his NETA 3 certification and went on to perform maintenance and testing in utility and industrial environments. He joined Doble Engineering Company in 2010 as Principal Engineer in the Client Service group.

6:00 PM – 8:30 PM **Welcome Reception**
17th Floor – All are welcome to attend

Tuesday, October 3, 2017

6:30 AM – 6:00 PM **Registration & Information Desk**
William Penn Ballroom Foyer

6:30 AM – 7:30 AM **Breakfast – Hosted by MEPPI**
William Penn Ballroom

Circuit Breaker Seminar attendees have the opportunity to visit the MEPPi manufacturing facility. **Some restrictions apply and final confirmation is subject to approval by MEPPi.**

7:30 AM – 5:00 PM **MEPPI Factory Tour**
Warrendale, PA



Full-day trip to the MEPPi manufacturing facilities located in Warrendale, PA. This location is their center for product service and training. During the day there will be demonstrations of MEPPi's product line and equipment and a variety of training opportunities. Lunch will be provided on the tour. Return to the Omni William Penn is scheduled for approximately 5:00 PM.



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Note: This full-day tour is for conference attendees only. Exhibitors and competitors are not able to attend. Confirmation of tour participation is subject to final MEPPi approval and will be provided in advance of the conference.

5:30 PM – 8:00 PM **Industry Expo Opening Reception**
17th Floor Ballroom

6:30 AM – 6:00 PM **Registration & Information Desk**
William Penn Ballroom Foyer

6:30 AM – 8:00 AM **Breakfast**
Sternwheeler & Riverboat

8:00 AM – 8:45 AM **Understanding Apparatus Controls – Part II**
Rick Youngblood, Principal Engineer
Doble Engineering Company

This is the second section of Monday afternoon's introductory class. In this session students will learn about control schemes and how the development of trip, close, and reclose circuits work as well as how to troubleshoot each circuit to determine the bad action or component to reestablish proper breaker function.

Rick Youngblood's engineering career spans more than three decades. After leaving active duty from the Air Force he joined Cinergy Corporation (then known as Public Service of Indiana) as an entry level engineer. After receiving his BSEE from Purdue University he was promoted to Project Engineer and then Manager of Technical Services in their Northern Division responsible for construction, maintenance and metering. After merging with Cincinnati Gas and Electric and forming Cinergy Corporation, Mr. Youngblood became Senior Engineer responsible for implementing their CMM System "Maximo" and developing their condition-based maintenance program. He went on to become Supervising Engineer for Substation Services. In 2004 Mr. Youngblood joined American Electrical Testing Company as Regional Manager of their Midwest office. He obtained his NETA 3 certification and went on to perform maintenance and testing in utility and industrial environments. He joined Doble Engineering Company in 2010 as Principal Engineer in the Client Service group.

8:45 AM – 9:45 AM **Maintenance Done Right**
Jim McLean, Director of LTC Business
North American Substation Services

Jim McLean is the Director of LTC Business for North American Substation Services LLC. He has held key positions in the service, sales and marketing areas for Reinhausen Manufacturing and Waukesha Electric Systems. Mr. McLean has 30 years of experience in the service and support of manufacturing, maintenance and field operations plus 16 years of experience in Field Service Management. He has traveled the United States, Canada, the Caribbean and Europe as a computer programmer specializing in interface and communications. Mr. McLean is a training class developer and instructor for LTC training classes where he



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has instructed over 120 classes and 950 students across the United States and Canada. He has traveled to Venezuela to lead in a LTC failure analysis. Mr. McLean enjoys working with youth sports and teaching proper techniques for football and basketball. He is the past President, V President and Senior Division V President for Medina Football & Cheerleading League where he led in the activities of 12 youth league football and cheerleading teams. He has been a head basketball coach with the Boys & Girls Club of America in North Carolina. He is an active board member of the local high school athletic booster club. Mr. McLean is originally from North Carolina where he attended both Central Piedmont Community College and Gaston College.

9:45 AM – 10:15 AM **Morning Break**
William Penn Ballroom

10:15 AM – 11:00 AM **Lubrication Techniques for Circuit Breaker Mechanisms**
Jack Harley, CEO
FirstPower Group LLC

Functional operation of many older circuit breakers may be effected by the condition and type of lubricants used in the mechanism and the method of lubricant application. Options for lubricant selection and factors to be considered for different components and environments will be presented. Selection and application factors are based on field observations, laboratory and simulator tests and best practices.

Jack Harley is President of First Power Group LLC, which provides services to transmission substations of electric utilities and large industrial users of electric power. Mr. Harley is active in the IEEE Transformers Committee and IEEE Switchgear Committee and is a member of CIGRE.

11:00 AM – 12:00 PM **Inside a Circuit Breaker: Breaker Elements, Maintenance, Repair & Replace Considerations**
Finley Ledbetter, CEO & Chief Scientist
Group CBS Inc.

Finley Ledbetter (Presenter) is the Chief Scientist for Group CBS, Inc. with over thirty-five years of power systems engineering experience, a member of the IEEE, and past president of PEARL.

12:00 PM – 1:30 PM **Industry Expo & Lunch**
17th Floor Ballroom

1:30 PM – 2:15 PM **SF6 Overview**
MEPPI

2:15 PM – 3:15 PM **SF6 Handling & Challenges**
Lukas Rothlisberger, CEO
DILO Company, Inc.



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With mandatory greenhouse gas emissions reporting now being a reality for many SF6 users, owners of GIE (Gas Insulated Equipment) now more than ever are looking to eliminate SF6 handling problems that can lead to reportable SF6 losses and GEI problems. This presentation will address all aspects of SF6 handling: Gas samplings, proper connecting procedures, eliminating handling emissions, correct vacuuming techniques and safe filling practices. Comprehensive general safety protocols as well as record keeping requirements for State and Federal emission monitoring will also be discussed. Major challenges and problems associated with SF6 gas inventory management will also be addressed as will the question of new vs. recycled SF6.

Lukas Rothlisberger has worked for DILO Company since 1996 and as CEO is currently responsible for all of DILO's operation in the Americas. He is a member of various SF6 related Task Forces for organizations such as IEEE, CIGRE, IEC and NEMA. Mr. Rothlisberger is one of the authors of the CIGRE SF6 Recycling Guide and has written numerous technical papers on proper SF6 handling techniques. Speaking engagements and clients include Doble, Finepoint, IEEE, and most domestic Electric Utilities. He has over 18 years of experience assisting Electric Utilities in establishing their own SF6 handling guidelines and has trained countless personnel how to safely work with and reduce and eliminate SF6 emissions.

3:15 PM – 3:45 PM **Afternoon Break**
William Penn Ballroom

3:45 PM – 6:00 PM **Diagnostics Using Infrared & SF6 Camera Technology**
Ed Kochanekwol, Eastern Region Sales Director
FLIR Systems, Inc.

This popular presentation addresses two main issues in a substation: Obtaining an accurate temperature measurement; and how to use a FLIR GF306 camera to detect SF6 gas. We will look at what the effects of emissivity, reflectivity and distance have on temperature measurement; the typical applications in a substation and what to look for that would indicate a problem; and how to use a thermal camera to detect SF6 leak and how to get the most out of that camera.

Ed Kochanek is Director of Sales Eastern Region for FLIR in the Test Division. Mr. Kochanek holds a Level 1 thermography certification through the Infrared Training Center in Nashua NH. He has been with FLIR for over 15 years working with customers in the utility industry helping them to select the best thermal camera for their application and instructing them on how to get the most from their investment.

6:00 PM – 8:00 PM **Industry Expo & Reception**
17th Floor Ballroom

8:00 PM – 11:00 PM **Casino Night – Hosted by DILO Company & DILO Direct**
Mezzanine Level



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Thursday, October 5, 2017

7:00 AM — 5:00 PM **Registration & Information Desk**
William Penn Ballroom Foyer

7:00 AM – 9:00 AM **Breakfast**
Sternwheeler & Riverboat

9:00 AM – 5:00 PM **How Things Work – Day of Hands-On Learning & Demonstration**

Major circuit breaker manufacturers walk attendees through how major apparatuses work, common problems and best practices. You can view the apparatuses up close, discuss the most common technical call issues and ask the experts questions in small, rotating groups throughout the day. Participating manufactures include:

- **ABB**
- **GE**
- **Hitachi T&D Solutions, Inc.**
- **MEPPI**
- **Parts Super Center**
- **Siemens**
- **Southern States**

Important Note: *These demonstrations are not intended to replace, constitute or suffice as official manufacturer training. Attendance at manufacturer demo sessions by representatives of competing manufacturers may be limited.*

Friday, October 6, 2017

6:30 AM – 12:00 PM **Registration & Information Desk**
William Penn Ballroom

6:30 AM – 8:00 AM **Breakfast**
Sternwheeler & Riverboat

Attendees choose the session that's right for them this morning:

8:00 AM – 11:30 AM **Special Focus on Load Tap Changers**

ABB Inc.
Siemens

8:00 AM – 11:30 AM **Special Presentation: On-Line Breaker Monitoring 201**



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If you're interested in knowing more about on-line breaker monitoring, this is for you! And if you think you know all there is to know about breaker monitoring, think again! Beginners and more advanced attendees will appreciate this special extended hands-on presentation. Learn to find and identify useful control circuits from prints, identify bushing CT circuits and turn ratios from a nameplate, and partake in practical how-to activities from plumbing SF6 sensors to performing start-to-finish setup of a breaker monitor.

Note: Due to the hands-on nature of this class, participation is limited.

11:30 AM – 12:00 PM **Final Q&A and Closing Remarks**