

Hydrogenerator Monitoring Course

November 6 - 9, 2018

Portland, Oregon



OVERVIEW

On-line monitoring systems installed in hydro power plants is a critical step toward predicting machine behaviour. The real benefit of this predictive capability of malfunctions and identification of irregularities in system behaviour can significantly improve repair planning and scheduling and also prevent additional damage from occurring.

Stator winding problems have been identified in over 40% of all hydraulic

generators having modern thermoset windings. This coupled with less frequent but equally expensive rotor winding failures means that almost 50% of hydrogenerator failures are caused by the deterioration of rotor and stator windings. To capture additional failures related to the fixation of mechanical components (bearings, rim, poles, foundations joints) modern monitoring systems include vibration and air gap monitoring along with electrical parameters and process parameters (temperatures, pressures, flow) for a broad understanding of machine behavior during operation, both electrically and mechanically.

Preventing machine failures involves a thorough understanding and appreciation of the design, function and interaction of all major components that make up typical machine. Proper training and education on machine component function, specification, testing, monitoring, maintenance and preparing effective repair specifications is the first step in prevention.

SEMINAR OBJECTIVES

The course focuses on hydro-electric generators. Although much of the discussion relates to synchronous machines rated greater than 10MVA and 6.9kV the principles apply equally to generators of all sizes down to 4kV. Discussion will concentrate on stators (frames, windings and laminated cores), rotors (windings, rims and spiders), as well as brackets, bearings and cooling. The course is presented from an end user perspective, rather than that of a machine designer.

WHO SHOULD ATTEND?

This course is directed at engineering and maintenance personnel responsible for the purchase, installation, maintenance, testing and repair of hydrogenerators.

Course Instructors

Dr. Nicolas Dehlinger is a Rotating Machine Engineer at Iris Power (Qualitrol). He graduated from the Université Laval, Québec, Canada, in 2007 (M.Sc.) and in 2011 (Ph.D.), with a specialization in Electrical Machine Design. Since 2010, he has been working as an electrical design engineer for GE (formerly Alstom) in Tracy, Canada and in Denver, USA. He was mainly involved in generator refurbishment projects, repair/testing and assessment of generator windings and cores.

Ozren Husnjak has more than 10 years of experience in vibration data collection, processing and analysis. Ozren has a degree from Departments of Physics, Faculty of Science where he worked as assistant teacher. Since 2006, Ozren worked for VESKI, Zagreb, providing expertise in signal analysis and software development. Ozren conducted a number of training courses in this area and was involved in installation of vibration and air gap sensors, and provided data interpretation services.

AGENDA - 2-1/2 days

Machine design and monitoring technologies

- Introduction
 - Component Overview
- Rotor design and potential failure mechanisms
- Rotor types (two and three bearings)

- Rim types and pole assembly
 - Rotor pole problems
 - Bearing and foundation joints
- Stator design and potential failure mechanisms

- Stator core frame
 - Endwinding problems
 - Stator bar problems
- Introduction to monitoring systems
- Vibration monitoring (theory and application)

Air gap and flux monitoring (theory and application)

Electrical monitoring practices

- PD and Ozone monitoring
- Load angle and Power quality

Hydraulic monitoring practices

Case studies

- Air gap, Vibration, Electrical quantities, Hydraulic quantities

Registration form on page 2

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To register for the seminar please send completed form with credit card information to fax # 905-677-8498 or e-mail to khoward@qualitrolcorp.com. If paying by check please make check payable to Iris Power LP and send to 3110 American Drive, Mississauga, Ontario, L4V 1T2. Please write "Iris Hydro Course" on the check to ensure that it is received by the appropriate department and include a completed registration form with payment.

Name: _____

Title: _____

Company: _____

Address: _____

City & Province/State: _____

Postal/Zip Code: _____

Telephone: _____ Fax: _____

E-mail: _____

Special Dietary needs: _____

Please print email address clearly

Payment made via:

P.O. # _____

Visa MasterCard

Card #: _____ CVS # _____ Exp.Date: _____

Card Holder Name: _____

Signature: _____

REGISTRATION Only 20 seats available, so register now.

Registration includes breakfast, lunch
and breaks daily.

A complete set of notes is also included.

PRICE DOES NOT INCLUDE HOTEL ACCOMMODATIONS.

Confirmation will be issued upon
receipt of payment.

COST

\$1495.00 USD

Send registration to:

Karen Howard

Fax: 905-677-8498

khoward@qualitrolcorp.com

Tel.: 905-364-4568

Location of Venue

The Paramount Hotel

808 SW Taylor Street

Portland, OR 97205

Phone +1 (503) 223-9900

+1 (855) 215-0160

Room Rate: \$144.00 US
(until October 5, 2018)

[Book room on-line](#)

CANCELLATION POLICY

Cancellation received prior to October 6, 2018 will result in a \$75.00 US processing fee. Withdrawal received up to one week prior to the seminar will be subjected to a charge of \$150.00 US. There will be no refunds a week prior to the seminar. Delegations substitution is permitted.