

DETECTION OF PARTIAL DISCHARGES ON THE ONLINE HYDRO-GENERATOR STATOR WINDING

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Degree of Master of Science

Department of Electrical Engineering

University of Moratuwa

Sri Lanka

December 2012

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Thesis submitted in partial fulfillment of the requirements for the degree Master of
Science in Electrical Installation

Supervised by: Prof. J.P. Karunadasa

Department of Electrical Engineering

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Sri Lanka

December 2012

Declaration

I declare that this is my own work and this dissertation does not incorporate without acknowledgement any material previously submitted for a Degree or Diploma in any other University or institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

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The above candidate has carried out research for the Master dissertation under my supervision.

Signature of the supervisor:

(Prof. J.P. Karunadasa)

Date

Acknowledgment

This dissertation would not have been possible without the guidance and the help of few individuals who has contributed and extended their valuable assistance in the preparation and completion of this research study.

First my utmost gratitude to my advisor, Prof. J.P.Karunadasa whose good advice, support encouragement I will never forget.

I am indebted to my colleagues and Technical Supporting Staff of the Samanawewa Power Station specially Chief Engineer, Mr. Sepala Karunasena and Electrical Engineer Mr. Amila Weerasinghe who extended their support throughout the period of research work.

My sincere thanks also goes, Mr. G.A.Jayantra, the Deputy General manager of Generation Projects Branch whose technical expertise in the field was invaluable in installation of Partial Discharge Monitoring System.

Course Coordinator of Electrical Installation group and Officers of Post Graduate Office and Department of Electrical Engineering at University of Moratuwa helped me in various ways to clarify the things related to my academic schedules and I wish to thank them all.

Last, but by no means least, I thank my wife and family for their support and encouragement extended at all times.

Abstract

Demand for hydro power is ever increasing with the escalating cost of fossil fuel and generation capacity limitations at peak loads. Therefore availability of hydro units is critical in order to cater the demand.

The insulation system of stator winding is highly susceptible to electrical, thermal and mechanical stresses, aging and consequent failures. Replacement or maintenance of Stator winding would take long time and properly engineered condition monitoring system is needed to avoid such occurrence or plan remedial works making outage time minimum.

Off line test methods has long been used to assess the condition of the motor and generator winding insulation. There are practical limitations in those methods while Online Partial Discharge (PD) measurements is currently being used commercially addressing some of the drawbacks of offline methods.

This research analyses the 2 different online PD monitoring technologies which are being commercially used for hydro generators. Required data were obtained from the PD monitoring systems installed at Samanalawewa Hydro Power station.

Pulse distribution patterns of PD with respect to polarity predominance, Load effect on PD, effect of environmental factors of humidity and temperature on PD, cross talk between phases when measuring PD and applicability of RTDs embedded in the winding to sense PD were analysed. Results have been interpreted based on the obtained data and contemporary research works on online PD monitoring systems.



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