

EFFECT OF HUMIDITY ON PARTIAL DISCHARGES OF GENERATOR STATOR

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(09/8557)



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Department of Electrical Engineering

University of Moratuwa

Sri Lanka

November 2013

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Thesis submitted in partial fulfillment of the requirements for the degree Master of
 **University of Moratuwa, Sri Lanka.**
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Sri Lanka

November 2013

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 that 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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Date:

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

.....

Prof. H.Y.R. Perera

Date:

Abstract

It was observed that the insulation condition of some generators is not up to the standard level when analyze the results of condition monitoring tests done on hydro generators of CEB. This situation prompted generator insulation level to be monitored closely. Hence, the Asset Management Hydro Electrical Branch of CEB recently initiated online monitoring of partial discharge (PD) activity in hydro machines.

Partial discharge can cause progressive deterioration of insulation and end result of which may be eventual breakdown of the insulation. If partial discharges can be controlled to a certain level, possibility of unexpected winding failures can be reduced and loss of outages and repair cost can be avoided and the reliability level of the generators can be increased.

Majority of main hydro power generators of Sri Lanka have been constructed in wet zone with water present lower close below the generator. Therefore these factors can give rise to higher humidity levels around such generators. The purpose of this research was to investigate the effect of humidity on partial discharge in hydro generators.

For this study New Laxapana Unit 2 generator was selected and a partial discharge monitoring system was installed for online monitoring facilities. Using the data extracted from this system, behavior of PD variations against relative humidity was analyzed.

In addition to that using an experimental setup PD activity was measured under controlled humidity conditions.

Both these analyses confirmed that there is an effect of humidity on PD activity.

Keywords: partial discharge, epoxy, mica

Acknowledgement

First and foremost I wish to offer my sincerest gratitude to my supervisor, Professor H.Y.R Perera, who supported me by stimulating suggestions and encouraging throughout my dissertation with patience and knowledge. I should also thank Professor M.P.Dias, Head of the Department of Electrical Engineering, and the other members of the academic staff of the Department of Electrical Engineering, for their valuable suggestions and comments.

In addition I would like to express my gratitude to the officers in Post Graduate Office of the Faculty of Engineering of University of Moratuwa for helping in various ways to clarify the things related to my academic works in time with excellent cooperation and guidance. Sincere gratitude is also extended to the people who serve in the Department of Electrical Engineering office.

Especially I must be thankful very much to my colleagues Chintaka Tilakarathne, Nisal Amarasingha and Dinindu Kodithuwakku in the Laxapana Hydro Power Complex, Ceylon Electricity Board for providing support in numerous ways to carry out the studies of the project.

I express my thanks and appreciation to my parents and my girlfriend Sewwandi for their understanding, motivation and patience. Lastly, but in no sense the least, I am thankful to all colleagues and friends for giving their fullest co-operation throughout the time of research and while writing this dissertation.

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LIST OF ABBREVIATIONS

| Abbreviation | Description |
|--------------|---|
| CEB | Ceylon Electricity Board |
| DC | Direct Current |
| PD | Partial Discharges |
| IHM | Insulation Health Monitor |
| IEC | International Electrotechnical Commission |
| RTD | Resistive Thermal Detector |
| RMM | Rotating Machine Monitor |
| PDI | Partial Discharge Intensity |
| LED | Light Emitting Diode |



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