

LB/DDN/53/09

DEVELOPMENT OF A SPEED STABILIZER FOR RAPID SYNCHRONIZATION OF MINI-HYDRO GENERATOR

A dissertation submitted to the
Department of Electrical Engineering, University of Moratuwa
in partial fulfillment of the requirements for the
Degree of Master of Science

by

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January 2009

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DECLARATION

The work submitted in this dissertation is the result of my own investigation, except where otherwise stated.

It has not already been accepted for any degree, and is also not being concurrently submitted for any other degree.

UOM Verified Signature

D.G. Subasinghe

I endorse the declaration by the candidate.

Dr. J.P. Karunadasa



ABSTRACT

The objective of this study is to develop a damping method to stabilize the speed of the generator rotor during synchronization so as to minimize synchronization time and also to develop a prototype circuitry for a selected Mini-Hydro plant to obtain actual results.

The present system of the identified Mini-Hydro generator was modeled reasonably to identify the present response of the system for a step input. This was then simulated in Matlab and based on that a new PI controller with a power electronic switching circuit was developed to impart a resistive loading to generator in order to control the oscillation of the rotor during synchronization. Two switching strategies are discussed and they were tested at site for actual results.

One of the switching strategies showed positive results where the controller's performance is mostly in line with the simulated results.

ACKNOWLEDGEMENT

First I pay my sincere gratitude to Dr. J.P. Karunadasa who encouraged and guided me to conduct this research and on perpetration of final dissertation.

I make this opportunity to extend my thanks to Dr. Narenda De Silva for the valuable instructions given to me during the project.

I would like to take this opportunity to extend my sincere thanks to Mr. Prabath Wickramasinghe (Head-Industrial Solutions - Hayleys Ltd), Mr. Sudharshana Gamage (Electrical Engineer - Hayleys Ltd), Mr. M.G.K. Jayathunga (Superintendent – Gomala Oya (Pvt) Ltd) and his staff, Mr. D.U. Jayasooriya (Electrical Engineer - Ceylon Electricity Board) and his staff, Mr. A. Weeraratne (Electrical Engineer – Orient Electric (Pvt) Ltd), Nalaka Samarakoon (Executive- Orient Electric (Pvt) Ltd), W.A. Wijesiri (Electrical Engineer – Colombo Dockyard Ltd), R. Ranasinghe (General Manager – Orient Mag Line (Pvt) Ltd) and his staff, P.B.S.K. Baduwasam (Electrical Engineer – Micro Cells Ltd), who gave their co-operation to conduct the research and to develop the Prototype design successfully.

It is a great pleasure to remember the kind cooperation extended by the colleagues in the post graduate programme, friends, my subordinates in the office and especially my wife who helped me to continue the studies from start to end. Finally, I should also admire the patience of my beloved two kids during the project.

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