TIME DEPENDENT TRANSMISSION LOSSES IN NATIONAL NETWORK

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

P.A.N.SHANTHA

Supervised by: Professor Ranjit Perera

Department of Electrical Engineering
University of Moratuwa, Sri Lanka

November 2008

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

P.A.N.Shantha

2008/11/24

I endorse the declaration by the candidate.

UOM Verified Signature

Prof. Ranjit Perera

ABSTRACT

Ceylon Electricity Board (CEB) has the responsibility of Transmission and most of the Generation and Distribution of electric power in Sri Lanka. Today, total technical and non technical losses (Energy losses) are around 15.67%. It is a large loss compared with losses in developed countries. Losses will also affect electricity tariff. At the end, it affects domestic, commercial and industrial consumers as well as Gross Domestic Product (GDP) of the country. Transmission losses are very important to future planning and design of the National Network. Losses should be minimized as much as possible.

As Ceylon Electricity Board has not yet investigated time dependent transmission losses in National Electric Network accurately, this study focused on the following,

- Study thirty minutes time interval transmission losses in National Network for a day.
- Transmission network is modelled and simulated using MATLAB programme and calculation of power flow and transmission losses.
- Analysis of the simulated results.

Simulation results show that peak loss is recorded at 19.30 p.m. and amounting to 3.17% of total generation. Day minimum is recorded at 3.30 a.m. and minimum loss is 1.52% of total generation. Any time in between 0.00 a.m. to 24.00 midnight, Transmission losses vary from 1.52 % to 3.17 %.

ACKNOWLEDGEMENT

Thanks are due first to my supervisor, Professor Ranjit Perera, for his great insights, perspectives and guidance.

I also thank Mr. R.J. Gunawardena-Additional General Manager (Transmission), Mr. T.D. Hadagama-Deputy General Manager (System Control Branch), Mr. J. Nanthakumar-Chief Engineer (Operation Audit), Mr. L. Weerasinghe-Chief Engineer (System Operations), Mr. T. Senavirathna- Electrical Engineer (System Control), Dr. L.D.L. Perera-Electrical Engineer (Transmission Planning) and Dr. A.M.D.R. Samarakoon-Chief Engineer (Generation Planning) for facilitation me with the necessary data and information

Lastly, I should thank many individuals, friends and colleagues who have not been mentioned here personally in making this educational process a success. May be I could not have made it without your support.

CONTENTS

Annexes

List of Figures

List of Tables