

**SOLVING
THE UNDER VOLTAGE PROBLEM IN
SRI LANKAN NATIONAL GRID**

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To My Parents and My Wife

The research presented in this dissertation was carried out as a part of the M. Sc. degree of Engineering Program in Department of Electrical Engineering in University of Manitoba, in 2007.

In completion of the individual research project it was decided to "Electrical Power Transmission Network" in Manitoba as the area of study.

The research is a attempt to model the existing system as possible and simulate the existing under voltage condition and to find the voltage magnitude across the line voltage profiles.

The power system is modelled to various conditions, may be developed in terms of physical quantities, such as line length, voltage profile, bus design, physical structure, and various power sources. Considerations were given to practical considerations such as, loss of reactive power sources, generating power structure of power lines.

In order to have a proper model and to find better solution EMTPDCAD was used as a software. This is a time-domain simulator and with that it was possible to have a better dynamic model which is very much closer to the existing one. On the plotting of this varying quantities, gave a good view of existing & existing the responses.

PREFACE

This dissertation includes the individual project details/results which has been completed as a part of Master of Engineering Program at Department of Electrical Engineering in University of Moratuwa, Sri Lanka in 2001.

In completion of this individual research project it was selected the “Electrical Power Transmission Network” in Sri Lanka as the area of study.

This research is a attempt to model the existing system, as possible and simulate the existing under voltage condition and to find the various remedial actions for this voltage collapse.

How close is a system to voltage instability, may be measured in terms of physical quantities, such as load level, active power flow through a critical interface, and reactive power reserve. Considerations were given to possible contingencies such as; loss of reactive power sources, generating units and loss of critical lines.

In order to have a proper model and to find better solutions EMTDC/PCAD ver 3.0.0 personnel edition was used. This is a time-domain simulator and with that it was possible to have a better dynamic model which is very much closer to the existing one. On-line plotting of time varying quantities, gave a great ease of modeling & checking the proposals.

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1. OBJECTIVES AND METHODOLOGIES

The main objective of this research study is to find a low cost solution for the existing under voltage situation in Sri Lankan power transmission system.

In completion of this objective the following methodologies were used ;

- a. Study the existing Sri Lankan Power transmission network with generator busses and load busses.
- b. Model this transmission system in a computer using computer aided software and have a dynamic model.
- c. Testing and tuning of the model with existing values.
- d. Implementation of proposals and produce the results.



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