

**RELIABILITY IMPROVEMENT IN 33kV NETWORK  
BY INTRODUCTION OF OPTIMALLY LOCATED  
LOAD BREAK SWITCHES**

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University of Moratuwa, Sri Lanka.  
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Department of Electrical Engineering

University of Moratuwa

Sri Lanka

September 2012

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

Department of Electrical Engineering

University of Moratwa

Sri Lanka

September 2012

## Declaration

I declare that this is my own work and this thesis 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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Date: .....

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

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Prof. H.Y.R. Perera

Date: .....

## Abstract

According to observations made on the reliability level which is indicated by reliability indices such as System Average Interruption Duration Index (SAIDI) and System Average Interruption Frequency Index (SAIFI), 33kV network of the Ceylon Electricity Board shows poor performance on the aspect of network reliability. These observations have urged the necessity of analyzing the 33 kV network on reliability point of view and proposing a cost effective method to improve the reliability level of the 33kV network. In addition to improve consumer satisfaction, reliability improvement of the 33kV distribution network shall make significant positive impact on the economy of the country since the recovery of unserved electrical energy has provided considerable benefits to industrial and other consumer categories.

For this study, 33kV network of North Central Province (NCP) was selected and analyzed focusing on the reliability of the network using the distribution planning software-SyneerGEE. This involves producing a model compatible to existing reliability level of 33 kV network by providing required data. Required data for model for reliability analysis shall be obtained by processing the available data relating to network reliability.

Proposed method for the reliability improvement of the network is introduction of optimally located remote operated Load Break Switches (LBS). Fault indicators having remote communication facility are proposed to install and to be operated for the identification of fault location. Above methods were simulated on prepared model which is compatible to the existing reliability level of 33kV network of NCP and searched for the best cost effective option.

Number of LBSs that should be installed for a particular feeder, locations at where those LBSs should be installed to get the maximum reliability improvement of the network and target reliability level of each feeder were mainly determined by considering the cost of unserved energy and the cost for the utility for the improvement of reliability up to the required level.

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# Contents

<b>Declaration</b> .....	<b>i</b>
<b>Abstract</b> .....	<b>ii</b>
<b>Acknowledgement</b> .....	<b>iii</b>
<b>Contents</b> .....	<b>iv</b>
<b>List of Figures</b> .....	<b>vi</b>
<b>List of Tables</b> .....	<b>vii</b>
<b>List of Appendices</b> .....	<b>viii</b>
<b>List of Abbreviations</b> .....	<b>ix</b>
<b>Chapter 1</b> .....	<b>1</b>
<b>1. Background and Scope</b> .....	<b>1</b>
1.1. Background.....	1
1.2. Scope of the study.....	5
1.3. Problem Statement.....	6
1.4. Objectives.....	6
1.5. Methodology.....	7
<b>Chapter 2</b> .....	<b>9</b>
<b>2. Modeling of 33kV Network for Reliability evaluation</b> .....	<b>9</b>
2.1. Reliability level of existing network.....	9
2.2. Criteria used for modeling the 33kV network on reliability point of view	
11	
2.2.1. Failure rates of defined exposure zones .....	13
2.2.2. Reliability model of an example feeder.....	18
2.3. Reliability analysis of 33kV network of NCP .....	24
2.3.1. Exposure zones for the 33kV network of NCP .....	24
2.3.2. Failure rates of defined exposure zones .....	26

2.3.3.	Restoration time .....	30
2.3.4.	Length of each section.....	30
2.3.5.	Number of consumers .....	30
2.4.	Analysis Results.....	30
<b>Chapter 3</b>	.....	<b>32</b>
<b>3.</b>	<b>Finding Optimum locations for Switches.....</b>	<b>32</b>
3.1.	Factors affecting the SAIDI of a feeder.....	33
3.2.	Example SAIDI calculation for a feeder having two Switches .....	33
3.3.	Method to find the optimum locations for switches .....	36
3.4.	Proposed database.....	36
3.5.	Algorithm for the program to find the optimum locations for switches..	38
<b>Chapter 4</b>	.....	<b>42</b>
<b>4.</b>	<b>Finding target Reliability level for a feeder .....</b>	<b>42</b>
4.1.	Obtaining corresponding cost curves for a feeder .....	43
4.1.1.	Obtaining curve for the cost of unserved energy.....	43
4.1.2.	Obtaining curve for the economic cost of installing switches.....	44
4.2.	Determine reliability target for the example feeder Horrowpathana of NCP 33kV network.....	45
4.2.1.	Target SAIDI.....	48
4.3.	Achieving the target.....	48
<b>Chapter 5</b>	.....	<b>49</b>
<b>5.</b>	<b>Conclusions .....</b>	<b>49</b>
<b>References</b>	.....	<b>51</b>
<b>Appendices</b>	.....	<b>53</b>

## List of Figures

Figure 2.1-Defined Exposure zones according to characteristics of the area .....	12
Figure 2.2-Defined Exposure zones according to protective devices of the line.....	13
Figure 2.3-Feeder No x with p numbers of properly discriminated protection devices .....	20
Figure 2.4-Feeder No x with q numbers of Switches.....	22
Figure 3.1 -Sample feeder assuming two switches .....	33
Figure 3.2-Sample feeder indicating the proposed way of numbering sections of the feeder for convenience of data base operations .....	37
Figure 4.1-Total Cost due to the variations of the reliability level .....	42
Figure 4.2-Target SAIDI for Horrowpathana feeder .....	47



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## List of Tables

Table 2.1 -SAIDI of NCP .....	10
Table 2.2-Failure duration and Reasons for failures-March .....	10
Table 2.3-Failure data for the sample distribution network.....	14
Table 2.4-Failure rates and length of exposure zones of sample distribution network .....	15
Table 2.5-Required data for modeling .....	19
Table 2.6-Required data for modeling (With protection devices) .....	21
Table 2.7 Required data for modeling (With Switches) .....	23
Table 2.8-Assumed failure rates and length of exposure zones for NCP distribution network.....	26
Table 2.9-Observed Failure rates of 33kV Feeders of NCP .....	27
Table 2.10-Per Unit lengths of each exposure zones respective to the feeder .....	28
Table 2.11-SAIDI of each feeder of NCP obtained by SynerGEE model .....	31
Table 3.1-Failure rates and Restoration time of defined exposure zones of the example feeder .....	33
Table 3.2-Section data for the defined feeder.....	34
Table 4.1-Optimum location of Switches for Horrowpathana Feeder .....	46
Table 4.2 -Cost of Unserved energy for Horrowpathana feeder .....	46
Table 4.3-Cost for Load Break Switches .....	47



## List of Appendices

Appendix 1-Geographical boundaries and 33kV network of NCP.....	54
Appendix 2-Length of each exposure zones of feeders .....	55
Appendix 3-Number of failures of feeders per month for 2009 .....	56
Appendix 4-Number of failures of feeders for 2010.....	57
Appendix 5-33kV break down data for March,2011 .....	58
Appendix 6-33kV break down data for April,2011 .....	59
Appendix 7-Observed SAIDI of 33kV network of NC .....	60
Appendix 8-Horowpathana feeder .....	61
Appendix 9-Location of the switches .....	62



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## List of Abbreviations

<b>SAIDI</b>	System Average Interruption Duration Index
<b>SAIFI</b>	System Average Interruption Frequency Index
<b>NCP</b>	North Central Province
<b>LBS</b>	Load Break Switch
<b>GSM</b>	Global System for Mobile communications
<b>CEB</b>	Ceylon Electricity Board
<b>GDP</b>	Gross Domestic Product
<b>AGM</b>	Additional General Manager
<b>ID</b>	Identity
<b>SCADA</b>	System Control And Data Acquisition
<b>PUCSL</b>	Public Utility Commission Sri Lanka



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