

IMPROVEMENT OF CEB DISTRIBUTION PROTECTION TO ENHANCE SYSTEM RELIABILITY.

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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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.

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Abstract

Distribution protection and system reliability have become equally important concepts since the inception of power systems. With more and more sensitive equipment coming in to industries, the requirement of protection and higher reliability of power system is been highlighted. Problems with system reliability result in costly loss of production to critical processes create a dilemma for both the serving utility & the consumer. The protective devices and switches play an important role in the reliability of electrical distribution systems by minimizing the impact of interruption. In this project, a method for identifying the type and location for protection devices and switches on the distribution system using cost-based optimization is proposed.

Data has been obtained from the data loggers in the re-closers, DDLO fusers and transformers which are connected to the Labugama feeder of the Ranala gantry energized by the Kosgama grid substation.

The proposed method is based on the existing reliability analysis and reliability analysis, after introducing various components, e.g., Sectionalizes, Auto-reclosers and switching gantry. The detailed design of the protection devices and the switches are determined by minimizing the total cost of reliability that comprises apparatus investment, maintenance, and interruption cost.

Chapters 03 to 05 concentrate mainly on the selection of technologies and sample feeder which represents the total system. Chapters 06 will discuss the way of data collection and analysis. Suggestions on possible improvements to reduce number of customer interruptions and customer interruptions duration while maintaining same degree of protection will discuss under the chapter 07.

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List of Abbreviations

Term	Definition or Clarification
SAIFI	System average interruption frequency index.
SAIDI	System average interruption duration index
CAIDI	Customer average interruption duration index.
MAIFI	Momentary average interruption frequency index.
LOLP	Loss of Load Probability
LOLH	Loss of Load Hours.
LOEP	Loss of Energy Probability.
IRR	Internal Rate of Return
kWh	Kilo Watt Hours
USD	United States Dollars
LTGEP	Long Term Generation Expansion Plane.



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