RELIABILITY IMPROVEMNET IN THE 33kV DISTRIBUTION FEEDER USING OPTIMUM POSITIONING OF AUTO RECLOSERS

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DECLARATION OF THE CANDIDATE AND SUPERVISORS

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

Dr. W. D. A. S. Rodrigo

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ABSTRACT

In an era where Sri Lanka economy is going towards a drastically higher growth it is highly important to have a reliable electricity network in the country. To improve the reliability of the distribution network, Distribution Licensees improve the system capacity and at the same time install protective devices to reduce the interrupted area due to an electrical fault in the network. For this Auto Reclosers and Fuses are used in the Distribution Network.

In developed countries the installation of Protective devices are done optimally and techniques have been developed. In Sri Lanka, the process of planning, design and construction of transmission and medium voltage power lines is solely authoritative by Transmission Licensee and Five Distribution Licensees of the country. At present there is no proper way of selecting optimal location for the installation of Auto reclosers is practiced in either of these Licensees.

As the first step of this study, a research survey was done about the optimal location selection methods researched in other countries. A suitable objective function was modeled to find the optimal location to install an Auto Recloser with the constraint of finding two optimal locations in series.

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This report will discuss the objective function formation to find the optimal location for the Auto Recloser and also as a supporting study a pilot project done on how to co-ordinate the fuses with the Auto Reclosers and the Circuit Breakers at the Grid Substation is also included.

Major Findings of this research: Optimal locations to install an Auto recloser for a feeder according to the SAIDI values of substations and the energy consumptions of bulk and retail consumers connected to that specific feeder.

Findings of the pilot project: how to co-ordinate the fuses installed on a feeder and how to decide the rating of a fuse to be installed on the feeder by maintaining the protection co-ordination with other protective devices on the feeder.

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LIST OF ABBREVIATIONS

AR	Auto Recloser
AEE	Area Electrical Engineer
CB	Circuit Breaker
CEB	Ceylon Electricity Board
CSC	Customer Service Center
DD1, 2, 3, 4	Distribution Division 1,2,3,4
EENS	Expected Energy Not Served
ENS	Energy Not Served
GA	Genetic Algorithm
GSS	Grid Sub Station
LKR	Sri Lankan Rupees
MINLP	Mixed Integer Non-Linear Programming
MV	Medium Voltage
NLIP	Non-Linear Integer Programming
SAIDI	System Average Interruption Duration Index
RTS	Reactive Tabu Search
TC	Time Vs Current
USD	US Dollars

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