



# **IMPROVEMENT OF LIGHTNING PROTECTION IN LOW VOLTAGE DISTRIBUTION SYSTEMS IN AREAS WITH HIGH ISOKERAUNIC LEVELS**

A Dissertation Submitted to the  
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Degree of Master of Engineering

by  
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## Abstract

This dissertation presents a study meant for improvement of lightning protection in low voltage distribution systems in the areas with high isokeraunic levels. The electricity consumers in Sri Lanka, especially those who live in areas with high isokeraunic levels, suffer considerable damages to their electrical appliances due to lightning. The objective of this project is to assist the electricity distribution authorities in finding remedial measures to overcome the difficulties faced by the consumers.

Beregala in Avissawella, an area severely affected by consequences of lightning, was selected for the study. Two low voltage distribution lines that run across a rural mountainous area were identified for the modeling purpose. The type of conductor, average span of the line and typical electrical loads connected to the line were taken into consideration in modeling the line.

The model of the line as well as the lightning strike was simulated using software PSCAD / EMTDC. The effectiveness of Lightning Surge Arrestors when connected at various points along the distribution line was analyzed. A field study too, was carried out using two distribution lines running across similar ground conditions to gauge the effectiveness of using a shielding conductor in a low voltage overhead distribution line.

Based on the theoretical and the field studies, the report finally presents its findings that might be useful in finding solutions to minimize the damages caused to household electrical appliances due to lightning.

## DECLARATION

The work submitted in this dissertation is the result of my own investigation, except where otherwise stated.

It has not been yet accepted for any degree, and is also not being concurrently submitted for any other degree.



P.W. Hendahewa  
10<sup>th</sup> September, 2007

We/I endorse the declaration by the candidate.

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