

**DETERMINING SUITABLE SETTINGS FOR AUTO
RECLOSING SCHEMES OF THE SRI LANKAN
TRANSMISSION SYSTEM**

G.R.H.U. Somapriya

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Degree of Master of Science

Department of Electrical Engineering

University of Moratuwa
Sri Lanka

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Gama Ralalage Harshana Udayakumara Somapriya

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Dissertation submitted in partial fulfillment of the requirements for the
Degree Master of Science in Electrical Installations

Supervised by: Dr.K.T.M.Udayanga Hemapala

Department of Electrical Engineering

University of Moratuwa
Sri Lanka

September 2012

DECLARATION

“I declare that this is my own work and this dissertation 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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The above candidate has carried out research for the Masters Dissertation under my supervision.

Signature of the supervisor

Date:

(Dr. K.T.M. Udayanga Hemapala)

ABSTRACT

The majority of faults in the transmission network can be successfully cleared by the proper use of protective relays to trip the respective circuit breakers and to bring back the system to normalcy using high speed autoreclosing. Thus, autoreclosing can significantly reduce the outage time due to faults and provide a higher level of service continuity to the customer. Furthermore, successful high-speed reclosing on transmission circuits can be a major factor when attempting to maintain system stability during fault clearing.

Initial studies revealed that a detailed study of Autoreclosing settings in the transmission network of Ceylon Electricity Board and their performance based on failure analysis has not been carried out since the review of the protection system and settings by Lahmeyer International in 1996. Further there has been a brief analysis by the PB power consultants in their report on the CEB transmission system and organizational arrangements for operation and maintenance in October 1999. Since then there has been a comprehensive expansion of the CEB transmission network.

Existing settings were reviewed along with failure incidents recorded during the period of November 2006 to August 2012 in the selected transmission lines. The stability analysis was carried out with the existing settings and prospective settings using the existing CEB power system which is modeled in PSSE software. Based on the simulated results, analysis of failure incidents, review of existing settings and the literature available on the practices followed in determining Auto reclose settings a set of Auto reclose settings for 220kV and 132kV transmission lines were proposed.

These new settings and recommendations will improve the AR success rate thereby improving the reliability of the network. It will also minimize the risk of major failures resulted due to the definitive tripping of important transmission lines due to transient faults.

Key words: Auto reclosing, Transmission lines, Simulations, Failure analysis.

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LIST OF ABBREVIATIONS

Abbreviation	Description
CEB	Ceylon Electricity Board
PSSE	Power System Simulator for Engineering
AR	Auto Reclosing
KCCP	Kelanithissa Combined Cycle Plant
EDG	Emergency Diesel Generator
SSR	Subsynchronous Resonant Oscillations
HSR	High Speed Reclosing
DDR	Digital Disturbance Recorder



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