APPROVAL

The thesis titled "**Study and Analysis of Switching Transients in Power Distribution System**" submitted by Md. Mahadi Hasan (201416112), Md. Mahfuzur Rahman (201416082), Md. Farhan Haider (201416093) and Zarin Tasnim Tishad (201416016), session 2013-2014 has been accepted as satisfactory in partial fulfilment of the requirements for the degree of **BACHELOR OF SCIENCE IN ELECTRICAL, ELECTRONIC AND COMMUNICATION ENGINEERING** on December 2017.

APPROVAL OF THE SUPERVISOR

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DR. ABDUL HASIB CHOWDHURY

PROFESSOR

DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING (EEE)

BANGLDESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY (BUET)

DHAKA-1000

DECLARATION

It is hereby declared that this thesis or any part of it has not been submitted elsewhere for the reward of any degree or diploma.

SUBMITTED BY

MD. MAHADI HASAN	MD. MAHFUZUR RAHMAN
(Id No: 201416112)	(Id No: 201416082)
MD. FARHAN HAIDER	ZARIN TASNIM TISHAD
(Id No: 201416093)	(Id No: 201416016)

DEDICATION

To our beloved parents and our respected supervisor

ABSTRACT

The switching transient is not a new phenomenon; it has been around for many decades. However, it has received more attention recently because of the greater number of failure of many electrical equipments like transformer, circuit breaker etc. because of the phenomena. Both energization and de-energization of transformer and shunt capacitor bank produce considerable amount of transient overvoltage which in turn can cause insulation failure of transformer and malfunctioning of protective equipments. The worst case occurs if the frequency of the transients matches the resonance frequency of the transformer causing voltage and current magnification to a level that exceeds the BIL of transformer. The purpose of this thesis work is to study the switching transient over-voltages that occur during different switching events in an arbitrary distribution network. We have analysed the network for switching actions like switching of transformer, capacitor bank and switching of load. The analysis is done considering both overhead lines and underground cables to make a comparative study. Transient short circuit fault also causes high frequency overvoltage; which is analysed in this work. Finally, the analyses of the output data is done to find out the main reasons for this transient and some recommendations are given to minimize the effects of transient overvoltage.

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LIST OF ABBREVIATIONS

BIL	Basic Insulation Level
PSCAD	Power System Computer Aided Design
TRV	Transient Recovery Voltage
ANN	Artificial Neural Network
UHVDC	Ultra High Voltage Direct Current
EHVAC	Extra High Voltage Alternating Current
EHVDC	Extra High Voltage Direct Current
EMTP	Electromagnetic Transient Program
EMTDC	Electromagnetic Transient including DC
ANSI	American National Standards Institute
IEC	International Electrotechnical Commission
FACTS	Flexible Alternating Current Transmission
LCP	Line Constants Program
GTO	Gate Turn On Thyristor
SVC	Synchronous Var Compensator
ENI	Electric Network Interface
ROW	Right Of Way
HVDC	High Voltage Direct Current
MOV	Metal Oxide Varistor
SPD	Surge Protection Device
TVSS	Transient Voltage Surge Suppressor