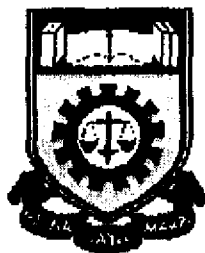


**RCCB's NUISANCE TRIPPING AT FINAL
DISTRIBUTION BOARDS MIMOS AS A CASE STUDY**

This thesis is presented in partial fulfillment for the award of the
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Thank You.

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ABSTRACT

Power quality becomes a major concern of both electricity providers and their users. For the users, the economic impact of power disturbances can range from several hundred dollars to repair or replace home appliances to millions of dollars in product or production losses and cleanup. For utilities, system disturbances can lead to user dissatisfaction and revenue losses.

Many have concluded that the problems are caused by power supplier (i.e. Tenaga Nasional Berhad), but the main reason to the power quality problems is increment of *nonlinear loads in the particular system*. Wiring installation and grounding practice in the distribution system can also contribute to these problems. Therefore, as a user serious attention have to be given in wiring and grounding installation to make sure that the equipment functions as desires.

This project mainly focused on the effects of poor or improper grounding, inadequate wiring installation practice and high content of harmonic in the distribution systems that cause power quality problems.

The aim of this project is to understand the available theory and correlation with the actual cases referring to Residual Current Circuit Breakers (RCCB's) nuisance trippings at Institut Sistem Mikroelektronik Malaysia (MIMOS) as a case study. A visual inspection was done to know the existing wiring and grounding practice at the MIMOS buildings. Data analysis of voltage and current events was monitored using Reliable Power Meter (RPM) has been made to assist analysis and problem's diagnosis.

Inadequate wiring, improper grounding and high harmonic content presence causes problem and failure to the operation of the equipment, due to protection device tripping are discussed together with the recommended solutions.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Nuisance trippings of Residual Current Circuit Breakers (RCCB's) occur at almost all the final Distribution Boards (DB's) located in the building of MIMOS complex. These nuisance trippings occur frequently and the rates were increasing. There were also problems of computer malfunction where hard disks crashed, power supply damage and intermittent failure of computer equipment.

The MIMOS complex is divided into three main areas; East Block, West Block and Public Block. Since the main activity of MIMOS is Information Technology based, therefore most of the electrical loads are personal computers, computer server, laser printers, telecommunication equipment and Uninterruptable Power Supplies (UPS). All these utilization equipment are designed and built using electronic-based power supplies i.e. switch mode power supplies. All these loads are considered as nonlinear loads since they draw distorted non-sinusoidal current. To assist analysis and problems diagnosis, complete data of voltage and current events were monitored using Reliable Power Meter (RPM) at Main Distribution Board One (MSB-1), Main Distribution Board Two (MSB-2), EMERGENCY SB, SSB(B), Level 3 East Block Distribution Board (DBPL-ET1), Level 2 East Block Distribution Board (DB-ESS) and UPS supply at Level 2 East Block Distribution Board (DB-UPS-ES1). A simplified single line diagram representing Main Distribution Board and Sub-Panel Distribution Board are given.