

POWER QUALITY INTERRUPTION AT ENGINEERING BLOCK A ITM

**This is presented in partial fulfilment for the award of the
Advanced Diploma in Electrical Engineering of
INSTITUT TEKNOLOGI MARA**



MOHD ZAMRISHAM BIN MOHD ZAIN
Department of Electrical Engineering
INSTITUT TEKNOLOGI MARA
40450 Shah Alam
JUN 1996

ACKNOWLEDGEMENT

In the name of Allah s.w.t, the Most Gracious, Ever Merciful, who has given me the strength and ability to complete this project and report.

I would like to express my deepest gratitude to my project supervisors, En. Mohd Zaki bin Abdullah for his valuable guidance, comments and ideas towards the success of this project.

My gratitude also goes to my parents who had given moral support, assistance and prayed for my success. Also, thanks to my classmates and friends for suggestions and contributions to this project.

Finally, thanks to all staffs of Power System Laboratory and Maintenance Department, thank you and I wished you all the best.

Mohd Zamrisham bin Mohd Zain

Institut Teknologi MARA

40450 SHAH ALAM

SELANGOR

ABSTRACT

In the early days of electrical usage, standard electric services, along with its associated shortcomings, was usually adequate for operating most electrical equipment. Digital electronic devices, specifically digital clocks and other microprocessor-controlled devices (industrial controllers and personal computer), began appearing in the mid-to-late 1970's. As those devices became more widely used, it became clear that the old standards of electric power were not adequate for their reliable operation[1]. Their connection to the electric network causes a significant distortion in the line current and when their overall power is no longer negligible with respect to the network power, also some distortion in the line voltage, thus deteriorating the electric supply quality. Electrical problem within malfunction protective devices, aged wiring, poor discrimination of protection system, large switching loads do contribute to the power disturbance a part from the stress placed upon the electrical system by the non-linear loads. The main objective of this project is to measure and analyse the power quality interruption that occurs in ITM especially in Block A Engineering.

TABLE OF CONTENTS

<u>TITLE</u>	<u>PAGE NO</u>
Acknowledgment	i
Abstract	ii
Contents	iii
1. INTRODUCTION	1
2. POWER QUALITY	5
2.1 Utility Power Generation and Distribution	5
2.1.1 Generation	5
2.1.2 Transmission and Distribution	6
2.2 Types of Power Quality Problems	6
2.2.1 High Frequency Events	7
2.2.2 Voltage Event	10
2.2.3 Frequency	12
2.2.4 Distortion	13
2.2.5 Harmonic	13
2.3 Effect Power Quality on Equipment	13
3. TYPES OF TREATMENT DEVICES	15
3.1 Transient Voltage Surge Suppressor	15
3.2 Electronic Line Filters	15
3.3 Isolation Transformer	16
3.4 Voltage Regulator	17
3.5 Uninterruptible Power Source(UPS)	17

CHAPTER 1

1. INTRODUCTION

Power quality is a term that is directed at a wide variety of variations in the electric power supplied to utility customers. These variations can originate and/or manifest themselves at various places in the network. Many of the power quality concerns are associated with the operation and design of customer facilities; concerns associated with wiring and grounding problems, switching transients, load variations and harmonic generation[2]. The ITM main supply system exhibit that it received two 33kV incoming feeders from Tenaga Nasional Berhad (TNB) via a main substation located near Hotel ITM and it than being step-down through two 33kV/11kV transformer. The circuit breakers used at the 11kV main substation are of vacuum type for the incoming and outgoing feeders are then connected radially to 26 substations located inside the ITM Campus.

In recognition of this issues, ITM have became increasingly concerned about power quality and have established students projects to promote power quality education. This project is to conduct an engineering study on power quality is indeed the culprit of outages and failures. Almost all the 11kV substations in the campus