

**CONDITION MONITORING OF OIL FILLED
TRANSFORMER
UTILIZING DISSOLVED GAS ANALYSIS**

This report is presented in partial fulfillment for the award of the
Bachelor of Electrical Engineering (Hons)
UNIVERSITI TEKNOLOGI MARA (UiTM)



SYAHRULAZAM BIN SAINAN
Faculty of Electrical Engineering
UNIVERSITI TEKNOLOGI MARA
40450 Shah Alam
Selangor Darul Ehsan

ACKNOWLEDGEMENT

I would like to express my gratitude to Pn. Bibi Norasiqin Binti Sheikh Rahimullah, my project supervisor for her guidance and support in accomplishing this report. I would also like to take this opportunity to thank En. Ahmad Fawzal Bin Mohd Noor, Managing Director of AFCM Condition Monitoring for providing the data regarding of this project. I would also like to thank to all of my friends, without their helps this report might not have been implemented. I really enjoy thinking of new and different ways to approach a problem.

Finally, I would like to say a very big thank you to lecturers in UiTM Shah Alam and I'm very proud to be a UiTM student during the two and a half years period of study in UiTM Shah Alam.

Syahrulazam Bin Sainan
Universiti Teknologi MARA (UiTM), Shah Alam

ABSTRACT

This project describes the condition monitoring of oil-filled transformer utilizing Dissolved Gas Analysis. The main objective is to study and detect any defect in oil-filled transformer by using Dissolved Gas Analysis. Dissolved Gas Analysis is probably the most widely used condition monitoring technique to monitor the operation of oil-filled transformers [1]. In order to use Dissolved Gas Analysis, the gas samples in those transformers have to be taken using accurate sampling technique. All the gas samples have to be analyzed to extract the gases and get the data for fault gases. Using this analysis, defect from fault gases in the transformer can be detected. A recommendation can be made so that proper action can be taken before the unit suffers additional damage. The scope of analysis covers only on the fault gases of oil-filled transformers.

TABLE OF CONTENTS

CHAPTER	DESCRIPTION	PAGE
1	INTRODUCTION	1
2	DISSOLVED GAS ANALYSIS	
2.1	Introduction	3
2.1.1	Benefits	5
2.1.2	Frequency of Testing	5
2.1.3	Testing Schedule	6
2.1.4	Choice of Oil	6
2.1.5	Color and Appearance	7
2.1.6	Water Content	7
2.2	Fault Gases	8
2.2.1	Electrical Faults	9
2.3	Sampling Technique	11
2.3.1	Auxiliary Fittings	11
2.3.2	Gas Sampling	12
2.3.3	Sample Identification	13
2.3.4	Shipment	13
2.4	Testing Philosophies	14

CHAPTER 1

INTRODUCTION

In general, Dissolved Gas Analysis is one of the Condition-Monitoring techniques to check the condition of electrical equipment in most industrial applications. Condition monitoring allows the operators of industrial plant or equipment to assess its condition while it is in service. It thus allows defects to be detected and addressed before they lead to major breakdown [1]. Condition monitoring system also can be known as preventive (and predictive) maintenance.

Condition monitoring which is also known as preventive maintenance can be planned and organized in the most cost effective way. It is the most important objective of this project. The objective of Dissolved Gas Analysis described in this paper is to prevent and predict electrical equipment from damage due to fault gases in transformers. The preparation of this paper based on Dissolved Gas Analysis to diagnose condition of oil-filled transformers in focusing on the fault gas only.

Condition monitoring is very important because it will decrease routine maintenance that is only the defective equipment will be repaired and need to be taken out of service. It also will create an efficient schedule to repair all of the defective equipment. Since all of the faults will be quantified or will be known, a maintenance schedule can be created to repair the most critical problems before make other inspection to all the expected defect equipments.

Condition monitoring also will decrease downtime for repair which is to allow all the repairing time will be on time after the inspection detects defect. Condition monitoring also allow all the inspections are done while the equipment is on running [2]. Condition monitoring is very important because it will increase