

APPLICATION OF ANN TO PREDICT INCIPIENT
FAULTS IN POWER TRANSFORMER
BASED ON DGA METHOD

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ABSTRACT

This report is about the Artificial Neural Networks (ANN) are used to predict incipient faults in power transformers oil. The prediction is performed through the Dissolved Gas Analysis (DGA) method. The function of this method is for detect and diagnose the different types of incipient faults that occur in power transformers. By interpretation of dissolved gasses in oil insulation of power transformers, this method was applied in the Artificial Neural Networks (ANN) to classify the different faults by using the DGA method. In DGA method, the Roger's Ratio and International Electrotechnical Commission (IEC) Ratio were applied into ANN to see the performance of ANN's network. For assessment, two set databases are employed: Roger's ratio and IEC ratio. The data bases are collected from Tenaga Nasional Berhad (TNB) data. The results show these methods were used to predicting the fault more than 90% of accuracy in best case.

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CHAPTER 1

1.0 INTRODUCTION

1.1. OVERVIEW

Power transformer is important in transmission and distribution of electrical power system in a country. The oil mineral insulator shows the performance of power transformer either it in well condition or not. The life of transformers depend on the life of its insulation. Failure of power transformer may cause long interruptions in power supply and required expensive repair or replace a new one [1] [2].

The incipient fault in power transformer depending the gasses that appeared in the oil insulation in the power transformers and it must be detected before the fault become serious and in the end it cause the power transformer break down or damage [3] [4].

Dissolved gas-in-oil analysis (DGA) is the most important test for identified the condition of a power transformer and it can identify incipient fault in oil insulation. The dissolved gas ratios is used using predefined criteria of the incipient fault. These dissolved gasses contains mainly hydrogen (H_2), methane (CH_4), ethane (C_2H_6) ethylene (C_2H_4), acetylene (C_2H_2), carbon monoxide (CO) and carbon dioxide (CO_2) [5] [6] [7].

The development of artificial intelligence (AI) method to detect the incipient fault in power transformer will increase the performance of detection. The Artificial neural networks (ANN) are widely used for power transformer fault diagnosis because of their superior learning, generalization capabilities and fault-tolerate capabilities in practical applications [8] [9].