

**PERFORMANCE COMPARISON BETWEEN METAL OXIDE
VARISTOR AND GAS DISCHARGE TUBE AGAINST TRANSIENT
OVERVOLTAGE DUE TO LIGHTNING STRIKE**

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ABSTRACT

This project presents the comparison of the performance of transient overvoltage due to lightning strike. There were two protection devices compared in this project which is Metal Oxide Varistor (MOV) and Gas Discharge Tube (GDT). These two types of transient protector are commonly used to suppress transient in many applications such as industrial process measurement, control instrumentation, high-frequency communications and ac-medium power supply line. Their sharp breakdown characteristic enables them to provide transient suppression performance. Three models of MOV have been simulated in this project which is IEEE Group model, Picenti Giannettoni model and Fernandez Diaz model. The best among this three were compared to GDT. Where the model used to simulate the performance of GDT in this project is model proposed by Christophe Basso. The simulation has been done using the Power System Aided Design (PSCAD) software base on UiTM Shah Alam's distribution system. Results showed that Gas Discharge Tube is better than Metal Oxide Varistor in protecting our system against lightning strike.

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CHAPTER 1

INTRODUCTION

1.1INTRODUCTION

Malaysia is one of the tropical countries that have most frequent lightning activities. The researches done by meteorological department found that flash density of lightning strike in Malaysia mostly equal to 20flash/km/year [1]. Most of the transient overvoltage occurrence on the line system is caused by return stroke of the lightning. The highest value of return stroke current recorded in Malaysia is 352kA [2]. Since the current industries used a lot of sensitive electronic technology for their control system purposes, communication and switching equipments, so the topics of lightning transient protection is important to discuss. The principle of lightning transient protection is knowledge of the mechanism of the lightning discharge enable an understanding of the way in which lightning detection and warning system operates [3]. As we know the transient overvoltage can cause extreme damage and explosion to our sensitive electronic devices such as personal computer, radio, television, telephone, refrigerator and many more. The young engineers nowadays should be more creative and come with a new design of mitigation technique against lightning transient overvoltage. Metal Oxide Varistor (MOV) and Gas Discharge Tube (GDT) are two of famous mitigation technique used by majority of the industries now.