

COMPARISON OF PROPOSED ARC MODEL FOR POWER CIRCUIT BREAKERS AGAINST THE CASSIE MAYR'S MODELS

This project report is presented in partial fulfillment for the award of the Bachelor of
Electrical Engineering (Hons.)

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NOVEMBER 2008

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ACKNOWLEDGEMENT

All praise is to Allah S.W.T, The Most Gracious and Most Merciful who has given me the strength, ability and patient to complete this project.

I would like to convey my deepest gratitude and appreciation to my project supervisor, Dr. Ngah Ramzi bin Hamzah for his invaluable suggestion, guidance, advice discussions and willing in sharing the knowledge towards for the completion and success of this project.

I also like to take this opportunity to express my appreciation to my family, especially to my father and mother for give me a lot of support until I finish my study. May ALLAH SWT bless them all and thank you so much for their support.

Tremendous support was also given by my colleagues and friends in completing this dissertation. In this respect I wish to acknowledge the assistance of Ahmad Faisal bin Jamaluddin, Hamizan bin Ali, Azahari bin Jaafar and Fauzi bin Musa. May Allah reward all our efforts and good intentions Amin. May Almighty Allah bless and reward them for their generosity. Thank you.

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ABSTRACT

This paper address the possibility of designing and describes a comparison between Mayr's and Cassie's arc models and proposed model during contact separation of circuit breaker by using Matlab Simulink. This design of the propose model has been simulated in MATLAB Simulink. The design of proposed model successfully made. Through the simulation made, simulation results of several contact separation time, arc voltage, time interval of arc and post arc current zero was determine. This result found and compare to the Mayr's and Cassie arc model. This project it is a successful because if compared to exist model, the results approximately close from the proposed arc model.

Keywords:

Circuit-breaker, Arc Model, Mayr's arc , Cassie's arc

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

The arc is generally defined as a continuous luminous discharge of electricity across an insulating medium which is changed into a conducting medium due to a huge number of free electrons and ions. The arc was firstly studied concerning interruption capabilities of circuit breakers, in which arc models were initially introduced to enhance circuit breaker testing. Using arc models, the capability of arc quenching can be predicted and design enhancements can be achieved with a lower number of experimental tests. Therefore, the time is reduced and the technical and economical problems of the experimental tests are overcome. The arc models have been recently modified to study the performance of arcing faults in different voltage levels and to test their detections and their discriminations. In power systems, when a circuit breaker tries to interrupt the flow of current in a line, the system reacts in a way which tries to maintain the current flow. As the breaker contacts separate an electric current flows across the contacts, through the surrounding ionized medium. This phenomenon is called an electrical arc and it occurs at extremely high temperatures. To accelerate the process of arc extinction and current interruption the insulating characteristics of the medium are optimized and the arc may be extinguished by a gas blast. Arc interruption can be described as a transient during which an ionized conducting medium is changed into an insulating medium. MATLAB is a well-known and popular general-purpose mathematical program. Since the introduction of the Power System Blockset (PSB) , the MATLAB program is also a suitable tool for the computation of power system transients. In this paper the proposed arc model is introduced. The aims are to simulate the arc in the SF₆ circuit breaker, from the high-

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