



ELECTRICAL POWER ENGINEERING

Department of Electrical Power Engineering

Postgraduate Research Template

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|--|-------------------------------|--|----------------------|-------------------------|-------------------------|-------------------|
| # | Student Name / Surname | Nadeem Goolam Hoosen | Start Date | Sep 2018 | Supervisor | Dr. E.E. Ojo |
| | Title of Project | Controlled Switching of 11kV Vacuum Circuit Breaker for Fault Interruption | Completion | Feb 2021 | Co-Supervisor(s) | Prof. M.N. Ijumba |
| Program of Study (M Eng. / D Eng.) | | | M Eng. | | | |
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| Synopsis of Research Project: (< 300 words) | | | | | | |
| <p>The failure of the power equipment contributes to poor quality of supply that results to loss of income for power utilities. This has raises concern in the power industries, prompt the necessity to put in place protection systems. The inability for protection systems and circuit breaker to clear faults on time causes the major power equipment such as the transformers to fail and also circuit breakers to fail over time due to effects of inrush currents and arcing. In High voltage application, a technology called controlled breaker switching was developed to control the circuit breaker such that it closes the breaker at the least current point and takes into account the effects of the breaker idle time and temperature when energising the breaker. This thus ensuring the circuit breaker is energised at a time with the least effects of arcing and inrush currents. The technology is also implemented on circuit breaker opening such that it trips quickly and at the correct time current zero to prevent damage to the major electrical equipment and even the circuit breakers. The implementation of this is rarely applied on MV applications for fault interruption and was never done using a vacuum circuit breaker.</p> <p>The intention of this research is to implement the controlled switching technology on a 11kV MV vacuum switchboard breaker for fault interruption. This implementation will be conducted using simulation software PSCAD coupled with hypothesised formulas to determine the tripping times. The effects of this implementation will be analysed to determine if the application has reduced the arcing time and inrush currents during fault interruption thus assisting in determining if this controlled switching technology using a vacuum breaker will improve the lifespan of a circuit breakers and other major related equipment connected to it.</p> | | | | | | |