



*ELECTRICAL POWER ENGINEERING*

Department of Electrical Power Engineering

Postgraduate Research Template

#	Student Name / Surname	Sindisiwe Cindy Malanda	Start Date	2018	Supervisor	Prof I.E Davidson
	Title of Project	Transient Fault Analysis of a VSC-Based Multi-Terminal HVDC Scheme.	Completion	2019	Co-Supervisor(s)	Dr. M. Kabeya
Program of Study (M Eng. / D Eng.)			Master of Engineering			
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<p><b>Synopsis of Research Project:</b>  Multi-terminal VSC HVDC (MTVSC-HVDC) based schemes is a technology that enables grid integration of renewable energy sources and allows the flexibility of power transmission for easier interconnection among several power networks. HVDC transmission has been perceived as an alternative to overcome the limitations of HVAC transmission, but it is now the established technology of choice for long distance transmission, subsea electrical transmission systems and interconnection of asynchronous AC grids. Current developments in power transmission technology have led to the recognition of MTVSC-HVDC networks as a fundamental component in the present and future power network configuration. This is due to the fact that it has the ability to handle an ever-progressing demand of electricity and high penetration of new renewable energy sources. However, robust protection for such networks is still a challenge. Since the VSCs are vulnerable to DC faults, therefore it is important to perform an overall fault detection and location, particularly on multiterminal systems so as to isolate the dc fault and then restore the system to working order. Unlike traditional point-to-point HVDC links, multiterminal system requires a HVDC circuit breakers at each end of a line to select the faulted part of the system and isolate it while keeping other part of the system operating. The pole-to-ground and pole-to-pole DC faults are among the several challenges that results to the occurrence of very large and fast amplitude discharge current from the DC-link capacitance. Thus, the overall system operation can be threatened as a result of the occurrences of these faults within the DC-lines. This research study proposes to investigate the influence of the DC transient fault over the MTVSC-HVDC system and to proffer reliable protection measures. For this study a multi-terminal VSC-HVDC based system which is based on self-commutated PWM technique will be modelled. Three-level converters topology will be used, and it will be interconnected using four AC grids. The MATLAB/SIMULINK software package will be utilized for this study.</p>						