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Wed-Mo-Po3.08-03 [55]: A Resistance Model of Fault Current Limiting Magnets under DC Impact

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Abstract: The short-circuit fault current on the DC side affects the operation safety of the multi-terminal flexible HVDC transmission system (MTDC) seriously. At the same time the superconducting fault current limiter (SFCL) has received extensive attention in limiting the DC impact current due to its characteristics such as fast response speed, good current limiting effect and zero impedance at steady state. At present, simulations of the resistance of YBCO tapes under DC impact is relatively larger, which affects the design accuracy of SFCLs. In this paper, the characteristics of DC fault current are studied. The resistance and other parameters of YBCO samples under DC impact are measured by use of a DC impact platform. The heat transfer process of YBCO tapes under DC impact is studied and three different modeling methods are obtained. Finally, these methods are improved considering the characteristics of the fault current limiting magnet (FCLM), and the simulation results are compared with the experimental results of FCLMs. The advantages and disadvantages of three modeling methods are compared, and the correctness is verified. This research aids in simulation analysis and optimization design of DC SFCLs.

Key words: fault current limiting magnet, YBCO tape, DC impact and transient heat transfer.

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