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# Wed-Mo-Po3.09-06 [68]: Technical and Economic Analysis of Resistive Superconducting Current Fault Limiter with Parallel Shunt Resistance

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The resistive superconducting fault current limiter (RSFCL) is widely used in high voltage direct current transmission based on modular multilevel converter (MMC-HVDC) to effectively limit the fault current and facilitate the interruption of the DC circuit breaker. During current limiting process, the RSFCL needs to withstand an overcurrent impact with a magnitude of several times the critical current, and the temperature rise could leave irreversible damage on its superconducting properties. In order to protect the superconducting tapes, the RSFCL is usually connected with a parallel shunt resistance which can divert part of the fault current. However, the shunt resistance will affect the current limiting performance of RSFCL, and need to consume more superconducting tapes under the same equivalent resistance. This paper will discuss the technical and economic performance of RSFCL with shunt resistance. Using finite element software, the temperature rise and the quenching resistance of the RSFCL will be calculated, and the results will be compared with the case without shunt resistance in terms of current limiting performance, fault response speed, superconducting tape consumption, and temperature rise. This work is expected to be the reference for the RSFCL design and optimization.

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