MT29 Abstracts and Technical Program



Contribution ID: 332

Type: Poster

Fri-Af-Po.01-01: Quench Detection and Protection of the Excitation Coils of a 2G HTS Superconducting Wind Generator Based on Multi -Turn Co - wound Coil Technology

Friday 4 July 2025 14:00 (2 hours)

For offshore superconducting wind generators, the complex operating conditions inside the machine—including thermal losses, stress, vibration, and transient load variations—pose significant challenges to the stable operation of the magnet. These factors can trigger coil quenching, potentially leading to the burnout of excitation coils and further generator fault condition. This study is a preliminary study for the 25 MW wind generator development plan, investigates the quench overload capability and inter-turn current sharing of no-insulation (NI) coils, metal-as-insulation (MI) coils, and insulated coils under the defects situation with the application of multi-turn co-wound technology. Experimental validation was conducted on scaled-down coils at 77 K, demonstrating that multi-turn co-wound technology significantly enhances the overload tolerance of superconducting excitation coils. Additionally, it amplifies quench voltage signals under fault conditions, enabling earlier fault detection and response.

Author: KE, Zequn (Shanghai Jiao Tong University)

Co-author: Prof. HUANG, Zhen (Shanghai Jiao Tong University)

Presenter: KE, Zequn (Shanghai Jiao Tong University)

Session Classification: Fri-Af-Po.01 - Quench Detection and Protection II