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Thu-Af-Or19-08: Experimental research of contact mechanical behavior among YBCO tapes in HTS cable

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The HTS (high temperature superconductor) cable is an important component of large magnet system due to its excellent electromagnetic characteristics. The contact mechanical properties such as friction and contact resistance are significantly affected by the contact force among the HTS tapes in HTS cable when subjected to the strong magnetic field, high current, and low temperature in extreme working conditions. It is meaningful to improve the performance of large magnet system that study the contact mechanical behavior among YBCO tapes in HTS cable. This paper focuses on CORC and TSTC cable and TSTC cable, we conducted experiments to obtain the data of contact force and contact resistance and critical current degradation among YBCO tapes under different loads at room temperature (293K) and operating temperature (77K). The relations between contact force, contact resistance, friction and different loads are obtained by organizing experimental data. This work aims to search for the contact mechanical properties among the HTS tapes in operating conditions and provide the guidance of the optimization design and application of large magnet system.

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