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Counterflow cooling tests of superconducting cables for railway systems

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DC electric railway systems are widely used in Japan, including in the metropolitan areas. However, they have some problems, such as limited use of regenerative brakes and energy loss. In order to solve those problems and in the aim of streamlining and saving of energy of power system in DC electric railway systems, Railway Technical Research Institute (RTRI) has developed superconducting cables for railway systems. It has consistently tackled various issues including technologies and applications, such as basic property of HTS wires, optimization of introductory configuration by simulation, and system design with high reliability. Based on such various inquests and examination results, the prototype of the superconducting cable (30 meters, DC1.5 kV, 5 kA), where the counterflow circulation system (Go-Return system) was adopted, was produced and installed in railway test track of RTRI.

Results of counterflow cooling tests by controlling the number of cryocoolers in the opposed terminal will be discussed.

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