Fabrication of a Scaled MgB2 Racetrack Demonstrator Pole for a 10-MW Direct-Drive Wind Turbine Generator - DTU Orbit (18/03/2019)

Field windings made of MgB2 wires or tapes are considered for their potential to reduce volume, weight, and cost of large offshore wind turbine generators. To gain experience of how to use this relatively new material in full-scale generators, tests of different winding methodologies and techniques are needed. In this paper, we describe in detail the steps used to wind a racetrack coil with a length of 1 m and a width of 0.5 m out of 4.5 km of MgB2 superconducting tape. The width corresponds to a full-scale pole of a 10-MW generator, whereas the length of the straight section is shorter than the corresponding full-scale pole. The coil was built up of ten double pancake coils. Each double pancake coil was wet wound using a semiautomatic winding process, where Stycast 2850 was applied directly to the MgB2 tape without any other dedicated electrical insulation. The strengths and weaknesses of the winding process are discussed and compared to the dry-winding method.

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