Investigation of Twisted Stacked-Tape Cable Conductor

M. Takayasu[1], J.V. Minervini[1], L. Bromberg[1], M.K. Rudziak[2], and T. Wong[2]

[1]MIT Plasma Science and Fusion Center, Cambridge, MA 02420, U.S.A.
[2]Supercon, Inc., Shrewsbury, MA 01545, U.S.A.

Abstract - A cable fabrication method of a twisted stacked tape conductor for HTS YBCO tapes has been developed and tested. A 2 m long, 32-tape conductor of 4 mm width YBCO was fabricated with a 200 mm twist pitch. The measured critical current of the straight cable agreed with the expected values estimated from the self-magnetic field. The 2 m long cable wound on a surface of 0.5 m diameter circle did not show any degradations. It has been confirmed through tests with single tape and cable tests that it is possible to develop a YBCO multiple-tape stacked cable with a 200 mm twist pitch and to make a coil with an innermost turn of at least 0.5 m diameter. A joint method for a multi-tape YBCO cable using BSCCO tapes has been developed and operated at 2.2 kA. AC losses of a twisted stacked YBCO tape cable also have been analyzed. The twisted stacked-tape cabling method for YBCO tapes will be very useful for high-current, high-field magnets for various applications.

Keywords: Cabling, critical current, AC loss, HTS, termination, joint.

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