Contribution ID: **940** Type: **Poster Presentation of 1h45m**

Stability and Normal Zone Propagation in a conduction cooled racetrack coil wound of YBCO Coated Conductor Tape – FEM Modeling

Wednesday, 30 August 2017 13:15 (1h 45m)

We present a Finite Element Method (FEM) analysis of stability, heating and quench propagation in a conduction cooled race track coil at 20 K. The coil was assumed to be wound using YBCO coated conductor tape either non-insulated or insulated by a kapton tape. An anisotropic continuum model of the winding for thermal propagation, with input parameters taken from experiments, was developed and adopted in computations. Both coils – with non-insulated as well as kapton insulated tape - have the same critical current. The coil with non insulated tape needs more YBCO tape but can operate at lower current. As a consequence of this the non-insulated coil has a higher operational temperature margin. The coil wound using the non-insulated tape also shows a higher degree of electromagnetic stability because of possible current sharing among the turns within the winding. Stress–strain modeling showed that due to a strong anisotropy of Jc in YBCO film, the critical current of the coils is not limited by mechanical stresses, but by the radial magnetic field component in the winding, i.e. by the field component parallel to c-axis of YBCO film. Cooling time of the non-insulated coil is shorter than that of the insulated one.

Submitters Country

USA

Primary author: MAJOROS, Milan (The Ohio State University)

Co-authors: SUMPTION, Mike (The Ohio State University); Prof. COLLINGS, Ted (MSE, The Ohio State University); DOLL, Dave (Hyper Tech Research); TOMSIC, Michael (Hyper Tech Research Inc.)

Presenter: MAJOROS, Milan (The Ohio State University)

Session Classification: Wed-Af-Po3.11

Track Classification: G3 - Stability of Conductors and Coils