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Bending Characteristics of Cable-In-Conduit Conductor based on Quasi-Isotropic Strands

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In recent years, the REBCO tapes have a broad development prospect in the application of large high field magnets due to its high critical current density and superior mechanical property. Several conductors/cables with high carrying current capacity made of REBCO tapes, such as RACC, CORC, TSTC, RS, SSC, HTS-CroCo and Q-IS, are expected to fabricate cable-in-conduit conductor (CICC) or Rutherford. The critical bending radius of CICC is a significant parameter for the high field magnet design. This paper presents the bending characteristics of CICC based on Q-IS. Firstly, the CICC model is established in the finite element software to analyze the current distribution of CICC. A dummy CICC sample made from six Q-ISs arranged in the six helical slots is tested in the 77K to verify the feasibility of CICC simulation model. The bending diameter and current distribution of CICC at 4.2K under high magnetic field are simulated based on the verified model, which is useful for its application for the high field magnet.

Index Terms—Bending, critical current, cable-in-conduit conductor (CICC), Q-IS.

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