1. Introduction

- The applications of high temperature superconducting (HTS) tapes for high field magnets need the stacking of multiple tapes to increase the capacity of the current. Several types of the conductors with the large capacity are recently developed. Conductor on round core (CORC) is one of them.
- For the application of HTS conductors, we need not only the large capacity of the conductor but also the low AC losses. The striation on the tape is one of the solutions for the loss reduction because the AC losses depend on the width of the tape.
- We proposed a loss calculation method for a solenoid coil wound with striated CORC. A straight short section of the CORC coil with 22 turns of striations were calculated. And the magnetization losses of the solenoid coil with 22 turns of striated CORC were calculated.

II. Methodology of magnetization loss calculation of CORC

\[ P = \int B^2 \, dB \]  
\[ P = \sum_{n=1}^{N} P_n \]  
\[ \Delta L = S \cdot l \]

- \( S \): Width of the HTS strand
- \( l \): unit length of HTS strand
- \( B \): perpendicular magnetic flux density
- \( \Delta L \): magnetization losses of unit volume
- \( P \): magnetization losses of the model CORC

IV. CORC with striated strand HTS tape

- For the calculation of the AC losses, we first calculated the perpendicular magnetic field on the coil and then the loss density was calculated. The results from the proposed method were compared with the measured ones in case of a straight short sample of CORC.
- We also measured the magnetization losses of CORC with a stripped strip and calculated the losses in the coil when CORC turns at 4 striated strands. The Coiled CORC was helically wound on the former, so the perpendicular fields on the strands differ with the position or arc angle on the former.

VI. Conclusion

- We suggested a calculation method of the magnetization losses in a solenoid coil wound with CORC. CORC is one of the candidates with the large capacity for high field magnet applications. On the other hand, the electrical power transformer, AC reactor, or SMES need not only the large capacity but also the low AC losses.
- We also measured the magnetization losses of CORC with a stripped strip and calculated the losses in the coil when CORC turns at 4 striated strands. The Coiled CORC was helically wound on the former, so the perpendicular fields on the strands differ with the position or arc angle on the former.
- CORC with striations proved itself to have low AC losses due to the perpendicular magnetic fields. But it does not mean that CORC is the better conductor for AC applications than other conductors because it experiences the perpendicular magnetic fields everywhere. We are trying to make and test a solenoid coil with striated CORC. And then we design HTS devices for AC applications with various types of the conductors.