Application potential of round wires/cables made from CC tapes

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Why cables?

- maximal tape critical current is limited

- maximal tape length is limited

- possibility to bend

- equal electromagnetic conditions in all wires

- low AC loss
Cable concepts

Twisted stack

Roebel cable

CORC cable
Which one is the best?
Engineering current density

Roebel cable - $J_e$

CORC - $J_e$
Engineering current density

Roebel cable - $J_e$

Roebel cable – transposition length

CORC – transposition length

CORC - $J_e$
In-field performance

77 K, 100 mT

CORC cable

Roebel cable
In-field performance

77 K, 100 mT

![Graph showing in-field performance with Roebel cable and CORC cable line graphs at 77 K, 100 mT.](image-url)
In-field performance

77 K, 100 mT

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Tape resistance against mechanical stress

Increase of $J_e$ – reduce former diameter

Different layers - different lay angle
CORC cable – 2 tapes, SuperPower, core diameter 3.5 mm
CORC cable SuNam tape – 4 tapes

Core – copper tube, 6 mm outer diameter

Length – 5 m

Internal cooling – flow of nitrogen

Coil – 5 turns, diameter 33 cm

13 turns, diameter 11 cm
CORC cable SuNam tape – 4 tapes

- Blue line: Ic coil - 13 turns
- Red line: Ic tape x 4 - perpendicular field
Low AC loss cable – CORC with striations

- full transposition of filaments

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- non striated - 144 Hz
- non striated - 72 Hz
- striated - 144 Hz
- striated 72 Hz
- non striated - soldered - 144 Hz
- non striated - soldered - 72 Hz
- experiment - striated - soldered - 144 Hz
- experiment - striated - soldered - 72 Hz
- theory - 3 strips
- theory - 3 x 5 strips
- FEM - non striated
- FEM - striated
CORC cable - summary

- low engineering current density

- scalability to high currents

- short twist length

- isotropic properties (only on long length)

- low AC loss
Question:

Which cable is the best?

Answer:

For which application?

CORC cable is good choice for

AC applications

with

high currents