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## Recent Work

### **Title**

Engineering current density optimization in Nb 3Sn Rutherford Cable

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### **Author**

Scanlan, R.M.

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## Engineering Current Density Optimization in Nb<sub>3</sub>Sn Rutherford Cable

D.R. Dietderich, H.C. Higley, E.H. Palmerston, R. M. Scanlan

LBNL, Berkeley, CA 94720

To produce the highest field, a magnet designer wants the highest possible current per unit cross-section, engineering critical current density,  $J_e$ . Of the factors that determine  $J_e$ , this paper will focus on increasing the compaction of the cable. This work began when Nb<sub>3</sub>Sn cable made of Oxford modified-jelly-roll strand was annealed prior to coil fabrication. This was done to reduce the dimensional changes that occurred during heat treatment. The annealed cable was re-rolled to give it the desired dimensions, but the process was never optimized to maximize the compaction. The objective of this work is to increase the compaction of a cable by re-rolling, after it has been annealed at 210°C and 340°C, and retain a high critical current that has not been degraded. It has been observed that a cable contracts by 0.2-0.25% when annealed at 210°C for 6h. It is hoped that by increasing the time or the temperature of the annealing treatment one can remove most, if not all, of these dimensional changes, such that none occur during the heat treatment of a coil.

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