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Continuous transport and magnetization measurements on production coated conductors

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Understanding the reasons for variations in critical current (I_c) of production coated conductors is becoming increasingly important for magnet builders. To provide such information, we use a reel-to-reel I_c measurement system, YateStar, to characterize the conductors. YateStar is a hybrid device allowing transport I_c measurement in two orthogonal fields and remanent magnetization evaluation of $I_c(x)$, making it much easier to separate vortex pinning and cross-sectional contributions to $I_c(x)$. Regions of interest can be precisely located by Hall probes and then cut out for microstructural studies. Here we show different types of as-manufactured defect populations and cases where no degradation occurs in use and where strong degradation has occurred in use. The applications include magnet coils that have suffered quench damage and cables wound of tapes around a round core. Protection against pre-existing or in situ damage is a significant concern for all magnet builders. Our experiments are providing direct information on these points.

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