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Structured Cable for High-Current Coils of Tokamaks CHRISTOPHER BENSON, PETER MCINTYRE, AKHDIYOR SATTAROV, THOMAS MANN, Texas A&M University — The 45 kA superconducting cable for the ITER central solenoid coil has yielded questionable results in two recent tests. In both cases the cable T_c increased after cycling only a fraction of the design life, indicating degradation due to fatigue and fracture among the superconducting strands. The Accelerator Research Lab at Texas A&M University is developing a design for a Nb_3Sn structured cable suitable for such tokamak coils. The superconductor is configured in 6 sub-cables, and each subcable is supported within a channel of a central support structure within a high-strength armor sheath. The structured cable addresses two issues that are thought to compromise opposition at high current. The strands are supported without cross-overs (which produce stress concentration); and armor sheath and core structure bypass stress through the coil and among subcables so that the stress within each subcable is only what is produced directly upon it. Details of the design and plans for development will be presented.

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