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Wed-Mo-Po3.01-04 [4]: Structural assessment of the DTT Poloidal Field Coil system

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In the context of the European Fusion Roadmap, the Divertor Tokamak Test (DTT) experimental reactor is intended to investigate alternative divertor configurations in view of the EU-DEMO power exhaust handling necessities, and it is to be built at the Frascati ENEA research centre in Italy. The six poloidal field coils of the tokamak are responsible for the plasma shape and equilibrium, and numerous steps were taken to obtain a design that is magnetically consistent with the plasma requirements and structurally compliant with the chosen failure criterion. All the poloidal field magnets are superconductive and comprised of NbTi, except for the uppermost and lowermost coils which feature $\mathrm{Nb_3Sn}$ as superconducting material. This work presents the structural assessment that has been performed on the poloidal field coil system, taking into account the cooldown process, the energisation to operating conditions and fatigue. Finite Element Analysis has been employed as the principal means of investigation, while some classical results from the theory of Elasticity corroborate the evaluations.

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