

Cogging Torque Reduction of a Novel Low-Speed High-Energy Permanent-Magnet Electrical Machine

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Abstract

The cogging torque of a novel low-speed high-energy permanent-magnet electrical machine was estimated using the flux-MMF method together with the help of finite element technique (FET). The high-energy permanent magnets are arranged with flux concentration and magnetized tangentially on the rotor support structure. Soft magnetic pieces are attached to both poles of the magnets. The width of these pieces corresponding to the lowest cogging torque was adopted. The slot openings were then filled by soft magnetic wedges and their effect on the cogging torque and performance of the machine was studied. The machine was manufactured and the starting torque in both cases was measured.