MT 26
International Conference
on Magnet Technology
Vancouver, Canada | 2019

Contribution ID: **1012** Type: **Poster Presentation**

Tue-Mo-Po2.11-12 [98]: A Study on the Shape Design of a Magnetic-Geared Synchronous Motor for Improvement of Performance and Securing Rigidity

Tuesday 24 September 2019 08:45 (2 hours)

This paper describes a study on the shape design of Magnetic-geared synchronous Motor for improvement of performance and securing rigidity. The Magnetic-Geared synchronous Motor(MGM) is an all-in-one structure of a magnetic gear and a permanent magnet synchronous motor, and is an electric machinery capable of operating both functions. In this study, the existing surface-mounted type is set as the model of the basic design and the performance is improved through the design of changes in the permanent magnet shape of the rotor. Mechanical reduction devices have high mechanical noise and vibration and require replacement due to wear of the gear teeth, resulting in increased maintenance costs. In addition, when the induction motor is applied, the power transmission efficiency drops to 90% or less, so the efficiency tends to be low. In this paper, the basic design of the 1kW magnetic-geared synchronous motor (MGM) was performed in SPM type. However, SPM type with many domestic and foreign research examples has limited performance due to large magnetic gap and disadvantage of structural rigidity at high speed. Thus, in this study, the existing SPM type was set as the model of the basic design and the performance improvement and rigidity were secured through the design of changes shape of the rotor. This method of study was conducted based on the FEM of electromagnetic field. This paper describes a study on the shape design of the MGM for improvement of performance and securing rigidity. In order to improve the performance, the shape of the rotor was changed to reduce the amount of permanent magnet and the torque ripple rate. In addition, we propose and design a favorable shape for high speed and secured rigidity through FEM analysis. MGM has studied SPM type, but MGM proposes IPM type because IPM type is excellent in performance and rigidity.

Authors: JEONG, Geochul (Hanyang University); JANG, Hyungkwan (Hanyang University); KIM, Hyunwoo; LEE, Ju (Hanyang University)

Presenters: JANG, Hyungkwan (Hanyang University); KIM, Hyunwoo

Session Classification: Tue-Mo-Po2.11 - Motors V