

A Study on Traction Motor Design for Obtaining the Maximum Traction Force of Tram-Train

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Abstract : This study is about IPMSM design for obtaining the maximum traction force of Tram-Train. Tram-Train is a Tram and Train-combined railway vehicles, which operates at a maximum speed of 70km/h in the city section (Tram section) and at a maximum speed of 150km/h in the out-of-city section (Train section). For this reason, tram-train was designed to be an IPMSM (Interior Permanent Synchronous Motor) with a wide range of speed variation. IPMSM's magnetic path varies depending on the shape of rotor and in this case, the power characteristics are different in the constant torque area and the flux weakening area. Therefore, this study suggests a method to improve Tram-Train's traction force, based on the relationship between magnetic torque and reluctance torque. The suggested method was applied through IPMSM rotor shape design and electromagnetic field finite element method was conducted to verify the validity of the suggested method.

Keywords : tram-train, traction motor, IPMSM, synchronous motor, railway vehicles

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