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Tue-Af-Po2.20-04 [56]: Low-Weight Design Method of Electric Outboard PM Motor for Small Leisure Boat

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This paper presents the design of Electric outboard Permanent Magnet(PM) motor driven at a rated output and speed of 2.5 kW and 3,000 r/min, respectively, for use in small leisure boat. The PM motor for electric outboard motors is located below the water surface and it is necessary to set the proper PM operating point in consideration of the fact that the water cooling can be applied. In addition, the actual driving mechanism must be capable of at least three speed adjustments and rapid acceleration/ deceleration at the same time. In this paper, the final design model that satisfied the above specifications of electric outboard PM motor is performed with finite element analysis(FEM). The optimal design is to improve the output density to achieve low-weight and to compare the outer rotor type with the inner rotor type. Finally, the validity of the low-weight design method is verified through manufacturing prototype and experiments.

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