Study on improving efficiency of three phase induction motors with copper rotorfor aerospace

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ABSTRACT

This paper presents the analysis of the characteristic equation of copper rotor three phase induction motors established by equivalent circuit. In addition, this paper also shows the influence of the materials and sizes of squirrel-cage rotor copper bars on motor performances. Even though the copper rotors are not currently widely-used, increasing the efficiency of motors has become a crucial issue. The copper rotors may gradually take place of aluminum rotors. Thus it is important to do research in the characteristics of copper rotors. Induction motors are popular not only in industries but also in daily life. It is environmental-friendly and power-saving to increasing the efficiency of induction motors. This paper discusses and analyzes the change of torque characteristics on a 200W/12pole copper rotor three phase induction motor with different the rotor materials and stator windings. Therefore, we may be able to know more about the influence of copper rotors on the torque characteristics of induction motors. Simulation software can also help to simulate and calculate the other characteristics of induction motors, such as current, power or power factors, etc. Besides, we also focus on factors for influencing efficiency. Next we do experiments to prove the analysis of equivalent circuit and simulation. For example, DC test, lock-rotor test, no-load test and increase-load test, and so on. These tests prove that equivalent circuit shows the data that affects efficiency. Moreover, with modifying the data for simulation software, we can know more information about data for influences and value of improving efficiency by modifying motors.

Keywords : three phase induction motor, squirrel-cage rotor copper bar, efficiency of three phase induction motor.

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