

Corrosion Effects on the Magnetic Behavior of Magnetic Circuit of an Induction Machine

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Abstract: In This paper, the effect of corrosion on the magnetic behavior of a magnetic material used as a magnetic circuit in the induction machines is studied. With this objective, the magnetic properties of the samples with corrosion and without corrosion were evaluated by the study of hysteresis loops using a homemade vibrating sample magnetometer (VSM). The magnetic parameters extracted from the hysteresis loops such as saturation magnetization, coercive, remanent magnetization, squareness ratio, magnetic permeability, and hysteresis area were analyzed. It was shown that more energy is required to demagnetize the sample with corrosion than the sample without corrosion, and the hysteresis loss in the case of the sample with corrosion is more than the case of the sample without corrosion. These mean that when the corrosion is presented in the magnetic circuits of the induction machine, the hysteresis loss increases, consequentially reducing the machine efficiency.

Keywords : corrosion, magnetic behavior, hysteresis loops