

An experimental study of induction motor current signature analysis techniques for incipient broken rotor bar detection

ABSTRACT

Incipient fault detection of the induction machines (IM) prevents the unscheduled downtime and hence reduces maintenance costs. Condition monitoring, signal processing and data analysis are the key parts of the EVI fault detection scheme. The Motor Current Signature Analysis (MCSA) is considered as an effective condition monitoring method in any EVI. However, a signal processing technique, which enhances the fault signature and suppress the dominant system dynamics and noise, must be considered. Windowed Fourier transform analysis and wavelet are of the most considered signal processing methods. However, some parameters influence their ability and accuracy. This paper intends to investigate the effectiveness of these methods for incipient fault detection. Accordingly, current signal was measured and analyzed for broken rotor bar diagnosis in a squirrel-cage induction machine. Results indicated that though windowing improves Fourier transform analysis, it is not capable of accurate incipient fault detection. In other words, wavelet analysis is superior for this purpose.

Keyword: Induction machine; Broken rotor bar; Motor current signature analysis; Fourier analysis; Wavelet analysis