Experimental Validation and Dynamic Simulation of Rotor Faults in Induction Motors

Ariunbolor PURVEE, German Mongolian Institute for Resources and Technology, Mongolia, Robert MORELOS ZARAGOZA, San Jose State University, CA, United States, Munkhjargal TSERENDORJ, Mongolian National University (private), Mongolia and Enkhbat TSEND-AYUSH, Mongol Tsankhim Co.LTD. Electric Motors Repair Center, Mongolia

Modelling and simulation

Rotors of squirrel cage induction motors consist of rotor bars that cannot be repaired, once broken. Due to Mongolia's remote and landlocked location, replacements cannot be obtained easily, which poses a problem in industries such as mining, which is a major economic driver. It is therefore very important to monitor the condition of the rotors, while the motor is still in good running condition, in order to detect any faults in the rotors prior to motor breakage. Dynamic simulation of a squirrel cage induction motor with a broken rotor bar, based on a winding function approach, was used to characterize rotor faults. Experimental results showed that the characteristic frequencies in vibration analyses exhibit the same patterns as those obtained in torque analyses of rotor bar faults. Therefore, either a vibration data acquisition device or a torque data acquisition device can be used for online condition monitoring of rotor faults. This has implications for mining companies, who often work in remote locations, and for other sectors where downtime is critical.