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Action List for Rotor Anomalies

Your reliability analyst just told you that they suspect a rotor cage anomaly on one of your critical motors. What can you do to lower the risk of a catastrophic failure, reduce the chance for secondary damage to the stator windings, and possibly extend production as long as possible? The following list is a good start to accomplishing each of those lofty goals in the event of a rotor cage defect:

- Increase the testing frequency for trend analysis
- Limit the starts and stops of the motor
- Minimize load fluctuations of the motor
- Determine the rotor design as open or closed bar
- Determine the speed of the motor

The most stress felt by the rotor cage is during the motor start-up. Once the motor is up and running the slip is very low and the stress on the rotor bars is greatly reduced. Minimizing load fluctuations focuses on the same subject as limiting start-ups in that load fluctuations create varying current and stress on the rotor. If you can base load the motor with the rotor anomaly and rely on other motors to vary with load demand you would reduce the stress on the fault. Knowing the rotor design is important to understand the risk of the situation. If the rotor is a closed bar design then the rotor bars are mostly underneath the rotor iron and even if the bar is cracked or broken the overlapping iron will prevent the rotor bar from exiting the slot. This lowers your overall risk and allows you to delay any immediate action for the sake of production. However, if the rotor is an open bar design then as the rotor defect advances it is very common for the rotor bar slot to open up allowing a broken bar to escape and come in contact with the stator iron and windings. This is often catastrophic and at minimum a 2-3 times multiplier in the cost of repairs. Finally, know the speed of your motor. A two-pole motor running near 3600rpm has significantly more centrifugal force on the rotor bars than a four or six-pole motor. The combination of a two-pole motor with an open bar design places the motor at a high risk and may force your hand to take immediate action.

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