



# CASE STUDY—ROTOR

## Vibration Caused by Electrical Fault

<b>Industry:</b>	<b>Refinery</b>	<b>Fault Zone:</b>	<b>Rotor</b>
<b>Motor Type:</b>	<b>Synchronous</b>	<b>Voltage:</b>	<b>13.200</b>
<b>HP:</b>	<b>1750</b>	<b>Speed:</b>	<b>1200 rpm</b>

### ***Summary***

Unbalanced rotor fields detected with RIC and inductive measurements.

### ***Problem***

After finding unacceptable vibration levels of 4 Mils on a large compressor motor, attempts were made to balance the rotor with a 2-lb. weight. Initially, the weight reduced the vibration to an acceptable 1.5 Mils. However, levels climbed again until they reached 10 Mils at no-load. Several technologies were employed to locate the source but provided no conclusive results.

### ***Looking for the Root Cause:***

A service company was contracted to perform MCE testing. Initial test confirmed that the insulation system, power circuit and stator windings were in good health. However, a Rotor Influence Check (RIC) revealed a inductive imbalances which deviated by as much as 9%. Such a variance focused the troubleshooting efforts to the rotor. Inductance readings taken on the individual rotor coils identified marked differences among field poles. This imbalance, undetected by other methods, created a field distortion substantial enough to induce the measured vibrations. The decision to replace the rotor was made and the vibration readings taken following the repair were normal.

### ***Savings***

Without the use of the MCE, troubleshooting efforts would have continued for at least another 24 hours. Enormous downtime costs had persuaded the company to replace the entire motor if no solution had been found by this time. Utilizing the MCE drastically reduced financial losses and prevented the unnecessary costs of total motor replacement.



***Estimated Failure Costs***

-Downtime \$1,440,000

-Removal/Installation \$10,000

-Motor Repair/ Replacement \$750,000

**Total Losses Prevented \$2,200,000**