Vibration Analysis

Case Study – Gas Recycle Fan

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Vibration Analysis – Gas Recycle Fan

- The Gas Recycle Fan is part of an Animal Feeds Dryer Plant.
- It is critical for the operation of the Dryer Plant. Failure will result in Dryer Plant shutdown.
- Monthly Vibration readings are taken throughout the operation period.
- In Sept 2012 it was noticed an increase in vibration levels in the 3-4X RPM band on the motor NDE horizontal reading.
Motor NDE – Overall Vibration Trend mm/sec RMS

3-4 x RPM Band Trend mm/sec RMS
Increase in Harmonics less than 10X RPM
Spectrum shows synchronous harmonics from 1X RPM up to 8X RPM.
High Resolution 6400 Line spectrum shows clear sidebands surrounding the 1-8 XRPM harmonics
Extended Time Waveform clearly shows a regular “Beat” is present, this was also audible.
Gas Recycle Fan – Motor Details

- Induction Motor
- Power 315 KW
- 1500 RPM.
- Actual Running Speed 1490 RPM
- 4 Poles
- Rolling Element Bearings
Gas Recycle Fan Motor – Detailed Analysis

High Resolution spectrum shows run speed harmonics surrounded by modulation sidebands

1xRPM 2xRPM 3xRPM
Gas Recycle Fan Motor – Detailed Analysis

Sidebands measured at 40 CPM (Cycles Per Min)

Suspected Rotorbar Problem
Gas Recycle Fan Motor – Detailed Analysis

Rotorbar Defect Freq = No. of Poles x Slip Frequency

1500 RPM – 1490 RPM = 10 CPM Slip Frequency

4 Poles x 10 CPM Slip Freq = 40 Cycles Per Min

40 Cycles per min matches the spacing of the modulation sidebands surrounding the 1xRPM harmonics. This is also the frequency of the “Beat”

Conclusion:

Rotorbar Defects Present on Motor
Upon Inspection - Rotobar found to be cracked