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Vibration Analysis

Case Study – Gas Recycle Fan

Presentation by:Stuart Walker

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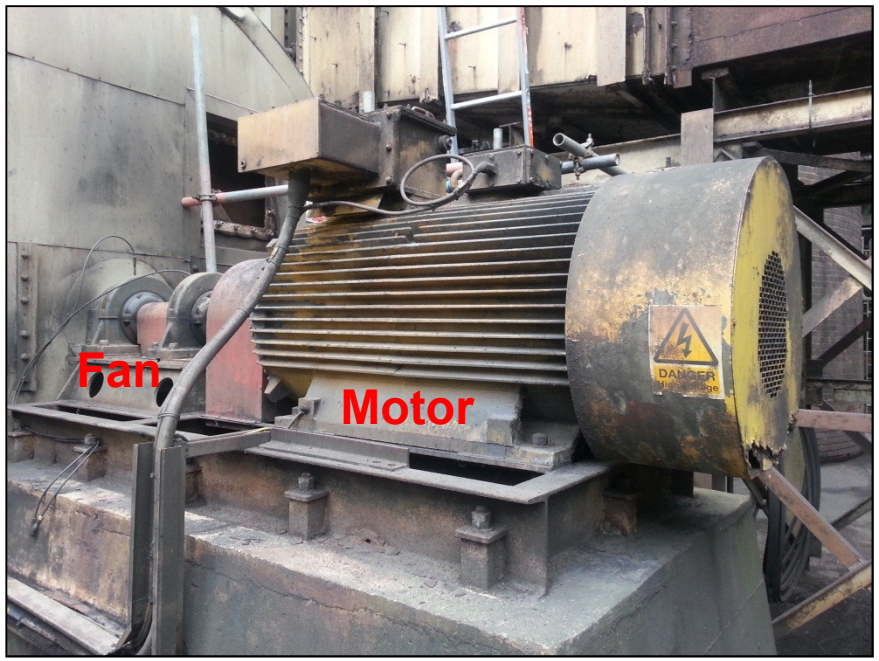
Vibration Analysis – Gas Recycle Fan



- 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 3-4XRPM band on the motor NDE horizontal reading

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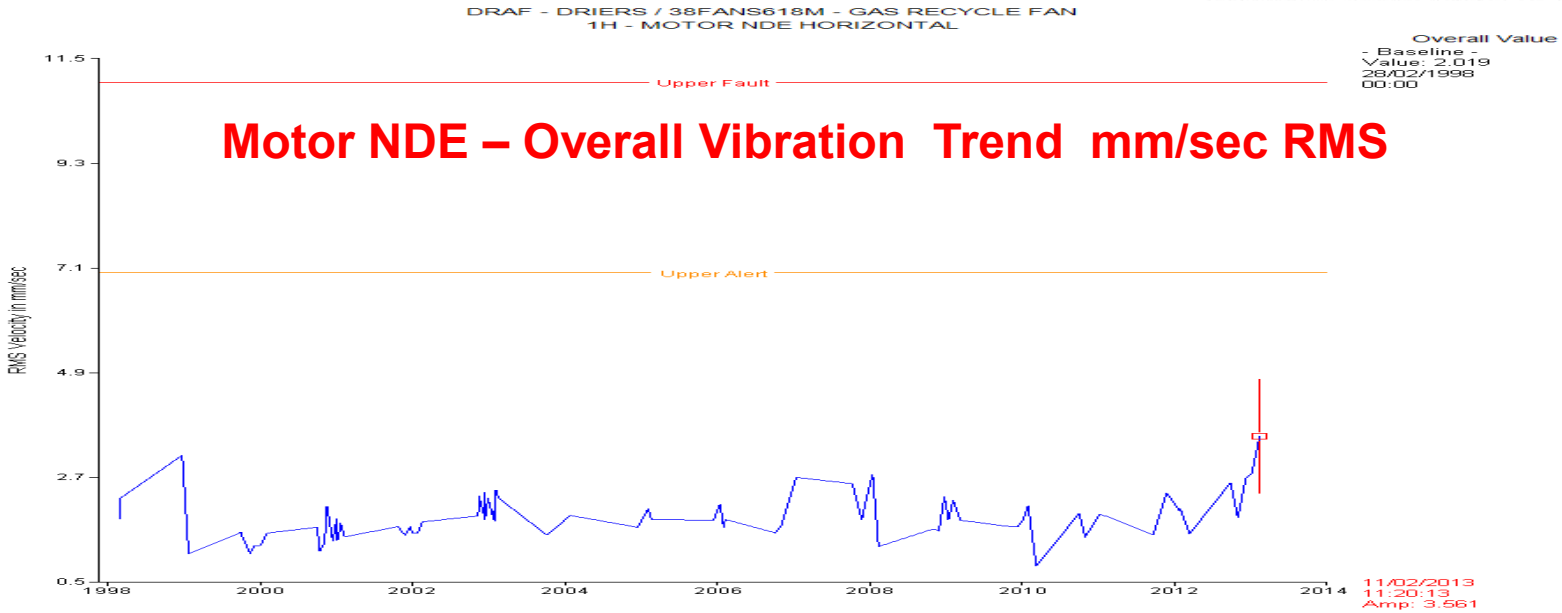
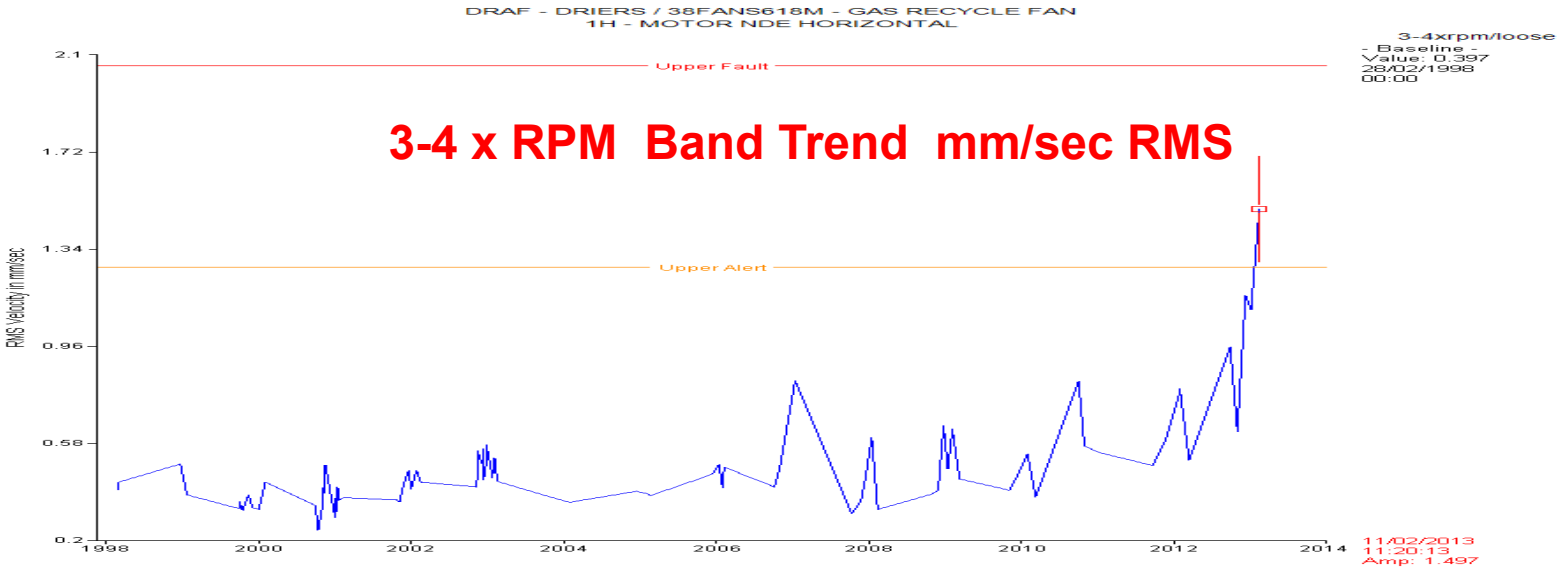


Motor NDE – Overall Vibration Trend mm/sec RMS



3-4 x RPM Band Trend mm/sec RMS

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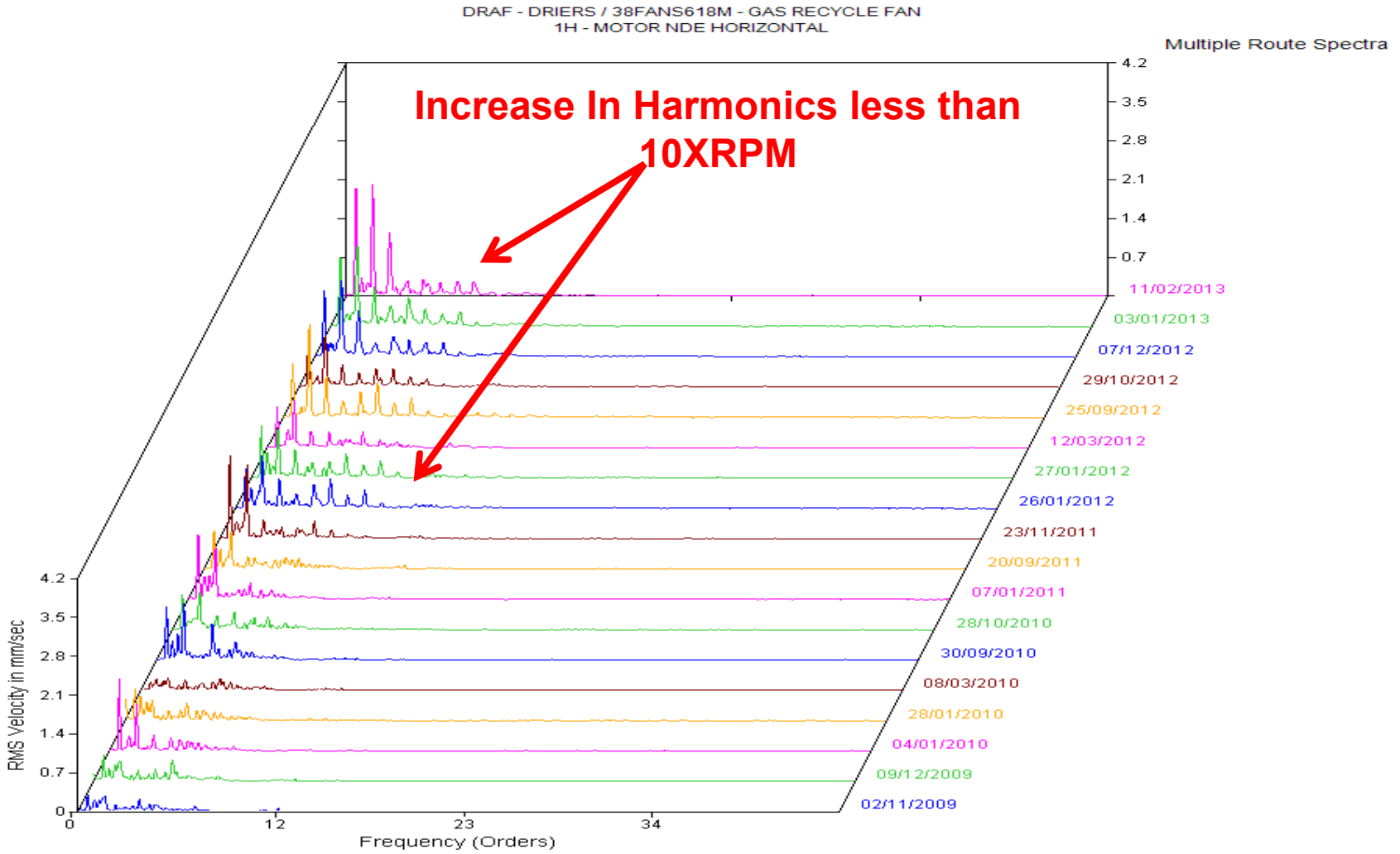

Multiple Spectrum History Plot- Motor NDE Horiz

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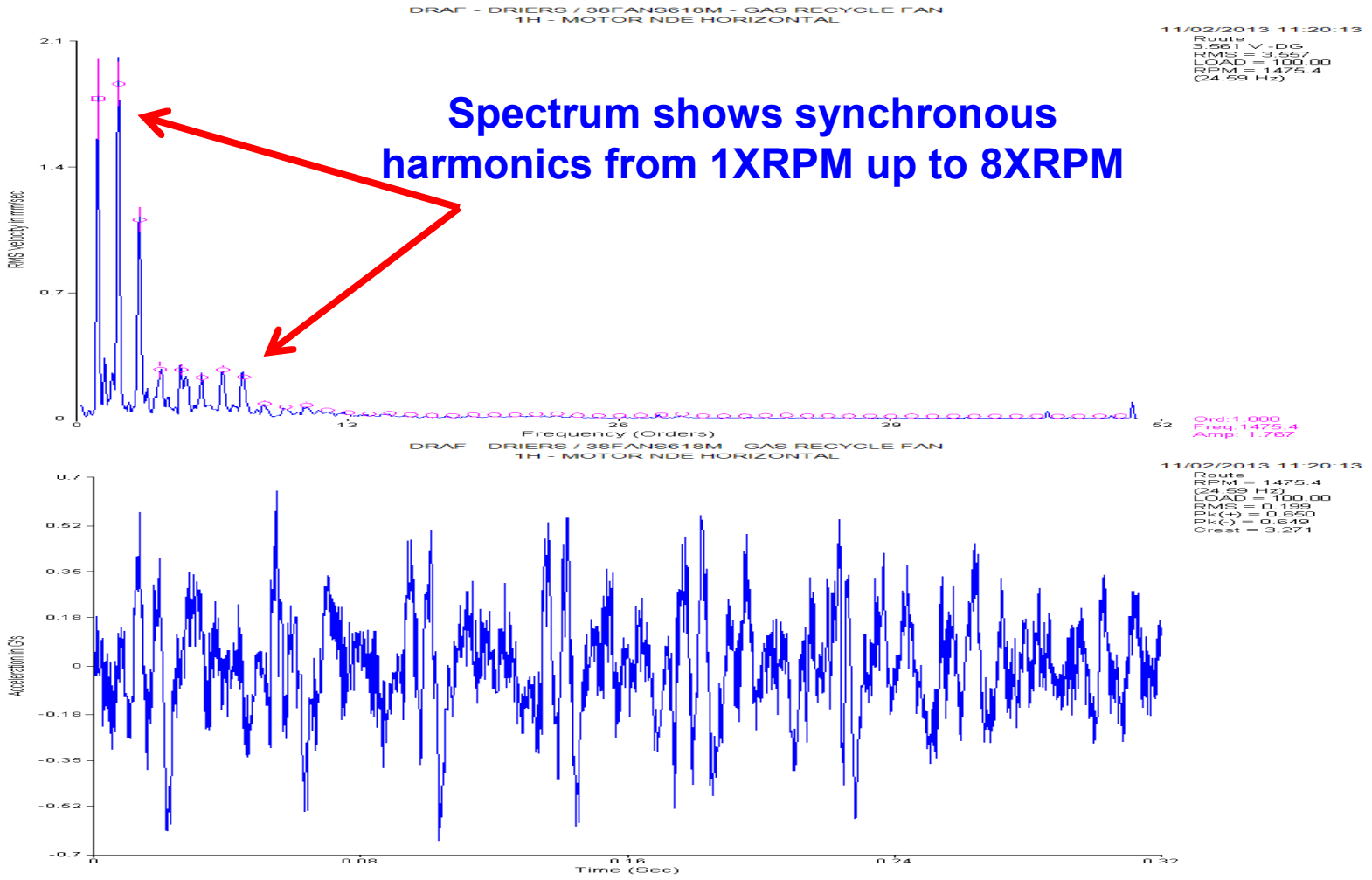

Spectrum & Waveform - Motor NDE Horiz

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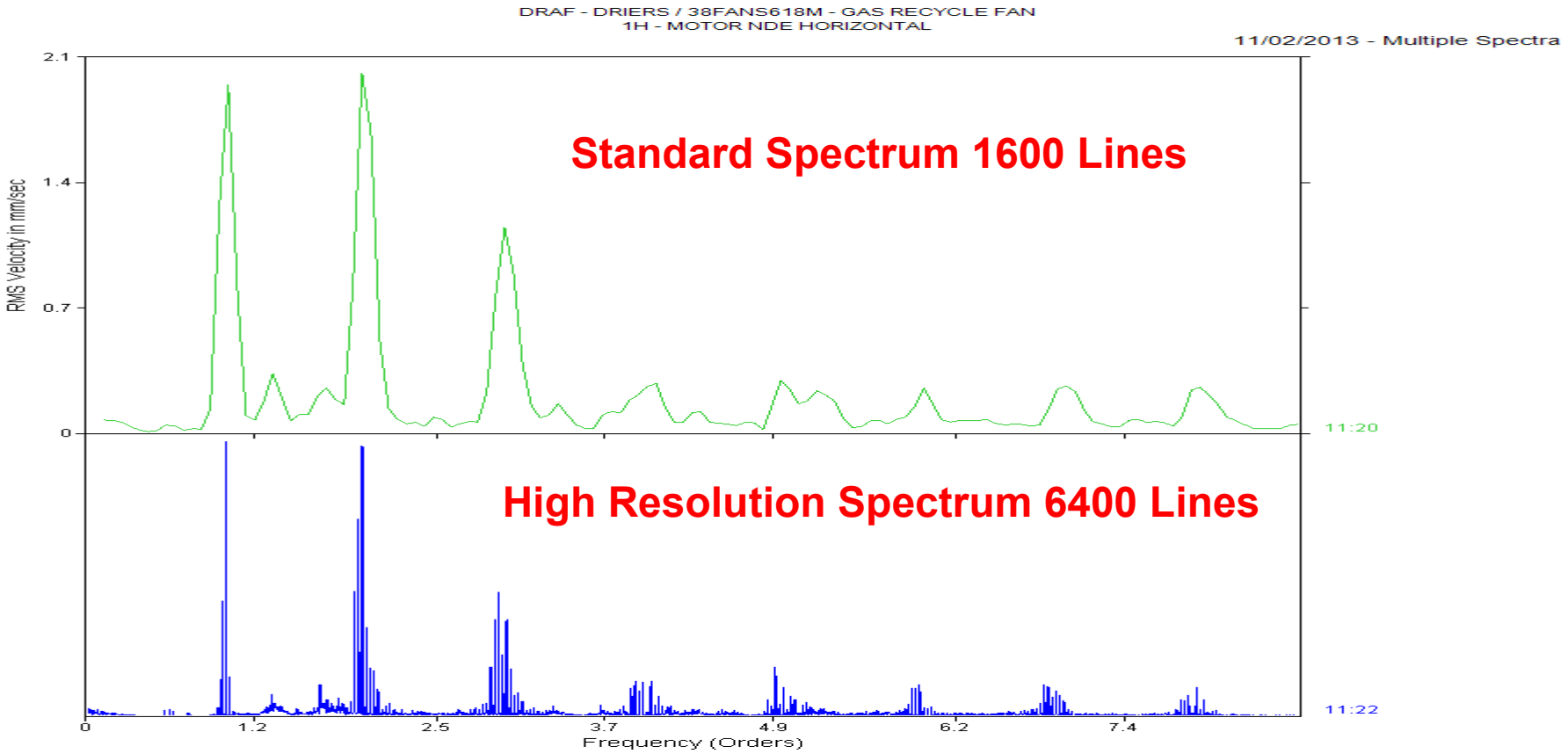

High Resolution 6400 Line spectrum shows clear sidebands surrounding the1-8 XRPM harmonics

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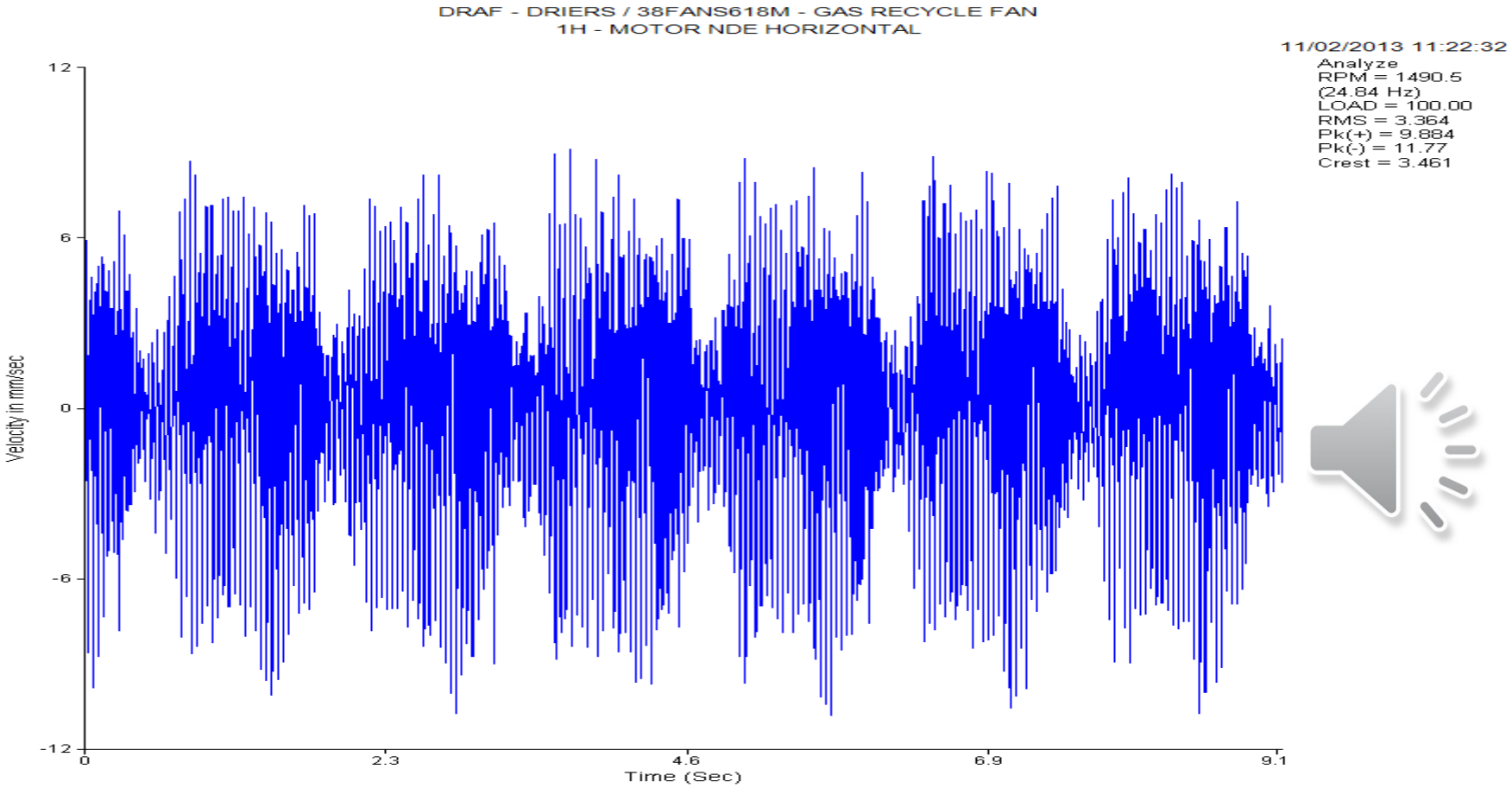

Extended Time Waveform clearly shows a regular “Beat” is present, this was also audible.

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Gas Recycle Fan – Motor Details

- Induction Motor
- Power 315 KW
- 1500 RPM.
- Actual Running Speed 1490 RPM
- 4 Poles
- Rolling Element Bearings

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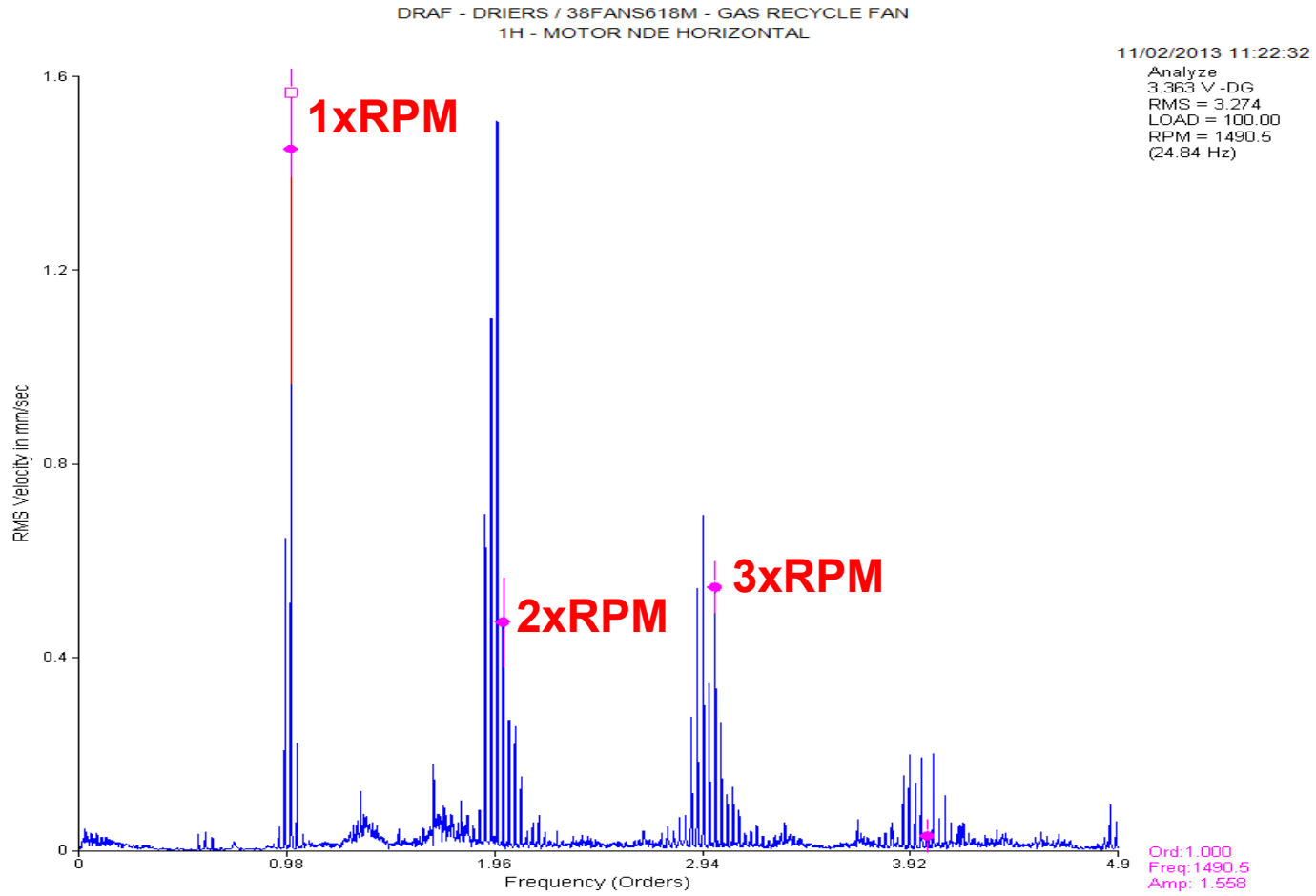
Gas Recycle Fan Motor – Detailed Analysis



High Resolution spectrum shows run speed harmonics surrounded by modulation sidebands

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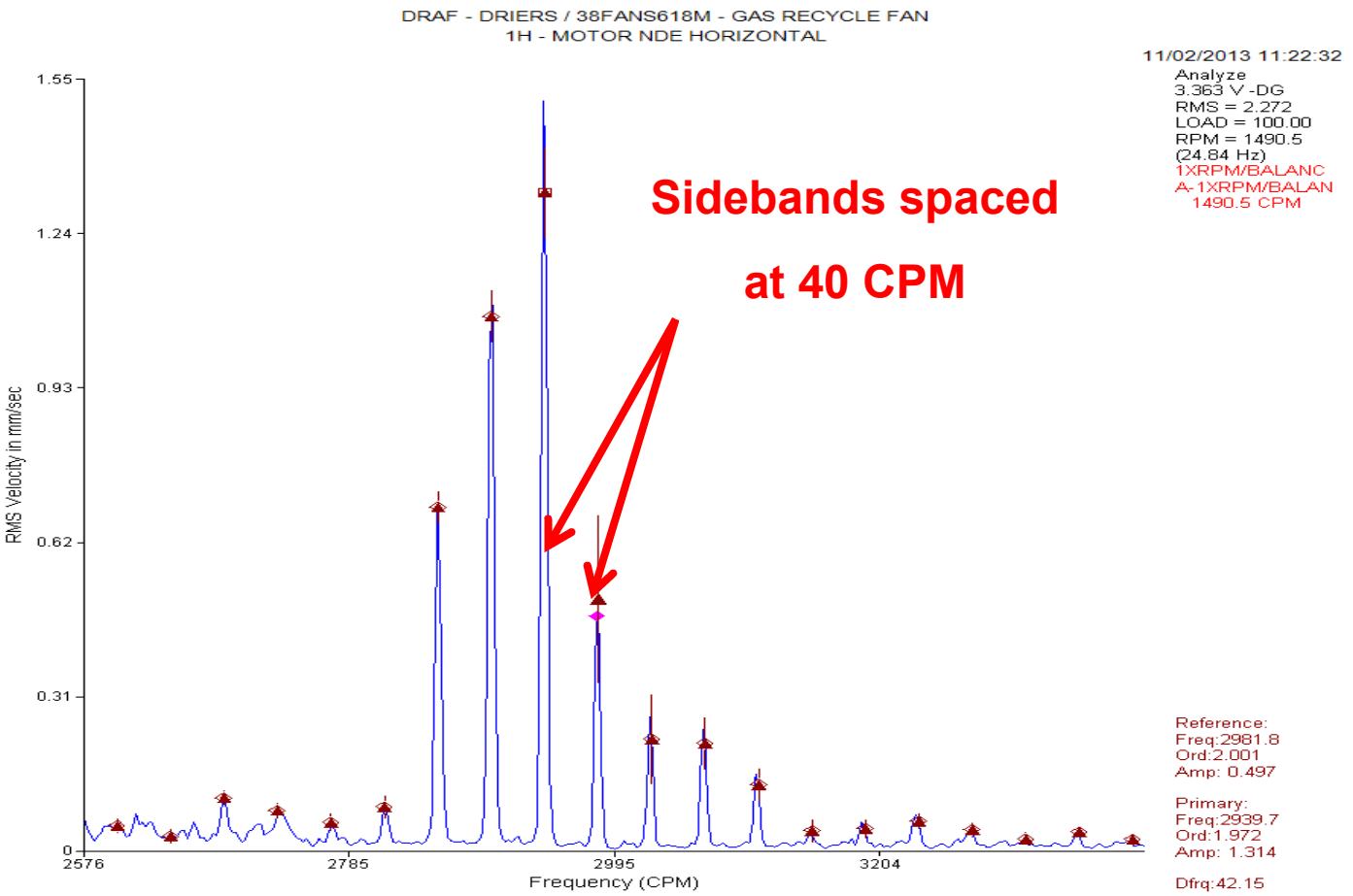
Gas Recycle Fan Motor – Detailed Analysis



Sidebands measured at 40 CPM (Cycles Per Min)

Suspected Rotorbar Problem

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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 harmioncs. This is also the frequency of the "Beat"

Conclusion :

Rotorbar Defects Present on Motor

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Upon Inspection - Rotobar found to be cracked