

# CASE STUDY



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TECHNOLOGIES



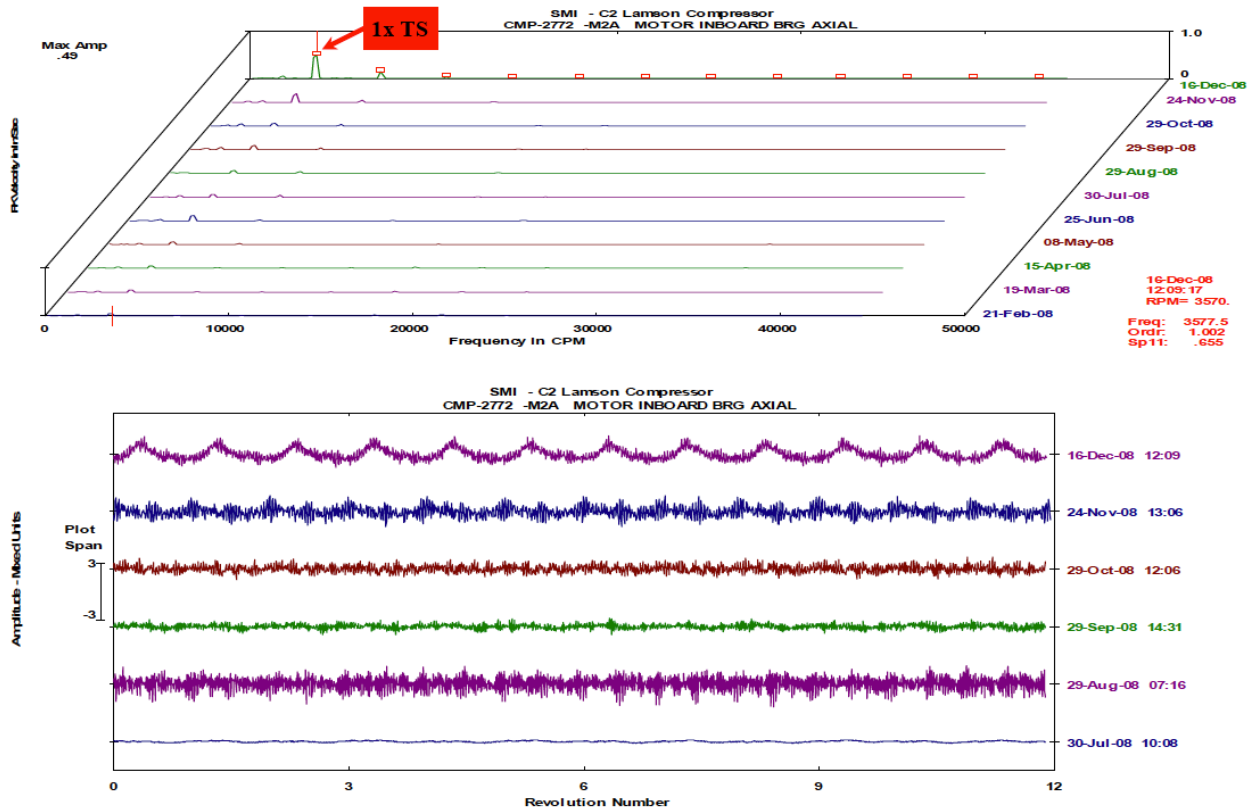
# Title: Vibration Amplitudes Effected by Machine Load and Speed

Industry: Chemical | Machine: Lamson Compressor | Technology: Vibration Analysis

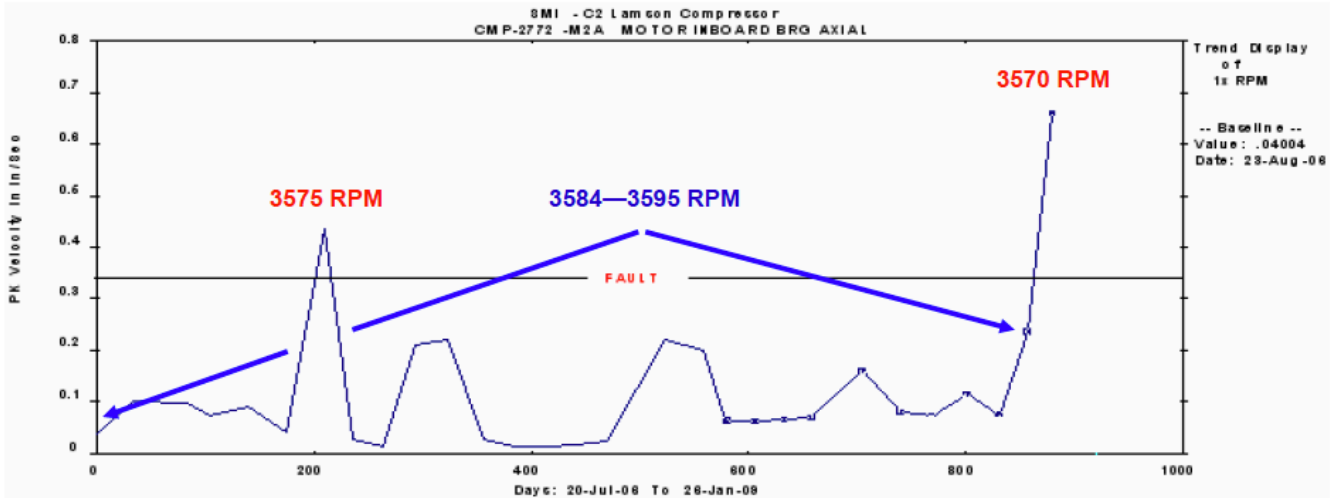
**Purpose:** This case study highlights the effects that slight adjustments to a machine’s speed and load can have on its measured vibration amplitudes.

**Overview:** While performing vibration analysis services for a Louisiana-based specialty minerals facility, it was noted that the Lamson compressors were frequently on monthly vibration reports for misalignment, imbalance, and bearing defects. These compressors were repeat 'bad actors' within the facility’s predictive maintenance (PdM) program. A plan for the in-depth analysis of the compressors’ monthly vibration data was developed and initiated.

**Findings:** The #3 Lamson compressor was identified for additional analysis resulting from a recent increase in its vibration amplitudes at 1x TS. Phase analysis showed slight misalignment across the coupling, though this did not appear to be the cause for the sudden increase in vibration levels. A visual inspection confirmed that there were no loose or missing bolts on either the motor or compressor feet and that the frame was secured to the foundation with no signs of movement between vibration surveys.

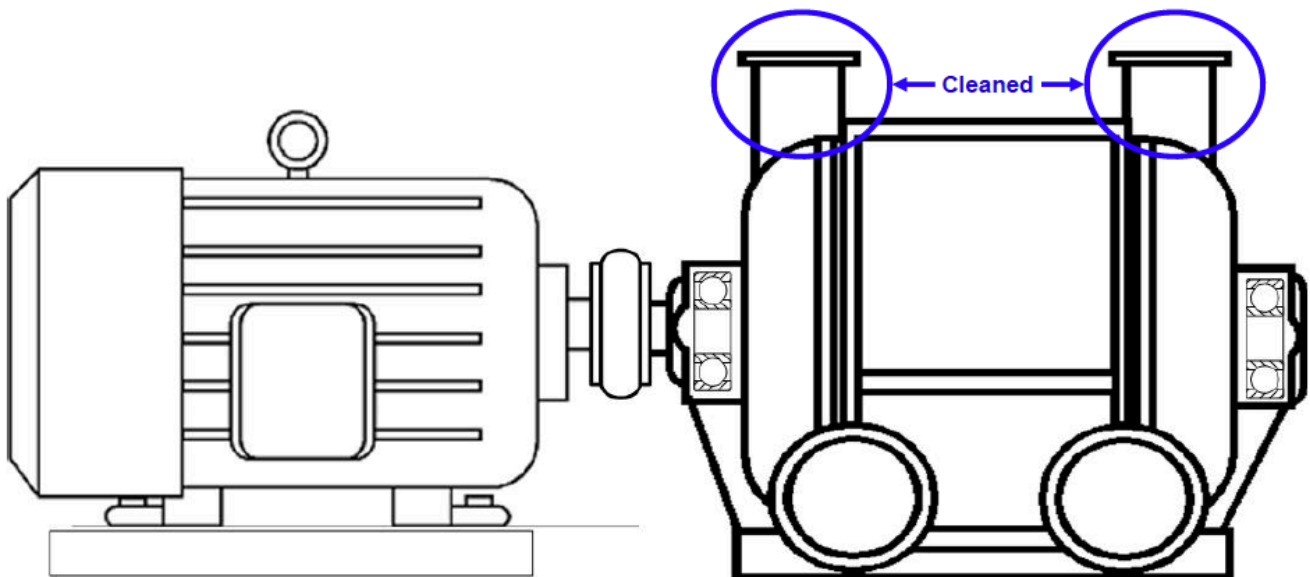


With misalignment and imbalance ruled out as the root cause for the vibration level increase, a closer look at the machine's previous vibration survey data was performed to see if the machine speed could be used to determine what the load was relative to each survey. This research confirmed that a slight decrease in the motor speed occurred each time the 1x TS amplitude increased above fault level. It is worth noting that this is a 2-Pole motor, with a straight 4160-volt feed, which results in a nominal speed of 3600 rpm, not accounting for any slip. It was determined that the machine loading was significantly affecting the vibration levels, using this slowing of the motor speed as the gauge for loading levels during each vibration measurement period.

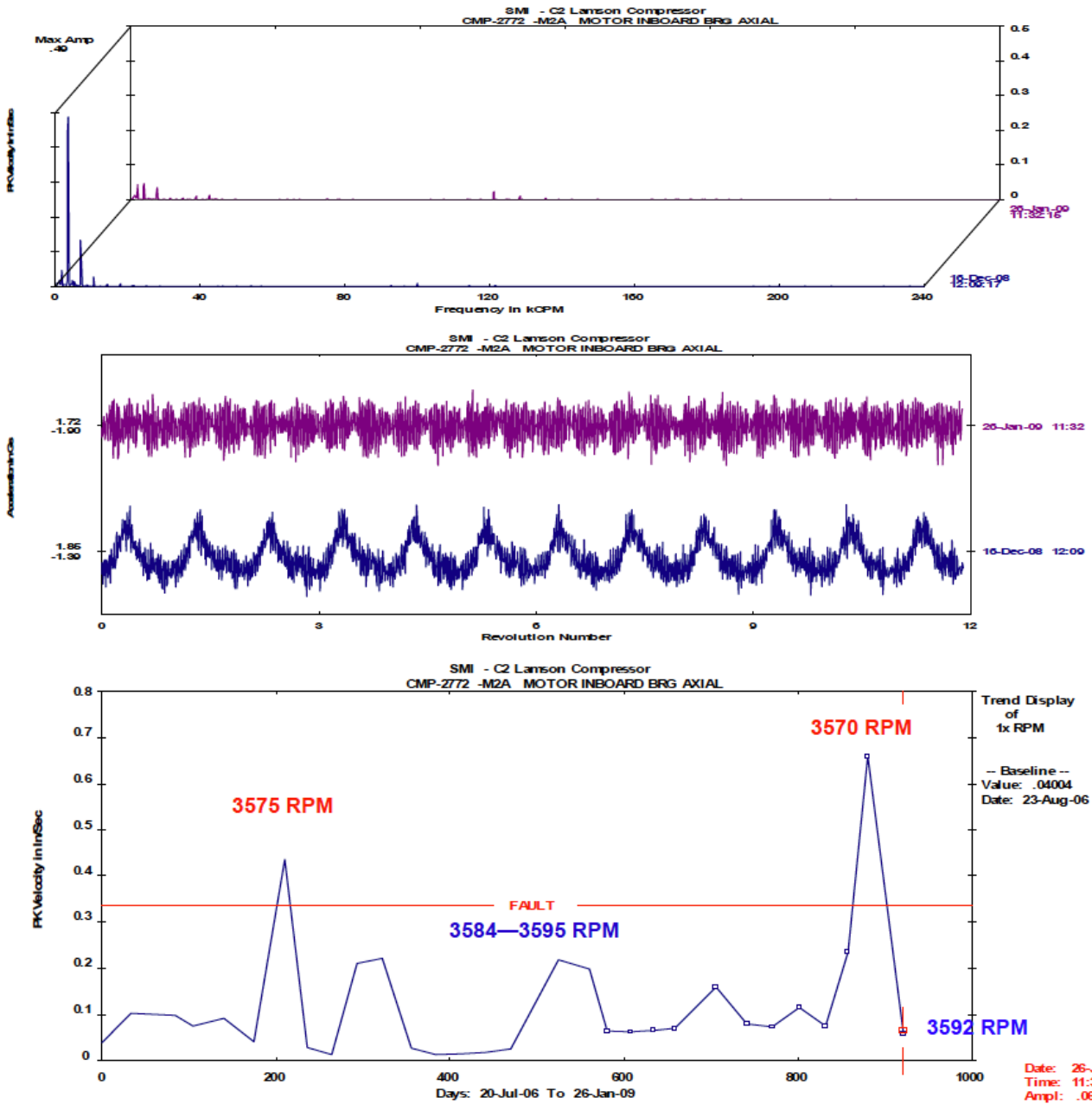


**Recommendation:** It was recommended that the #3 Lamson compressor's load be lessened to aid in decreasing the excessive vibration amplitudes.

**Corrective Actions Taken:** The customer cleaned the compressor's inlet and outlet lines between vibration surveys which aided in lessening the load on the compressor.



**Post Repair Data:** The 1x TS amplitude dropped to normal operating levels and the waveforms lost their sinusoidal-type appearance.



### About IVC Technologies

IVC Technologies is dedicated to helping our customers achieve optimal efficiencies through condition-based monitoring (CBM) utilizing our highly experienced and certified CBM analysts, cutting-edge PdM technologies, and equipment with unsurpassed analytic capabilities. Our Advanced Testing Group (ATG) is comprised of the foremost leading experts in the diagnosis of the most complex problems plaguing industry today.

