TITLE

Motion Amplification Study, KTG Memphis, TN

1: Executive Summary

Hi-Speed Industrial Service was called in to use its Motion Amplification Technology and Vibration Analysis Technology to inspect the Headbox Dilution Fan Pump. Several videos were taken at different angles and sections of the motor/pump. Vibration data was also collected at each bearing of the motor and pump in Horizontal, Vertical, and Axial positions. Pump operating speed was approximately 1353 rpm during these acquisitions.

2: Methodology of Data Acquisition

Initial video was taken with the motor and pump at side view. Pump appeared to have significant movement compared to the motor. Several videos were then taken of the pump to determine at which direction the most movement was occurring.

3: Data Analysis & Results

Click on picture to open video link

Motor and Pump (Side View)

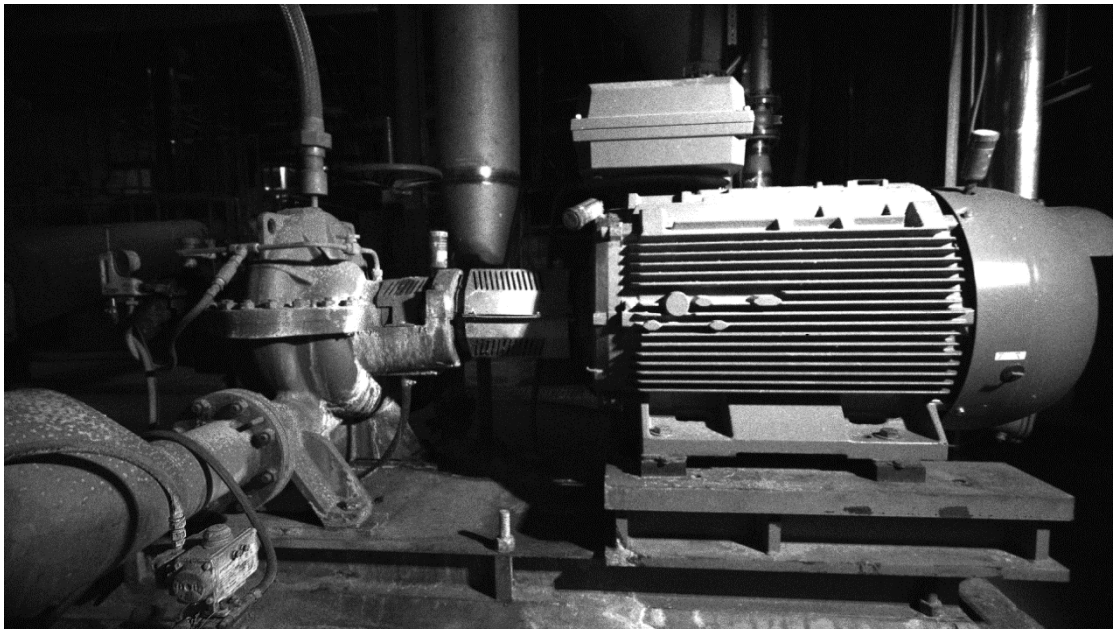

Figure 1: Motion Amplification, Motor/Pump side view

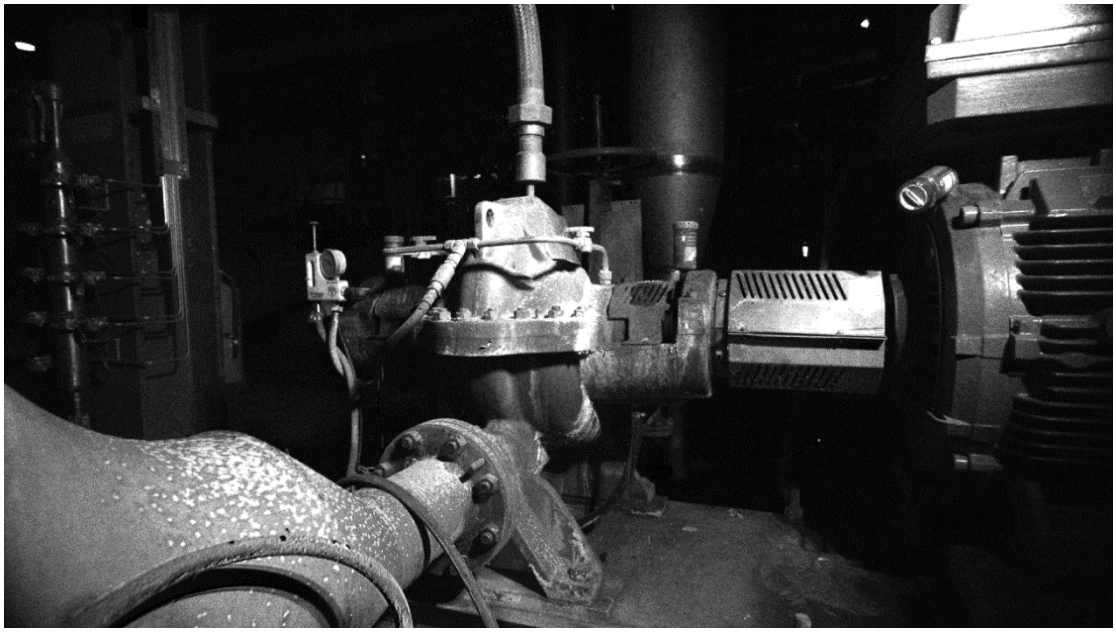

Figure 2: Motion Amplification, Pump Inboard Side View

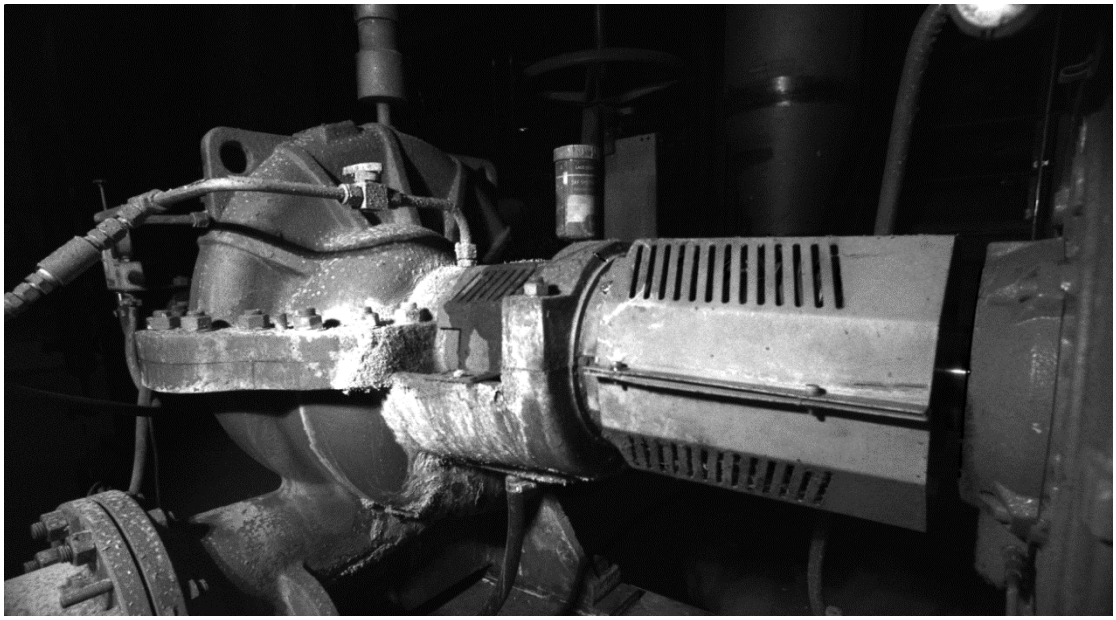

Figure 3: Motion Amplification, Pump Inboard

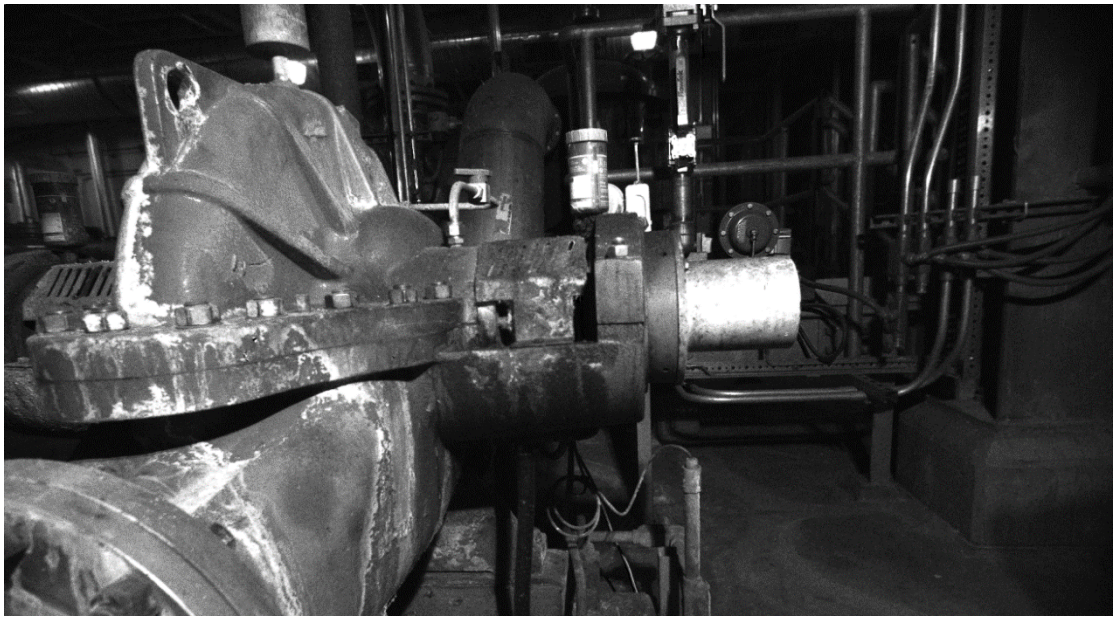

Figure 4: Pump Outboard End (Side View)

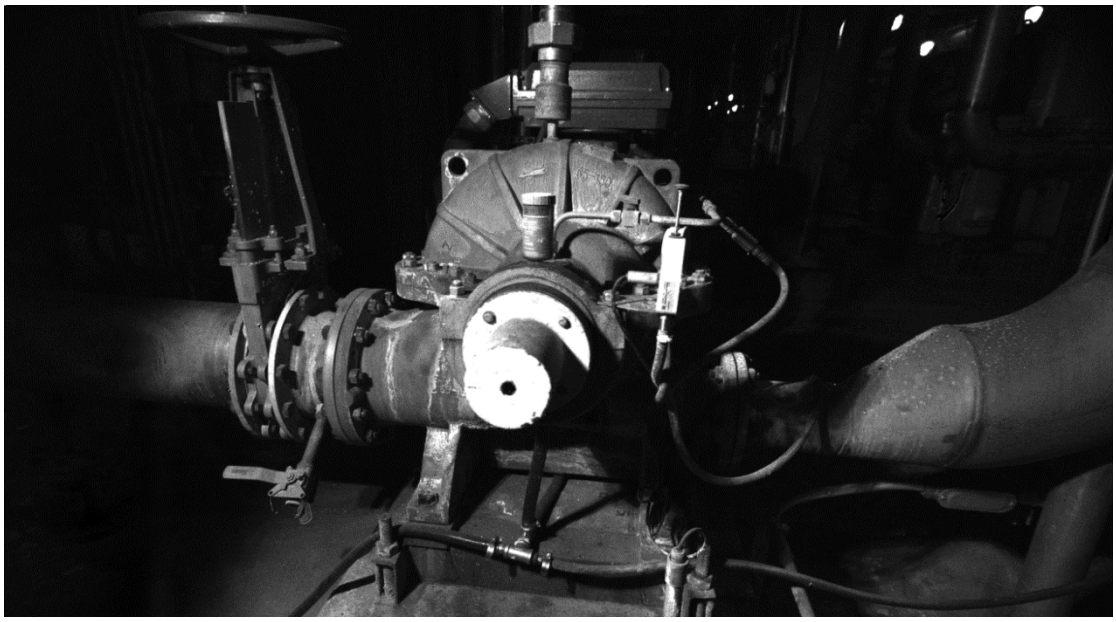

Figure 5: Pump Outboard End (End View)

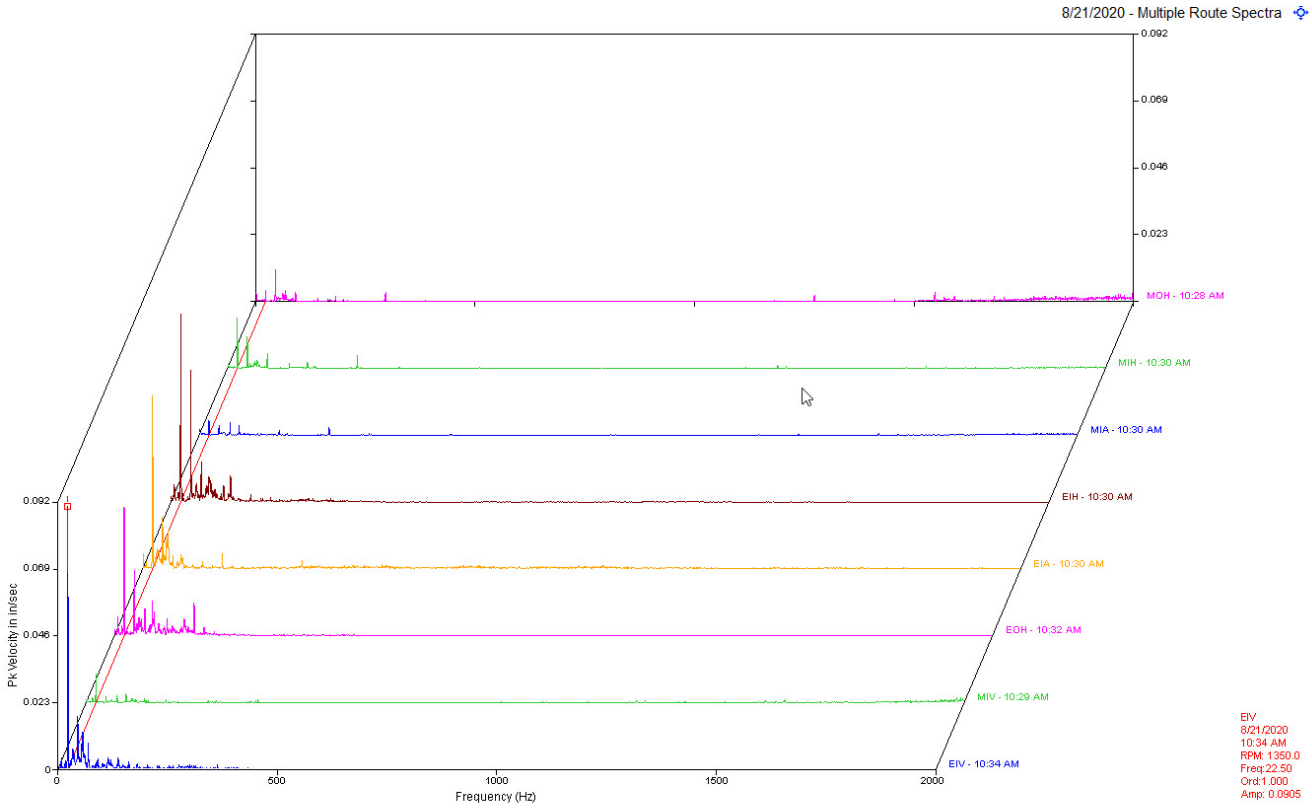

Figure 5: Headbox Dilution Fan Pump

Abbreviated Last Measurement Summary

MEASUREMENT POINT	OVERALL LEVEL	HFD / VHFD
M16 - Headbox Dilution Fan Pump		(21-Aug-20)
	OVERALL LEVEL	1 - 20 KHz
MOH	.027 In/Sec	.847 G-s
MIH	.025 In/Sec	.713 G-s
MIA	.013 In/Sec	.942 G-s
EIH	.094 In/Sec	.153 G-s
EIA	.080 In/Sec	.238 G-s
EOH	.067 In/Sec	.108 G-s
MIV	.017 In/Sec	1.012 G-s
EIV	.108 In/Sec	.145 G-s

Clarification Of Vibration Units:

Acc	-->	G-s	RMS
Vel	-->	In/Sec	PK

4: Conclusion(s) and Corrective Action(s)

Motion amplification of the motor and pump showed very little to no movement of the motor; however, MA video did show some movement of the pump. The inboard end of the pump appeared to have the most movement. Vibration data showed the unit to have an overall vibration of .1 inches per second peak or less with data indicating most of the vibration to be at the pump inboard vertical. Data showed a 1 x rpm vibration throughout the pump with pump inboard horizontal showing some 2 x rpm vibration as well

Motion Amplification video of the pump shows a torsional type of movement which leads us to believe that the pump has an issue with the pump coupling hub or possible bent or bowed pump shaft. Because the motion appears to be at the bearing housings, it may also be possible that there could be loose fasteners at the bearing housings. We do understand that this unit is controlled by a Variable Frequency Drive and may operate at different speeds from time to time. Because of the forcing frequencies from the pump, it is possible that this pump may operate near a resonant frequency; however, during our testing, the motor/pump did not appear to be operating near a resonant or critical speed.

Even though MA video does show some pump movement, the excess of this movement was minimal during our tests along with the vibration amplitudes. Again, this pump does vary some as far as shaft speed goes, however, operations did tell us that the pump was operating at its normal setting during our testing. It may be necessary to increase and or decrease the speed of this unit while taking vibration data to see if vibration has a sudden change in amplitudes. This could explain why this unit is being reported by your vibration group.

In conclusion, overall vibration was rather low during our test. Pump rpm was around 1350 which is approximately 75 percent of full speed. Motion amplification showed some torsional type of movement in the pump and may be due to the possible issues previously discussed in this report. It is recommended to investigate and inspect for these types of issues as time allows. Because the amplitudes of vibration were rather low during our testing, this issue has a low severity at this time.

Please contact us for any questions or comments and we thank KTG for allowing HI-Speed to utilize our MA and Vibration Technologies.