HI-SPEED INDUSTRIAL SERVICE QualiTest® Diagnostics

7030 Ryburn Dr. Millington, TN Phone: (901) 873-5300 Fax: (901) 873-5301 www.gohispeed.com

August 30, 2024

Josh Cavitt
Sonoco
Memphis, TN

Josh,

The following is a summary of findings from the quarterly vibration survey performed at your facility on 8/22/24. Please let us know if there are any questions or comments.

QualiTest® uses a four step rating system for defects.

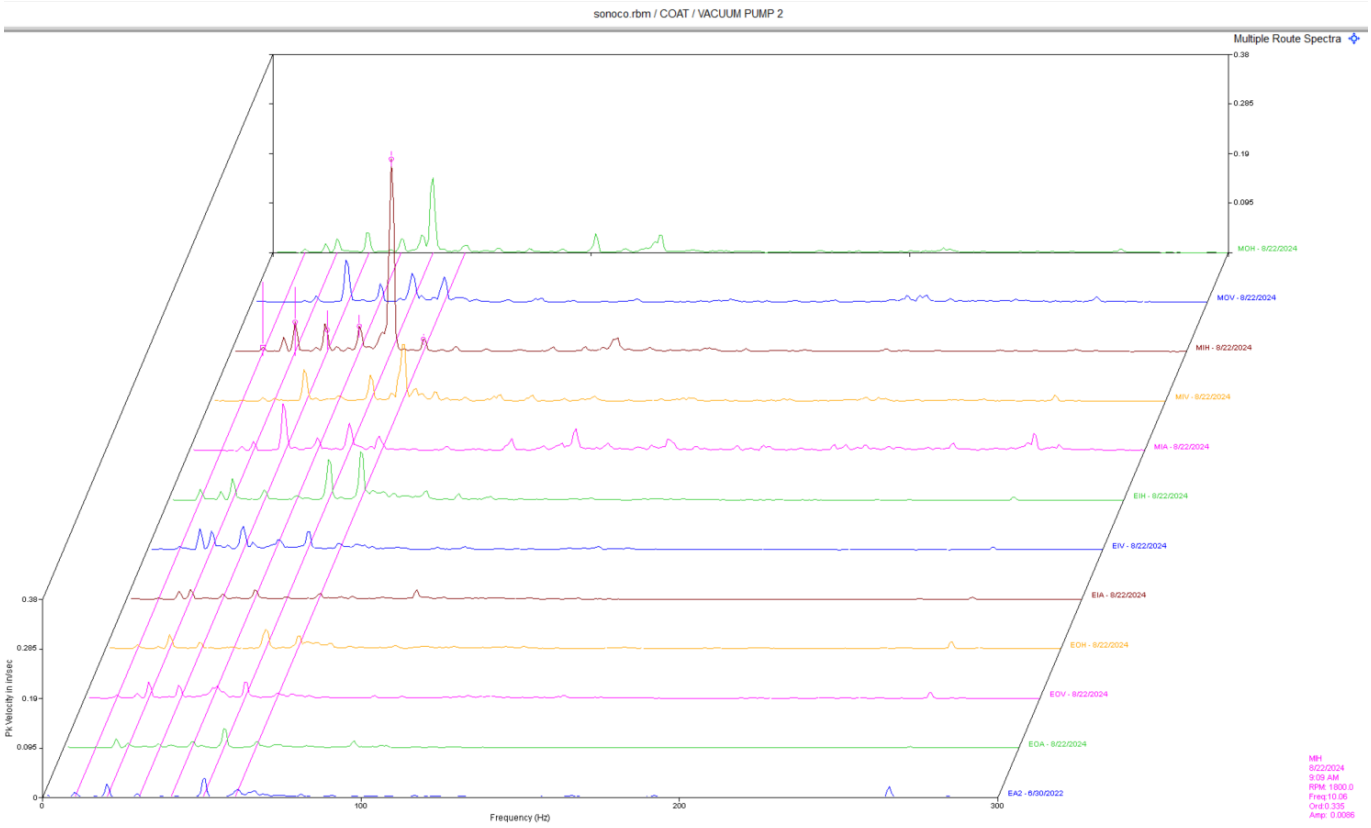
Class I: Defect is present, but effect on reliability is not clear; no immediate action is required. Continue to normally monitor.

Class II: Defect (s) present that may cause problem in long term (2-6 months). Repair during normal maintenance scheduling. Continue to monitor.

Class III; Defect (s) present that may cause failure in short term (less than 2 months). This should be addressed as soon as practical, with a high maintenance priority. Increase monitoring frequency.

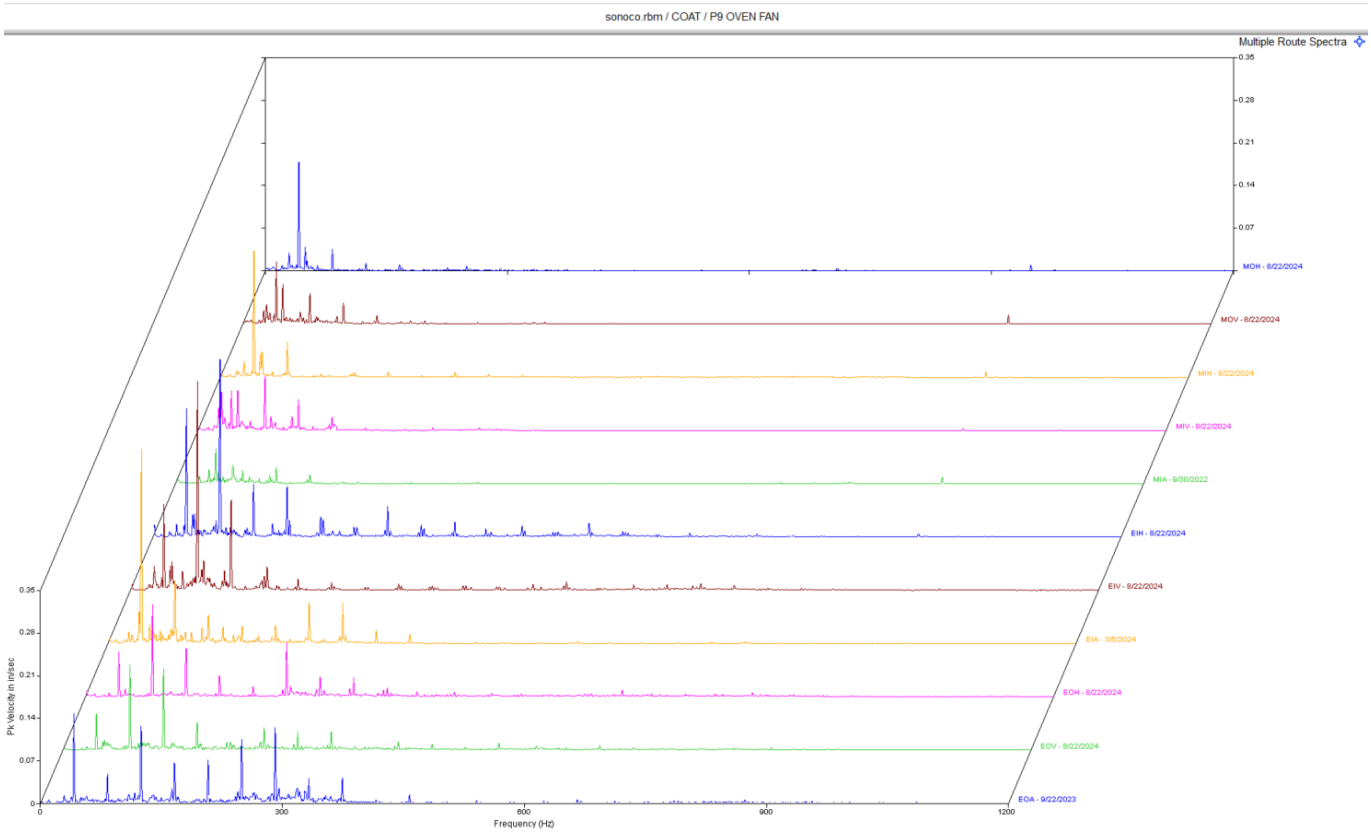
Class IV; Defect (s) present that makes continued reliability unpredictable, and possibility of secondary damage is high. Repairs should be made ASAP. An unscheduled shutdown should be considered for repairs

Defects



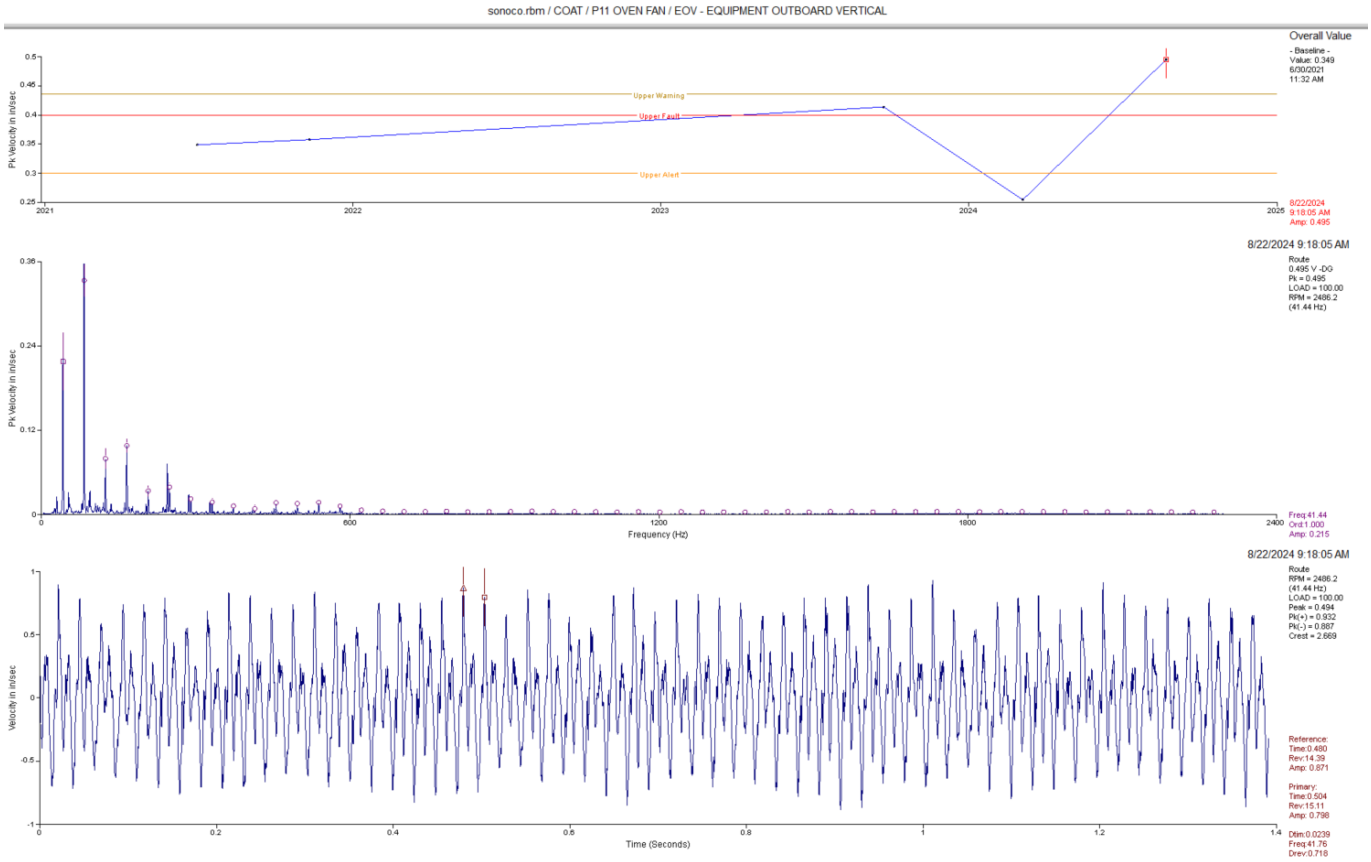
CLASS II Vacuum Pump 2

Trend data shows an increase in motor amplitude. Dominant vibration at the MIH appears to be a harmonic of a sub-synchronous peak. This could be belt or vacuum pump frequency. For now, check belts and sheaves for wear and ensure belt tension is correct. Ensure all fasteners are tight especially at the pump.



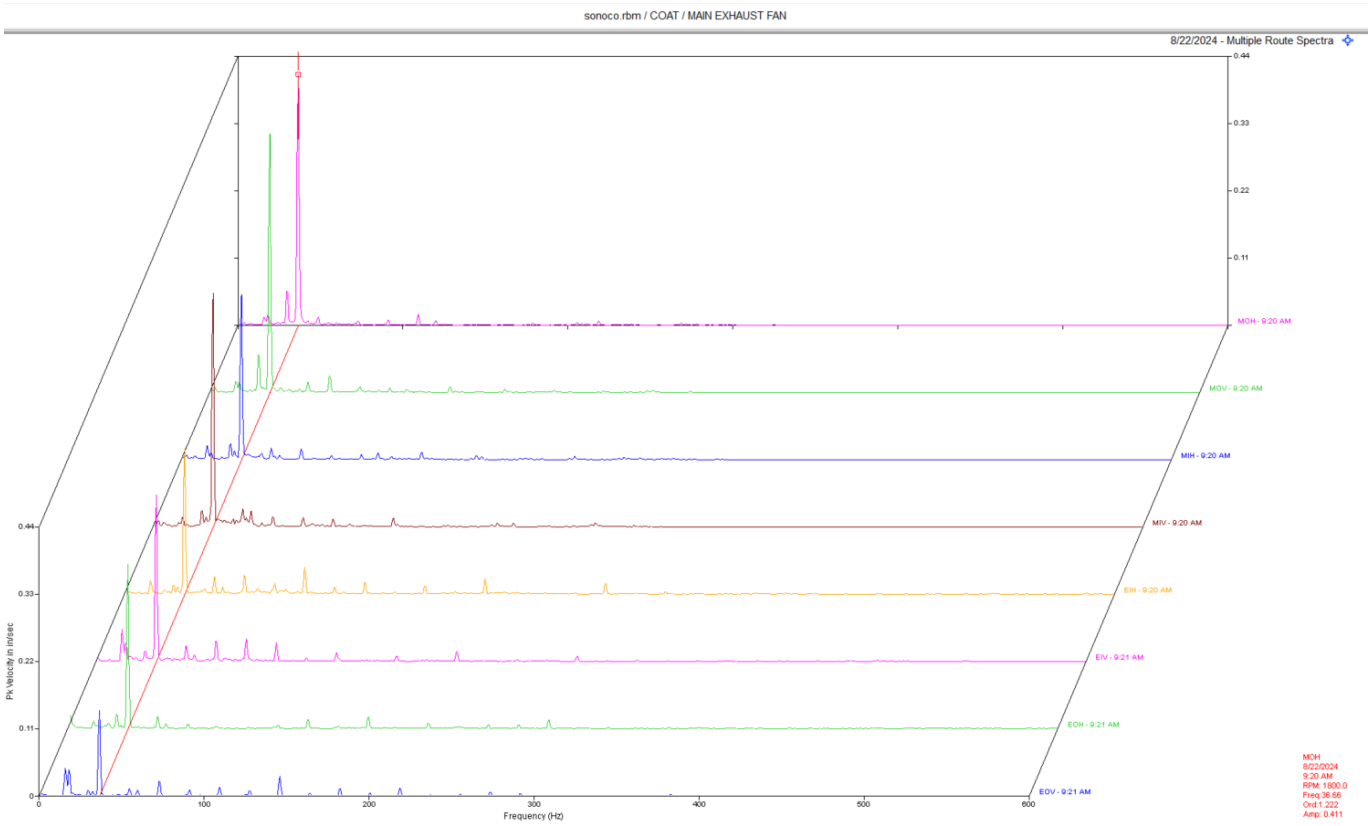
CLASS II P9 Oven Fan

Multi point spectra of the motor and fan show several fan rpm harmonics present in the fan bearing data. This is an indication of mechanical fit looseness. Inspect fan bearings for looseness as time allows. Ensure fan shaft does not have excessive wear/run out.



CLASS II P11 Oven Fan

Fan outboard vertical bearing data shows several fan rpm harmonics present in the fan bearing data. There are also sub-synchronous peaks present which may be belt frequencies. This is an indication of mechanical fit looseness and belt/sheaves issues. Inspect fan bearings for looseness as time allows. Ensure fan shaft does not have excessive run out and ensure belts and sheaves are in good shape.

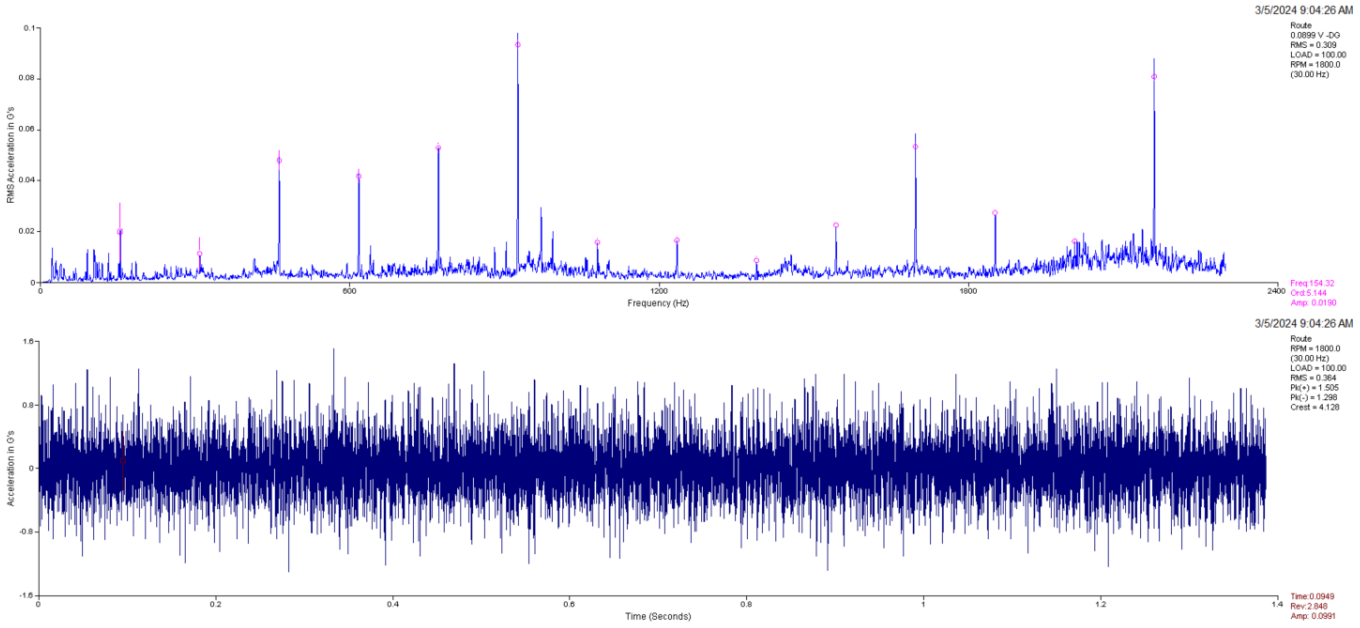


CLASS II Main Exhaust Fan

Motor/fan data shows a dominant vibration at 36 HZ. in the motor and the fan with the motor having highest amplitude. This frequency is fan speed. For now, ensure motor/fan base fasteners are tight. Ensure sheaves are properly aligned with minimal face run out.

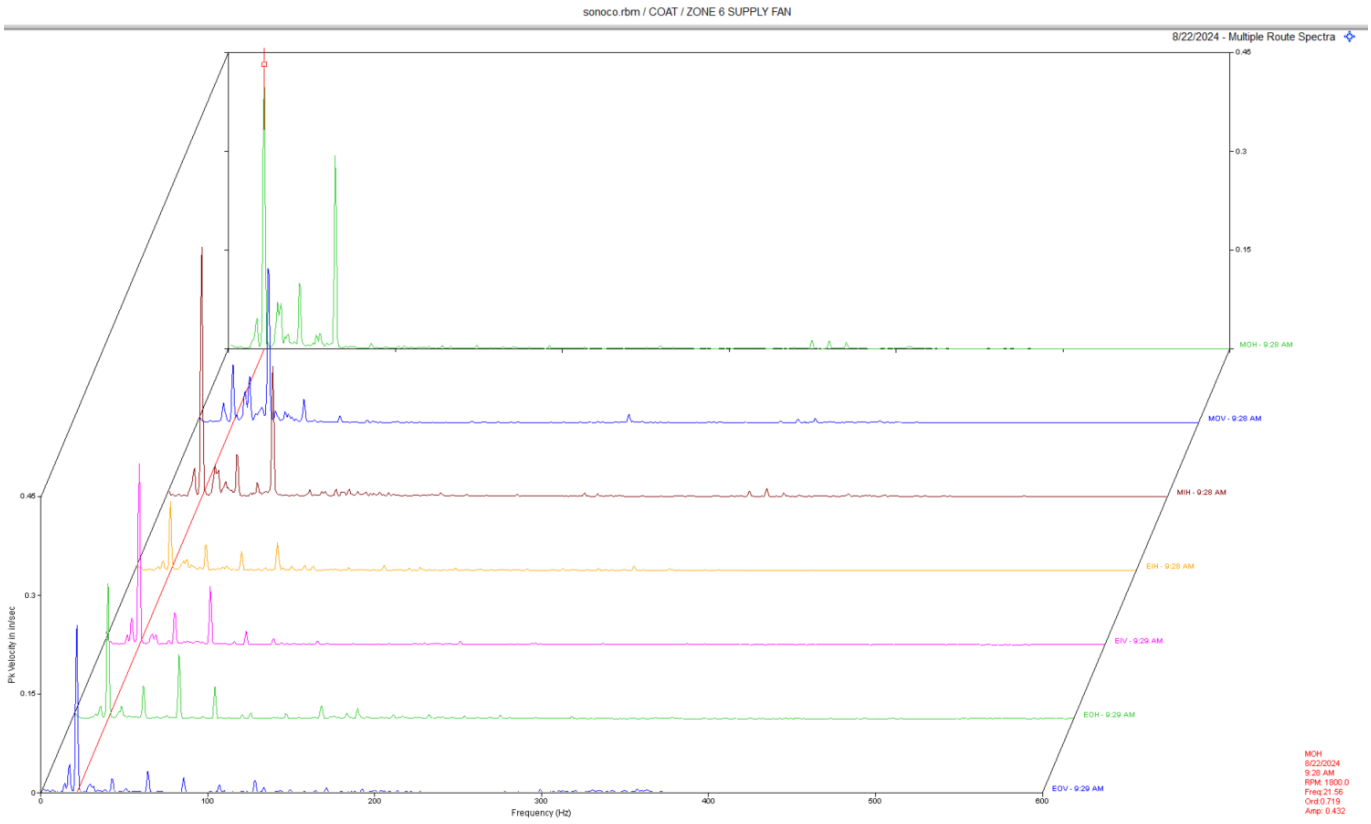
CLASS II Zone 3 Supply Fan

Motor outboard vertical data shows a dominant vibration at a frequency close to 1 x motor rpm. This peak is actually a harmonic of a sub-synchronous peak. This may be a belt harmonic but could also be a resonant frequency. Motor also has some high frequency vibration and may need lubrication. Check motor bearings for proper lube, check belts for issues, and ensure all motor base fasteners are tight and structure is sound.



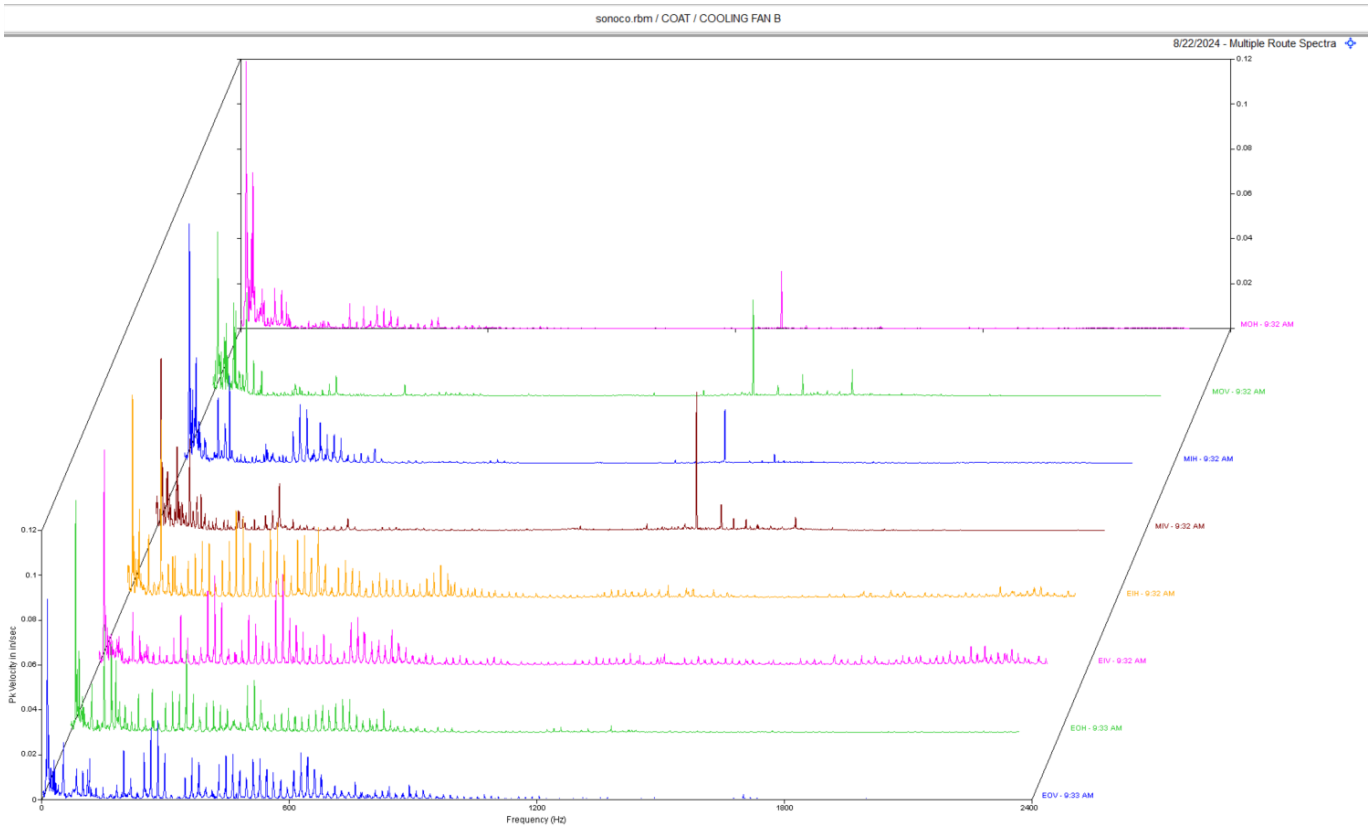
CLASS II Zone 5 Supply Fan

Fan inboard (DE) bearing data shows non-synchronous harmonics in the spectrum. This is an indication of bearing defects. Inspect fan bearings for defects and wear as scheduling allows.



CLASS III Zone 6 Supply Fan

Motor/fan data shows a dominant vibration at 21.5 HZ. in the motor and the fan with the motor having highest amplitude. This frequency is fan speed. For now, ensure motor/fan base fasteners are tight. Ensure sheaves are properly aligned with minimal face run out.



CLASS II Cooling Fan B

Multi point spectra of the motor and fan show several fan rpm harmonics present in the fan bearing data. This is an indication of mechanical fit looseness. Inspect fan bearings for looseness as time allows. Ensure fan shaft does not have excessive wear/run out.

Abbreviated Last Measurement Summary

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Database: sonoco.rbm
Station: COATER

MEASUREMENT POINT	OVERALL LEVEL	HFD / VHFD
VACPUMP1 - VACUUM PUMP 1	(22-Aug-24)	
	OVERALL LEVEL	1 - 20 KHz
MOH	.099 In/Sec	.359 G-s
MOV	.160 In/Sec	.390 G-s
MIH	.105 In/Sec	.444 G-s
MIV	.149 In/Sec	.419 G-s
MIA	.319 In/Sec	.059 G-s
EIH	.072 In/Sec	.196 G-s
EIV	.056 In/Sec	.292 G-s
EIA	.034 In/Sec	.213 G-s
EOH	.052 In/Sec	.444 G-s
EOV	.046 In/Sec	.182 G-s
EOA	.035 In/Sec	.275 G-s
VACPUMP2 - VACUUM PUMP 2	(22-Aug-24)	
	OVERALL LEVEL	1 - 20 KHz
MOH	.201 In/Sec	.719 G-s
MOV	.160 In/Sec	1.104 G-s
MIH	.438 In/Sec	1.156 G-s
MIV	.195 In/Sec	1.373 G-s
MIA	.169 In/Sec	.177 G-s
EIH	.169 In/Sec	.116 G-s
EIV	.109 In/Sec	.189 G-s
EIA	.051 In/Sec	.207 G-s
EOH	.086 In/Sec	.120 G-s
EOV	.087 In/Sec	.108 G-s
EOA	.065 In/Sec	.189 G-s
CTPUMP1 - COOLING TOWER PUMP 1	(22-Aug-24)	
	OVERALL LEVEL	1 - 20 KHz
MOH	.029 In/Sec	.427 G-s
MOV	.089 In/Sec	.200 G-s
MIH	.058 In/Sec	.151 G-s
MIV	.043 In/Sec	.364 G-s
MIA	.042 In/Sec	.079 G-s
EIH	.085 In/Sec	.358 G-s
EIV	.032 In/Sec	.051 G-s
EIA	.037 In/Sec	.323 G-s
CTPUMP2 - COOLING TOWER PUMP 2	(22-Aug-24)	
	OVERALL LEVEL	1 - 20 KHz
MOH	.034 In/Sec	.415 G-s
MOV	.082 In/Sec	.334 G-s
MIH	.050 In/Sec	.388 G-s
MIV	.061 In/Sec	.325 G-s
MIA	.049 In/Sec	.219 G-s
EIH	.037 In/Sec	.537 G-s
EIV	.062 In/Sec	.029 G-s
EIA	.048 In/Sec	.161 G-s
P9OVENFAN - P9 OVEN FAN	(22-Aug-24)	
	OVERALL LEVEL	1 - 20 KHz
MOH	.197 In/Sec	.048 G-s
MOV	.161 In/Sec	.066 G-s
MIH	.233 In/Sec	.101 G-s
MIV	.184 In/Sec	.161 G-s
EIH	.428 In/Sec	1.112 G-s
EIV	.457 In/Sec	1.139 G-s
EOH	.249 In/Sec	1.064 G-s
EOV	.255 In/Sec	.998 G-s

P11OVENFAN - P11 OVEN FAN (22-Aug-24)

	OVERALL LEVEL	1 - 20 KHz
MOH	.152 In/Sec	.026 G-s
MOV	.193 In/Sec	.070 G-s
MIH	.133 In/Sec	.042 G-s
MIV	.319 In/Sec	.040 G-s
EIH	.264 In/Sec	.608 G-s
EIV	.404 In/Sec	.439 G-s
EOH	.305 In/Sec	.650 G-s
EOV	.495 In/Sec	.644 G-s

MAINXHAUST - MAIN EXHAUST FAN (22-Aug-24)

	OVERALL LEVEL	1 - 20 KHz
MOH	.446 In/Sec	.489 G-s
MOV	.461 In/Sec	.338 G-s
MIH	.299 In/Sec	.551 G-s
MIV	.415 In/Sec	.270 G-s
EIH	.272 In/Sec	.368 G-s
EIV	.307 In/Sec	1.136 G-s
EOH	.292 In/Sec	1.205 G-s
EOV	.180 In/Sec	1.159 G-s

ZONE1FAN - ZONE 1 SUPPLY FAN (22-Aug-24)

	OVERALL LEVEL	1 - 20 KHz
EIH	.157 In/Sec	.314 G-s
EIV	.139 In/Sec	.587 G-s
EOH	.146 In/Sec	.194 G-s
EOV	.142 In/Sec	.129 G-s

ZONE2FAN - ZONE 2 SUPPLY FAN (22-Aug-24)

	OVERALL LEVEL	1 - 20 KHz
MOH	.271 In/Sec	.354 G-s
MOV	.212 In/Sec	.060 G-s
MIH	.260 In/Sec	.265 G-s
MIV	.192 In/Sec	.175 G-s
EIH	.202 In/Sec	.092 G-s
EIV	.167 In/Sec	.126 G-s

ZONE3FAN - ZONE 3 SUPPLY FAN (22-Aug-24)

	OVERALL LEVEL	1 - 20 KHz
MOH	.488 In/Sec	.076 G-s
MOV	.926 In/Sec	.324 G-s
MIH	.390 In/Sec	.368 G-s
MIV	.287 In/Sec	.347 G-s
EIH	.247 In/Sec	.274 G-s
EIV	.260 In/Sec	.290 G-s
EOH	.260 In/Sec	.254 G-s
EOV	.244 In/Sec	.501 G-s

ZONE4FAN - ZONE 4 SUPPLY FAN (22-Aug-24)

	OVERALL LEVEL	1 - 20 KHz
MOH	.257 In/Sec	.157 G-s
MOV	.273 In/Sec	.184 G-s
MIH	.271 In/Sec	.166 G-s
MIV	.203 In/Sec	.248 G-s
EIH	.215 In/Sec	.084 G-s
EIV	.069 In/Sec	.103 G-s
EIA	.128 In/Sec	.084 G-s
EOH	.172 In/Sec	.117 G-s

ZONE5FAN - ZONE 5 SUPPLY FAN (22-Aug-24)

	OVERALL LEVEL	1 - 20 KHz
MOH	.091 In/Sec	.069 G-s
MOV	.097 In/Sec	.131 G-s
MIH	.110 In/Sec	.086 G-s
MIV	.109 In/Sec	.157 G-s
EIH	.111 In/Sec	.635 G-s
EIV	.082 In/Sec	.883 G-s

ZONE6FAN - ZONE 6 SUPPLY FAN (22-Aug-24)

	OVERALL LEVEL	1 - 20 KHz
MOH	.574 In/Sec	.074 G-s
MOV	.314 In/Sec	.075 G-s
MIH	.467 In/Sec	.082 G-s
MIV	.225 In/Sec	.067 G-s
EIH	.140 In/Sec	.128 G-s
EIV	.316 In/Sec	.285 G-s
EOH	.256 In/Sec	.194 G-s
EOV	.280 In/Sec	.019 G-s

COOLFAN B - COOLING FAN B (22-Aug-24)

	OVERALL LEVEL	1 - 20 KHz
MOH	.193 In/Sec	.419 G-s
MOV	.150 In/Sec	.770 G-s
MIH	.182 In/Sec	.475 G-s
MIV	.161 In/Sec	1.056 G-s
EIH	.215 In/Sec	.852 G-s
EIV	.187 In/Sec	1.108 G-s
EOH	.184 In/Sec	.204 G-s
EOV	.170 In/Sec	.137 G-s

EXHAUSTFAN - EXHAUST FAN (22-Aug-24)

	OVERALL LEVEL	1 - 20 KHz
MOH	.287 In/Sec	.075 G-s
MOV	.257 In/Sec	.059 G-s
MIH	.169 In/Sec	.022 G-s
MIV	.347 In/Sec	.243 G-s

COOLFAN A - COOLING FAN A (22-Aug-24)

	OVERALL LEVEL	1 - 20 KHz
MOH	.327 In/Sec	.397 G-s
MOV	.188 In/Sec	.200 G-s
MIH	.334 In/Sec	.526 G-s
MIV	.108 In/Sec	.456 G-s
EIH	.111 In/Sec	.129 G-s
EIV	.096 In/Sec	.167 G-s
EOH	.112 In/Sec	.267 G-s
EOV	.110 In/Sec	.283 G-s

502SPNBLWR - 502 SPENCER BLOWER (22-Aug-24)

	OVERALL LEVEL	1 - 20 KHz
MOH	.173 In/Sec	.220 G-s
MOV	.147 In/Sec	.522 G-s
MIV	.193 In/Sec	.076 G-s

ALNESNCBLW - A LINE SPENCER BLOWER (22-Aug-24)

	OVERALL LEVEL	1 - 20 KHz
MOH	.108 In/Sec	.045 G-s
MOV	.093 In/Sec	.121 G-s
MIV	.203 In/Sec	.064 G-s

CLNESNCBLW - C LINE SPENCER BLOWER (22-Aug-24)

	OVERALL LEVEL	1 - 20 KHz
MOH	.130 In/Sec	.129 G-s
MOV	.132 In/Sec	.023 G-s
MIV	.065 In/Sec	.098 G-s

DLNESNCBLW - D LINE SPENCER BLOWER (22-Aug-24)

	OVERALL LEVEL	1 - 20 KHz
MOH	.278 In/Sec	.022 G-s
MOV	.217 In/Sec	.033 G-s
MIH	.168 In/Sec	.113 G-s
MIV	.210 In/Sec	.085 G-s

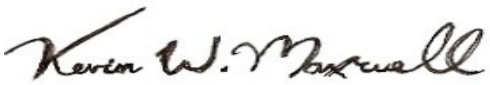
Clarification Of Vibration Units:

Acc --> G-s RMS

Vel --> In/Sec PK

As always, it has been a pleasure to serve Sonoco. If there are any comments or questions, do not hesitate to contact us.

Sincerely,



Senior Reliability Specialist
ISO Certified Vibration Analyst, Category III

HI-SPEED INDUSTRIAL SERVICE

QualiTest® Diagnostics

Cell: 901-486-4565
Email: kwilliam@gohispeed.com