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

October 14, 2022

Nucor Roll Mill
Jackson-Flowood, MS

Subject: October vibration survey

Below is a summary report for the monthly Roll Mill vibration survey that was performed on October 11, 2022. Most of the machines surveyed were found to be in good condition except for the following.

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.

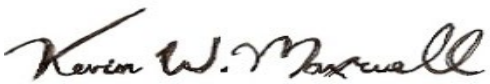
Class II: Defect (s) present that may cause problem in long term (2-6 months). Repair during normal maintenance scheduling. Continue to monitor.

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

As always, it has been a pleasure to NUCOR Steel Flowood, MS. If there are any comments or questions, do not hesitate to contact us.

Sincerely,



ISO Certified Vibration Analyst, Category III

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

Defects

Roll Stand 1
Drive motor has elevated axial vibration in drive end of motor. Vibration is dominant at 360 HZ. This is SCR card firing rate frequency. Check VFD drive components for issues. Rated as a **CLASS I** defect.

Roll Stand 3
Outboard motor bearing is starting to show some signs of bearing issue. May be due to fluting. Data is showing outer race defects harmonics on the ODE bearing. This will be monitored very closely in the coming surveys. Rated as a **CLASS II** defect for now.

Roll Stand 5
Cooling fan motor has increased vibration. Check all fasteners and motor frame for looseness. Gear mesh vibration increased slightly this month. Last gear inspection of the gearbox does show some tooth wear in this gearbox. The up and down amplitude of this peak from month to month is likely due to change in tooth load and machine speed. We will continue to monitor this very closely. This is rated as a **CLASS II** defect.

Roll Stand 6
Gear mesh vibration was slightly higher this month. A dominant gear mesh vibration is sometimes present towards the output of the gearbox. The up and down amplitude of this peak is likely due to change in tooth load and speed. We will continue to monitor this very closely. Because of the high amplitude this month, this issue is rated as a **CLASS II** defect.

Roll Stand 7
Gearbox vibration was slightly higher this survey. We still suspect this to be possibly due to a resonant gear mesh frequency vibration. The up and down amplitude of this peak from month to month is likely due to change in tooth load and machine speed. We will continue to monitor this very closely. Because of the high amplitudes in the gearbox and bearing defect related vibrations in the motor, this is rated as a **CLASS II** defect.

Roll Stand 16
Motor was down this survey. Drive motor still likely has bearing issues. Vibration data indicates race defects in the motor bearings which likely caused by electrical fluting. Motor should be scheduled for replacement as scheduling allows. Ensure new motor has proper grounding/fluting protection. Rated as a **CLASS III** defect.

Furnace Cooling Tower Drives North and South
Motors have axial vibration that appears to be occurring at or near 1 x motor rpm and may indicate a structural issue such as loose fasteners, weak flexible motor base. This could also be caused by a resonance or air flow turbulence in this unit. We will continue to monitor this issue closely. Rated as a **CLASS II** defect.

Mill Water West Pump
Top thrust bearing shows signs of bearing defects according to the spectral data of the Outboard end of the motor. This appears to be light defects at this time and will be monitored closely. Rated as a **CLASS I** defect.

Abbreviated Last Measurement Summary

****

Station: Roll Mill Rolls

MEASUREMENT POINT	OVERALL LEVEL	HFD / VHFD
STD1A - Stand 1A	(11-Oct-22)	
	OVERALL LEVEL	1K-20KHz
MOH	.126 In/Sec	.091 G-s
MIH	.096 In/Sec	.123 G-s
MIA	.117 In/Sec	.096 G-s
COH	.165 In/Sec	.092 G-s
GIA	.015 In/Sec	.048 G-s
GIH	.028 In/Sec	.063 G-s
GI2	.023 In/Sec	.018 G-s
GI3	.020 In/Sec	.057 G-s
GI4	.021 In/Sec	.030 G-s
GI5	.012 In/Sec	.042 G-s
GI6	.055 In/Sec	.135 G-s
GOH	.065 In/Sec	.105 G-s
STD2A - Stand 2A	(11-Oct-22)	
	OVERALL LEVEL	1K-20KHz
MOH	.057 In/Sec	.087 G-s
MIH	.050 In/Sec	.041 G-s
MIA	.114 In/Sec	.885 G-s
COH	.198 In/Sec	.048 G-s
STD1 - Stand 1	(11-Oct-22)	
	OVERALL LEVEL	1K-20KHz
MOH	.076 In/Sec	.092 G-s
MIH	.053 In/Sec	.014 G-s
MIA	.528 In/Sec	.276 G-s
GIA	.028 In/Sec	.042 G-s
GIH	.045 In/Sec	.038 G-s
COH	.061 In/Sec	.017 G-s
STD2 - Stand 2	(11-Oct-22)	
	OVERALL LEVEL	1K-20KHz
MOH	.136 In/Sec	.087 G-s
MIH	.182 In/Sec	.113 G-s
MIA	.093 In/Sec	.070 G-s
GIA	.073 In/Sec	.027 G-s
GIH	.085 In/Sec	.126 G-s
COH	.609 In/Sec	.029 G-s
STD3 - Stand 3	(11-Oct-22)	
	OVERALL LEVEL	1K-20KHz
MOH	.064 In/Sec	.383 G-s
MIH	.070 In/Sec	.048 G-s
MIA	.223 In/Sec	.166 G-s
GIA	.019 In/Sec	.0064 G-s
GIH	.039 In/Sec	.061 G-s
COH	.197 In/Sec	.020 G-s
STD4 - Stand 4	(11-Oct-22)	
	OVERALL LEVEL	1K-20KHz
MOH	.095 In/Sec	.033 G-s
MIH	.081 In/Sec	.037 G-s
MIA	.104 In/Sec	.075 G-s
GIA	.091 In/Sec	.072 G-s
GIH	.090 In/Sec	.019 G-s
COH	.298 In/Sec	.029 G-s
STD5 - Stand 5	(11-Oct-22)	
	OVERALL LEVEL	1K-20KHz
MOH	.049 In/Sec	.077 G-s

	MIH	.074 In/Sec	.098 G-s
	MIA	.101 In/Sec	.086 G-s
	GIA	.043 In/Sec	.0014 G-s
	GIH	.082 In/Sec	.049 G-s
	GOH	.268 In/Sec	.229 G-s
	COH	.473 In/Sec	.047 G-s

STD6 - Stand 6 (11-Oct-22)

	OVERALL LEVEL	1K-20KHz
MOH	.075 In/Sec	.011 G-s
MIH	.044 In/Sec	.024 G-s
MIA	.108 In/Sec	.038 G-s
GIA	.080 In/Sec	.011 G-s
GIH	.047 In/Sec	.100 G-s
GOH	.189 In/Sec	.392 G-s
COH	.360 In/Sec	.050 G-s

STD7 - Stand 7 (11-Oct-22)

	OVERALL LEVEL	1K-20KHz
MOH	.053 In/Sec	.044 G-s
MIH	.034 In/Sec	.091 G-s
MIA	.103 In/Sec	.181 G-s
GIA	.105 In/Sec	.023 G-s
GIH	.082 In/Sec	.132 G-s
GOH	.272 In/Sec	.145 G-s
COH	.347 In/Sec	.100 G-s

STD9 - Stand 9 (11-Oct-22)

	OVERALL LEVEL	1K-20KHz
MOH	.032 In/Sec	.026 G-s
MIH	.105 In/Sec	.045 G-s
MIA	.273 In/Sec	.082 G-s
GIA	.088 In/Sec	.021 G-s
GIH	.056 In/Sec	.020 G-s
COH	.158 In/Sec	.078 G-s

STD10 - Stand 10 (11-Oct-22)

	OVERALL LEVEL	1K-20KHz
MOH	.032 In/Sec	.010 G-s
MIH	.067 In/Sec	.011 G-s
MIA	.082 In/Sec	.010 G-s
GIA	.036 In/Sec	.064 G-s
GIH	.051 In/Sec	.016 G-s
COH	.117 In/Sec	.051 G-s

STD13 - Stand 13 (11-Oct-22)

	OVERALL LEVEL	1K-20KHz
MOH	.060 In/Sec	.077 G-s
MIH	.141 In/Sec	.103 G-s
MIA	.150 In/Sec	.207 G-s
GIA	.027 In/Sec	.032 G-s
GIH	.039 In/Sec	.0079 G-s
GOH	.040 In/Sec	.024 G-s
COH	.329 In/Sec	.159 G-s

STD14 - Stand 14 (11-Oct-22)

	OVERALL LEVEL	1K-20KHz
MOH	.076 In/Sec	.042 G-s
MIH	.105 In/Sec	.118 G-s
MIA	.153 In/Sec	.152 G-s
GIA	.057 In/Sec	.021 G-s
GIH	.031 In/Sec	.019 G-s
GOH	.029 In/Sec	.012 G-s
COH	.269 In/Sec	.078 G-s

NORTH AC - NORTH AIR COMPRESSOR QUINCY (11-Oct-22)

	OVERALL LEVEL	1 - 20 KHz
MOH	.153 In/Sec	1.362 G-s
MIH	.107 In/Sec	.543 G-s
MIA	.119 In/Sec	.740 G-s

		OVERALL LEVEL	1K-20KHz
	CIA	.400 In/Sec	.474 G-s
	CIH	.223 In/Sec	.503 G-s
	COH	.234 In/Sec	.407 G-s

WEST AC - WEST AIR COMPRESSOR QUINCY (11-Oct-22)

		OVERALL LEVEL	1 - 20 KHz
	MOH	.176 In/Sec	.180 G-s
	MIH	.126 In/Sec	.219 G-s
	MIA	.338 In/Sec	.028 G-s
		OVERALL LEVEL	1K-20KHz
	CIA	.314 In/Sec	.677 G-s
	CIH	.254 In/Sec	.552 G-s
	COH	.178 In/Sec	.450 G-s

Station: Roll Mill Utilities

MEASUREMENT POINT	OVERALL LEVEL	HFD / VHFD

HYDPMP1 - Hydraulic Pump East (11-Oct-22)

	OVERALL LEVEL	1K-20KHz
MOH	.082 In/Sec	.248 G-s
MIH	.212 In/Sec	.306 G-s
PIV	.424 In/Sec	2.263 G-s

HYDPMP2 - Hydraulic Pump Center (11-Oct-22)

	OVERALL LEVEL	1K-20KHz
MOH	.060 In/Sec	.183 G-s
MIH	.159 In/Sec	.183 G-s
PIV	.303 In/Sec	1.521 G-s

DESFAN - Desolution Fan (11-Oct-22)

	OVERALL LEVEL	1K-20KHz
MOH	.032 In/Sec	.065 G-s
MIH	.054 In/Sec	.029 G-s

COMFAN - Combustion Air Fan (11-Oct-22)

	OVERALL LEVEL	1K-20KHz
MOH	.095 In/Sec	.196 G-s
MIH	.078 In/Sec	.127 G-s
MIA	.059 In/Sec	.133 G-s
FIH	.046 In/Sec	.106 G-s
FOH	.057 In/Sec	.337 G-s

EJCFAN - Ejector Air Fan (11-Oct-22)

	OVERALL LEVEL	1K-20KHz
MOH	.101 In/Sec	.377 G-s
MIH	.092 In/Sec	.393 G-s
MIA	.061 In/Sec	.176 G-s
FIA	.061 In/Sec	1.328 G-s
FIH	.060 In/Sec	1.561 G-s
FOH	.095 In/Sec	.816 G-s

COLPMP2 - Furnace Cooling Pump center (11-Oct-22)

	OVERALL LEVEL	1K-20KHz
MOH	.293 In/Sec	.119 G-s
MIH	.045 In/Sec	.271 G-s
MIA	.178 In/Sec	.149 G-s

FCTSOUTH - Furnace CT Drive South (11-Oct-22)

	OVERALL LEVEL	1K-20KHz
MOH	.446 In/Sec	.099 G-s
MIH	.154 In/Sec	.098 G-s
MIA	.566 In/Sec	.094 G-s

FCTNORTH - Furnace CT Drive North (11-Oct-22)

	OVERALL LEVEL	1K-20KHz

	MOH	.538 In/Sec	.101 G-s
	MIH	.358 In/Sec	.126 G-s
	MIA	.240 In/Sec	.083 G-s

SCLPMP2 - Scale Pit Pump North (11-Oct-22)

	OVERALL LEVEL	1K-20KHz
MOH	.318 In/Sec	.216 G-s
MIH	.125 In/Sec	.275 G-s
MIA	.153 In/Sec	.143 G-s

CTWTR2 - CT Pump West (11-Oct-22)

	OVERALL LEVEL	1K-20KHz
MOH	.136 In/Sec	.224 G-s
MIH	.097 In/Sec	.181 G-s
MIA	.132 In/Sec	.103 G-s

MILWTR3 - Mill Water Pump West (11-Oct-22)

	OVERALL LEVEL	1K-20KHz
MOH	.076 In/Sec	.348 G-s
MIH	.054 In/Sec	.463 G-s
MIA	.043 In/Sec	.337 G-s

MILWTR1 - Mill Water Pump East (11-Oct-22)

	OVERALL LEVEL	1K-20KHz
MOH	.046 In/Sec	.159 G-s
MIH	.039 In/Sec	.301 G-s
MIA	.049 In/Sec	.142 G-s

Clarification Of Vibration Units:

Acc --> G-s RMS

Vel --> In/Sec PK