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October 29, 2024

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 10/24/24. Most of the machines surveyed were found to be in good condition except for the following.

HI-SPEED 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.

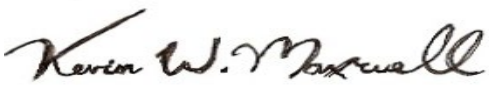
Class II: Defect (s) present that may cause problem in long term (2-6 months). Repair during normal maintenance scheduling. Continue to monitor.

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,



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Defects

Roll Stand 1A
Planetary gearbox still has some vibration and noise floor that comes and goes in spectral data at the input end of the gearbox. The amplitudes and gear mesh frequencies in spectral data may be influenced some due to load and speed; however, they may also indicate low level internal wear or defects in internal components. We are continuing to monitor this closely. Rated as a **CLASS I** defect.

Roll Stand 1
Drive motor continues to have elevated DE axial vibration associated with line frequency 60 Hz and 360 HZ. (6 x line freq.). The amplitudes tend to go up and down depending on motor load and speed. This may be an SCR issue or electrical resonance. It is recommended to inspect drive components for issues. Rated as a **CLASS I** defect.

Roll Stand 2
Inboard gearbox (Int.) is showing some gear mesh vibration with sidebands of input rpm. This issue appears to come and go based on load and speed. This type of vibration is an indication of heavy tooth load or possible gear wear. Rated as a **CLASS I** defect.

Roll Stand 6
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 changes in tooth load and speed. This vibration was higher this month, with amplitude showing an increase from .142 ips in July to .813 in August. We will continue to monitor this very closely. This is rated as a **CLASS I** defect.

Roll Stand 7
Gearbox vibration was higher in amplitude this survey. Vibration data shows dominant gear mesh harmonics on outboard end of the gear casing. The up and down amplitude of this peak from month to month is likely due to changes in tooth load and machine speed. We suspect this to be possibly due to a resonant gear mesh frequency vibration and we will continue to monitor this very closely. Rated as a **CLASS I** defect.

Roll Stand 12
Drive motor spectral data is showing some non-synchronous peaks that may be associated with bearing race defects. Typically, this issue is caused by fluting of the bearing races. This is low level at this time, and we are monitoring this closely. Rated as a **CLASS I** defect.

Roll Stand 13
Cooling fan motor still has high vibration. Overall amplitude at the ODE of the cooling fan motor was over 1.3 ips-pk during our test on 8/29. Data shows dominant 1 x rpm vibration. Inspect fan and all fasteners/structure ASAP. Rated as a **CLASS III** defect.

Roll Stand 16
Cooling fan motor has elevated vibration at the ODE. Last month's amplitude was .6 ips-pk while amplitude this survey was.86 ips-pk. Inspect the cooling fan structure, fasteners, and fan wheel as scheduling allows. Rated as a **CLASS II** defect.

Furnace Cooling Tower Drive South
Motor data shows axial and radial 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.

Abbreviated Last Measurement Summary

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Database: nucorja9.rbm
Station: Roll Mill Rolls
Report Date: 29-Oct-24 10:56

MEASUREMENT POINT	OVERALL LEVEL	HFD / VHFD
STD1A - Stand 1A	(24-Oct-24)	
	OVERALL LEVEL	1K-20KHz
MOH	.073 In/Sec	.015 G-s
MIH	.073 In/Sec	.105 G-s
MIA	.091 In/Sec	.131 G-s
COH	.156 In/Sec	.030 G-s
GIA	.105 In/Sec	.186 G-s
GIH	.184 In/Sec	.230 G-s
GI2	.152 In/Sec	.211 G-s
GI3	.151 In/Sec	.209 G-s
GI4	.113 In/Sec	.190 G-s
GI5	.066 In/Sec	.164 G-s
GI6	.055 In/Sec	.130 G-s
GOH	.058 In/Sec	.029 G-s
STD2A - Stand 2A	(24-Oct-24)	
	OVERALL LEVEL	1K-20KHz
MOH	.129 In/Sec	.011 G-s
MIH	.088 In/Sec	.061 G-s
MIA	.101 In/Sec	.053 G-s
COH	.331 In/Sec	.058 G-s
STD1 - Stand 1	(24-Oct-24)	
	OVERALL LEVEL	1K-20KHz
MOH	.105 In/Sec	.017 G-s
MIH	.135 In/Sec	.062 G-s
MIA	.331 In/Sec	.174 G-s
GIA	.043 In/Sec	.049 G-s
GIH	.053 In/Sec	.033 G-s
COH	.117 In/Sec	.013 G-s
STD2 - Stand 2	(24-Oct-24)	
	OVERALL LEVEL	1K-20KHz
MOH	.105 In/Sec	.046 G-s
MIH	.142 In/Sec	.134 G-s
MIA	.085 In/Sec	.039 G-s
GIA	.111 In/Sec	.275 G-s
GIH	.151 In/Sec	.140 G-s
COH	.411 In/Sec	.036 G-s
STD3 - Stand 3	(24-Oct-24)	
	OVERALL LEVEL	1K-20KHz
MOH	.062 In/Sec	.055 G-s
MIH	.102 In/Sec	.042 G-s
MIA	.186 In/Sec	.091 G-s
GIA	.030 In/Sec	.013 G-s
GIH	.052 In/Sec	.014 G-s
COH	.153 In/Sec	.040 G-s
STD4 - Stand 4	(24-Oct-24)	
	OVERALL LEVEL	1K-20KHz
MOH	.047 In/Sec	.0085 G-s
MIH	.079 In/Sec	.086 G-s
MIA	.085 In/Sec	.124 G-s
GIA	.046 In/Sec	.046 G-s

	GIH	.086 In/Sec	.030 G-s
	COH	.451 In/Sec	.017 G-s

STD5 - Stand 5 (24-Oct-24)

	OVERALL LEVEL	1K-20KHz
MOH	.059 In/Sec	.055 G-s
MIH	.053 In/Sec	.046 G-s
MIA	.092 In/Sec	.062 G-s
GIA	.123 In/Sec	.122 G-s
GIH	.058 In/Sec	.333 G-s
GOH	.414 In/Sec	.500 G-s
COH	.393 In/Sec	.077 G-s

STD6 - Stand 6 (24-Oct-24)

	OVERALL LEVEL	1K-20KHz
MOH	.071 In/Sec	.020 G-s
MIH	.061 In/Sec	.022 G-s
MIA	.098 In/Sec	.022 G-s
GIA	.093 In/Sec	.0092 G-s
GIH	.051 In/Sec	.018 G-s
GOH	.212 In/Sec	.311 G-s
COH	.214 In/Sec	.058 G-s

STD7 - Stand 7 (24-Oct-24)

	OVERALL LEVEL	1K-20KHz
MOH	.082 In/Sec	.135 G-s
MIH	.051 In/Sec	.069 G-s
MIA	.188 In/Sec	.176 G-s
GIA	.067 In/Sec	.086 G-s
GIH	.157 In/Sec	.110 G-s
GOH	.625 In/Sec	.244 G-s
COH	.527 In/Sec	.184 G-s

STD8 - Stand 8 (29-Aug-24)

	OVERALL LEVEL	1K-20KHz
MOH	.055 In/Sec	.013 G-s
MIH	.062 In/Sec	.043 G-s
MIA	.050 In/Sec	.084 G-s
GIA	.045 In/Sec	.040 G-s
GIH	.065 In/Sec	.011 G-s
COH	.245 In/Sec	.258 G-s

STD9 - Stand 9 (24-Oct-24)

	OVERALL LEVEL	1K-20KHz
MOH	.092 In/Sec	.038 G-s
MIH	.144 In/Sec	.294 G-s
MIA	.064 In/Sec	.178 G-s
GIA	.106 In/Sec	.101 G-s
GIH	.073 In/Sec	.351 G-s
COH	.171 In/Sec	.067 G-s

STD10 - Stand 10 (29-Aug-24)

	OVERALL LEVEL	1K-20KHz
MOH	.046 In/Sec	.026 G-s
MIH	.065 In/Sec	.041 G-s
MIA	.095 In/Sec	.039 G-s
GIA	.091 In/Sec	.059 G-s
GIH	.073 In/Sec	.116 G-s
COH	.177 In/Sec	.198 G-s

STD11 - Stand 11 (24-Oct-24)

	OVERALL LEVEL	1K-20KHz
MOH	.016 In/Sec	.042 G-s
MIH	.033 In/Sec	.102 G-s
MIA	.033 In/Sec	.177 G-s
GIA	.050 In/Sec	.049 G-s
GIH	.050 In/Sec	.085 G-s
GOH	.040 In/Sec	.109 G-s
COH	.164 In/Sec	.046 G-s

STD12	- Stand 12		(24-Oct-24)
		OVERALL LEVEL	1K-20KHz
	MOH	.027 In/Sec	.034 G-s
	MIH	.025 In/Sec	.143 G-s
	MIA	.045 In/Sec	.124 G-s
	COH	.103 In/Sec	.065 G-s
STD13	- Stand 13		(24-Oct-24)
		OVERALL LEVEL	1K-20KHz
	MOH	.088 In/Sec	.093 G-s
	MIH	.123 In/Sec	.105 G-s
	MIA	.124 In/Sec	.148 G-s
	GIA	.047 In/Sec	.206 G-s
	GIH	.040 In/Sec	.349 G-s
*	GOH	.033 In/Sec	.097 G-s
	COH	1.172 In/Sec	.511 G-s
STD14	- Stand 14		(24-Oct-24)
		OVERALL LEVEL	1K-20KHz
	MOH	.087 In/Sec	.385 G-s
	MIH	.096 In/Sec	.086 G-s
	MIA	.055 In/Sec	.153 G-s
	GIA	.162 In/Sec	.277 G-s
	GIH	.044 In/Sec	.166 G-s
	GOH	.045 In/Sec	.025 G-s
	COH	.239 In/Sec	.184 G-s
STD15	- Stand 15		(24-Oct-24)
		OVERALL LEVEL	1K-20KHz
	MOH	.064 In/Sec	.031 G-s
	MIH	.058 In/Sec	.039 G-s
	MIA	.094 In/Sec	.089 G-s
	GIA	.030 In/Sec	.112 G-s
	GIH	.033 In/Sec	.112 G-s
	COH	.070 In/Sec	.065 G-s
STD16	- Stand 16		(24-Oct-24)
		OVERALL LEVEL	1K-20KHz
	MOH	.123 In/Sec	.193 G-s
	MIH	.200 In/Sec	.101 G-s
	MIA	.055 In/Sec	.041 G-s
	GIA	.059 In/Sec	.040 G-s
	GIH	.032 In/Sec	.029 G-s
	GOH	.022 In/Sec	.099 G-s
	COH	.859 In/Sec	.150 G-s
NORTH AC	- NORTH AIR COMPRESSOR QUINCY		(24-Oct-24)
		OVERALL LEVEL	1 - 20 KHz
	MOH	.104 In/Sec	.688 G-s
	MIH	.081 In/Sec	.466 G-s
	MIA	.089 In/Sec	.322 G-s
		OVERALL LEVEL	1K-20KHz
	CIA	.254 In/Sec	.657 G-s
	CIH	.150 In/Sec	.706 G-s
	COH	.126 In/Sec	.394 G-s
SOUTH AC	- SOUTH AIR COMPRESSOR QUINCY		(29-Aug-24)
		OVERALL LEVEL	1 - 20 KHz
	MOH	.243 In/Sec	.351 G-s
	MIH	.220 In/Sec	.326 G-s
		OVERALL LEVEL	1K-20KHz
	CIA	.291 In/Sec	.774 G-s
	CIH	.257 In/Sec	.337 G-s
	COH	.260 In/Sec	.360 G-s
WEST AC	- WEST AIR COMPRESSOR QUINCY		(29-Aug-24)
		OVERALL LEVEL	1 - 20 KHz
	MOH	.181 In/Sec	.523 G-s
	MIH	.198 In/Sec	.089 G-s
	MIA	.219 In/Sec	.014 G-s

	OVERALL LEVEL	1K-20KHz
CIA	.336 In/Sec	.371 G-s
CIH	.232 In/Sec	.277 G-s
COH	.152 In/Sec	.308 G-s

Station: Roll Mill Utilities

MEASUREMENT POINT	OVERALL LEVEL	HFD / VHFD

HYDPMP1 - Hydraulic Pump East (28-Aug-24)

	OVERALL LEVEL	1K-20KHz
MOH	.101 In/Sec	.491 G-s
MIH	.192 In/Sec	.505 G-s
PIV	.386 In/Sec	6.162 G-s

HYDPMP2 - Hydraulic Pump Center (23-Oct-24)

	OVERALL LEVEL	1K-20KHz
MOH	.070 In/Sec	.234 G-s
MIH	.184 In/Sec	.143 G-s
PIV	.293 In/Sec	.410 G-s

HYDPMP3 - Hydraulic Pump West (23-Oct-24)

	OVERALL LEVEL	1K-20KHz
MOH	.103 In/Sec	.202 G-s
MIH	.333 In/Sec	.253 G-s
PIV	.269 In/Sec	1.080 G-s

DESFAN - Desolution Fan (23-Oct-24)

	OVERALL LEVEL	1K-20KHz
MOH	.073 In/Sec	.050 G-s
MIH	.057 In/Sec	.052 G-s
MIA	.065 In/Sec	.066 G-s

COMFAN - Combustion Air Fan (23-Oct-24)

	OVERALL LEVEL	1K-20KHz
MOH	.230 In/Sec	.170 G-s
MIH	.212 In/Sec	.167 G-s
MIA	.150 In/Sec	.125 G-s
FIH	.088 In/Sec	.046 G-s
FOH	.118 In/Sec	.157 G-s

EJCFAN - Ejector Air Fan (23-Oct-24)

	OVERALL LEVEL	1K-20KHz
MOH	.053 In/Sec	.158 G-s
MIH	.070 In/Sec	.194 G-s
MIA	.035 In/Sec	.126 G-s
FIH	.038 In/Sec	.371 G-s
FOH	.080 In/Sec	.171 G-s

COLPMP2 - Furnace Cooling Pump center (23-Oct-24)

	OVERALL LEVEL	1K-20KHz
MOH	.255 In/Sec	.280 G-s
MIH	.065 In/Sec	.343 G-s
MIA	.168 In/Sec	.114 G-s

FCTSOUTH - Furnace CT Drive South (23-Oct-24)

	OVERALL LEVEL	1K-20KHz
MOH	.189 In/Sec	.135 G-s
MIH	.176 In/Sec	.124 G-s
MIA	.615 In/Sec	.106 G-s

FCTNORTH - Furnace CT Drive North (23-Oct-24)

	OVERALL LEVEL	1K-20KHz
MOH	.239 In/Sec	.111 G-s
MIH	.116 In/Sec	.090 G-s
MIA	.145 In/Sec	.026 G-s

SCLPMP2 - Scale Pit Pump North (24-Oct-24)

		OVERALL LEVEL	1K-20KHz
	MOH	.171 In/Sec	.330 G-s
	MIH	.098 In/Sec	.394 G-s
	MIA	.103 In/Sec	.219 G-s
*	PIH	.124 In/Sec	.617 G-s

CTWTR1 - CT Pump East/Middle Pump (23-Oct-24)

		OVERALL LEVEL	1K-20KHz
	MOH	.092 In/Sec	.558 G-s
	MIH	.111 In/Sec	.151 G-s
	MIA	.061 In/Sec	.124 G-s

MILWTR2 - Mill Water Pump Center (23-Oct-24)

		OVERALL LEVEL	1K-20KHz
	MOH	.079 In/Sec	.288 G-s
	MIH	.070 In/Sec	.527 G-s
	MIA	.059 In/Sec	.308 G-s

MILWTR1 - Mill Water Pump East (23-Oct-24)

		OVERALL LEVEL	1K-20KHz
	MOH	.063 In/Sec	.264 G-s
	MIH	.058 In/Sec	.239 G-s
	MIA	.042 In/Sec	.171 G-s

Clarification Of Vibration Units:

Acc --> G-s RMS

Vel --> In/Sec PK