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July 29, 2024

Nucor Roll Mill
Jackson-Flowood, MS

Subject: July vibration survey

Below is a summary report for the monthly Roll Mill vibration survey that was performed on 7/25/24. 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,

Kevin W. Maxwell

ISO Certified Vibration Analyst, Category III

HI-SPEED INDUSTRIAL SERVICE

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Defects

Roll Stand 1A
Planetary gearbox still has some vibration and noise floor 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 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 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. It is recommended to inspect drive components for issues. Rated as a **CLASS II** defect.

Roll Stand 2
Inboard gearbox (Int.) is showing some elevated 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 II** defect for now.

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 present during testing, but amplitude is below alarm level. We will continue to monitor this very closely. This is rated as a **CLASS I** defect.

Roll Stand 7
Gearbox vibration was lower 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 8
Cooling fan motor has some elevated vibration at 10 Hz. This is likely a resonant frequency of the frame that the fan motor is mounted to. Rated as a **CLASS I** defect.

Roll Stand 12
Motor/Drive was not in service this survey; however, the following likely still applies: 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.

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

MEASUREMENT POINT	OVERALL LEVEL	HFD / VHFD
STD1A - Stand 1A	(25-Jul-24)	
	OVERALL LEVEL	1K-20KHz
MOH	.084 In/Sec	.047 G-s
MIH	.056 In/Sec	.047 G-s
MIA	.089 In/Sec	.101 G-s
COH	.090 In/Sec	.030 G-s
GIA	.071 In/Sec	.028 G-s
GIH	.133 In/Sec	.336 G-s
GI2	.128 In/Sec	.159 G-s
GI3	.074 In/Sec	.140 G-s
GI4	.048 In/Sec	.141 G-s
GI5	.041 In/Sec	.0051 G-s
GI6	.042 In/Sec	.104 G-s
GOH	.049 In/Sec	.024 G-s
STD2A - Stand 2A	(25-Jul-24)	
	OVERALL LEVEL	1K-20KHz
MOH	.055 In/Sec	.0042 G-s
MIH	.092 In/Sec	.041 G-s
MIA	.093 In/Sec	.159 G-s
COH	.104 In/Sec	.039 G-s
STD1 - Stand 1	(25-Jul-24)	
	OVERALL LEVEL	1K-20KHz
MOH	.100 In/Sec	.093 G-s
MIH	.122 In/Sec	.045 G-s
MIA	.408 In/Sec	.442 G-s
GIA	.035 In/Sec	.051 G-s
GIH	.080 In/Sec	.012 G-s
COH	.081 In/Sec	.012 G-s
STD2 - Stand 2	(25-Jul-24)	
	OVERALL LEVEL	1K-20KHz
MOH	.135 In/Sec	.103 G-s
MIH	.090 In/Sec	.046 G-s
MIA	.391 In/Sec	.262 G-s
GIA	.097 In/Sec	.122 G-s
GIH	.073 In/Sec	.019 G-s
COH	.205 In/Sec	.052 G-s
STD3 - Stand 3	(25-Jul-24)	
	OVERALL LEVEL	1K-20KHz
MOH	.047 In/Sec	.200 G-s
MIH	.089 In/Sec	.049 G-s
MIA	.167 In/Sec	.172 G-s
GIA	.019 In/Sec	.020 G-s
GIH	.037 In/Sec	.0094 G-s
COH	.143 In/Sec	.079 G-s
STD4 - Stand 4	(25-Jul-24)	
	OVERALL LEVEL	1K-20KHz
MOH	.056 In/Sec	.028 G-s
MIH	.146 In/Sec	.077 G-s
MIA	.095 In/Sec	.099 G-s
GIA	.036 In/Sec	.087 G-s
GIH	.117 In/Sec	.023 G-s
COH	.197 In/Sec	.023 G-s

STD5 - Stand 5 (25-Jul-24)

	OVERALL LEVEL	1K-20KHz
MOH	.025 In/Sec	.019 G-s
MIH	.051 In/Sec	.029 G-s
MIA	.133 In/Sec	.063 G-s
GIA	.081 In/Sec	.012 G-s
GIH	.080 In/Sec	.015 G-s
GOH	.124 In/Sec	.056 G-s
COH	.469 In/Sec	.059 G-s

STD6 - Stand 6 (25-Jul-24)

	OVERALL LEVEL	1K-20KHz
MOH	.064 In/Sec	.014 G-s
MIH	.099 In/Sec	.016 G-s
MIA	.105 In/Sec	.021 G-s
GIA	.070 In/Sec	.021 G-s
GIH	.055 In/Sec	.015 G-s
GOH	.142 In/Sec	.051 G-s
COH	.240 In/Sec	.032 G-s

STD7 - Stand 7 (25-Jul-24)

	OVERALL LEVEL	1K-20KHz
MOH	.051 In/Sec	.053 G-s
MIH	.042 In/Sec	.073 G-s
MIA	.115 In/Sec	.050 G-s
GIA	.069 In/Sec	.0034 G-s
GIH	.042 In/Sec	.014 G-s
GOH	.417 In/Sec	.030 G-s
COH	.393 In/Sec	.080 G-s

STD8 - Stand 8 (25-Jul-24)

	OVERALL LEVEL	1K-20KHz
MOH	.043 In/Sec	.0077 G-s
MIH	.066 In/Sec	.019 G-s
MIA	.062 In/Sec	.049 G-s
GIA	.054 In/Sec	.012 G-s
GIH	.030 In/Sec	.0046 G-s
COH	.137 In/Sec	.072 G-s

STD9 - Stand 9 (25-Jul-24)

	OVERALL LEVEL	1K-20KHz
MOH	.047 In/Sec	.049 G-s
MIH	.086 In/Sec	.290 G-s
MIA	.133 In/Sec	.308 G-s
GIA	.095 In/Sec	.014 G-s
GIH	.195 In/Sec	.042 G-s
COH	.157 In/Sec	.025 G-s

STD10 - Stand 10 (25-Jul-24)

	OVERALL LEVEL	1K-20KHz
MOH	.057 In/Sec	.028 G-s
MIH	.068 In/Sec	.079 G-s
MIA	.130 In/Sec	.081 G-s
GIA	.050 In/Sec	.041 G-s
GIH	.040 In/Sec	.186 G-s
COH	.122 In/Sec	.110 G-s

STD11 - Stand 11 (25-Jul-24)

	OVERALL LEVEL	1K-20KHz
MOH	.018 In/Sec	.043 G-s
MIH	.024 In/Sec	.069 G-s
MIA	.034 In/Sec	.075 G-s
GIA	.061 In/Sec	.018 G-s
GIH	.035 In/Sec	.016 G-s
GOH	.032 In/Sec	.070 G-s
COH	.172 In/Sec	.061 G-s

STD14 - Stand 14 (25-Jul-24)

	OVERALL LEVEL	1K-20KHz

MOH		.120 In/Sec	.045 G-s
MIH		.185 In/Sec	.070 G-s
MIA		.071 In/Sec	.118 G-s
GIA		.035 In/Sec	.0072 G-s
GIH		.015 In/Sec	.0049 G-s
GOH		.020 In/Sec	.012 G-s
COH		.212 In/Sec	.139 G-s

STD15 - Stand 15 (25-Jul-24)

	OVERALL LEVEL	1K-20KHz
MOH	.079 In/Sec	.023 G-s
MIH	.058 In/Sec	.063 G-s
MIA	.055 In/Sec	.020 G-s
GIA	.051 In/Sec	.066 G-s
GIH	.055 In/Sec	.096 G-s
COH	.073 In/Sec	.043 G-s

STD16 - Stand 16 (25-Jul-24)

	OVERALL LEVEL	1K-20KHz
MOH	.069 In/Sec	.056 G-s
MIH	.096 In/Sec	.034 G-s
MIA	.071 In/Sec	.160 G-s
GIA	.097 In/Sec	.195 G-s
GIH	.076 In/Sec	.134 G-s
GOH	.048 In/Sec	.118 G-s
COH	.120 In/Sec	.065 G-s

NORTH AC - NORTH AIR COMPRESSOR QUINCY (25-Jul-24)

	OVERALL LEVEL	1 - 20 KHz
MOH	.097 In/Sec	.991 G-s
MIH	.083 In/Sec	.608 G-s
MIA	.064 In/Sec	.644 G-s
	OVERALL LEVEL	1K-20KHz
CIA	.311 In/Sec	.638 G-s
CIH	.165 In/Sec	.416 G-s
COH	.127 In/Sec	.376 G-s

SOUTH AC - SOUTH AIR COMPRESSOR QUINCY (25-Jul-24)

	OVERALL LEVEL	1 - 20 KHz
MOH	.131 In/Sec	.321 G-s
MIH	.122 In/Sec	.251 G-s
MIA	.259 In/Sec	.233 G-s
	OVERALL LEVEL	1K-20KHz
CIA	.197 In/Sec	.561 G-s
CIH	.145 In/Sec	.369 G-s
COH	.172 In/Sec	.365 G-s

WEST AC - WEST AIR COMPRESSOR QUINCY (25-Jul-24)

	OVERALL LEVEL	1 - 20 KHz
MOH	.227 In/Sec	.234 G-s
MIH	.130 In/Sec	.284 G-s
MIA	.214 In/Sec	.154 G-s
	OVERALL LEVEL	1K-20KHz
CIA	.389 In/Sec	.394 G-s
CIH	.288 In/Sec	.431 G-s
COH	.182 In/Sec	.418 G-s

Station: Roll Mill Utilities
Report Date: 29-Jul-24 10:44

MEASUREMENT POINT	OVERALL LEVEL	HFD / VHFD

HYDPMP1 - Hydraulic Pump East (24-Jul-24)

	OVERALL LEVEL	1K-20KHz
MOH	.101 In/Sec	.238 G-s
MIH	.240 In/Sec	.490 G-s
PIV	.404 In/Sec	3.704 G-s

HYDPMP2 - Hydraulic Pump Center (24-Jul-24)

	OVERALL LEVEL	1K-20KHz

	MOH	.065 In/Sec	.163 G-s
	MIH	.206 In/Sec	.155 G-s
	PIV	.288 In/Sec	.551 G-s

DESFAN - Desolution Fan (24-Jul-24)

	OVERALL LEVEL	1K-20KHz
MOH	.034 In/Sec	.077 G-s
MIH	.042 In/Sec	.036 G-s

COMFAN - Combustion Air Fan (24-Jul-24)

	OVERALL LEVEL	1K-20KHz
MOH	.068 In/Sec	.196 G-s
MIH	.077 In/Sec	.185 G-s
FIH	.039 In/Sec	.248 G-s
FOH	.056 In/Sec	.623 G-s

EJCFAN - Ejector Air Fan (24-Jul-24)

	OVERALL LEVEL	1K-20KHz
MOH	.062 In/Sec	.285 G-s
MIH	.061 In/Sec	.433 G-s
MIA	.039 In/Sec	.226 G-s
FIA	.049 In/Sec	.299 G-s
FIH	.038 In/Sec	.675 G-s
FOH	.087 In/Sec	.567 G-s

COLPMP2 - Furnace Cooling Pump center (24-Jul-24)

	OVERALL LEVEL	1K-20KHz
MOH	.183 In/Sec	.201 G-s
MIH	.297 In/Sec	.284 G-s
MIA	.070 In/Sec	.150 G-s

FCTSOUTH - Furnace CT Drive South (24-Jul-24)

	OVERALL LEVEL	1K-20KHz
MOH	.079 In/Sec	.079 G-s
MIH	.199 In/Sec	.094 G-s
MIA	.176 In/Sec	.081 G-s

FCTNORTH - Furnace CT Drive North (24-Jul-24)

	OVERALL LEVEL	1K-20KHz
MOH	.209 In/Sec	.060 G-s
MIH	.148 In/Sec	.088 G-s
MIA	.119 In/Sec	.037 G-s

SCLPMP1 - Scale Pit Pump South (24-Jul-24)

	OVERALL LEVEL	1K-20KHz
MOH	.166 In/Sec	.540 G-s
MOV	.121 In/Sec	.286 G-s
MIV	.072 In/Sec	.115 G-s
MIH	.176 In/Sec	.212 G-s
MIA	.092 In/Sec	.112 G-s
PIA	.090 In/Sec	.134 G-s
PIH	.127 In/Sec	.090 G-s
PIV	.058 In/Sec	.091 G-s

CTWTR1 - CT Pump East/Middle Pump (24-Jul-24)

	OVERALL LEVEL	1K-20KHz
MOH	.080 In/Sec	.419 G-s
MIH	.080 In/Sec	.206 G-s
MIA	.092 In/Sec	.187 G-s

MILWTR3 - Mill Water Pump West (24-Jul-24)

	OVERALL LEVEL	1K-20KHz
MOH	.048 In/Sec	.423 G-s
MIH	.055 In/Sec	.254 G-s
MIA	.030 In/Sec	.261 G-s

MILWTR2 - Mill Water Pump Center (24-Jul-24)

	OVERALL LEVEL	1K-20KHz
MOH	.077 In/Sec	.290 G-s
MIH	.056 In/Sec	.670 G-s

MIA .052 In/Sec .169 G-s

Clarification Of Vibration Units:

Acc --> G-s RMS

Vel --> In/Sec PK