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February 28, 2021

Nucor Roll Mill
Jackson-Flowood, MS

Subject: February vibration survey

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

Defects

Roll Stand 1A Planetary Gearbox
Overall vibration amplitudes are varying with survey while gearbox data show signs of distress. We will continue to monitor this unit closely. Still rated as a **CLASS I** defect for now.

Roll Stand 2
Last month the drive end of the intermediate gearbox showed an increase in gear mesh frequencies with 2 and 4 x GMF being high in amplitude. Input rpm sidebands were also present around the GMF harmonics. This vibration was not present this month. There are some low-level gear mesh peaks, but nowhere near the amplitude that was present last month. This may be due to the gearbox running at a lower speed this month. We will monitor this stand very closely in the future. For now, this is rated as a **CLASS I** defect.

Roll Stand 5
Drive motor is starting to show some signs of bearing issue in the drive end bearing. There is still a dominant gear mesh vibration is present from time to time towards the output of the 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. Because of the motor bearing issue starting to appear in the spectral data this is rated as a **CLASS II** defect for now.

Roll Stand 5 Cooling Fan Motor
There still appears to be a vibration in this unit that may be due to imbalance of the fan wheel. Inspect, clean fan wheel as time allows. Ensure all fastening bolts are tight. We will monitor this closely. Rated as a **CLASS II** defect.

Roll Stand 6
A dominant gear mesh vibration is 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. This issue seems to have begun after gearbox was repaired. We will continue to monitor this very closely. Rated as a **CLASS I** defect.

Roll Stand 7
Gearbox vibration was higher this month. 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. Rated as a **CLASS I** defect.

Roll Stand 13 Cooling Fan Motor
Fan appears to have vibration associated with fan imbalance. Resonance may also be a factor as this vibration does seem to vary slightly depending on the speed of the DC motor. We will monitor this closely. Rated as a **CLASS I** defect.

Furnace Cooling Tower Drive South
Motor has a high axial vibration. This appears to be occurring at 1 x motor rpm and may indicate an issue with the drive coupling or some other structural issue such as loose fasteners. This could also be caused by a resonance in this unit since the blade pitch has been altered. 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-Feb-21)	
	OVERALL LEVEL	1K-20KHz
MOH	.076 In/Sec	.030 G-s
MIH	.048 In/Sec	.087 G-s
MIA	.113 In/Sec	.105 G-s
COH	.168 In/Sec	.155 G-s
GIA	.032 In/Sec	.067 G-s
GIH	.068 In/Sec	.048 G-s
GI2	.043 In/Sec	.207 G-s
GI3	.034 In/Sec	.184 G-s
GI4	.020 In/Sec	.074 G-s
GI5	.018 In/Sec	.032 G-s
GI6	.019 In/Sec	.035 G-s
GOH	.021 In/Sec	.038 G-s
STD2A - Stand 2A	(25-Feb-21)	
	OVERALL LEVEL	1K-20KHz
MOH	.086 In/Sec	.014 G-s
MIH	.056 In/Sec	.035 G-s
MIA	.076 In/Sec	.055 G-s
COH	.083 In/Sec	.049 G-s
STD1 - Stand 1	(25-Feb-21)	
	OVERALL LEVEL	1K-20KHz
MOH	.067 In/Sec	.026 G-s
MIH	.097 In/Sec	.093 G-s
MIA	.393 In/Sec	.307 G-s
GIA	.038 In/Sec	.015 G-s
GIH	.075 In/Sec	.078 G-s
COH	.074 In/Sec	.016 G-s
STD2 - Stand 2	(25-Feb-21)	
	OVERALL LEVEL	1K-20KHz
MOH	.059 In/Sec	.015 G-s
MIH	.072 In/Sec	.052 G-s
MIA	.117 In/Sec	.047 G-s
GIA	.032 In/Sec	.085 G-s
GIH	.031 In/Sec	.034 G-s
COH	.133 In/Sec	.083 G-s
STD3 - Stand 3	(25-Feb-21)	
	OVERALL LEVEL	1K-20KHz
MOH	.061 In/Sec	.046 G-s
MIH	.097 In/Sec	.013 G-s
MIA	.315 In/Sec	.169 G-s
GIA	.031 In/Sec	.064 G-s
GIH	.029 In/Sec	.137 G-s
COH	.152 In/Sec	.030 G-s
STD4 - Stand 4	(25-Feb-21)	
	OVERALL LEVEL	1K-20KHz
MOH	.041 In/Sec	.049 G-s
MIH	.083 In/Sec	.025 G-s
MIA	.121 In/Sec	.455 G-s
GIA	.068 In/Sec	.751 G-s
GIH	.061 In/Sec	.078 G-s
COH	.132 In/Sec	.034 G-s

STD5 - Stand 5 (25-Feb-21)

	OVERALL LEVEL	1K-20KHz
MOH	.046 In/Sec	.055 G-s
MIH	.084 In/Sec	.079 G-s
MIA	.130 In/Sec	.101 G-s
GIA	.043 In/Sec	.0033 G-s
GIH	.031 In/Sec	.016 G-s
GOH	.066 In/Sec	.101 G-s
COH	.357 In/Sec	.039 G-s

STD6 - Stand 6 (25-Feb-21)

	OVERALL LEVEL	1K-20KHz
MOH	.043 In/Sec	.084 G-s
MIH	.044 In/Sec	.039 G-s
MIA	.116 In/Sec	.087 G-s
GIA	.036 In/Sec	.0099 G-s
GIH	.034 In/Sec	.015 G-s
GOH	.139 In/Sec	.043 G-s
COH	.240 In/Sec	.043 G-s

STD7 - Stand 7 (25-Feb-21)

	OVERALL LEVEL	1K-20KHz
MOH	.032 In/Sec	.065 G-s
MIH	.094 In/Sec	.116 G-s
MIA	.092 In/Sec	.150 G-s
GIA	.036 In/Sec	.0066 G-s
GIH	.028 In/Sec	.022 G-s
GOH	.188 In/Sec	.022 G-s
COH	.235 In/Sec	.057 G-s

STD8 - Stand 8 (25-Feb-21)

	OVERALL LEVEL	1K-20KHz
MOH	.048 In/Sec	.0078 G-s
MIH	.051 In/Sec	.112 G-s
MIA	.077 In/Sec	.055 G-s
GIA	.056 In/Sec	.012 G-s
GIH	.037 In/Sec	.037 G-s
COH	.121 In/Sec	.056 G-s

STD9 - Stand 9 (25-Feb-21)

	OVERALL LEVEL	1K-20KHz
MOH	.034 In/Sec	.123 G-s
MIH	.100 In/Sec	.095 G-s
MIA	.071 In/Sec	.069 G-s
GIA	.120 In/Sec	.066 G-s
GIH	.103 In/Sec	1.232 G-s
COH	.169 In/Sec	.066 G-s

STD10 - Stand 10 (25-Feb-21)

	OVERALL LEVEL	1K-20KHz
MOH	.040 In/Sec	.027 G-s
MIH	.065 In/Sec	.075 G-s
MIA	.080 In/Sec	.035 G-s
GIA	.048 In/Sec	.116 G-s
GIH	.053 In/Sec	.110 G-s
COH	.200 In/Sec	.033 G-s

STD11 - Stand 11 (25-Feb-21)

	OVERALL LEVEL	1K-20KHz
MOH	.025 In/Sec	.042 G-s
MIH	.032 In/Sec	.074 G-s
MIA	.041 In/Sec	.081 G-s
GIA	.080 In/Sec	.042 G-s
GIH	.066 In/Sec	.207 G-s
GOH	.052 In/Sec	.145 G-s
COH	.148 In/Sec	.020 G-s

STD12 - Stand 12 (25-Feb-21)

	OVERALL LEVEL	1K-20KHz

MOH	.022 In/Sec	.066 G-s
MIH	.024 In/Sec	.065 G-s
MIA	.037 In/Sec	.063 G-s
COH	.081 In/Sec	.052 G-s

STD13 - Stand 13 (25-Feb-21)

	OVERALL LEVEL	1K-20KHz
MOH	.071 In/Sec	.133 G-s
MIH	.102 In/Sec	.261 G-s
MIA	.128 In/Sec	.120 G-s
GIA	.042 In/Sec	.041 G-s
GIH	.029 In/Sec	.031 G-s
GOH	.022 In/Sec	.106 G-s
COH	.382 In/Sec	.616 G-s

STD14 - Stand 14 (25-Feb-21)

	OVERALL LEVEL	1K-20KHz
MOH	.115 In/Sec	.081 G-s
MIH	.135 In/Sec	.061 G-s
MIA	.133 In/Sec	.072 G-s
GIA	.052 In/Sec	.051 G-s
GIH	.030 In/Sec	.011 G-s
GOH	.040 In/Sec	.011 G-s
COH	.290 In/Sec	.032 G-s

STD15 - Stand 15 (25-Feb-21)

	OVERALL LEVEL	1K-20KHz
MOH	.058 In/Sec	.103 G-s
MIH	.043 In/Sec	.046 G-s
MIA	.046 In/Sec	.113 G-s
GIA	.050 In/Sec	.376 G-s
GIH	.057 In/Sec	.358 G-s
COH	.113 In/Sec	.073 G-s

NORTH AC - NORTH AIR COMPRESSOR QUINCY (25-Feb-21)

	OVERALL LEVEL	1 - 20 KHz
MOH	.114 In/Sec	.183 G-s
MIH	.118 In/Sec	.348 G-s
MIA	.189 In/Sec	.210 G-s
	OVERALL LEVEL	1K-20KHz
CIA	.201 In/Sec	.430 G-s
CIH	.196 In/Sec	.562 G-s
COH	.156 In/Sec	.448 G-s

SOUTH AC - SOUTH AIR COMPRESSOR QUINCY (25-Feb-21)

	OVERALL LEVEL	1 - 20 KHz
MOH	.085 In/Sec	1.099 G-s
MIH	.233 In/Sec	.301 G-s
MIA	.076 In/Sec	.474 G-s
	OVERALL LEVEL	1K-20KHz
CIA	.240 In/Sec	.504 G-s
CIH	.226 In/Sec	.379 G-s
COH	.259 In/Sec	.492 G-s

Database: nucorja9.rbm
Station: Roll Mill Utilities

MEASUREMENT POINT	OVERALL LEVEL	HFD / VHFD

HYDPMP1 - Hydraulic Pump East (25-Feb-21)

	OVERALL LEVEL	1K-20KHz
MOH	.113 In/Sec	.183 G-s
MIH	.265 In/Sec	.162 G-s
PIV	.267 In/Sec	1.731 G-s

HYDPMP3 - Hydraulic Pump West (25-Feb-21)

	OVERALL LEVEL	1K-20KHz
MOH	.140 In/Sec	.439 G-s

	MIH	.394 In/Sec	.273 G-s
	PIV	.333 In/Sec	1.429 G-s

DESFAN - Desolution Fan (25-Feb-21)

	OVERALL LEVEL	1K-20KHz
MOH	.039 In/Sec	.035 G-s
MIH	.039 In/Sec	.047 G-s

COMFAN - Combustion Air Fan (25-Feb-21)

	OVERALL LEVEL	1K-20KHz
MOH	.111 In/Sec	.132 G-s
MIH	.089 In/Sec	.055 G-s
MIA	.067 In/Sec	.100 G-s
FIH	.054 In/Sec	.131 G-s
FOH	.074 In/Sec	.644 G-s

EJCFAN - Ejector Air Fan (25-Feb-21)

	OVERALL LEVEL	1K-20KHz
MOH	.072 In/Sec	.411 G-s
MIH	.046 In/Sec	.483 G-s
MIA	.045 In/Sec	.092 G-s
FIH	.035 In/Sec	.456 G-s
FOH	.066 In/Sec	2.307 G-s

COLPMP2 - Furnace Cooling Pump center (25-Feb-21)

	OVERALL LEVEL	1K-20KHz
MOH	.428 In/Sec	.262 G-s
MIH	.164 In/Sec	.233 G-s
MIA	.171 In/Sec	.192 G-s

FCTSOUTH - Furnace CT Drive South (25-Feb-21)

	OVERALL LEVEL	1K-20KHz
MOH	.391 In/Sec	.061 G-s
MIH	.274 In/Sec	.107 G-s
MIA	.633 In/Sec	.035 G-s

FCTNORTH - Furnace CT Drive North (25-Feb-21)

	OVERALL LEVEL	1K-20KHz
MOH	.384 In/Sec	.091 G-s
MIH	.243 In/Sec	.087 G-s
MIA	.130 In/Sec	.029 G-s

SCLPMP1 - Scale Pit Pump South (25-Feb-21)

	OVERALL LEVEL	1K-20KHz
MOH	.306 In/Sec	.341 G-s
MOV	.177 In/Sec	.479 G-s
MIV	.107 In/Sec	.193 G-s
MIH	.176 In/Sec	.139 G-s
MIA	.186 In/Sec	.138 G-s

CTWTR1 - CT Pump East/Middle Pump (25-Feb-21)

	OVERALL LEVEL	1K-20KHz
MOH	.053 In/Sec	.389 G-s
MIH	.048 In/Sec	.420 G-s
MIA	.042 In/Sec	.154 G-s

MILWTR3 - Mill Water Pump West (25-Feb-21)

	OVERALL LEVEL	1K-20KHz
MOH	.058 In/Sec	.317 G-s
MIH	.048 In/Sec	.616 G-s
MIA	.027 In/Sec	.349 G-s

MILWTR1 - Mill Water Pump East (25-Feb-21)

	OVERALL LEVEL	1K-20KHz
MOH	.053 In/Sec	.147 G-s
MIH	.055 In/Sec	.265 G-s
MIA	.035 In/Sec	.123 G-s

Clarification Of Vibration Units:

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Acc       -->  G-s      RMS
Vel       -->  In/Sec   PK
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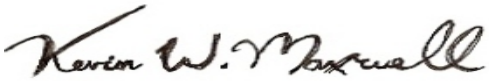
As always, it has been a pleasure to NUCOR Steel Flowood, MS. If there are any comments or questions, do not hesitate to contact us.

Sincerely,



ISO Certified Vibration Analyst, Category III

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