



QualiTest® Diagnostics

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August 19, 2019

NUCOR Melt Shop

Subject: August vibration survey

Most of the machines surveyed were found to be in good condition with the exception of 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

Hi-Speed Industrial Service tests and inspects industrial machinery and equipment and makes recommendations concerning maintenance and repairs based on its experience in the field of industrial repair and maintenance. The information contained herein is provided as an opinion only, not as a guaranty or warranty of the matters discussed herein.

Defects

West Caster Mold Water Pump

High 1 x rpm vibration is present in the motor axial. This indicates angular misalignment. Perform a precision alignment with less than .003" offset and angularity. Ensure there is no soft foot present. Rated as a **CLASS II** defect.

East Caster Mold Water Pump

Pump is showing some signs of internal wear. Coupling may also be wearing due to misalignment. Perform a precision alignment with less than .003" offset and angularity. Ensure there is no soft foot present. Rated as a **CLASS II** defect.

Cooling Tower #6 Supply Pump

The pump bearing vibration data still indicates there is bearing wear, and possibly cavitation in the pump. Inspect ODE pump bearing SOON. Ensure the pump has no inlet restrictions and is operating in the correct part of the curve. Rated as a **CLASS II** defect.

Cooling Tower #3 Supply Pump

The pump appears to have cavitation which is causing a high noise floor in the spectrum. This is also making the ODE pump bearing have high acceleration. This could also be a bearing issues but the noise floor is masking the data somewhat. Pump impeller or other pump internals may be worn which could be causing this vibration. Pump needs to be inspected as time allows. Rated as a **CLASS II** defect.

Cooling Tower #2 Supply Pump

The pump appears to have cavitation which is causing a high noise floor in the spectrum. This is also making the ODE pump bearing have high acceleration. This could also be a bearing issues but the noise floor is masking the data somewhat. Pump impeller or other pump internals may be worn which could be causing this vibration. Pump needs to be inspected as time allows. Rated as a **CLASS II** defect.

Spray Chamber Exhaust Fan

Fan bearing data is showing signs of mechanical looseness/wear in the bearings and/or fits. Fan bearings need to be checked for looseness wear SOON. Motor axial vibration remains higher than normal and may be due to sheave or belt issue. Ensure belts are in good shape and sheaves are aligned and not worn. Rated as a **CLASS III** defect.

Caster Baghouse Reverse Fan

This motor has a NU bearing in the drive end instead of a deep groove ball bearing. The NU bearing is designed for a radial type of load such as belt drive application. This unit is a direct drive application and does not need this type of motor bearing at the drive end. The bearing may not be able to load properly at times and can cause the type of vibration previously seen a few months ago. Motor may need to be swapped out in the future with a motor that has the proper bearing. We will continue to monitor this closely. Rated as a **CLASS I** defect for now.

Caster Baghouse ID Fan

1 x fan rpm vibration has **decreased** in both fan bearings after balancing the fan wheel. Also the new motor has a 7 x rpm vibration which may be due to some slight clearance issue with the sleeve bearings or could also be a natural frequency. We will monitor these vibrations closely. Rated as a **CLASS I** defect.

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

Sincerely,

Kerion W. Maxwell

ISO Certified Vibration Analyst, Category III



QualiTest® Diagnostics

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Abbreviated Last Measurement Summary

Database: nucorja9.rbm

Station: Melt Shop

Report Date: 19-Aug-19 13:11

MEASUREMENT POINT	OVERALL LEVEL	HFD / VHFD
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WCMWP - WEST CASTER MOLD WATER PUMP (13-Aug-19)		
	OVERALL LEVEL	1K-20KHz
MOH	.189 In/Sec	.664 G-s
MIH	.123 In/Sec	.857 G-s
MIA	.473 In/Sec	.940 G-s
PIA	.474 In/Sec	.933 G-s
PIH	.318 In/Sec	.864 G-s
POH	.215 In/Sec	.806 G-s
MCMWP - MID CASTER MOLD WATER PUMP (13-Aug-19)		
	OVERALL LEVEL	1K-20KHz
MOH	.036 In/Sec	.812 G-s
MIH	.085 In/Sec	.622 G-s
MIA	.112 In/Sec	.524 G-s
PIA	.142 In/Sec	1.086 G-s
PIH	.121 In/Sec	.894 G-s
POH	.127 In/Sec	.837 G-s
WBOSTRP - WEST Booster PUMP (13-Aug-19)		
	OVERALL LEVEL	1K-20KHz
MOH	.035 In/Sec	.325 G-s
MIH	.032 In/Sec	.345 G-s
MIA	.030 In/Sec	.351 G-s
PIA	.098 In/Sec	.747 G-s
PIH	.108 In/Sec	.966 G-s
POH	.140 In/Sec	1.393 G-s
ECSWP 1LFT - EAST CASTER SPRAY WP 1 LEFT (13-Aug-19)		
	OVERALL LEVEL	1K-20KHz
MOH	.473 In/Sec	.601 G-s
MIH	.187 In/Sec	1.026 G-s
MIA	.204 In/Sec	.600 G-s
MCSWP 2LFT - MID CASTER SPRAY WP 2 LEFT (13-Aug-19)		
	OVERALL LEVEL	1K-20KHz
MOH	.692 In/Sec	.485 G-s
MIH	.196 In/Sec	.846 G-s
MIA	.115 In/Sec	.333 G-s

WCSWP 4RT - WEST CASTER SPRAY WP 4 RIGH (13-Aug-19)		
	OVERALL LEVEL	1K-20KHz
MOH	.153 In/Sec	.434 G-s
MIH	.129 In/Sec	.040 G-s
MIA	.084 In/Sec	.529 G-s
ESERVOHYDP - EAST SERVO Hyd PUMP (13-Aug-19)		
	OVERALL LEVEL	1K-20KHz
MOH	.018 In/Sec	.168 G-s
MIH	.069 In/Sec	.188 G-s
PIV	.122 In/Sec	1.359 G-s
WSERVOHYDP - WEST SERVO Hyd PUMP (13-Aug-19)		
	OVERALL LEVEL	1K-20KHz
MOH	.131 In/Sec	.228 G-s
MIH	.073 In/Sec	.267 G-s
PIV	.086 In/Sec	1.233 G-s
SERVOHRECP - SERVO Hyd RECIRC PUMP (13-Aug-19)		
	OVERALL LEVEL	1K-20KHz
MOH	.101 In/Sec	.167 G-s
MIH	.033 In/Sec	.333 G-s
PIV	.033 In/Sec	.836 G-s
N2DECKHYDP - North 2ND DECK Hyd PUMP (13-Aug-19)		
	OVERALL LEVEL	1K-20KHz
MOH	.068 In/Sec	.336 G-s
MIH	.034 In/Sec	.238 G-s
PIV	.479 In/Sec	2.354 G-s
2DEKRECIP - 2ND DECK L&S Hyd RECIRC PUM (13-Aug-19)		
	OVERALL LEVEL	1K-20KHz
MOH	.114 In/Sec	.020 G-s
MIH	.086 In/Sec	.157 G-s
PIV	.313 In/Sec	.644 G-s
S2DECKHYDP - SOUTH 2ND DECK Hyd PUMP (13-Aug-19)		
	OVERALL LEVEL	1K-20KHz
MOH	.538 In/Sec	.212 G-s
MIH	.621 In/Sec	.411 G-s
PIV	.395 In/Sec	1.013 G-s
1SUPLYP - #1 Supply Pump (13-Aug-19)		
	OVERALL LEVEL	1K-20KHz
MOH	.063 In/Sec	.289 G-s
MIH	.064 In/Sec	.245 G-s
MIA	.090 In/Sec	.129 G-s
PIA	.206 In/Sec	1.011 G-s
PIH	.169 In/Sec	.742 G-s
POH	.195 In/Sec	.792 G-s
3SUPLYP - #3 Supply Pump (13-Aug-19)		
	OVERALL LEVEL	1K-20KHz
MOH	.050 In/Sec	.939 G-s
MIH	.063 In/Sec	1.009 G-s
MIA	.118 In/Sec	.766 G-s
PIA	.200 In/Sec	.685 G-s
PIH	.157 In/Sec	.941 G-s
POH	.243 In/Sec	1.490 G-s
4SUPLYP - #4 Supply Pump (13-Aug-19)		
	OVERALL LEVEL	1K-20KHz
MOH	.053 In/Sec	.767 G-s
MIH	.047 In/Sec	.763 G-s
MIA	.067 In/Sec	.539 G-s
PIA	.177 In/Sec	.722 G-s
PIH	.171 In/Sec	.828 G-s
POH	.192 In/Sec	.859 G-s

6SUPLYP	- #6 Supply Pump	(13-Aug-19)
	OVERALL LEVEL	1K-20KHz
MOH	.041 In/Sec	.243 G-s
MIH	.060 In/Sec	.291 G-s
MIA	.070 In/Sec	.177 G-s
PIA	.163 In/Sec	2.157 G-s
PIH	.175 In/Sec	1.086 G-s
POH	.214 In/Sec	1.500 G-s
CBRA	- CASTER BAGHOUSE REVERSE AIR	(13-Aug-19)
	OVERALL LEVEL	1K-20KHz
MOH	.045 In/Sec	.423 G-s
MIH	.041 In/Sec	.504 G-s
MIA	.040 In/Sec	.625 G-s
CBID	- CASTER BAGHOUSE ID FAN	(13-Aug-19)
	OVERALL LEVEL	1K-20KHz
MOH	.071 In/Sec	.054 G-s
MOV	.066 In/Sec	.049 G-s
MIH	.074 In/Sec	.084 G-s
MIV	.104 In/Sec	.152 G-s
MIA	.044 In/Sec	.129 G-s
FIA	.221 In/Sec	.332 G-s
FIH	.089 In/Sec	.589 G-s
FIV	.064 In/Sec	.639 G-s
FOH	.106 In/Sec	.477 G-s
FOV	.030 In/Sec	.250 G-s
FRAF	- Furnace REVERSE AIR Fan	(13-Aug-19)
	OVERALL LEVEL	1K-20KHz
MOH	.027 In/Sec	.122 G-s
MIH	.031 In/Sec	.108 G-s
MIA	.024 In/Sec	.182 G-s
FIA	.063 In/Sec	.643 G-s
FIH	.051 In/Sec	.732 G-s
FOH	.025 In/Sec	.428 G-s
EFBHF	- East Furnace Bag House Fan	(13-Aug-19)
	OVERALL LEVEL	1K-20KHz
MOH	.046 In/Sec	.672 G-s
MIH	.038 In/Sec	.500 G-s
MIA	.047 In/Sec	.403 G-s
FIA	.059 In/Sec	.427 G-s
FIH	.096 In/Sec	.657 G-s
FOH	.100 In/Sec	1.012 G-s
WFBHF	- WEST Furnace Bag House Fan	(13-Aug-19)
	OVERALL LEVEL	1K-20KHz
MOH	.063 In/Sec	.262 G-s
MIH	.072 In/Sec	.207 G-s
MIA	.072 In/Sec	.859 G-s
FIA	.109 In/Sec	.557 G-s
FIH	.125 In/Sec	1.007 G-s
FOH	.075 In/Sec	.550 G-s
NCHYDP	- North CASTER Hyd PUMP	(13-Aug-19)
	OVERALL LEVEL	1K-20KHz
MOH	.073 In/Sec	.302 G-s
MIH	.035 In/Sec	.278 G-s
PIH	.080 In/Sec	.379 G-s
SCHYDP	- SOUTH CASTER Hyd PUMP	(13-Aug-19)
	OVERALL LEVEL	1K-20KHz
MOH	.045 In/Sec	.184 G-s
MIH	.023 In/Sec	.159 G-s
PIH	.124 In/Sec	.751 G-s
SCEXFAN	- SPRAY CHAMBER EXHAUST Fan	(13-Aug-19)
	OVERALL LEVEL	1K-20KHz

MOH	.481 In/Sec	.462 G-s
MIH	.733 In/Sec	.344 G-s
MIA	.888 In/Sec	.165 G-s
FIH	.412 In/Sec	.652 G-s
FOH	.420 In/Sec	.639 G-s

Clarification Of Vibration Units:

Acc	-->	G-s	RMS
Vel	-->	In/Sec	PK