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September 5, 2024

NUCOR Melt Shop

Subject: August 2024 vibration survey

Below is a summary report for the Melt Shop monthly vibration survey that was performed on 8/28/24. 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.

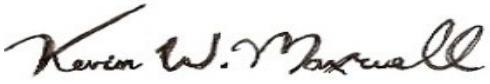
Class II: Defect (s) present that may cause problem in long term (2-6 months). Repair during normal maintenance scheduling. Continue to monitor.

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 serve NUCOR Steel Flowood-Jackson, MS. If there are any comments or questions, do not hesitate to contact us.

Sincerely,



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Defects

Middle Caster Mold Water Pump

Pump was down this survey; however, the following still applies: Vibration data shows issues in the pump. Data suggests looseness/wear of the pump bearings/fits. Impeller and other pump internals may also have wear. The pump will likely need attention soon. Rated as a **CLASS II** defect.

East Booster Pump

Motor vibration data indicates defects are present in the motor bearings. Inspect motor as scheduling allows. Rated as a **CLASS II** defect.

East Servo Hyd. Pump

Pump was down this survey; however, the following still applies: Pump vibration data shows quite a bit of hydraulic vane pass frequency and rpm sidebands surrounding these peaks. This is usually due to pump wear but may also be influenced by excessive loading and unloading of the pump. For now, ensure pump has proper flows and is operating properly. Rated as a **CLASS II** defect.

Middle 2nd Deck Hyd. Pump

Pump was down this survey; however, the following likely still applies: Overall amplitude is slightly lower but still high. The presence of vane harmonics and high acceleration amplitude in the pump suggests a flow issue. Ensure pump is operating at normal flow. Unit still has a high 1 x rpm vibration. Rated a **CLASS II** defect.

South 2nd Deck Hyd. Pump

Spectral data of the pump shows harmonics of hydraulic vane frequency. This may be due to internal pump wear and or flow issue. Rated as a **CLASS II** defect.

Cooling Tower #4 Supply Pump

Pump data shows some signs of bearing defects/wear in the ODE pump bearing. Inspect pump as scheduling allows. Rated as a **CLASS III** defect.

Cooling Tower #5 Supply Pump

Pump was down this survey; however, the following likely still applies: Pump has some increased 1 x rpm axial vibration. For now, it is recommended to inspect couplings, alignment, and all pump fasteners as scheduling allows. Rated as a **CLASS II** defect.

Cooling Tower #6 Supply Pump

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

Caster ID Baghouse Fan

Motor and fan inboard vertical data are still showing some impacting in the time waveform. It is recommended to inspect gear couplings, especially the fan end coupling as time allows. We will continue to monitor this closely. Rated as a **CLASS II** defect.

West Furnace Baghouse Fan

Data still shows a 2 x rpm vibration in the motor. This usually is an indication of an alignment and or coupling issue. Vibration is not at an alarm level yet, so this is a **CLASS I** defect.

Spray Chamber Exhaust Fan

Motor and fan both have increased vibration this survey. Belts could be slipping which is allowing the motor to operate at speeds near a resonance which causing high 1 x fan rpm vibration in the unit. High 1 x rpm vibration could also be structural. Inspect all motor base mounts/fasteners. Inspect fan for build-up and inspect belt tension soon. Rated as a **CLASS III** defect.

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                Abbreviated Last Measurement Summary
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          Database:  nucorja9.rbm
          Station:   Melt Shop


MEASUREMENT POINT             OVERALL LEVEL       HFD / VHFD
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WCMWP      - WEST CASTER MOLD WATER PUMP   (28-Aug-24)
                              OVERALL LEVEL     1K-20KHz
       MOH                     .106 In/Sec       .344 G-s
       MIH                     .086 In/Sec       .340 G-s
       MIA                     .120 In/Sec       .240 G-s
       PIA                     .166 In/Sec      1.108 G-s
       PIH                     .114 In/Sec       .606 G-s
       POH                     .162 In/Sec       .749 G-s

ECMWP      - EAST CASTER MOLD WATER PUMP   (28-Aug-24)
                              OVERALL LEVEL     1K-20KHz
       MOH                     .068 In/Sec       .661 G-s
       MIH                     .085 In/Sec       .647 G-s
       MIA                     .060 In/Sec       .583 G-s
       PIA                     .180 In/Sec      3.606 G-s
       PIH                     .123 In/Sec      2.195 G-s
       POH                     .173 In/Sec      2.822 G-s

EBOSTRP    - EAST Booster PUMP             (28-Aug-24)
                              OVERALL LEVEL     1K-20KHz
       MOH                     .094 In/Sec      1.197 G-s
       MIH                     .100 In/Sec      3.415 G-s
       MIA                     .078 In/Sec      1.443 G-s
       PIA                     .297 In/Sec       .698 G-s
       PIH                     .128 In/Sec       .271 G-s
       POH                     .085 In/Sec       .251 G-s

ECSWP 1LFT - EAST CASTER SPRAY WP 1 LEFT   (28-Aug-24)
                              OVERALL LEVEL     1K-20KHz
       MOH                     .160 In/Sec       .190 G-s
       MIH                     .064 In/Sec       .295 G-s
       MIA                     .068 In/Sec       .149 G-s

MCSWP 2LFT - MID CASTER SPRAY WP 2 LEFT    (28-Aug-24)
                              OVERALL LEVEL     1K-20KHz
       MOH                     .255 In/Sec       .409 G-s
       MIH                     .108 In/Sec       .788 G-s
       MIA                     .110 In/Sec       .212 G-s

MCSWP 3RT  - MID CASTER SPRAY WP 3 RIGHT   (28-Aug-24)
                              OVERALL LEVEL     1K-20KHz
       MOH                     .100 In/Sec       .455 G-s
       MIH                     .072 In/Sec       .692 G-s
       MIA                     .091 In/Sec       .521 G-s

MSERVOHYDP - MIDDLE SERVO Hyd PUMP         (28-Aug-24)
                              OVERALL LEVEL     1K-20KHz
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	MOH	.128 In/Sec	.304 G-s
	MIH	.048 In/Sec	.224 G-s
	PIV	.109 In/Sec	.470 G-s

WSERVOHYDP - WEST SERVO Hyd PUMP (28-Aug-24)

	OVERALL LEVEL	1K-20KHz
MOH	.069 In/Sec	.196 G-s
MIH	.057 In/Sec	.225 G-s
PIV	.199 In/Sec	.547 G-s

SERVOHRECP - SERVO Hyd RECIRC PUMP (28-Aug-24)

	OVERALL LEVEL	1K-20KHz
MOH	.104 In/Sec	.165 G-s
MIH	.104 In/Sec	1.211 G-s
PIV	.199 In/Sec	2.148 G-s

N2DECKHYDP - North 2ND DECK Hyd PUMP (28-Aug-24)

	OVERALL LEVEL	1K-20KHz
MOH	.068 In/Sec	.310 G-s
MIH	.146 In/Sec	.431 G-s
PIV	.201 In/Sec	1.387 G-s

2DEKRECIP - 2ND DECK L&S Hyd RECIRC PUM (28-Aug-24)

	OVERALL LEVEL	1K-20KHz
MOH	.118 In/Sec	.509 G-s
MIH	.107 In/Sec	.346 G-s
PIV	.264 In/Sec	1.905 G-s

S2DECKHYDP - SOUTH 2ND DECK Hyd PUMP (28-Aug-24)

	OVERALL LEVEL	1K-20KHz
MOH	.237 In/Sec	.578 G-s
MIH	.261 In/Sec	.393 G-s
PIV	.698 In/Sec	1.338 G-s

1SUPLYP - #1 Supply Pump (28-Aug-24)

	OVERALL LEVEL	1K-20KHz
MOH	.069 In/Sec	.340 G-s
MIH	.113 In/Sec	.222 G-s
MIA	.137 In/Sec	.200 G-s
PIA	.421 In/Sec	.392 G-s
PIH	.307 In/Sec	.322 G-s
POH	.203 In/Sec	.599 G-s

2SUPLYP - #2 Supply Pump (28-Aug-24)

	OVERALL LEVEL	1K-20KHz
MOH	.065 In/Sec	.573 G-s
MIH	.079 In/Sec	.751 G-s
MIA	.118 In/Sec	.528 G-s
PIA	.260 In/Sec	.685 G-s
PIH	.289 In/Sec	.485 G-s
POH	.300 In/Sec	1.614 G-s

3SUPLYP - #3 Supply Pump (28-Aug-24)

	OVERALL LEVEL	1K-20KHz
MOH	.065 In/Sec	1.986 G-s
MIH	.069 In/Sec	1.348 G-s
MIA	.076 In/Sec	.895 G-s
PIA	.201 In/Sec	.428 G-s
PIH	.159 In/Sec	.417 G-s
POH	.211 In/Sec	1.262 G-s

4SUPLYP - #4 Supply Pump (28-Aug-24)

	OVERALL LEVEL	1K-20KHz
MOH	.046 In/Sec	.634 G-s
MIH	.051 In/Sec	.735 G-s
MIA	.069 In/Sec	.992 G-s
PIA	.171 In/Sec	1.003 G-s
PIH	.170 In/Sec	.775 G-s
POH	.271 In/Sec	2.744 G-s

6SUPLYP - #6 Supply Pump (28-Aug-24)

	OVERALL LEVEL	1K-20KHz
MOH	.050 In/Sec	.367 G-s
MIH	.069 In/Sec	.202 G-s
MIA	.072 In/Sec	.147 G-s
PIA	.146 In/Sec	1.889 G-s
PIH	.174 In/Sec	.544 G-s
POH	.196 In/Sec	1.399 G-s

CBRA - CASTER BAGHOUSE REVERSE AIR (28-Aug-24)

	OVERALL LEVEL	1K-20KHz
MOH	.039 In/Sec	.160 G-s
MIH	.051 In/Sec	.109 G-s
MIA	.034 In/Sec	.367 G-s
FIH	.039 In/Sec	.236 G-s
FOH	.083 In/Sec	.105 G-s

CBID - CASTER BAGHOUSE ID FAN (28-Aug-24)

	OVERALL LEVEL	1K-20KHz
MOH	.042 In/Sec	.162 G-s
MOV	.034 In/Sec	.084 G-s
MIH	.048 In/Sec	.231 G-s
MIV	.075 In/Sec	.359 G-s
MIA	.034 In/Sec	.186 G-s
FIA	.089 In/Sec	.935 G-s
FIH	.118 In/Sec	1.216 G-s
FIV	.103 In/Sec	.983 G-s
FOH	.057 In/Sec	.189 G-s
FOV	.031 In/Sec	.167 G-s
FOA	.042 In/Sec	.066 G-s

FRAF - Furnace REVERSE AIR Fan (28-Aug-24)

	OVERALL LEVEL	1K-20KHz
MOH	.059 In/Sec	.455 G-s
MIH	.073 In/Sec	1.100 G-s
MIA	.038 In/Sec	.441 G-s
FIA	.076 In/Sec	.163 G-s
FIH	.072 In/Sec	.160 G-s
FOH	.072 In/Sec	.386 G-s

EFBHF - East Furnace Bag House Fan (28-Aug-24)

	OVERALL LEVEL	1K-20KHz
MOH	.079 In/Sec	.852 G-s
MIH	.097 In/Sec	.678 G-s
MIA	.076 In/Sec	.554 G-s
FIA	.089 In/Sec	.997 G-s
FIH	.100 In/Sec	1.246 G-s
FOH	.106 In/Sec	.913 G-s

WFBHF - WEST Furnace Bag House Fan (28-Aug-24)

	OVERALL LEVEL	1K-20KHz
MOH	.095 In/Sec	.262 G-s
MIH	.118 In/Sec	.198 G-s
MIA	.040 In/Sec	.312 G-s
FIA	.089 In/Sec	1.125 G-s
FIH	.139 In/Sec	1.165 G-s
FOH	.107 In/Sec	1.005 G-s

NCHYDP - North CASTER Hyd PUMP (28-Aug-24)

	OVERALL LEVEL	1K-20KHz
MOH	.080 In/Sec	.469 G-s
MIH	.066 In/Sec	.548 G-s
PIH	.068 In/Sec	.498 G-s

MIDCHYDP - MIDDLE CASTER Hyd PUMP (28-Aug-24)

	OVERALL LEVEL	1K-20KHz
MOH	.067 In/Sec	.395 G-s
MIH	.084 In/Sec	.797 G-s
PIH	.149 In/Sec	.428 G-s

SCHYDP - SOUTH CASTER Hyd PUMP (28-Aug-24)

	OVERALL LEVEL	1K-20KHz
MOH	.104 In/Sec	.334 G-s
MIH	.076 In/Sec	.378 G-s
PIH	.139 In/Sec	.709 G-s

Clarification Of Vibration Units:

Acc --> G-s RMS

Vel --> In/Sec PK