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August 19, 2019

General Recycling 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.

<u>Class I:</u> Defect is present, but effect on reliability is not clear; no immediate action is required. Continue to normally monitor.

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

<u>Class III</u>: 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.

<u>Class IV</u>: 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.

Shredder

Shedder motor vibration has decreased this survey. 4 x rpm is still dominant which usually indicates some type of coupling issue. We will continue to monitor this closely. Rated as a **CLASS I** defect.

Cyclone Blower

Vibration is higher than normal on the blower and motor. Check motor base for cracks and looseness and ensure fan wheel is not out of balance due to build-up. Ensure sheaves are aligned properly as well. Inspect soon. Rated as a **CLASS II** defect.

Mag Drum Drive

Vibration data shows a low frequency vibration and heavy knocking in motor and gear drive. Gear drive has visible movement which may be due to issue with sprocket and or chain. Ensure all bolts are tight and check sprockets and chain for issues such as misalignment and chain for defects and proper tension. Internal drive components may be damaged inside the gear drive unit due to the heavy jerking and knocking type vibration. Rated as a **CLASS III** defect.

Conveyor 11

The motor has 1 x rpm vibration that has increase again since last month, which is most likely due to loose fasteners or flexible structure. The motor axial still shows some high sub-synchronous vibrations. It is recommended to inspect all fasteners and motor base/structure soon. Ensure belts and sheaves are aligned properly and not excessively worn. Conveyor bearings are also showing signs of defect/wear especially the ODE bearing. Because of the increased vibration in the motor, this is rated as a **CLASS III** defect.

As always, it has been a pleasure to serve General Recycling. If there are any comments or questions, do not hesitate to contact us.

Sincerely,

Kerin W. Marcuell

ISO Certified Vibration Analyst, Category III



QualiTest Diagnostics Cell: 901-486-4565 Email: kwilliam@gohispeed.com

Database: nucorja9.rbm Station: Scrap Yard

MEASUREMENT	POINT	OVERALL LEVEL	HFD / VHFD	
SHRFDDFR	- SHDEDUED	(1	3-2119-19)	
SIREDDER	SIREDDER	OVERALL LEVEL	1K-20KH4	
мон			037 G-s	
MOII		.200 III/Sec	.057 G-5	
MTV		113 In/Sec	.005 G S	
мтн		194 Tn/Sec	.084 G-S	
MIN		189 In/Sec	334 G-s	
		.109 11, 560		
CYCLONE	- CYCLONE	(1	(13-Aug-19)	
		OVERALL LEVEL	1K-20KHz	
MOH		.199 In/Sec	.340 G-s	
MIH		.208 In/Sec	.067 G-s	
MIA		.252 In/Sec	.454 G-s	
EIH		.441 In/Sec	.228 G-s	
EOH		.521 In/Sec	.038 G-s	
MIV		.796 In/Sec	.072 G-s	
мз	- MAG DRUM	(1	3-Aug-19)	
-		OVERALL LEVEL	1K-20KHz	
MOH		.427 In/Sec	.228 G-s	
MIH		.372 In/Sec	.228 G-s	
MIA		.209 In/Sec	1.145 G-s	
GTH		.454 In/Sec	.792 G-s	
GOH		.558 In/Sec	5.075 G-s	
TDB		126 In/Sec	036 G-s	
ODB		.146 In/Sec	.0029 G-s	
NUMBER 11	- NUMBER 11	(1	3-Aug-19)	
		OVERALL LEVEL	1K-20KHz	
MOH		.555 In/Sec	.273 G-s	
MIH		.640 In/Sec	.450 G-s	
MIA		.432 In/Sec	.294 G-s	
EIH		.293 In/Sec	.899 G-s	
EIA		.289 In/Sec	.832 G-s	
EOH		.345 In/Sec	.193 G-s	
SAIRCOMP	- NEW SEPARATO	R SOUTH AIR COMP (1	3-Aug-19)	
		OVERALL LEVEL	1K-20KHz	
MOH		.076 In/Sec	.211 G-s	
MIH		.064 In/Sec	.881 G-s	
MIA		.054 In/Sec	2.111 G-s	
EIH		.045 In/Sec	3.252 G-s	
EIA		.051 In/Sec	1.484 G-s	
EOH		.058 In/Sec	.890 G-s	
NAIRCOMP	- NEW SEPARATO	R NORTH AIR COMP (1	3-Aug-19)	
		OVERALL LEVEL	1K-20KHz	
MOH		.097 In/Sec	.355 G-s	
MIH		.180 In/Sec	.997 G-s	
MIA		.079 In/Sec	1.275 G-s	
EIH		.177 In/Sec	1.891 G-s	
ETA		.161 In/Sec	1.040 G-s	
EOH		.112 In/Sec	.909 G-s	
arification	Of Vibration U	 nits:		
Acc	G-s RM	S		
Vel	> In/Sec PK			