HI-SPEED INDUSTRIAL SERVICE QualiTest® Diagnostics

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July 24, 2019

Grenada Manufacturing
Grenada, MS

Please find attached our report covering the July 2019 vibration survey. All machinery appeared to be satisfactory condition during the survey except for the following machine(s).

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 mo.). Repair during normal maintenance scheduling. Continue to monitor.

Class III ; Defect (s) present that may cause failure in short term (less than 2 mo.). 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

Presses

2200 Ton Verson
Motor is showing some signs of electrical issues. Clutch bearings are starting to show some slight wear/defects. We will monitor this closely. Rated as a **CLASS I** defect.

200 Ton Clearing
Press was not in operation during this survey.

Niagra Press
Motor appeared to be within acceptable vibration limits during this survey. No problems noted.

400 Ton Stamtec
Press was not in operation during this survey; however, the following most likely still applies: Clutch/Flywheel unit shows some signs of bearing issue. Unit needs to be inspected as scheduling allows. Rated as a **CLASS II** defect.

300 Ton Seyi
Press was not in operation during this survey.

600 Ton Stamtec
Motor/Clutch appeared to be within acceptable vibration limits during this survey. No problems noted.

600 Ton Minster
Press was not in operation during this survey.

USI Press
Press motor appeared to be within acceptable vibration limits during this survey. No problems noted.

1500 Ton Verson
Press was not in operation during this survey.

150 Ton Minster
Press motor appeared to be within acceptable vibration limits during this survey. No problems noted.

200 Ton Minster (near main entrance)
Data suggest belts and sheave issue. Data also suggests fit looseness of the motor/clutch. It is recommended to inspect the sheaves for wear and misalignment and ensure belts are properly tightened and not worn or defective. Motor may have rotor/drum imbalance. Rated as a **CLASS II** defect.

1200 Ton Clearing (Rheem Press)
Press motor appeared to be within acceptable vibration limits during this survey. No problems noted.

Blow Press 1
Press was not in operation during this survey.

Tandem Line #1

#1 Press
Motor and possibly the clutch bearings appear to be defective and or have inadequate lubrication. It is highly recommended to inspect the motor bearings and clutch bearings for defects, wear, and lubrication SOON. Rated as a **CLASS III** defect.

#2 Press
Motor/Clutch appeared to be within acceptable vibration limits during this survey. No problems noted.

#3 Press
Data suggest belts and sheave issue. It is recommended to inspect the sheaves for wear and misalignment and ensure belts are properly tightened and not worn or defective. Motor may have rotor/drum imbalance. Rated as a **CLASS II** defect.

#4 Press
Motor/Clutch appeared to be within acceptable vibration limits during this survey. No problems noted.

#5 Press
Data suggest belts and sheave issue. It is recommended to inspect the sheave and flywheel for wear and misalignment and ensure belts are properly tightened and not worn or defective. Ensure flywheel assembly isn't loose. Rated as a **CLASS II** defect.

Tandem Line #2

F McKay
Press was not in operation during this survey; however, the following most likely still applies: 1 x and 2 x rpm vibration is still present in the motor and clutch horizontals. Data indicates possible imbalance or eccentric clutch drum of the motor/clutch unit. Mechanical looseness of the fits and housings may also contribute to this type of vibration. The sheaves may also be misaligned or worn. It is recommended to inspect the clutch drum and motor rotor for imbalance and eccentricity, inspect the fits and housings for wear, inspect all fasteners for looseness, and inspect the sheaves for wear and misalignment as soon as scheduling allows. Ensure belts are properly tight and not worn. Rated a **CLASS II** defect.

G McKay
Press was not in operation during this survey.

H McKay
Press was not in operation during this survey; however, the following most likely still applies: Data suggest belts and sheave issue. It is recommended to inspect the sheaves for wear and misalignment and ensure belts are properly tightened and not worn or defective. There may also be some bearing fit wear in the motor/clutch. Rated as a **CLASS II** defect.

I McKay
Press was not in operation during this survey; however, the following most likely still applies: Clutch and motor spectral data show signs of bearing defects as well.as looseness/wear in the motor fits or other internal parts. Unit needs attention soon. Rated as a **CLASS III** defect.

Tandem Line #3

Bliss Press #1
Press motor appeared to be within acceptable vibration limits during this survey. No problems noted.

Bliss Press #2
Press motor appeared to be within acceptable vibration limits during this survey. No problems noted.

Bliss Press #3
Press was not in operation during this survey; however, the following most likely still applies: Data of the motor shows harmonics of what may be flywheel rpm or belt frequency. Motor and Flywheel sheave and belts should be inspected for wear and defects as scheduling allows. Rated as a **CLASS II** defect.
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Bliss Press #4
Press motor appeared to be within acceptable vibration limits during this survey. No problems noted.

Bliss Press #5
Press motor appeared to be within acceptable vibration limits during this survey. No problems noted.

Compressors

Gardner Denver Air Compressor
Press was not in operation during this survey; however, the following most likely still applies: Vibration data shows internal wear of compressor. Inspect compressor for wear soon. Rated as a **CLASS III** defect.

NEW Quincy Compressor East
Spectral data indicates high 1 x rpm vibration in the motor especially in the axial direction. This could be due to misalignment, imbalance of the couplings, loose or soft foot, and or flexible structure. Structure/frame is not bolted down or grouted in and is causing most of this vibration. Inspect for these issues soon. Rated as a **CLASS II** defect.

NEW Quincy Compressor Middle
1 x input rpm vibration has increased in the compressor. Inspect the coupling for issues and ensure motor and compressor are aligned properly. Rated as a **CLASS II** defect.

NEW Quincy Compressor West
Spectral data indicates high 1 x rpm vibration in the motor especially in the axial direction. This could be due to misalignment, imbalance of the couplings, loose or soft foot, and or flexible structure. Structure/frame is not bolted down or grouted in and may be contributing to this vibration. Inspect for these issues soon. Rated as a **CLASS II** defect.

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Abbreviated Last Measurement Summary
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              Database:  gstamp.rbm
              Station:   PRESSES

      MEASUREMENT POINT             OVERALL LEVEL       HFD / VHFD
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      2200VERSON - 2200 Ton Verson                (17-Jul-19)
                                   OVERALL LEVEL     1 - 20 KHz
             MOV                     .093 In/Sec       .231 G-s
             MOH                     .090 In/Sec       .391 G-s
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	MIH	.064 In/Sec	.376 G-s
	MIV	.072 In/Sec	.254 G-s
	MIA	.067 In/Sec	.179 G-s
	JIA	.101 In/Sec	.091 G-s
	JIV	.039 In/Sec	.282 G-s
	JIH	.070 In/Sec	.192 G-s
	JOH	.112 In/Sec	.251 G-s
	JOV	.045 In/Sec	.154 G-s
	CIV	.038 In/Sec	.276 G-s
	CIH	.039 In/Sec	.385 G-s
	COH	.049 In/Sec	.077 G-s
	COV	.043 In/Sec	.051 G-s
	CIA	.091 In/Sec	.037 G-s

200CLEARNG - 200 Ton Clearing (01-Sep-15)

	OVERALL LEVEL	1 - 20 KHz
MOH	.216 In/Sec	.432 G-s
MIH	.145 In/Sec	.343 G-s
MIA	.236 In/Sec	.205 G-s
* MOV	.116 In/Sec	.346 G-s
* MIV	.278 In/Sec	.110 G-s

NIAGRA - Niagra Press (05-Mar-19)

	OVERALL LEVEL	1 - 20 KHz
MOH	.076 In/Sec	.124 G-s
MIH	.029 In/Sec	.080 G-s
MIA	.258 In/Sec	.050 G-s
* MOV	.063 In/Sec	.045 G-s
* MIV	.059 In/Sec	.043 G-s

400STAMTEC - 400 Ton Stamtec (06-May-19)

	OVERALL LEVEL	1 - 20 KHz
MOH	.152 In/Sec	.215 G-s
MIH	.142 In/Sec	.241 G-s
MIA	.220 In/Sec	.210 G-s
CIH	.111 In/Sec	.239 G-s
CIA	.114 In/Sec	.250 G-s
COH	.101 In/Sec	.110 G-s
* MOV	.232 In/Sec	.187 G-s
* MIV	.200 In/Sec	.373 G-s
* CIV	.269 In/Sec	.281 G-s
* COV	.434 In/Sec	.318 G-s

300SEYI - 300 Ton Seyi (17-Jul-19)

	OVERALL LEVEL	1 - 20 KHz
MOH	.128 In/Sec	.179 G-s
MIH	.103 In/Sec	.089 G-s
MIA	.066 In/Sec	.062 G-s
CIH	.087 In/Sec	.077 G-s
CIA	.072 In/Sec	.040 G-s
* COH	.056 In/Sec	.279 G-s
* MOV	.034 In/Sec	.262 G-s
* MIV	.031 In/Sec	.128 G-s
* CIV	.029 In/Sec	.416 G-s
* COV	.0064 In/Sec	.0045 G-s
* JIV	.053 In/Sec	.303 G-s
* JOV	.055 In/Sec	.141 G-s

600STAMTEC - 600 Ton Stamtec (17-Jul-19)

	OVERALL LEVEL	1 - 20 KHz
MOH	.242 In/Sec	.113 G-s
MIH	.126 In/Sec	.112 G-s
MIA	.183 In/Sec	.060 G-s
CIH	.146 In/Sec	.063 G-s
CIA	.180 In/Sec	.062 G-s
* COH	.071 In/Sec	.719 G-s
* MOV	.078 In/Sec	.617 G-s
* MIV	.039 In/Sec	.395 G-s
* CIV	.133 In/Sec	.194 G-s
* COV	.033 In/Sec	.590 G-s

600MNSTR - 600 Ton Minster (01-Sep-15)

	OVERALL LEVEL	1 - 20 KHz
MOH	.074 In/Sec	.109 G-s
MIH	.057 In/Sec	.102 G-s
MIA	.033 In/Sec	.039 G-s
FIH	.074 In/Sec	.047 G-s
FOH	.044 In/Sec	.012 G-s
* MOV	.041 In/Sec	.165 G-s
* MIV	.040 In/Sec	.147 G-s

VERSON1500 - 1500 Ton Verson (11-Dec-17)

	OVERALL LEVEL	1 - 20 KHz
MOH	.020 In/Sec	.041 G-s
MIH	.023 In/Sec	.128 G-s
MIA	.016 In/Sec	.016 G-s
* CIH	.078 In/Sec	.053 G-s
* FIH	.067 In/Sec	.028 G-s

USIPRESS - USI PRESS (17-Jul-19)

	OVERALL LEVEL	1 - 20 KHz
MOH	.020 In/Sec	.025 G-s
MIH	.017 In/Sec	.079 G-s
MIA	.012 In/Sec	.016 G-s

150MNSTR - 150 Ton Minster (17-Jul-19)

	OVERALL LEVEL	1 - 20 KHz
MOH	.077 In/Sec	.065 G-s
MIH	.032 In/Sec	.092 G-s
MIA	.062 In/Sec	.263 G-s
FBH	.012 In/Sec	.042 G-s
* FBV	.012 In/Sec	.013 G-s
* COH	.039 In/Sec	.107 G-s
MIV	.041 In/Sec	.155 G-s

200MNSTR - 200 Ton Minster (17-Jul-19)

	OVERALL LEVEL	1 - 20 KHz
MOH	.460 In/Sec	.241 G-s
MIH	.227 In/Sec	.253 G-s
MIA	.178 In/Sec	.106 G-s
FBH	.013 In/Sec	.013 G-s
* FBV	.013 In/Sec	.013 G-s
* COH	.218 In/Sec	.062 G-s
MIV	.227 In/Sec	.090 G-s

RHEEMPRESS - 1200 TON CLEARING (RHEEM) (17-Jul-19)

	OVERALL LEVEL	1 - 20 KHz
MOH	.036 In/Sec	.156 G-s
MIH	.028 In/Sec	.142 G-s
MIA	.025 In/Sec	.208 G-s
* FBH	.031 In/Sec	.015 G-s
* FBV	.014 In/Sec	.014 G-s
MOV	.022 In/Sec	.088 G-s
MIV	.026 In/Sec	.058 G-s

BLOWPRESS1 - BLOW PRESS 1 (05-Mar-19)

	OVERALL LEVEL	1 - 20 KHz
MOH	.037 In/Sec	.189 G-s
MIH	.047 In/Sec	.121 G-s
MIA	.036 In/Sec	.171 G-s
* FBH	.089 In/Sec	.031 G-s
* MOV	.102 In/Sec	.297 G-s
* MIV	.071 In/Sec	.081 G-s

BLOWPRESS2 - BLOW PRESS 2 (09-Jan-15)

	OVERALL LEVEL	1 - 20 KHz
MOH	.109 In/Sec	.035 G-s
MIH	.110 In/Sec	.0099 G-s
MIA	.049 In/Sec	.0059 G-s
* FBH	.055 In/Sec	.0084 G-s

* FBV	.048 In/Sec	.025 G-s
* MOV	.280 In/Sec	.154 G-s
* MIV	.221 In/Sec	.113 G-s

GDEAIRCOMP - GARDNER DENVER AIR COM (02-Nov-18)

	OVERALL LEVEL	1 - 20 KHz
MOH	.212 In/Sec	1.295 G-s
MIH	.140 In/Sec	.588 G-s
MIA	.201 In/Sec	.721 G-s
CIH	.141 In/Sec	.583 G-s
CIA	.202 In/Sec	1.116 G-s
COH	.179 In/Sec	1.394 G-s

QUINCYEAST - QUINCY EAST AIR COMPRESSOR (17-Jul-19)

	OVERALL LEVEL	1 - 20 KHz
MOH	.432 In/Sec	.161 G-s
MIH	.594 In/Sec	.270 G-s
MIA	.084 In/Sec	.360 G-s
CIH	.194 In/Sec	.699 G-s
CIA	.217 In/Sec	.851 G-s
COH	.202 In/Sec	.562 G-s

QUINCYMID - QUNICY MIDDLE AIR COMPRESSOR (17-Jul-19)

	OVERALL LEVEL	1 - 20 KHz
MOH	.068 In/Sec	.245 G-s
MIH	.113 In/Sec	.643 G-s
MIA	.079 In/Sec	.353 G-s
CIH	.224 In/Sec	.594 G-s
CIA	.214 In/Sec	.603 G-s
COH	.269 In/Sec	.387 G-s

QUINCYWEST - QUNICY WEST AIR COMPRESSOR (17-Jul-19)

	OVERALL LEVEL	1 - 20 KHz
MOH	.705 In/Sec	.134 G-s
MIH	.636 In/Sec	.156 G-s
MIA	.280 In/Sec	.199 G-s
CIH	.099 In/Sec	1.491 G-s
CIA	.116 In/Sec	.765 G-s
COH	.096 In/Sec	.665 G-s

Station: Tandem Line # 1

MEASUREMENT POINT	OVERALL LEVEL	HFD / VHFD

1 - # 1 West (17-Jul-19)

	OVERALL LEVEL	1 - 20 KHz
MOH	.884 In/Sec	.364 G-s
MIH	.439 In/Sec	.337 G-s
CIA	.413 In/Sec	.321 G-s
CIH	.731 In/Sec	.437 G-s
* MIA	.070 In/Sec	.162 G-s
* MOV	.135 In/Sec	.436 G-s
* MIV	.036 In/Sec	.703 G-s
* COH	.222 In/Sec	.465 G-s
* CIV	.037 In/Sec	.178 G-s
* COV	.034 In/Sec	.512 G-s

#2 - #2 (17-Jul-19)

	OVERALL LEVEL	1 - 20 KHz
MOH	.126 In/Sec	.061 G-s
MIH	.113 In/Sec	.098 G-s
CIA	.080 In/Sec	.096 G-s
CIH	.149 In/Sec	.224 G-s
* MIA	.142 In/Sec	.334 G-s
* COH	.078 In/Sec	.126 G-s
* MOV	.189 In/Sec	.238 G-s
* MIV	.105 In/Sec	.365 G-s

* CIV		.127 In/Sec	.193 G-s
* COV		.146 In/Sec	.762 G-s

#3 - #3 (17-Jul-19)

	OVERALL LEVEL	1 - 20 KHz
MOH	.164 In/Sec	.293 G-s
MIH	.268 In/Sec	.257 G-s
CIA	.089 In/Sec	.422 G-s
CIH	.492 In/Sec	.400 G-s
* MIA	.106 In/Sec	.134 G-s
* COH	.104 In/Sec	.275 G-s
* MOV	.101 In/Sec	.381 G-s
* MIV	.061 In/Sec	.402 G-s
* CIV	.074 In/Sec	.252 G-s
* COV	.033 In/Sec	.369 G-s

#4 - #4 (17-Jul-19)

	OVERALL LEVEL	1 - 20 KHz
MOH	.165 In/Sec	.143 G-s
MIH	.143 In/Sec	.193 G-s
CIA	.096 In/Sec	.071 G-s
CIH	.132 In/Sec	.105 G-s
* MIA	.118 In/Sec	.053 G-s
* COH	.196 In/Sec	.609 G-s
* MOV	.136 In/Sec	.062 G-s
* MIV	.062 In/Sec	.393 G-s
* CIV	.136 In/Sec	.332 G-s
* COV	.177 In/Sec	.398 G-s

#5 east - #5 East (17-Jul-19)

	OVERALL LEVEL	1 - 20 KHz
MOH	.415 In/Sec	.023 G-s
MIH	.349 In/Sec	.037 G-s
CIA	.092 In/Sec	.022 G-s
CIH	.334 In/Sec	.022 G-s
* MIA	.128 In/Sec	.150 G-s
* COH	.134 In/Sec	1.047 G-s
* MOV	.064 In/Sec	.145 G-s
* MIV	.067 In/Sec	1.094 G-s
* CIV	.069 In/Sec	.730 G-s
* COV	.082 In/Sec	.314 G-s

Station: Tandem Line # 2

MEASUREMENT POINT	OVERALL LEVEL	HFD / VHFD

F McKay - F McKay (west) (01-Sep-15)

	OVERALL LEVEL	1 - 20 KHz
MOH	.762 In/Sec	.123 G-s
MOV	.269 In/Sec	.332 G-s
MIH	.478 In/Sec	.173 G-s
MIV	.329 In/Sec	.228 G-s
COH	.348 In/Sec	.255 G-s
COA	.141 In/Sec	.313 G-s
MIA	.205 In/Sec	.112 G-s
* JIA	.187 In/Sec	7.7-5 G-s
* JIH	.275 In/Sec	.0001 G-s

G Mckay - G McKay (05-Mar-19)

	OVERALL LEVEL	1 - 20 KHz
MOH	.101 In/Sec	.096 G-s
MOV	.243 In/Sec	.163 G-s
MIH	.295 In/Sec	.069 G-s
MIV	.218 In/Sec	.096 G-s
MIA	.263 In/Sec	.092 G-s

H McKay - H McKay (05-Mar-19)

		OVERALL LEVEL	1 - 20 KHz
*	MOH	.405 In/Sec	.625 G-s
*	MOV	.283 In/Sec	.204 G-s
*	MIH	.229 In/Sec	.249 G-s
*	MIV	.165 In/Sec	.201 G-s
	COH	.278 In/Sec	.236 G-s
	CIA	.167 In/Sec	.461 G-s
*	MIA	.229 In/Sec	.324 G-s

I McKay - I McKay (05-Mar-19)

	OVERALL LEVEL	1 - 20 KHz
MOH	.473 In/Sec	1.396 G-s
MOV	.422 In/Sec	.947 G-s
MIH	.252 In/Sec	1.352 G-s
MIV	.266 In/Sec	2.283 G-s
COA	.218 In/Sec	.706 G-s
COH	.195 In/Sec	.712 G-s
* COV	.116 In/Sec	.139 G-s
* MIA	.116 In/Sec	.125 G-s

Station: Tandem Line #3

MEASUREMENT POINT	OVERALL LEVEL	HFD / VHFD

Press1 - Press # 1 1000 TON BLISS (17-Jul-19)

	OVERALL LEVEL	1 - 20 KHz
MOV	.088 In/Sec	.193 G-s
MOH	.063 In/Sec	.219 G-s
MIV	.081 In/Sec	.209 G-s
MIH	.072 In/Sec	.182 G-s
MIA	.088 In/Sec	.090 G-s

Press2 - Press # 2 1000 TON BLISS (17-Jul-19)

	OVERALL LEVEL	1 - 20 KHz
MOV	.076 In/Sec	.550 G-s
MOH	.071 In/Sec	.092 G-s
MIV	.059 In/Sec	.193 G-s
MIH	.065 In/Sec	.082 G-s
MIA	.066 In/Sec	.087 G-s

Press3 - Press # 3 1000 TON BLISS (17-Apr-18)

	OVERALL LEVEL	1 - 20 KHz
MOV	.212 In/Sec	.075 G-s
MOH	.262 In/Sec	.029 G-s
MIV	.157 In/Sec	.053 G-s
MIH	.247 In/Sec	.146 G-s
MIA	.212 In/Sec	.064 G-s

Press4 - Press # 4 1000 TON BLISS (17-Jul-19)

	OVERALL LEVEL	1 - 20 KHz
MOV	.174 In/Sec	.150 G-s
MOH	.081 In/Sec	.075 G-s
MIV	.112 In/Sec	.106 G-s
MIH	.092 In/Sec	.116 G-s
MIA	.099 In/Sec	.069 G-s

Press5 - Press # 5 1000 TON BLISS (17-Jul-19)

	OVERALL LEVEL	1 - 20 KHz
MOV	.050 In/Sec	.171 G-s
MOH	.054 In/Sec	.111 G-s
MIV	.049 In/Sec	.152 G-s
MIH	.054 In/Sec	.160 G-s
MIA	.067 In/Sec	.077 G-s

Clarification Of Vibration Units:
Acc --> G-s RMS

Vel --> In/Sec PK

As always, it is a pleasure to serve the Grenada Manufacturing operation. If there are any comments or questions, do not hesitate to contact us.
Sincerely,

ISO Certified Vibration Analyst, Category III

HI-SPEED INDUSTRIAL SERVICE
QualiTest® Diagnostics

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