vibration - thermography - oil analysis - laser alignment - in-situ balancing

unit 12, roseberry court, ellerbeck way, stokesley,
north yorkshire, ts9 5qt.

tel: 01642 714710 website: www.vibrotech.co.uk

Summary of Inspection

Date: 11-10-2007 **Report No.** 071011.3348

Location	Equipment	Comment	Status	Page
Mill	Process Supply Pump			2
	Extract Air Fan Unit			
	Mill Motor & Gearbox			3
	No.6 Bucket Elevator			
	No.7Bucket Elevator			
	No.12 Bucket Elevator			
	Vent Fan Unit			
	No. 2 Combustion Fan Unit			
	No. 1 Grinder			
	No. 2 Grinder			
	No. 1 vacuum Pump			
	No. 2 vacuum Pump			
	Mill Rotary Valve			
	Feed Rotary Valve			
	Mill Rotary Valve			
	Final Rroduct Conveyor			
Compressor House	A Compressor			4 & 5
	B Compressor			6
	No. 1 Blower			
Auxiliary Mill				
	No.1 Roll			
	No.2 Roll			
	No. 1 Bucket Elevator			
	No.2 Bucket Elevator			
	Lubrication Pump			7
	Hydraulic Pump			
	Press Drive System			8
Process Plant	Compaction Unit			9
	Dust House Fan			
	Dryer Purification Fan			
	Bag House Fan			
	Shaker Bed Motor Only			
	Combustion AirFan			

Key:-

- Recommend Action
- Fluctuating
- Satisfactory
- Not Running

Report

Motor

We previously reported the motor had shown an increase within the high frequency band, due to electrical fault frequencies.

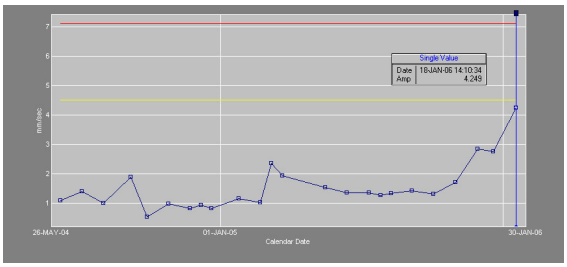
These fault frequencies are still present and have increased further. This is due to a progression of the electrical fault. (See motor trend 2 02).

The Thermographic survey has shown a hot spot on the supply to this motor. See Thermographic image opposite.

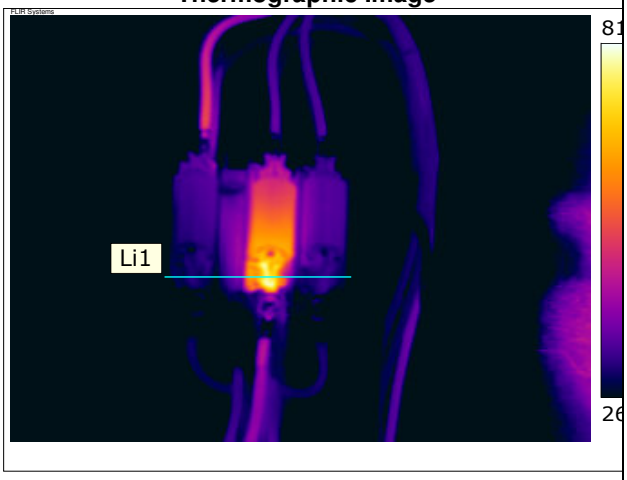
Pump

The pump is running satisfactorily.

2 01
Motor Trend



Thermographic Image



Recommended Action:

Motor

Inspect all the electrical connections to the motor.

I would recommend particular attention is paid to the yellow phase fuse connection, this is also illustrated on page 15 of your Thermographic report.

If this work has been carried out, there will be a fault on the motor.

Pump

The pump is running satisfactorily.

Inspection :

Repaired by:..... date:

Comment:

Report:

Motor

The previously reported 6Kcpm peak (2 x Line Frequency) is still evident in the axial plane. As previously reported, there is now an apparent and progressive increase in the 2 x rotational speed frequency level. (See Waterfalls 1A.1 & 2A.1).

There has also been an increase in the 2 x rotational speed peak in the vertical plane. (See 1V.1 & 2V.1 spectra overlay)

The increase in the 2 x rotational speed peak is indicative of an ongoing increasing 'mechanical movement' in the axial plane and a recent increase in the vertical plane.

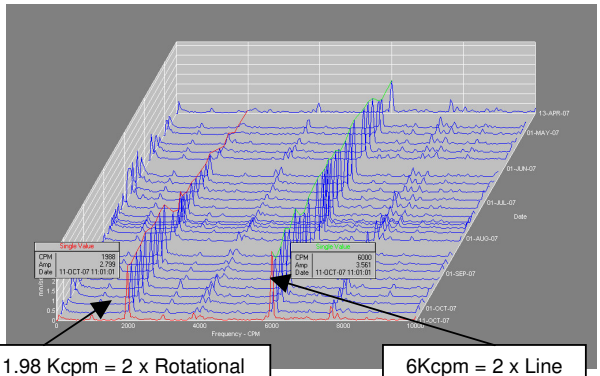
It is assessed Axial looseness is related to the 6 Kcpm axial peak and therefore rotor related.

The vertical looseness may be attributable to the recent bearing change. Bearings themselves do not appear to have 'internal' looseness but may be loose within the housings / between inner race and shaft.

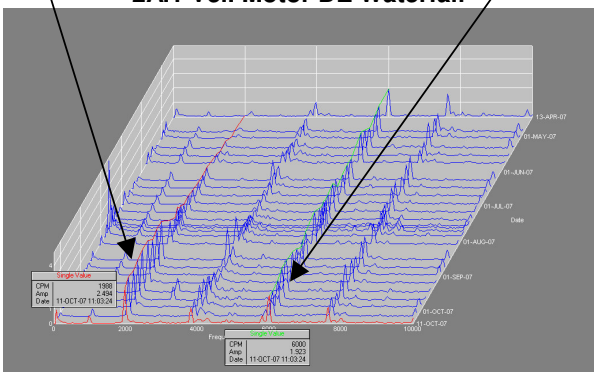
Gearbox

Satisfactory

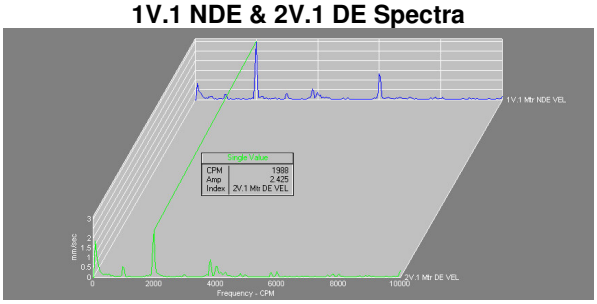
1A.1 Vel. Motor NDE Waterfall



2A.1 Vel. Motor DE Waterfall



1V.1 NDE & 2V.1 DE Spectra



Recommended Action:

Motor

As a first action check, confirm the security of the bearing cap bolts. Resurvey on completion.

Previous recommendations still apply.

Inspection:

Repaired by:..... date:

Comment:

Report

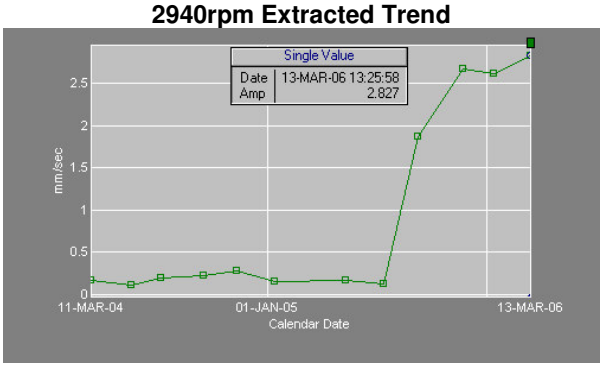
Motor

The previously reported increased 1x motor rpm vibration is still present. (See motor 2940 rpm extracted trend and spectrum waterfall 2 04 of 1x motor rpm (2940rpm) increase). This will be due to any of the following:

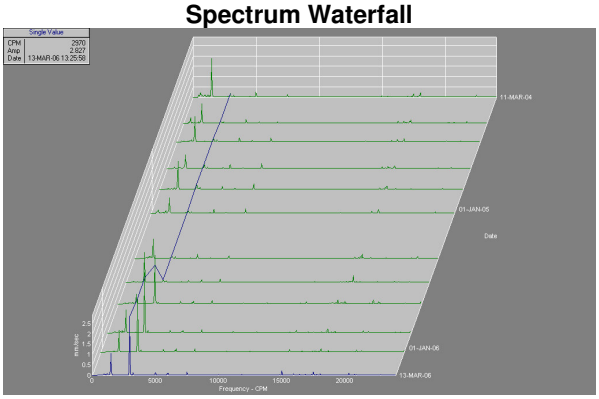
- Misalignment of the drives. This is possible when there is increased tolerances on the flange spigots.
- Eccentricity of the motor shaft, after motor failure.
- Bent motor shaft, after motor failure.
- Loose gear fit.

Any, or all of the above can cause this unit to fail prematurely and without warning.

2 04
2940rpm Extracted Trend



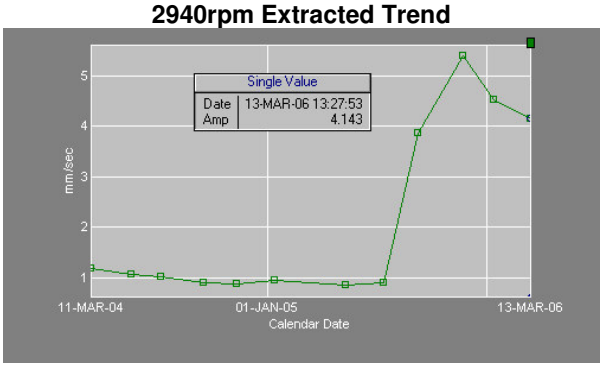
2 04
Spectrum Waterfall



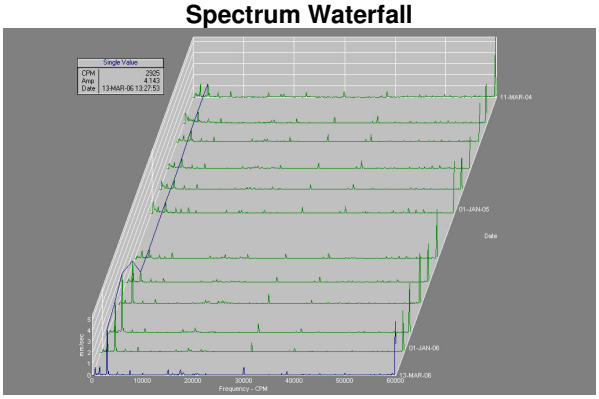
Air End

The air end male flute non-drive end increases due to transmitted vibration from the motor shaft speed are also still present. (See air end extracted trend and spectrum waterfall 5 01).

5 01
2940rpm Extracted Trend



5 01
Spectrum Waterfall



Cooling Fan Motor

The cooling fan unit is running satisfactorily.

Recommended Action:

Compressor Motor & Air End

We previously recommended you find out why the motor had failed and what repairs have been carried out on the motor. This information can then be used to help diagnose the cause of the increased 1x motor rpm vibration.

Due to the further increases, I would recommend this request is carried out as soon as possible.

Please advise us of your findings. We will then advise what corrective action is required.

Cooling Fan Motor

None.

Inspection :

Repaired by:..... date:

Comment:

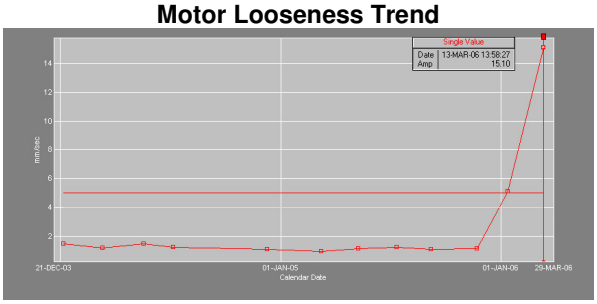
Report

Drive Motor & Air End

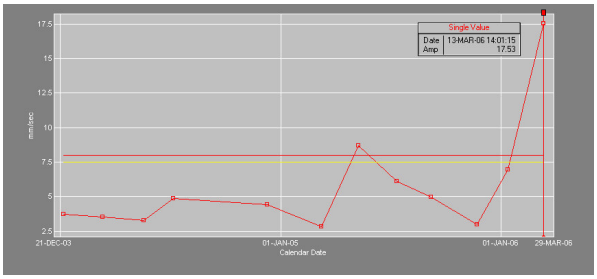
The motor and the input shaft of the air end have both shown increases due to looseness/movement fault frequencies.

This can be caused by either looseness/wear on the motor, or gear shaft assembly. (See motor trend 1 01 and air end trend 5 01).

1 01
Motor Looseness Trend



5 01
Air End Looseness Trend



Fan Motor

The fan motor has shown an increase due to bearing fault frequencies.

Recommended Action:

Drive Motor & Air End

Remove the motor for repair. When the motor is removed check the air end input shaft for wear/movement.

As this motor was only overhauled in April 2005 and we have been reporting high readings since it was fitted. I would recommend the reason for the failure and all the motor tolerances are closely investigated.

Fan Motor

Change the motor.

Inspection :

Repaired by:..... date:

Comment:

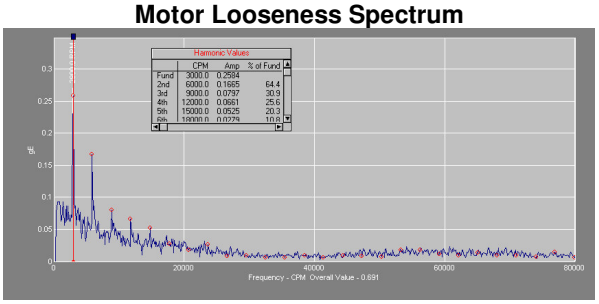
Report

Motor

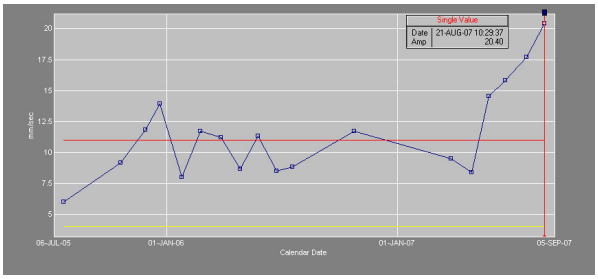
As previously reported, the bearing readings on this unit remain at an unacceptable level, due to looseness fault frequencies (See motor spectrum 2 02).

There has also been a steady increase in structural looseness vibration caused by looseness of the frame/base to the floor. (See motor trend 2 05).

2 02
Motor Looseness Spectrum



2 05
Base/Frame Structural Looseness Trend



Pump

There has been an increase on the pump bearings, due to stress caused by the increased vibration from the structural looseness.

Recommended Action:

Motor

The looseness fault frequencies on this unit are a concern and will be due to either worn housings or journals, I would therefore recommend this unit is removed for overhaul as soon as your production will allow.

Although the base/frame has been concreted in, it is still structurally loose and the vibration level is now above acceptable limits. Is the new concrete base secure to the original floor? Visual inspections indicate the base/frame has worn loose within the new concrete base. I would recommend the base/frame is secured as soon as possible.

Pump

Carry out the base/frame security repairs before irreversible damage is caused to the pump bearings.

Inspection :

Repaired by: date:

Comment:

Report

Left Motor

The left motor is maintaining a steady increase in wear fault frequencies from the drive end bearing. (See left & right motor drive end bearing trend overlays 2 02).

Right Motor

The right motor is running satisfactorily.

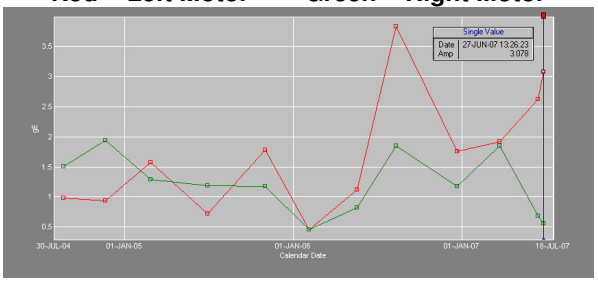
Press

The press has shown a large increase in the previously reported bearing frequencies. This is due to the progression of a bearing fault on the rotor shaft. (See press shaft trend and spectrum overlay 1 02). The press shaft trend and spectrum overlay 1 02 opposite, shows the difference between when it was fitted in August 06 (Blue trace) and it's last reading on 27 June 07. (Red trace).

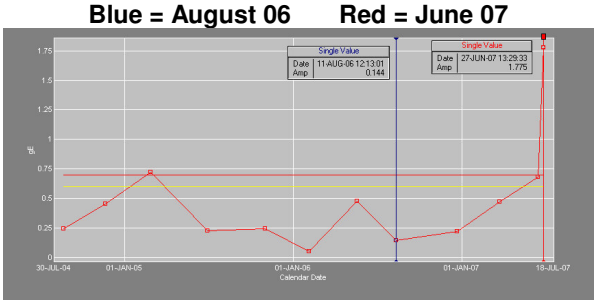
As both press shaft bearings are the same size and only checked from one point, it is not possible to identify which bearing is faulty.

There is also looseness/movement vibration on this shaft.

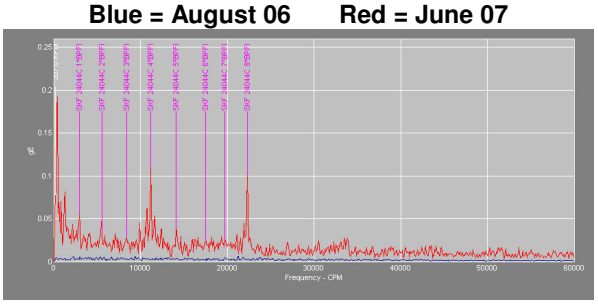
2 02
Motor Drive End Bearing Trends
Red = Left Motor Green = Right Motor



1 02
Press Shaft Outer Point Bearing Trend
Blue = August 06 Red = June 07



1 02
Press Shaft Outer Point Bearing Trend
Blue = August 06 Red = June 07



Recommended Action:

Right Motor
None.

Left Motor
Change the bearings when production allows.

Press Shaft
I would recommend the press shaft bearings are changed urgently. Also whilst dismantled inspect the press assembly for wear.

Inspection :

Repaired by:..... date:

Comment:

Report

Motor

Satisfactory. See below.

Intermediate Shaft

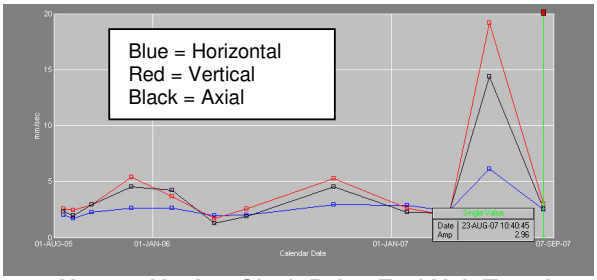
Satisfactory.

Replacement of intermediate shaft bearings, alignment of belt pulleys and alignment across the fluid drive has reduced general vibration and bearing distress levels considerably as illustrated on attached trends.

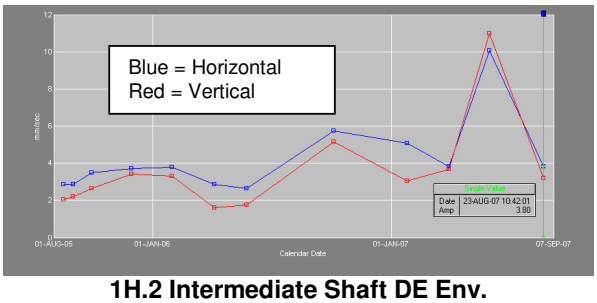
Gearbox

Satisfactory

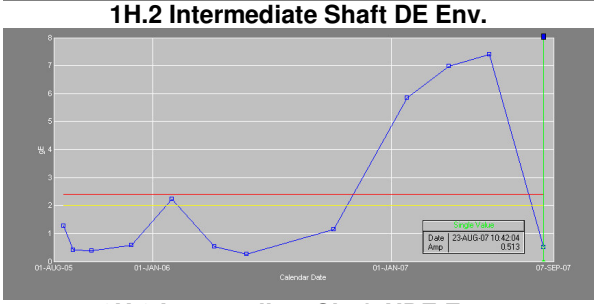
2H.1: 2V.1 & 2A.1 Motor DE Vel. Trend



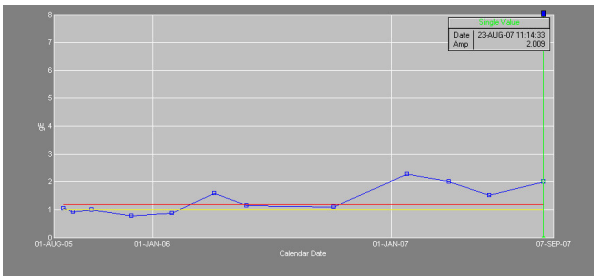
1H.1 & 1V.1 Int. Shaft Drive End Vel. Trend



1H.2 Intermediate Shaft DE Env.



2H.2 Intermediate Shaft NDE Env.



Recommended Action:

Motor, Intermediate Shaft & Gearbox

Routine monitoring.

Inspection :

Repaired by:..... date:

Comment: