

# VIBRATION SURVEY

On behalf of



On Line Vibration Monitoring Ltd

**Sample Vibration Monitoring Report**

September 2020



# **INTRODUCTION**

All rotating machinery vibrates. It is a well-established fact that a machine's condition is relative to its vibration levels. Each mechanical defect generates vibration in its own unique way.

This makes it possible to identify a mechanical problem by measuring and noting its vibration characteristics. The information is trended over a period of time and compared with pre-set alarm levels.

This is the basis of a good Predictive Maintenance System of condition monitoring, making it possible to detect an impending mechanical problem, analyse its cause and take appropriate action before failure actually occurs.

Whilst some machinery will always fail suddenly and catastrophically, most will trend towards failure over a period of time. If vibration monitoring surveys are carried out at appropriate frequencies, these can be detected before failure occurs, thus giving time for remedial action to be organised, minimising unplanned plant downtime and maximising efficiency.

1. Vibration monitoring of machinery and equipment in the **Bread Plants, Morning Goods Plant & Services** was carried out between the **24<sup>th</sup> & 28<sup>th</sup> August 2020** on behalf of **On Line Vibration Monitoring Ltd, Cumbria**.
2. This is a report on the conditions prevailing when the equipment was monitored. The monitoring was carried out during normal working hours without disruption to the daily activities of the site.
3. All plant was monitored with a data collector/analyser. The data collected is transferred to a computer in which specialised software analyses the recorded information, prints reports and plots graphs.
4. All alarms are based on established levels of vibration for general machinery, modified as experience and knowledge of the plants characteristics and trends become known.
5. Where plant was monitored and no abnormalities prevailed, no comment is made in the report. Any anomalies are identified in the **EXCEPTION REPORT** and are explained with the aid of Graph Plots of various vibration characteristics.
6. The **ACTION SUMMARY** contains recommended actions for the client to consider. As many factors will affect the life of components, the recommended actions are based on the results of the measurements taken at the time of the survey and general operational conditions and are given in good faith and cannot be considered absolute.
7. Any defects noted during the survey but unrelated specifically to Vibration Monitoring are reported under the heading **PERIPHERAL DEFECTS**. Any other notes are under the heading **GENERAL**.
8. Authorised persons only should perform the investigations and repairs. Site isolation procedures should always be followed before inspections or remedial actions.
9. Contact details in case of queries are:

Mobile: 07816 662420  
Email: [steve@onlinevibration.co.uk](mailto:steve@onlinevibration.co.uk)

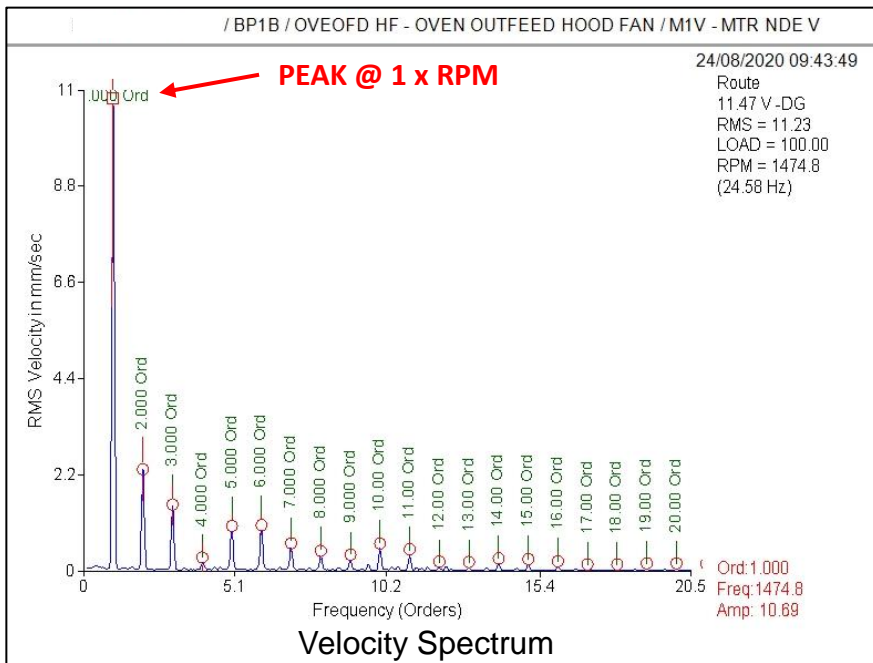
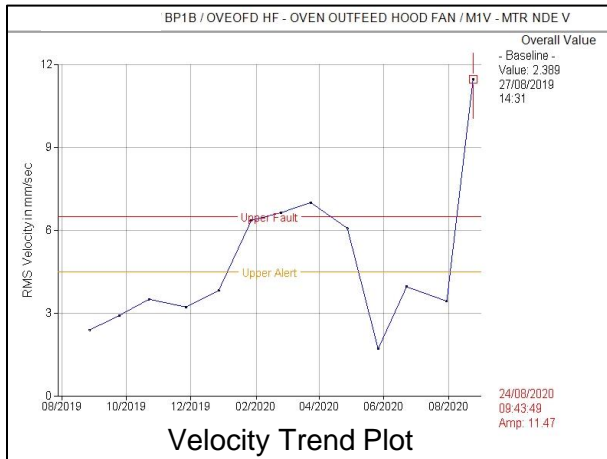


Steven Hurst (Director)  
**On Line Vibration Monitoring Ltd**



# EXCEPTION REPORT

## BP 1 OVEN – OUTFEED HOOD FAN



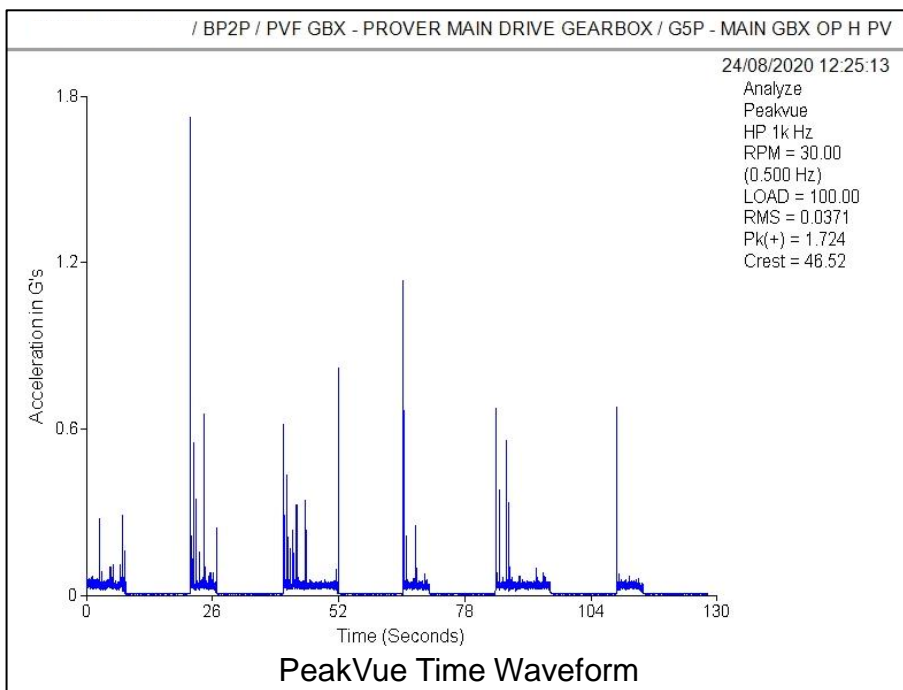
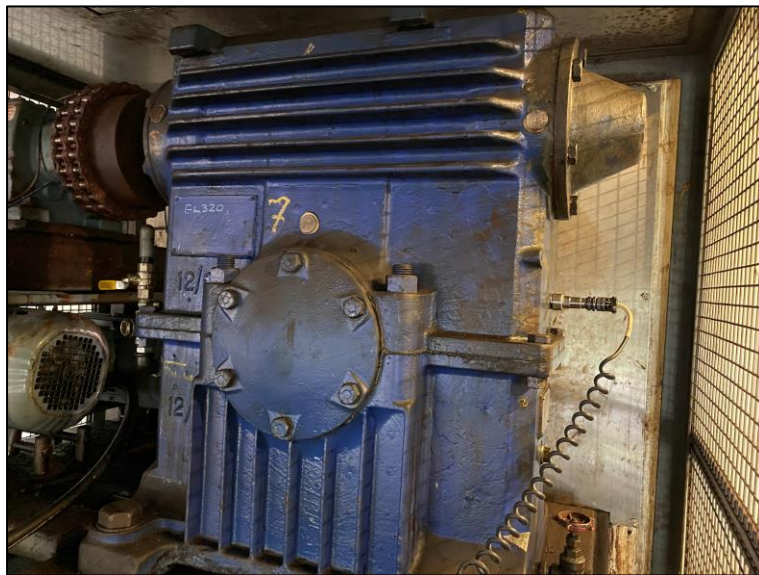
### BP 1 OVEN – OUTFEED HOOD FAN

Vibration velocity measured on the outfeed hood fan motor has increased above alarm level 2 this visit. The velocity spectrum shows a peak relating to 1 x running speed with a series of harmonics. High frequency vibration is low indicating serviceable bearing condition. The increase in vibration and the patterns in the spectrum may be due to a combination of fan imbalance and developing looseness.

#### ★ACTION★

**Investigate:** - Inspect / clean the fan impeller. Check for damage, eccentricity, security etc. Also check the motor and fan housing fixing bolts are secure.

## BP 2 FINAL PROVER – MAIN DRIVE GEARBOX



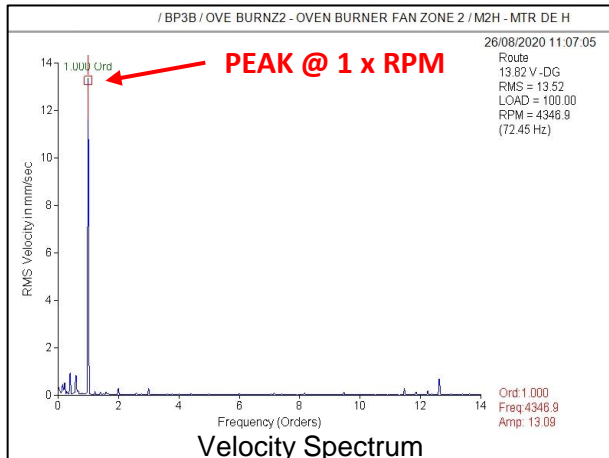
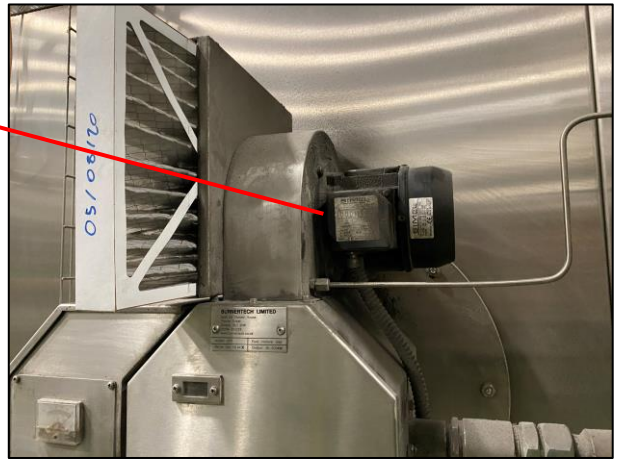
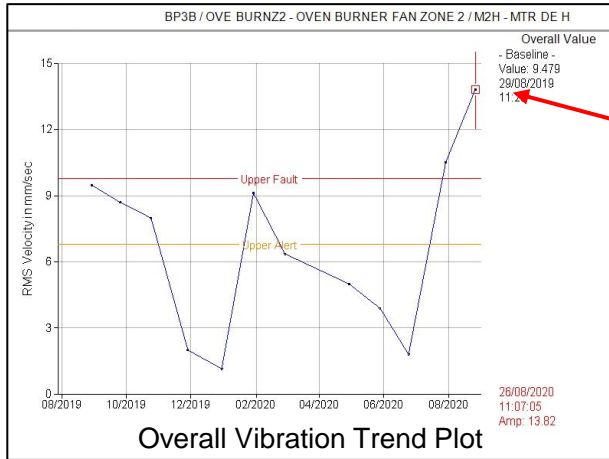
## BP 2 FINAL PROVER – MAIN DRIVE GEARBOX

The PeakVue time waveform recorded on the main gearbox output shaft bearing over 128 seconds shows 6 index cycles of the prover. Random impacting can be felt on each index cycle. These are shown as transient spikes on the time waveform. The impacts feel particularly strong in one position on the gearbox output shaft suggesting a possible problem with the output crown gear. Further investigation is warranted. Note: The prover was emptying when readings were taken.

### **★ACTION★**

**Investigate:** - Remove the guard top cover and gearbox oil filler cap and inspect the crown gear for wear / damage. Note: The input worm gear may obscure view so an endoscope may be required. Also consider draining and flushing the lubricant checking for debris.

## BP 3 – OVEN BURNER 2 - COMBUSTION FAN



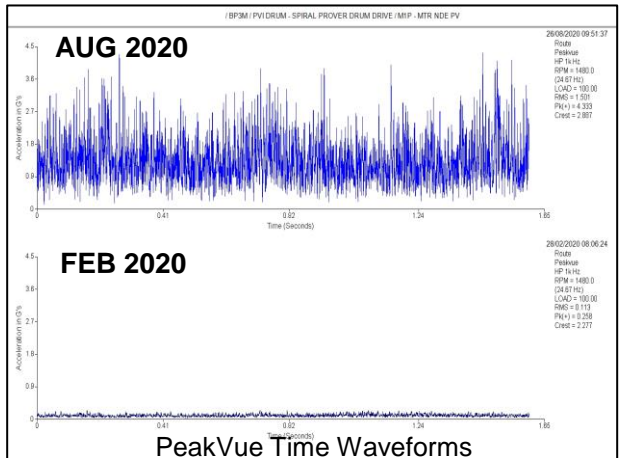
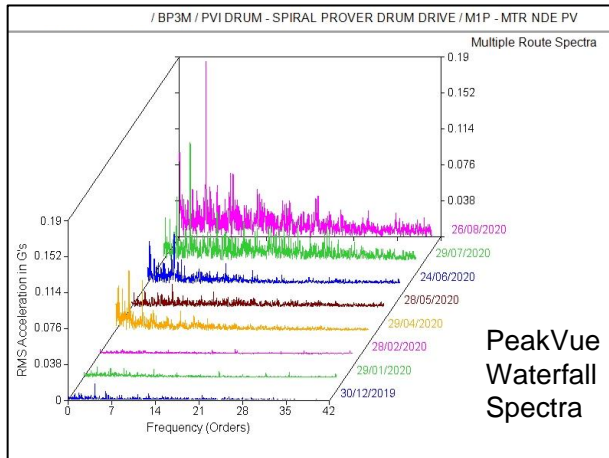
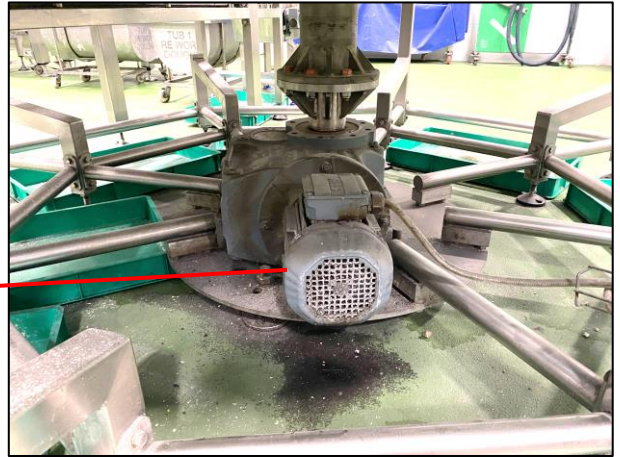
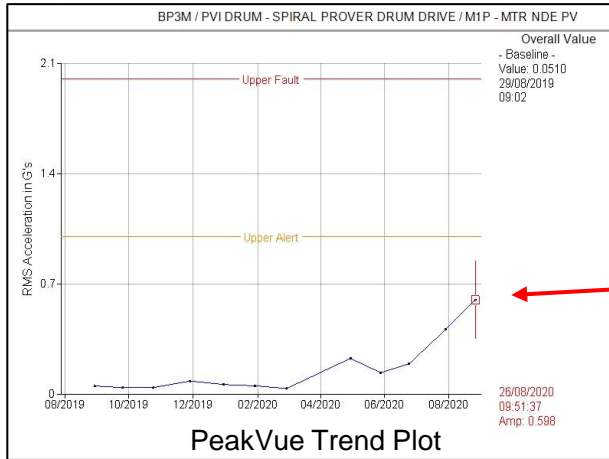
## BP 3 – OVEN BURNER 2 - COMBUSTION FAN

Overall vibration velocity measured on the fan motor sits above alarm levels. The spectrum shows most of this vibration is at fan running speed indicating imbalance. This is most likely due to uneven build-up of dirt / debris on the fan impeller. Note: The finger guard on the fan inlet is loose and rubbing on the fan impeller.

### ★ACTION★

**Clean the fan impeller. Re-secure the fan inlet guard.**

## BP 3 – SPIRAL PROVER MAIN DRIVE GEARMOTOR – MTR NDE



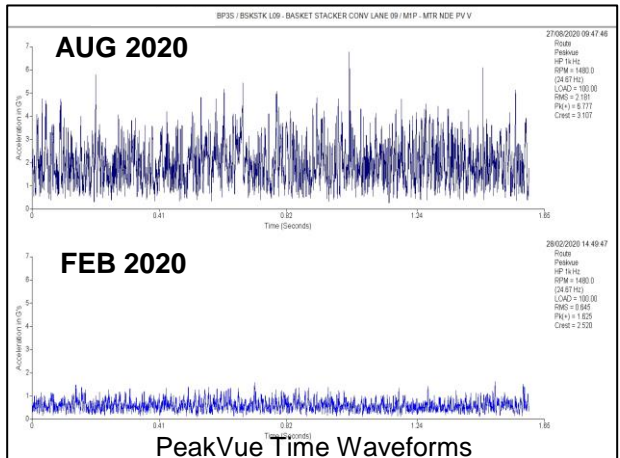
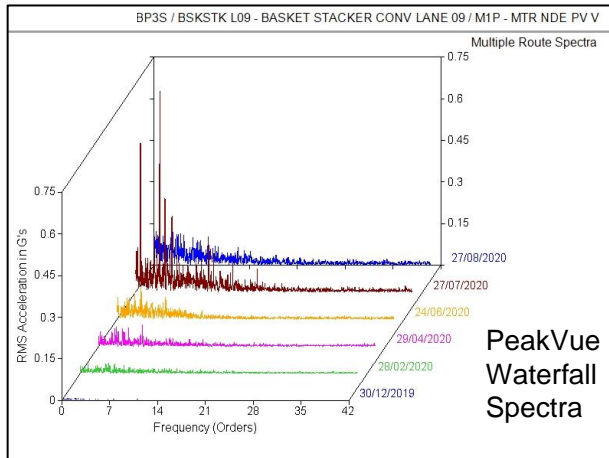
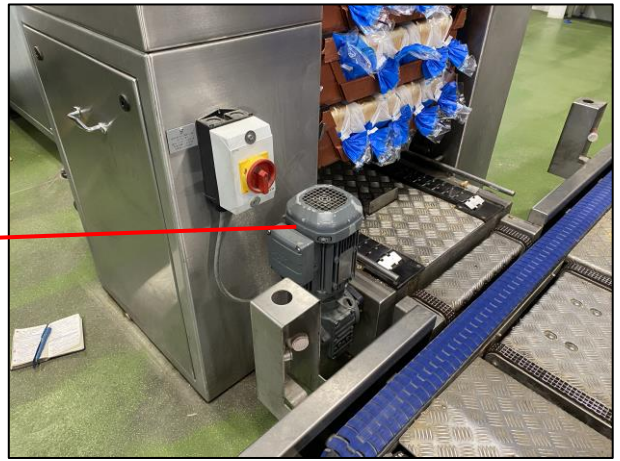
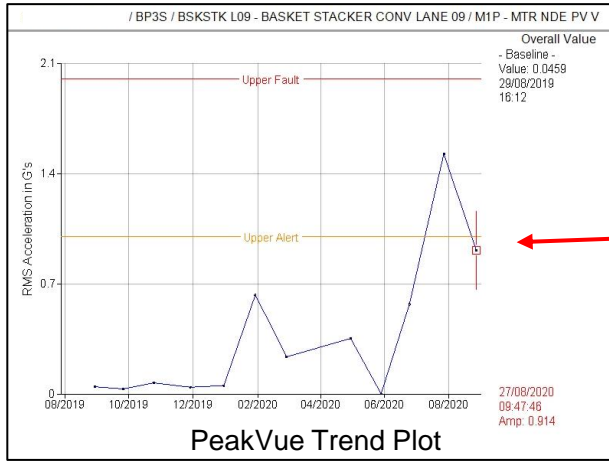
## BP 3 – SPIRAL PROVER MAIN DRIVE GEARMOTOR – MTR NDE

PeakVue measured on the motor NDE has been trending upwards over the last few visits. The waterfall spectra shows the increase in broadband vibration. The time waveforms taken six months apart show the increase in random high frequency vibration. This is most likely due the progression of bearing fatigue. The drive is not operating smoothly.

### ★ACTION★

Overhaul the motor bearings.

# BP 3 – LINE 9 BASKET STACKER OUTFEED CONV GEARMOTOR – MTR NDE



# BP 3 – LINE 9 BASKET STACKER OUTFEED CONV GEARMOTOR – MTR NDE

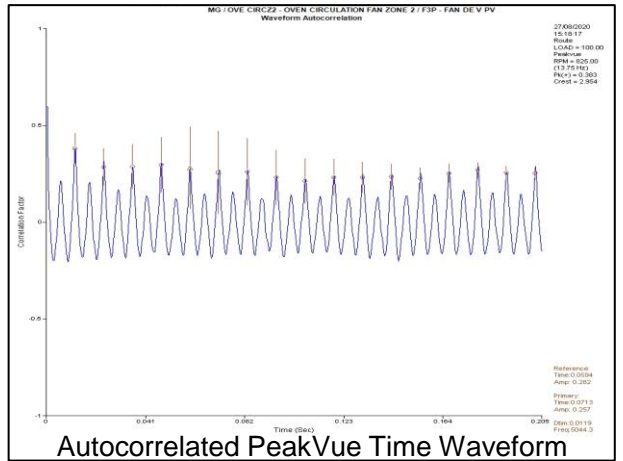
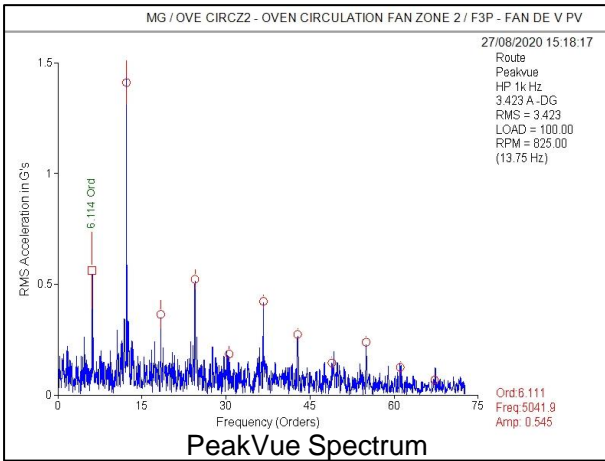
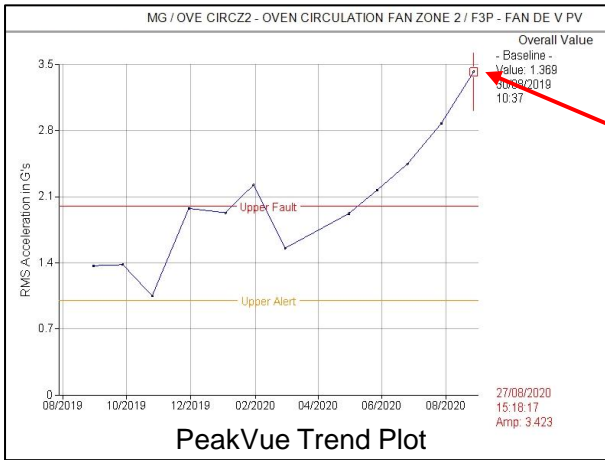
PeakVue measured on the motor NDE has dropped back just below alarm but remains above previous low running levels. The waterfall spectra shows the increase in broadband vibration over recent visits. The time waveforms taken six months apart show the increase in signal level.

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# MG OVEN – CIRCULATION FAN 2 – FAN SHAFT DE BEARING



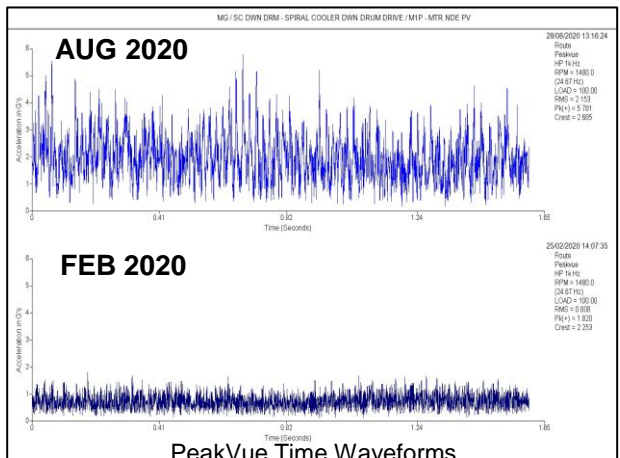
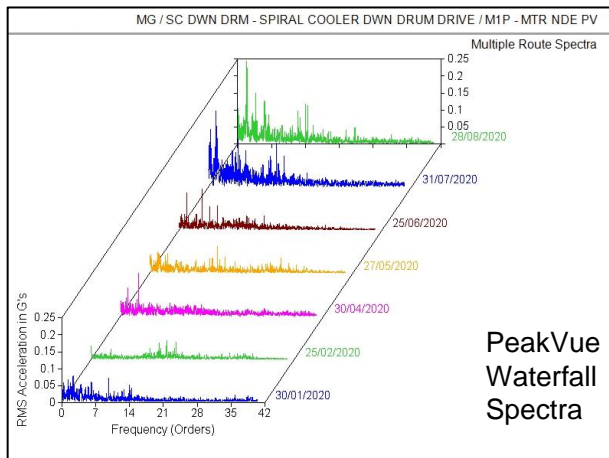
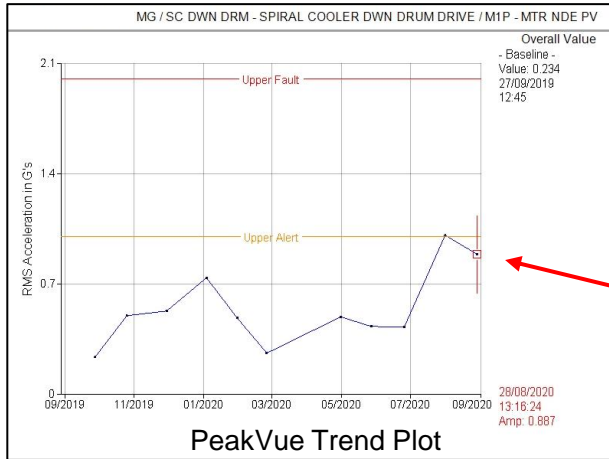
# MG OVEN – CIRCULATION FAN 2 – FAN SHAFT DE BEARING

PeakVue measured on the fan shaft DE bearing (nearest to pulley) has increased again this visit and sits well above alarm level 2. The spectrum shows a peak at 6.1 x running speed with harmonics. The time waveform shows impacting signals relating to the peak in the spectrum. These non-synchronous signals indicate a bearing defect is progressing on the fan shaft DE bearing.

## ★ACTION★

Replace the fan shaft bearings soon.

# MORNING GOODS – COOLER DOWN DRUM GEARMOTOR – MTR NDE



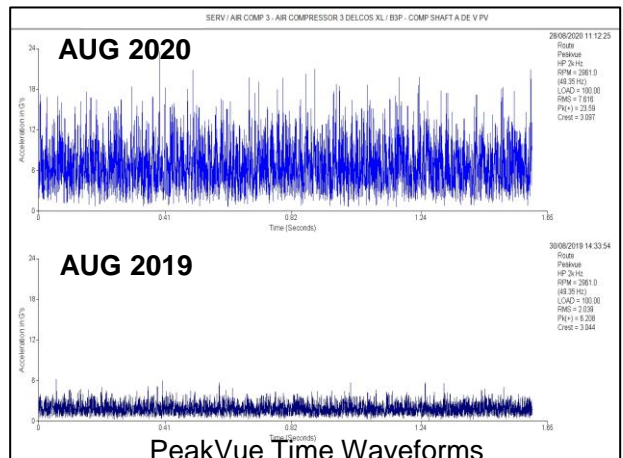
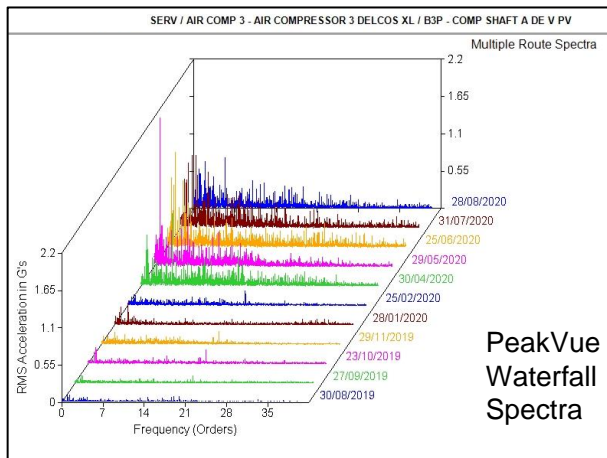
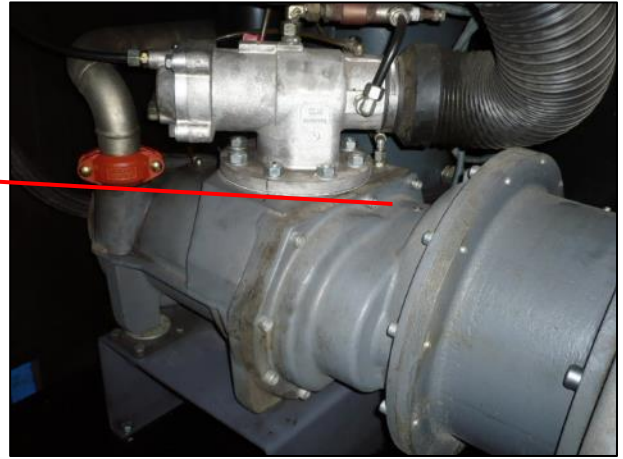
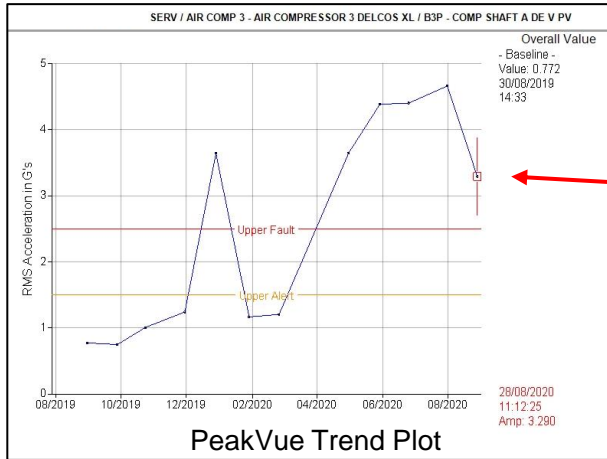
# MORNING GOODS – COOLER DOWN DRUM GEARMOTOR – MTR NDE

PeakVue measured on the motor NDE has dropped just below alarm level 1 but remains above previous running levels. The waterfall spectra shows the increase in broadband vibration over recent visits. The time waveforms taken six months apart show the increase in signal level. The motor is not operating smoothly. This is most likely due to early stage bearing fatigue.

## ★ACTION★

Consider overhauling the motor bearings.

## SERVICES – AIR COMPRESSOR 3 (DELCOS XL)



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PeakVue measured on the compressor DE remains above alarm level 2. The waterfall spectra shows the increase in broadband vibration over recent visits. The time waveforms taken a year apart show the increase in signal level. Similar increases are also evident on other measurement positions on the compressor but the highest signal levels are present on the compressor input gear casing. This may be due to wear in the compressor gears / bearings.

### ★ACTION★

**Split the compressor from the motor and inspect the gears / bearings for wear / damage. Consider sending an oil sample for analysis to check for wear particles.**

## **ACTION SUMMARY**

**August 2020**      See Graph Plots for more detail.

### **BREAD PLANTS, MORNING GOODS & SERVICES**

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#### **BP 1 OVEN – OUTFEED HOOD FAN**

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## **ACTION SUMMARY.....Continued**

**August 2020**            See Graph Plots for more detail.

### **BREAD PLANTS, MORNING GOODS & SERVICES**

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#### **★ACTION★**

**Split the compressor from the motor and inspect the gears / bearings for wear / damage. Consider sending an oil sample for analysis to check for wear particles.**

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## PERIPHERAL DEFECTS

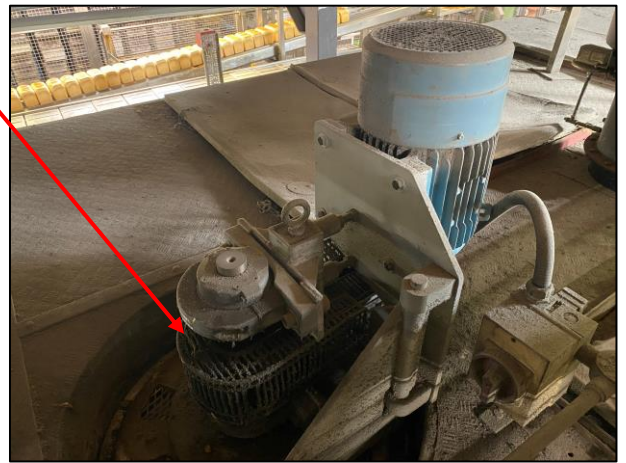
### ➤ Bread Plant 1 – Rounder Gearmotor

Oil is weeping from the gearbox output shaft seal and there's a pool of oil on the floor under the gearbox.



### ➤ Bread Plant 1 – Oven Circulation Fans

Circulation fan 5 has a broken drive belt and the others are cracked. Circulation fans 3, 6 & 7 all have badly cracked drive belts. Replace the drive belts on these fans.



### ➤ Bread Plant 2 – Oven Circulation Fan 5

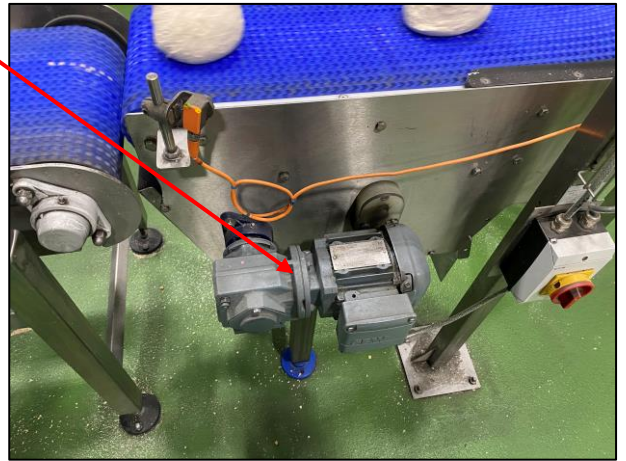
The heat shield below the bottom fan shaft bearing is not turning. This needs refitting to the fan shaft to deflect the heat away from the bearing.



## PERIPHERAL DEFECTS

➤ **Bread Plant 3 – Rounder Outfeed Conveyor A9**

The drive shaft is worn in the drive side shaft bearing.



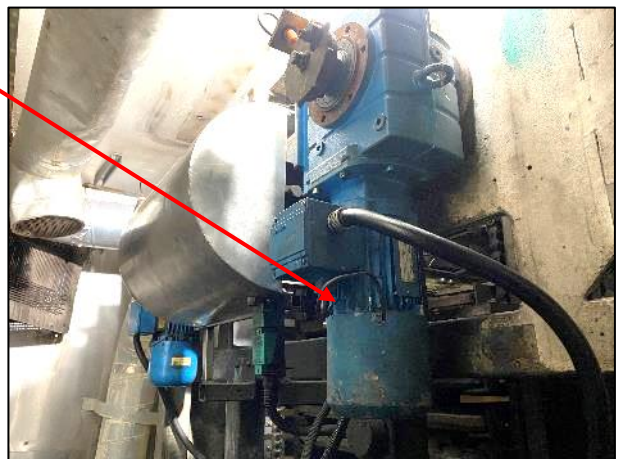
➤ **Bread Plant 3 – Oven Circulation Fan 2**

Two of the drive belts are missing.



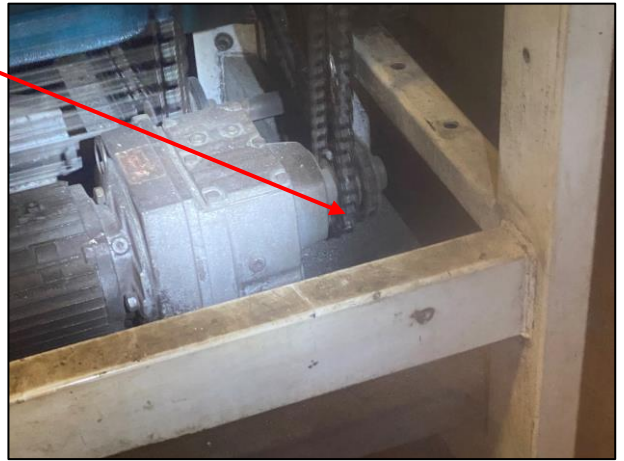
➤ **Morning Goods – Prover Raise Gearmotor (Side nearest to BP1)**

The brake is very noisy when energising. This may be due to a worn brake disk / excessive brake gap. Check / adjust the brake gap.

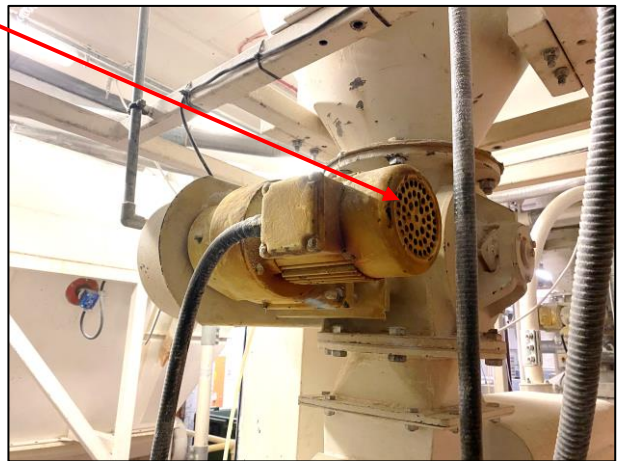


## PERIPHERAL DEFECTS

- **Morning Goods Cooler – Overdrive below cooler outfeed conveyor**  
The drive chain is slack and jumping on the drive sprocket.



- **Flour Room – Morning Goods White Sieve Infeed Rotary Valve**  
The motor cooling fan is not turning. It needs re-securing to the motor shaft.



- **Chiller Room Adjacent to Air Compressor 3**  
There is water leaking from the chilled water return pipe behind chiller No.2





# GENERAL

If you have any questions or comments regarding this report or the service provided please contact me on one of the following;

Mobile: 07816 662420  
Email: [steve@onlinevibration.co.uk](mailto:steve@onlinevibration.co.uk)



Steven Hurst (Director)  
**On Line Vibration Monitoring Ltd**



## **NOTATION**

DE: -	Drive-end of machine
NDE: -	Non-drive end of machine
O/P: -	Output
I/P: -	Input
V: -	Vertical measurement
H: -	Horizontal measurement
A: -	Axial measurement
mm/s: -	Vibration velocity in millimeters/second
um: -	Vibration displacement in microns (micrometers)
g: -	Vibration acceleration in g
PeakVue: -	High Frequency Vibration energy generated from shock pulse of bearing and gear wear.
Magnitude: -	Sum of all vibration on a machine - indicates general machine condition
Spectrum: -	Plot of amplitude vs frequency - indicates specific machine faults
Waterfall: -	Plot of Spectrum vs time - shows history & developing faults
Autocorrelation: -	A mathematical process applied to a time waveform used to aid the identification of repeating patterns.
Synchronous: -	Vibration at a whole number multiple of running speed e.g. 1X or 5X
Non-Synchronous: -	Vibration at greater than 1X running speed but not a multiple of running speed e.g. 1.5X or 3.1X.
Sub-Synchronous: -	Vibration at a frequency less than running speed e.g. 0.6X
CPM: -	Cycles per minute - vibration frequency - Sometimes in kcpm; cpm x1000. (CPM is often used instead of Hz as it relates directly to machine rpm)
Hz: -	Hertz - vibration frequency (Cycles per second). (Sometimes in kHz; Hz x 1000). 1Hz = 60CPM