



*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](http://www.vibrotech.co.uk)*

# **vibration Analysis Report**

## **customer**

## **???? POWER station**

## **1.3MW Diesel generator set one**

## **30 July 2017**

SKF Microlog CMVA75.

Serial No 1206041

Accelerometer: CMSS2200

Serial No S61426

Accelerometer: MTN/1100

Serial No 234530

SKF @ptitude Analyst Vibration Analysis Software.  
Dell Notebook Computer.

### **Analyst**

Mr K Blockley.

## **Introduction**

A Vibration Analysis was requested by Mr ????? of ????? Sites on Three 1.3MW Diesel Generator sets situated at ????? Power Station. This is the report for the Number One Set.

Three sets were identified for testing. Tests were carried out at zero and full load.

## **Vibration Analysis Report Overview**

The RIC Engine was manufactured by Dorman and the generator by Leroy Somer

- Rating = 1.3MW
- Volts = 3.3Kv
- Speed = 1500rpm
- Engine Construction Design = V Type/In-line/Others
- Operating System = Two Stroke/Four stroke/Synchronous/Asynchronous
- Coupling = Flexible Coupling – Direct Coupling – Elastic Coupling.
- The engine and generator were mounted to a framework which were commonly resiliently mounted to the floor
- The Engine and Generators were separate units/flange mounted.

**The readings were taken on each unit at the following positions:**

### **Engine**

Drive & Non-drive End, Top, Bottom & Shaft Position:- Horizontal, Vertical & Axial.

### **Generator**

Drive & Non-drive End Bottom Horizontal & Shaft Position:- Horizontal, Vertical & Axial.

### **Engine Mountings**

Drive & Non-drive End Foot & Skid Top mounting positions:- Vertical.

### **Generator Skid**

Engine & Alternator skid resilient mountings. 6 Left & 6 Right: numbered 1 to 6 engine non-drive end through to Generator non-drive end - Vertical.

Left & right sides are set by viewing the engine from the non-drive end.

To test the reciprocating engine and Generator, the following frequency bands were used to comply with ISO Standard 10816 part 6. Displacement 120cpm to 600cpm, Velocity 600cpm to 15,000cpm & Acceleration 15,000cpm to 60,000cpm. These combined frequency lengths/measurement types cover a total frequency range of 120cpm to 60,000cpm as required by this standard. Values were recorded in RMS. The Generator bearings were also tested using an acceleration filter 30K-600K cpm.

**Measurement Report.**

**Measurement Result Table One – Zero Load.**

**Table One**

<b>Generator One - Zero Load</b>									
	<b>Horizontal</b>			<b>Vertical</b>			<b>Axial</b>		
<b>Measuring</b>	<b>Disp</b>	<b>Vel</b>	<b>Acc</b>	<b>Disp</b>	<b>Vel</b>	<b>Acc</b>	<b>Disp</b>	<b>Vel</b>	<b>Acc</b>
<b>Position</b>	<b>um</b>	<b>mm/s</b>	<b>m/s<sup>2</sup></b>	<b>um</b>	<b>mm/s</b>	<b>m/s<sup>2</sup></b>	<b>um</b>	<b>mm/s</b>	<b>m/s<sup>2</sup></b>
Eng NDE Bott	1.85	10.04	2.45						
Eng NDE Shaft	0.81	9.5	0.38				2.73	2.58	1.24
Eng NDE Top	1.08	11.11	1.26	1.26	7.37	1.06			
Eng DE Bott	1.66	7.67	1.44						
Eng DE Shaft	0.82	6.14	0.55						
Eng DE Top	0.85	7.17	0.59	0.70	1.78	0.57	0.36	1.23	0.31
Gen DE Bott	0.36	4.15	0.24						
Gen NDE Bott	0.48	11.4	0.15						
Gen NDE Shaft		12.11			2.88			6.31	
Gen DE Shaft		4.41			1.80			4.94	

**Measurement Result Table Two – Full Load.**

**Table Two**

<b>Generator One - Full Load</b>									
	<b>Horizontal</b>			<b>Vertical</b>			<b>Axial</b>		
<b>Measuring</b>	<b>Disp</b>	<b>Vel</b>	<b>Acc</b>	<b>Disp</b>	<b>Vel</b>	<b>Acc</b>	<b>Disp</b>	<b>Vel</b>	<b>Acc</b>
<b>Position</b>	<b>um</b>	<b>mm/s</b>	<b>m/s<sup>2</sup></b>	<b>um</b>	<b>mm/s</b>	<b>m/s<sup>2</sup></b>	<b>um</b>	<b>mm/s</b>	<b>m/s<sup>2</sup></b>
Eng NDE Bott	1.96	14.2	2.54						
Eng NDE Shaft	0.99	10.17	0.48				2.90	5.90	1.46
Eng NDE Top	1.26	14.45	0.82	1.09	6.81	2.04			
Eng DE Bott	2.53	13.05	1.72						
Eng DE Shaft	2.38	9.69	0.85						
Eng DE Top	1.96	9.35	0.69	1.19	2.81	0.52	0.65	1.74	0.69
Gen DE Bott	0.55	6.45	0.25						
Gen NDE Bott	0.84	15.24	0.34						
Gen NDE Shaft		16.81			5.16			9.78	
Gen DE Shaft		8.06			4.35			4.87	

**Engine – Generator Vibration Report.**

When vibration measurements were taken according to ISO 10816-6, as stated in the vibration analysis report overview. Tables One and Two showed that the highest vibration on the engine & alternator is when it is loaded and at the Generator Non-drive end horizontal position. **16.81mm/s**. This gives this generator set a vibration severity grade of 18.

You informed us that you were working within a vibration severity grade of 45 for these three generator sets.

**Measurement Result Table Three – Engine Mountings**

**Table Three**

**Engine Mountings**

Overall Vibration mm/s

Engine	Eng NDE Left	Eng NDE Right	Eng DE Left	Eng DE Right
NDE Top	8.16	9.58		
NDE Stand	8.58	9.97		
DE Top	6.24	9.40		
DE Stand	6.11	9.47		
Top			2.84	3.34
Skid Top			2.51	3.29

**Vibration Engine Mounting Report**

Table three figures are indicating that no looseness is present on the mountings on the engine drive and non-drive ends.

**Measurement Result Table Four – Skid Resilient Mountings.**

**Table Four**

**Skid Resilient Mountings**

Overall Vibration mm/s

Engine - Alternator	Position 1		Position 2		Position 3		Position 4		Position 5		Position 6	
	L	R	L	R	L	R	L	R	L	R	L	R
Skid Top	8.23	10.4	4.77	5.39	4.27	3.88	1.77	2.87	2.69	4.98	4.42	2.68
Res Mount Top	9.78	12.1	4.43	2.92	4.99	3.29	2.88	2.62	3.16	2.73	5.7	4.7
Res Mount Bottom	0.22	0.04	0.14	0.14	0.06	0.04	0.10	0.18	0.94	4.96	0.08	0.10
Floor	0.09	0.03	0.15	0.11	0.05	0.03	0.04	0.36	0.03	0.09	0.03	0.04

**Vibration Skid Resilient Mounting Report**

Table four figures are indicating that no looseness is present and that the resilient mountings are operating correctly.

## **Vibration Summary**

### Engine – Generator Vibration

The Engine Generator Vibration Severity Grade for this set is classed as 18 according to ISO 10816 – Part 6. As you are using a vibration severity grade of 45 for these sets, this unit is considered to be within acceptable tolerances.

### Engine Mountings

The engine mounting readings in table three are indicating vibration levels within the specified vibration severity grade and are not indicating any looseness vibration.

### Vibration Skid Resilient Mounting

The vibration damping on all the resilient mountings appears to be working satisfactorily and are not indicating any looseness vibration.

## **Conclusion**

The vibration levels in the rotational planes and on the engine/generator mountings across the generator set are considered to be within tolerance according to ISO Standard 10816- part 6, with the vibration damping on all the resilient mountings, appearing to be working satisfactorily.