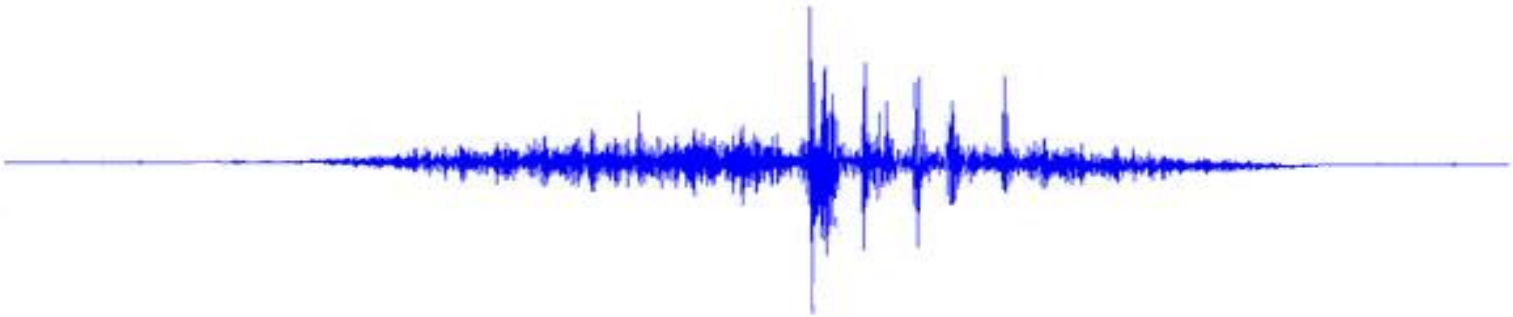
Vibration Analysis Report



BHILAI STEEL PLANT

SP-3 AREA PD FAN-2 REPORT on
14.08.2023

Mechano Maintenance Services Pvt. Ltd., (a division of SPM INDIA)
Fortune Chambers, 4th Floor, Silicon Valley, Madhapur, Hyderabad – 500 081, Andhra Pradesh, INDIA
Phone : 91 40 444 55555 / Fax : 91 40 444 55500 ; E-mail: consultancy@spm.co.in; www.spm.co.in

Vibration Inspection Site Information	
Customer	**BHILAI STEEL PLANT(SAIL)**
Address	SP-3 AREA, BHILAI STEEL PLANT, BHILAI
Contact Person	
Phone	
E –mail	
Date of Visit	14.08.23
Vibration Analyst	Mr. Raghu Palthi

Report Content:

Scope: This Report contains fault diagnosis with analysis and recommendations for corrective actions. This is all supported by spectrum plots for each point of the equipment identified as being defective. We employ a coding system, which makes it easy to understand the criticality of the fault and how quickly it needs to be investigated.

Measurement: An overall vibration reading measured in mm/sec RMS used to determine general mechanical and electrical fault within rotating machinery.

Equipment Used: *Leonova Infinity Dual Channel Analyzer*

Evaluation of rotating machine condition as per ISO 10816-3 Vibration Severity Standard: The ISO committee has completely revised the old ISO 2372 Vibration severity standard for evaluating In-situ performance of rotating machines. The new standard ISO 10816-3 accommodates the many changes that have taken place in the design and operating frequencies of modern process machinery.

Classification according to Machine Type and Application- A significant difference in the design, type of bearings and support structures requires a separation into different groups. Machines in these groups may have horizontal, vertical or inclined shafts and can be mounted on rigid or flexible supports

SUMMARY REPORT

Sl. No	Name of the Machine	Health Condition	Recommendations	Page No.
1	**PD FAN-2**	**MARGINAL**	Check the coupling gap as per OEM Review the alignment between drive to driven After completion of above activity if vibration valued not reduced then go for dynamic balancing. **NOTE:** Due to coupling issue vibration values are higher side this leads high axial vibrations.	4

For SPM Instrument India Pvt. Ltd.,

Consultancy Services.

SPM	Machine Condition Report	सेल SAIL

Machine Name:	PD FAN-2	Machine Condition	MARGINAL

Analysis: The vibration spectrum dominating fundamental frequency (**750rpm)** (1X) with 3X,6X frequency which indicative source vibration is due to misalignment/coupling related frequency.

Note: Cross phase analysis carried out across the coupling & readings are found out of phase **179 degrees** in Axial to Axial at Motor DE to Fan DE bearing which is indicative of Angular misalignment.

Recommended Action Plan:

1. Check the coupling gap as per OEM
2. Review the alignment between drive to driven After completion of above activity if vibration valued not reduced then go for dynamic balancing.
3. **NOTE:** Due to coupling issue vibration values are higher side this leads high axial vibrations.

Machine Data

Power	1.2MW
Motor Speed	750 RPM
Motor brg Nos	

As Per ISO 10816 Standard Class III machines

Standard Vibration Level	Machine Condition
Up to 4.5 mm/sec.	Normal
4.5 to 11.2 mm/sec.	Marginal
Above 11.2 mm/sec.	Critical

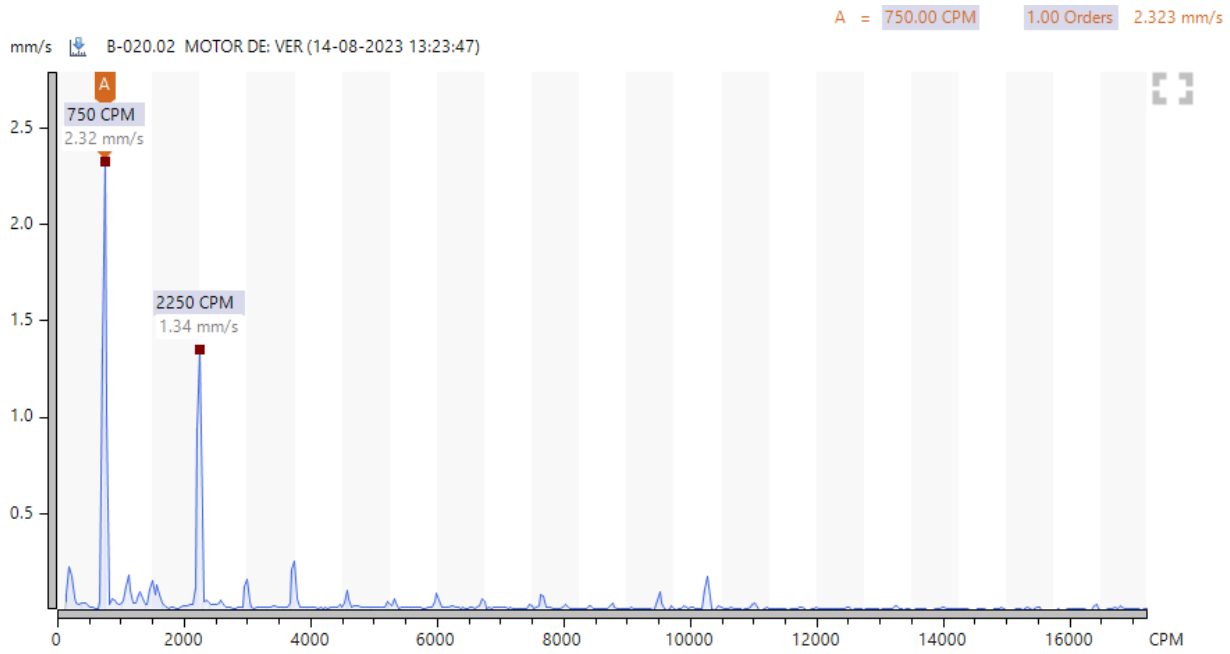
Measuring Results: 14.08.2023

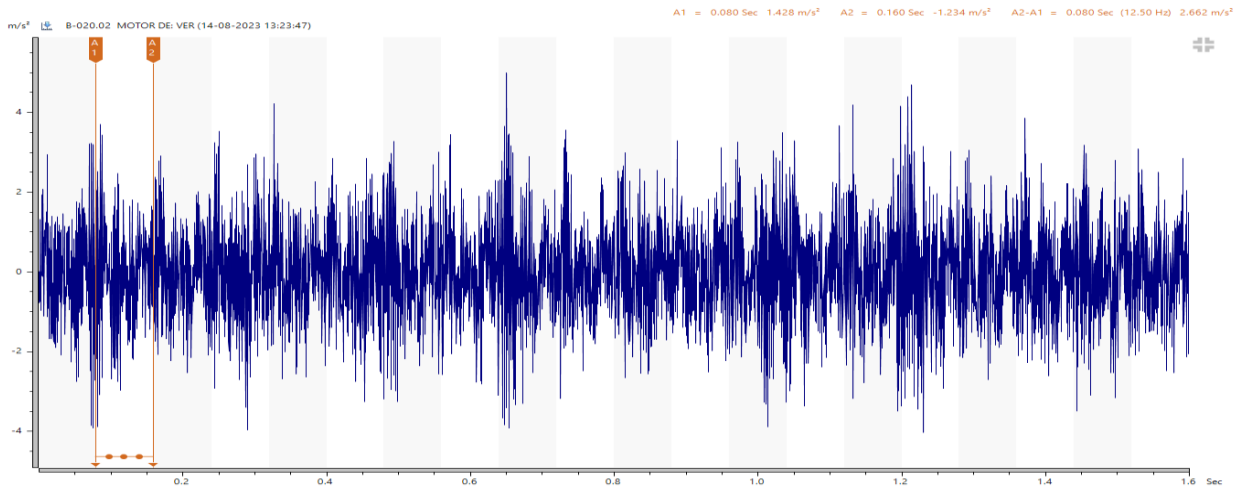
Location	Velocity (RMS)			Acceleration(RMS)		
	Horizontal	Vertical	Axial	Horizontal	Vertical	Axial
PD FAN-2 MNDE	0.91	1.06	**2.59**	0.71	0.71	1.81
MOTOR DE	1.93	2.83	2.08	0.74	0.95	0.91
FAN DE	2.45	2.75	**8.09**	0.95	0.84	1.84
FAN NDE	1.21	0.75	2.99	0.64	0.60	0.71

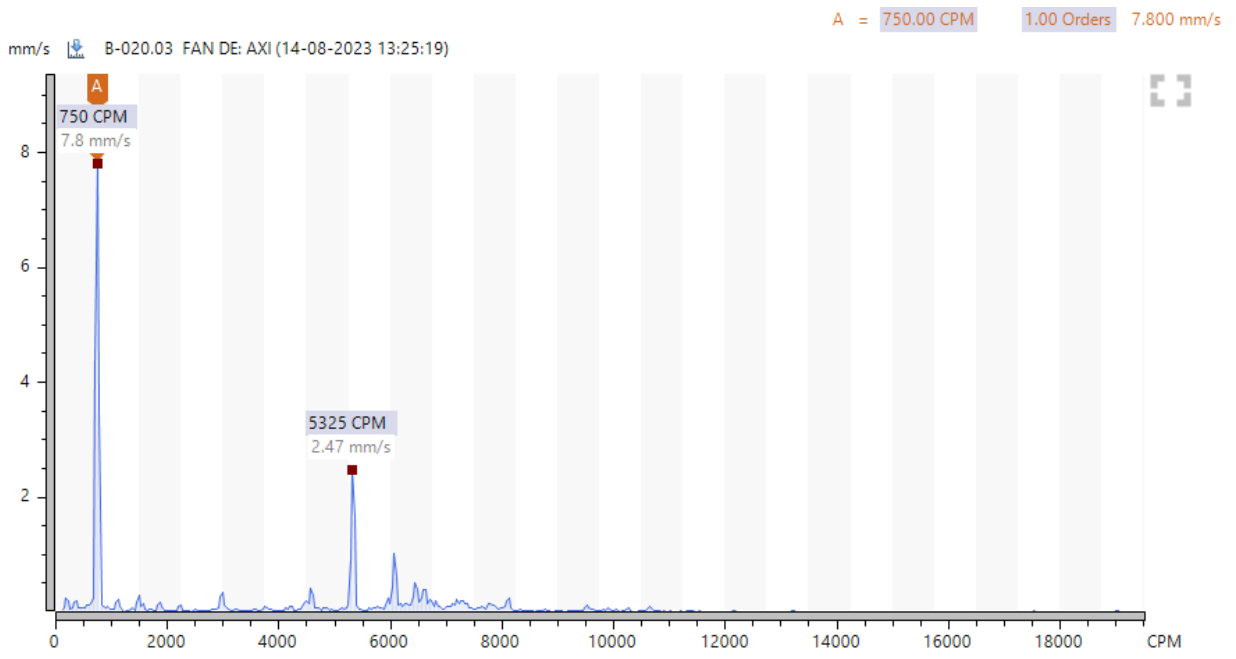
Overall Vibration Readings:

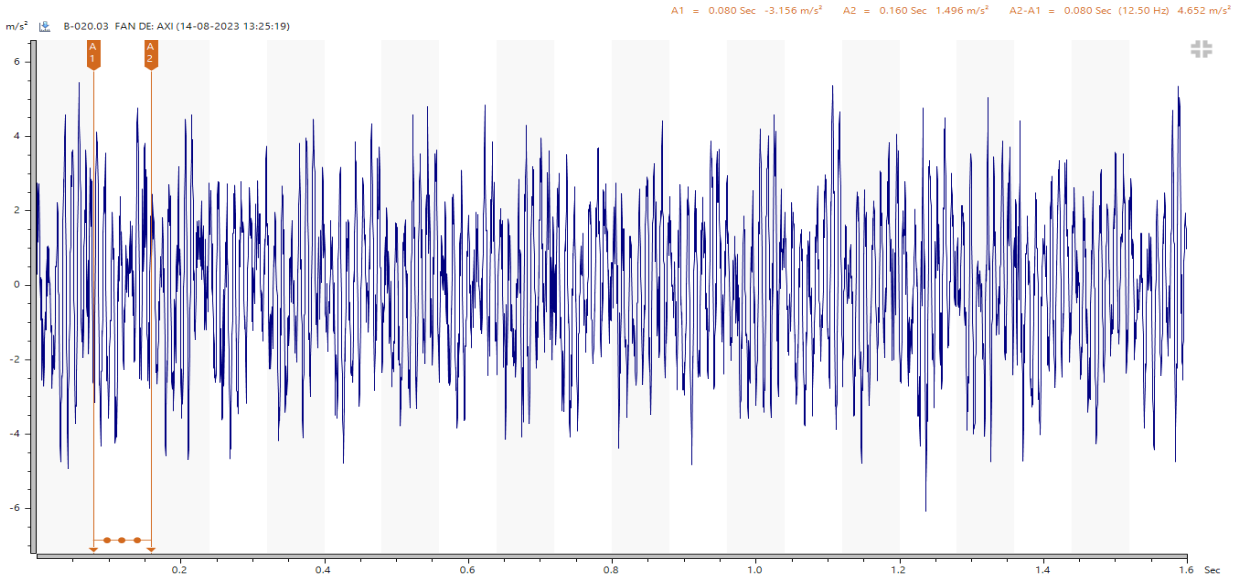
The maximum overall vibration amplitude recorded was **2.59** mm/sec in Axial direction at Motor NDE; **8.09** mm/sec in axial direction at Fan DE, bearings

Vibration Spectrum,

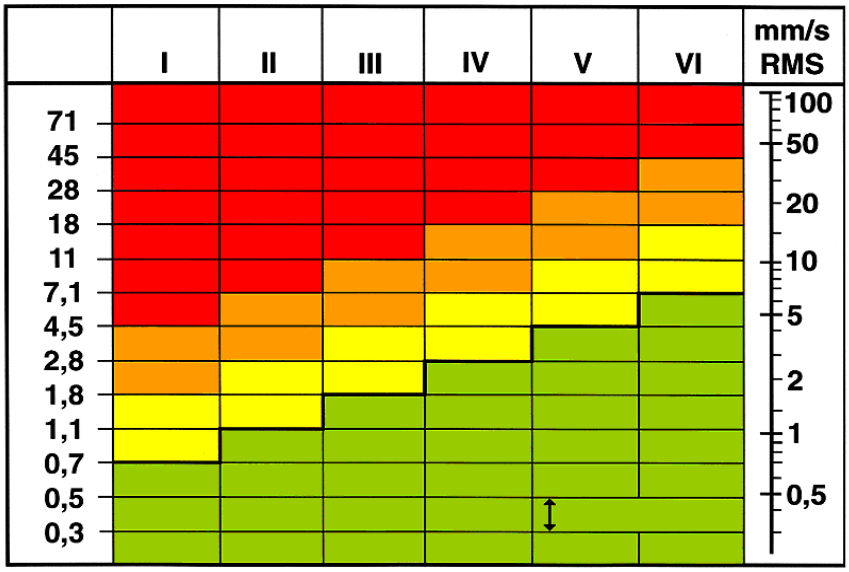





A = 750.00 CPM 1.00 Orders 7.800 mm/s
mm/s B-020.03 FAN DE: AXI (14-08-2023 13:25:19)
A
750 CPM
7.8 mm/s
5325 CPM
2.47 mm/s
8
6
4
2
0
2000
4000
6000
8000
10000
12000
14000
16000
18000
CPM


A1 = 0.080 Sec -3.156 m/s² A2 = 0.160 Sec 1.496 m/s² A2-A1 = 0.080 Sec (12.50 Hz) 4.652 m/s²
m/s² B-020.03 FAN DE: AXI (14-08-2023 13:25:19)
A 1
A 2
6
4
2
0
-2
-4
-6
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
Sec

Vibration Limits As per ISO 10816 Standards



VIBRATION LIMITS AS PER ISO 10816 STANDARDS (Velocity in mm/sec-RMS)

Machine class: 1

Individual parts of engines and machines integrally connected with the complete machine in its normal operating condition. (Production electrical motors of up to 15 kW are typical examples of machines in this category.)

As Per ISO 10816 Standard Class I machines

Standard Vibration Level	Machine Condition
Up to 1.8 mm/sec.	Normal
1.8 to 4.5 mm/sec.	Marginal
Above 4.5 mm/sec.	Critical

Machine class: 2

Medium-sized machines, (typically electrical motors with 15 to 75 kW output) without special foundations, rigidly mounted engines or machines (up to 150 kW) on special foundations.

As Per ISO 10816 Standard Class II machines

Standard Vibration Level	Machine Condition
Up to 2.8 mm/sec.	Normal
2.8 to 7.1 mm/sec.	Marginal
Above 7.1 mm/sec.	Critical

Machine class: 3

Large prime movers and other large machines with rotating masses on rigid and heavy foundations, which are relatively stiff in the direction of vibration measurement

As Per ISO 10816 Standard Class III machines

Standard Vibration Level	Machine Condition
Up to 4.5 mm/sec.	Normal
4.5to 11.2 mm/sec.	Marginal
Above 11.2 mm/sec.	Critical

Machine class: 4

Large prime movers and other large machines with rotating masses on foundations, which are relatively soft in the direction of vibration measurement (for example turbo generator sets, especially those with lightweight substructures)

As Per ISO 10816 Standard Class IV machines

Standard Vibration Level	Machine Condition
Up to 7.1 mm/sec.	Normal
7.1 to 18.0 mm/sec.	Marginal
Above 18.0 mm/sec.	Critical

Machine class: 5

Machines and mechanical drive systems with un balanceable inertia effects (due to reciprocating parts), mounted on foundations, which are relatively stiff in the direction of vibration measurement.

As Per ISO 10816 Standard Class V machines

Standard Vibration Level	Machine Condition
Up to 11.1 mm/sec.	Normal
11.1to 28.0mm/sec.	Marginal
Above 28.0 mm/sec.	Critical

Machine class: 6

Machines and mechanical drive systems with unbalanceable inertia effects (due to reciprocating parts), mounted on foundations which are relatively soft in the direction of vibration measurements; machines with rotating slack coupled masses such as beater shafts in grinding mills; machines, like centrifugal machines, with varying unbalances capable of operating as self contained units without connecting components; vibrating screens, dynamic fatigue-testing machines and vibration exciters used in processing plants.

As Per ISO 10816 Standard Class VI machines

Standard Vibration Level	Machine Condition
Up to 18.0 mm/sec.	Normal
18.0 to 45.0mm/sec.	Marginal
Above 45.0 mm/sec.	Critical