Vibration analysis Report

Date: 10/07/2025

Line-1 CEMENT MILL -2 Z2M06 CM2 LIFTING SIDE

Equipment details: -

Equipment No	**CM-2 Lifting side gear box**
Location	**L1 Cement mill-2**
Motor Capacity & Speed	**1800 & 993**
Gear box bearing Details input stage	**22330 CC / W33**
Gear box rpm ratio	**993 &140**
Gear box oil grade	**VG 320**
Equipment Mounting Type	**Rigid**

Subject: - On 03.05.2025, vibration readings were taken at the rated RPM of the above equipment, and it was observed that the gearbox input vibration and acceleration levels had increased.

Z2M06 CM2 LIFTING SIDE		26.03.25	29.03.25	05.04.25	13.04.25	18.04.25	28.04.25	03.05.25
MM/SEC (RMS)								
3H	GEAR BOX INPUT DE HORIZONTAL	4.818	4.859	4.543	6.506	5.398	5.295	5.499
3P	GEAR BOX INPUT DE PEAK VUE HORIZONTAL	0.877	0.945	1.312	1.11	1.277	0.867	1.174
3V	GEAR BOX INPUT DE VERTICAL	4.026	3.493	3.479	4.635	3.777	3.673	4.843
3A	GEAR BOX INPUT DE AXIAL	4.03	4.694	4.869	5.948	4.945	4.917	6.136
4H	GEAR BOX INPUT NDE HORIZONTAL	3.109	3.474	3.366	3.372	3.668	2.971	4.074
4P	GEAR BOX INPUT NDE PEAK VUE HORIZONTAL	0.401	0.399	0.536	0.76	0.519	0.541	0.791
4V	GEAR BOX INPUT NDE VERTCAL	3.166	3.987	3.259	3.135	2.962	2.65	4.168
4A	GEAR BOX INPUT NDE AXIAL	4.999	4.983	4.965	5.854	5.256	5.356	6.252

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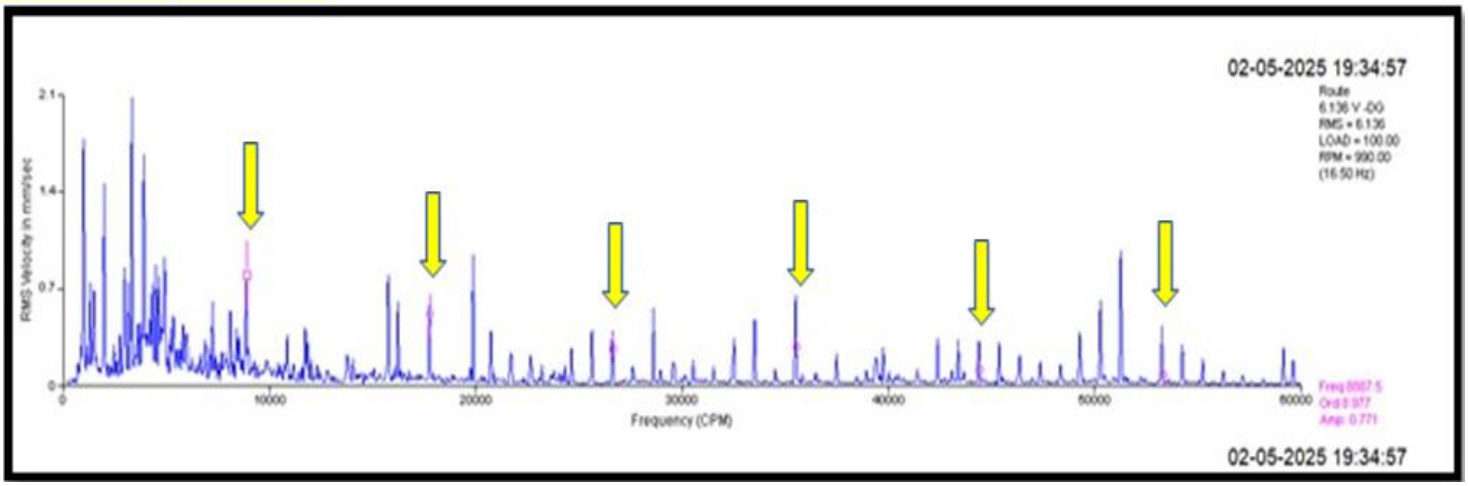
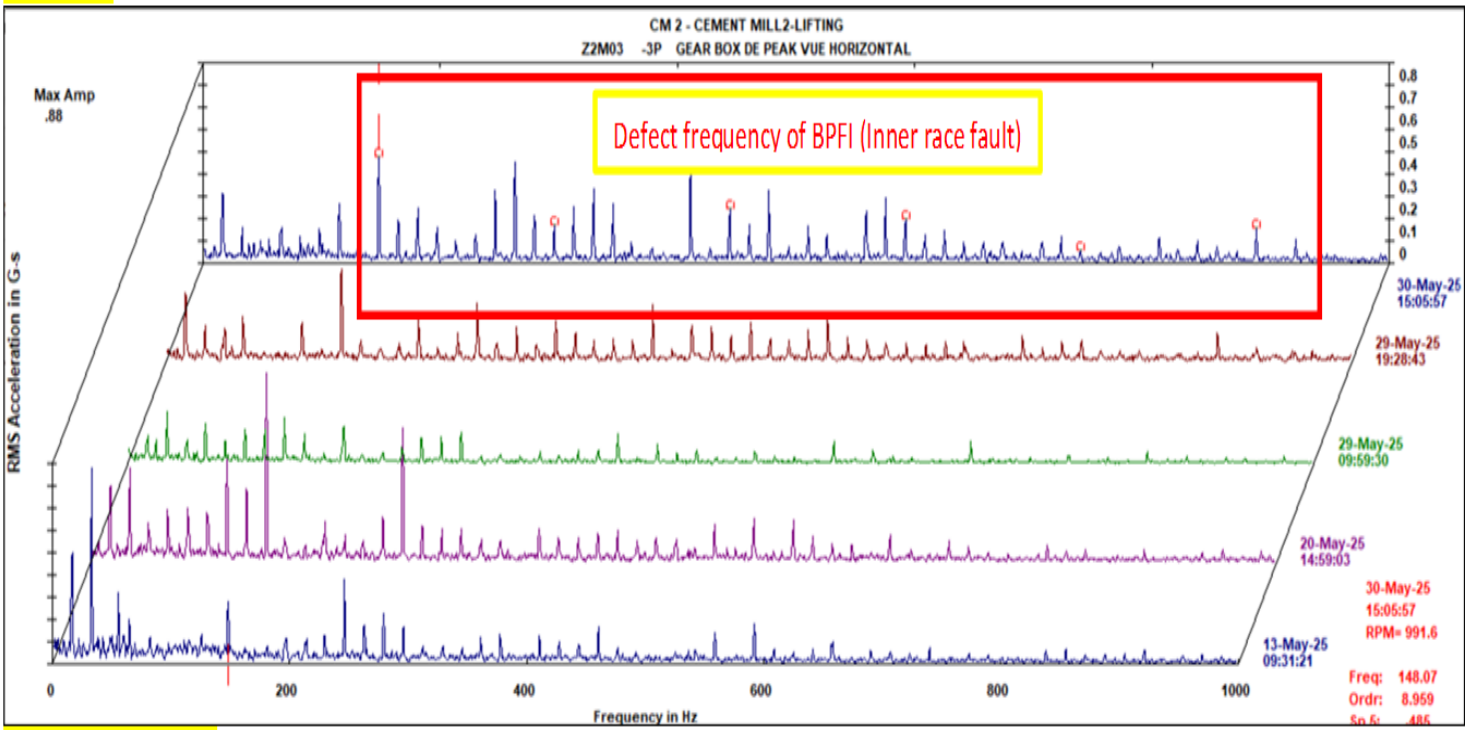
Acceleration spectrum: -



Waterfall spectrum: -



Analysis and Observations

1. The overall vibration level of the equipment is considered to be Un-satisfactory.
2. The FFT analysis reveals the presence of bearing defect frequency (non-synchronized with near BPFI) along with gear mesh frequency with sidebands associated with the first intermediate shaft.

Recommendations:

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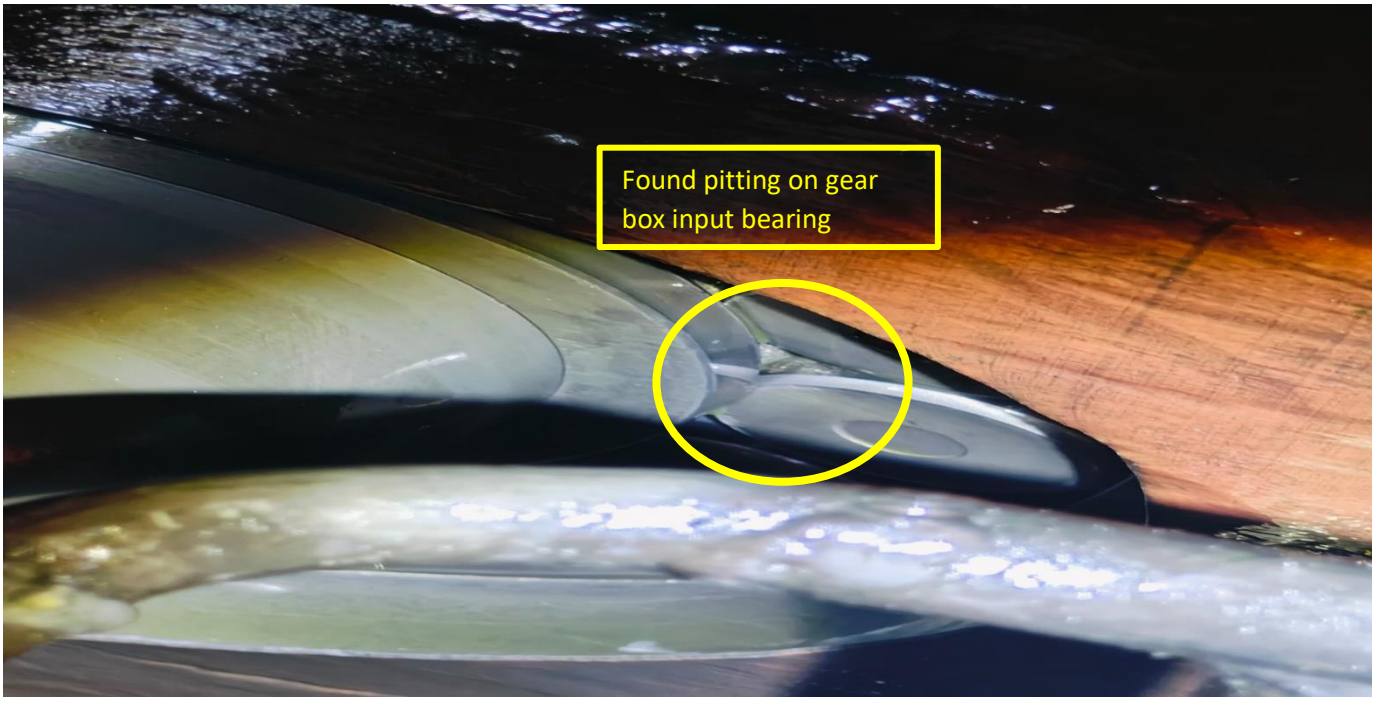
3. It is recommended to proactively initiate the procurement of gearbox input bearings in order to replace them during the next scheduled opportunity stoppage, thereby preventing unexpected failures.
4. Additionally, Please inspect the 1st intermediate bearing clearances.
5. Please Inspect the coupling with review the alignment from pinion to motor via gearbox.

On 30.05.2025 taken again the vibration. Found gear box input vibration and Acceleration levels are still increased trend.

Z2M06 CM2 LIFTING SIDE		03.05.25	29.05.25	30.05.25
MM/SEC (RMS)				
3H	GEAR BOX INPUT DE HORIZONTAL	5.499	5.709	6.218
3P	GEAR BOX INPUT DE PEAK VUE HORIZONTAL	1.174	1.404	1.803
3V	GEAR BOX INPUT DE VERTICAL	4.843	4.239	4.599
3A	GEAR BOX INPUT DE AXIAL	6.136	6.508	6.397
4H	GEAR BOX INPUT NDE HORIZONTAL	4.074	3.515	3.287
4P	GEAR BOX INPUT NDE PEAK VUE HORIZONTAL	0.791	1.043	1.901
4V	GEAR BOX INPUT NDE VERTCAL	4.168	3.25	3.724
4A	GEAR BOX INPUT NDE AXIAL	6.252	6.413	6.284

On 14.06.2025 we conducted the gear box inspection found gear box input bearing severe pitting on bearing inner race

Effected bearings images :-



As per the vibration analysis report, the concerned team proceeded with the replacement of the gearbox on 06.07.2025, followed by the successful completion of laser alignment. Subsequent to these actions, vibration readings were conducted on 08.07.2025, which were found to be within acceptable limits.

Final vibration & Acceleration readings: -

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Z2M06 CM2 LIFTING SIDE		01.07.25	08.07.25
1H	MOTOR NDE HORIZONTAL	1.980	0.909
1P	MOTOR NDE PEAK VUE HORIZONTAL	0.074	0.057
1V	MOTOR NDE VERTICAL	1.538	0.553
1A	MOTOR NDE AXIAL	1.396	1.130
2H	MOTOR DE HORIZONTAL	2.375	0.962
2P	MOTOR DE PEAK VUE HORIZONTAL	0.071	0.145
2V	MOTOR DE VERTICAL	3.211	1.140
2A	MOTOR DE AXIAL	1.555	0.781
3H	GEAR BOX INPUT DE HORIZONTAL	8.043	5.930
3P	GEAR BOX INPUT DE PEAK VUE HORIZONTAL	2.342	0.376
3V	GEAR BOX INPUT DE VERTICAL	5.303	3.135
3A	GEAR BOX INPUT DE AXIAL	8.063	6.412
4H	GEAR BOX INPUT NDE HORIZONTAL	4.948	5.150
4P	GEAR BOX INPUT NDE PEAK VUE HORIZONTAL	1.580	0.701
4V	GEAR BOX INPUT NDE VERTCAL	3.640	3.390
4A	GEAR BOX INPUT NDE AXIAL	7.093	5.704
5H	GB INTER DE HORIZONTAL	5.404	5.821
5P	GB INTER DEPEAK VUE HORIZONTAL	1.575	0.439
5V	GB INTER DE VERTICAL	3.901	2.447
5A	GB INTER DE AXIAL	4.890	4.719
6H	GB INTER NDE HOR	6.843	4.613
6P	GB INTER PEAK VUE NDE HOR	1.125	0.902
6V	GB INTER NDE VERT	3.654	3.555
6A	GB INTER NDE AXIAL	7.060	4.933
7H	GEAR BOX OUTPUT DE HORIZONTAL	5.429	6.081
7P	GEAR BOX OUTPUT DE PEAK VUE HORIZONTAL	1.252	0.347
7V	GEAR BOX OUTPUT DE VERTICAL	2.966	3.687
7A	GEAR BOX OUTPUT DE AXIAL	5.004	5.951
8H	GEAR BOX OUTPUT NDE HORIZONTAL	4.284	5.210
8P	GEAR BOX OUTPUT NDE PEAK VUE HORIZONTAL	0.882	0.453
8V	GEAR BOX OUTPUT NDE VERTICAL	2.752	4.629
8A	GEAR BOX OUTPUT NDE AXIAL	6.901	7.923
9H	PINION DE HORIZONTAL	3.196	3.310
9P	PINION DE PEAK VUE HORIZONTAL	0.222	0.223
9V	PINION DE VERTICAL	3.184	3.033
9A	PINION DE AXIAL	3.656	3.236
10H	PINION NDE HORIZONTAL	2.913	2.769
10P	PINION NDE PEAK VUE HORIZONTAL	0.160	0.169
10V	PINION NDE VERTICAL	3.182	2.997
10A	PINION NDE AXIAL	3.952	2.499

After correction:

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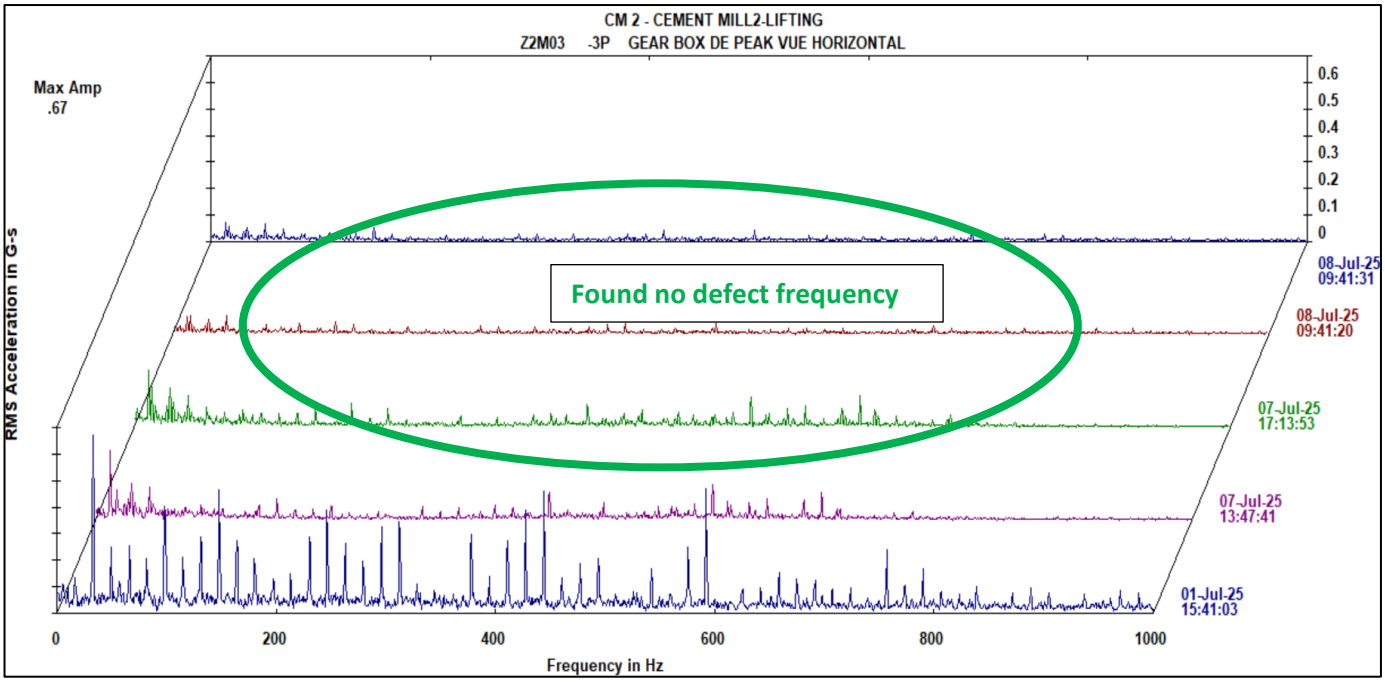

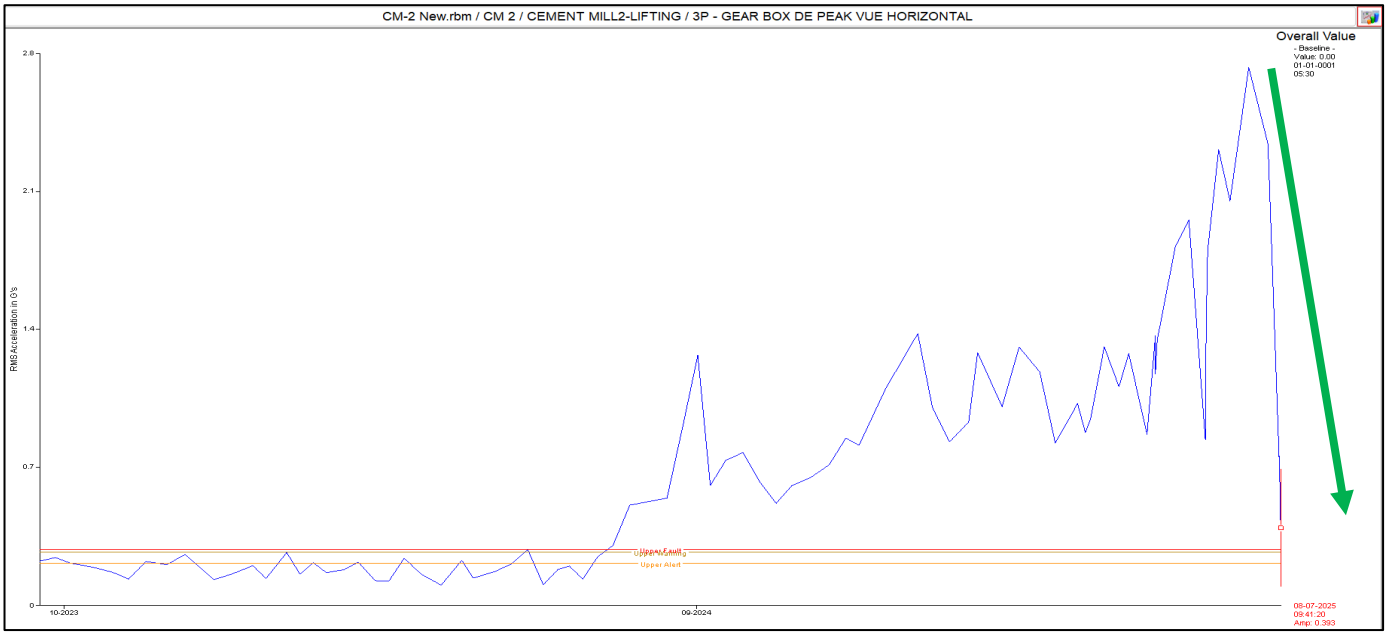

Current/Final Status:

- Following the replacement of the affected bearing gearbox, acceleration levels have decreased from 8.5 to 5.91 mm/sec at the input, and acceleration has reduced from 3.5 to 0.37g.
- These levels are within the acceptable range, demonstrating that the corrective actions have been successful.
- Continuous monitoring will be maintained to ensure sustained equipment performance and to promptly identify any potential issues.

Final Results: Normal

We extend our sincere gratitude to the concerned team for their invaluable support.