

Case study of Rotor Bar Crack in Cooler Fan (180 KW)

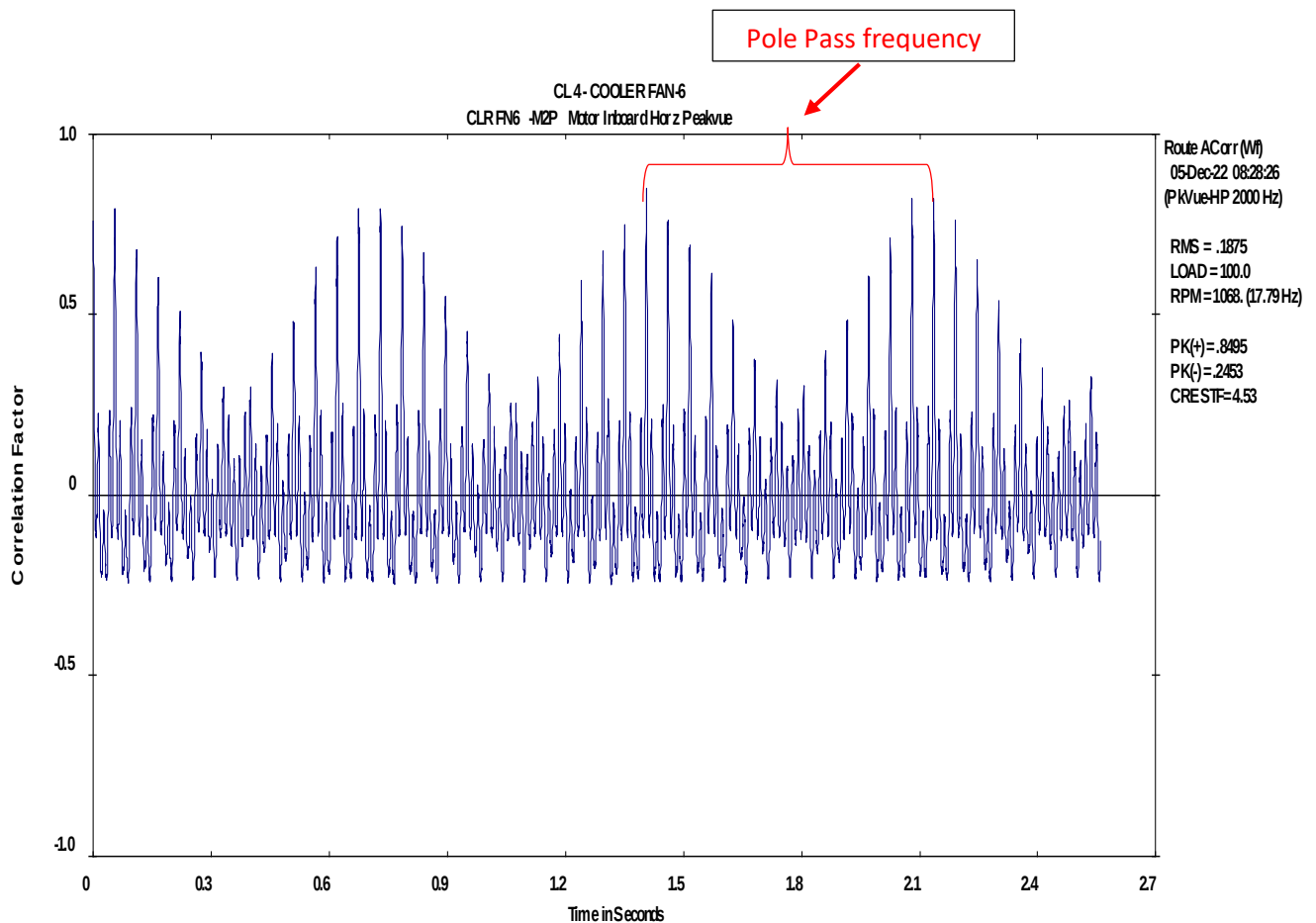
Instrument: CSI 2140.

Software: AMS Machinery Manager

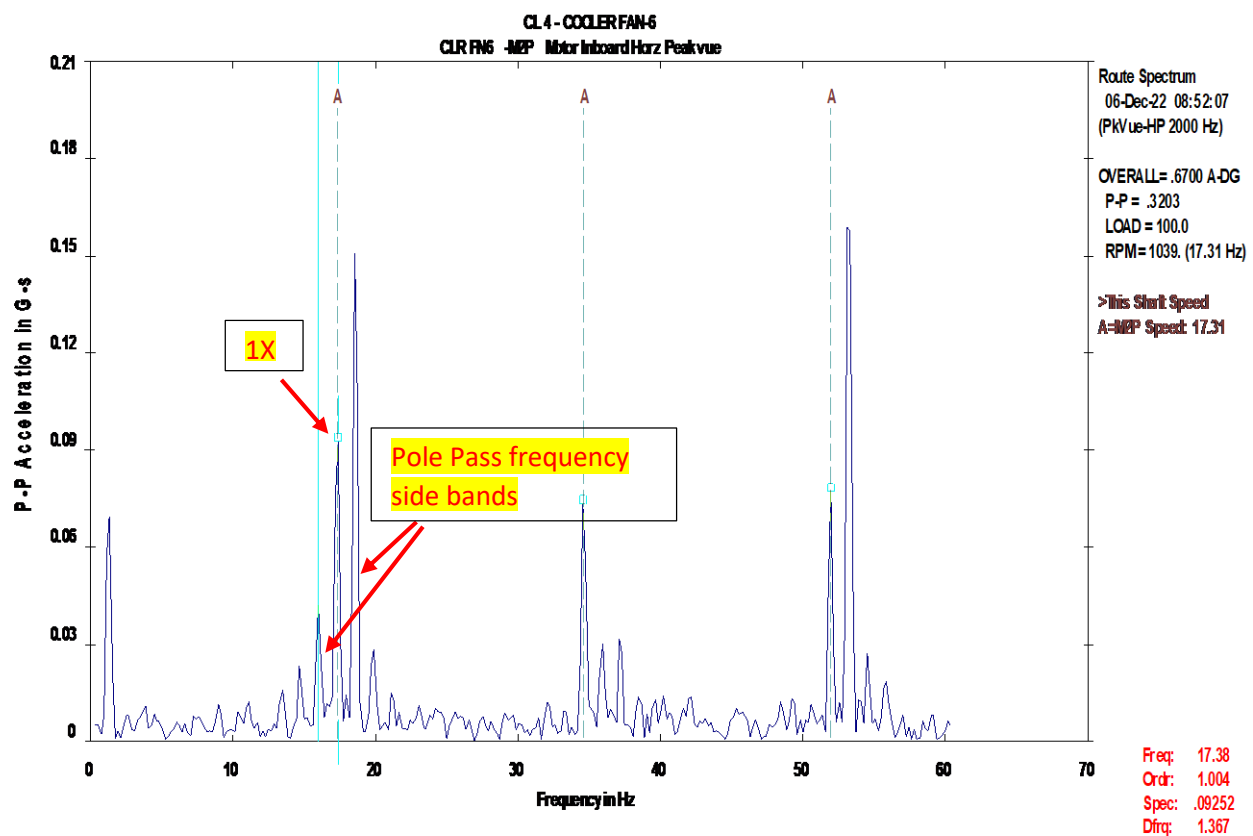
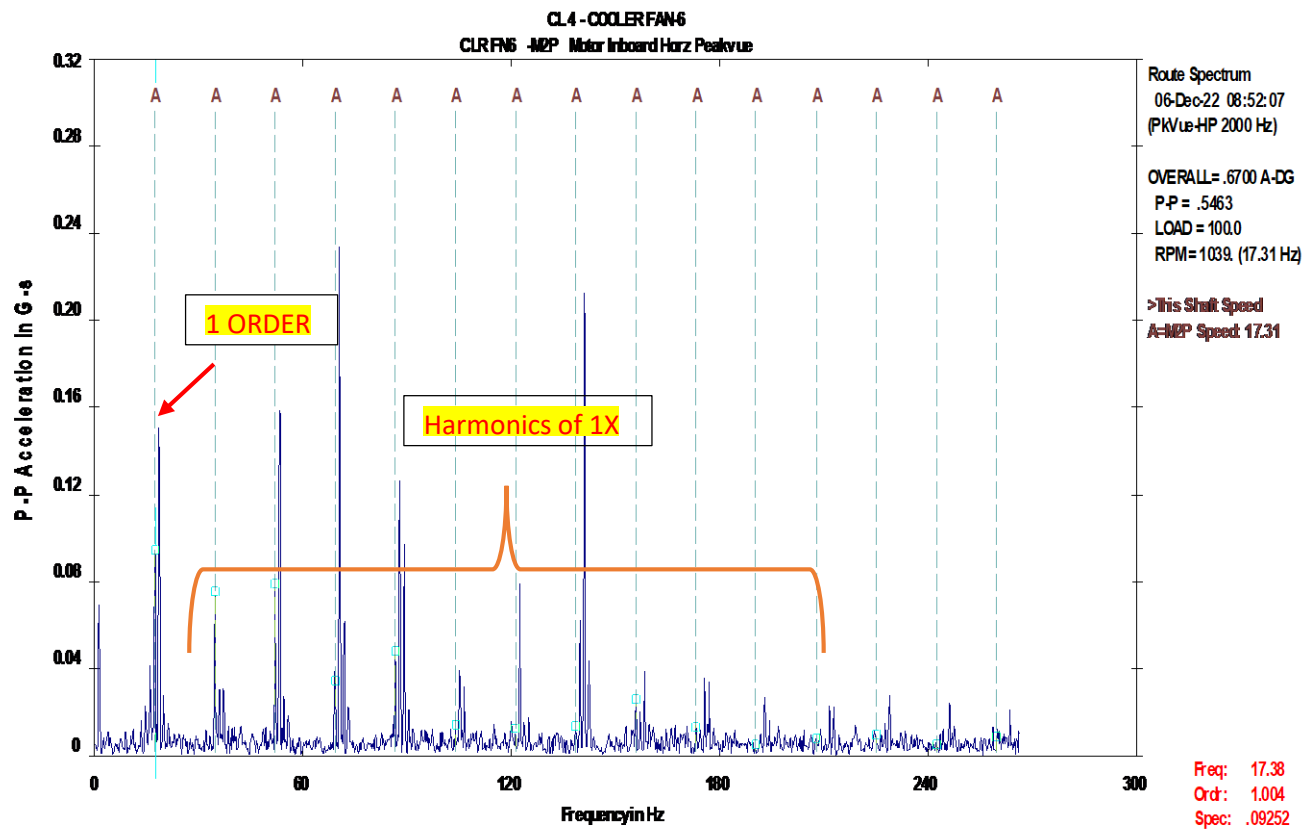
Before Maintenance: Readings as on: 05.12.2022 (Motor Replaced in shutdown)

Location	MNDE	MDE	FDE	FNDE
H	2.6	2.6	0.6	0.7
V	0.9	0.6	0.2	0.3
A	0.8	0.4	0.4	0.6

Auto correlated Time wave form: Motor Drive End side



Spectrum: Motor Drive End side:



Observation: Vibrations readings found normal, but vibration spectrum and time waveform is indicating 1X harmonics with PPF sidebands and beatings in timewavform with PPF.

As per above spectrum and TWF suspected rotor bar crack. For confirmation conducted MCSA.

MOTOR CURRENT SIGNATURE ANALYSIS (MCSA):

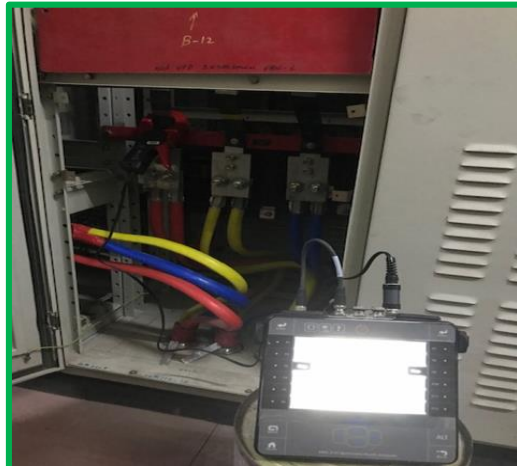
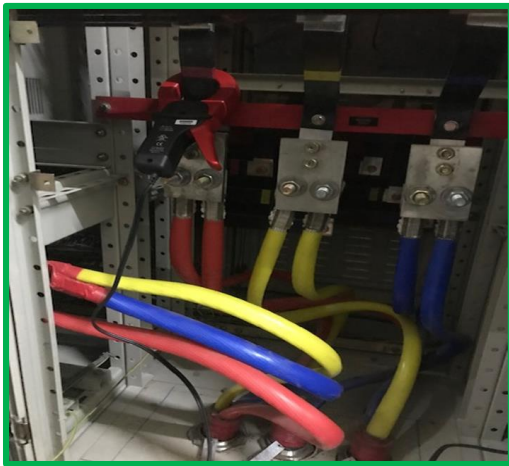
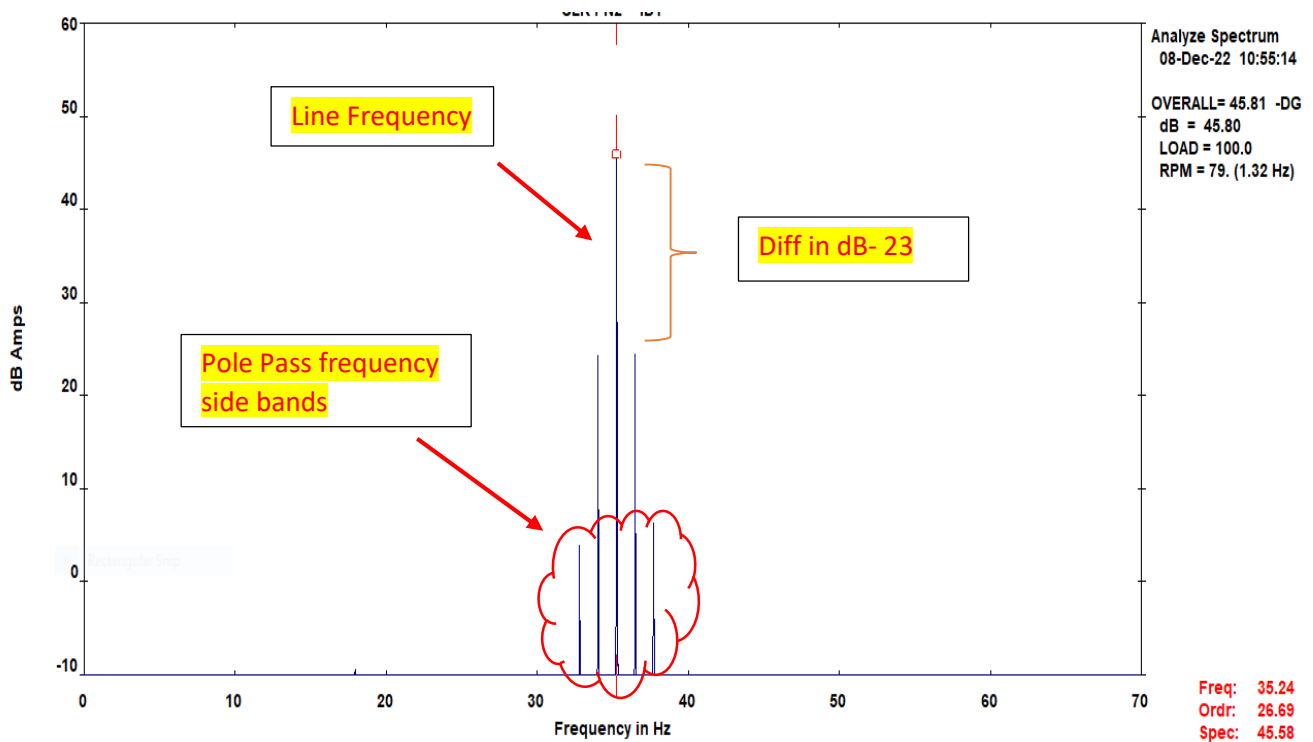


Figure 1&2 conducting MCSA



MCSA Severity chart: dB difference: > 60: Excellent, 54-60: Good, < 48-54: Moderate,

42-48: Cracked bars, 36-42, broken rotor bar, 30-36: Multiple cracks, <30: severe rotor faults.

Observation:

- Difference in dB level is 23 in MCSA, which is indicating severe rotor bar crack.

Recommendation: In view of the above diagnosis, it is recommended to replace the motor and check the Motor for rotor bars defect.

Findings after inspection: Inspected motor on 2.2.23 and observed Cracks on Rotor.

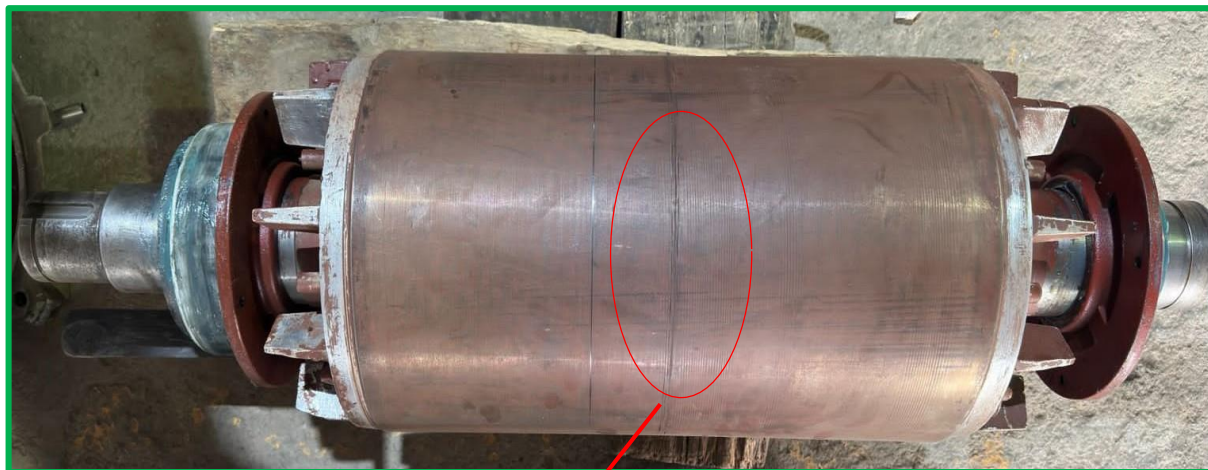


Figure 3# Rotor



Figure 4# Rotor crack in close view

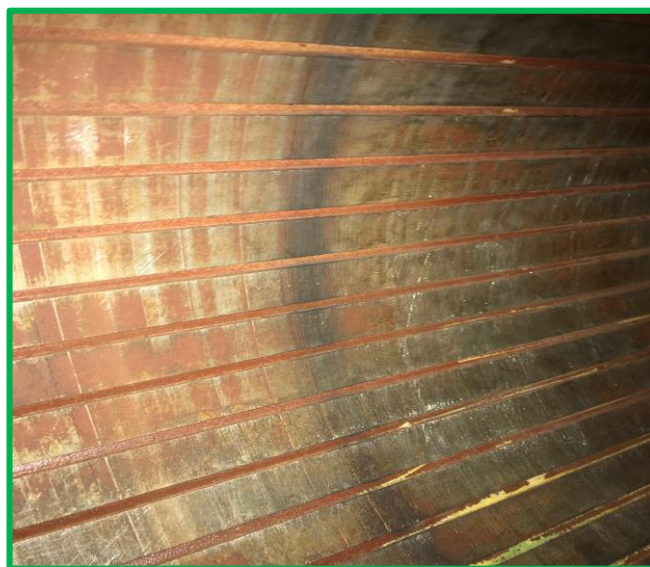


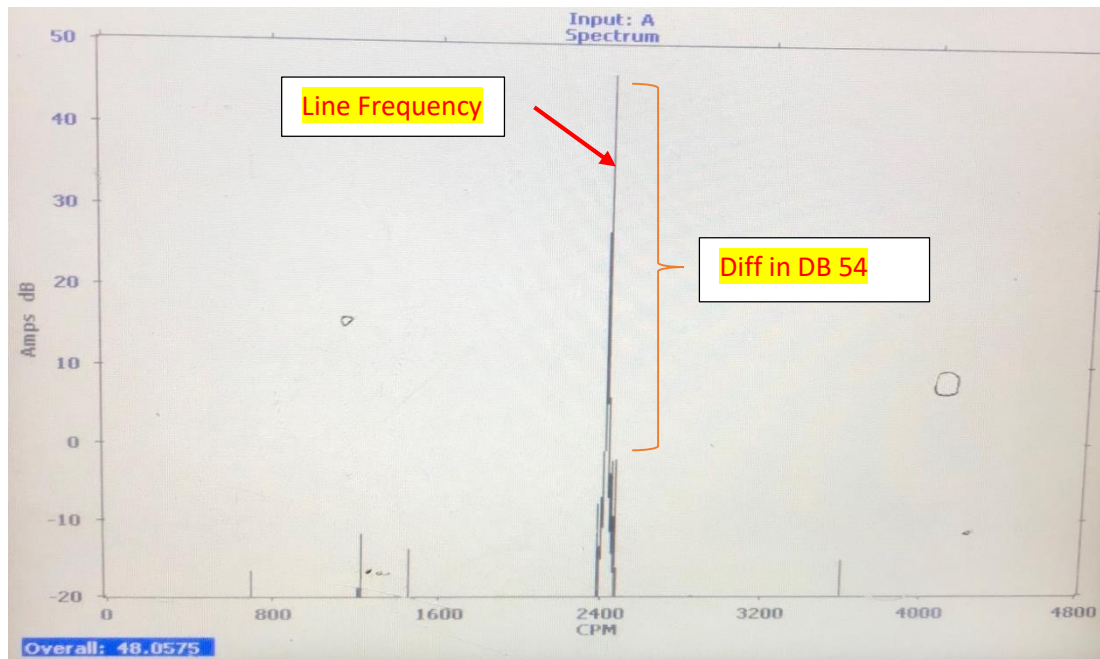
Figure 5# Motor stator

After Motor replacement:

Vibration Readings after replacement of Motor:

Location	MNDE	MDE	FDE	FNDE
H	1.2	1.4	0.7	0.8
V	0.5	0.6	0.3	0.3
A	1.0	0.8	0.5	0.7

MCSA readings after Motor replacement:



Observations: dB difference is 54, indicating healthy rotor condition.

Conclusion:

1. Spectrum and TWF indicating 1X harmonics with PPF sidebands, suspected rotor defect.
2. MCSA done found 23 dB difference, confirmed rotor defects.
3. Inspected Motor rotor found rotor crack.
4. Replaced the motor.
5. Motor vibrations reduced from 2.6 to 1.4 mm/s (RMS).