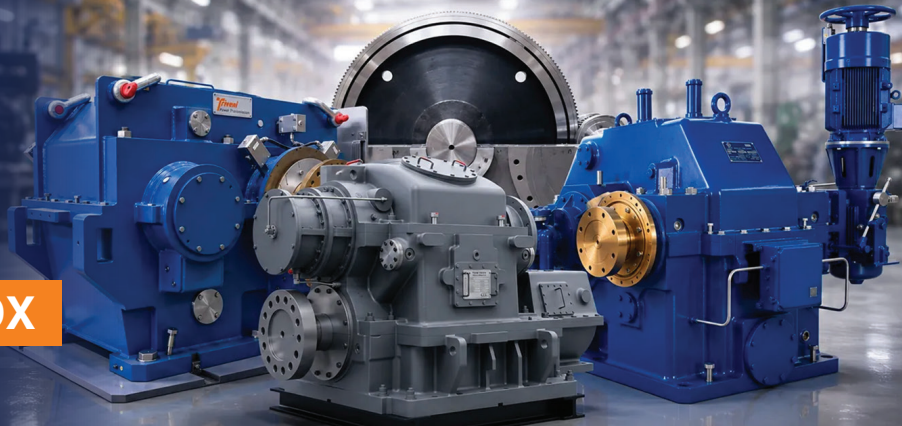


STEAM TURBINE GEARBOX (SUGAR –NORTH INDIA)



1 TECHNICAL DATA:

Power	26,895 KW
Type	Speed Reducer
Input / Output Speed	6828 / 1500 rpm
Ratio	1 : 4.55
Service Factor	1.3 (AGMA)
Make	Flender
Year of Commissioning	2020

2 PREAMBLE / PROBLEM REPORTED

The gearbox experienced frequent failures of the high-speed shaft (HSS) NDE bearing within two years of operation. These repeated failures resulted in elevated bearing temperatures, unplanned shutdowns, and reduced plant reliability.

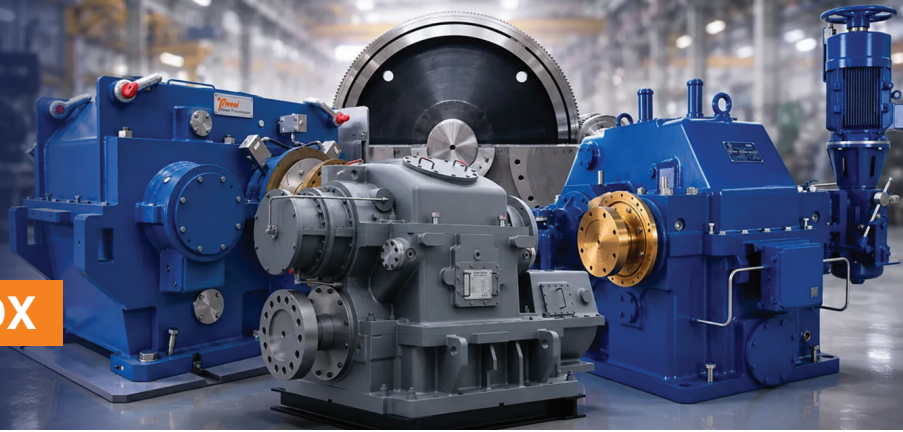
3 DIAGNOSTICS STEPS UNDERTAKEN / OBSERVATIONS MADE

A detailed inspection and operational assessment revealed the following:

- Pinion NDE bearing temperature reached up to 110°C at a load of 17 MW
- White metal layer rupture and peeling from the bearing shell
- Shaft to bearing blue bedding showed evidence of localized loading towards the gear teeth side
- Casing bore skew resulting in taper contact at the pinion NDE bearing
- Bearing clearances were initially within design limits prior to trial run
- Alignment of high-speed and low-speed shafts was found within OEM tolerances

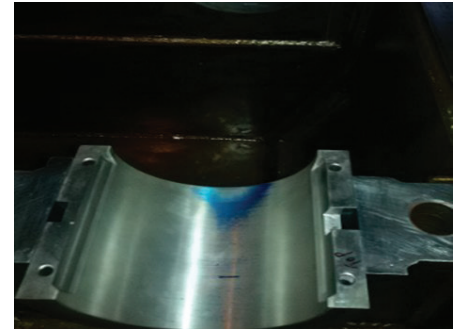


STEAM TURBINE GEARBOX (SUGAR –NORTH INDIA)



4 ANALYSIS

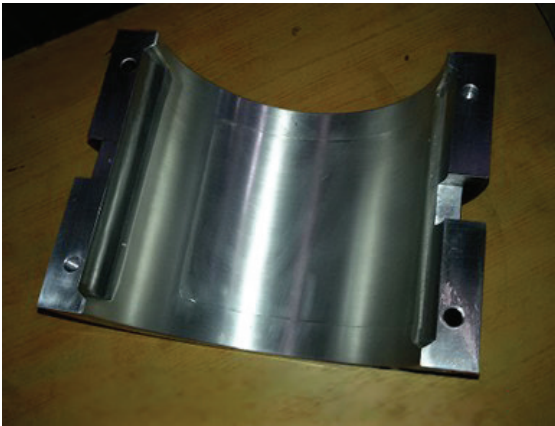
- The root cause was identified as side loading of the offset bearing due to misalignment effects
- Offset bearings are inherently more sensitive to shaft positioning and alignment variations compared to pressure dam bearings
- Localized contact near the joint line resulted in increased load per unit area, leading to excessive stress
- This condition led to elevated operating temperatures and repetitive bearing failures



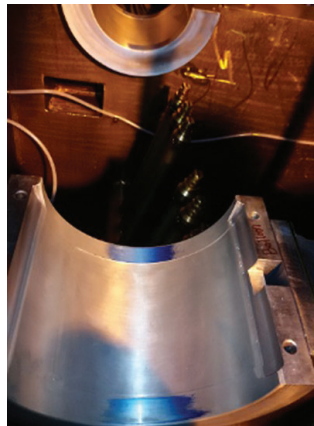
5 SOLUTION OFFERED / ACTION TAKEN

Triveni implemented improved design and corrective measures to enhance bearing performance:

- Replaced the offset bearing design with pressure dam bearings, which are less sensitive to misalignment
- Corrected pinion journal contact through precision scraping and polishing
- Performed gearbox alignment as per standard protocol
- Conducted full-load trial runs to validate performance



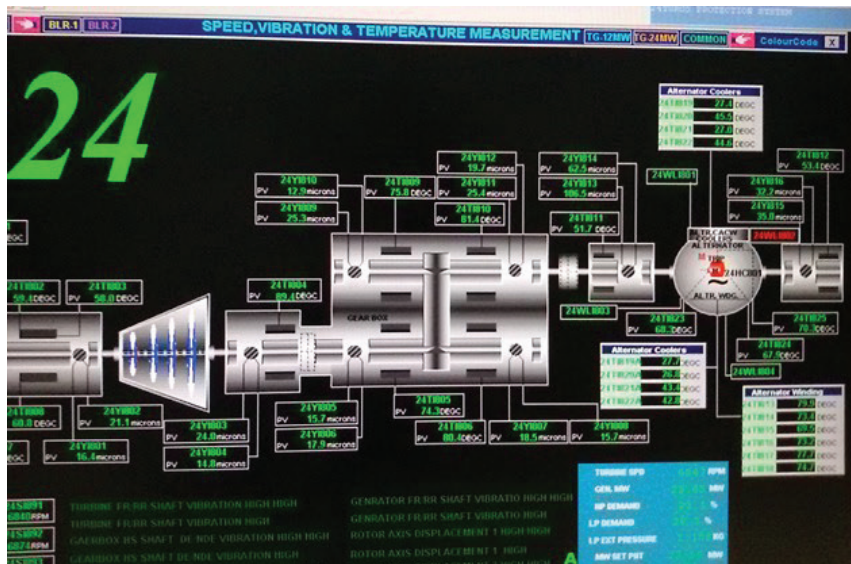
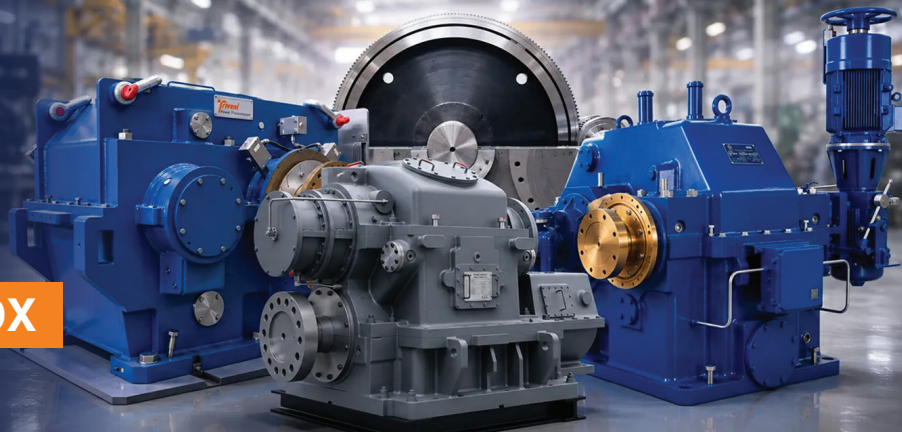
PRESSURE DAM BEARING



Post-implementation observations:

- Bearing temperatures stabilized within acceptable limits
- Vibration levels remained normal
- Overall gearbox performance improved significantly

STEAM TURBINE GEARBOX (SUGAR –NORTH INDIA)



6 CONCLUSION

The gearbox was successfully **refurbished and recommissioned**, restoring reliable operation.

The implemented solution ensured:

- Elimination of frequent high-speed bearing failures
- Improved reliability through advanced bearing design
- Stable operating temperatures and vibration levels
- Consistent performance with all parameters within permissible limits



7 OUTCOME

The gearbox has been operating reliably since recommissioning, delivering improved stability and long-term performance.