



BOOSTER PUMP GEARBOX (IPP – INDIA)

1 TECHNICAL DATA:

Power	671 KW
Type	Speed Reducer
Input/Output Speed	5720 / 1494 RPM
Application	Booster Pump
Make	German
Year of Commissioning	2002

2 PREAMBLE / PROBLEM REPORTED

Premature gear failures were reported in the booster pump gearbox, leading to reduced system reliability and frequent maintenance interventions.

To restore dependable operation, the customer approached Triveni for a robust and long-term engineering solution.

3 DIAGNOSTICS STEPS UNDERTAKEN / OBSERVATIONS MADE

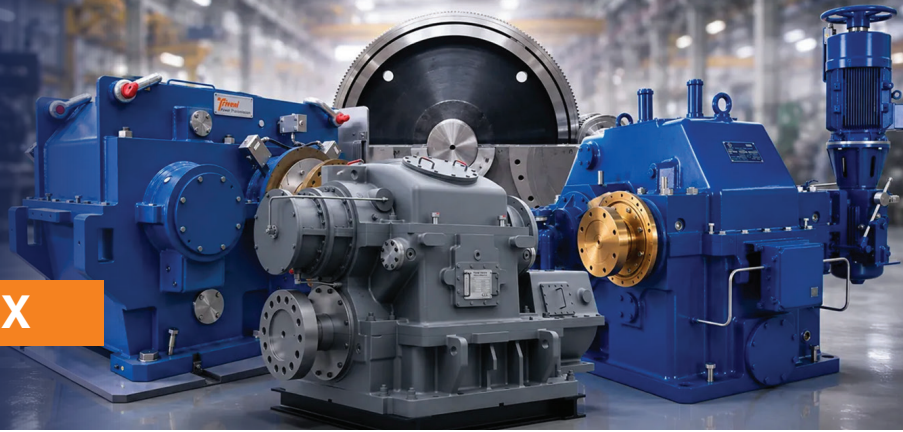
A detailed inspection and technical evaluation revealed the following:

- Severe pitting observed on the high-speed shaft (HSS) coupling-side helix
- Minor pitting and wear on the low-speed shaft (LSS)
- Wear marks identified on tilting pad thrust bearings
- Gearbox casing dowelling was found to significantly influence load distribution across gear elements.

4 ANALYSIS:

- The root cause was identified as helix-bound operation, resulting in overloading of one side of the gear
- This led to uneven load distribution, causing localized stress, excessive wear, and premature failure
- Thermal expansion of the gearbox casing contributed to one-sided loading on the HSS bearing, further aggravating the condition

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5 SOLUTION OFFERED / ACTION TAKEN:

Triveni implemented a design-focused solution to eliminate the root cause and improve system reliability:

- Designed a new gearbox with enhanced axial float to accommodate thermal growth
- Ensured controlled axial float in the pinion shaft coupling, maintaining the gear mesh at the center of float range
- Optimized casing dowelling (at the HSS end only) to prevent asymmetric loading due to thermal expansion
- Manufactured and assembled new gearsets and bearings with improved load distribution characteristics



6 CONCLUSION:

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

The implemented solution ensured:

- Elimination of premature gear failures
- Balanced load distribution across gear helices
- Improved axial float management and thermal compensation
- Stable operation with all parameters within permissible limits

7 OUTCOME:

The gearbox has been operating reliably since recommissioning, delivering improved durability and consistent performance.