



COMPRESSOR GEARBOX (FERTILIZER NORTH – INDIA)

1 TECHNICAL DATA:

Power	4.5 MW
Type	Speed Increaser
Input/Output Speed	1485 / 9900 RPM
Application	Fertilizer Compressor
Make	German
Year of Commissioning	1992

2 PREAMBLE / PROBLEM REPORTED

Gear internal failure was reported within six months of repair by a local agency, resulting in repeated shutdowns and significant reliability issues.

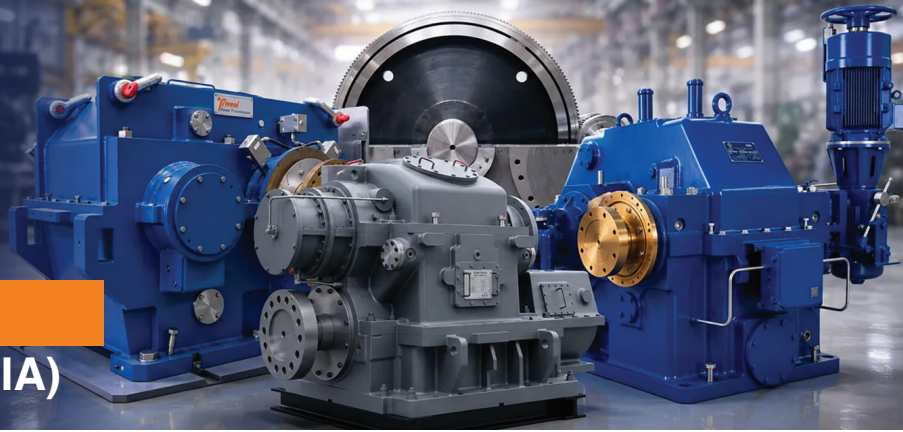
To address the recurring failures and ensure long-term performance, the customer approached Triveni for a robust and sustainable solution.

3 DIAGNOSTICS STEPS UNDERTAKEN / OBSERVATIONS MADE

A comprehensive inspection and condition assessment identified the following:

- White metal rupture in the planet pin bearings, indicating severe load-related distress
- Resultant damage to planet gears and ring gears
- High casing vibration levels during operation
- Failure of the leaf spring pack, affecting system stability





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4 ANALYSIS:

- The root cause was identified as overloading of bi-metal pin bearings, which were inadequate for the operating load conditions
- Insufficient load-carrying capacity led to bearing rupture, triggering cascading damage to gears
- Repeated failures were attributed to non-uniform load distribution and inadequate system stiffness

5 SOLUTION OFFERED / ACTION TAKEN:

Triveni implemented a comprehensive design upgrade to enhance load capacity & system stability:

- Introduced tri-metal pin bearings with significantly higher load-carrying capability
- Ensured individual balancing of planet gears and planet carrier with pins for uniform load distribution
- Optimized axial positioning of the ring gear to achieve balanced load sharing
- Designed and installed a new leaf spring with optimized stiffness characteristics



6 CONCLUSION:

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

The implemented solution ensured:

- Elimination of failures caused by bi-metal bearing overload.
- Improved load distribution through balanced gear assemblies.
- Enhanced stiffness and stability of the system.
- Stable operation with all parameters within permissible limits.

7 OUTCOME:

The gearbox has been operating reliably since recommissioning, with improved durability and performance. The complete solution was delivered within 24 weeks, ensuring minimal operational disruption.