

STEAM TURBINE GEARBOX (STEEL PLANT-INDIA)



1 TECHNICAL DATA:

Power	42 MW
Type	Speed Reducer
Input/Output Speed	7063 / 1500 RPM
Application	Steam Turbine Generator
Make	French
Year of Commissioning	2013

2 PREAMBLE / PROBLEM REPORTED

Premature failure of the gear set was reported in the steam turbine generator (STG) gearbox, leading to abnormal operation and unplanned shutdown.

The customer approached Triveni to provide a reliable and long-term replacement solution.

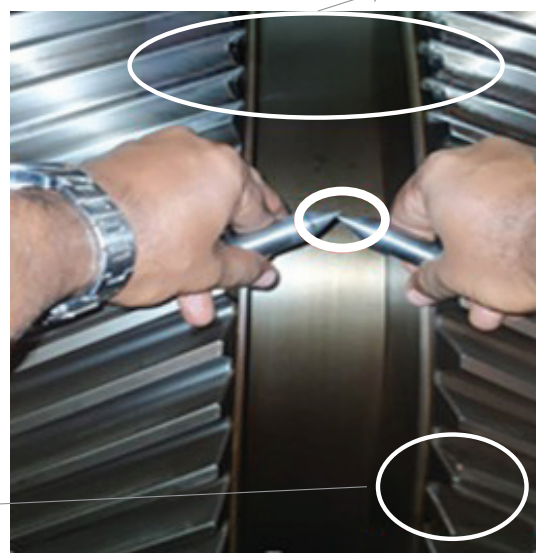
3 DIAGNOSTICS STEPS UNDERTAKEN / OBSERVATIONS MADE

A detailed inspection and technical evaluation revealed the following:

- Gear tooth damage localized on one side of the helix, indicating uneven load distribution
- Relative rotation between left-hand helix (LHH) and right-hand helix (RHH) by approximately 2 mm
- Load contact observed predominantly on only one helix, confirming imbalance in load sharing

2mm Mismatch Observed

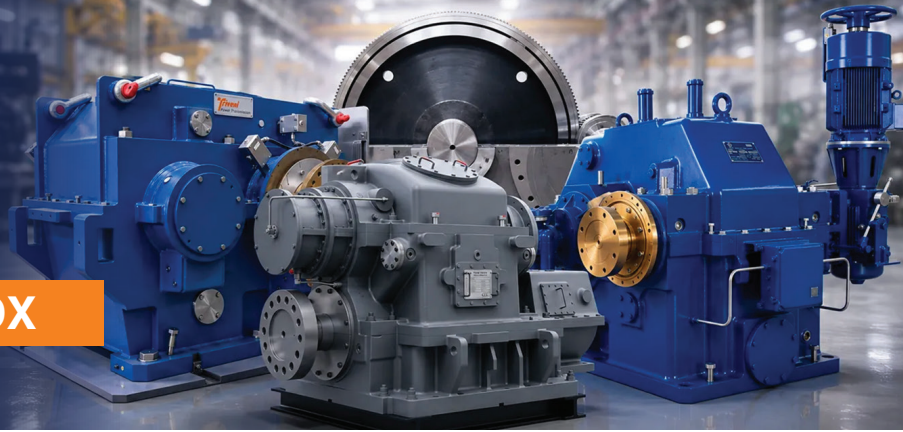
LHH



4 ANALYSIS:

- The root cause was identified as the split-type double helical gear wheel design, which allowed relative movement between gear halves causing helix shift by 2mm.
- This led to slippage between the gear and shaft, causing uneven load distribution
- As a result, one helix experienced overloading, leading to progressive damage and premature gear failure

STEAM TURBINE GEARBOX (STEEL PLANT-INDIA)



5 SOLUTION OFFERED / ACTION TAKEN:

Triveni implemented a design upgrade to eliminate the failure mechanism:

- Supplied new gear internals along with bearings
- Replaced the split-type double helical gear wheel with a single-piece gear wheel design to eliminate relative movement
- Optimized gear wheel mass elastic characteristics to match existing split design value, ensuring improved shrink fit locking.



6 CONCLUSION:

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

The implemented solution ensured:

- Elimination of premature gear set failures
- Uniform load distribution across both helices
- Enhanced reliability through robust single-piece gear design
- Stable operation with all parameters within permissible limits

7 OUTCOME:

The gearbox has been operating reliably since recommissioning, with improved performance and durability. The complete solution was delivered within 18 weeks, ensuring minimal disruption to plant operations.

