

REPAIR & OVERHAUL

At a point in the life of any rotating equipment it will require some degree of repair or overhaul. Allen Gears Services is committed to return any gearbox to full working condition as quickly and cost-effectively as possible.

Wherever possible we will carry out repairs and overhaul on site. Parts that cannot be repaired in-situ will be returned to our state-of-the-art refurbishment facility in Pershore, UK. There our highly experienced technical and engineering experts guarantee the swift manufacture and turnaround of replacement parts.

unrivalled benefits



recent experience case study

GEARBOX OVERHAUL

Fellside Heat and Power Station

Project background

Fellside Heat & Power Limited – a wholly owned subsidiary of BNFL – owns the Fellside Station in Cumbria, UK. The gas fired plant generates up to 188MWe, which is sold to the national grid, and since 2002 has been the sole steam supply to Sellafield, making it a critical asset to the operation of BNFL's business.

In 2005, Wood Group Heavy Industrial Turbines, were awarded a \$9 million, six year maintenance contract involving the provision of packaged maintenance services for the three General Electric Frame 6581 gas turbines.

These turbine packages each included a main load speed reducing Flender Graffenstaden parallel shaft gearbox rated at 54MW with an input speed of 5113 rpm and output of 3000 rpm.



damaged white metal bearings after gearbox strip



view of damaged shaft



contact mark checks during re-assembly



final reassembly at AG site

The challenge

The gearboxes were installed in 1993, and have not had any routine maintenance performed upon them in this time.

The operator reported a catastrophic failure to Wood Group, who contacted the OE gearbox manufacturer to discuss – Little interest was received from the OE manufacturer with regards to carrying out failure analysis, so Wood Group turned to Allen Gears, who were recommended to carry out the investigation work, due to their recent experience.

The outcome

The gearbox was returned to Allen Gears, where a fully strip and inspection was carried out – This confirmed that it was the white metal bearing which had led to damage to the pinion shaft journal.

Whilst carrying out the inspection, Allen Gears also discovered that the pinion shaft had bent as a result of the failure. From the shaft journal to shaft end, there was a bend of 4mm.

The work

Allen Gears rectified the existing pinion by:

- 1 Machining the shaft journal back to fresh metal
- 2 Machining all outboard items including the bore to bring the shaft back to running true.
- 3 Building the shaft journal back up using metal spray & a new location spigot on the flange
- 4 Carrying out CMM check on the position of the fitted bolt holes on the mounting flange, then patching and re-boring holes on the correct PCD.

The method of reclamation ensured that the quill shaft and coupling hub could be reused, saving the end user considerable time and money.

Allen Gears then re-assembled the unit, carrying out the usual checks – clearance, backlash, contact markings. All proved to be excellent, so the unit was shipped back, fully assembled to the customer.

Returning to Site

The unit was re-installed, and Allen Gears were asked to verify the alignment based upon the original specifications, the generator manufacturer carried out the low speed alignment and Allen Gears were again asked to verify this alignment by carrying out calculations based upon the originals specs.

Allen Gears were then asked to witness re-commissioning. They carried out vibration monitoring on the damaged pinion & also from the control system. The unit was run at various stages up to 30 MW and all recordings taken were excellent.

Conclusion

The complete task was completed from start to finish in only 5 weeks. As a result of this, along with our responsiveness and high quality throughout the job, the customer has requested that Allen Gears carry out the inspection and overhaul of the other two units on site.

Technical Data

Requirement:	Failure investigation and rectification after failure on site
Plant:	Fellside CHP Plant, Cumbria, UK
Operator:	British Nuclear Group Limited
Application	GE Frame 6 gas turbine
Application Type:	Gas turbine drive generator – GE Frame 6
Gearbox Type:	Flender Graffenstaden vertical off-set parallel shaft
Power:	54,000 kW
Speeds:	Input: 5113 rpm. Output: 3000 rpm



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