

Sulzer Repco Overhauls and Repairs a 150-MW Steam Turbine, Including Rotor Straightening

Sulzer Repco received an order to inspect the HP turbine casing of the generator set of a 150-MW steam turbine generator driver which had had a long standstill period.



Low balance check of high-pressure steam turbine rotor.

The turbine is of a reaction type with internal casings operating with steam of 147 bar at 530 °C and had been out of production for more than a year. The end user had protected the turbine casings during this long outage period.

During the inspection it was determined that the turbine rotor, weighing 15 tons and with an overall length of around 7000 mm, and still in the turbine lower casing, had developed a permanent bow of 0.12 mm. All of the interstage labyrinths clearances were out of tolerance due to rotor rubbing.

Dismantling Begins

In the first week of August 2002, Sulzer Repco's Field Service crew started a three-week dismantling of the turbine. Internal housings – including diaphragms, rotor, bearings, central labyrinth housing (old and new), all split line bolts and several small parts – were shipped to the Sulzer Repco repair center in Europort, the Netherlands.

Full Inspection

The rotor was thoroughly inspected, including a mechanical run-out. The

detailed outcome reported a permanent bow with a maximum of 0.12 mm TIR at the center of the rotor. A full phase-1 inspection, including NDT and dimensional checks, was performed. No further defects of the rotor were found.

A peening procedure to straighten the rotor was performed, and the resulting run-out was within acceptable limits. After the straightening procedure, the rotor was heat treated (up to 600 °C, which is approximately 10% above steam inlet temperature). Glassbead blasting, NDT, hardness testing, rotor run-out check, and at-speed balancing were then performed.

The result of the straightening procedure and processes produced an overall maximum and final run-out below 0.03 mm TIR at the center of the rotor, which is within the acceptable tolerances.



Steam turbine back in operation after overhaul.

Meanwhile these other inspection and repairs were performed at the repair center:

- Cleaning and NDT of all split line fasteners
- Restoring labyrinth clearances by repair and machining of the labyrinths
- Machining of new interstage labyrinth housing (supplied by customer) to correct dimensions

- Machining of new labyrinths in interstage labyrinth housing
- Blueing and contact development, and correction of split lines on the inner casings
- Renewal of special HP joints at inlet admission

On site, the inspection, cleaning, flange machining, split line blue contact and renewal of special HP joints, were ongoing.

Lower and top casings were prepared to receive inner casings, interstage labyrinth housing, and a rotor for re-assembly.

Re-assembly on Site and Start-up

In mid October 2002, the Field Service crew travelled to the customer's site to start re-assembling the HP turbine. In mid November, the turbine was mechanically complete, and the production systems, the governor,



Repair inner casing of steam turbine rotor.

regulating and overspeed-trip tests were carried out.

After a successful start-up on November 27, 2002, the customer was able to supply 150 MW of power to the public grid.

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