

# ON-SITE MACHINING OF DAMAGED GAS TURBINE SHAFT IN SAUDI ARABIA

## FIAT TG 20 B-7/8 GAS TURBINE FOR SAUDI ELECTRIC COMPANY

Saudi Electric Company (SEC) contacted Goltens Red Sea (Saudi) about damage to the shaft on a Fiat TG 20 B-7/8 Gas Turbine at their Narjan Power Plant. Goltens dispatched an In-Situ machining specialist to perform and initial inspection of the damaged shaft and confirmed that Goltens could repair the damage.

Recognizing that moving a turbine rotor of this size is a complicated process that poses great risk to the delicate machinery, Goltens proposed to SEC that the rotor be removed from the engine casing and placed in a stand for machining. This solution presented less risk to the machinery and avoided the time and expense of transport to and from a workshop.

#### **TURBINE SHAFT INSPECTION**

Once SEC had disassembled the engine and placed the rotor in the stand, Goltens inspected the shaft damage on the compressor and exhaust bearing journals. Goltens visually inspected and calibrated the shaft, performed MPI crack tests and checked the shaft for hardness values. Inspection Results:

- MPI tests showed no cracks on compressor or exhaust side journals
- Hardness checks found hardness values within acceptable limits between 239Hb and 309Hb
- Visual inspection showed heavy scoring on the compressor side bearing journal and minor scoring on the exhaust side bearing journal

### COMPRESSOR JOURNAL REPAIRS:

As the damage on the compressor bearing journal was more significant, Goltens' In-Situ machinists needed perform fine grinding and honing on the journal to remove the heavy scoring.

Goltens managed to remove the scoring taking only 0.25mm from the shaft diameter.

Hardness and crack tests were completed again with no cracks found and hardness at acceptable levels.

#### **PROJECT FACTS:**

Engine Type: Engine Maker: Engine Model: Gas Turbine MAK FIAT TG 20 B- 7/8

NAJRAN POWER PLANT

Calibration of the damaged shaft



MPI Crack tests being performed on Journal







#### **EXHAUST JOURNAL REPAIRS:**

As the damage to the exhaust side was less severe, Goltens was able to remove the lighter scoring without grinding the journal. Goltens technicians were able to polish the journal to restore the journal with only honing and machine polishing.

Subsequent crack and hardness tests showed the exhaust journal surface to be acceptable.

**ON-SITE TURBINE SHAFT REPAIR RESULTS:** Goltens completed the repairs to the full satisfaction of SEC removing the absolute minimum from the shaft diameter.

Goltens' proven ability to perform the machining repairs onsite allowed SEC to avoid the cost and delay of transport, minimizing downtime, as well as limit the risk exposure of transporting the equipment.



Machining in process to restore journal surface



Exhaust side journal post polishing



Compressor side journal post polishing