

## IN-PLACE MACHINING AND MAJOR MAINTENANCE SERVICE-WARTSILA 18V50DF

### IN-SITU ANNEALING SAVES ANOTHER 18V50DF CRANKSHAFT FOR TRINIDAD POWERPLANT

Ahead of a scheduled 36,000 overhaul, one of Trinidad and Tobago Electricity Commission's (T&TEC) Wartsila 18V50DF dual fuel generators experienced a casualty on crankpin #9. The maker was brought in to inspect the damage and provided a report that resulted in the generation of a public tender for the completion of the repairs and the 36,000-hour overhaul.

Goltens traveled to the plant to complete an inspection of the engine, which had been completely disassembled by plant personnel at the maker's recommendation. Goltens determined that the 450mm diameter journal had surface cracks and excessive hardness (as high as 568HB) from the bearing failure and proposed an in-place machining and annealing repair in addition to the overhaul.

#### IN-PLACE MACHINING AND ANNEALING

After the tender was awarded, Goltens in-place machinists first machined the crankpin to  $-4.5\text{mm}$  to remove all surface cracks leaving a hard spot  $250\text{mm} \times 120\text{mm}$ . Goltens then performed the annealing process and reduced the crankshaft hardness from 568HB to a maximum of 300HB. A new radius was then cut for the final undersize of  $-6.0\text{mm}$  and final machining and polishing was completed with a surface finish of  $0.4\text{Ra}$ .

#### MAJOR SCHEDULED MAINTENANCE

While the annealing was being completed, Goltens deployed diesel teams to begin the overhaul of components in parallel. The 36,000-hour scope was comprehensive and included:

- Calibration/overhaul of pistons and connecting rods
- Honing of cylinder liners
- Replacement of all crankpin and main bearings
- Overhaul of cylinder heads
- Remove and replace all cam bushings & Polish Camshafts
- Overhaul Vibration Damper
- Overhaul Turbochargers & Fuel Equipment
- Complete rebuild of the engine
- Commissioning and Testing on Diesel and Gas

#### PROJECT FACTS: TRINIDAD POWER PLANT

Customer:	Trinidad & Tobago Electricity Commission
Engine:	Wartsila 18V50DF
Hardness Pre-annealing:	568HB (max)
Hardness Post-annealing:	300HB (max)
Journal Diameter (pre):	450mm
Material Removed:	6.0mm



Machining new fillet radii after annealing



Calibration check after in-place machining



Calibration and overhaul of pistons



### REPAIR RESULT

Once the engine was completely rebuilt, Goltens flushed the engine, completed system checks and commissioned the engine. The engine was then turned over to T&TEC powerhouse personnel. Another successful demonstration of the power of Goltens' in-place machining methods and 76 years of diesel engine expertise to repair an otherwise condemned crankshaft and complete major scheduled maintenance overhaul.



Rigging of honed liner into position



Removal of Vibration Dampener



Overhaul of cylinder heads in powerhouse



Calibration check on camshaft bores



Installation of big end bearing housing