

CRANKPIN REPAIR

SWD-WARTSILA 280 – JOURNAL ANNEALING AND GRINDING

A power plant in Ecuador suffered a severe casualty involving one of their generators. Assessment of the 220 mm diameter crankpin journal showed that the big end bearing had failed and damaged the crankpin journal surface.

The Crankpin journal surface was severely scored with scratches measuring up to 0.40 mm deep (shown right). Additionally, the bearing failure had generated significant heat causing areas of severe hardness above 650 Brinell and run-out measurement of the adjacent main journal showed the shaft was bent with a run-out of 0.10mm.

Goltens initially ground 1.00mm from the crankpin to remove the heat cracks, scratches and hopefully the hardness. After this initial machining, the areas of high hardness remained. Further grinding 3.00mm total from the diameter revealed continued hardness up to 500 Brinell. Given that the maximum crankpin reduction of diameter is 5.00mm on this engine, Goltens advised the client that the only way to save the shaft was to stop the grinding process, anneal the crankpin to remove the hardness, and then complete the repair with a final grinding process.

REPAIRS CONSISTED OF:

- Rough machining to remove all cracks (3.0 mm dia.)
- Annealing crankpin to reduce harness from >650 Brinell to between 250-300 Brinell
- Post annealing straightening of the crankshaft (0.02mm after straightening)
- Crankpin journal ground to its final size 216.00mm (4.00mm undersize)
- Fillet radii ground to finished spec under journal surface
- Lube oil holes rounded off and polished
- Journal polished to 0.3Ra according the Maker's spec

RESULTS:

Goltens' combined in-situ grinding and annealing process was utilized to salvage and otherwise condemned shaft, avoiding costly disassembly, replacement and rebuilding costs and prolonged loss of use.

CRANKSHAFT SPECS: Wartsila SWD-280

Crankpin Journal Diameter:	220 mm
Finished Journal Diameter:	216mm
Pre- Annealing Hardness:	>650 Brinell
Pos-Annealing Hardness:	250-300 Brinell

