

ANNEALING AND SINGLE POINT CUTTING SAVES MAK 16CM32 CRANKSHAFT

STATIONARY POWERPLANT - NICARAGUA

Goltens received the call to take over the repair of a damaged MaK 16CM32 from CENSA in Nicaragua. The company that had begun the job was unable to effectively mobilize tools and technicians to remove the high hardness discovered in the pin. Goltens mobilized its annealing equipment and single point cutting tools and in-situ machinists to site and took over the job.

As the pin had already been machined down to 278.5mm, pre-machining was not required prior to annealing. Goltens verified that the crankpin was free of surface cracks and performed a hardness mapping of the crankpin. Hardness values over 500 hB (hardness Brinell) were discovered in spots around the crankpin surface, well above the manufacturer's acceptable limits for hardness.

Goltens installed the annealing equipment and performed the annealing process after which the hardness values were brought to within acceptable parameters and the crankpin was finish machined and honed to a final diameter of 278mm.

ON-SITE MACHINING CONSISTED OF:

- Performed Magnaflux crack test and hardness tests on crankpin #6 journal surface
- Annealed crankpin #6 to remove high hardness areas and bring to within maker tolerances for hardness
- Machined crankpin #6 to a finish diameter of 278.00mm
- Super polished crankpin to a finish of <math><0.2\text{Ra}</math>

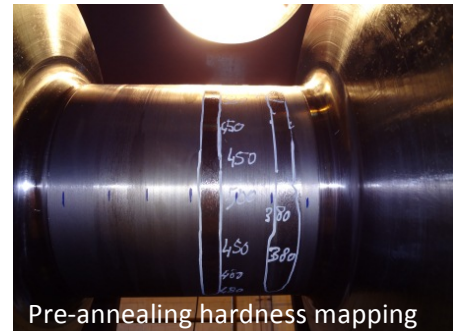
CRANKSHAFT MACHINING AND ANNEALING RESULTS:

Goltens was able to mobilize a single in-situ machining team capable of performing the crankshaft machining and annealing saving the customer unnecessary downtime and costs associated with the waiting for the mobilization of multiple teams.

The crankshaft was restored to operational status with only 0.5mm additional material removed from the crankshaft diameter. The finished crankshaft was within maker specifications and the engine was returned to operation.

PROJECT FACTS: CENSA Nicaragua

Engine Make:	MAK 16CM32
Engine Output:	7,050 kW
Engine RPM:	720
Hardness Pre-Annealing:	500+hB
Hardness Post Annealing:	<math><350\text{hB}</math>
Dia. Pre-Machining/Annealing:	278.5mm
Finished Diameter:	278.0mm



Pre-annealing hardness mapping



Annealing equipment setup on damaged crankpin



Post Annealing hardness testing

Post Annealing crankpin machining



Super polished crankpin (finish 0.2Ra)