

## DAIHATSU CRANKSHAFT REPLACEMENT FOR CEMENT CARRIER

### GOLTENS SPECIALISTS REPLACE DAIHATSU 8DKM28 CRANKSHAFT AND OVERHAUL ENGINE

A 10-year-old cement carrier suffered a main engine bearing failure on its Daihatsu 8DKM28 engine. The OEM was contacted by the client to inspect the damaged crankshaft and the OEM determined it was beyond repair and required replacement.

Goltens Miami was contacted by the client to carry out the required work to bring the vessel back into operation. Goltens Miami's team quickly presented the customer with a proposal and project plan for the removal and replacement of the crankshaft along with inspection and overhaul of the major components as part of the rebuild. Due to limited space onboard, and to increase efficiencies, Goltens proposed sending the major components for inspection and overhaul to its workshop.

#### PROJECT EXECUTION:

The ship's crew had disassembled the majority of the engine prior to teams' arrival. The crew had removed the cylinder heads, pistons & connecting rods, cylinder liners, turbo charger and aux pumps. The pistons, liners, turbocharger, governor, air cooler and all connecting rods were shipped to Goltens Miami to be inspected and overhauled.

Goltens inspected the space and designed a rigging plan to safely lift the block and rig the condemned crankshaft out and the new crankshaft in. Goltens got to work welding the required pad eyes and made other preparations such as removing the counterweights, bearing caps and other components prior to commencing the rigging operations.

The engine block was lifted and braced in a safe position for rigging of the crankshaft. The crankshaft was then removed and rigged to the engine room deck, where it was then rigged ashore. To thoroughly inspect the engine, the engine was thoroughly cleaned and NDT conducted on all bearing saddles and all surfaces on the engine block. Bearing saddles were reinstalled and torqued, with laser inspection and internal bore checks completed satisfactorily.

#### PROJECT FACTS: CRANKSHAFT REPLACEMENT

Engine Make/Model:	Daihatsu 8DKM28
Location:	Rhode Island, USA
Vessel Type:	Cement Carrier
Year of Build:	2011



Figure 1: Engine stripped with rigging equipment attached to crankshaft for lowering



Figure 2: Engine block lifted and braced for crankshaft removal



With all inspections completed, the new crankshaft was lowered into the engine room by shore crane and rigged into place with new upper bearings. Main bearing saddles were then installed with new lower bearings, and the block was lowered. Engine was then reassembled, with use of the overhauled and replacement engine components.

**RESULT:**

Once the engine was rebuilt, alignment was checked via laser, and replacement coupling was installed. All ancillary fuel, water and oil systems and exhaust reattached and the engine was filled with water to verify no leaks and the oil system was flushed. The engine was then filled with new oil and the engine heated for start. Hot alignment checks were completed and the engine run in tests of 1 minute, 5 minutes, 15 minutes, 30 minutes and 1 hour were successfully completed with bearings being checked at each interval.

With the engine trials completed, the engine was turned over to the ship's Chief Engineer and the cement carrier returned to service.



Figure 3: Crankshaft lowered from block



Figure 4: Crankshaft rigged from underneath block



Figure 5: Rigging condemned shaft out of the engine room



Figure 6: Lowering replacement crankshaft into the engine room with shore crane





Figure 7: Non-Destructive crack testing on block prior to new crankshaft installation



Figure 8: Goltens technicians rigging new crankshaft to lower engine room deck



Figure 9: Laser check of block bore



Figure 10: Installing new upper bearing shells before lifting crankshaft into position



Figure 11: Crankshaft ready for final lift into position