CASE STUDY

METALOCK BRASIL

MECHANICAL MARINE DIESEL ENGINE REPAIR:
PORT SIDE MAIN ENGINE & REDUCTION GEAR

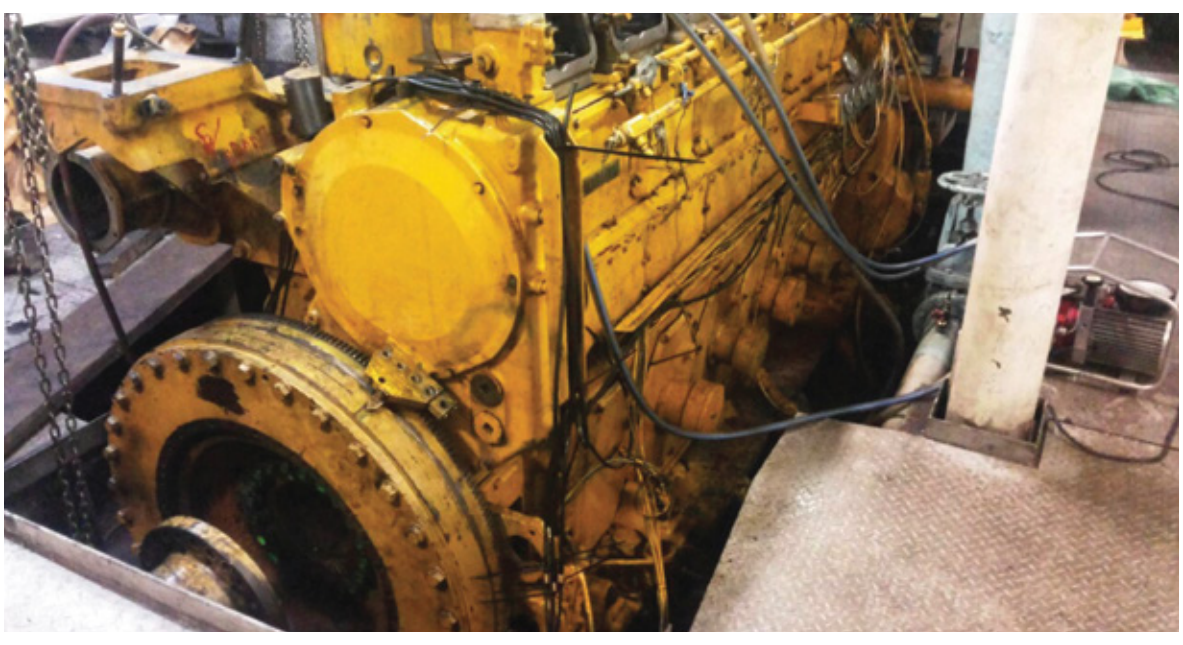
THE CLIENT

This company owns, operates and manages 72 modern offshore oil service vessels.

The ship is a Platform Supply Vessel built in 1999 with two Caterpillar 3606 main engines (4640BHP; LOA 66m; DWT 2800mt). The vessel is classified by ABS.

THE SITUATION

The Port Side Main Engine was shut down due to overspeed.



THE SERVICE

Metalock Brasil Ltda. was contracted to prepare portable equipment and to attend on board the vessel at Rio de Janeiro anchorage with specialist In Situ Machining, mechanical and alignment Service Teams to carry out inspections and necessary repair services on Port Side Main Engine:

1. Inspect main journal pockets, including all dimensional checks before and after line boring, according to the maker's tolerance tables.
Having found scratches and white metal deposited on crankpins and main' journals, the crankshaft was dismantled and measurements taken.
Crankpin diameter measurements varied from 214,97mm to 215,98mm.
Hardness measurements varied from 45,4 HS to 73,8 HS.
Main Bearing pockets before machining varied between 264,80mm and 265,08mm. Two Main Bearing Pockets were machined with Metalock's Line Boring Machine and measured at 265,98mm.
Having established the amount of material to be removed from crankpins, in excess of makers allowance specification, it was decided to scrap the crankshaft and fit a new one. At the client's request, the new crankshaft was inspected and crankpin and main journal dimensional and hardness measurements were taken and reported by Metalock technicians.

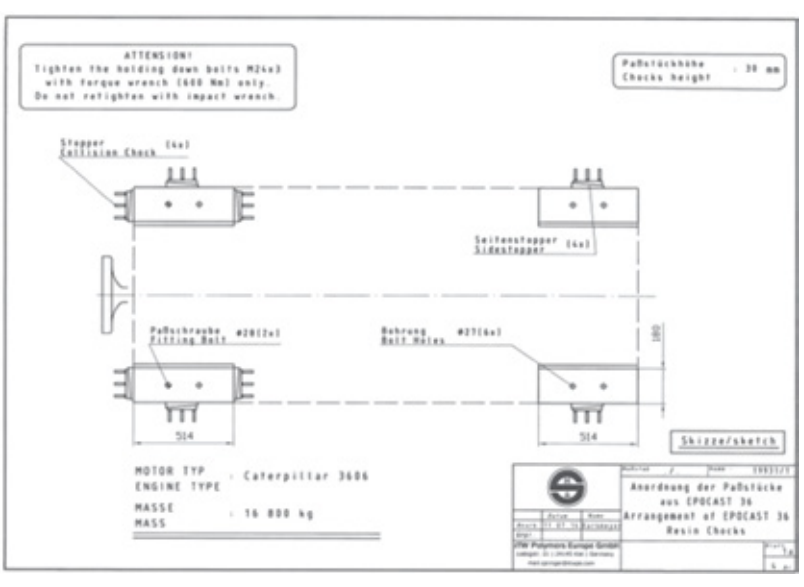
2. Visually inspect port side Reduction Gear Box and perform clearance checks of clutch discs, gears and bearings.
Equipment was opened by Metalock, stripped and found to be in normal operational conditions.

3. Check Main Journal saddle alignment before and after Line Boring services.
Laser technology was used to perform this service. Findings were reported.

4. Check alignment of the Engine Block, using Laser Technology, according to makers tolerance tables and thermal compensation graphs, checking crankshaft deflections and correcting them to acceptable values. Repeating the process after chocking and final torque.
Laser technology was used to perform this service. Findings were reported.

5. Carry out engine chocking using EPOCAST 36 chocking compound and specific technology.
Chocking calculations, supplied by the maker, and a Design Assessment Certificate issued by the Classification Society ABS for the chocking resin EPOCAST 36, were presented.

Caterpillar Reference Tables were used during the services.



THE RESULTS

Pertinent measurement and alignment findings, time sheets and photographs of the various job phases were compiled, a Technical Report was prepared and delivered to the client. The engine was tested and run to satisfaction.

MAIN BEARING POCKET N°	POS	MAIN BEARING POCKET WITH SHELLS A	B	C	D	CLEARANCE A	B	C	D
1	FWD	250,28	250,27	250,29	250,28	0,30	0,29	0,31	0,30
	AFT	250,28	250,27	250,30	250,28	0,30	0,29	0,32	0,30
2	FWD	250,26	250,27	250,27	250,28	0,28	0,29	0,29	0,30
	AFT	250,26	250,27	250,27	250,28	0,28	0,29	0,29	0,30
3	FWD	250,27	250,28	250,29	250,27	0,30	0,31	0,32	0,30
	AFT	250,27	250,28	250,29	250,27	0,30	0,31	0,32	0,30
4	FWD	250,27	250,29	250,31	250,29	0,29	0,31	0,33	0,31
	AFT	250,27	250,28	250,32	250,30	0,29	0,30	0,34	0,32
5	FWD	250,27	250,27	250,28	250,30	0,30	0,30	0,31	0,33
	AFT	250,27	250,27	250,28	250,30	0,30	0,30	0,31	0,33
6	FWD	250,27	250,26	250,29	250,29	0,30	0,29	0,32	0,32
	AFT	250,27	250,26	250,28	250,29	0,30	0,29	0,31	0,32
7	FWD	250,28	250,24	250,26	250,32	0,31	0,27	0,29	0,35
	AFT	250,28	250,24	250,27	250,33	0,31	0,27	0,30	0,36

HARDNESS CHECKS

CRANKPIN N° 1 – HS			
0°	59,6	-	60,1
45°	59,7	-	59,9
90°	62,0	-	61,9
135°	61,1	-	62,0
180°	61,2	-	61,5
225°	62,0	-	61,9
270°	62,1	-	61,8
315°	62,0	-	62,3
360°	59,6	-	60,1

CRANKPIN N° 2 – HS			
0°	60,6	-	60,7
45°	60,9	-	61,1
90°	61,8	-	62,0
135°	62,3	-	62,1
180°	62,4	-	62,2
225°	60,0	-	61,4
270°	60,9	-	61,0
315°	62,1	-	61,9
360°	60,6	-	60,7

CRANKPIN N° 3 – HS			
0°	62,1	-	61,3
45°	61,8	-	62,0
90°	62,0	-	62,3
135°	61,9	-	62,1
180°	62,3	-	62,0
225°	62,1	-	62,2
270°	62,0	-	62,1
315°	61,9	-	61,7
360°	62,1	-	61,3