



KALANGALA INFRASTRUCTURE SERVICES LTD.

SPECIFICATIONS

FOR

**Works in Connection with the major
overhaul of the Main Engines (MAN) D2876
LE 406 at 25,000 hr service intervention of
the**

M/V PEARL

(MAY 2022)

OBJECTIVE

The objective of this maintenance intervention (Major Overhaul of the Main Engines) is to make sure that once completed, would perform another trouble-free period of approximately 20,000 running hours.

METHODOLOGY

The engine maintenance is to be conducted based on Time Between Overhaul (TBO) and Condition Based Overhaul (CBO) approach.

Inspection and Overhaul/Works on all the engine components/systems to be done according to the manufacture's (MAN) service interval instructions for 25,000 hours maintenance and in close cooperation with the Chief Engineer. This implies that both engines will undergo Major overhaul and only OME Spare parts are to be used.

DIESEL ENGINES – MAN D2876 LE 406

1. Inspection

Together with the Chief Engineer, check all pressure and temperature gauges on both engines and document the readings at different engine loads before overhaul.

2. Oils/Lubricants samples to be extracted from the two engines and immediately after sent to recognized laboratories for analysis. Results to be presented to the Chief Engineer / Owner's representative.

3. Carry out Major overhaul of the two engines 1 & 2 according to (MAN) Service interval Instructions for 25,000 hrs. Inspect, Disassemble, Clean, Analyse, Replace/Fix, and Assemble as appropriate considering but not limited to the following systems/components/parts.

- 1) CRANKCASE SEAL CRANKSHAFT FRONT
- 2) OIL SPRAYER NOZZLE CRANKCASE
- 3) CYLINDER LINERS
- 4) RADIAL SHAFT SEAL TIMING CASE
- 5) TIMING CASE CONNECTING PARTS
- 6) BEARINGS
- 7) CONNECTING RODS/BEARINGS
- 8) PISTONS
- 9) CYLINDER HEADS GASKETS/BOLTS

- 10) VALVES TAPPETS
- 11) OIL COOLER
- 12) OIL PUMPS
- 13) OIL SUMP WITH MOUNTING PARTS
- 14) RAW WATER PIPES
- 15) COOLANT PUMPS, BLEEDER PIPES/MOUNTING PARTS
- 16) COOLING WATER LINES
- 17) INTERCOOLERS/ COOLING WATER PIPES
- 18) RAW WATER PUMP DRIVE/MOUNTING PARTS
- 19) EXHAUST MANIFOLD
- 20) TURBO CHARGERS
- 21) NOZZLE HOLDER INJECTION NOZZLES
- 22) INJECTION PUMP FASTENERS/CONNECTIONS
- 23) DRIP OIL MOUNTING PARTS
- 24) FUEL SYSTEM
- 25) ALTERNATOR COMPONENTS
- 26) CHARGING PRESSURE SENSOR FASTENERS
- 27) OIL PRESSURE CONTROL
- 28) OIL PRESSURE SENDER
- 29) OIL SUPPLY TEMPERATURE SENDER.

4. Main Engine Switchboards to be opened and all terminal connections to be tightened.
5. All alarms to be tested and capability to reset local and from wheelhouse control console verified.
6. Check and replace engine mountings where necessary.
7. Canopy to be thoroughly cleaned and doors to be readjusted to close completely.
8. On completion before commissioning, carry out a performance analysis by taking a set of service readings at different engine loads which must be well documented and given to the Chief Engineer.

Attached is a list of some Spare Parts recommended for replacement by the manufacturer as analysed by the technical team and is subject to amendments as found appropriate.

NO.	SUMMARY	PART NAME/DESCRIPTION	PART NO.	QTY. (PCS)
1	CRANKCASE SEAL CRANKSHAFT FRONT	- RADIAL SHAFT SEAL 105X130X12RD-ACM/PTFE/FILZ ASSEMBLY	51.01510-6004	2
		- CONTROL HOUSING SEAL ASBESTOS-FREE	51.01903-0251	2
2	CYLINDER LINER	- TORIC SEAL 138X2, 1-FPM2-70	51.96501-0493	24
		- TORIC SEAL 144X4-FPM2-70	51.96501-0522	24
3	OIL SPRAYER NOZZLE CRANKCASE	- OIL SPRAYER NOZZLE ASSEMBLY	51.01601-5089	12
4	RADIAL SHAFT SEAL TIMING CASE	- SEAL REAR PTFE	51.01501-6012	2
		- RADIAL SHAFT SEAL 120X140X13-ACM/PTFE	51.01510-0206	2
		- RACE	51.02130-0013	2
5	TIMING CASE CONNECTING PARTS	- CONTROL HOUSING SEAL ASBESTOS-FREE	51.01903-0252	2
6	BEARING	- MAIN BEARING NORMAL SPATTERED	51.01113-6066	14
		- THRUST WASHER NORMAL ASSEMBLY	51.01114-6110	4
7	CONNECTING ROD CONROD BEARING	- CRACK CONROD ASSEMBLY	51.02400-6051	4
		- EXTERNAL HEX ROUND BOLT M14X1,5X65,5-10.9-E18-ZNPHR		12
8	PISTON COMPLETE	- STATIONERY ENGINE PISTON NORMAL ASSEMBLY	51.02500-6015	4
		- KEYSTONE RING	51.02503-0752	12
		- TAPER FACE COMPRESSION RING	51.02503-0784	12
		- BEVELLED OIL SCRAPER RING	51.02503-0806	12
9	CYLINDER HEAD GASKET CYLINDER HEAD BOLT	- CYLINDER HEAD GASKET ASBESTOS FREE	51.03901-0338	12
		- EXTERNAL HEX ROUND BOLT M15X2X168-1200N/MM2-E20-ZNPHR3		24
		- EXTERNAL HEX ROUND BOLT M15X2X109-1200N/MM2-E20-ZNPHR3		12
		- EXTERNAL HEX ROUND BOLT M15X2X144-1200N/MM2-E20-ZNPHR3		36
10	VALVES VALVE TAPPET	- EXHAUST VALVE	51.04101-0501	6
		- INTAKE VALVE	51.04101-0509	6
		- SEAL VALVE STEM D25/D28	51.04902-0028	24
		- PUSH ROD	51.04302-0027	12
11	OIL FILTER OIL COOLER	- GASKET 26X48X1,0-AFOE2-M3219	06.56254-2203	4
		- GASKET ASBESTOS FREE	51.05901-0119	2
		- SEAL 14,7X22X1,5-ST/FPMI-80 WITH ELASTOMER LIP	06.56631-0106	2
		- HEX COLLAR DOWEL SCREW M12X1,5X14H11X282-10.9-PAB	51.90020-0189	2
		- TORIC SEAL 133X4,4-NBR3-70	06.56930-3809	2
		- DRAIN PLUG M18X1,5X13-ST-GEOELT	51.90310-0127	2
		- FILTER HOUSING	51.05502-6008	2
		- SEAL 18,7X26X1,5-ST/FPMI-80 WITH ELASTOMER LIP	06.56631-0109	2
12	OIL PUMP	- OIL PUMP ASSEMBLY	51.05101-6008	2
13	OIL SUCTION LINE	- GASKET 35X58X1,0-AFOE2-M3219-A1-G1	06.56259-0033	2
14	OIL SUMP WITH MOUNTING PARTS	- OIL SUMP SEAL ASBESTOS FREE	51.05904-0132	4
		- DRAIN PLUG M26X1,5X20-95MNPB28K	51.90310-0186	4
		- GASKET ASBESTOS-FREE	51.96601-0352	4
15	RAW WATER PIPES	- TORIC SEAL 50X5N-NBR3-70	06.56930-2223	2
16	COOLANT BLEEDER PIPE	- SEAL 14,7X22X1,5-ST/FPMI-80 WITH ELASTOMER LIP	06.56631-0106	24
17	COOLANT ELBOW	- GASKET	51.06901-0190	2
		- TORIC SEAL 67X5N-EPDM9-70	06.56939-0049	2
18	COOLANT PUMP MOUNTING PARTS V-BELT PULLEY	- COOLANT PUMP SEAL	51.06901-0156	2
19	COOLANT PUMP REPAIR KIT LARGE VERSION	- COOLANT PUMP SEAL	51.06901-0156	2
		- COOLANT PUMP SEAL ASBESTOS-FREE	51.06901-0108	4
		- TORIC SEAL 60X4N-EPDM9-60	06.56939-0094	4
		- TORIC SEAL 36,5X3,5-NBR3-60	51.96501-0337	4
20	COOLING WATER LINES	- GASKET RETARDER	51.06901-0145	2
		- CONNECTING UNION GASKET ASBESTOS-FREE	51.06302-0408	2
21	INTERCOOLER COOLING WATER LINES	- COOLANT PUMP SEAL ASBESTOS-FREE	51.06901-0142	2
		- COOLANT PIPE	51.06303-5079	2
22	INTERCOOLER COOLING WATER PIPE	- TORIC SEAL 46X3N-NBR3-70	06.56930-2107	2
		- TORIC SEAL 51X5N-FPM1-70-GN	06.56936-6405	2
23	RAW WATER PUMP DRIVE	- GASKET ASBESTOS-FREE	51.38902-0016	2
24	RAW WATER PUMP MOUNTING PARTS	- TORIC SEAL 46X3N-NBR3-70	06.56930-2107	4
		- TORIC SEAL 51X5N-FPM1-70-GN	06.56936-6405	4
		- GASKET 30X53X1,5-AFQ1-M3219	06.56256-2504	4
25	COVER EXHAUST MANIFOLD	- EXHAUST MANIFOLD SEAL ASBESTOS-FREE	51.08901-0082	2
		- TORIC SEAL 34X4N-FPM2-70	06.56937-1686	2
		- TORIC SEAL 48X4N-FPM2-70	06.56937-2168	2
26	EXHAUST ELBOW	- EXHAUST MANIFOLD SEAL ASBESTOS-FREE	51.08901-0082	2
		- TORIC SEAL 34X4N-FPM2-70	51.56973-1686	2
		- TORIC SEAL 48X4N-FPM2-70	06.56973-2168	2
27	EXHAUST MANIFOLD WATER COOLED	- SEAL IN EXHAUST GAS AREA DMR 77	51.08140-0047	8
		- SEAL IN EXHAUST GAS AREA DMR 88	51.08140-0048	8
		- EXHAUST MANIFOLD SEAL ASBESTOS-FREE	51.08901-0099	12
28	IN TAKE PIPE	- INTAKE PIPE SEAL	51.08902-0161	12
29	INTERCOOLER	- INTERCOOLER SEAL ASBESTOS-FREE	51.09905-0035	2
30	INTERCOOLER ELBOW	- GASKET ASBESTOS-FREE	51.09904-0028	2
31	INTERCOOLER WATER SPACE COVER	- INTERCOOLER SEAL ASBESTOS-FREE	51.09905-0029	2
32	TURBOCHARGER	- GASKET ASBESTOS-FREE	51.08901-0041	2
		- COOLANT ELBOW	51.06302-0509	2
		- SEAL 12,7X16X1,5-ST/FPM1-80 WITH ELASTOMER LIP	06.56631-0105	2
33	TURBOCHARGER COOLING WATER LINES	- SEAL 26,7X34,93X2-ST/FPM1-80 WITH ELASTOMER LIP	06.56631-0112	4
34	TURBOCHARGER EXHAUST ELBOW	- GASKET ASBESTOS-FREE	51.15901-0026	2
35	TURBOCHARGER OIL PRESSURE PIPE	- GASKET 12X38X11X1-AFOE4 ASBESTOS-FREE	51.96601-0386	2
		- SEAL 14,7X22X1,5-ST/FPMI-80 WITH ELASTOMER LIP	06.56631-0106	4
36	TURBOCHARGER OIL RETURN PIPE	- GASKET 26X52,5X11X1,5-AFOE2 ASBESTOS-FREE	51.96601-0383	2
37	NOZZLE HOLDER INJECTION NOZZLE	- NOZZLE HOLDER COMBINATION	51.10100-7407	12
		- SEAL 9,5X20X1-CU	51.98701-0065	12
38	INJECTION PUMP FASTENERS AND CONNECTIONS	- TORIC SEAL 10X3-FKM1-80-GN	06.56938-0522	2
39	DRIP OIL LINE MOUNTING PARTS	- SEAL 6,2X11X1-CU DOUBLE	51.96501-0348	12
		- SEAL 8,7X14X1-ST/FPM1-80 WITH ELASTOMER LIP	06.56631-0125	2
40	FUEL LINES	- SEAL 14,7X22X1,5-ST/FPMI-80 WITH ELASTOMER LIP	06.56631-0106	22
41	ALTERNATOR COMPONENTS 51.26101-7205	- ALTERNATOR N1-28V 10/55A	51.26101-7205	2
42	CHARGING-PRESSURE SENSOR FASTENERS	- TEMPERATURE SENSOR	51.27421-0103	2
43	OIL PRESSURE CONTROL	- SWITCH OIL PRESSURE	50.27421-0054	2
		- RUBBER CAP	50.27901-0015	2
44	OIL PRESSURE SENDER	- OIL PRESSURE SENDER	50.76034-0007	2
		- RUBBER CAP	81.96410-0123	2
45	OIL SUPPLY TEMPERATURE SENDER 2 PIN	- TEMPERATURE SENDER 2 PIN 6-24V	50.61344-1000	2
		- SEAL 14,7X22X1,5-ST/FPMI-80 WITH ELASTOMER LIP	06.56631-0106	2
46	SHELL AND TUBE HEAT EXCHANGER	- SHELL AND TUBE EXCHANGER S/N. 20005726:2010271023	558992	2
		- SHELL AND TUBE EXCHANGER S/N. 20005726:2010271023	764654	2

NOTE.

Please note that Kalangala Infrastructure Services Ltd. "KIS" (Owner) propose these services to be conducted at "**Port Bell**" port/facilities – **Luzira Uganda**. The owner shall meet all costs at the port/facilities that relate to the services.