



COBU – Case Discussion

INTRODUCTION

Gulf Oil Marine's Cylinder Oil Blending Unit (COBU) which has been designed and built to meet the needs of dual fuel engines as well as meeting the needs of both high sulphur and IMO 2020 compliant low sulphur fuels, helped a customer to optimise vessel operations as well as ensuring reasonable liner conditions. In fact, the COBU will help further stretch the time between vessel overhauls without compromising the main engine operability.

Our customer installed a COBU in Oct 2019. Their vessel has a WinGD / 6X72 engine. Two oils were used: GulfSea Cylcare 140BN and GulfSea Cylcare ECA50, both of which are OEM-approved.

With a COBU system fitted, the vessel's Chief Engineer was able to react quickly to changes in fuel sulphur and engine cleanliness by adjusting the BN and to a change in fuel type by adjusting the detergency.

After running 12,350 hrs, mostly on 3.5%S HSFO, with an average lubricant feed-rate of 0.9 g/kW/h, the scrape-down analysis (SDA) results for the vessel's 6 cylinders are shown here:



GULFSEA SDA INSIGHT

Equipment Information

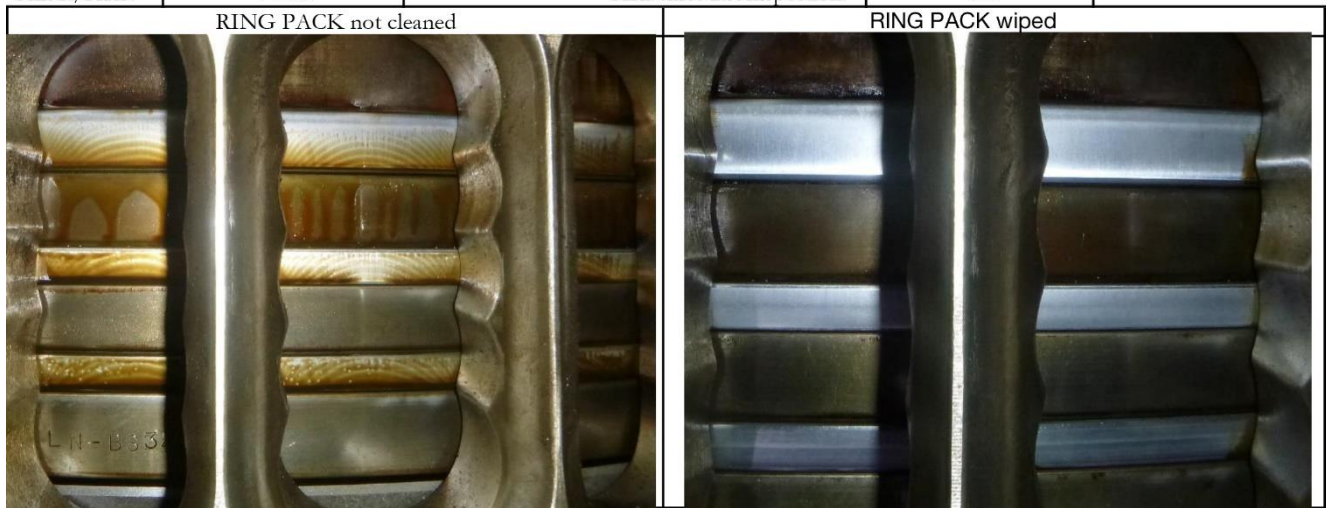
Company Name		Engine Make & Model	WinGD / 6X72
Vessel Name		Total Running Hours	12350
IMO Number		Engine Power Rating (MCR)	32.00 %
Type of Fuel	HFO 380 3.45% Sulphur	Cylinder Oil Feed Rate [g/kW/h]	0.90
Product Grade In Use	GulfSea Cylcare DCA 5070H + GulfSea Cylcare 50140		

Cylinder Number	1	2	3	4	5	6
Sample No	20532054	20532055	20532056	20532057	20532058	20532059
Bottle No	-	-	-	-	-	-
Sampling Date	30-Apr-20	30-Apr-20	30-Apr-20	30-Apr-20	30-Apr-20	30-Apr-20
Sample Origin	Slovenia	Slovenia	Slovenia	Slovenia	Slovenia	Slovenia
Piston Running Hours	12350	12350	12350	12350	12350	12350
Cylinder Liner Running Hours	12350	12350	12350	12350	12350	12350
Piston Ring Running Hours	12350	12350	12350	12350	12350	12350
Overall Rating	Normal	Normal	Normal	Normal	Normal	Normal
Results						
Analysis						
BN[mgKOH/g]	42.3	33.0	41.0	41.1	41.9	39.2
KV@40°C[mm²/s]	291.5	291.8	300.6	295.5	278.1	300.4
KV@100°C[mm²/s]	26.50	26.71	27.36	26.55	25.98	27.50
Flash Point[°C]	Pass	Pass	Pass	Pass	Pass	Pass
Water[%wt]	0.90	0.90	0.90	0.90	0.90	0.90
Soot/Insoluble[%wt]	0.30	0.40	0.30	0.30	0.30	0.30
PQ Index/2ml[-]	14	17	17	15	13	15
Wear Elements[ppm]						
Aluminium (Al)	9	12	12	10	10	11
Chromium (Cr)	<1	1	1	1	1	1
Copper (Cu)	<1	1	1	<1	1	1
Iron (Fe)	24	30	26	24	24	28
Lead (Pb)	<1	<1	<1	<1	<1	<1
Tin (Sn)	<1	<1	<1	<1	<1	<1
Cont. Elements [ppm]						
Sodium (Na)	24	31	28	26	27	30
Silicon (Si)	64	71	72	69	71	75
Molybdenum (Mo)	1	2	2	1	1	2
Nickel (Ni)	46	56	54	48	48	52
Silver (Ag)	<1	<1	<1	<1	<1	<1
Vanadium (V)	146	178	170	154	154	169
Additive Elements[ppm]						
Boron (B)	41	37	42	39	43	40
Zinc (Zn)	18	18	13	16	16	15
Phosphorus (P)	14	15	11	13	14	12

	Inspection Through Scavenge Ports	Form: Sertica Revision: 04/24.04.2020 Approved: Tech/ SD
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Unit No. 3
Unit R/HRS: 14128

Date: 14.07.2020
HRs since last inspection: 571



LINER overview

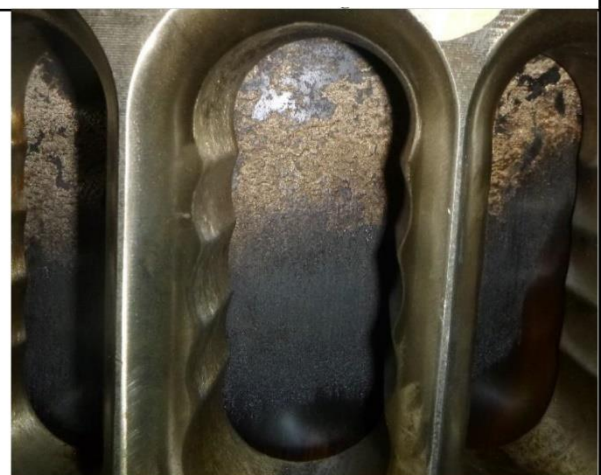
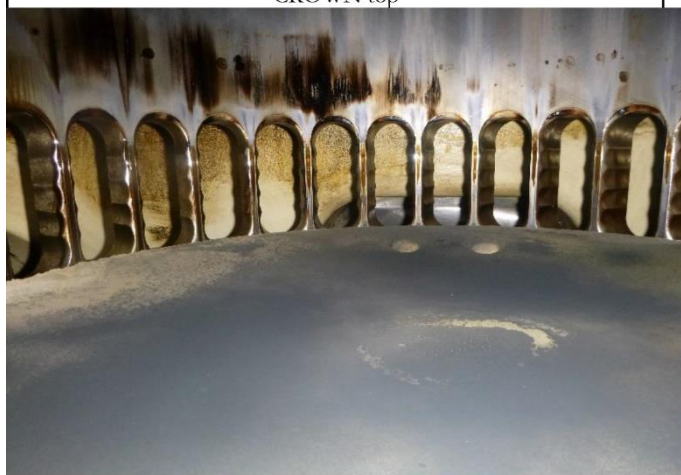
UNDER PISTON SPACE or LINER wall cleaned



CROWN top



CROWN land





Comments on Performance*

After 12,350 hours of HSFO operations, there were no major issues with deposits. The Scrape-down Analysis (SDA) report showed normal conditions for all the six liners. Also, as can be seen from the photos of one of the cylinders from the scavenge port inspection report, the liner and piston conditions were fairly reasonable despite the long and extended operations. In fact, the photos of the other 5 cylinders from the report also showed similar results.

Insights

Through BN adjustments, the COBU is able to optimise neutralisation and avoidance of corrosion. The COBU also can accurately measure the feed rate, confirming against the maker's standard feed rate. It thus allows meaningful cylinder oil feed-rate adjustments (if needed) to effectively respond to abrasive and adhesive wear, running-in and other circumstances where additional liner lubrication is necessary: too little feed-rate may result in liner scuffing, a dry appearance and loss of gas sealing while too high a feed-rate is likely to create excessive sludge and build-up in the scavenge under piston space. The COBU can hence be very helpful to ensure that the ring land, ring grooves and ring backs remain free of deposits and lacquers.

Summary

The use of the COBU allows users to adjust to the maker's standard cylinder feed-rate to effectively optimise liner and ring conditions as well as cross-check cylinder oil consumption (by grades). It also allows the control and switching of BN of the resultant blended cylinder in the daily tank, depending on liner and ring-pack cleanliness based on the oil samples from under the piston. This enhances optimal cylinder oil consumption which ensuring liner condition and equipment operability. The key benefit of the COBU is that the risk of over-lubrication can be effectively controlled while allowing the BN to be optimally adjusted to ensure ring and piston cleanliness and machine operability.

If you have any enquiries, please consult our global technical team at
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[Updated in August 2020]

*** Note:** Results may vary depending upon (not limited to) the specific equipment used, equipment condition, operating conditions and environment, etc.