

SEA-Mate® Blending-on-Board

Fit-for-Purpose Lubrication

CASE STUDY 2016: CLARA MAERSK

It was decided during the first half of 2015 to test the operational and financial effectiveness of the SEA-Mate® Blending-on-Board (BOB) system on smaller engines such as 8S50MC, and therefore the new and smaller Blender B500Mk2 was installed on Clara Maersk. Prior to this, the BOB had only been installed on the largest marine engines. With the BOB unit installed, the vessel was able to reduce the feed-rate by 25% in 1,5 years and the associated benefits of having a BOB unit installed were quickly proven. As expected, the effectiveness of clean system oil benefits from continuously refreshing the in-use system oil was also achieved. Cleaning the crankcase and keeping the viscosity of system oil close to the condition of new oil, reducing friction and effectively reducing the fuel consumption. Furthermore, it was possible to optimize the system oil centrifuge operation, reducing the energy used for operating the centrifuge and minimizing the loss of system oil through the centrifuge. The effectiveness of BOB on Clara Maersk was well-proven and subsequently, more BOB installations on many other small bore size engines were completed, resulting in similar effectiveness.

VESSEL DATA

Vessel type:	Container Vessel
Main engine:	MAN B&W 8S50MC
Main engine power:	10,480 kW
BOB retrofit completion:	June 2015
Cylinder lubrication system:	Mechanical
Cylinder lubrication feed-rate (Q4 2017):	1,54 g/kWh
Cylinder lubrication minimum feed-rate:	1,10 g/kWh

REDUCED COST AND IMPROVED CONDITION

After the blender installation, Clara Maersk have managed to reduce the feed-rate from 1,54 g/kWh to 1,10 g/kWh. A total cylinder oil consumption reduction of 25%.

CYLINDER LUBRICATION FEED-RATE REDUCTION

(Data from 2015-2016)

	Pre BOB (reference)	2015 Jul-Dec	2016 Jan-Jun	2016 Jul-Dec
Feed-rate (g/kWh)	1,54	1,40	1,36	1,15
Total reduction (g/kWh)	0	0,14	0,18	0,39
Relative feed rate (%)	100%	91%	88%	75%



WITH THE BOB INSTALLED

With BOB installed, there will not be a need to adjust the feed-rate corresponding to various operating conditions. Instead, the BN value of the cylinder oil is adjusted, while keeping the feed rate constant. The blended cylinder oil will have the optimal neutralization and detergency capabilities and it is possible to run cylinder lubrication at a fixed low feed rate, regardless of the fuel Sulphur in use. By using a recommended onboard scrape-down test kit, the crew can easily monitor the condition of the cylinder units by performing periodic drain oil analysis. This will secure the best cylinder oil settings for the specific engine. In order to secure successful implementation of Blending-on-Board, Maersk ensured a back-to-back rotation of the Chief Engineers and priority was given to proper training of the crew, leaving no shortfall while implementing a different lubrication operation and strategy.

EASY OPERATIONS

The BOB system does not increase the workload but helps the crew in the daily routine with the already existing tasks. The installation of the blender has shown to be a real positive experience for the vessel Clara Maersk. Both crew and engine have experienced its benefits from the implementation and overall the BOB system has been very successful.

YEARLY SAVINGS

The graph shows development in cylinder oil feed-rate, as well as the reduction in total cylinder lubricant used and the actual consumption of the BOB high-BN cylinder oil product. The current state has resulted in the following savings.

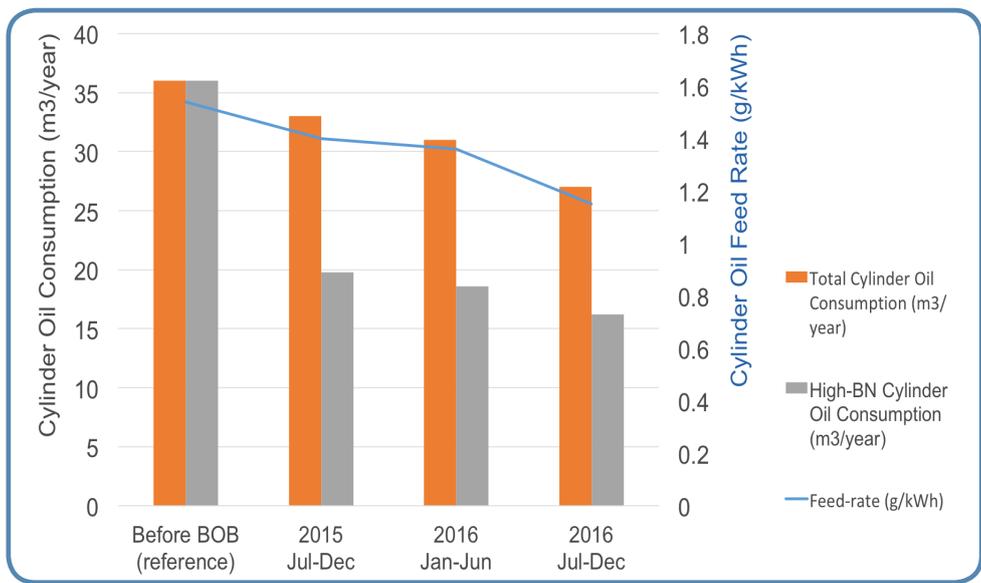
SYSTEM OIL QUALITY AND LOWERED SYSTEM ABRASION

Due to the continuous refreshment of system oil in use, it has been possible to maintain a good system oil quality onboard. The refreshed oil also shows cleaner system oil with a visible cleaner crankcase and oil sump. Clean and fresh system oil will have a positive technical impact on TBO's relating to for example FIVA valves, piston cooling, bearings, and preheater efficiency. Moreover, since the installation of BOB, Clara Maersk has experienced significantly lowered engine abrasions, enabling piston rings to run +30,000 hours without replacement. The vessel have not replaced any cylinder liners, due to constant low liner wear.



Clara Maersk

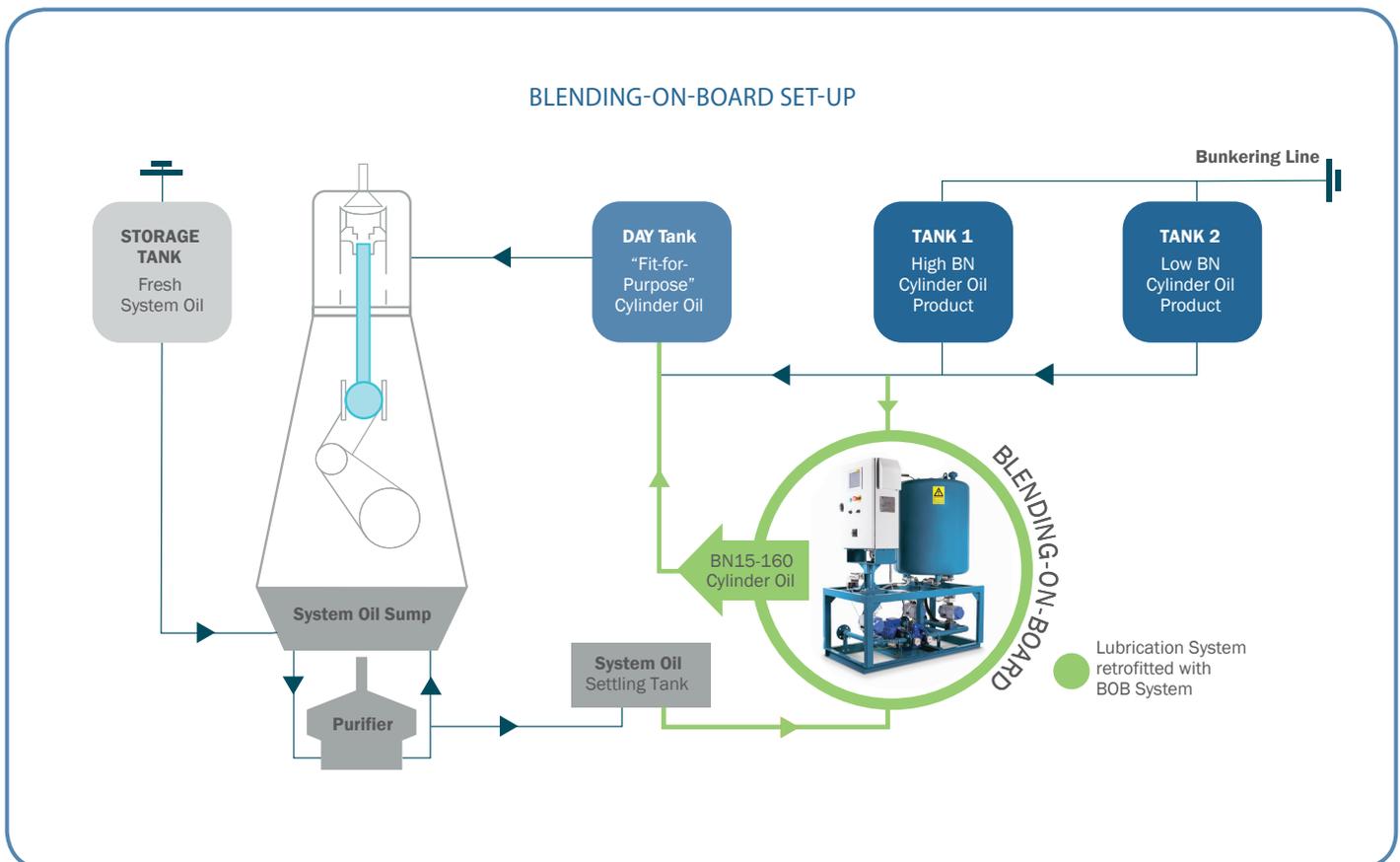
	USD/year
Cylinder oil savings	13,500
Reduced System Oil Waste	4,380
Fuel savings (0,5% acc. to BWSC study)	12,500
Reduced component wear	6,000
Total savings (USD/year)	36,380



COST AND SUSTAINABLE BENEFITS

With the installment of the SEA-Mate® Blending-on-Board, Clara Maersk has gained both cost-effective and sustainable benefits through more efficient use of lubrication oils, reduced oil and energy consumption, and less wear on system-parts. With a SEA-Mate Blending-on-Board installed, the vessel eliminated the worries and timing of changeover plans for the cylinder oil, as the vessel can begin to blend the existing cylinder oil to a lower BN when the fuel is changed. With a BOB installation, the result is a cylinder oil fit for the specific operating conditions for each vessel and a reduction of Clara Maersk cylinder oil consumption by 25% on the currently used feedrate, resulting in a significant cost reduction of 13,500 USD/year, entirely based on cylinder oil reduction. Taking into account the reduced system oil waste, lowering fuel consumption, and reduced component wear, this sums up to significant annual savings and offering a return-on-investment on the BOB system of approximately one year.

These significant reductions are directly linked to more responsible consumption on Clara Maersk. With the reduction of 25% cylinder oil, calculating 36 m³/year (2015) to 27 m³/year (2016), resulting in an annual reduction of 9 m³/year consumed cylinder oil. Transferring this to reduced annual CO₂ emitted from the cylinder oil alone on Clara Maersk it can be calculated an annual saving of approximately 27t CO₂ per year in cylinder oil. Moreover, with the installment of BOB, Clara Maersk is contributing to Maersk's commitment to the UN sustainable development goals 12 and 13, enabling a more responsible consumption.



SEA-Mate Blending-On-Board system with an example of pipe layout.

For more information and contact details, please visit us at www.marinefluid.dk