LONGER LASTING LUB OIL REDUCES SHIP EMISSIONS, COSTS

By: Peter Weide, Managing Director, MarShip UK

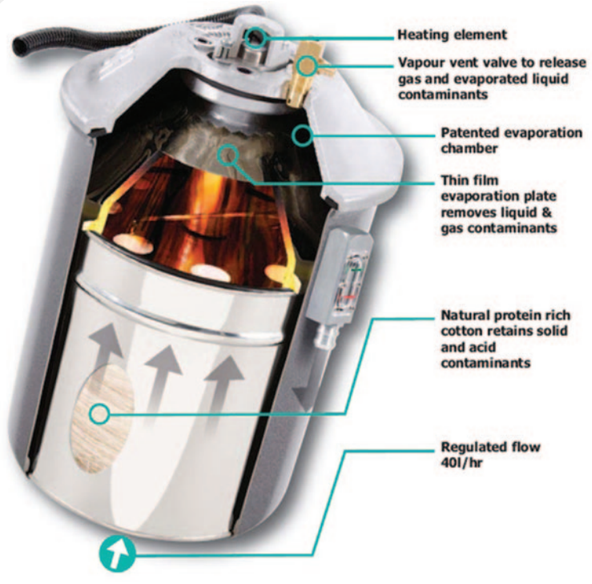
Transporting 1 ton of cargo 1 km by air produces approximately 400 grams of carbon dioxide. Doing the same with a medium-sized container ship produces 40 grams, or one tenth the amount, making shipping by far the most carbon efficient means of transporting goods.

However, because there are far more ships than planes, shipping still contributes an estimated 1.15 billion tons of CO_2 annually, or almost 4.5% of global emissions of the main greenhouse gas. In comparison, the aviation industry is responsible for 650 million tons of CO_2—half that of shipping. Further, it is suggested by most studies that shipping emissions are set to become the biggest contributor of manmade CO_2 after cars, housing, agriculture, and industry. In short, it's vital that the ship-ping industry cleans up its act.

Lubricating oil waste is one area where breakthroughs can significantly reduce CO_2 emissions. Vessels both large and small depend on oil. While Green Ship Technology may eventually solve the issue, this does not help the vast majority of vessels that rely on oil for lubrication. So what exactly can be done? In short, make the lub oil last longer.

The Environmental Impact of Oil Waste

Typically, vessels with smaller engines carry out oil drains at 500 hours and replace following manufacturer recommendations or when the oil has become contaminated with combustion products or fuel. Not only is this expensive, but this oil "wastage" has a major environmental impact. An engine running just 4,500 hours a year undertakes nine oil changes a year—which could equate to approximately 3,600 liters of oil used and disposed of in an engine with a 400-liter sump. It's clear that this usage must be reduced soon in order to ensure this valuable resource stays at an affordable price.



Reducing the cycle of draining and disposal is an obvious starting point, and it's easy to do. For example, the EDI oil purifier from MarShip UK can reduce the cycle to twice yearly oil drains—meaning only 800 liters of oil is used. Simply put, this reduction benefits the environment as it reduces cost.

An Ocean of Difference

It's all about perception. After all, changing a relatively small amount of oil every so often doesn't grab your attention, but "every so often" can translate into 9, 10, or more times a year and a savvy operator realizes that this volume of oil can nearly equal the amount found in the main engine, which they do anything to save. About 500 liters per oil drain is not seen as much, but 5,000 liters a year (from 10 oil changes) adds up to a lot. Project that across the worldwide shipping industry, and you're talking about an initiative that could make an ocean of difference.

Lubricating oil in large slow- and medium-speed engines is never drained out and changed. There are thousands of liters (and thousands of dollars) circulating in these engines, so engineers send samples of the oil for laboratories to analyze and keep it clean with purifiers until the lab report advises them to replace it. The only reason that this has not been done with smaller engines in the past is that the capital cost of these large purifiers far outweighed the savings, so it was cheaper to just drain and replenish the oil. Smaller purifiers were simply not available—until now.

The extended oil drain (EDI) is to oil as the kidney is to the blood. Because oil contains smart additives that hold contaminates in suspension (some oils are better than others), the oil becomes saturated with these contaminants. This is when it needs changing. All you really need to do is remove contaminates so you can continue to use the oil. Many engine manufacturers and original equipment manufacturers are already doing this. They recognize that extending oil drain in their engines with a simple bypass oil filter that cleans the oil will allow for longer life of the oil; however, this is only half the story, as the acids from combustion and any diesel fuel must also be removed.

To ensure that oil is properly cleaned to a suitably high standard, MarShip UK advocates a two-stage process. First, the oil should be filtered to two microns and then passed through an evaporation process to remove gaseous acid and fuels. But, you need to do more than just filter it. Employing a two-stage process ensures that the oil is clean and can be used up to four times longer. In fact, it is conceivable that with a high-quality or synthetic oil in an engine fitted with a cleaning system, the oil

will last many thousands of hours between changes. This is critical for ship owners because as the oil remains in service they can employ oil analysis that helps detect any potential engine defects. For example, the owner will be able to see if there's copper, tin, or lead in the oil—indicating prob-lems with the cylinders—or if the oil contains aluminum, which can indicate a problem with the pistons. You can't do that if you drain your oil every 500 hours!

Case Study 1

MarShip UK installed two EDI filters on The Humber Viking for Meridian Marine Management to solve a fuel dilution problem. The lub oil in this case had serious fuel dilution problems, meaning the fuel had found its way into the lub oil. The lub oil has a certain viscosity and the fuel has a much lighter viscosity, which thins out the lub oil. In this case, the client's standard practice was to drain the oil every 250 hours; however, they were struggling to reach 200 hours before the dilution become so severe that they had to dispose of the lube oil and replace it. Two EDI units were installed, the oil changed, and a sample taken. Our results showed a level of fuel of 3.4% even in the brand new oil, indicating how much old oil is left behind during an oil change. We started the process, and the fuel dilution decreased to zero over the next 1,000 hours of the target trial period. Due to the evaporation effect in the EDI, the fuel is being evaporated, so gradually the lighter hydrocarbons are being burnt off while the heavier ones are being caught in the filter. This was fully supported with an oil analysis program to ensure the engine was never compromised. Owners of similar vessels were also experiencing problems and purchased EDI purifiers; unfortunately, the engines failed catastrophically before they were fitted, resulting in complete engine rebuilds.

Case Study 2

An additional test was carried out on a CAT3508 operating 4,500 hours a year. The number of service intervals in this example is nine, meaning changing and disposing of the oil and filters nine times a year. The total cost for each change is £1,010, for the total cost over the course of the year of £9,090. In this case study, two EDI filters were installed by the engineers on board immediately fol-lowing an oil change. The cost of two EDI purifiers is £1,782, but they reduce the number of service intervals to an average of 2.3 a year. To change the oil using an EDI, it costs £1,236, a total cost for the first year of £4,563 that includes the units. Essentially, the ROI is within two oil changes or 2-3 months. Using the example above, years two to five produce greater savings – around 69% or £6,309.

The filter was changed (an exceptionally easy process) at 250 hours as the EDI has a "cleaning effect" that results in the filter getting prematurely blocked (a spare filter is

included with the EDI to ensure this vital step is not missed). At 500 hours, when the oil would normally be drained, samples were taken every 100 hours up to 2,000 hours. Following each sample, an analysis report was emailed to the Superintendent—all included in the service offered by MarShip UK. Reducing the number of oil changes from 9 to just 2.3, means far less oil is disposed.

The ecological benefits are clearly evident and enormous. Introducing an oil cleaning process means vessels can use up to 75% less oil and return a monetary savings of 69%. Also, the engine can last longer between overhauls because the oil is cleaner, returning even more environmental and monetary savings.

This is a remarkably simply process utilizing few parts: a filter, a chamber, and a heater. Given the case studies described above, it's easy to see why the system is so popular. Oil companies recognize that their oil is prone to contaminates and acid degradation, so if they can use a system that can remove these contaminates, the oil will last even longer, which is good for their customers. But until this happens, the onus is on the vessel to responsibly manage their oil. Cleaning oil used by the engine is one of the most environmentally friendly changes that a vessel can undertake. It is only by embracing such changes that the shipping industry can maintain its reputation for being the most environmentally sound way of transporting. An additional benefit from extending oil drain by four times is that the life of the filter is also extended by four times, meaning that filters are not being thrown out as frequently, adding further enviornmental and monetary savings. For more information, visit www.marship.eu.