

The Great Lubricity Caper

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In recent months some vessel owners have reported they have been told by certain fuel treatment makers that 2020 0.5 percent sulfur fuels may routinely suffer from insufficient lubricity. The remedy? Treatment with the same lubricity additives most owners use today for 0.1% sulfur fuels. Easy pitch for a salesperson wishing to quickly expand sales and reap handsome commissions.

Harks back to the American West of the late 19th Century when travelling “doctors” and “professors” shamelessly hawked tonics certain to ward off many frightening ailments, this clever fear tactic often relieving the struggling ranchers and farmers of their hard-earned Morgan silver dollars. Laced with laudanum, alcohol, cherry juice, and yes, even rattlesnake oil, these elixirs made their consumers feel very safe indeed!

Yet while blended 2020 fuels are notoriously problematic in many ways, poor lubricity has not been among any of the challenges. Fuel testing laboratories and suppliers have been very quiet on the subject. No warnings by testing laboratories, no news stories, no reports by owners, no bulletins by engine makers regarding insufficient lubricity.

And for good reason. The 2020 fuels are blends of both high sulfur distillates, heavier fuels and hydrotreated, low sulfur distillate fuels – blends calculated to have a sulfur content of no more than 0.5 percent. Suppliers are careful to achieve that mark. As the low sulfur hydrotreated component of the blend is far costlier than the others, blenders are careful to limit the amount of hydrotreated fuel – using only enough to reach right at, or just a fraction below the 0.5 percent mark.

Yet with a 0.5 percent sulfur content, is not the lubricity of these fuel now compromised, posing great risk to fuel delivery systems?

Hardly. Truth is, almost all diesel fuel sold in the United States for many decades until 1993 had a maximum sulfur content of 5000 ppm, or 0.50 percent. The one exception was California, where the maximum sulfur permitted was 3000 ppm, or 0.3 percent. In October 1993, the California Air Resources mandated a state standard of 0.05 percent for both highway and off-road diesel fuels. While all types of diesel vehicles and engines ran perfectly fine on fuels under the old standards, suddenly the nightly news was filled with reports of hundreds of trucks stranded on freeways throughout the state – fuel pumps quickly disabled by the poor lubricity of the 0.05 percent fuels.

CARB and EPA regulators had neglected one key point. The hydrotreatment process used to manufacture the new fuel also stripped out the oxygen and nitrogen compounds responsible for lubricity. The 0.05 sulfur fuels were simply lubricity deficient. Within weeks, onshore fuel distribution terminals began injecting lubricity treatment into these fuels. Then in 2004 CARB established a new lubricity standard – a maximum 520 micron wear scar rate in HFRR testing. Just in time. Two years later, CARB mandated a 15 ppm maximum content – just 0.015 % - now dubbed ultra- low sulfur diesel fuel (ULSD). The United States Environmental Protection Agency (EPA) adopted the same mandate four years later in 2010 for all USA fuels.

Today all diesel fuels sold onshore in the USA are treated with lubricity additives. By law, refiners are forbidden to add them directly into pipelines, as is the case in almost all countries globally. Rather, lubricity additive fuel injection systems are in place at regional onshore fuel distribution terminals for injection after being received from the refinery pipeline. Yet most 0.1% sulfur fuels received by commercial marine vessels are refinery direct – leaving it up to each vessel owner to purchase stocks of lubricity additive to treat fuel during bunkering operations.

But back to 0.5% sulfur marine fuels. If the decades long use of 0.5% and 0.3% sulfur fuels in the USA and California never showed any indication of failures attributed to poor lubricity, why should vessel owners today feel it necessary to spend considerable sums on lubricity additives for a fuel with a sulfur content never known to be problematic?

Fact is, no such purchase is necessary. The 0.5 percent 2020 fuels easily comply. The below chart tells the story. Samples of 0.5% sulfur fuel were recently taken in Singapore, Houston and Antwerp and HFRR tests were conducted at NAIAS Laboratory in Athens. The results make it abundantly clear why no 0.5% marine fuel need be treated with lubricity additives, and why even HFRR testing is simply not needed for these fuels.

HFRR TEST 0.5% SULFUR FUEL (Max 520 microns)

Port	Result (microns)
Antwerp	106
Houston	200
Singapore	166

For 0.1% fuels mandated in ECA areas, the situation is wholly different. These fuels are also blended – but not in all cases. In some areas, especially in California, little or no blending is conducted. Rather, the vessel receives ULSD automotive diesel fuel, mandated not to exceed 0.015% of sulfur. As these fuels are refinery-direct, no lubricity component is added. Within just a few hours, fuel delivery systems can suffer catastrophic failures, putting all at risk, unless the fuel is treated by personnel onboard.

For those aspiring salespeople who wish to emulate the great medicinal showmen of the 19th Century American West, in due course they will have no choice but to heed the advice of W.C. Fields, who wisely opined, “there comes a time in the affairs of man when he must take the bull by the tail and face the situation.”