



The Cost of Fraud in the Maritime Fuel Market

SUMMARY

The \$120B¹ maritime fuel market (“bunker fuel”) is rife with fraudulent behavior resulting in enormous losses from common practices that can be corrected through trusted technology which enables better transparency. We invite you to learn more about how this is possible.

1. Saurabh Dixit, Rutuja Danekar , Eswara Prasad. (2020). Bunker Fuel Market by Type. Allied Market Research. <https://www.alliedmarketresearch.com/bunker-fuel-market#:~:text=The%20global%20bunker%20fuel%20market,bunkers%20to%20power%20its%20engines>

The Problem: **Fraudulent Activity Has Significant Financial Impact**

One of the more widely observed examples of fraudulent behavior is misstating fuel density at time of delivery. Marine fuel is always sold by weight (mass) and delivered by volume. If the density on the BDN (Bunker Delivery Note) is inaccurate – where the volume received reflects a higher quantity than the actual weight delivered – then the short-delivered quantity results in a commercial loss.

Studies have shown that 66% of VLSFO (Very-low Sulfur Fuel Oil) samples analyzed had a lower density declared on the BDN than the actual lab-tested density of the fuel; a typical indicator of “short bunkering”².

Annual Average Loss per Small Fleet

390,000 USD

for a fleet of 20 ships with 8 bunkerings each per year

However, it's equally important to understand that not all density discrepancies are due to intended fraud. They could instead result naturally from unintentional contamination that impacts the density. The industry currently lacks the ability to see patterns of contamination, whether intentional or not, and a means to predict the risks associated with density discrepancies.

It's easy to see from the below study that the cost of short bunkering to the industry is well over \$1B annually when you consider there are roughly 128K vessels in the global fleet. What's not so easily observed is the impact of the unspoken industry practice of ignoring fuel quantity discrepancies of less than 0.3%.

FuelTrust Study: **Economic Impact due to Density Deltas in Bunkering Operations**
September 1, 2019 to February 21, 2020

Bunker stemmed per vessel each month	avg. 1000mt
Density of Fuel @15 ^C (BDN declared value)	0.9889
Density of Fuel @15 ^C (actual tested value)	0.9889
Density Delta @15 ^C	0.0024
Short Delivery/month due to Density Delta	2.4mt /month
Annual Economic Impact per Vessel (USD)	\$14,880.67

2. VLSFO Insights. (2020). Veritas Petroleum Services Group. <https://www.v-p-s.com/vps-data-services/vlsfo-insights/>

As an example, a 0.29% difference on a 1000mt fuel delivery, or approximately 290mt, would likely not be disputed, allowing a \$130K loss to be deemed acceptable. This practice means that customers continue to pay for product they don't actually receive, and billions of dollars are being lost annually across the industry.

Areas For Fuel Fraud

Temperature to Volume Relationship

Much like the issues seen with density inaccuracies, another common area for malpractice exists in the temperature to volume relationship. All petroleum products have a high rate of thermal expansion which must be taken into account when significant quantities are being delivered. If a fuel delivery agent were to understate the temperature during the opening gauge and then overstate the temperature at the closing gauge, a volume discrepancy could quite easily occur.

Water in Fuel

Further, water in fuel isn't uncommon from such sources such as tank condensation. However, in some cases, deliberate injection of water has been an issue which not only impacts the quantity, but also the quality of the fuel. Unfortunately, the exact proportion of water in the fuel can't be determined upon delivery – it's only after settling that a true measurement can be determined. Costs related to high water content aren't limited to the loss of true fuel but may also include disposal costs of water separated from the fuel by the vessel's OWS (oily water separator).

Bunker Fuels

Literally the bottom of the barrel of refined crude products, bunker fuels are inherently "dirty", even in their most pristine condition. Being barely more liquid than road tar, it's easy to understand why these fuels need distillates and additives ("cutter stocks") to reduce their viscosity enough to function in ship engines. Imagine the thin line between acceptable enhancements that improve their quality, and contaminants that can catastrophically damage a ship's engine. Everything from used motor oil, restaurant vegetable oil and rubber by-products have been found in "bad bunkers" - none of which should be part of a reliable fuel supply chain. For years it's been understood that bluewater ships were the "incinerators of the refining industry," but it's unacceptable that they have become literal incinerators that contaminate the global environment as a result of fraudulent acts.

Intended Collusion

One of the more common, and least technical, forms of bunker fraud is that of simply delivering less fuel than purchased through collusion between the supplier or barge crew and the ship crew. In such a case the buyer orders 1000mt of fuel but only receives 700mt. The ship crew signs the BDN to reflect the full receipt of 1000mt. The buyer then pays the supplier for a full delivery with

the value of the 300mt delta (\$150k at \$500/mt) being split between the colluders. The ship crew then covers the shortage by recording greater bunker consumption than what actually took place.

Practices like this could involve an owner defrauding a charterer, the ship crew defrauding their owner, a charterer's bunker buyer defrauding the charterer, or some combination of these scenarios. The best way to avoid this type of collusion fraud is to use reputable third-party bunker surveyors, along with regular voyage performance monitoring. Because this requires more expense, new hardware, and work, it's often bypassed by those less than diligent or vigilant.

To further complicate fraudulent matters, should an owner have a dispute with a charterer over the fuels provided to the vessel, either in quantity or quality, they have a limited window of time in which they can lodge their protest and several obstacles to overcome to secure resolution.

BIMCO, an international shipping association with over 2,500 members in 123 countries, has updated their widely accepted Standard Fuel Sulfur Content Clause for Time Charterers in response to the MARPOL air quality regulations which came into effect in May 2019. Their aim is to give clarity for all parties complying with the new requirements. As such, charterers must now provide the vessels they're using 'with fuels of the necessary sulfur content to allow the vessel trade within the emission control zones ordered by the time charterers.' Should the sulfur content not be within the required specifications, as determined by the lab analysis post fuel delivery, the owners must consider whether any applicable indemnification from charterers might cover them if regulatory penalties are incurred. If questionable fuel has been used, owners must determine how much risk the vessel has been placed under mechanically. With only 14 days to file a quantity claim and 30 days to file a quality claim, the onus of responsible investigation places a tremendous amount of pressure on owners that oftentimes may be unachievable under the best of conditions with current technology or manual methods.

Bunker fuels constitute roughly 60% of a vessel's operating expense. Any fraudulent activities impacting this cost amounts to a substantial³ loss for the owner/operators of the vessel. Additionally, with the industry commonly accepting up to a 3% loss due to short bunkering, the financial effect is well over \$3.6B a year.

3. Stratiotis, Elizabeth. (2018). Fuel Costs in Ocean Shipping. More Than Shipping. <https://www.morethanshipping.com/fuel-costs-ocean-shipping/>

The History: **Fraud Is Not New**

Fraud in the maritime industry is not new. As far back as 300 BC, when a Greek sea merchant intentionally committed insurance fraud, stories of scandalous behavior on the high seas have been shared. Today it is much harder to prove fraud, however, it's clearly ongoing, as evidenced by the number of recent lawsuits between fuel suppliers and shipping principals. While off-spec bunker fuel claims represent only about 3% of total machinery claims,⁴ they reflect approximately 6% of the costs.

Studies from the P&I (Protection and Indemnity) clubs indicate that 42% of claims, totaling \$297M per year, are categorized as "machinery", of which 34% are due to main engine damage. Of those with engine damage, 16% are caused by off-spec bunkers,⁵ which cost \$545K on average to repair. These machinery claims do not include catastrophic claims due to loss of propulsion, most often tied to fuels or long-term damage from fuels. Such catastrophic claims can be in the millions, to hundreds of millions per incident.

Since the arrival of new fuels necessary for compliance with IMO2020, shipowners have begun to see new problems arise. One is the troubling pattern of abnormal wear on engine pistons that may not be correctable without additional, although costly, efforts to mitigate damage. Critics point to the fact that these debatably harsher VLSFO products became the dominant fuel type in shipping over a four-month period, from September 2019 to January 2020,⁶ as a somewhat compulsory option to comply with the new standards; perhaps without a full understanding of their impact on engines originally designed for older, heavier fuel oils. Additionally, many shipowners have faced the painful realization that these fuels can sometimes be unstable when mixed with other fuels, forcing them into expensive commercial decisions to avoid fuel co-mingling issues.

To make matters worse these new fuels, that are required to address global climate concerns, are now being opposed by environmental groups who describe them as super-pollutant 'frankenstein fuels' because of their potentially toxic impact if they were ever spilled into the ocean. After the recent grounding and fuel spill of the *Wakashio* off the coast of Mauritius in August 2020, some are calling for bans on use of these fuels in Arctic waters which could lead to costly diversions from typical shipping lanes if such fear spreads to other waterways.

Operating heavy machinery in the middle of the ocean is risky under the most trustworthy conditions. When the potential of contamination or instability of fuels, whether intentional or not, is introduced exponential risk is created. The only viable way for the maritime industry to safely embrace these new fuels is under the umbrella of transparency with decisions backed by data from partners who are empowered to mutually trust each other.

4. Main Engine Damage Study, The Swedish Club, 2012

5. Global Marine Insurance Casualty Trends, IUMI Cefor, 2018

6. Degnarain, Nishan. (2020). Shipping-Gate Timeline: How the Global Ship Fuel Controversy Came About. Forbes. <https://www.forbes.com/sites/nishandegnarain/2020/12/21/shipping-gate-explained-how-the-global-ship-fuel-scandal-came-about/>

The Solution: **FuelTrust Risk Provenance[®] Platform**

Creating a trusted fuel ecosystem through transparency and traceability

FuelTrust leverages its technology platform to authenticate relationships across the fuel lifecycle, digitally verify data from shared sources, validate compliance, and identify potential fraud.

Backed by the power of Artificial Intelligence and Blockchain, the FuelTrust platform provides reliable origination, protected traceability, responsible transparency, a full DNA of the data, and connected and meaningful insights.

With deep insight into when, where and from whom fuel is supplied, our solution allows you to alleviate the financial impact of bad fuel, mitigate regulatory risk, and empower greener fleets.



**Make compliance
transparent**



**Identify potential fuel
fraud and engine risks**



**Minimize supply chain
friction and costs**



**Reduce carbon-
sulfide pollution**

If you'd like to learn more about how the FuelTrust Risk Provenance Platform can help you enable a trusted, transparent, and traceable fuel ecosystem, please contact us at info@fueltrust.io



About Us

FuelTrust® is a start-up SaaS company building industry solutions through its Risk Provenance® Platform. Along with our head office in Houston, Texas, our growing team is spread across the US and Europe.

Leveraging advanced AI and a private blockchain network, we help complex industries form trusted commercial ecosystems through transparency and traceability.

Through deep insight into when, where, and by whom risk is introduced into a business lifecycle, FuelTrust empowers companies to identify opportunities, reduce fraud, mitigate risk, and validate compliance in every part of their business lifecycle.

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