

What makes bunkering so difficult?

By Carsten Hounsgaard, Project Sales Manager at Insatech

Cheat and defraud of fuel quantity during bunkering operations is a considerable problem and may result in many vessels being invoiced for more fuel than actually received. Since fuel costs constitute between 50 pct. and 70 pct. of a ship's total operational costs, even small differences in fuel quantity become large extra costs for shipping operators and shipping companies.

Purchases and sales of oil in the marine industry are, roughly speaking, to a large extent driven by a microeconomical, basic human behaviour of profit maximization. As oftentimes seen, some oil traders have a preference for fuel quantity tampering, however usually only to an extent where the trader remains "accepted as a part of the group" and thus continuously enabled to do business with his counterparts.

Obviously, when it comes to trading of oil between two professional companies, there will be a set of contractual rules and official standards regulating the price of the oil being traded. There are large sums at stake every time a deal is made, and a number of different stakeholders are seeking to make a profit on the deal. Since the oil trading industry is a system where everyone knows the cost price of the oil being traded, the rules of supply and demand can contribute to explaining the trading pattern. This means that the sales price ends up being equal to the cost price because no one wants to suffer a loss. Hence, if someone pursues profit in this system, few options are left – one being fraudulently exploiting the amount of oil being traded. It is not unusual for a bunker to be traded up to five times before reaching its end-buyer who then actually takes it into use.

Every time a bunker is traded, the possibility exists that the company selling the oil has cheated on the amount of oil delivered. Indeed, the further out on sea the trade of oil takes place, the less regulation and control there seems to be. This has to do to with the fact that there is no supranational government or agency with the authority to control and regulate oil trade through law enforcement. To put it crudely, the only law of the sea resembles the "law of the jungle".

As the oil "moves" through the sales chain, it will at some point end up in the hands of the end-buyer. This person or company is, presumably, the only one in the chain who does not make a living of trading oil. He is probably the one in the chain with the least amount of technical and practical knowledge of oil, and definitely the one who legally seen is least protected against cheating. Inevitably, this end-user market where a lot of money is being exchanged, and where no supranational sea authority yet exists, will attract persons or companies who are willing to do just about anything to make a quick profit. And frankly, it is not difficult to profit off of this market as all it takes is low moral standards and a bit technical and practical knowledge about oil. Unfortunately, those people who cheat on oil delivery give the majority of bunker traders, who actually "play it fair" and would never consider cheating, a bad reputation, too.

So why is non-fraudulent bunkering so difficult?

As soon as a deal between a bunker trader and an end-user has been made and the latter feels he can rely on the bunker trader, it is time for the actual bunker job to begin. When the actual operation of bunkering between two vessels takes place, different stakeholders will seek to profit from the bunkering, which may result in some of these typical scenarios:

- The bunker seller himself cheats on the amount of oil delivered
- The bunker seller's crew try to cheat on the amount of oil delivered
- The bunker seller's and buyer's crew form an alliance in order to cheat on the amount of oil delivered
- The buyer's crew cheat the seller
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What these possible scenarios have in common is that fuel tampering is only possible during the critical time of point when oil is being delivered since the different stakeholders who want to cheat can do so by short-delivering. The following case description illustrates how Insatech's Bunker Control System was able to detect and document cheating during bunkering.

The price of one bunker job gone wrong is equivalent to an investment in Insatech's Bunker Control System

In June 2013 Insatech Bunker Control System documented cheating during bunkering. The receiving vessel had been delivered 53.3 metric tons short. That is equivalent to USD 31,980. For the shipping company this meant that the investment in Insatech's Bunker Control System was "paid back" on just one bunker job.

The most common way of measuring the quantity of fuel received during bunkering operations is by measuring volume, which creates the basis for the calculation of the mass of the fuel. These measurements are usually performed by sounding in tanks. However, this way of measuring is not enough to give a correct measurement of the quantity delivered as the volume can be manipulated. Volume is relative when it is converted to mass, relative to temperature and density. So when selling oil, there will be a gain in "talking the temperature down" and there is a major gain in introducing air in oil and lowering the density. This gives an incorrect calculation of the mass, when the measured volume at temperature is calculated back to volume at 15 degrees and then multiplied with density. If the start temperature is wrong and air is introduced the results are that the customer ends up paying for more fuel than he has received. The Insatech Bunker Control System provides the crew, operators and shipping companies with safe monitoring of oil transfer and true knowledge of the transferred amount, ensuring that they do not pay for more than they receive. The following case study will illustrate this.

"The success of any bunker quality and quantity dispute will depend upon the quality of the evidence collected in support of the claim".

In June 2013 Insatech Bunker Control System showed that a receiving vessel had been delivered 53.3 metric tons short during bunkering. We choose not to name the port or the bunkering company. For more specific information about this case, you are more than welcome to contact Insatech, mail@insatech.com, +45 5537 2095.

On the receiving vessel, a Yokogawa Coriolis mass flow meter, of the type Rotamass, was installed and controlled by a bunker control system from Insatech A/S.

Measurement results from the bunker operation:

- Vessel sounding: 818.1 MT
- Barge measurement: 820.3 MT

The two measured and afterward calculated values are corresponding to standard information level on a barge to vessel transfer, and give no rise to concern. However, the vessel had a mass flow meter installed, and its reading showed:

- Mass flow meter: 767 MT
- The difference in barge figures is $820.3 - 767 = 53.3$ MT

Or, when converted into USD 600/MT = the price of USD 31,980!

Why the different measurement values?

The Insatech Bunker Control System registered what the manual sounding did not have a chance to observe, i.e., that the barge during operation switched tank and left the valve from the empty tank just a little bit open. The Insatech Bunker Control System will, by detecting the mass, not the volume, provide you with a valid and reliable measurement. In other words, when calculating from volume to metric tons, the barge and vessel are using the wrong reference which becomes clear when you go through the collected data from the bunker control. Therefore, the flow meter is right when it claims you have been delivered 53.3 metric tons short equivalent to USD 31,980.

To have an Insatech Bunker Control System installed on your ship will help you in case you need to prove that you have received less fuel than you paid for. The golden rule of bunker disputes is: "The success of any bunker quality and quantity dispute will depend upon the quality of the evidence collected in support of the claim".

Insatech Bunker Control System

The system is a one (HFO) or two (HFO+MGO) flow meter solution based on the Coriolis principle. The Coriolis principle mass flow meters ensure correct mass measurements, temperature and density. The Bunker Control installation can be supplied according to MID Annex MI-005 as an option (Custody transfer). The MID guarantees that measured values are correct and is a strong asset in any claim situation. The Bunker Control System has a built in anti-pilferage function. Entrained air will be detected immediately and alarm will be given. This ensures that surprises due to the cappuccino effect are eliminated. Furthermore, the reverse flow totalizer guarantees that only net flow is measured. All data is summed up in an automatically generated bunker report (optional MID approval).

Features

- Direct measurement in metric tons (vacuum)
- Direct actual density measurement
- Direct temperature measurement
- Online calculation of Density15
- Built-in anti-pilferage function
- Average temperature calculation
- Average Density15 calculation
- Air in oil detection and alarm
- Counter per delivery

- Total counter - not resettable
- Reverse flow totaliser
- Full data log of every parameter available in the system
- Full bunker delivery report

Optional features

- Data integration via internet
- MID certification
- Sulphur measurement
- Water in oil measurement
- Automatic sampler

Flow measuring equipment

- Mass measurement using the Coriolis principle
- +/- 0.1% accuracy of flow rate
- Reproducibility of reading: +/- 0.05%
- Temperature measurement +/- 0.5°C +/-0.2% of reading
- Density accuracy: +/- 0.00005 g/cm³ (non aerated liquids)
- Mass flow measurement up to 600 t/h
- Special detector decoupling ensuring high independency of external loads and vibrations
- Available in explosion proof versions
- Optional heat tracing

Viscosity measuring equipment

- +/- 1% accuracy of reading
- Reproducibility of reading: +/- 0.5%
- Density independent (not a tuning fork)
- Explosion proof
- Output: 2 x analog or 1 analog and 1 serial (RS232 or RS485)

Blend unit actuator

- Operating time 90°: 2 – 11 sek.
- Open/shut: 90° - 180° rotation angle
- Position indication: Cam switches (options: potentiometer or transmitter 0-(4)-20mA)
- Explosion proof
- Optional failsafe device, mechanical or electric

About Insatech A/S

Since its formation in 1989 Insatech A/S has been located in the city of Vordingborg, Denmark. In 2005, the company became a part of Swedish Addtech AB, a technology trading group. During the financial crisis Insatech A/S has had a positive development up until today where more than 60 workers are employed. The annual turnover for 2013 is expected to exceed € 15 million and expected to rise by 25% per year in the years to come. Insatech A/S delivers quality products, consultancy, and technical solutions within field instruments, control, and calibration to nearly all industries and processes.

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