

# THE DIESEL DOCTOR

**Peter Weide**, director of MarShip, continues his occasional series with advice on fuel contaminants – and how to deal with them

Last time, we looked at the problems associated with modern diesel (*Fishing News*, 12 December). This month, we are looking at the contaminants in fuel, where they come from, and what to do about them.

By far and away the greatest contaminant in fuel is water. It comes from the atmosphere through condensation, the supplier, leaking fuel coolers and poor fuel storage.

Water is responsible for degrading the fuel, reducing the lubricant quality, and rusting the tank and fuel system components. It harbours diesel bug, and has even been known to explode the tips of fuel injectors, leading to catastrophic engine failure.

Lying in the bottom of the tank, the water reacts with the fuel, producing a very mild acidic layer which accelerates the degradation of the diesel, producing sludge. It can reduce the stability of the fuel, leading to the agglomeration of asphaltenes which settle on the bottom as more sludge, identifiable as a black, shiny, tar-like substance.

Water in suspension in the fuel will reduce the lubricating qualities of the fuel, and given that the lubrication in modern diesel is questionable at best (more about that next time), any reduction will negatively impact the life of fuel injectors and pumps.

Rusting? That speaks for itself on the bottom of the tank, but be mindful that saturated water in the fuel can settle in injectors and fuel pumps when the engine is stopped, which

will naturally lead to early failure.

Last but not least, it harbours diesel bug. That's the black slimy sludge you find on the bottom of the tank and in your filters. Engine failures are one of the most common reasons for rescue by the RNLI, and those engine failures are very often due to blocked filters from sludge, particularly diesel bug.

Diesel bug is the collective name for bacteria, yeast and mould. It doubles its number every 20 minutes, lives for 48 hours, then dies and sinks to the bottom to join the excrement from when it was living. You know about it when your filters start blocking up.

Imagine one teaspoon (5ml) of diesel bug doubling its number every 20 minutes – that becomes 10ml in 20 minutes, then 20ml in 40 minutes, 40ml in one hour, 80ml in one hour 20 minutes, 160ml in one hour 40 minutes, 320ml in two hours and 640ml in two hours 20 minutes. So in about two and a half hours, you can get a litre of diesel bug from a teaspoon!

OK, so that's in a lab under perfect conditions – but think about your fuel tank: very dark, very still, and gently warmed by fuel returning from the engine – well, that's about as good as it gets for bacteria to start multiplying. You'll know about it when you hit the breakwater.

The good news is that water is the easiest contaminant to remove – just open the drain cock on the tank regularly and drain off the water – it's as simple as that!

If you don't have a drain, consider getting a Diesel Dipper® with a Dip Tube. This will suck from the very bottom of your tank while your engine is running and at sea, so scouring everything – water, sludge and all – off the bottom of the tank.

If you know you have had diesel bug, you need to kill it with a biocide. Our DieselAid® B is a neat biocide with engine manufacturer approval. Don't use a treatment that absorbs water into the fuel – that's the last thing you want, especially on a common rail engine.

What of the other contaminants? Dust, dirt, rust, etc will be handled by your filter. There is more evidence now of poor-quality biodiesel giving waxing problems, which we will discuss next time, but it is worth noting that water can promote this waxing, so the importance of draining the water from your tank cannot be overstated.

Always remember: no water equals no bug (and mostly none of the other problems either).

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▲ Asphaltenes are identifiable as a black, shiny, tar-like substance which settles on the bottom of the fuel tank.

## GOING BEYOND THE LAW

We are all familiar with finding the law in acts of parliament and regulations, but do fishermen need to do more to comply with health and safety legislation? **Duncan MacLean** of Brodies LLP explains



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In health and safety legislation, the main act is the Health and Safety at Work etc Act 1974, and the plethora of regulations under it. Shipping's equivalent is the Merchant Shipping Act 1995. Is it enough to comply with acts and regulations, or do you need to go further?

### Codes and guidance

The HSE publishes Approved Codes of Practice (ACOPs) and guidance. ACOPs are approved by the HSE and give practical guidance on how to comply with the law. Following the advice given will generally allow a party to demonstrate compliance with the law, although it can of course use alternative methods.

HSE guidance advises how to comply with the law, and may include technical detail and information to be found elsewhere. The Maritime and Coastguard Agency (MCA) publishes Merchant Shipping

Notices (MSNs), which convey mandatory information that must be complied with under UK legislation. MSNs tend to relate to regulations (made by statutory instrument), and provide more corresponding technical detail. The MCA also issues Marine Guidance Notices (MGNs), which give advice and guidance – sometimes referring to codes – relating to the improvement of the safety of shipping and life at sea, among other things.

### Why this matters

If a prosecutor proves that a party charged with an alleged breach of health and safety legislation did not follow the applicable ACOP, then that party needs to show that it complied in another way. Similarly, any ACOP or guidance may be used to show the appropriate standard expected in an industry, in the event of a civil claim.

In the marine sphere, the MCA uses MGNs to provide guidance, even though there is no statutory requirement for compliance. In a recent MGN dealing with the recovery of persons from the water, it was made clear that although it dealt primarily with mandatory requirements under the International Convention for the Safety of Life at Sea 1974 (SOLAS), it was also used to provide guidance for vessels to which SOLAS did not apply – thus demonstrating that these international provisions should be regarded as industry guidance.

The MCA stated that the MGN 'should, as far as practicable, be observed by the owners and operators of non-SOLAS vessels'. It included a non-exhaustive list of 12 types of non-SOLAS vessels, including workboats, pilot boats, fishing vessels and mobile offshore drilling units.

In a recent determination in a fatal accident inquiry into the death of a fisherman who was not wearing a personal flotation device, the sheriff made a specific recommendation to the industry that all small fishing vessel owners, operators and managers, employers of fishermen and skippers, and fishermen on small vessels should make themselves aware of specified MSNs and MGNs on the subject, and stated that they should 'ensure that they are followed'.

The sheriff indicated, however, that despite a substantial quantity of material being published by the MCA and others for the benefit of fishermen, the relevant publications did not appear to be making their way to the intended recipients. Although her determination was not directed towards any individual party and is therefore not binding,

the strong language used does demonstrate the courts' expectation that people will refer to guidance.

### Compliance with guidance is key

Safety of employees and workers is paramount, so awareness of and compliance with guidance, or compliance that achieves an equivalent standard, is the only safe course of action. Failure to do so may result in an organisation being the subject of scrutiny by the court.

The scale of the task should not be underestimated. The four documents referred to by the fatal accident inquiry sheriff on this one subject alone run to over 100 pages, and are directed to all manner of fishing vessels and crews across the country. Enabling communication of the message is therefore key.