

## The Surveyor the Sludge and the Smoke

I joined a small passenger ship as Chief Engineer, the previous incumbent having resigned over a matter of white smoke, of which the vessel had a long history. She was laid up in her home port, within a week or so in which the decor was to be refurbished after a recent dry-dock, so the matter of white smoke, while pressing, was not urgent, I thought.

Never having seen the vessel performing. I arranged to have the engines started the next day, just to obtain some benchmark of smokiness. This we subsequently achieved and there was, no doubt, a lot of smoke. Discussion with the ships personnel showed a wide range of views, most of which seemed to consist of 'it's not as bad as it was' (Engineers), or 'it's worse than ever' (Mates), but I put at least part of it down to the engines running on low or even no load. There was also possibly inadequate or incorrect preparation for sailing with optimum minimal smoke rather than 'acceptable', a very subjective concept.

While further considering the situation I arranged to test all the safety gear. A number of problems arose, but when it came to testing the emergency generator, with no success in Auto, Local or Manual, trouble was apparent. A look at the sight glass on the tank (it was a long time ago), showed a greyish fluid instead of a transparent gas oil column. We drained the glass and as feared, it was a grey slime, microbes.

The tank was drained down and cleaned. with the emergency generator systems also being fully overhauled and flushed. Before we filled it from a service tank I decided to inspect the service tank and again found slime. Being on shore power, I was able to open up the other service tank to find the same indications, as indeed I was to find in virtually all the tanks in the following weeks.

The immediate solution was to pump everything ashore, "quick clean" the settling and service tanks, plus the most accessible storage tanks, dose them with biocide and fill up with new throughout, thus having at least reduced the amount of microbial contamination. Pre-sailing checks showed the emergency generator running satisfactorily, and the engines, although not good, an improvement.

I couldn't understand though why the generators never smoked on starting. while the Main Engine invariably did, although intermittently reducing in intensity the weeks to come we cleared all the tanks, fuel systems, modified LO systems, stripped and rebuilt the Main engines, investigated parameters and history, and even tried starting with all the fan shut down, which woke a few brains. During this period, I realised that the generators, being in the same compartment as the continually running boilers actually had considerable residual heat in their structure, including the fuel system, which was a very short run from the service tanks to the machines.

As there was a possible correlation between heat and emission reduction, I further increased the jacket water temperature while circulating before sailing, but this only had a limited effect as I was somewhat wary of the proximity of the cut out value, especially on Stand By departures, so the LO purifier heating was increased and circulation time also extended to get sufficient heat into the engine for the hoped for reduction, but with reduced turning to avoid lube oil lying on the piston crowns.

It should be pointed out here that the vessel ran permanently on diesel oil and all fuel heating capacity had been removed so it was not possible to raise the temperature to the fuel system by the smallest extent, only by general ambient heating.

After considerable trial and error, we reached a series of purely arbitrary (though safe) parameters for heating through the engine, jacket water, lubricating oil and scavenge air for a specified pre sailing period, and the vessel settled down in her own, comparatively smoke free zone at departures. She continues to run satisfactorily, the solution having been free, but the investigations being very expensive over the years.

The major cause of all this - the microbes - was two fold. The local Surveyor and permanent ships technical staff was a rather big social item, he waived the tanks and they waved their thanks. This I found when I accompanied him on the first survey we carried out onboard, an awkward access d.b. tank which wasn't ready, I thought. He looked in and said "OK", and here but the bunker connection was at the end of the line, it has to be borne in mind he was fully aware of the problems.

When I asked him what was OK, he replied "the tank'. A couple of inches of gritty sludge covered with a layer of diesel lay in the tank bottom where no attempt at cleaning had been made as he'd come unannounced' and it was venting. When I asked him about coming back alter it was clean, lie announced no need, "diesel is clean', I subsequently found this was a normal survey for the vessel.

Had I not accompanied him and checked, the tank would have been boxed up, then filled, the sludge and the microbes pumped once more into the system and we would have been back to the beginning, but that was deemed easier then cleaning the tank.

The other problem? The vessel bunkered, very occasionally, from a fuel manifold that ran for a considerable distance ashore and underground. It was gravity fed from a tank which in itself was no problem and very rarely, if ever, used by other vessels.

The length of time fuel lay stagnant in this part of the line is only conjecture, but was definitely months whilst the vessel was away. When I checked the sample before starting the fuelling I was given a sealed can, but not from the point of bunkering. When this was requested a slight altercation ensued which resulted in the fuel being refused and tankers being brought in direct from the refinery.

Thus, the surveyors 'clean" diesel plus general poor practice resulted in major expenditure and problem, didn't seem to affect their social life much though!

Oh, before I forget, they were all golfers! The call of the ball and all that.

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