

UNISERVICE / TÜRKIYE VISWA LAB. FUEL ANALYSIS

BÜLTEN #17

TECHNICAL UPDATE

MORE ON DURBAN FUEL

You must have received our Technical Update on Durban bunker fuels a couple of months ago. This created a lot of interest and many of Viswa Lab customers appreciated the contents of this update and sought clarifications on some of the points. The purpose of this update is to tell you about what more we have seen in the Durban bunker fuels. The comments that follow are not intended to brand all Durban fuels, nor all Durban fuel suppliers. We carried out, at the request of a ship manager, extensive investigations into the loss of power experienced by the main machinery while using bunker fuel supplied at Durban.

Based on our analysis of the fuel and also a detailed analysis of the ignition and combustion characteristic of this fuel, we advised the ship managers to carry out several steps with regard to the main engine timings, temperature and pressure settings, cleanliness of exhaust passages, turbocharger exhaust gas economizers etc. Even with all these, there was no perceptible improvement in the engine performance.

We then started looking at other aspects of this fuel, using scanning electron microscopy, determining the calorific value through actual test, study of ash content etc. We were able to establish that this bunker fuel contained pulverized coal particles. As it is, Durban fuels are well known for high carbon content. It has all along been assumed that this high carbon content resulted because of thermal cracking carried out in the refineries in South Africa. The carbon in the petroleum fuel occurs as petroleum coke. It has 3 different appearances, shapes, sizes and hardness value which are distinctly different from the particles obtained by pulverizing coal.

Since no coal is pure, the ash content goes up when pulverized coal is added to the fuel. This too has been established by us. Putting all this together, Viswa Lab is able to say that at least one supplier in Durban is definitely adding pulverized coal to the bunker fuel. How would he benefit from this? Coal is cheap; its average density is 1.3. Bunker fuel is paid on weight. Pulverizing coal is easy. There is a substantial jump in profit margin when you add, perhaps 5 to 10 % of pulverized coal to the bunker fuel and sell it at bunker fuel prices.

What is the harm to the users of the bunker fuel? Coal will not burn in the diesel engine cylinder the way diesel fuel burns. Much of it will exit the engine as unburnt hydrocarbon particles. Even if the coal burned fully the calorific value of coal is less than the calorific value of bunker fuel. The engine power would be reduced to that extent. If the coal particle did not burn, as is likely to be the case, the power loss can still be higher. In the case we investigated, the power loss amounted to nearly 15 %. The high ash would wear out the rubbing parts of the cylinder, piston and the piston ring. The carbon deposits would clog the passages, sit on the turbocharger blade and cause it to surge. The carbon particles would go up further in the funnel and block the gas passages in the exhaust boiler. The exhaust emission from the funnel would be excessive.

Viswa Lab is particularly happy and proud of this technical update intended to help you get the best out of the bunker fuel. Viswa Lab is committed to investigating all the fuel-related problems to help you obtain optimum efficiency from the bunker fuel.

Dr. Vis

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