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Department: T.O.

Report: TO 92-02

Contamination of gasoil by micro-organism

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Project: 70011
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Published: January 1992

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RIVO REPORT

Translation from the French of Test Results from the Rijksintituut Voor Visserijonderzoek - the Dutch Fishing Industry Research Institute.

1. INTRODUCTION

Most vessels in the Dutch fishing industry are fuelled by gasoil. This is a middle distillate fuel-oil refined from crude oil and because of the changes in refining processes in the last few years there have been subtle changes in the quality. During this period of change in crude oil and refining, slight differences could be detected, the nature of which was not immediately apparent. One such difference, however, which has been detected, has been the increase in contamination by microorganisms, which include bacteria, fungi, and yeasts, separately or in combination.

The contamination can develop from:

a. the atmosphere;

b. polluted service pipes and / or storage tanks;

c. water.

The problems confronting the fishing industry were serious especially with regard to blocked filters. These blockages resulted in high costs including frequent maintenance down-time and loss of fishing. There were also a rapidly growing number of losses due to appreciable corrosion in fuel pump plungers and injector nozzles. Once contamination occurred it could develop very quickly, even by a factor of one million within twelve hours.

The speed at which the microorganisms develop is dependent on available nutrients and the presence of water in the gasoil. Water can arise by condensation in the storage tanks, by the microorganisms themselves producing water, and be carried in the distribution system. Additives to the gasoil during or after refining can also increase the amount of available nutrients to above the normal level of the base crude oil.

Apart from filter-blocking, and often noticeable damage to fuel pumps and injectors, contaminated gasoil can also be detected by its colour, smell, sludge-forming and the visible presence of a fungal slime. When this type of problem arises in an industrial sector such as the fishing industry, the market immediately reacts by advocating a number of "solutions" even though, very often, it is not clear what the origin of the problem is.

In this case a product came from New Zealand, through France. The inventor claimed to have solved the contamination problems with a De-Bug unit.

The one thing that was definitely established was that this problem was also known on the other side of the world.

2. ACTION

This De-Bug unit consists of a number of magnets in a marine grade aluminium housing. Microorganisms present in the contaminated gasoil are subjected to a strong magnetic field as they pass through the device, and over a period of time are physically disrupted enough to disintegrate, pass through the filter and burn with the fuel in the cylinder.

Over a number of years of experimentation in New Zealand it has been so successfully established that a well-known oil company promotes its use.

3. RESEARCH METHOD

Before introducing the De-Bug unit to the Dutch fishing industry, BO & AC Nederland requested R.I.V.O. Ijmuiden to select two ships with contamination problems to test the L4000 De-Bug unit for a period of six months.

5. CONCLUSION

From the research it is now definitely established that on the test ships GO 22 and GO 28 the contamination was controlled within one week of the installation of the L4000 De-Bug unit.

Following a mishandling accident to the magnets in the L4000 De-Bug unit on board the GO 22 the importance of the magnetic field became apparent. The magnets were reassembled incorrectly and contamination reoccurred in the fuel (5 Oct. on table, page 6).

It was also very evident from the research that the source of contamination can be very localised. In spite of keeping the gasoil free of water as much as possible it seemed, from taking the samples, that varying contamination could suddenly appear without the bunkering of new gasoil. This shows that with condensation and the presence of microorganisms, a matrix for contamination can develop. For this reason we recommend that, in the building of new ships, special attention should be given to tank drainage, to avoiding great differences in temperature within the fuel system and also providing filters and service pipes with drains.

Furthermore, it is worth mentioning that installing the L4000 De-Bug unit on the GO 22 increased the service life of the fuel filters from two weeks to 14 months, while the lifetime of the injector nozzles was lengthened from 9 to 14 months.

In conclusion the R.I.V.O. is aware of many unanswered questions, but the trials conducted with the L4000 De-Bug unit on the two ships have clearly shown that the De-Bug unit is a solution to contamination problems.

At this time in Holland about 150 ships are fitted with the De-Bug unit.