Case Study

RCT - SPIEGELGRACHT

Preface:

In November 2018 the shipping company Rederij Cement Tankvaart (RCT) vessel Leidsegracht successfully switched over to using DEX oil. DEX DP1 10W40 was used for the Caterpillar 3406E engine and DEX DP2 ISO VG100 for the gearbox. The crew noticed an immediate reduction in the level of machine noise produced. The ship had become much quieter.

This resulted in the decision to carry out further tests on another RCT-owned vessel, the Spiegelgracht. On this ship the crew had noticed raised noise levels in the living quarters. A problem they would be eager to see resolved. The Twin Disc marine gearbox was lubricated using DEX DP2 ISO VG100, and decibel readings were taken before and after its introduction in order to quantify the reduction in noise levels.

The ship:

The test took place on the Rederij Cement Tankvaart (RCT) owned vessel Spiegelgracht. The Spiegelgracht is a self-unloading powder carrier which uses compressed air to discharge its load. Its sailing area is the Netherlands, Belgium and Germany. The RCT fleet comprises 18 self-unloading powder carriers.

The technical department is located at Keizersveer 3C, Raamsdonksveer.

Spiegelgracht specifications:

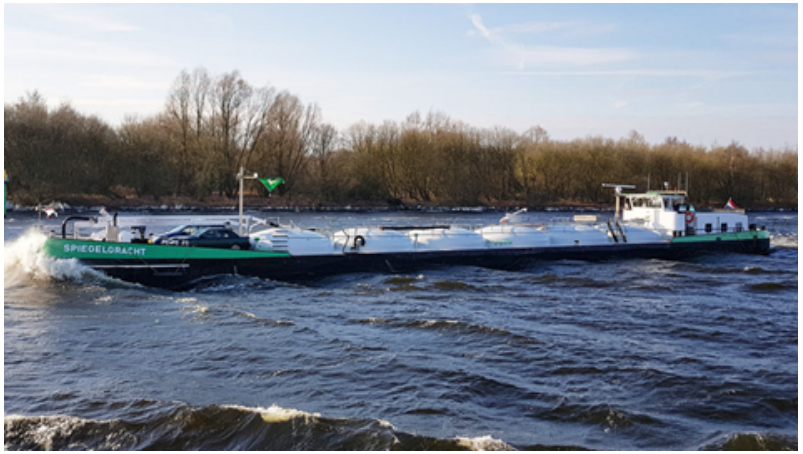
- ENI: 02315151
- Construction year: 1977
- Dimensions: 55.00 m x 6.64
- Capacity: 500 tonnes
- Draught: 2.38 m

The gearbox:

The Spiegelgracht has a Twin Disc marine gear which is driven by a Caterpillar 3406 DITA engine. The gearbox was installed in 2001 and to date has been in operation for 27,000 hours. The vessel currently uses Total Caprano TD 30 which has been in place since September 2018 and has notched up 1,000 operational hours.

Brand: Twin Disk marine
Model nr. MG5114
BOM nr. S11106
Ratio nr. 343 1
Serial nr. 5GS060
Oil Capacity: 5.2 gallons (ca. 20 litres)

There have been no specific problems reported concerning the gearbox other than the shipping company's wish to reduce the level of noise it produces.



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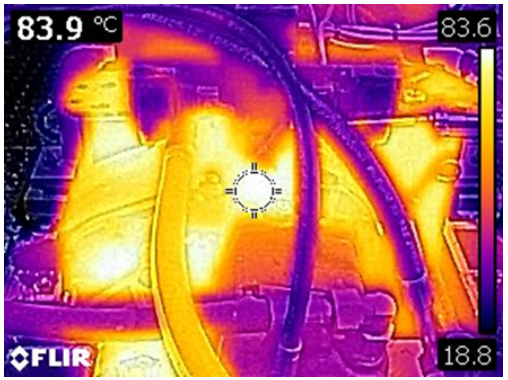
The temperature reading:

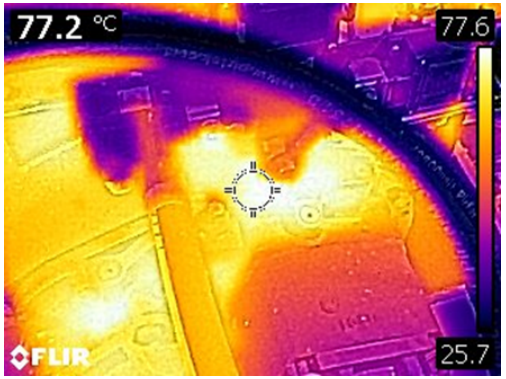
The difference in friction between the two oils can be measured by a temperature reading. This was measured twice, on both occasions above the gearbox when sailing at full power (1800 rpm):

- Test 1 = Total Caprano TD30 – temperature 83.9°C
- Test 2 = DEX DP2 ISO VG100 – temperature 77.2°C

The temperature reading shows a substantial 6.7°C temperature reduction when using DEX oil.



29-3-2019 Total Caprano TD30 - oil temp. 83,9°C



24-05-2019 DEX – DP2 ISO VG 100 (visco 30) – oil temp. 77,2°C

Conclusion:

A significant reduction in the level of noise directly above the gearbox was recorded at all speeds.

The following noise level reductions were recorded using DEX DP2 ISO VG100 oil:

Speed	Reduction in noise
stationary	min 1 dB
1650 rpm	min 3,4 dB
1800 rpm	min 3 dB

Using DEX DP2 ISO VG100 oil resulted in a significant noise reduction when compared with Total TD30 oil.

This noise reduction is a direct result of less friction in the machinery. DEX Oil claims its product causes less friction as a result of the nanotechnology treatment which the oil is subjected to. This becomes evident in the form of a significant reduction in temperature in the machinery, a reduction in noise levels, fuel savings and in the long term a noticeable reduction in wear and tear.

According to the Decibel scale a 3.0 decibel difference equates to either half or double the level of noise. This -3.4 reading indicates that the level of noise has more than halved!

The noise reduction experienced by the crew of the Leidsegracht has been substantiated by the test carried out on the Spiegelgracht. The reduced friction in the CAT main engine and gearbox on the Leidsegracht even resulted in a reduced fuel consumption of more than 5%!