

Case Study



REVERSE GEAR

Customer

Bais Beheer BV
Johan Bais, Den Helder, the Netherlands

Study commissioned by the customer and conducted by independent consultancy firm ORM advies.

The system

Gearbox driven by Wartsila main engine in fishing vessel HD4.

The problem

The gearbox (capacity 300 litres of oil) leaks and requires 20 litres of oil to be refilled weekly. Furthermore, the gearbox makes a hammering sound and resin is formed in the clutch.

The solution

By applying Dex DP2 ISO VG100, the hammering sound has disappeared. The gearbox no longer leaks and the operating temperature has dropped by 9 degrees. The latter results in a greatly reduced energy consumption of 28 kWh, due to less energy loss in the gearbox.

After 1,200 hours, no resin was found during a visual inspection (during the last 170 hours a CC Jensen filter HDU 15/25 was used to filter out the loosening resin) and the reverse clutch was found to be spotless.

Savings

- The reduced energy consumption of 28 kWh, when converted to fuel consumption, results in a reduction of 6 litres per hour. With an operating time of 6,000 hours, this results in a saving of 36,000 litres of fuel annually based on the estimated yearly operating time. In terms of this case study, this translates into an annual cost reduction of 18,000 Euros on fuel.
- Based on the same principles mentioned above, the reduced oil consumption in the gearbox is 1,000 litres. In terms of this case study, this translates into an annual cost reduction of approximately 9,000 Euros.



Date:	26.03.2018
Reportnumber:	AR1803257
Lab.nr.:	03.257
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Customer:	BAIS BEHEER
Reference:	ORM Advies / OR18-0027-a P. de Caluwe

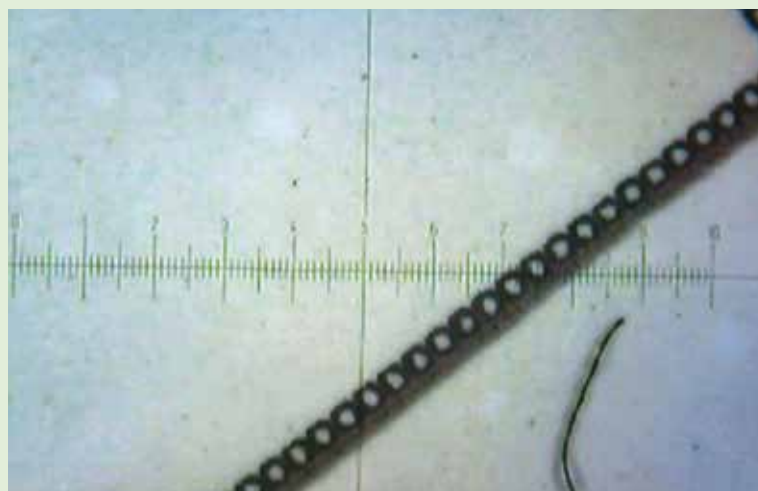
Engine model:	HD-4
Engine manufacturer:	REVERSE GEAR
Operating hours:	
Type of oil:	Dex OIL ISO VG 100 / 300 Ltr
Number of operating hours since last oil change:	1200
Sampling date:	15.03.2018 / (last 170 hours CJC filter was mounted)
Sampling location:	SAMPLE TAP

OIL CONDITION								
AR-no.	Date Sample	Hours	ISO 4406 1999 4,6,14 Micron	NAS 1638	Visc 40°C ASTM D 445 cSt	PQ Index	TAN ASTM D 664 mgKOH/g Norm	Water ASTM D 6304 METHOD C ppm
AR1712594	08.12.17	69765	21/18/13	10	103.80	3	0.35	37
AR1803257	15.03.18	--	19/16/12	8	93.04	10	0.74	68

ICP (ATOMIC EMISSION METHOD)							WEAR ELEMENTS (ppm)							
AR-no.	Na	B	Zn	P	Ca	Mg	Si	Fe	Cr	Mo	Al	Cu	Pb	Sn
AR1712594	6	0	18	465	70	5	1	3	0	0	0	0	0	0
AR1803257	23	28	131	531	430	26	5	11	0	1	0	7	0	0

Oil is slightly contaminated and contains fibers. Check filter system.
 PQ Index is within specifications (<25). Slight iron wear.
 Further chemical analysis is within specification. Await next sample.

Normal **Caution** Serious



• Membrane 0.8 micron • Volume 100 ml • Magnification: 40 x • 1 div. = 10 micrometer



Value in micron	Average of all counts converted to particles in 100 ml oil
>2	452620
>5	52440
>10	8320
>15	3240
>25	440
>50	60
>75	10
>100	0