



CASE STUDY

CUSTOMER

WIND TURBINE COMPANY

LOCATION

TARANTO, ITALY / 2013-2014

EQUIPMENT

V70 WIND TURBINE

APPLICATION

GEAR BOX

PROVEN
RESULTS



IMPROVED
GEARBOX
RELIABILITY

“The company was amazed by how much contamination was retained by the magnetic filter element”

- Alex Priori, Renox

CHALLENGE

Traditional filtration is unable to filter wear contamination under 4 microns in size that causes wear on close tolerance components such as bearings, gears and shafts.

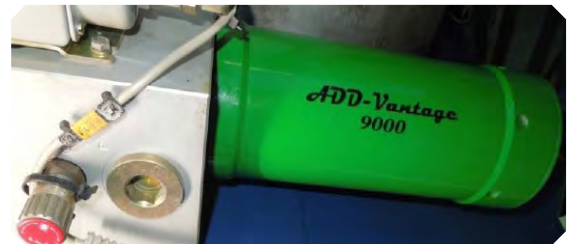
A bearing failure in a wind turbine gearbox can cost in excess of \$500,000. This figures does not account for downtime and maintenance.

SOLUTION

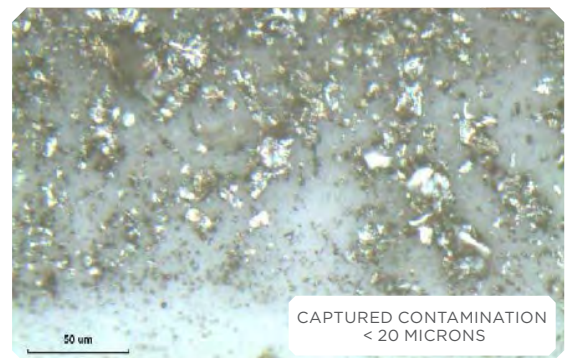
Install an OEI ADD-Vantage 9000 on the gearbox to test it's sub-micron filtration capability. The test took place after the windmill had been overhauled and flushed with new gear oil.

RESULTS

The photo shows contamination removed from the system after 7 months of operation.



CONTAMINATION COLLECTED
AFTER 7 MONTHS



CAPTURED CONTAMINATION
< 20 MICRONS




PRODUCT
RECOMMENDATION

ADD-VANTAGE 9000



RESULTS

The analysis shows that both ferrous (48.3%) and non-ferrous (51.7%) contamination down to 4 microns and below.



MECOIL

DIAGNOSI MECCANICHE

Specialized Services Laboratory with ISO 9001 Cert. RNA 1/2009/1

RENOX Srl

Machine ID: **VESTAS - WIND TURBINES GIORGIONE S V47 12569 Gearbox Particulate from Magnetic Rod**

Model: **Hansen - EH552C - 002/ AM0052**

Type of Machine: **Gearbox**

The sample is composed of particulate matter collected on a cloth. Requesting the characterization of particulate matter. Particulate matter is removed from a portion of the cloth (cm 5x5) by washing with heptanes, without mechanical action. The particulate suspension in solvent was recovered and filtered under vacuum over a membrane to disk, subsequently washed with heptanes, dried and the particulate matter observed under an optical microscope (see attached photos). For a characterization semi-quantitative of the elemental composition of particulate matter, we proceeded to RDE spectrometry-AES changes, after fouling of a disk electrode with the particulate on membrane, and analysis with standard of 0 ppm. The concentrations reported are a measure semi-quantitative of the composition of particulate matter. High presence of iron, with significant presence of phosphorus, silicon, zinc, manganese and traces of calcium, chromium, copper, and nickel.

The particulate detected and in most of nature magnetic metal (steel), with size of the particulates ranging from about 1 micron to over 20 microns.

DLI: 4844100 Palla-pel 30 May 2014

OR TEXACO/MEROP 300	Sample ID	DATE (MM/YY)
Notes:	Sample Date	22 May 2014
	Date Received	28 May 2014
	RECEIVED	

ASTM CLASS	Element	Unit	Value
ASTM CLASS METALLIC WEAR ELEMENTS	Iron	ppm	1796
	Chromium	ppm	111
	Nickel	ppm	80
	Molybdenum	ppm	<1
	Aluminum	ppm	22
	Lead	ppm	24
	Copper	ppm	87
	Tin	ppm	<1
	Silver	ppm	<1
	Titanium	ppm	2
ASTM CLASS	Arsenic	ppm	<5
	Manganese	ppm	204
	Silica	ppm	327
CONTAMINANT	Sodium	ppm	8
	Vanadium	ppm	2
	Potassium	ppm	12
	Calcium	ppm	127
	Magnesium	ppm	4
ASTM CLASS ELEMENT ADDITIVE	Phosphorus	ppm	691
	Zinc	ppm	205
	Boron	ppm	10