
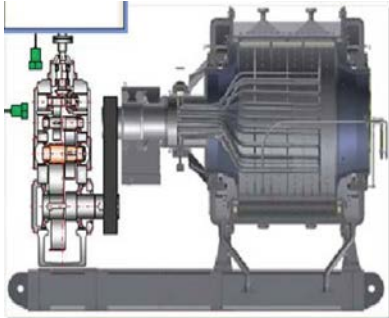





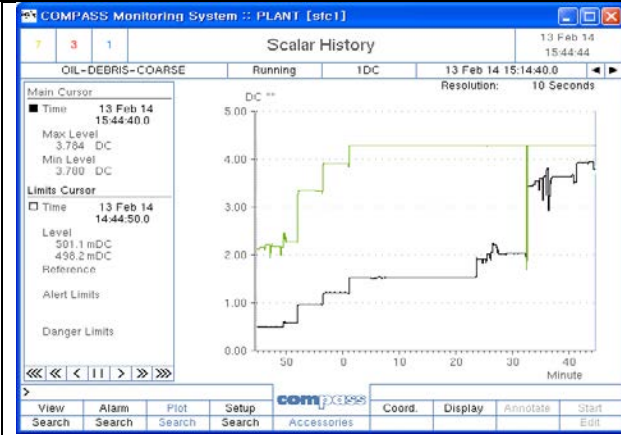
Case Study – Industrial Gearbox

	Date: February, 2014	Market: Industrial Chemical Refining & Processing
Product: Oil Debris Sensor - Model Number 1599-00-035		
Description of existing application	24 hour operation of a gear reduced drum power unit. The existing system included a network of vibration sensors.	
Gear RPM Range: 1,500 to 8		
	<p>21kW electric motor driving gear box</p> 	<p>Vibration sensors pre-existing</p> 
Description of new sensor in application	Placed the 1599 two channel sensor into the bottom of the oil tank via a retrofitted brass drain plug with exposed sensor assembly in its center. (Photo taken after second inspection) Remote electronics placed in a protected electronics enclosure away from gearbox.	 

Testing Result
Baseline test:

after installation a basic functionality test was performed wherein engineers introduced both coarse and fine particles for 1 hour. At the end of the test the sensors output had increased from 0.00 to 3.95 volts. With this confidence the system went live into real time monitoring in production.

It is important to note that during this test the vibration sensors (running in parallel, had no change in output.



1. 1599 wear debris sensor was installed on Feb 25 2013

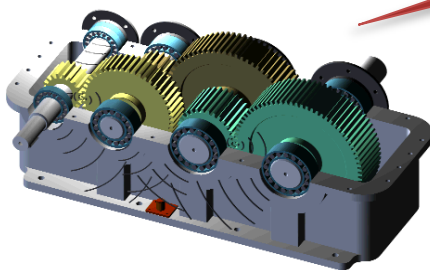
2. Detection : On May 1, 2013 at 16:47 Debris Sensor (Large Particle) Voltage rate of the sensor increased 0.6V to > 1.6V.

3. Inspection : a large amount of ferrous particles were detected by used oil analysis (on 2/5 2013 at 16:00) as a result of gear abrasion. And gear flaking and three cracks were found on gear no.4.

Actual debris removed from oil reservoir after voltage increase.



Long terms exposure and results



Gear No. 4 (green, small)



Actual Gear damage as viewed at inspection May 1, 2013

Lessons

System responsiveness was effective at immediately taking action (inspection) after observing the voltage increase from 0.6 to 1.3 volts. Preventative action taken was swapping in a new gear reduction unit and avoiding expensive downtime.