Wind turbine 4.0: some remarks on gathering quality data for predictive maintenance

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ATTEN2 Advanced Monitoring Technologies



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ABOUT US

PRESENTED BY: Fernando Reátegui







Our solutions allow to reach a new dimension in the prediction of machine failures, using state-of-the-art optical technology

Measuring the quality and condition of lubricants, we have established a new insight in the machines condition based monitoring,

Implementing Advanced algorithms we transform digital data into accurate and effective information to assess the operational risk in critical machines, adding value to our customers' business.











About us Inside our Company



PRODUCT

Our technology allows to measure fluids, specially lube oil, beyond counting particles from ferric materials as the standard market does by measuring all types of pollutants, allowing us to:

- Perform root cause analysis
- Measure the lube
 degradation
- Apply advanced diagnostic algorithms



Atten2 counts with a team of engineers and scientists working in R&D:

- Optical technology
- Electronic and Communication
- Surface and Material Techology
- Mechatronics
- Tribology
 - Data Scentist



Atten2 adds value to its technological solution through a solid service offer based on:

- Remote monitoring and advanced diagnosis
- Lab sample analysis
 - Training
- Technical service
 assistance







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Key Remarks on IoT

PRESENTED BY: Fernando Reátegui

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- Current focus is probably more on acquisition platforms than on measuring devices.
- Quality of measured data is key.
- Machine learning blindly will not provide satisfactory insights into machine behaviour.
- Previous assessment of risks and business priorities are important in order to take advantage of analysis output.



Our Technology













• Atten2's SAM Platform







Correlations



Correlations – Pitch angle vs. Particles

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- Pitch angle vs. Particles.
- ISO 04:
 - particles above 4 μm.
- ISO 14:
 - particles above 14 μm.
- Direct correlation.







Correlations – Gen. Speed vs. Particles

- Generator speed vs.
 Particles.
- ISO 04:
 - particles above 4 μm.
- ISO 14:
 - particles above 14 μm.
- Inverse correlation.







Normality model



Normality model

- Segmented power cuve.
 - Binning the wind speed axis.
 - Mean and variance within bins for curve fitting.
 - Upper and lower bounds computation.





- Two examples Power Curves
 - Different control systems.
 - MO09 shows more signs of wear from visual inspection.





- Correlations:
- BA53:
 - Pitch control is more erratic low correlation with sensor measurements.
 - High correlation with oil temperature in excluded samples.



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Normality model

- MO09:
 - Better pitch control high correlation with sensor measurements.
 - Low correlation among features in excluded samples.





Conclusions



- The remarks we used to start this discussion off:
 - Focus on the measuring device.
 - To gather quality data.
 - Which will translate into better modelling.
 - As our machine learning strategy will keep sight of the characteristics of the physical application.





Keep in touch with us

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