



We interview Manuel Angós

Manuel Angós is the Technical Director of Preditec and has more than 30 years of experience in the field of predictive maintenance. As an expert in vibration analysis and condition monitoring systems (CMS) today we want to ask him some questions.

Among the services offered by Preditec | Grupo Álava, one of the most demanded is the temporary monitoring of rotating machinery, how and why does this demand arise?

M.A. We are often contacted by customers who are concerned about a machine, in most cases "critical machinery", which shows a symptom of an incipient failure but it is not being monitored or the current monitoring gives no clues to the possible problem. The symptom may be a different and strange noise, a small increase in temperature, a slight decrease in power or efficiency, an increase in electricity consumption, etc. Customers know that something bad is coming, but they don't know what or when. It is then when we apply the vibration analysis, to show what is happening and know from what moment it will be dangerous to

continue operating the machine. At Preditec | Grupo Álava, as a leader in predictive diagnosis, we offer remote diagnosis services for rotating machinery. Maintenance engineers who work for our client companies only need to contract the diagnostic service and we take care of everything.

What kind of technology do we use in this situation? Can you give us more details?

M.A. We have different technologies adapted to different cases and types of tests. We are currently achieving excellent results in predictive services through the installation of a TWave Mobility Case. This case includes a CMS TWave T8, as well as a 3G/4G router. In the kit that we provide, all other accessories are included: sensors, cables, etc..

And once the installation is done, what are the next steps?

M.A. The case is accessed remotely and securely via the Internet, so vibration data can be analyzed by our engineers at any time, from anywhere. After the placement of the sensors and the initial configuration, the TWave case starts sending vibration data: spectra, waveforms, orbits, global value trends, etc. The monitoring unit can be left on the machine for days or even weeks until the analyst has good data for the diagnostic report. This report indicates the state of the machine and the operating expectations. With this information, operation and maintenance managers can make the right decisions. Sometimes the machine can continue to run. In other cases it is necessary to stop the operation, look for spare parts, carry out a repair, etc. The objective is to anticipate the total failure and avoid the complete replacement of the damaged machine.

Why TWave?

M.A. TWave has launched a very innovative vibration monitoring and analysis system, the model TWave T8, oriented to medium sized machinery and being competitive also for small machines. We have known the TWave developers for years and we have trusted their products in many national and international projects, but with this new system they have exceeded expectations. We are increasingly using this online CMS to permanently monitor our customers' critical machinery, due to its performance, ease of installation and competitive price in a segment where these features are key. Now with the Mobility Case accessory, it has also become an ideal tool as portable unit, because it gives us flexibility of configuration and diagnostic tools that are impossible to find in equipment in this price range. Since a professional is always looking for the best tools to perform his task, the engineers of Preditec | Grupo Álava rely on TWave technology for the diagnosis of their machines based on vibration analysis. The main objective of our engineers is to make the most accurate diagnosis. Reducing the quality of our analysis tools is not an option for us.

And what kind of machines can be monitored?

M.A. This service is ideal for critical machines where an anomaly has been detected and a fast and reliable diagnosis must be made. We use this system with customers from all industrial sectors. The service is especially useful in machines that operate in variable speed and power ranges so they cannot be characterized with a punctual data acquisition.

Typical machines on which this service is normally performed are:

- *Medium sized steam and gas turbines*
- *Single Stage Centrifugal Pumps*
- *Single-stage, multi-stage centrifugal pumps*
- *Fans*
- *Electric motors*
- *Rotary, screw and reciprocating compressors*
- *Agitators, mixers*
- *Mills and rotary kilns*
- *Gearboxes*
- *Centrifuges*
- *Cooling towers*
- *Diesel engines and generators*
- *Wind turbines*

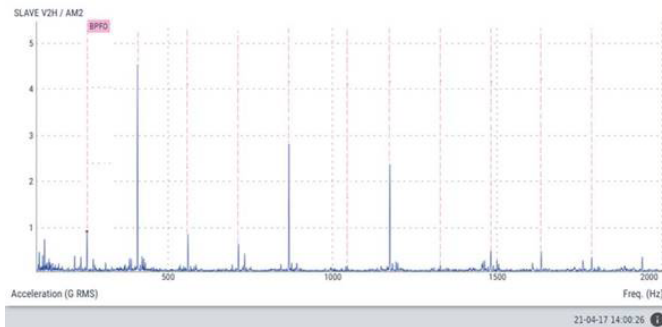
What types of faults can be detected and diagnosed?

M.A. It is possible to diagnose and follow the evolution of possible faults such as:

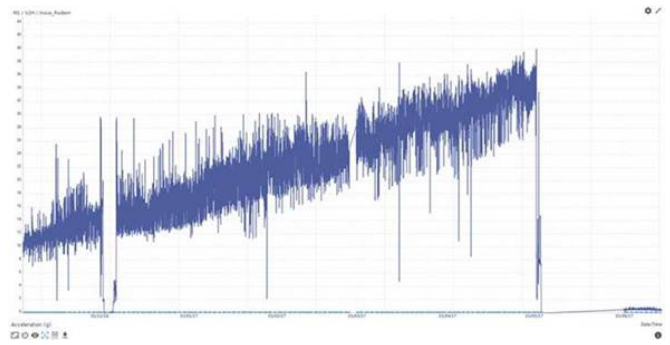
- *Unbalance*
- *Misalignment*
- *Looseness*
- *Bearing failures*
- *Gear failures*
- *Problems with electric motors*
- *Problems in hydraulic machinery*
- *Problems with belts and pulleys*
- *Weak benches*
- *Resonances*
- *Rub*
- *Fluid Instability*
- *Process problems*

Could you give an example of a real case?

M.A. Just recently we were called from a thermal power station. After a punctual vibration measurement, a failure was detected in one of the bearings of the induced draft fan. The failure was related to the bearing outer ring. The spectrum clearly showed the inherent failure frequencies (BPFO and harmonics), as can be seen in the following image.



In order to avoid replacing the bearing, which meant a plant shutdown, it was decided to install a TWave Mobility Case with 3G connection. In this way, our technical service was able to carry out an exhaustive follow-up of the fault. The customer wanted to ensure that the bearing could withstand operation until the next scheduled plant shutdown after 6 months without causing a catastrophic failure and subsequent production shutdown. After the installation of the sensors and the TWave Mobility Case, a very close monitoring of the fault was carried out, which evolved linearly over the weeks. The following image shows the evolution of the parameter related to the bearing failure, extracted after signal processing using the demodulation technique.



Although just before the programmed stop, the vibration signal reached high amplitude levels (30 G) at high frequency, the bearing failure was at all times under control. In this way it was guaranteed that there would not be a catastrophic failure. Finally, the bearing was replaced during plant shutdown and the parameter value dropped to 1 G after commissioning, so the machine returned to normal operation.

Thank you very much for your time and useful information. It will be surely of great interest to our customers.

M.A. It has been a pleasure. Thank you.

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