Positive **vibrations**

Chris Ryan, a senior technical expert in plant reliability techniques, explains to Louise Davis how vibration analysis is a hugely useful monitoring tool – but that its value depends on the availability of professionally trained personnel

As the name would suggest, vibration analysis measures and monitors vibration signals from equipment then uses the information gathered to analyse and evaluate the equipment's condition. Vibration analysis is widely deployed – applications span pretty much any plant equipment with moving parts, such as engines and compressors, pumps, bearings and gears as well as gearboxes and drivetrains.

But the wide range of applications does not mean that vibration analysis can be deployed blithely, without due care. The condition monitoring specialist, AVT Reliability, makes a useful point on its website, observing that, "To a trained expert, vibrations can tell a lot about the condition and performance of a piece of machinery".

And that need for operator knowledge and experience is key to the success of vibration analysis applications, according to Chris Ryan, director of AVT Reliability Ireland.

"We have invested heavily in developing our training academy and ensuring we have the best training personnel in place," begins Ryan.

"We have an extensive list of training courses based around maintenance practices and condition monitoring available, from certified vibration analysis courses to Asset Reliability Practitioner (ARP), Lubrication Management, Thermography, Balancing and Laser Alignment courses. Many feature three levels of expertise, allowing a candidate to enter the course at their existing competency and move through the levels, building their knowledge and obtaining qualifications at a pace that suits them."

Ryan rightly points out that such training isn't merely a box-ticking exercise for plant managers: "It's important that the knowledge our customers gain from investing in training via our academy is transferred to personnel onsite so they can be advocates for condition monitoring and help better understand how their machinery behaves."

Putting this into context, Ryan describes condition monitoring and vibration analysis as a growing industry, with more plants each year becoming aware and adopting a predictive maintenance approach to reliability.

"The key is to ensure a plant's condition-based maintenance approach is sustainable, and this is far easier when there are trained experts on the ground that advocate for this technology and understand how it adds value to the reliability programme," he believes.

FAULT FINDING
For those unsure on the value proposition, Ryan says: "Left unchecked, vibration can cause fatigue in the structure of plant machinery and is the root cause of up to

Above: **Chris Ryan, director of AVT Reliability Ireland**

Right: **Machine Sentry is AVT Reliability's popular condition monitoring solution**

Main: **Professionally trained personnel are critical to AVT Reliability's approach to condition monitoring**

*Right: **The fixed version of Machine Sentry is a vibration and temperature sensor***

15% of failures. Vibration analysis is a reliable form of predictive maintenance and is an extremely effective way of identifying faults or potential problems in any rotating equipment. The process involves measuring the vibration levels and frequencies of machinery as it runs and analysing the data collected to determine the health of the machine."

He adds: "Changes in vibration can be identified, enabling the early correction of issues including imbalance, looseness, misalignment and bearing failure, in almost all rotating machines, including motors, pumps, gearboxes, fans, turbines, compressors, to name but a few."

Ryan explains that vibration analysis's early-detection fault-finding capabilities "allow plant managers to plan in production downtime, allocate resources and ensure the correct spare parts are in stock to efficiently deal with an issue, – which has a huge impact on cost savings and production uptime."

And he is also keen to point out that vibration analysis is not about replacing a plant's engineering strategies: "Rather, it's there to add value and will support your onsite maintenance and engineering teams to become more focused on predictive maintenance rather than reactive," he asserts.

KEEPING WATCH

As well as its popular training courses, AVT Reliability is well known for its range of proprietary condition monitoring solutions.

Detailing these offerings, Ryan says: "AVT Reliability and Machine Sentry offer various tools that are flexible enough for users to choose what works best for the location of their plant and the applications required. Operators can choose whether measurements will be made semi-continuously, permanently or as needed, using a wireless handheld device."

The firm also offers route-based condition monitoring technology via its Machine Sentry Mobile Kit. Ryan comments: "For fixed applications, such as essential and critical machines we offer our Machine Sentry Fixed Sensor, and we also offer a hybrid kit known as the Reliability Kit, which consists of both a mobile sensor and five wireless fixed sensors for fault finding and troubleshooting applications. For the most critical and costly assets, Machine Sentry Online is an excellent choice, offering 24/7 real time monitoring."

Ryan is proud of the work that has gone into this product portfolio, and he explains that part of the team's motivation was learning from the failures of other condition monitoring players.

"Having relied upon other manufacturers in the past, where

AI ANALYSIS

Ryan offers a considered response when asked what role AI plays within vibration analysis. "Whilst we fully understand the irreplaceable value and importance of having the 'human factor', benefiting from experience and the trusty human senses – such as the expertise, intuition and observational skills of maintenance teams – we also understand the growing need for the speed, consistency and scalability that AI-driven solutions offer," he states.

"AVT Reliability is actively engaged in AI development to ensure our Machine Sentry ecosystem and its users gain the maximum benefits from our software. We are developing our AI training material, which will ensure we have the required data to allow us to continue to further develop AI in our platforms in the future."

He adds: "We are committed to ensuring that Machine Sentry remains at the forefront of innovation, and we are excited about the future potential of AI to transform the way industries approach predictive maintenance and asset health monitoring."

*Right: **Machine Sentry is available as a mobile option that can be used for route mode monitoring of vibration in plant equipment***

OUTREACH WORK

With regard to industry awareness of vibration analysis, Ryan says that AVT Reliability works with several organisations that are fully aware and understand how important condition monitoring techniques such as vibration analysis are, but there are still many who are not yet aware.

He comments: "We employ many methods to educate the industry in the various techniques we use and the advances in technology that, if used correctly, can benefit them. Social media and training are two important aspects for us." The firm's training academy has trained hundreds of technicians and engineers in vibration analysis and other condition monitoring technologies.

Ryan adds: "We are also actively engaging with colleges and universities, and we have a fantastic apprenticeship programme in place. We believe condition monitoring should be part of all courses and apprenticeships so that graduate engineers are aware of its benefits the moment they join an engineering, maintenance or reliability department."

technical support, training and engagement was undervalued and therefore inadequate, we decided to use our combined expertise to develop not only a best-in-class suite of sensors with a superior web-based condition monitoring platform, but we also committed to do this all within the UK and Ireland," he explains.

"Our technical support teams are based in the UK, Ireland, continental Europe and North America – providing a reliable and rapidly expanding support system for customers. We have developed and managed our vibration sensor technology and software so that the support users receive both onsite in-person and remotely is unmatched."

FEEDBACK LOOP

Ryan reports enthusiastic feedback from current users, which naturally gets fed into the team's product development efforts. Recent advances include the launch of Machine Sentry Next Generation, the newest iteration of the firm's software platform.

"The system is packed with new

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>
> *Chris Ryan*

Left: **Qualified personnel can reap the benefits of deploying vibration monitoring tools**

and enhanced features, which include waterfall plots, improved speed, enhanced accessibility and highly requested new features, delivering a more user-friendly and efficient experience," he reveals.

Happy customers can be found in "just about all" engineering sectors, says Ryan – some of which include pharmaceutical, oil & gas, power generation, food & beverage, chemical and general manufacturing. And as with most speciality engineering applications,

expert advice can be hugely valuable for those considering investing in such tools – something that is especially true of situations where deploying vibration analysis can be challenging.

Ryan encourages plant managers to seek advice from those with extensive experience. He advises: "If you have a situation or application that is a little more unusual or complicated than the norm, then please reach out to our team – there is little that we have not experienced or overcome." œ