

Asset improver

Plant condition monitoring equipment is more accessible than ever. But where should you be thinking about using it? Brian Tingham takes expert advice

There is no doubt that running plant to failure is a perfectly reasonable approach on small and/or non-critical assets. Those are plant items that aren't going to cause a problem, in terms of safety or production – the latter, because spares are readily available and/or there is spare capacity and/or alternative routes on flexible plant.

So says Tom Berry, reliability business leader with GE Energy Optimisation and Control. And he adds that this implies that plant engineers need to undertake at least some form of criticality analysis before specifying any kind of condition monitoring equipment, whatever the level of sophistication and technology involved.

For the majority of plants where such analyses haven't already been done, Berry recommends retrospective RCM (reliability centred maintenance). "Then the technologies you need and the plant to be equipped will almost choose themselves. For example, if your analysis shows bearing failures or shaft-related problems as the issues, then vibration monitoring is still the best bet. For electrical assets, it might be acoustic emissions, earth leakage or motor condition monitoring," comments Berry.

Are you protected?

Interestingly, he also advises engineers not to be fooled into believing that they must be well protected, simply because their largest plant items are already so well engineered and instrumented. "The rest of most sites' plant is not so well instrumented. So, unless you've got rigorous maintenance strategies, you're going to get caught out with unplanned downtime," he explains.

And there's more. We also need to understand what condition monitoring might help us do, once it uncovers problems, in terms of preventing plant failure. Choices should include adjusting plant operations, instigating maintenance or running machines at a reduced rate until the next shutdown.

All well and good. But, although received wisdom has it that investing in condition monitoring improves reliability and bears down on downtime, it's notoriously difficult to measure. There's also the problem that some predictive maintenance technologies were oversold in the early years. So management's receptiveness to RCM studies and the rest might be less than favourable.

In the intensive process industries, organisations such as Emerson and GE Energy offer services designed not only to measure asset criticality, but also to establish KPIs (key performance indicators) likely to satisfy management. Emerson, for example, has its web-based Asset portal, which provides benchmarking and gap analysis, as well as calculating a so-called 'maintenance priority index' and establishing which technologies and where best to site them. The bottom line here is that what works for one plant may not for another.

GE's Berry cites engineers at Canadian energy firm Nexen, which found that one key to making its condition monitoring deliver improvements was to integrate data from different technologies – vibration, infrared, field device diagnostics etc. "On most plants, that ability to see an integrated picture of plant condition monitoring is missing. But it is so important, if you want to reduce the period between recognising the onset of a potential failure, understanding the nature of that failure and then identifying a solution," advises Berry.

In one case, on water injection train motors at Nexen's Buzzard oil project in the North Sea, the approach not only revealed much higher than expected vibrations on motor-driven pumps during start-up, but also gave the motor manufacturer enough data to prove the cause as a rotor imbalance, resulting from plant thermal effects.

"They couldn't solve the problem in situ, but they were able to put in a different management regime to keep it operating to the scheduled plant overhaul," says Berry. **PE**



Wireless systems

If you're thinking that getting condition monitoring equipment, even on critical plant, is going to be too difficult, because of wiring and installation costs, it's worth considering wireless technology.

Adoption to date has been slow, but that may yet change, with the growth of offshore wind farm installations and their high value rotating equipment – and as plant managers onshore realise the limits of information collected infrequently and out of sync by technicians on their periodic walkarounds.

Plant engineers can start fairly small: for example, a wireless HART vibration device (CSI 9420) will set you back about \$2,500 and provide online monitoring over the transmitter. Adding a wireless gateway (costing another \$2,500) is then enough to instrument a pump, a motor, fan equipment on top of a cooling tower etc.

"Wireless vibration can unlock applications where wiring was too expensive. You also get a very cheap source of field device diagnostic information," comments David Gill, Emerson business development manager.