

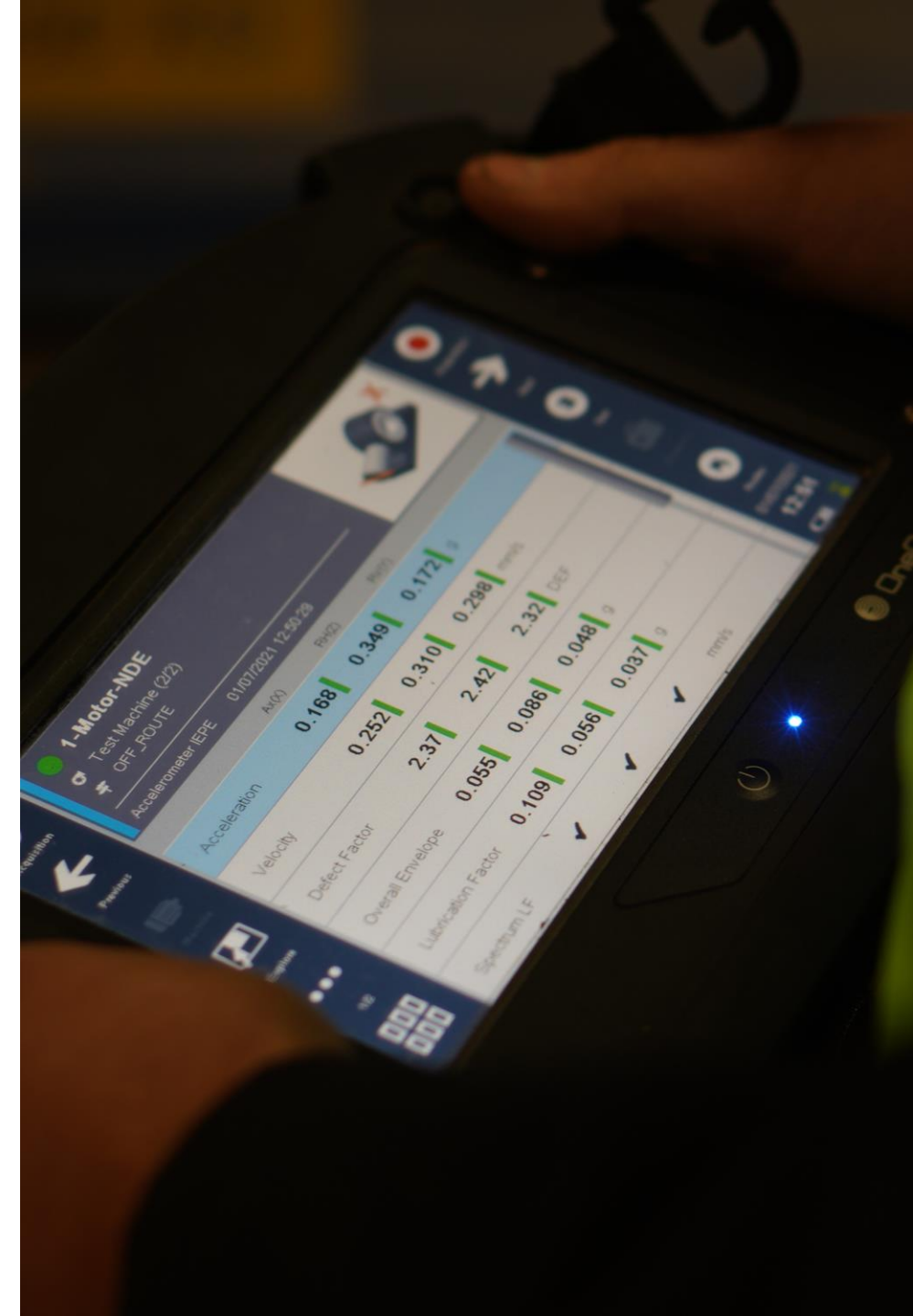


DETECT • SOLVE • IMPROVE

How can reliability and condition monitoring improve sustainability?

What is a sustainable manufacturing?

- A sustainable business, or a green business, is an enterprise that has minimal negative impact or potentially a positive effect on the global or local environment, community, society, or economy—a business that strives to meet the triple bottom line.



Condition Monitoring for Sustainability

- Using our natural resources responsibly and carefully is an important aspect of sustainability. The extraction of raw materials, their transportation, the production of steel, the manufacturing of bearings and gears are very energy-intensive. Furthermore, the exhaust emission is enormous.

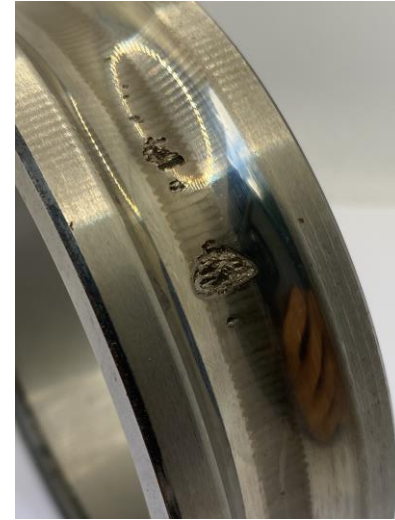
The method, that was practiced for decades, was the preventive maintenance. Parts were replaced long time before they reached their maximal life expectancy. This is not only very cost-intensive, but it also requires raw materials and energy. Of course, this approach has been the only option for a long time.



Condition Monitoring for Sustainability

Vibration Analysis

- With vibration analysis we can exactly determine which parts are damaged. And even more important: it is possible to document which parts are undamaged and can run another campaign.
- The actual life expectancy of a machine can exceed the calculated expectancy for several hundred percent. Therefore, using planned maintenance to change an asset unnecessarily not only is unsustainable, but you also risk inducing a failure on a machine that otherwise had nothing wrong with it.



1MTR-NDE			2MTR-DE		
1Ax	1RH	1RV	2Ax	2RH	2RV
0.247	0.481	0.3	0.37	1.53	0.801
0.356	0.627	0.368	0.254	1.02	0.478
2.38	2.34	2.45	2.28	2.61	2.1
0.1	0.308	0.135	0.165	0.684	0.337
0.02	0.021	0.02	0.027	0.028	0.023

Instead of replacing the asset on time-based interval, we can identify which component of the machine has the problem and replace just this component. In this case the motor drive end bearing.

Lowering your Energy Consumption

- Cutting energy cost is a win-win situation in today's environment. Lower energy usage reduces the demand for the fuels required to generate electricity and cuts your business' carbon emissions.



Lowering your Energy Consumption

Precision Alignment

- By improving reliability through precision maintenance, we can have a massive effect on the energy consumption.
- Precision Alignment is the process of aligning machine trains together so the center-align of the equipment is as collinear as possible.
- Studies carried out by ACOEM USA, found that the energy savings can vary machine to machine. As an example, they measured the energy usage before and after alignment on two chilled water pumps. Pump No.1 saw at 8% energy consumption reduction and Pump No.2 they found a 2.5% reduction. Based on the factories energy costs per kWh from aligning the two pumps, they saved £2,800 on there energy bill and reduced the over energy consumption on the plant.



Lowering your Energy Consumption

Compressed Air

- Compressed air is often referred to as the fourth utility. It is essential to many sectors as a safe, reliable and versatile source of power. It does however take a considerable amount of energy, generally in the form of electricity to produce the clean, dry, pressurized air that is needed for so many processes and applications.

Top Tips

- Have an ongoing leak test and repair programme. Leaks reappear and a 3mm hole could cost over £600/year in wasted energy.
- Check that any unused compressed air lines are isolated and not leaking air.
- By reducing wastage, e.g., by repairing leaks, the generation pressure can be reduced incrementally without affecting operations or production processes.

Top Tips by the British Compressed Air Society



Lowering your Energy Consumption

Heat Loss

- As much as half of the energy consumption of a building can often be attributed to heat loss.
- Air leakage, un-lagged pipework, poorly sealed windows and doors are often to blame.
- The leakage pathways are often complex and difficult to follow, but thermographic imaging gives an opportunity to trace the leakage and take measures to minimize the energy losses.



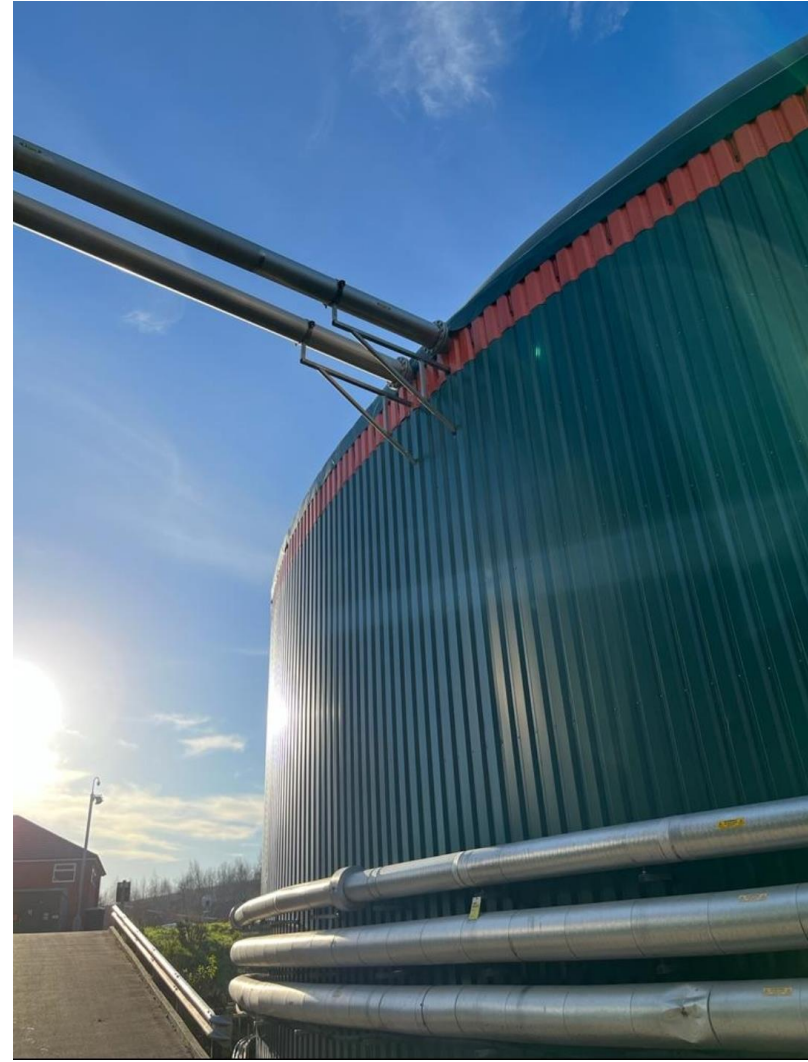
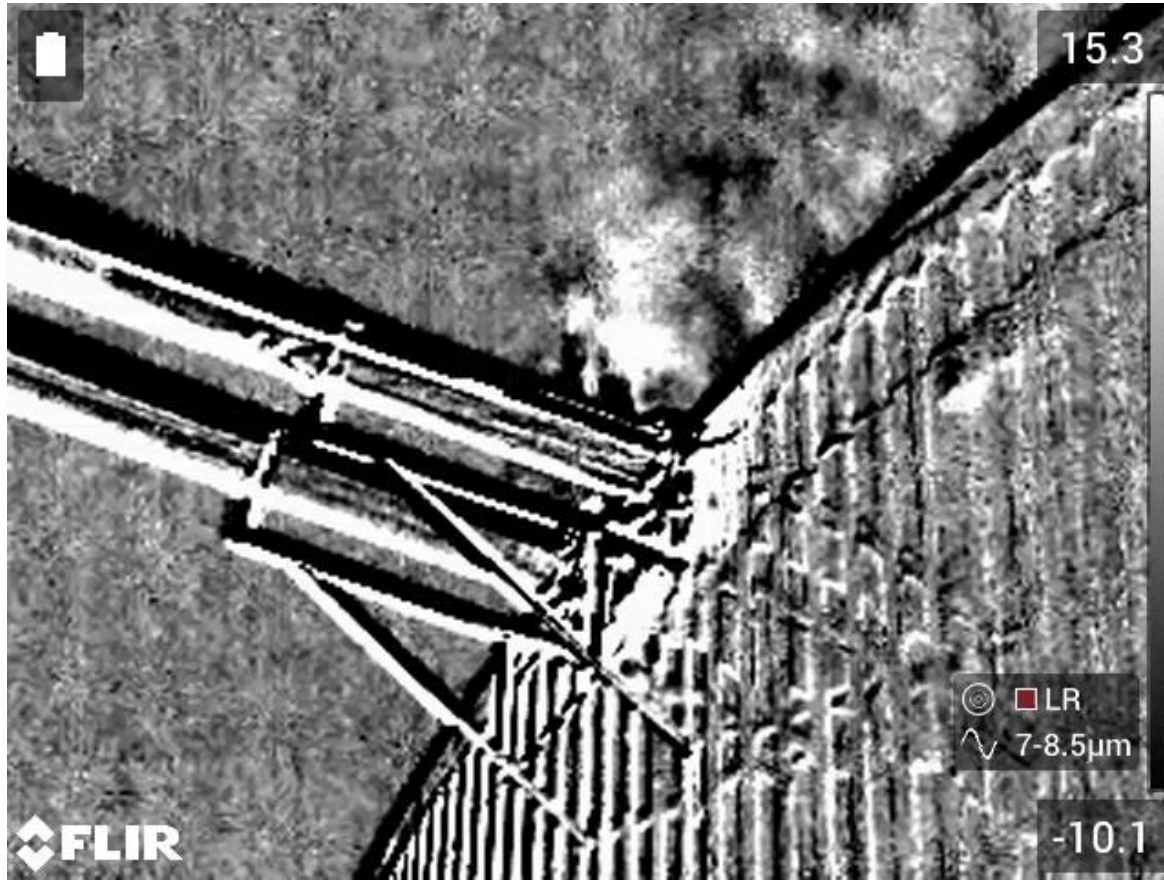


Emissions Compliance

Dangerous Gases

- Gases that are toxic or harmful to the environment are often invisible to the naked eye. This is true for many volatile hydrocarbons and emissions, that may affect the climate, the local environment and people's health.
- A gas detection camera allows us to easily gain a complete picture of an area and the leaks that would otherwise have reached the atmosphere can be prevented. FLIR's cameras can detect greenhouse gases such as methane, SF₆ and carbon dioxide. Both the industry and the control authorities recognize the value of optical gas imaging to prevent leakages and reduce their harmful effects.

Emissions Compliance



Detect • Solve • Improve

At Maintain Reliability we pride ourselves in the level of service we deliver to our customers. Using our experience we are able to help you...

DETECT problems on your assets and plant before they cause a functional failure. We are then able to review the data and using our guidance offer reliability solutions to help you...

SOLVE problems with your equipment. Whether this be providing resource for a necessary bearing replacement, gearbox overhaul or implementing reliability centred maintenance strategies.

IMPROVE reliability with criticality studies, PM Reviews, CMMS systems or looking at root cause analysis and defect elimination to help prevent breakdown and increase plant performance.

At Maintain Reliability Ltd we are proud to offer the full reliability solution.



References

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A dark, industrial scene featuring a worker in a hard hat and safety vest. The worker is positioned in the lower right, looking down at a component of a large, complex machine. The machine has various pipes, valves, and structural elements. The overall lighting is dim, with a green vertical bar on the left side of the frame.

Any Questions?