



Predictive Maintenance & Condition Monitoring
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T.E.V.A. Services Deliver Major Results for Contract Chemicals

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Contract Chemicals processes and produces a wide range of specialist chemicals used by industry, from pharmaceuticals to photography, and agriculture to foods. The processes that transform the raw materials into useable and indeed essential elements for many other manufacturers are in continuous operation.

The reactors, distillation vessels, liquid and solid handling, together with ducting and pipework that deliver the finished products must not only operate cost-effectively, but maintain the highest standards of safety and cause no harm to the environment.

Contract Chemicals places great emphasis on the planning and design of plant, equipment and processes, with all departments encouraged to contribute ideas relating to effective maintenance and operability of plant. The company was investigating the benefits of condition based monitoring and maintenance in order to complement its existing maintenance strategies.

What was needed was a system that enabled machinery to be routinely monitored and the information analysed to ensure the resources were deployed in an optimum manner, and interruptions to process downtime and throughput reduced.



Condition Based Maintenance at Contract Chemicals

Since the aim of maintenance strategies is to preserve the availability of a physical asset, there are two common strategies to achieve this - Reliability Centred Maintenance (RCM) and Total Productive Maintenance (TPM). On the one hand, RCM can determine what maintenance needs doing, based on the performance of the machine, whilst TPM is targeting maintenance in relation to the business processes.

Supporting these strategies are condition based monitoring techniques and practices, where the work of checking the correct operation of fixed and moving equipment is undertaken. These may be done on site, or equally common nowadays, as remote monitoring across the Internet.

Status reports can be produced at any time, and the condition of plant – checking to ensure equipment is operating within temperature, mechanical condition, vibration levels, or a range of other characteristics is measured and the information provided as input to the maintenance plan.

The use of specialist external agencies such as T.E.V.A. Ltd can help reduce operational costs of carrying out these tasks, to ensure that skilled in-company resources are utilised in the most cost-effective way.



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T.E.V.A.'s Performance Impresses Contract Chemicals

Contract Chemicals first made contact with T.E.V.A. through the trade exhibition Maintech, at which the company exhibited and demonstrated their range of services. Contract Chemicals were impressed not only with the way the company presented itself, but the content of their services programme, products, skills and experience.

Contract Chemicals opted to utilise the Thermal Imaging, Vibration Analysis and Fan Balancing services offered by T.E.V.A., and this has proved beneficial both in support of the maintenance programmes, but also in the overall business benefits to the company.

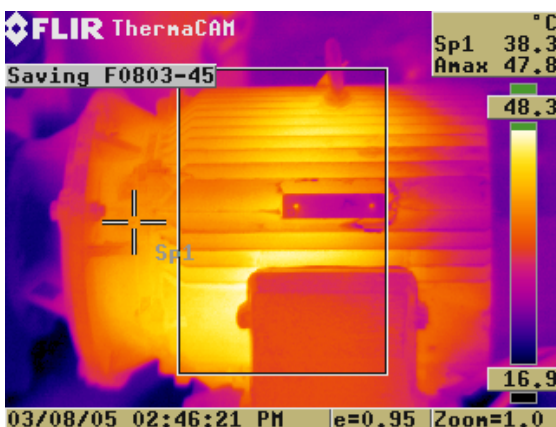


Fig: 1 The two images above show the external (normal) view, alongside a thermal image of the same piece of equipment. This clearly demonstrates the value of infra-red thermography in the Plant Manager's armoury of resources.

An area vital to the operation of plant is the ability to ensure heat generated during the operation of plant and equipment is within safe and designed limits. The use of **Thermal Imaging**, as applied to moving and non-moving components enables Contract Chemicals to identify the sources and level of heat generated by electrical cabinets, cable terminations, and motors that drive pumps.

Infra-red thermography is a non-destructive, non-intrusive, non-contact mapping of thermal patterns on the surface of machinery and other plant. It is used to pinpoint and analyse the thermal performance of plant, and a major benefit is that it allows the Plant Manager to avoid production stoppages and potentially critical failures. In addition, the reports provided also help to align and prioritise maintenance with production schedules.

In such an important operation as chemical process industries, where pumps and machinery are running 24 hours a day in one of the most aggressive environments, according to Harry Wilson, Contract Chemicals' Regulatory Compliance Supervisor, this service is capable of **"showing faults before they happen"**

From the data gathered by Thermal Imaging T.E.V.A. produce tabular and graphical reports on a quarterly basis, covering the fixed installations of Contract Chemicals – including electrical cabinets, where the images – such as the example illustrated here – enable potential problems to be identified and disasters avoided.

Also on Contract Chemicals list of activities for which condition based monitoring was investigated, was the regular **vibration monitoring and analysis**. It is an obvious dictum that machinery will break down – indeed, I believe it was Keats who said ... "things fall apart"...and in the case of rotating machinery in a chemical plant, from pumps to gearboxes and fans, prevention is clearly better than cure. The chemicals that flow through the plant equipment can cause wear and tear to all of these elements, and the frequent and routine monitoring and reporting of the equipment status is vital.



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As part of the service provided T.E.V.A. were able to gather data from the equipment, using accelerometers and other equipment to measuring vibration levels from the plant's assets. The signals from the vibration sensors are sent to a signal processor, where the received data is captured and displayed in a graphical format. This output is the machine's 'vibration spectrum' – the heart beat – and which is then analysed to identify problems, or potential problems associated with the equipment's operation.

Fan balancing is another key area for Contract Chemicals. When particulate build-up on a fan is uneven, it may result in an out of balance status. Additionally this can increase wear on the component, and potentially lead to production problems. Here again, data is collected on site, with monthly reports providing, through a traffic light system, a good indication of the performance of that component. This input to Contract Chemicals planned maintenance regime provides even better reliability.

These are some of the main advantages that Contract Chemicals' Harry Wilson sees from T.E.V.A. Ltd's services:

"... they are very pro-active and the service has clear safety benefits, and equally importantly, T.E.V.A. provide backup for Contract Chemicals preventative maintenance programme"

Overall, Contract Chemicals has found that condition based monitoring services, with clear, and accurate reporting delivers many benefits. The application and growth in the use of sophisticated monitoring systems

The collected data is then used to produce monthly reports, and perform health checks on the assets that are in daily operation. The reports identify and illustrate the levels of vibration and its impacts, against a series of pre-set thresholds – a traffic light system – that gives an early warning of changes in equipment performance. For critical equipment on the plant this has been found to be very useful.

The reports provided give a better idea and understanding of what is happening around the plant, with clear, visual interpretations of the collected and analysed data. This pro-active approach, along with enhancements to the existing planned maintenance programmes is also very well received by the rigorous Health & Safety regime in place at Contract Chemicals.

can be better suited to a specialist service provider, to support more cost-effective plant maintenance, and ultimately better plant reliability and improved production processes.

In the words of Harry Wilson, Contract Chemicals' Regulatory Compliance Supervisor;

"T.E.V.A. have the essential skills, the equally essential technology and provide cost-effective support for us..."

ends



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About T.E.V.A. Ltd

T.E.V.A. is based in Barrow-in-Furness, and have an armoury of services designed to reduce energy costs and increase product quantity and quality. The company's Condition Monitoring and Predictive Maintenance programs are designed to identify items that are about to go wrong before they do. In a practical, flexible and responsive approach the principal services include:

- Balancing Services
- Contract Data Collection and Analysis
- Thermal Imaging
- Laser Alignment
- Training Solutions

T.E.V.A.'s team of technicians and engineers have a depth of knowledge second to none in their understanding and skill across wide range of process industries, and many different kinds of continuously operating plant pumps, seals, fans, conveyors etc. Most aspects of the manufacturing processes can be monitored and maintained, whether that is slow running machines, to sophisticated detection systems for factory air networks, or thermal imaging of cable terminations behind locked enclosures.

These programs inevitably helps to reduce operating costs, increasing plant and machine reliability and availability. It can also enhance product quality and extend the life of machine equipment.

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