



Heating, Ventilation, Air Conditioning & Refrigeration

Thermal Imaging has become well established as an invaluable tool for diagnostic and preventative maintenance in manufacturing and process industries worldwide; the technology enables the appropriate maintenance to be carried out before complete breakdown occurs and consequently reduces equipment downtime and minimises the associated impact on profits. Just as with these (normally electrical and mechanical) applications, the simple use and low cost of the current generation of thermal imagers make them the ideal tool for a host of other applications, and in particular for the HVACR (Heating, Ventilation, Air Conditioning and Refrigeration) Industry. Thermal imagers are now being used to readily identify, for example, poor circulation in radiators, discontinuities in pipe routes in under floor heating systems, leaking pipes, poor performance of mechanical and electrical units, incorrect airflow distribution and temperature distribution in chilled or frozen cabinets.

Thermography

Infrared thermography is one of the most important sensing technologies to be applied to the detection and monitoring of manufacturing and production equipment. Until recently this sophisticated technology was prohibitively expensive, being driven mainly by military applications; over the last few years, however, the technology has improved and it has been introduced to high volume commercial and professional applications by innovative companies such as Irisys. This has brought the price down to a level which is opening up a host of new applications. Thermal imagers measure the infrared energy emitted by surfaces remotely and are consequently extremely simple to operate as no physical contact is necessary. Many facilities have employed thermographers to carry out inspections every 6 or 12 months; the cost of the equipment and its ease of use mean that these inspections can now be carried out as and when required by the organisations own maintenance staff. Appropriate thermal imagers no longer need to cost £30,000 or more; for example the comprehensive range of imagers from Irisys starts from less than £1,000 – less than the cost of a single survey from a thermographer.

Environmental Control

HVACR equipment is installed to provide an acceptable environment in terms of temperature, humidity and ventilation levels. This is required not only for the health and comfort of the occupant, but also to ensure the health of the building and increasingly to control energy costs. This latter point is becoming increasingly significant as governments around the world are focussing more and more on energy efficiency.

Surface temperature has started to play a major role in both audits and energy surveys, as it can be used to evaluate the condition of the building itself as well as the electrical, mechanical, HVAC and plumbing systems. Consequently air leakage, moisture accumulation, blockages in pipes, and structural features behind walls etc can all be detected and documented with thermal imaging cameras. Regular maintenance of the HVAC system is now becoming the norm in many establishments where strategies are being developed to monitor all aspects of the system – from ductwork and pipe work to anomalous boilers, motors and bearings. This work is leading to the creation of planned preventative maintenance regimes.

Predictive/Preventative Maintenance

Over recent years advances in instrumentation technology, and the requirement to reduce operational costs and increase operation efficiency, has resulted in the more progressive industries abandoning traditional routine maintenance programmes in favour of condition monitoring and predictive maintenance strategies.

Conventional maintenance programmes are driven by equipment failures or by the regular, but often arbitrary 3, 6 or 12 monthly, routine maintenance exercise. Little attempt is made to monitor equipment performance or to track historical maintenance information; little is therefore achieved in terms of minimising the equipment downtime, extending the useful life of the equipment or reducing the overall lifecycle costs. In part this is due to either the unavailability or affordability of the necessary instrumentation.

The appropriate instruments such as infrared temperature monitors and vibration analysers are now becoming available. Handheld equipment can be used to simply check the condition of critical equipment; microprocessor based versions of these instruments are increasingly being used to provide continuous condition monitoring. Trend analysis can in many circumstances be more important than for example, a spot absolute temperature measurement. Those organisations employing these strategies are already reporting

dramatic reductions in operational downtime and costs, and as a result are predicting increased capacity, improved quality of service and increased returns on investment.