



Preventative maintenance for buildings

Plant managers have become familiar with the benefits associated with the use of thermal imaging in their planned preventative maintenance regimes associated with the equipment within their premises; the increasing focus of governments around the world on energy efficiency is now leading to the use of the same technology to monitor the location and extent of heat loss from the structure.

Driver for identifying heat loss in buildings

(i) **Cost savings**

Heating and cooling a building consumes energy, costs of which are increasing. Any reduction in heat/cooling losses will reduce energy consumption leading to a direct cost saving.

(ii) **Social responsibility**

All businesses are becoming more aware of their corporate social responsibilities. Reducing energy usage is one aspect of this C.S.R.

(iii) **Legal**

As part of the Kyoto agreement, Britain has to reduce its carbon emissions to 12.5% less than the 1990 emissions by 2012. In the UK ~45% of all carbon emissions come from buildings.

Part L of the new building regulations refers to conservation of heat and power. The regulation is further subdivided into parts covering new and old buildings, commercial and domestic buildings. Targets are being introduced to reduce carbon emissions, starting with new commercial buildings over 500m², and then gradually phasing the rest in.

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 in the main 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.

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.

Planned Preventative Maintenance programmes are now routinely applied to several areas within the commercial and industrial building; typically these include electrical inspections, mechanical inspections, HVAC equipment and associated plant and machinery.

Energy Conservation

Thermal imaging is a technique for creating an image of a scene based on the invisible thermal radiation emitted from an object. This technology lends itself to detecting faults in a mechanical or electrical plant, but it is equally appropriate for the identification of hot spots in buildings – an essential requirement for all those involved in energy conservation. The thermographer will be able to quickly perform a survey which will highlight problems with:-

- Missing or non-existent insulation
- Moisture damage
- Thermal Bridges
- Drafts due to ill fitting doors and windows etc
- Floors and roofing
- Anomalous pipes, radiators, ducts and other HVAC equipment