

## Thermography

### Understanding the Risk

Every year electrical fires cause significant financial losses. Many of these incidents could have been identified before they caused a problem by organisations undertaking infrared thermographic inspections of their electrical installations on a regular basis to reinforce their planned preventative maintenance programmes.

Electrical circuits and components will breakdown for a variety of reasons. Whether it is through overloading, fatigue, defective components, contamination or just loose connections they will always have a rise in temperature or 'hot spot' prior to breakdown. Infrared cameras allow thermographers to see these thermal imbalances prior to the breakdown of the subject being surveyed.

### Controlling the Hazard

All objects give off energy (heat) and these energy levels have a direct relationship to the amount of infrared waves being generated. With the aid of an infrared camera that heat can be detected and measured.

By detecting and measuring temperature differences from one surface of an object to another, skilled technicians are able to diagnose possible problems and provide meaningful recommendations. Areas scanned include, but are not limited to:

- Electrical switch gear, breakers, bus connections and contacts
- Transformer bushing connections and cooling fins
- Motor and generator connections, windings, feeders and excitors
- Bearings on motors, line shafts and process equipment
- Friction in drive gears and drive belts
- Refractory systems (boilers, kilns, molten material containment, etc.)
- Steam traps and piping insulation
- Tank levels and insulation problem

Infrared surveys of electro-mechanical systems are usually conducted as part of a regular preventative maintenance programme. The results of these surveys can help plan maintenance schedules, minimise shut down time and have long term significant cost savings.



Several independent studies have been made addressing the cost-effectiveness of infrared thermography. These compare the cost of testing (and the savings realised by conducting proper repairs based on the findings) versus the cost of damage if the repairs are not made and the equipment breaks down. When the studies looked at the direct damage (the cost of the damage to the equipment), the average ratio was £4 saved for each £1 spent. When factors such as spoilage, loss of production and extra expense were included, the ratio increased to £20 saved for each £1 spent.

Infrared thermography is quickly developing into one of the preferred methods for fault detection. Its advantages include:

- Thermal imaging equipment detects radiant heat energy that cannot be seen by the human eye
- The use of thermal imaging equipment is performed through non-contact means, which makes it a safe choice of inspection for many applications
- Valuable decision making information can be gained through the proper use of modern infrared imaging systems in a very time efficient manner

- Infrared thermography can normally be performed without disruption to the equipment that is under review

For further information, contact your local AIG risk engineer.

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