THERMOGRAPHY IN FOCUS

Industrial Electrix regular feature on infrared images from members of the Australian Professional Thermography Association Inc.

A Low *Delta-T* Can Be the Sign of a Much Bigger Issue

During a recent routine survey at a mine site on the west coast of Tasmania, a serious fault was identified inside the junction box of a 3.3kV electric motor.

The 3.3kV electric motor

In this case, the low Delta-T indicated a potential internal fault inside the equipment. While the variation was low, from the thermal images being displayed, it was evident that a critical fault was within the HV motor connections and would require immediate intervention.

Thermography can be difficult as we are considering small but significant temperature indicators, according to the three principles of heat transfer. Conduction, radiation, and convection. In this case we had two heat transfer principles evident:

1. Conduction. The initial identification was made with a slight temperature elevation of the HV tail. While this elevation was small, it was the correct interpretation of the thermal heat pattern
2. Radiation. It was also the thermal pattern, showing an area on the cover of the junction box, caused by internal heat that provided a positive location of the fault behind the cover.

With similar previously identified faults, this has not always been the case, and identification was only through thermal conduction in the motor tails, with variations in the low single digits.

At the time of the fault being identified, all associated electrical checks were also carried out to rule out the temperature elevation being attributed to variation of load between the phases. The motor was taken out of service in a planned manner, ensuring the work was completed safely and efficiently with minimal down time.

The fault was repaired with the damaged tails replaced and all other connections checked, and the motor was returned to service. Follow up checks were carried out to verify that the work completed had been effective.

POSSIBLE CONSEQUENCES

This survey has routinely been carried out every 6 months for the past 11 years with a lot of faults being identified over that time. Risks to business vary, depending on the fault.

Had this fault not been identified and repaired, the costs of further damage and associated downtime would likely run to six figures.

CONCLUSION

The identification of this fault again reinforces the benefits of strict routine survey regimes, the importance of understanding the CM method you're utilising and also having the level of training, practical experience and Certification, to rate the calls on the critical assets during a survey.

As professional thermographers we are looking out for thermal indicators, and the resulting Delta-T, at every survey. A subtle variation can at times be the sign of much bigger issue.

The real heroes of this sort of find are the businesses that follow best practice principles as well as the organisers who, day in and day out, coordinate the regular condition monitoring functions to be carried out routinely by capable, professional, and accredited personnel. IE

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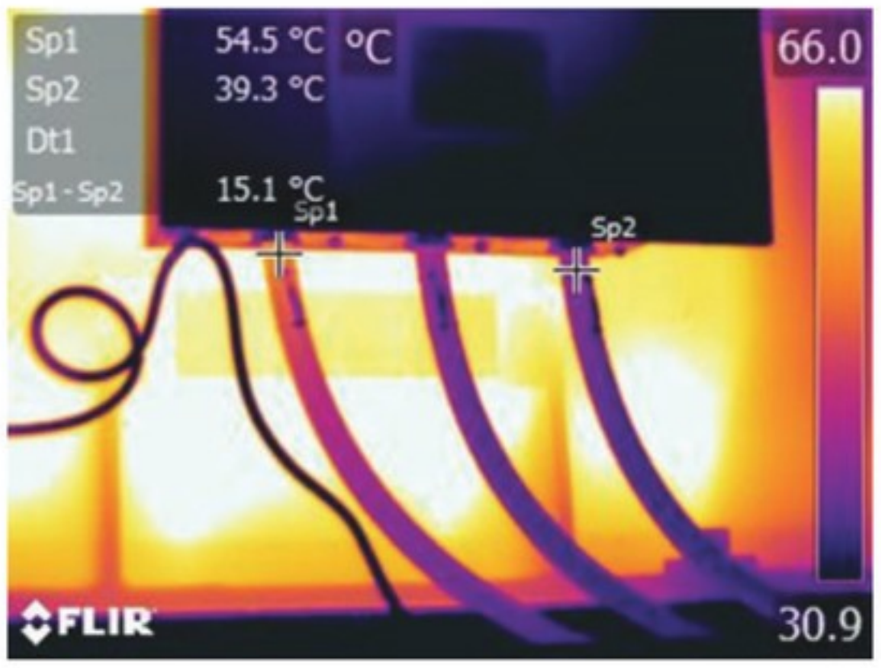
There's more to thermography than meets the eye!

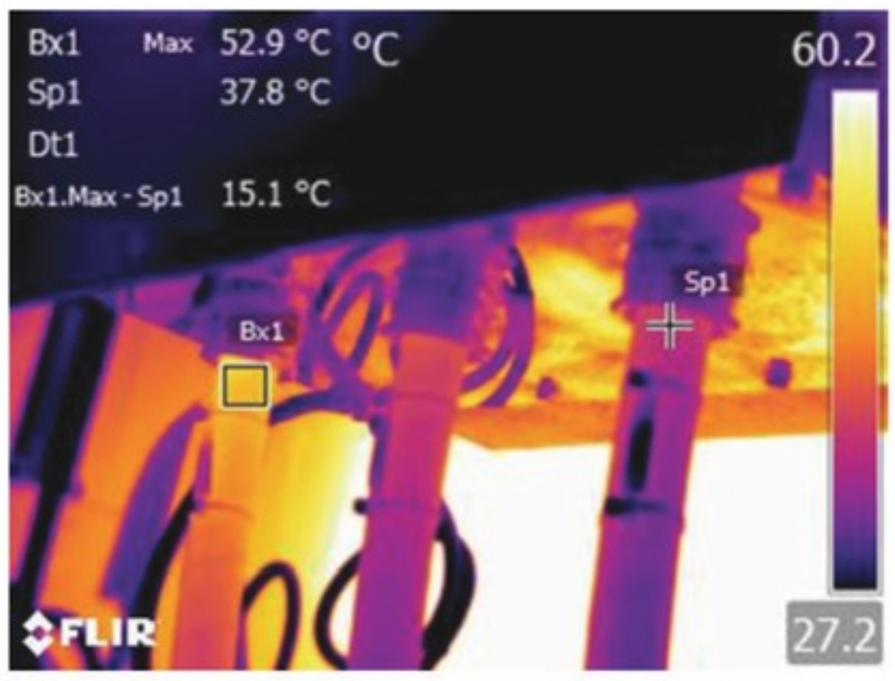
AUSPTA

1. Lower front angle of incomer glands



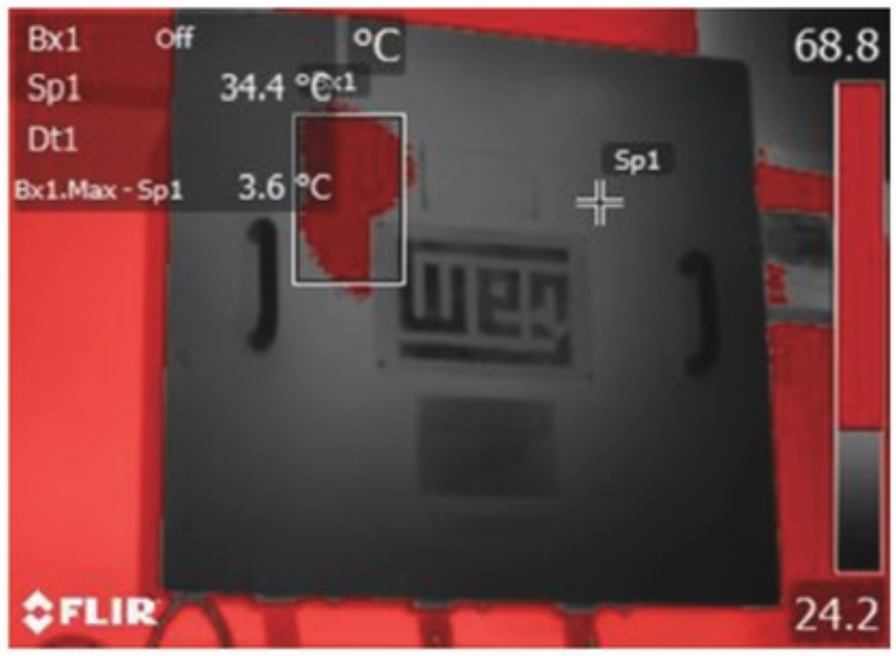
2. Elevated temperature noted at LHS phase

3. Lower right side angle of incomer glands



4. Again, elevation noted in LHS tail

5. Junction box with cover in place



6. Warm area consistent with the tail elevation

7. Cover removed showing three phases

8. Failing motor tail connection