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103. Detecting hot spots: pinpoint electrical workplace hazards with thermographic inspection. Richey, T. Greenhouse Grower 26(12):66, 68. 2008.

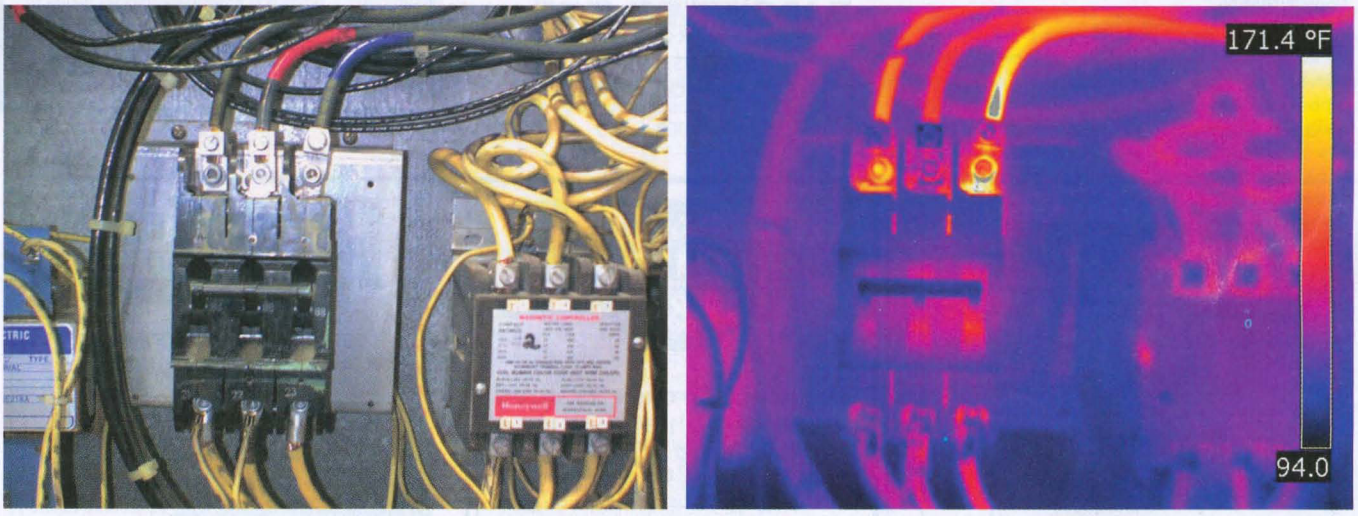
Detecting Hot Spots

Pinpoint electrical workplace hazards with thermographic inspection.

by **THOMAS RICHEY**

HORTICULTURAL businesses that regularly use electrical apparatuses and equipment must take serious safety precautions to prevent injury or damage to their property. At the very least, regular electrical preventative maintenance programs should be in place to protect against loss, and all electrical apparatuses must always be kept clean, cool, dry and tight. Infrared, or thermographic, inspections provide an added measure of safety using sophisticated technology to identify and rectify potentially damaging and dangerous electrical hot spots.

HSB Thermography Services is one such company that offers expert thermography services, which can quickly and efficiently detect a variety of problem-causing electrical conditions with little disruption to business operations. Thermography services can detect a number of potentially harmful or disruptive conditions, including friction, loose connections, poor metallurgy, insulation breakdown, improper liquid levels, tank levels and insulation problems – ultimately saving businesses thousands of dollars in potential losses and protecting lives.



Are hot spots lurking behind your electrical panels? This is what circuit breaker looked like during a thermographic inspection. The glowing yellow and orange areas indicate electrical hot spots.

Equipment with critical conditions can be taken off line under a scheduled shut down, as opposed to failing in the middle of a shift – or worse, during hours when your facility is unoccupied, increasing the chances of more severe damage or fire. Horticulture businesses of all kinds are beginning to recognize the value of a simple thermography inspection, and those that have gone through the process are able to identify potential hazards they never knew existed.

So What Is Infrared?

Infrared thermography is a noncontact and nondestructive way to detect problems in an electrical system. All electrical and mechanical equipment emits heat in the form of electromagnetic radiation. Infrared cameras, which are sensitive to thermal radiation, can detect and measure the temperature differences between surfaces. Abnormal or unexpected thermal patterns can be indicative of a problem with the equipment – problems that could cause a fire or lead to a breakdown or failure.

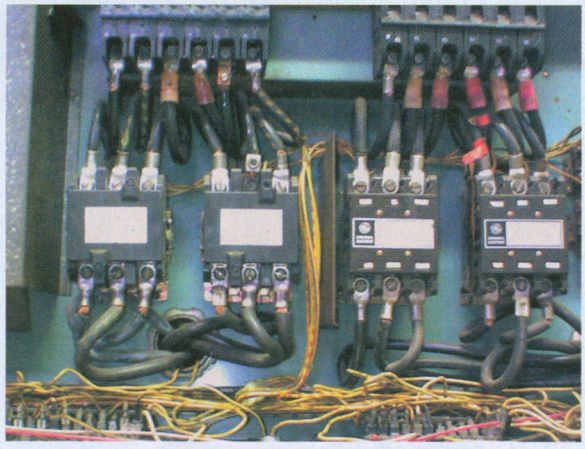
Using this technology, technicians can evaluate the findings and provide meaningful recommendations to a business's management, operations and maintenance personnel.

Hot Spots Are Hazardous

So-called hot spots are hot terminal connections that negatively affect your electrical system in several ways. First is wasted energy: Hot spots bleed electrical current, reducing the efficiency of the system and costing you more.

When the electrical connection actually fails, and the connections separate, an arc will melt most metals.

A connection that would have cost $200 in parts and labor to repair could cost a business owner hundreds of thousands of dollars in damages, and a fire caused by the failure could destroy an entire complex. Property damage resulting from electrical breakdowns and failures can be severe. In fact, electrical equipment failure and breakdown are the leading causes of fires.



A closer look at these starter connections also reveal a significant hot spot with the bright yellow connector.

Preparing For Infrared

To get started, contact your insurance agent, who can recommend infrared survey services in your area. Choose a professional infrared thermographer with the following credentials:

- A Written Practice program that meets the recommended practices section, SNT-TC-1A, of The American Society of Nondestructive Testing, Inc.
- A program that is audited by a third party.
- The ability to provide reports in hard copy, as well as electronically.
- Can provide references on request.

An infrared survey is simple and causes little interruption to business operations. The equipment does not need to be shut down. In fact, it is preferable for the equipment to operate near full-load capacity. That way, the severity of the finding can be measured with greater accuracy.

To prepare, first determine what areas you want surveyed. Major categories include electrical, from incoming power service to control cabinets; mechanical, such as bearings on fans, motors and line shafts; and energy losses, like steam traps or degraded insulation of boilers and kilns.

Electrical loads should be as near the normal level as possible when surveying electrical breakers, relays or controllers because low loads may not show problems. Most infrared thermographers require the customer to provide a qualified person to open and close electrical panels and cabinets. Make sure assigned personnel can perform this task safely.

When the thermographer arrives at your facility, hold a short meeting to clarify the importance of safety and the route that will be taken to conduct the survey. Talk to the thermographer before he or she leaves your site to be certain you are clear about what was found. Also, consider having the thermographer return after repairs to conduct another survey and ensure that repairs were properly completed.

In any case, the miniscule amount of preparation and time it takes to complete a survey is well worth the peace of mind and protection against loss of life and property.

John Baisch, owner of St. Louis-based Baisch and Skinner, a wholesale floral distributor, recently had an inspection by the HSB team, which identified electrical hazards he never would have known existed otherwise.

"We found malfunctioning and overloaded circuit breakers that needed to be replaced," Baisch says. "It just seems like a no-brainer for the knowledge you gain from it. We carry a lot of dried goods and we had an electrical fire at one of our facilities once. I don't want to go through that again – it's well worth the very little time it takes." **GG**

About the author: Thomas Richey is vice president of loss control/property claims for Hortica Insurance & Employee Benefits, leading the loss control division. For more information on thermographic inspections and other safety and loss control topics, contact him at 800-851-7740 or **trichey@hortica-insurance.com.**

Thermographic Scan Targets

What can be scanned during a thermographic inspection? Here are a few examples:

- Electrical switch gear, breakers, bus connections, and contacts
- Transformer connections
- Mechanical couplings on rotating equipment
- Process piping and heat exchangers
- Compressor heads
- Motor and generator connections, windings, feeders and excitors
- Bearings
- Friction in drive gears and drive belts
- Refractory systems
- Steam traps and piping insulation
- Tank levels and insulation problems