

## Revealing Opportunities for Energy Efficiency

### Infrared scans can help to optimize roofing and insulation performance

Story and images by Jeffrey L. Gadd

I have to laugh a little when I think of the word opportunities. Many who know me have heard the inside joke or story. As someone who has been involved in the maintenance profession most of my career I've partaken in lots of opportunities. Maintenance personnel are typically the "go-to" people when others have problems and no solutions. I once worked with an engineer who never had problems – only opportunities, which has stuck with me. I've always thought this to be either sarcasm or a great way to look at things.

#### Flat roof opportunities

With April showers on the way, May roof leaks will follow shortly. Roof leaks can cause lots of opportunity for maintenance personnel as well as for the owner and tenants. Infrared testing of flat roofs has been used successfully for finding roof leaks the last 20 years or so and is gaining popularity. What is needed for a successful inspection is 1) a day of full sun to heat up the roof and 2) little to no wind and a clear night.

After the sun goes down, the inspection begins and the roof starts giving heat back to the atmosphere. Areas with wet insulation trapped under the membrane will retain their heat longer than areas with dry insulation making them visible with infrared. Areas of opportunity are typically outlined with spray paint and numbered for reference. Image #1 is indicative of wet insulation (square area in red/white); again, areas with no problems would be uniform or all green in this color palette, which is obviously not the case. In this image you can see a roof drain and what appears to be a seam both could be suspect in letting moisture in.

I recently was hired to perform an inspection of a 48,000-square-foot roof. Ideal weather for roof inspections is not typical during March here in Cleveland

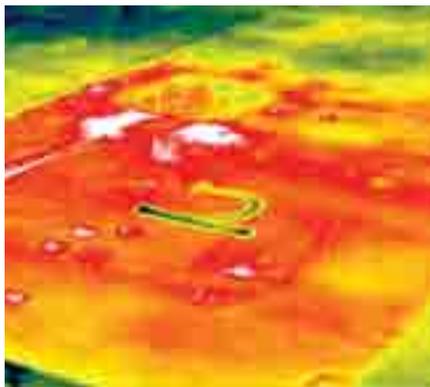


Image #1

but on March 17 of this year, it was perfect and a beautiful night for infrared. I am used to inspecting roofs with known leaks as that is what prompted the inspection/repair process. This case was different, as the customer was looking at purchasing a new (to them) building and wanted to evaluate one of the building's most valuable assets, the roof. What a great idea: to incorporate a thermal inspection to do their due diligence when considering the purchase of a multi-million dollar building. My first instinct was that any "opportunities" I might find would certainly be a great bargaining chip when negotiating the purchase price of the property. The roof checked out to be in great shape with no wet insulation, so now they may have traded their bargaining chip for a higher degree of peace of mind.

#### Insulation "opportunities"

Many people have started taking the cost of heating/cooling their buildings and homes much more seriously than ever before. Every time you turn around, people are talking about going green and we see acronyms such as LEED (Leadership in Energy and Environmental Design), R-values and the like. I've read that approximately 40% of the energy used in this country can be attributed to the conditioning of our homes and workplaces. Residential infrared inspections have increased dramatically the past couple years, as many are trying to save money on their utility costs. Commercial buildings too can benefit from an infrared inspection of their building envelope. Typically a 20 F temperature difference from inside to outside is recommended but in my experience the larger the differential the better.

Recently I assisted a newly built school where officials could not understand why they had sprinkler pipes freezing (remember: "opportunities"). I went in the evening with an ambient outside air temperature of 9 F, which gave us nearly a 60 F temperature differential to work with. First order of business was to go around the exterior looking for clues. Certainly I was able to find a few areas which indicated

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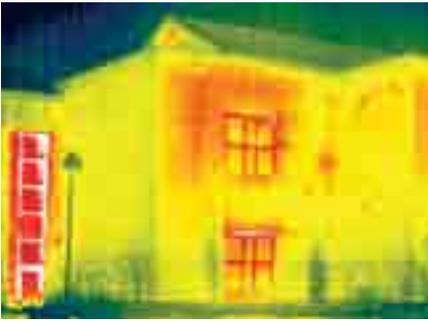


Image #2

heat loss (red areas) as shown in picture #2.

The interior spaces are where most of the opportunities were found on this project as cold intrusion was certainly causing the various pipes to freeze. Above the ceiling tiles, inspecting exterior walls temperatures in the teens and twenties were common. I believe the school officials were happy with the results of the infrared scan as it confirmed their suspicions, but they

were obviously not thrilled with the conditions that existed. Pictured in photo #3 is the space where the roof and interior wall meet, and areas in black/purple wicking down the wall is cold intrusion.

With the new green world we live in and uncertain economic times where budgets are strained and we need to do more with less, it only makes good economic sense to maintain your home or place of business.

Infrared inspections are useful for many things such as flat roofs, buildings and electrical inspections, plus many other applications. There are many reasons to have your flat roof inspected such as: leaking, warranty and insurance claims, pre-purchase inspections, or to evaluate the quality and effectiveness of mechanical work just performed, just to name a few. Many homes and other facilities could tighten up and save money on their utility expenses by

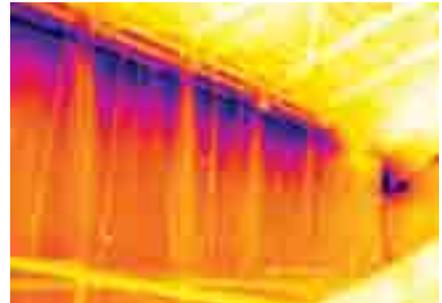
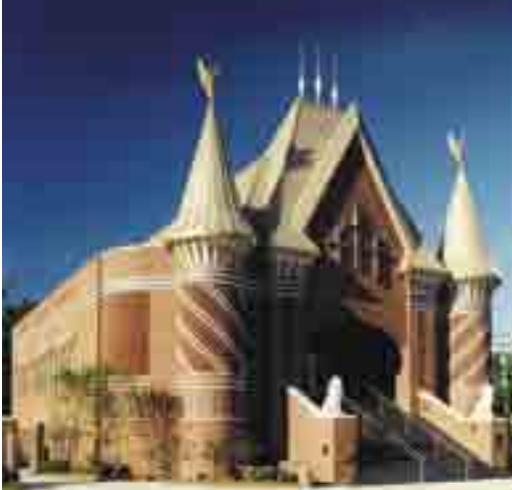


Image #3

having them evaluated and taking the appropriate corrective actions. In today's economy where energy prices are only heading upward, infrared inspections are one of the quickest ROI (return on investment) solutions an owner or manager can seek. **P**

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