

Your Roof and/or Walls Could Eat More Than Your Lunch

By Stephen Ruback, *Professional Inspector* [TREC License #6030]

It doesn't take a hurricane. Low slope roof leaks, EIFS wall internals rotting away in less than five years, and expensive internal destruction of stucco wall structures all account for many millions of dollars in property loss every year. The problems with EIFS homes have been so large that they often sell for as much as 1/3 less than comparable market value compared to other homes in the same area.

Low Slope [Flat] Roof?, EIFS?, Stucco?

Serious hidden damage is very common with these systems. By the time water makes its way to the visible surface from an exterior source, substantial internal damage can develop. Insulation saturated with water no longer insulates. Wood wall structures rot away, unseen. Collected moisture draws wood destroying insects. When this type of damage does finally become visible, it usually has already reached very expensive proportions.

Now you can detect this kind of hidden destruction before it devours the whole structure.

Other potential benefits include observation of wood destroying insect infestation, missing insulation, and hidden interior water leaks.

Is it magic?

No hocus-pocus or magic is involved. It's better than magic. InfraRed Thermographic imaging is simply the application of scientific principles with recent developments in high-technology measurement equipment.

It all revolves around subtle temperature changes and the equipment needed to measure them. Water soaked areas under the roof coating stand out like neon signs. Moisture in wall cavities likewise subtly changes the thermal profile of the surfaces around it. Missing insulation leaves clear thermal images if you have the right equipment to "see" it. Insects bring moisture with them, and this creates subtle temperature differences where they live. The right thermographic camera turns these temperature differences into distinctive pictures. Any extra heat being generated in electrical connections can show up like a light bulb.

With the right thermally sensitive equipment any of these subtle patterns in temperature can be transformed into black and white, or even color pictures, clearly showing temperature variations in any accessible structure.

Why haven't we seen more about this before?

New developments in infrared measurement equipment have brought this technology out from the laboratory and into the field. IR Thermography systems are finally portable. Their price has dropped from near a hundred thousand dollars to around \$20,000 and their portability has improved as well. They have now been in use for several years in chemical plants. Another rapidly growing application of this technology is for inspecting large flat roofs so leaks can be repaired before dripping water shows up inside – and only the faulty areas are repaired, rather than the entire roof.

Would you rather spend, say \$5,000 for repair of several clearly identified leaks or \$100,000, or more, for a whole new roof? Would you rather identify wall problems early on, or when the wall collapses?

How can I take advantage of IR Thermography?

While still a bit expensive for the average person to run out and buy his own IR Thermography system, you can now hire

the inspection service with a trained and experienced home inspector. If you have a low slope roof, EIFS or stucco walls, you can definitely benefit from an IR Thermography survey of your building. If your cooling and heating costs seem excessive, IR Thermography readily detects missing insulation, which keeps on costing you every month in excessive utility bills.

What are the limitations of IR Thermography?

Besides being expensive, the hardware still requires some experience to use effectively.

Once any moisture has completely dried out from a previously moist cavity, thermal variations are more difficult to detect. After months of drought conditions, moisture in walls from exterior leaks may need to be recharged by some welcome rain or a good soaking with a hose to achieve the best reading. Plumbing leaks are independent of the weather, of course.

It is also useful to have several degrees of temperature differential between the outside and inside, which means the AC should be running for several hours before inspection in the summer and the heat should be on for several hours in cooler times.

Roofs are ideally scanned at dusk to take advantage of the evening temperature differentials, proper timing is important.

How much anguish and trouble could have been avoided in the past, if you could see though the walls like Superman? Spot those termite trails, missing insulation, and hidden water soaked areas with a glance. Real x-ray vision may be a thing of wishful thinking, but with new advances in technology you can now come very close.

- Check out your walls inside EIFS or stucco without tearing them apart.
- Observe clear evidence of moisture in your walls ceilings or floors without poking or prying.
- Discover insidious leaks in low slope roofs for precise, cost effective repairs.
- Quickly document missing insulation, without opening walls or ceilings – reduce your excessive utility bills.
- Detect presence of significant insect infestation in your walls with a simple scan.
- Highlight overheated conditions in active electrical systems.

It's not magic – it's good, solid, well established science. Any time a few hundred dollars can save thousands, it is worth doing.

New homes need inspection too.

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