GREEN TECH THE SERIES COLUMN FOR OCTOBER 14, 2015
HEADLINE: THERMAL IMAGING & ENERGY EVALUATIONS; ITS TIME

During our recent B&B/Spa open house, a number of guests asked about the EnerGuide 84 rating on the Church and the value of energy audits on a home. I was surprised at the number of questions, in general, around energy conservation. There seemed to be particular interest in the use of the thermal imaging camera, which we'd used in both the church and spa building to confirm air leakage.

Over the past few years the use of thermal imaging (T.I.) has exploded in many fields. You will also hear the reference Infrared (IR) used, since it's now the most common commercial term. Thermal Imaging is widely accepted in medical practises, often used for breast scans and other imaging where heat and cold can define a health related issue. The ancient Egyptians used a crude form; they learned that where the body heat was elevated, disease was often found. The early Greeks would cover their patients in mud and whatever part dried the fastest was often indicative of where an illness was. Early thermology can be traced to a thermoscope, which was a glass tube that measured temperatures, the forerunner of our modern day thermometer.

The original thermal cameras were developed for the military and the U.S. army had these detectors as early as the 50's. A company called Raytheon can be credited with the commercialization of thermal imaging. They developed a coating for thermal sensors and the Gulf War was the first major war where this technology was used extensively by the soldiers on the ground. Today goggles, cameras and hand held devices for the military and law enforcement are common-place for finding people hiding in buildings and brush. NASA uses TI to plot a distant planet and most urban fire departments now have an IR camera at their disposal.

Today's IR cameras have become more accurate, portable and certainly cheaper than they were as little as 5 years ago. We use a FLIR B80 that sold for over $10,000 when we bought it. Today, a similar camera can be bought for about ½ to 2/3 of that. Canadian Tire has one for under a $1000.

How does an IR camera work? It's actually a simple process where the camera senses the radiant energy given off by anything within its field of view. The camera then converts this heat into a visual image that is displayed on the camera screen. There are two types of reference commonly used; color and greyscape. Some cameras can create a red-blue palette or an amber image that shows up as

shades of yellow. Most of this is reference is set by the operator and we have found that the color reference shows the images the best. The operator then sets the upper and lower temperature ranges for the area that is to be scanned.

Unfortunately, home builders and renovation contractors have been very slow to utilize IR technology. An IR camera will find insulation, or the lack of it; where the framing is located; air leakage around windows and doors and the presence of dampness in walls. We use our camera for finding water issues in basements, for example. As we tighten up the air envelope of our homes, an IR camera should be a given for builders to verify that the insulation has been done evenly; whether the area around the windows and doors are correctly sealed for air leaks and leakage at the sill plates; a common air fault area. This information can have a major effect on the energy efficiency of a building. Also, if there are air leaks, it usually means condensation, which, over time, will become rot, so this can be easily avoided from the get-go.

A lot of energy auditors have picked up on this technology, however. Recently, I was in a home and suspected basement dampness. I advised the client, who happened to be an energy auditor, that I was going out to get my IR camera and he quickly brought his own in; a camera far better than ours I might add, and it found the water issues I suspected.

On the other side, some companies sell this technology as the ''end all to be all'' for building envelope investigation, but it's not. While the technology has advanced the ability to inspect a building for air leakage, the ability to ''read'' the screen and interpret what it is showing can only be done with some amount of experience and this is where these cameras come into dispute with many builders. Understanding solar gain in a home, exposure and thermal mass, along with the realization that these cameras function with a heat differential, is essential and can only be understood by experience. As an example, unless the interior of a home has had the air conditioning on for some time, they are nearly useless in the summer.

Even in the winter, I have seen exterior walls that show vastly different readings based upon the sun exposure. A good IR operator will scan the outside first, provided there are enough temperature differentials. The exterior check also gives us a sense of the condition of the windows and is quicker than trying to work around interior furniture and stored goods. IR cameras are also used to find leaks in flat roof coverings, overheating in electrical connects and motors, issues with radiant floor heating and basement water problems along with air envelope concerns.

When I look at the movement towards sealing up our homes, I cannot understand why every insulation installation would not be checked with an IR camera and the same goes for the window and door installation. If you are looking at a new home and decide on getting an IR scan done, ask the operator how many years, not weeks he has been operating the camera. Every new home builder should be utilizing this technology and buyers should be demanding that when the blower door test is done, an IR scan is also completed.

It's time every home was scanned by an experienced tech using an IR camera. You are spending a considerable sum on a new home or renovation, should you not know that it's been done right?

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