

it matters

To the Insulation and HVAC Industries: Please Work Together

Chris Dorsi



There is a movement afoot in the home performance industry. The discussion is not new, but it IS creating a shift in our approach to high-performance housing from which the industry will reap important efficiencies and benefits.

The change is this: we are increasingly expecting that insulation and HVAC contractors will work together. That's it, and it sounds simple. Some say that there is nothing new in the proposition, because conscientious trades-people and business owners in these sectors have always engaged in rigorous quality control, and their work has always adhered to all the codes and standards. I do applaud these good intentions and those people who are doing their best work every day in the challenging world of the job site. But the reality of the construction trades is that these two specialties have often fallen short in the evolution towards modern buildings.

Why This Matters

This shift towards better cooperation between these trades is big news because we are about gain control of what has sometimes been a missing link in high-performing buildings: the shell, or envelope. We're talking about a complicated assembly here—walls, ceilings or floors—that includes structural components, insulation, air barrier, vapor barrier, vapor retarder, drainage plane, weather resistant barrier, cladding, plumbing, wires, windows, doors, and other components. (Have I left out your favorite term?) This assembly is complicated, it's hard to get it right. The thermal performance of the thing is left to the insulators, but when it doesn't work, the call-back often goes to the HVAC contractor. Our roles and responsibilities are confused here, and that's not fair to either trade. Unfortunately, market pressure has discouraged both trades from performing the type of high-quality work we need to get the job done correctly. This discussion about mixed responsibilities can be extended to all the construction trades.

Insulation Systems are Difficult

On a good day, in some buildings, in some parts of the world, the insulation systems we install in buildings function as intended. But sometimes they do not, and then all manner of bad things happen: the building is too hot, too cold, drafty, uncomfortable, unhealthy, moldy, static-ey, rotting, and expensive to operate.

It's About the Price Spread. These problems are not always the fault of the insulation companies and their crews. The problems are built into the system, and it comes down to market pressure.

The insulation business in many markets is more competitive than any other trades, and it's hard for companies that offer a premium service to compete.

That's because there is up to two or three times the price spread between the cheapest installed insulation, and the properly installed insulation system (insulation, air-sealing, and pressure-testing). The fast-as-you-can-go installation, in either new construction or remodel work, is surprisingly inexpensive, sometimes amounting to less than 5% of the total cost of the job. You unload a mountain of batts, give a low-paid worker a knife and stapler, and come back in two or three days when they're done. Sadly, this budget job can often comply with the building codes (separate

discussion).

Compare this to a high-quality insulation job, which includes air-sealing, conscientious installation of the materials, and perhaps pressure testing, and you have a job that is so vastly superior that it's a crime to compare the two bids. There is no such spread in pricing for the installation of, say, asphalt shingles. The market pressure in the insulation industry has been ever-downward, and it's time to change that pattern. Spoiler alert: I'm about to recommend giving a raise to the good insulation companies.

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what we'll gain

Reduced Risk. With the performance of the building shell well defined, HVAC contractors have less fear about the possibility of their systems not performing correctly. What is the building shell, after all, but just a big plenum? This is risk management 101: reduce the variables so you don't get surprised in court. Call backs are reduced for both trades since both the insulation systems and HVAC systems are more apt to perform as designed.

Comfort. These buildings are comfortable, due to the consistent interior temperature, humidity, and air movement. Note that each of those three attributes are affected by both the shell and the equipment -- do you see the rationale of this approach? And the customer loves comfort, in fact it's the main attribute most customers think they are buying.

Health. Human health is simply better in these buildings. You can manage the air quality since air enters and leaves through planned pathways. The pollutant loads are reduced because we don't have air migrating through dirty crawl spaces, attics, and building cavities. We have the systems and controls manage moisture like never before. We are, at long last, taking control of our buildings.

Energy. And finally, the cost of energy. It's odd to me that this has become almost a footnote in our industry, but it's true: energy efficiency is a hard sell at present in the North American residential market. There is no such problem, by the way, in our commercial and industrial sectors, and no one in Europe is shying away from efficiency. Our sag in interest is due to equal parts of apathy and low energy prices. But that will change in the future when fuel costs climb back to reflect their real value. And at present, it doesn't hurt to shave a few hundred dollars off a power bill, and use the savings to finance additional work.

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Who Owns the Shell?

You cannot properly design and install an HVAC system without understanding the performance of the building shell. Yet we see rampant rule-of-thumb design, and over-sizing “for safety” in the HVAC industry. In some ways, you can't blame them: they are not in charge of the building shell. This approach of not meddling with the other trades has deep roots in the culture of construction, but it's time for it to end. There are plenty of people talking about integrated management in the construction world, and it's time for us to pay attention. There are plenty of pockets where this cooperation already takes place, but many of us are working to spread this idea of shared responsibility to the industry-at-large.

The Cost of Integration.

When the building shell becomes a known quantity, the cost of HVAC installations will usually remain about the same. There is some cost reduction available when heating and cooling loads can be reduced because of reduced heating and cooling loads. But improved ventilation systems—probably a combination of a balanced central system plus spot ventilators—are often called for in

these properly-sealed buildings. Consider the cost difference a wash.

The cost of installing insulation (and air-sealing and testing) is often higher in these buildings. This is a good thing, because we're calling for improved standards and we should be willing to pay for it. But please note: the construction industry at-large does need to support the insulation industry in this newly-increased pricing structure. Let's stop supporting low-bid insulation contractors, and throw our weight behind the good guys.

The Pitch.

I think it's a compelling argument. We redouble our efforts to get all the trades at the table in an integrated approach. We share the responsibilities on our job sites to reflect the interaction of the systems. We teach everyone how to sell not just the stuff in their trucks, but also performance, comfort, durability, human health, and energy savings. We continue to study and refine our knowledge so we catch our mistakes. In the end, everyone will be happy, including the customer. And there will be plenty of money for everyone.

This is not that hard. Could we please just learn to work together?

We see an important role for the Federal government to take the lead in some critical initiatives within the home performance industry. These are projects that are so broad, or for which there is so little financial initiative, that private industry is not likely to fulfill the role. One such example is the ENERGY STAR Verified HVAC Installation program (ESVI) that is set to launch in 2015.

Among its wide range of activities, this new program will encourage homeowners, by way of a public education campaign, to expect that HVAC contractors who perform service at their homes include performance testing, and take some responsibility for the building shell. It's about time.

So we asked Casey Murphy of ICF International, who provides technical support for the Environmental Protection Agency, to give us a peek at what ENERGY STAR Verified HVAC Installation might deliver.

Verified HVAC Systems At Last

Casey Murphy

The Current Situation

The home performance industry promises a lot to homeowners, including but not limited to a comprehensive and diagnostic assessment of the home's energy consumption, recommendations to lower energy use, and, measured results after improvements are installed.

Too often the home performance industry under-delivers on that promise when it comes to HVAC systems -- in spite of the fact that HVAC systems often account for half of a home's energy use. Beyond combustion safety testing, what diagnostic tests are used to assess how well the HVAC system is performing? If an HVAC replacement is part of the scope of work, what measured results are used to verify that the system is performing as intended?

The Problem

This lack of protocols for testing-in and testing-out would be less of a problem if we had full confidence in the HVAC industry. But the HVAC industry has often failed to follow its own industry minimum standards. Reliable research shows that 50 to 70% of HVAC systems are improperly installed, causing them to be 10 to 50% less efficient than if they received quality design, specification, and installation. And this sobering statistic is the outcome of an extremely well vetted piece of research done as part of the ACEEE 2008 Summer Study.

Part of the problem is that most homeowners don't realize that HVAC systems are not plug-and-play devices, and that they may not deliver on the efficiency level listed on the nameplate. A recent study has indicated that customers have two

primary priorities in HVAC replacement: making sure their system is functioning (however ineffectively), and spending as little money as possible. For HVAC contractors that are trying to design and install systems correctly, this lack of consumer awareness gives their lower-priced competitors an unfair advantage to simply "swap out the box" and not follow quality installation standards.

One Solution

ENERGY STAR is working to address this challenge. We plan to launch the ENERGY STAR Verified HVAC Installation (ESVI) program in 2015, and we seek these outcomes.

Raise consumer awareness of the importance of quality installation practices, and the choosing of qualified HVAC contractors that can deliver those services.

Identify and recognize market-based oversight organizations that provide credentials for HVAC contractors, and who can verify that the installations are properly performed.

For at least the past 5 years, there's been a lot of talk about the "HVAC-to-Home Performance" path. The ESVI program bridges a significant gap in that path. The ESVI program requires

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HVAC contractors to evaluate the whole home—insulation, windows, air leakage, ducts—when properly sizing a replacement system. The program also requires measured results to verify that the HVAC system is properly installed.

These requirements will not only help the HVAC industry to meet its own industry standards, but they will also help support the home performance industry. At a minimum, home performance contractors can have more confidence that HVAC replacements that are part of a broader home

performance scope of work are installed correctly. And for home performance contractors that want to go further, they can incorporate new test-in and test-out procedures to deliver on the full promise of the home performance industry -- a comprehensive and diagnostic assessment of the home's energy consumption including HVAC systems, and measured results after shell and HVAC improvements are installed.

This would be a major breakthrough toward assuring that the homes in our country, and the systems within, can operate as designed to deliver comfort, safety, and efficiency.

Find out more:

www.energystar.gov/index.cfm?c=hvac_install_hvac_install_program_development

www.aceee.org/files/proceedings/2008/data/papers/1_692.pdf

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Moving the Insulation Industry from Good to Great

Steve Malon

Editor's note: The role of industry organizations in North America continues to evolve toward an educational mission. One organization that's having great success with their educational program is the High Performance Insulation Professionals Association (HPIP). Incoming president Steve Malon tells us more about their forward-looking educational program.

Our organization has a mission to train our installers to understand all the high performance insulation systems. Our predecessor, the Blow-In-Blanket Contractors Association (BIBCA), promoted the

BIBS system as one of the best wall and ceiling insulation systems. Today we are manufacturer-neutral—we support and train on all insulation systems that are certified by their manufacturers.

We recognize that our industry can no longer work as we used to, since new systems that maximize performance are developed constantly. It can't be business as usual for our industry—we're way past that.

In our training programs, we stress that no insulation system will be effective unless it is properly and expertly installed—as designed! This means that our installers must have the knowledge, background, and

training to understand how to install every type of material so it fits into the housing puzzle and performs the way it was intended.

We are also focused on the dual roles of insulation and moisture management. Our goal is to give our installers, the hands-on-the-job, the education and training they need to make sure that these thermal and moisture control systems work hand-in-hand with the building envelope and do not cause durability issues.

We've all heard horror stories about wood framed buildings that mold, rot, or degrade within a few short years after construction. I am sure these buildings were not "designed" to fail, but through ignorance or attitude they did! The people that built these structures probably had the best of intentions, but due to a lack of understanding of what their job REALLY entailed, the buildings failed anyway.

Insulation and moisture control systems must work in conjunction with the structure. If, in the course of installing insulation, it becomes apparent that there are problems with the structure, then it is the obligation of the insulation crew, or their employer, to suggest the appropriate fix to the contractor, and to not just insulate as usual.

I recently previewed a house we are going to insulate, and the general contractor was there installing windows in the rough openings. The installation directions for the windows were packaged with every window, but they had never read any of them. The windows were installed without a bottom pan gasket, or any sealant under the flanges. The flanges were simply flash-taped to the Tyvek weather barrier. This does not void the window warranty, but it is a moisture and air barrier issue at every window and door opening. When I questioned the contractor about this he said that our local county building codes do not require a window pan or tape, and that he had never installed



windows that way anyhow! Poor education, stuck in the past, poor attitude, it's good enough -- the list is long. Great windows, poor installation. You can predict the ultimate outcome when rainwater runs down into the walls and soaks the insulation and structure. This is not the way we want our high-performance materials to be installed!

The High Performance Insulation Professionals are striving to educate and train installers in our industry to do a job that is worthy of the design effort that went into the product. The more we train – the better the results. We look forward to moving our industry toward an ever-improving set of professional standards.



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