

Building With Science

The expanded role of building science in 2014

By Engineered Wood • February 03, 2014

With codes continuing to trend toward tighter envelopes and homebuyers demanding greater efficiency, more and more builders are seeing the value of using a systematic, scientific approach to evaluate new products, strategies and techniques to meet the higher expectations of consumers and codes. Building scientists—a relatively new group of building professionals gaining recognition in the industry—can help anticipate and respond to new trends and challenges that may surface in 2014.

What is building science? Loosely defined, it is the study of the technical performance of buildings, building materials, and how various materials come together as a system. Building scientists can work with architects, engineers, and designers to help apply this knowledge to construct better, higher-performing structures

“Builders are recognizing what building science can do for them in terms of helping them cost-effectively build high performance homes,” said Gord Cooke, professional engineer and partner with Construction Instruction, a consulting and education group.

“We’re starting to see leading builders with either a building scientist on staff or strong consulting relationships with such individuals. Builders are also taking advantage of their partnerships with manufacturers, many of whom have in-house building science teams.”

With the changes in the 2012 International Energy Conservation Council (IECC) starting to appear in many locales, and the 2015 code changes approaching, it’s no wonder builders are turning to these specially trained professionals who can understand the implications of the changes and can recommend ways to put code updates into practice most efficiently.

“The biggest challenge we have seen is the new focus on air tightness and air leakage control addressed in the 2012 IECC, and we expect it to be a continued focus in the next round of building codes,” Cooke said. “Addressing air leakage is probably the single most cost effective thing people can do to improve performance in their homes.”

With a focus on whole-home performance, building scientists can help builders address air leakage as they test existing homes and use their findings to update home designs and construction practices.

“If you’re not testing all of your houses for air tightness, you should at least be testing some to understand where you measure up and begin thinking about improvements,” Cooke explained.

Another building challenge Cooke anticipates for 2014 is the increase in wall insulation, also resulting from the 2012 IECC, as section R402.1 of the code calls for greater prescriptive insulation requirements.

“Adding insulation presents an interesting design challenge as it has a lot of impact on the entire home system from window build-out to structural design changes to overall cost,” Cooke said.

While not all builders are yet facing this code change, Cooke recommends they begin working with a building scientist early on, so that they’re prepared when it does start to alter their building practices. A scientist’s expertise can help a builder better understand how these changes will affect other systems in the home.



For example, Construction Instruction recently worked with a large builder to help them improve the thermal performance of the walls which, combined with strategies to reduce overall air leakage, allowed the builder to reduce the size of the HVAC system in many of their home models.

With the increased focus on efficiency, there is also a greater trend toward HVAC optimization, especially in southern climates, where many builders house HVAC equipment in the attic space.

“The largest initiative we’re seeing is to get that ductwork into cooler space. We’ve found that the easiest first step toward this is to reduce attic temperatures, making the addition of radiant barrier roof sheathing a no-brainer,” Cooke said. “Once the HVAC equipment has the benefit of cooler space, builders can begin looking at resizing the equipment for a more cost-effective solution.”

“In the long term, there’s going to be an interest in getting ducts into conditioned space through more extensive design changes, which is where connecting with a building scientist can really help. It’s also important to work with product manufacturers to understand how their products can work with different design options to make these design changes happen,” said Cooke.

Some builders have already enlisted the insight of building scientists. But according to Cooke, all builders should take the opportunity every few years to reevaluate their efforts towards greater efficiency as they continue to improve their homes. A number of building science resources already exist to help.

Expert authorities like Construction Instruction can offer builders insight, and industry organizations like The Energy & Environmental Building Alliance (EEBA), the Department of Energy “Builders Challenge” program and the NAHB Green initiative offer training and educational sessions on topics such as efficiency and code changes for professionals across the building industry, from builders and remodelers to architects and engineers.

“Even for those who don’t consider themselves green builders, tapping into these resources can provide great information on building science in general,” said Cooke. “But I think the biggest resource we have is the strategic partnerships we can form with product manufacturers that understand building science. These companies can help builders understand how a product best fits into a home design from a building science perspective.”

Visit [ConstructionInstruction.com](https://www.constructioninstruction.com) for additional resources and information.