



Gord Cooke

Gord Cooke, president of Building Knowledge Canada, is a Professional Engineer with 25 years of experience in the residential building industry. An educator, industry consultant, and international presenter, Cooke specializes in presenting practical building science solutions in understandable terms.

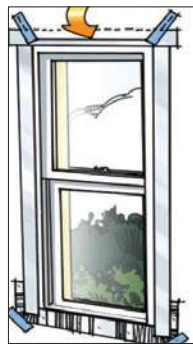
Five-Point Tune-Up

Focus on these areas to reduce risk and improve performance.

Although most builders and remodelers typically build throughout the year, spring is still a great time for renewal. Take the new product and design ideas you've gathered these past few months, add some new fresh plans to the lineup, and, of course, review your contracts with suppliers and trades for the coming year. From a technical perspective it's also a great time to tune up your knowledge of critical high-performance building techniques that can help avoid risks and offer new opportunities for savings, customer satisfaction, and a greening of our building processes.

Here are five spring tune-up ideas that will empower you and your trade contractors to identify opportunities for both improvement in building performance and cost reductions.

1. CONTROL WATER



The first goal of green building should be to create structures that last—say at least 100 years—and given that water is what destroys buildings and building materials, all builders need to turn a critical eye to exterior water management details. My fellow building scientist Mark LaLiberte likes to remind builders to put on their “water management glasses,” to look from the focused perspective of the path that water is going to take down the exterior of our buildings during a storm. Go further and imagine the “50-year” storm: Are the moisture control details you use, soon to be hidden behind the brick, stone, stucco, or siding façade, going to stand the test of time?

High-performance home builders will complete a quality-assurance checklist on each home before applying exterior finishes. In fact, there are checklists available from sources such as the EPA Indoor Air Plus or the LEED for Homes programs that include verification of items and details like

proper roof underlay, application of flashings on roof and wall penetrations, updated window flashing details, functional foundation drainage, correct site grading, and capillary breaks between concrete and wood elements.

Develop a system for capturing digital photo records of all your moisture-control details to show your homeowners how tuned in you are to these risks, and to document your own practices on every project.

2. FIELD-VERIFY QUALITY



Conduct a pre-drywall verification of insulation and air barrier details on the interior of every project. In the same way that critical weather-barrier details become hidden upon finishing, improperly installed insulation will be covered up for most of the building's life and will compromise energy performance and comfort year after year. Energy raters such as RESNET-trained contractors use a thermal bypass checklist and an insulation grading system that focus on draft-proofing behind critical areas such as bathtubs, fireplaces, and stairways on exterior walls and gaps, voids, and compressions of insulation.

3. TEST FOR TIGHTNESS



Make sure you verify air tightness with a blower-door test, a definitive and demonstrative test that has become a very important part of every energy-efficient and green building program verification procedure.

I want to stress that builders need to be more proactive with this test—a simple pass/fail declaration by your energy rater overlooks opportunities presented by the test results. Challenge your site supervisors, insulators, framers, and

Resources

The Environmental Protection Agency
www.epa.gov/indoorairplus

LEED for Homes
www.usgbc.org/leed/homes

NAHB
www.nahbgreen.org

other trades to review air tightness statistics for different models or different crews with the goal of continual improvement. Tight, tighter, tightest is a cost-effective goal. That is, air tightness is always good and can be done for very little incremental cost through simple training. For example, I recently gave a demonstration of a blower-door test to 60 tradespeople at a high-volume builder, followed by a pre-drywall site walk to review air-sealing responsibilities. This educational session resulted in average air leakage levels to be cut in half on the houses they built in the next month without any increase in cost.

In a future article we will review the interpretation of air-tightness results; take the first step this spring by committing to air-tightness testing in all your homes and look for consistency. Aim for continual improvement in results.

4. PROVE PERFORMANCE



The fourth tune-up item is actually a series of tests for your HVAC systems, which can be conducted by a knowledgeable, certified HVAC contractor or by an energy rater. The process starts by having heat loss, heat gain, and duct designs done for each of the house models you produce. Then, near completion of the home at minimum the following tests should be completed on the HVAC system:

- Measure the total air flow of the furnace or air handler and compare it with the design requirements and the manufacturer's specifications. There are a couple of methods and different types of equipment that can be used for this. For example, it can be done with the same piece of equipment used to measure duct leakage—another test that is recommended.

- Measure and adjust air flows at each supply diffuser or grille to match the heat loss and gain air flow requirements.

- Measure the pressure across rooms with doors closed to ensure adequate return air pathways.

- Measure duct leakage using a device called a "duct blaster." Like a mini blower door, the device pressurizes ductwork and allows for calculation of air leakage in the duct system. Air leakage of less

than 6% to 10% is normally the goal within comprehensive green programs.

- Check the refrigerant charge in the air conditioning system to be sure it matches manufacturer specifications.

These HVAC-system checks require a one-time expense for test equipment ranging from \$3,000 to \$5,000 and will take up to 1.5 hours to complete on a typical home. With the ever-increasing expectations of home buyers with respect to comfort and performance, I consider this a good investment; ask your HVAC contractor to invest in the equipment and training to do this or contract with an energy rater to do this work.

5. MEASURE AND MANAGE WASTE



Finally, this building season add a waste audit to your building process. Pick one or two homes and ensure all waste from those sites is collected, sorted, and measured. A comprehensive audit would include comparing original material purchase orders against actual product use and waste generated. But in its simplest form, a waste audit allows site supervisors and trade contractors to identify opportunities for reuse, reduction, and recycling. This very green activity is, of course, a good chance to identify cost-saving opportunities both by more effective use of materials and reducing waste-removal costs.

These five tune-up items will prompt improvements in the health, safety, comfort, durability, and energy efficiency of homes, but they also present opportunities for cost savings. Over time and with experience it may be practical to do random testing or inspections of at least some of these items within a comprehensive quality assurance program.

The key: Challenge yourself and your business partners to include objective measures of performance within your building process. One of the most important lessons I learned in engineering school ages ago is that if you measure it, it will improve. A path of continual improvement on the order of 15% to 20% on key performance measures such as air tightness, duct leakage, and waste reduction each year is a worthwhile goal for every high-performance builder.