

# The Builder's Journey



How I came to build *FHB's* best new home of the year, and what it taught me

BY ROB NICELY

**D**espite my parents' anguished cries to stay away from the trades, I have spent the past 25 years in construction. Building is what I am good at. I enjoy the analytical and organizational aspects of my job as well as the moments of Zen when I can totally focus on making what is in front of me useful and beautiful. Because I love the craft of building, I am always looking for ways to learn more. This desire to be a better builder led me to the world of green building. After years of attending training programs and conferences; reading books and magazines; and studying air quality, resource efficiency, Energy Star, and the California Advanced Homes Program, I started to feel like I had my feet under me.

Along the way, however, something weird occurred. I realized that I wasn't just focusing on what was happening on my sites or in my office anymore. I was thinking about where my building materials came from and where the waste from my projects would go. I wondered if my practices were supporting the viability of the resources I was using, or if I was missing an opportunity to build more sustainably. These questions started to enter into my analysis of whether I was good at my craft.

I discovered Passive House about five years ago. It is a way of building that reduces energy demand by thoroughly detailing and constructing the building shell. I was looking forward to building a Passive House, and I finally got the opportunity with what became *FHB's* 2013 best new home ("Passive House Perfection," pp. 34-39).

## Embracing change permanently

When I started getting into green building, I had years of normal building practices as a foundation. As soon as I felt like I knew enough to start making changes, I did. At my firm, we identified low-risk/high-impact changes versus high-risk/low-impact ones. In the beginning, we did small things, like making sure to sort our debris so that it could be recycled and choosing low-VOC products. We started taking a hard look at what was good enough when it came to insulation. This year, we are conducting blower-door tests on every new project or major remodel after installing windows and again at the end of the project. We are trying to establish what our standard practice should be. I will never in good conscience be able to build another "normal" house.

My point is that once you know, you can't un-know. Once you have seen how little effort it takes to improve the energy efficiency, durability, and air quality of a house dramatically, it just doesn't make sense to go back to the old ways. Why attach a 100,000-Btu furnace to a house that will leak heat as fast as you can pump it in when you can be more comfortable using 15% to 20% of the energy?

Our craft has always adapted to meet new demands, and that is what our industry is doing now. My hope is that this new way of building simply becomes the way to build.

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## "Air-sealing is hard"

Getting to 0.6 air changes per hour at 50 pascals (ACH50) as required by the Passive House standard was challenging. Even though we had a plan in place and tried to be diligent about filling every hole and crack as we went along, the house tested at around 0.8 ACH50 after the windows and doors were in but before we started insulating. With the house pressurized, though, it was remarkably easy to find even tiny leaks with a smoke stick or by putting a hand close to the assemblies. We sealed any leaks we could detect and stopped working when we got to 0.58 ACH50, which was where the house finally tested. This is the first project where we were trying to meet such high air-sealing standards, and we relied heavily on caulk and liquid-applied products. On our second Passive House project, we will be using Siga tape products for air-sealing, which we expect will result in an easier process.

## "Advanced framing is easy"

Using advanced framing—which involves procedures such as putting studs on 24-in. centers where possible, locating rafters directly over studs, avoiding cripples and trimmers where possible, sizing headers to actual load, and doing lighter corner and partition assemblies—means that there are far fewer sticks in our Passive House than there would be in a conventionally framed house. The result is a house that framed much faster than we anticipated. Where some of the measures we employed to reach low energy use cost more—triple-pane windows and extra insulation, for instance—using advanced-framing techniques clearly reduced the cost of construction on this project.

## "Additional standards are within reach"

On this project, we realized that just by meeting Passive House standards and doing a few other things that we had already made company policy, such as the use of low-VOC paint and adhesives, we were already at LEED for Homes Gold. We decided to fulfill some other measures to achieve LEED Platinum. In addition, we got a California Advanced Homes Program (CAHP) rebate, Energy Star certification, and EPA's Indoor AirPlus qualification with little additional effort.

## "It takes a village"

Remember the good old days when if you had a saw, a pickup, a dog, and a tool belt, you were in business? Now picture the exact opposite of that. A project that aspires to a Passive House level of performance requires that you start with a team of people who are willing and able to collaborate to create the desired outcomes. The architect, client, energy modeler, structural engineer, builder, HERS rater, and major subs such as the HVAC and insulation people all need to be aware of the objectives and have an active role in contributing solutions to the inherent challenges of building a high-performance home. To me, this is a major milestone in the industry's becoming more rigorous and technical. We are going from building the old clunkers of the past to the Ferraris of the future, and if you and/or your clients want certification, there are going to be people on your project—your Passive House consultant, your LEED AP, your HERS rater—who are going to want you to prove that you have met the criteria. With the 2014 building-code cycle, which will have significant changes in energy requirements, your building official is going to start acting a lot more like these people.