

Fine Homebuilding®

“Successful Green Project Integration”

Moderator: Rob Yagid

Design Editor, *Fine Homebuilding* magazine

Learning Outcomes:

- Discover methods to integrate new green-building techniques into your projects.
- Learn best practices for communicating to your clients and subcontractors the value of the materials and techniques you are incorporating.
- Explain the processes for successfully implementing new materials and techniques into your projects without sacrificing your schedule and increasing your profits.
- Learn how certifications and continuing education can help to maintain quality and potentially increase profits.



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FineHomebuilding.com
GreenBuildingAdvisor.com

Panelists

Fernando Pagés Ruiz, writer/builder

Fernando is a frequent contributor to *Fine Homebuilding* magazine and is the author of *Building the Affordable House: Trade Secrets for High-Value, Low-Cost Construction* (The Taunton Press, 2005) and *Affordable Remodel* (The Taunton Press, 2007). He has developed, built, and remodeled homes in California, Nebraska, and Wyoming, and has won a number of awards, including recognition from the National Association of Home Builders

BuildingAffordable.com

Michael Chandler, builder

Michael Chandler has been designing and building high-performance homes since 1978. Michael volunteered with the NAHB Research Center to help create the ICC-700 National Green Building Standard and also worked with his local HBA – DOC to establish their Green Building Council and implement a credible third-party certification process. He writes for *Fine Homebuilding* magazine and GreenBuildingAdvisor.com, and teaches the CGP and MCGP courses for the NAHB University of Housing. Michael is an 11-year member of NAHB Builder Twenty Program. He holds plumbing and general-contractor licenses and Certified Graduate Builder, Certified Green Professional, Master CGP, and Spike designations. In 2012, Michael earned the distinction of NAHB Master Green Professional of the Year, and his company received the award for NAHB Green Project of the Year—Single Family.

ChandlerDesignBuild.com

Don Ferrier, builder

Honored to be named the National Association of Home Builders' Green Builder Advocate of the year, Don has a passion for sustainable construction that has been coursing through his veins since the early '80s. Representing the third generation of the Ferrier Companies, Don is no stranger to construction. He is a true visionary of energy efficiency and sustainable construction techniques, and he travels across the U.S. educating and guiding those within the industry and beyond on their inherent benefits.

FerrierCustomHomes.com

Incorporating Best Practices

How the best builders adopt new materials and building techniques to boost quality and profits

BY FERNANDO PAGÉS RUIZ AND ROB YAGID

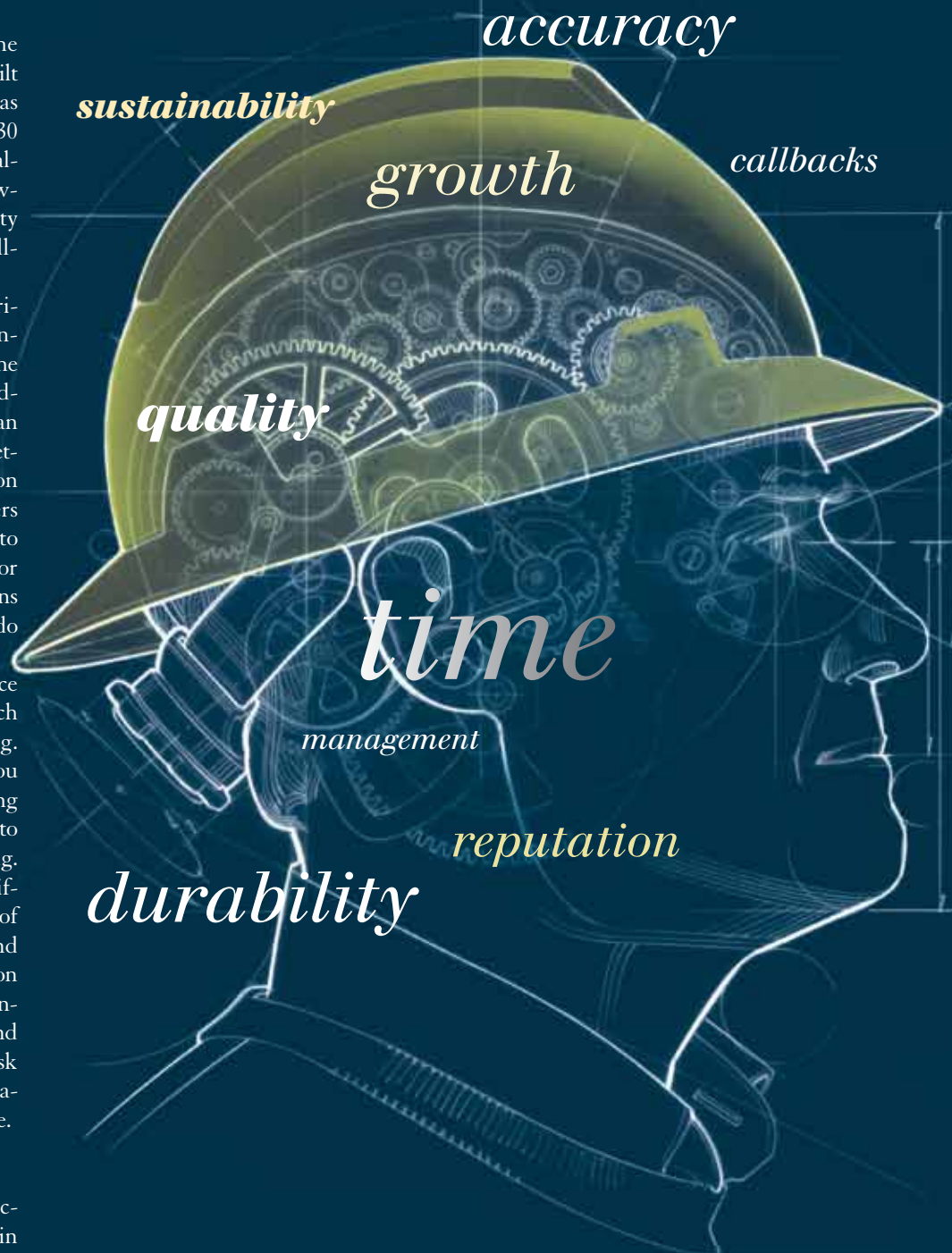
Best practices loosely describe the methods used to create a well-built house, the definition of which has expanded greatly over the past 30 years. Energy performance, indoor-air quality, and locally sourced materials with low-embodied energy have sidled up to quality craftsmanship and good design as the hallmarks of a great home.

Such attributes haven't always been a priority in mainstream home design and construction. Our current housing stock and the way new homes are built are being considered more carefully by the mass market than ever before. As a result, the demand for better built, more energy-efficient housing is on the rise; clients expect architects and builders to deliver. For many builders who want to meet that demand, expand their business, or simply build to a higher standard, questions remain: How do we get there, and how do we do it successfully?

Changing the way you build to keep pace with industry-accepted best practices, which can differ from code, can be challenging. Whether you're simply altering the way you flash windows, choosing to use a new siding material, or opting to incorporate SIPs into your next project, the tasks can be daunting. To get better insight into how to adopt a different way of building, we talked to some of the most progressive, successful builders and architects in the country. They shed light on the importance of education, the need to ensure accuracy and quality on the job site, and the methods of effectively managing the risk of changing the way they work in an ultra-competitive, cost-conservative marketplace.

Educate yourself

Every builder's journey toward best practices requires an education, on the job or in



The businesses of those we interviewed varied in scale and focus. Some were builders producing a large volume of homes, while others were remodelers with far fewer clients. Most, however, attributed their success to the same five elements. We asked a few of those builders to elaborate on each point. These strategies can help to improve the quality of the homes you build and the vitality of your business.

1 PROVIDE CONSISTENT OVERSIGHT

How we do it: To us, oversight does not mean micromanagement. Instead, oversight means paying attention to the daily tasks that our crews and subcontractors are engaged in—a perspective that has been critical in ensuring success in our projects and development in a self-directed, empowered staff. We have daily contact with our lead guys and usually are on site ourselves at least once a week, depending on what phase of the job we're on. From a designer/builder perspective, these site meetings give us and the crew a chance to go over construction methods that are based on our experience and performance goals. The visits also help to communicate how our design decisions evolved and offer an important opportunity for the crew to share experiences with our techniques, to offer feedback, and to share alternatives that may be more practical. Our practice has always been built on a two-sided conversation.

In some instances, such as the preinsulation, air-sealing stage, we have a checklist based on our past project successes and failures. Otherwise, we depend on the communication among everyone involved in the project. This is a communication business, and success usually follows clear communication. Things that go badly are often the result of not making sure that everyone is informed.



Name: Mark Klein and Jim McKnight

Company: Gimme Shelter Construction

Location: Amherst, Wis.

Years in industry: 24

the classroom. “Best practices are not forgiving,” says Tom Wade, co-owner of Artistic Homes in Albuquerque, N.M. Wade admits to some serious errors in his learning process, and he sums up his recommendation for any contractor wanting to become a better builder in four words: “Go back to school.” Fortunately, many formal and informal opportunities for continued learning exist.

Many of the builders we spoke with received their introduction and ongoing education in best practices through trade organizations, such as the National Association of Home Builders (NAHB), which provides formal courses and certifications like the two-day Green Building for Building Professionals course that helps builders to attain the popular certified-green-professional (CGP) designation. Many builders also agreed that the real trial-by-fire education starts the day you decide to build a certified home.

Green-building certifications from organizations like NAHB, LEED for Homes, and Masco Environments for Living provide consumers with an objective guarantee of the energy and environmental claims builders make. The process also provides outreach and training for the trades. Being forced to meet certification criteria can be a huge educational experience. For example, it might be a builder's first time taking a hard look at the leakiness of his walls.

Beyond more formal educational routes, all the builders we spoke with also have established a strong local network of experts and colleagues that they turn to regularly for insight and direction. Others simply tap into obvious but overlooked resources.

Don Ferrier of Ferrier Custom Homes in Fort Worth, Texas, relies heavily on suppliers when adopting a new material. “I think holistically, how a product or technique will affect the house as a whole, and then go to a knowledgeable, trusted source to learn how to implement and install that feature properly,” he says. Ferrier was taught how to work with SIPs from his supplier early in his career and was then able to educate his crews. He's now known nationally for his high-performance, SIP-constructed homes.

Dan Kolbert, a builder in Portland, Maine, attends monthly meetings with builders, carpenters, architects, engineers, energy auditors, and inspectors, who get together for “an informal discussion to ask, learn, debate, knock around, support, agonize over, ridicule, flog, and answer the challenges and concepts of best building practices,” Kolbert says, quoting the event invitation letter. “It's crazy to struggle alone.”

Educate those around you to ensure job-site quality

No one builds a house alone, and the ideals of best practices are worthless if they can't be implemented accurately and consistently. The best builders and architects have systems for managing work-

“We discovered we had been making some mistakes. They weren't expensive fixes,

2 ESTABLISH A NETWORK OF RELIABLE EMPLOYEES



Name: Don Ferrier

Company: Ferrier Custom Homes

Location: Fort Worth, Texas

Years in industry: 27

How I do it: I don't jump from supplier to supplier or subcontractor to subcontractor chasing the cheapest bid. Instead, I spend a lot of my time establishing and maintaining long-term relationships with suppliers, crew members, and subcontractors. At first, not everyone who works on our homes is versed in the way we work, but I find it important and beneficial to devote resources to training. For example, when looking for a new framer, I invite them to observe the assembly of one of our SIP homes. They might pick it up in about half a day, but I find they will usually be knowledgeable enough to complete a job themselves after working on roughly three homes with guidance.

When specifying a new material that one of our subcontractors may not be familiar with, I take the time

to educate them. The best subs are those interested in learning. For example, we have used QuickFlash (www.quickflashproducts.com) products for several years to seal all wall penetrations properly. On our jobs, all subcontractors are responsible for flashing and sealing any wall penetration they make, which is not how they normally operate. On their first project with us, I purchase the appropriate QuickFlash product and assist them in installing it correctly. I also bring out a can or two of expanding spray foam to seal for airtightness. On subsequent jobs for us, the subcontractor can include the flashing product and spray foam in their bid, and they know exactly how I want the plumbing, electrical, or HVAC penetration sealed.

flow and the way the work is being done. For most, the managerial segment of their business is driven by communication, organization, and an unrelenting commitment to getting the details right.

Portland, Ore., architect Nathan Good begins most projects with a meeting of all those involved. The gathering usually takes place on a weekend at a local lumberyard, where the architect, general contractor, subcontractors, supplier reps, consultants, and building inspectors are invited to meet. These small workshops begin with a message from the homeowners, who are able to express to everyone involved their hopes for the project and, when applicable, why they want a home that may not be conventional. Everyone has the opportunity to voice concerns, ask questions, talk, and learn from each other. Everyone shows up on site with clear, common goals.

Beyond hammering home lessons in the office, lumberyard, or conference hall, many builders simply strive to create job sites that foster accuracy. Patty McDaniel of Boardwalk Builders in Rehoboth Beach, Del., creates "a culture that embraces instructions," she says. "The lead carpenter and project managers have access to file boxes that live on site with all of the instruction manuals for each product in use. This way, training doesn't have to be completely based on memory recall. If a problem comes up or a detail is questioned, they have the resource at hand to find a solution."

Similarly, Michael Chandler, a green builder based in North Carolina, says it was easier to keep an eye on his crew, to teach, and to correct when he worked as lead carpenter. As his business grew, however, Chandler could no longer watch as closely, and he learned the



Name: Michael Chandler

Company: Chandler Design-Build

Location: Mebane, N.C.

Years in industry: 35

3 ANALYZE THE EFFECTIVENESS OF YOUR WORK

How I do it: The difference between best practices now and back in the early 1980s comes down to the science of measuring home performance: modeling performance before construction, testing building assemblies during construction, and then verifying the performance after occupancy. I install advanced energy-consumption tracking devices, such as the eMonitor by Power House Dynamics (www.powerhousedynamics.com), on our homes to see if they actually perform according to specifications. When they don't, I'm able to find out why. For example, I'm

able to tell when a home's hot-water solar collectors start cycling in the morning, how long they collect energy, and when they shut down. In one instance, the monitoring system showed the collectors weren't performing as I'd hoped. I was able to discover that there was a poorly insulated thermistor on one panel and made the necessary fix. All the best practices used to construct a quality home are theoretical if you can't determine how the home actually performs. It's the difference between tuning a car engine by ear and using an advanced computer to do the work.

but we wouldn't have known about them if not for firsthand observation."

PAUL ELDRENKAMP • Byggmeister Inc., Newton, Mass. • Years in industry: 28

“Create a culture that embraces instructions ... If a problem comes up or a

value of organization and communication. “You’ll go through a system with the crew—a rain-screen wall, for instance—and won’t do it again for four months,” he says. “By then, they won’t recall how it should be done. They might remember some details, but not all of them, or they will go back to doing it the way their last boss wanted it done.”

“We do a lot of extra drawings,” he says, referring to the 8½-in. by 11-in. detail sheets he takes to every job-site meeting. “We throw a drawing up on the hood of the truck, and gather round to discuss and debate the details.” His crews also meet weekly for a building-science lunch, which involves more time reviewing plans. It keeps his crews sharp, especially when the building cycle keeps them off a task for any length of time.

Properly executed details and quality control have become an obsession for most builders featured here. “Quality control is expensive—especially if you don’t do it,” says Chandler.

When things go wrong, employees ought to be held accountable. For example, Jerry Wade of Artistic Homes says, “We ask the drywallers to caulk behind every register boot and to foam the plates. Typically, guys don’t understand why we would have them do that.” So Wade brings the whole drywall crew—not just the bosses—to a blower-door test and shows them where and how air leaks occur. Then things get serious. Wade’s crew follows up on site with surprise spot-checking, cutting

drywall at random locations to see if the registers are caulked and the sills foamed. “If they’re not, the drywallers have to tear down the work and do it again, getting paid only once—and they learn quickly,” Wade says.

For builders like Paul Eldrenkamp, who runs Byggmeister Inc., a remodeling company in Massachusetts, analyzing how previous work is holding up is the best tool for ensuring the quality of future work. “I’d say 25% to 30% of our volume is repeat customers, so we take the opportunity to see how past projects are performing,” he says. He adds this advice: “Make sure your crew has had a chance to see how their previous projects have held up over time. For example, water intrusion has a quick feedback loop. If a flashing detail is wrong, it will become obvious quickly. We discovered we had been making some mistakes. They weren’t expensive fixes, but we wouldn’t have known about them if not for firsthand observation.”

“The bar is so low in the industry that it’s not hard to gain distinction.”

DAN KOLBERT

Kolbert Building
Portland, Maine

Years in industry: 25

Manage risk effectively

The risks of using different materials, products, and techniques have decreased over the years as more builders have adopted and experimented with best-practice methods. For example, many techniques currently deemed cutting edge, such as air-sealing and superinsulating, have been used by builders like Mark Klein and Jim McKnight (p. 62) for the past 30 years. Their homes, and countless others, have created a body of work from which the rest of us can learn. Even so, builders are notoriously skeptical and manage risk in a variety of ways.

One way Artistic Homes implements a forward-looking, best-practices approach while mitigating the risks of getting too far ahead of the curve is to adopt pending code provisions a few years ahead of their implementa-

4 GET YOURSELF AND YOUR PROJECTS CERTIFIED

How I do it: In Texas, there are no licensing requirements to become a builder. Put your name on the side of your truck, and you’re in business. Several years ago, I made a decision to distinguish myself from that class of builder and to become a pro-



Name: Sergio Grado

Company: GradCo Structures & Homes

Location: The Woodlands, Texas

Years in industry: 25+

essional builder for professionals. The best way to let my customers know that I’m educated in the best, most current industry practices and that I’m uniquely qualified to build or remodel their home was through certification. By attending classes through local homebuilder associations and at national events like the International Builders’ Show, I’ve achieved distinction as a graduate master builder, master certified green profes-

sional, certified graduate remodeler, and certified aging-in-place specialist. I’m currently working toward my LEED green-associate certification. The lessons I’ve learned through my certification processes—a deeper education in building science and business management—have been invaluable as I’ve transitioned from building large houses where square footage was the priority to a new realization where energy efficiency and sensibility are the projects’ goals.

Similarly, roughly 80% of the homes I’ve built are certified through third-party organizations. The certification process not only lets me know that my building approach is on track, but it also lets my customers know that their homes are being built to a better standard.

detail is questioned, they have the resource at hand to find a solution.”

PATTY McDANIEL • Boardwalk Builders, Rehoboth Beach, Del. • Years in industry: 28

tion. For example, Artistic Homes has revamped all its building plans to reduce the length of the hot-water lines to a maximum of 14 ft., a pending code provision that is intended to reduce standby heat loss. Similarly, the company builds to above-code standards like Energy Star and LEED for Homes, but adopts new versions of each program before they're officially launched. This way, they can stay ahead and still rely on prescriptive methods as a precaution against experimentation that could bring regrets. "We stay involved with organizations such as NAHB, EEBA, DOE/Building America, and several others. It is through these groups that we are able to keep our awareness of new requirements that may be coming," says Wade.

Eldrenkamp recommends a gradual, studied, cautious approach to adopting new materials or techniques to minimize risk. "Carefully articulate what problem you're trying to solve with a new material or technique, and think about what criteria you will use to evaluate whether in the end it solves the problem," Eldrenkamp says. "If you can't do that, stick with the materials and techniques you're used to."

Several of the builders we spoke with acknowledged that the higher cost of building better-performing homes, often argued as the greatest risk, was more the result of the learning curve than the actual cost of different materials or different building techniques. Among those who have embraced advanced building practices, the most striking common thread is the reward accrued from taking the risk: growth.

For example, R. Carter Scott of Transformations in Townsend, Mass., attributes his company's success—having grown 400% over 12 months and now building approximately 100 homes—to his commitment to keeping project costs competitive with more conventional homes by refining his approach with a keen eye on the bottom line.

"We spent about \$124 per sq. ft. on our first net-zero home," says Scott. "We actually got HERS minus 4, and then saw room for improvement. On the next house, we double-studded the walls with 2x4s and used low-density foam insulation and dense-packed cellulose instead of high-priced, high-density foam. We made other small changes and eventually shaved 60% off the cost to achieve net zero and ended up with a construction cost of \$104 per sq. ft.—just \$3 over conventional construction costs." Offering high-performance homes for the same price or lower than the standard home across the street has kept Transformations in the black while competitors struggle.

Embrace rewards carefully

Many builders say that adopting best practices and building better, more advanced homes have made them local experts and community resources. For many, that has led to a steady stream of work and numerous awards. However beneficial that acknowledgment may be, some builders insist that such recognition should be handled carefully. Kolbert finds that "the bar is so low in the industry that it's not hard to gain distinction." He warns of a dark side to getting recognized as one of the more advanced builders in an area—namely, the seduction of projects that go beyond your capabilities. "You have to study your motives with a cold, dispassionate attitude and evaluate a high-profile job just as you would any other," he cautions. But then, he adds, "the most rewarding thing about this work comes with sharing what you learn." □

Fernando Pagés Ruiz is a frequent contributor. Rob Yagid is a senior editor.



Name: Mary Tappouni

Company: Breaking Ground Contracting

Location: Jacksonville, Fla.

Years in industry: 20

5 EMBRACE THE VALUE OF CONTINUING EDUCATION

How I do it: I've found continuing, formal education to be crucial for staying on the cutting edge of my industry. The formal coursework that I've taken, which has resulted in dual bachelor's degrees in real estate and construction management from the University of Florida and certifications as a general contractor, LEED-accredited professional, and LEED for Homes green rater, to name a few, not only keeps me current and provides an opportunity to grow and improve as a business owner, but it also enables me to provide effective, up-to-date solutions for my clients' problems and needs.

Formal education is an often-overlooked resource in this industry, but it can provide a setting for focusing on a specific process, product, technology, or application without the risks associated with on-site trial and error. The classroom provides an opportunity to anticipate challenges and successes before the application process and allows us to create solutions based on various hypothetical situations. On-the-job training allows us to experience the real-world results that we may not be able to obtain in a classroom. Both are important to build the best home possible.

Our team engages in a variety of educational outlets, including live seminars and workshops, continuing-education courses at national building conferences, and even webinars, which have been particularly useful for researching the value of new products.

Continued education plays such an important role in the quality and success of our work that we've decided to make it a critical part of our business. Breaking Ground Education Services helps to educate our crews and those working in our community and region.