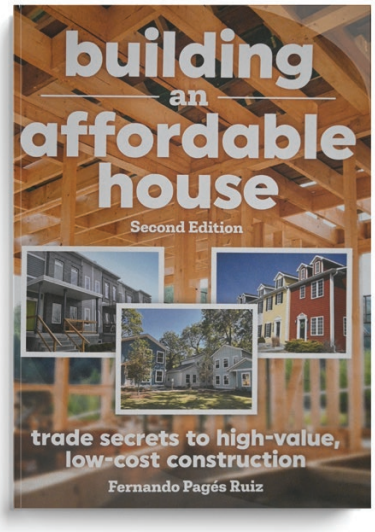
BY DAVID GERSTEL

A Masterful Guide to Building Better

When Fernando Pagés Ruiz published his first book on building affordable homes, it won a large audience in the construction industry. I was among the builders who benefited from the strategies it laid out for minimizing cost while delivering value. I had tired of building for wealthy people. I wanted to build a home that fit a wage worker's budget, made the least environmental impact I could manage, and produced a profit. The project's success on all three counts was in good part due to the guidance provided by Pagés' book.



Now, two decades later, he has given us another book about building affordable homes. Nominally, it is a second edition. But it is so thoroughly updated with respect to the codes, budget-friendly construction, environmentally considerate practices, and business opportunities that it is best viewed as an essential new book.

Before going further into what the new *Building an Affordable House: Trade Secrets to High Value, Low-Cost Construction* offers, I want to tell you briefly what it is not. Pagés' book is not a grand vision of solving the housing crisis with new policy directives or a technological innovation. Nor is it a pitch for those "affordable" tiny houses that may work for single people with minimalist inclinations but not often for families.

Instead, *Building an Affordable House* delivers one practical measure after another for trimming the cost of building family homes while also reducing the burden their construction imposes on our environment. Thereby, the book drives home a key lesson: Considerations for builders' and buyers' financial needs and for the environment are often joined at the hip. When you reduce labor and material costs, you usually reduce environmental impact. The right measures, such as those Pagés shows us by the hundreds, will put greenbacks in your pocket and/or leave them in your clients' pockets while also leaving the environment "greener" than it would otherwise be.

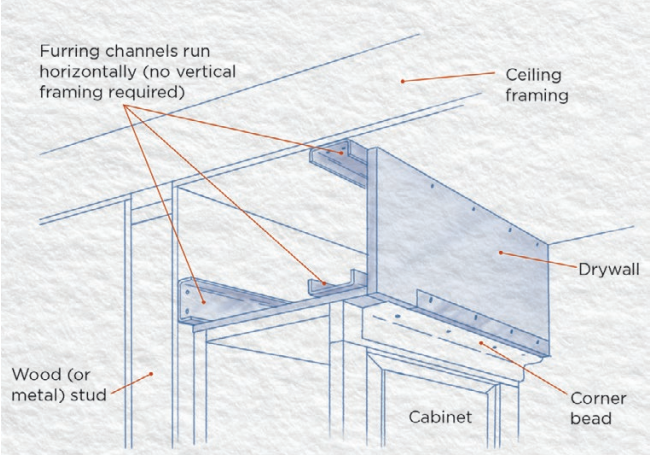
Pagés' book accomplishes its mission to educate us on achieving affordability with greener building via clear text supported by well-chosen graphics and photos. After a brief introduction, the book is organized in parallel with the natural order of construction, which Pagés, who has been building homes for decades, deeply understands. As a result, each set of his ideas is presented right where a reader would expect to find them.

Pagés starts with an overview, titled "Money Matters," of the challenges of and the possibilities for building more affordable homes. He concludes that first chapter with a forceful declaration: "Cutting back a little is not enough." As he explains, affordability must be expressed as a primary intention from the very beginning of a project. "Think of [the effort] as a construction diet requiring disciplined cost-cutting as you would cut calories—when you want ice cream, you have fruit." You want quartz countertops but instead specify a laminate with hardwood trim. Fail to diet from the get-go, and you can find yourself in the position of certain people who called Pagés for help. They had a budget of $200K, did not prioritize affordability throughout design, and ended up with a low bid of $600K. Pagés had to tell them he could do nothing for them.

Following his tough-minded introduction, in his second chapter, "Design," Pagés plunges into a narration of strategies for building affordably and profitably while minimizing environmental damage. Chapters 3 through 7 march steadily from foundation and other concrete work through framing and MPE (mechanical, plumbing and electrical). Chapters 8 through 10 cover insulation and drywall, the exterior shell and interior finishes. All chapters deliver numerous specific suggestions for profitable, affordable, and greener building along with delivery of attractive and sturdy homes.

The design chapter includes sound advice on harnessing architects and specialty contractors to the pursuit of affordability. It emphasizes, as well, a basic principle that I relied on in my efforts at succeeding financially with more affordable and greener home construction: The closer the house shape is to a cube, the more efficient will be your use of material and labor. The reduction in the use of material and labor will, Pagés points out, occur not only at the exterior walls. It will domino through the construction of the home from beginning to end. You will reduce the linear footage of the foundation, the number of joists and trusses, the square footage of siding and roofing, and the total length of baseboard and crown moldings. Even pipe and duct lengths will be minimized. All told, by choosing a cube rather than an elongated shape, you can reduce major building costs by 25%. Of course, a cube-shaped home will not work for every site. But Pagés, who is relentless in pursuing relatively small frugalities because they add up, provides a chart that shows the meaningful savings achieved with a variety of length-to-width ratios.

Photos and illustrations excerpted from *Building an Affordable House*, courtesy Abrams



Soffits, like those over upper kitchen cabinets, can be made with drywall, furring channels, and corner bead. This is less expensive than making them from conventional framing and drywall.

Continuing his discussion of design principles, Pagés suggests one move after another that can lower cost without compromising either durability or aesthetic appeal. Here's a brief sampling:

- Simplify traditional forms rather than fluffing them up with grandiose roofs and complex intersections.
- To add square footage (for closets, for example) without installing additional foundation, cantilever the floor framing.
- Because windows cost far more per square foot than the surrounding wall area, use them "like jewelry"—say, to enhance a diagonal view across a room to the outdoors and thereby add a sense of spaciousness.

Pagés' dedication to affordability and greener construction is prominently in play in Chapter 3 where he takes on concrete. He emphasizes that foundations, retaining walls, and flat work are especially costly in dollars and that the production of concrete imposes great environmental costs. According to numerous sources, including *Scientific American*, the production of concrete adds a pound of carbon to the atmosphere for every pound of concrete produced and is responsible for close to a tenth of atmospheric carbonization. Mostly, the problem must be solved by re-engineering the process we use to make concrete. That is happening (slowly). Meanwhile, we builders can pitch in and lessen environmental damage while also saving ourselves and our customers' dollars by reducing the amount of concrete we use.

My own favorite strategy for reducing concrete use is installing pier-and-grade-beam foundations. I favor their use even on flat lots. On my last project, going with a pier-and-grade-beam foundation rather than a conventional T-footing and stem wall delivered these results: Material for forms was cut by 80%, and concrete and steel, by 50%. Off-hauling of excavated soil was eliminated because the small volume of soil from the pier drilling was used on site for a landscape feature. The dollar savings were huge.

Pagés brings his readers many other strategies for reduction of concrete costs. Foundations, he asserts, are among "the most over-engineered areas of a home." Why? Because, he says, the codes "assume worst-case soils conditions." Consequently, foundation specifications can exceed need by a factor of 10 or more. Example: "While a typical two-story home with a full basement transfers a load of 500 lb. to 1,500 lb. per linear foot, a standard 8-in.-thick basement wall on a 12-in. by 16-in. footing can handle about 80,000 lb. per linear foot."

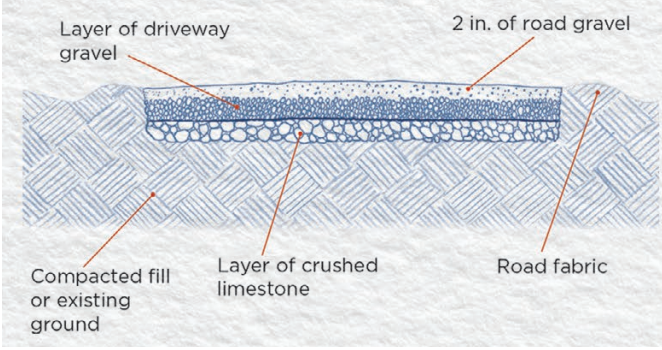
To pare wasteful dollar and environmental costs from concrete installations, Pagés suggests eliminations and substitutions. Among them: At a center bearing wall, eliminate separately formed and poured footings; simply thicken the slab instead. At exterior walls, get rid of footings altogether. Install the stem wall directly on the soil or a leveled bed of gravel. Going further, consider eliminating a basement in favor of a crawlspace or slab. And make that slab 2½ inches thick (as is standard in Europe). Cut more dollar and environmental cost from foundations by replacing steel (expensive stuff produced with huge releases of carbon into our air) with fiber. At driveways, get rid of concrete altogether. To save dollars and prevent rainwater runoff, build your driveway of gravel, as suggested in the illustration on the facing page.

Ideas for reducing both dollar and environmental costs likewise abound in the fourth chapter, "Framing." The basics are what is commonly pitched as "optimal value engineered" or "advanced framing." I like to call it "frugal framing," emphasizing appreciation for the careful, thrifty use of resources. Using frugal framing, I have reduced framing costs for a new home by close to a third even while optimizing energy efficiency and structural strength. Pagés reports similar results.

He goes beyond the basic first step of framing at 24 rather than 16 inches on-center and underscores the importance of reducing the material and labor used for headers, which he characterizes as the most wasteful of framing practices. While there is no one-size-fits-all solution, headers are often overspecified, Pagés says, and a single 2x10 may well do the job where "conventional brute force framing" would have called for double 2x12s.

In another attack on framing waste, Pagés suggests eliminating cross-bracing between joists less than 12 inches wide. Adequate bracing is provided by the subfloor above and drywall below. I wish the homebuilder who employed me long ago could have heard that idea. He would have embraced it. And I would have been spared many miserable hours stooping low to drive 16d commons through the joists and into the blocking with my 24 oz. framing hammer.

Like Pagés, I have searched long and hard for ways to reduce dollar and environmental cost in construction. Even so, much of what Pagés has turned up via his research and his decades of homebuilding amazed me. I did not know, for example, that you can lengthen the allowable span of joists by splicing shorter lengths together rather than going to a more costly larger dimension. Nor



Install a gravel rather than a concrete driveway, Pagés suggests. During construction, put down crushed stone to serve as a temporary drive. Add two layers of gravel at project completion. Payoffs: Big dollar savings. Elimination of atmospheric carbonization resulting from concrete production. Prevention of rainwater runoff. Prevention of falls caused by black ice. Plus, instead of an ugly swathe of concrete, a beautiful approach to the home.

was I aware of the level of savings that can be achieved with the thoughtful layout of the floor joists at stairways and the attentive selection of lumber for stringers, risers, and other details. Abide by the advice on stair construction in *Building an Affordable House*, and you will save the cost of the book many times over on the next stairway you construct. Additional lessons on lowering cost—with selection of attic trusses, for example—will leave even more dollars in your pocket.

By the time I finished reading the chapters about design, concrete, and framing, I was forming my evaluation of the book: This is a magnificent work. It's the kind of wonderful resource that can be created only by a person who has invested decades of study and thought coupled with the practice of their craft. That evaluation strengthened as I read chapters 5 through 10 with their discussions of MPE, insulation, air sealing, drywall, and the construction of the exterior shell and interior finish.

Here are just a few examples of the cornucopia of high-value ideas in chapters 5 through 10. Pagés urges centrally locating all major HVAC, plumbing, and electrical infrastructure, from space heaters through breaker panels. By doing so, you minimize use of ducting, pipe, and wiring. I adopted that strategy when building the house I cover in my book, *Building the Considerate House*. I grouped a combi hot water/space heater, an air handler, and the electrical panel close to the center of the cube-shaped structure. By then routing ducts, pipes, and wires above a drop ceiling in the adjacent laundry room, I was able to reach the three bathrooms, the kitchen, and all other rooms with very short and economical runs of material. Because modest space is required for heating and electrical equipment, similar centralization and reduction of construction costs can be achieved in almost any home.

As he moves to finish work in his later chapters, Pagés delivers a host of additional strategies for reducing financial and environmental impacts. For example, in a section titled "Making the Most of Drywall," he offers 11 cost-saving techniques. Among them is the soffit construction illustrated on the facing page (at top left). Another involves use of a so-called "buttboard" to join drywall sheets between studs, thereby saving the waste created by cutting sheets to meet right over studs.

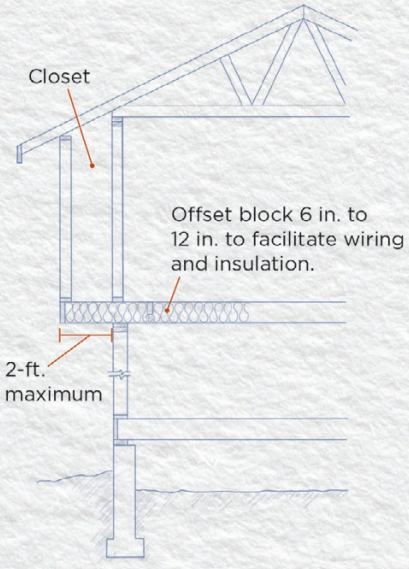
Pagés' section on drywall is included as a subchapter of the chapter titled "Insulation." At first glance, that surprised me. But the reason soon became apparent. Insulation must be accompanied by the crucial work of air sealing. And for that work, Pagés suggests the use of a technique developed in Canada called "Airtight Drywall." Though it is "one of the most effective, easiest, and least expensive means of sealing a home," it has been adopted by few builders in the U.S., Pagés reports.

For plumbing and electrical finish, Pagés encourages the use of builders' lines ("Cleveland" from Moen, for example). They cost far less than the heavily advertised "premium" lines from their manufacturers. But other than the name stamped on them, the premium lines and the builders' lines are likely to be near identical. In fact, the only significant difference between them, says Pagés, is cost to the purchaser. Cost is higher for the premium lines because it includes dollars spent on their pricey marketing

Pagés favors eliminating certain other finish items altogether. Example: At primary bedroom closets, don't install doors. After all, they are, he notes, rarely closed. Likewise, he suggests, you can go without doors at selected kitchen cabinets in favor of open shelving. That, along with producing savings, can add a nice bit of aesthetic "bling" when the shelves are used to display attractive kitchenware. I installed open shelving in place of cabinets in a home that I built 40 years ago. All the residents of that home have loved the results—a feeling of openness in the kitchen and the opportunity to get double duty from attractive dishes and pots by placing them on the shelves as decoration.

For all the strategies it proposes for cutting dollar cost and diminishing environmental impact, *Building an Affordable House* is far from indifferent to quality of design and construction. Pagés is keenly aware that to succeed as a builder, whether as a developer or a general contractor, you must produce good work. He learned that lesson, as he candidly divulges, with his first development. There, he brought homes to market at a price point around 60% of the next cheapest housing in town. But to get down to that level, he went with ultra-cheap windows. They leaked. He had to return to the project time and again to make repairs.

Flash forward to the far more experienced Pagés we encounter in the new *Building an Affordable House*: He now fully realizes that he is not trying to build homes that are merely cheap. They must be attractive



"By extending the roofline over a 2-ft. cantilever," Pagés points out, "it's possible to add a closet without complicating framing or making the footprint of the house any larger than it has to be."

and durable as well as affordable. Because he is, he declares, "in the business of building homes and not just housing, creating an environment that respects every American's dream represents a good deed and good business." He warns us against cutting corners too sharply as we pursue affordability, for the "lowest cost option is not a bargain."

Among his cautions: If you are building on clay soils, bring in a soils engineer for testing and recommendations. Yes, that will be costly but not nearly as costly as a foundation failure. For damp proofing or waterproofing foundation walls, turn away from spray- or roll-on asphaltic products. They are cheap. But they are also one of the least effective means of damp proofing, for they cannot bridge the cracks that inevitably form in basement walls. Upgrade, Pagés suggests, to a dimpled polyethylene product that provides a capillary break while directing water downward to a drainpipe. Then, before backfilling against your foundation wall, wait. "Basement cracks occur ... because builders backfill too soon and the uncured concrete cannot handle the stress."

Suggestions for frugal but smart, as opposed to stingy, specifications sprinkle Pagés' chapters on finish work. Here's his advice on plumbing fixtures: "Consider a steel tub with a simple, white-tiled wall" since that costs less than plastic. But also "make sure your plumber uses a mortar bed or foam insulation under the tub to add strength and avoid the tinny noise you hear when stepping into an unsupported steel tub."

If delivery of affordable and environmentally friendly homes is a mission you wish to embrace, be prepared to hit obstacles. Some may reside within yourself. You may have to break old habits and dismiss ingrained thinking errors. I find myself balking at 2 1/2-inch-thick garage slabs even though Pagés argues convincingly that they will do the job. Similarly, some readers of an article I wrote that advocated frugal framing pushed back against the idea. It would, they insisted, result in flimsy buildings. They were not able to bend to the compelling logic: Eliminating one stud per 4-foot-wide sheet of plywood or OSB results in eliminating only eight sheathing nails. And those can be more than made up for by slightly increasing nail frequency at the edges of the sheathing where, in any case, the substance of shear strength is achieved.

Architects and engineers may balk at some cost-cutting measures, as well. From wide experience working with architects, Pagés has sensed the root of their resistance: "They have deep insecurity about being associated with buildings that would not win their peer group's approval." Consequently, cost consideration is pushed aside by a desire to display their talent for striking design.

As for engineering, Pagés describes the segmented shear-wall design approach, for example, as "regrettably conservative." He zeroes in on the practice of designing one component of a structure at a time without taking into consideration strength contributed by other components. In contrast to that "segmented" approach, he holds out the possibility of a "holistic" approach to engineering, one that is, he emphasizes, now approved by building codes even in areas subject to earthquakes and hurricanes. By encouraging re-engineering from the segmented to the holistic approach—technically known as Perforated Shear Wall (PSW) design—Pagés was able to save $2,500 worth of hold-downs required for a ranch-style house.

Sometimes, engineers won't budge in the direction of affordability. I'm thinking of the guy who broke my clients' budget by insisting on a welded-steel roof frame for a straightforward home in the hills near my office. But other times, engineers can be persuaded to help foster cost control. For example, the soils engineer I hired when I was designing my *Considerate House* initially suggested I excavate 8 feet down for a footing and stem wall. I told him the cost would kill the project. I proposed instead a pier-and-grade-beam foundation. At first, the engineer resisted my idea. But I argued for it, pointing out the long-term success I had enjoyed using pier-and-grade-beam foundations on other projects. When his report hit my desk, that was the foundation design it called for.

Likewise, Pagés reports success bringing design professionals around. He points out to them well-known architects from Frank Lloyd Wright onward who designed simultaneously for beauty and affordability. Drop their names in your conversations with designers. Pass on lessons in affordable design you have picked up in Pagés' book. You can improve your chances of preventing designers from killing off projects by burdening them with excessive costs.

Fernando Pagés is a good writer. His narrative is concise and good humored. Even so, it poses a challenge: How is a reader to keep track of and make use of the many strategies he describes? Pagés anticipates this challenge and offers a solution by providing us chapter by chapter with "Money Saving Green" checklists. At HVAC, for example, the list includes centrally locating the

mechanical room, installing ductwork within conditioned space, and right-sizing air-conditioning equipment—which, as Pagés notes, is often wastefully oversized by mechanical contractors.

Pagés is primarily a developer. He has other developers in mind when he takes note, as he regularly does, of issues around the marketing of homes and of designing with buyers in mind. Developers should gobble up Pagés' strategies for reducing building cost while maintaining durability, performance, and aesthetic appeal. His methods will allow them to get to a sales price that makes their houses affordable for more people while maintaining profit margins. That's obvious.

What is not so obvious is that construction contractors can also draw on *Building an Affordable House* to gain financial advantage. Every trade will find ideas in the book that will help them to enhance their competitive position by reducing material and labor costs while producing good work. General contractors can greatly strengthen their ability to win contracts not only for construction but for preconstruction by mastering Pagés' tactics. Fifty years ago, builders rarely charged for their preconstruction work. Now the practice is widespread, with the services including three key components:

- Making sure the project is buildable as designed.
- Dialing in construction costs with increasing precision as project design moves forward.
- Collaborating with the designer and owner to value-engineer the project; namely, finding ways to minimize financial and environmental costs while honoring design intent.

Value engineering, perhaps even more than estimating, is one aspect of preconstruction service where many builders fall short. Fortunately, you can greatly up your value-engineering game by reading *Building an Affordable House.* It will enable you to offer numerous high-value, low-cost construction ideas during the preconstruction phase of a project. If you can also ensure buildability and can nail your estimating numbers, you will then be able to offer preconstruction services worth a professional fee.

Even if they become a fan of the book, any knowledgeable construction pro who reads *Building an Affordable House* is going to have some concerns and questions. I have a few myself, but just one serious concern with the content: Pagés' enthusiastic support for the use of plastic products, particularly vinyl siding. He does make a strong case for vinyl. Among other positives, he cites low cost, durability, and ease of maintenance. Recent generations of the material are even, in his opinion, quite attractive. He reports as well that vinyl has a global warming potential 75% lower than fiber cement siding and 85% lower than brick!

So far, so good. But Pagés also echoes the claims of manufacturers that vinyl is recyclable. Only about 5% of the plastic produced in the U.S. is recycled (*MIT Technology Review*, Oct/2023). Much of the remainder ends up in rivers and oceans. There it degrades into microplastics and nanoplastics (*Science Advances*, Jan/2024). These MNPs find their way into organisms, turning up in high concentrations in human brains (*Nature Medicine*, Feb/2025). To make matters worse, the plastic-recycling plants touted as a solution to plastic pollution are pouring MNPs into the environment (*Journal of Hazardous Material Advances*, May/2023). I could go on, but you get the point. Vinyl and plastics in general may support affordability. But green? No.

Pagés designed the interiors in this development to respond to cultural preferences of the new owners. On opening day, he placed an American flag and a flag of the new owner's home country on the front porch.

Setting aside my differences with Fernando Pagés about the use of plastic products, my view of his book comes down to one word: Admiration. I am not alone in that assessment. Andrés Duany, the highly regarded Miami architect who is credited with creating New Urbanism, is another. In his Foreword to *Building an Affordable House*, he writes that his shelves are loaded with books whose titles feature the words "affordable" and "housing." With one exception, Duany says, they espouse solutions that, if they happen at all, happen only at a hardly perceptible scale. Good point, that! How many folks are we now sheltering in homes built of rammed earth, hay bales, or shipping containers, or with 3D printing? The exception among his many books is *Building an Affordable House*. It is the only one, he says, that "displays the art of the possible" and is focused on achieving "affordability by reducing the costs of everyday building practice." Duany adds, referring to Pagés, "I trust him."

So do I. Pagés is not a theoretician. As Duany says, he's a man "who is in balanced measure, an artist, an architect, a hands-on builder." He's a man who has swung a hammer and has built 500 affordable homes including a dozen multifamily developments of six to 30 units. He's a man who, along with building, has for nearly half a century relentlessly researched possibilities for profitably building more affordable and greener homes. All that experience and learning has been distilled into the new *Building an Affordable House*. The result is a masterwork.

David Gerstel is a veteran builder and author of several well-known construction business books, including Crafting the Considerate House.