A Builder's Guide to Choosing and Installing Siding

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Vinyl is low cost, low maintenance, and immensely

Choosing Sides

BY SCOTT GIBSON

Vinyl siding continues to be one of the most popular choices for new homes in the U.S. Thanks to its wide availability, budget-friendly pricing, and minimal maintenance requirements, it was used on more than one in four new single-family homes built in 2023, according to the U.S. Census Bureau.

But if you're aiming for the look of traditional shingles or clapboards, alternatives include a variety of solid-wood species, as well as engineered wood and fiber cement. While vinyl's combination of low cost and easy upkeep makes it a standout in many regions, comparing materials side by side can help you find the best fit for your home's design, performance needs, and budget.

Whatever type of siding you're considering, it's worth weighing three key factors: appearance, durability, and cost (including installation). Here's a look at how the three big categories—wood, fiber cement, and vinyl—compare on these points. Brick and stucco, while dominant in some parts of the country, call for specialized installation techniques outside the skill set required for the options considered here.

Scott Gibson is a contributing writer. Photos courtesy of the manufacturers, except where noted.

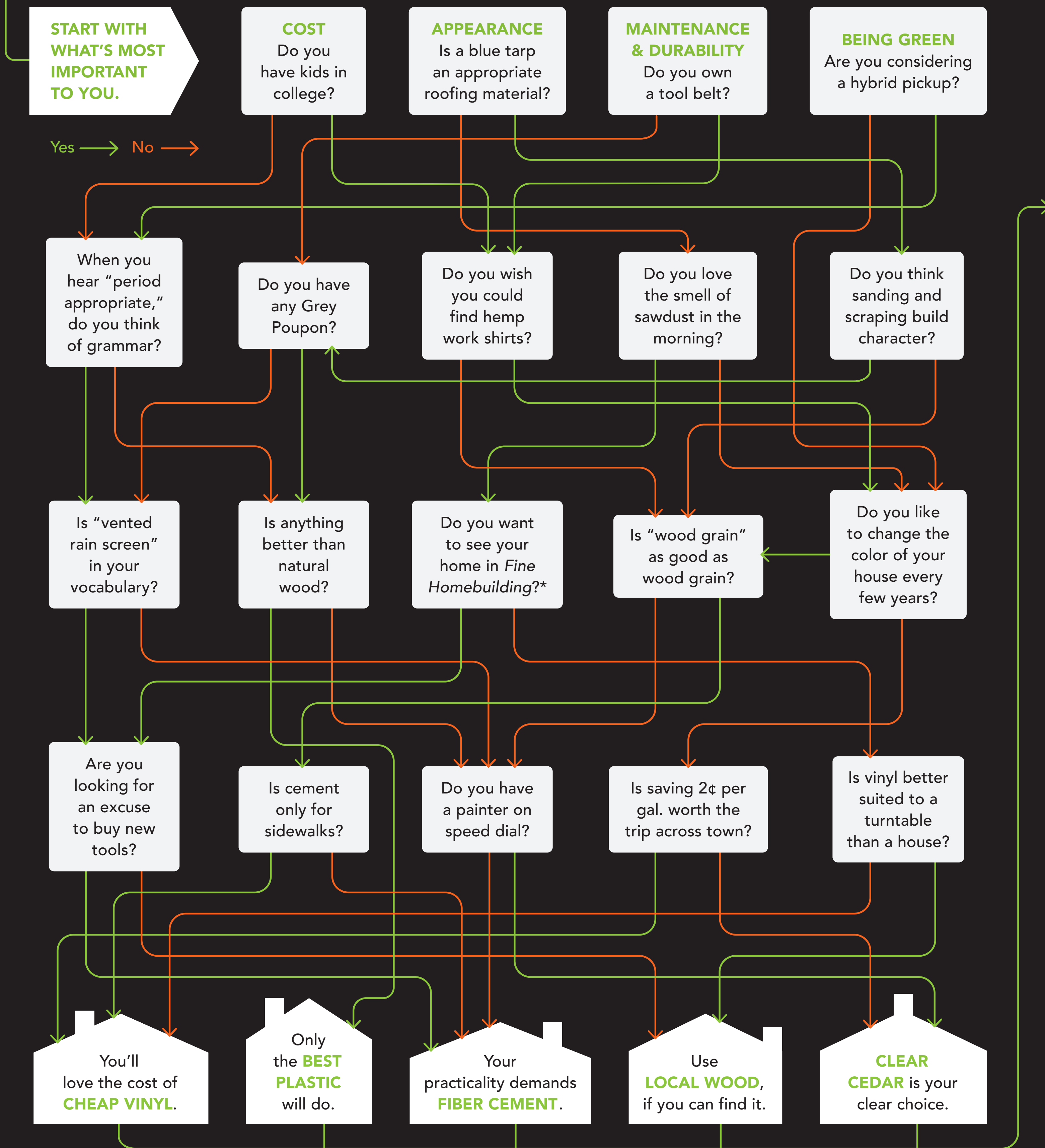
WOOD

FIBER CEMENT

VINYL

popular, but is it right for your house?

*There's fiber-cement siding on many of the homes featured in FHB. This is not an endorsement, though we do like the stuff.



WOOD

Shiplap and shingle. *For traditional homes, you can't get more authentic than real wood.*

Staunchly traditional, fading market share

Early settlers used mostly wood siding because that's what was available. In terms of market share, however, it's been downhill ever since. In no part of the country does wood siding currently account for even one-tenth of new single-family homes. In the South, it's a faint blip on the screen (2%), according to Census Bureau figures.

Wood siding is made from solid material or short scraps and offcuts glued together with finger joints. Species commonly used for siding run the gamut from cedar and redwood to pine, fir, and other locally available woods. When sourced locally, wood siding can be sustainable in every sense of the word.

Nothing looks quite like wood

Wood siding is available in many forms: sawn shingles, split shakes, tapered clapboards, and planks that can be applied either horizontally or vertically. It's adaptable to a range of architectural styles, and for certain types of houses, such as New England Capes, it has been the choice for generations of builders. In terms of appearance, wood remains the ideal against which all its lookalike substitutes are measured.

There's no durability without maintenance

The best grades of wood (clear heartwood of western red cedar, Alaskan cedar, and redwood, for example) have a long life expectancy if they're installed correctly. Lesser grades, such as pine, won't last as long. All types of wood are more durable with a coat of paint or stain. That means regular maintenance for the life of the product. Depending on climate, weather exposure, and other factors, paint may need attention in seven to 10 years. Leaving wood untreated is an option with some species (cedar shingles, for example, are often left unfinished), but expect the color to fade to gray. Untreated shingles and clapboards may curl or split.

Wood siding can last a long time when properly installed and maintained, but it can rot quickly when installed poorly. Wide eaves, protective porches, and good air circulation may not matter for vinyl or fiber cement, but it can help to extend the life of wood siding.

Top grades for top dollar

Wood siding comes in a broad range of profiles, grades, and wood species, all of which affect its cost. Top grades of clear siding are expensive: In material cost alone, cedar siding in 2025 averages between $500 and $1100 per square (100 sq. ft.), with some premium clear grades reaching even higher (see chart, p. 8). Local species can cost much less. You'll still pay a premium for the best material, however, and availability and quality vary widely depending on the lumber supply where you live.

Wood siding is installed relatively easily, and it has unrivaled workability. It's easily cut and shaped with simple carpentry tools, is light in weight, and is safe to handle. Wood siding probably lasts longer when installed over a vented rainscreen, which aids drying and prevents water from being trapped between the back of the siding and the sheathing. While very effective, it's an extra construction step with added costs. The cost of proper installation, as well as the costs involved in periodic maintenance, should be considered when comparing wood to other siding options.

From top: Red cedar, primed pine, clear-pine lap board

Eastern white-pine lap siding

Red-cedar shingle

Photos this page: top, Warren Jagger; bottom, Rodney Diaz. Photos facing page: top, Rob Yagid; center, Rodney Diaz; bottom, Dan Thornton.

FIBER CEMENT

Durable and noncombustible

Patented in Austria more than a century ago as Eternit, fiber-cement siding is made of sand, portland cement, and cellulose fiber. It's sold under at least a half-dozen brand names in the United States. Fiber cement may look like painted wood, but, say manufacturers, it is impervious to wood-boring insects and won't rot. Fiber-cement siding is noncombustible and comes with warranties of up to 50 years. On the downside, it's heavy and brittle, and cutting it produces dangerous silica dust.

Think hard, brittle wood

From a distance, fiber cement and wood are visually indistinguishable. Like vinyl, fiber-cement siding is available in a number of forms that look much like traditional wood siding. Lap siding is typically 5⁄16 in. thick and 12 ft. long and available in widths of 5¼ in. to 12 in. It's installed with an overlap of 1¼ in. In addition to smooth and textured lap siding, there are individual and panelized shingles as well as panels in sheets up to 4 ft. by 10 ft.

Fiber-cement siding can be ordered primed, unprimed, or factory-finished in one of nearly two dozen colors. Fiber cement must be painted; manufacturers recommend 100% acrylic latex paint.

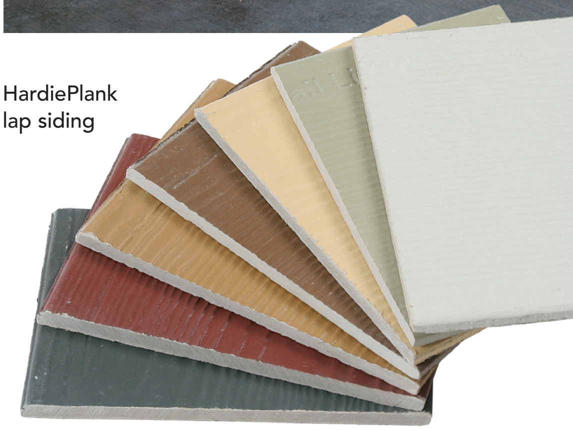
Tough to the core

With an inherent resistance to fire, insect damage, and rot, fiber-cement siding comes with lengthy warranties. James Hardie offers a 30-year nonprorated warranty on its fiber-cement products. Westlake Royal Building Products (WRBP), a major player in fiber-cement siding, offers products under the Hardie brand as well as its own lines with comparable warranties, including up to a 30-year nonprorated warranty on factory-finished siding. Their factory-finished products also come with a Double Lifetime Warranty covering peeling, flaking, and cracking—providing homeowners with long-term protection comparable to other leading brands.

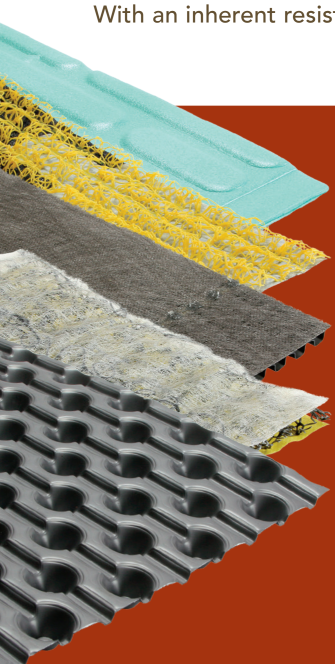
Installation boosts cost

National averages indicate that it costs as much to install a square of fiber cement—$150—as it does to buy it. There are a few reasons for this: Fiber-cement siding is relatively heavy (a 4-ft. by 8-ft. panel weighs 73 lb., compared to about 20 lb. for a 12-ft. piece of 8¼-in. lap siding). It's also somewhat brittle. More important, cutting fiber-cement products can create dust that contains crystalline silica, a serious health threat. Special vacuum-equipped saws or shears should be used. Proposed OSHA rules designed to protect workers may tighten job-site regulations in the future.

Close enough. *Fiber cement looks a lot like wood, even when it's near enough to touch.*



HardiePlank lap siding



Do fiber-cement and wood siding need a rainscreen?

Instead of nailing siding against housewrap or asphalt felt, many builders now install vertical furring strips or a plastic drainage mat between siding and a water-resistive barrier (WRB). This type of installation (one including an air gap directly behind the siding) is usually called a rainscreen installation. A rainscreen gap offers at least four benefits:

- It limits wicking by providing a capillary break between the back of the siding and the WRB.
- It allows moisture held in the siding and sheathing to be redistributed to adjacent materials by evaporation and diffusion, thereby limiting damage due to water that concentrates at leak points.
- It provides a path for liquid water to drain down to weep holes at the bottom of the wall.
- It provides a path for moving air, which helps to dry the siding and sheathing quickly if they get damp.

Wet-wall disasters are so common and so expensive to repair that an increasing number of building experts recommend that all siding installations include a rainscreen gap.

Most wet-wall fiascos are caused by elementary (but all-too-common) flashing errors. A rainscreen installation is a type of insurance policy that can prevent a small workmanship error from leading to disaster.

If you are installing wood or fiber-cement siding, a rainscreen provides you with an extra benefit: The paint job will last longer.

— Martin Holladay, sustainable building advocate

VINYL

Low price, long life

Combining durability and low maintenance with a low price, it's no mystery why vinyl (PVC) has become a dominant siding material. Pricier options include polymer (polypropylene) siding, which uses an injection-molding process to give products a highly defined, three-dimensional profile; and cellular PVC, which has a weight and density similar to wood.

If wood can do it, so can vinyl

Viny siding is manufactured in a number of profiles to replicate traditional wood siding, including shingles, clapboards, shiplap, and board and batten. It's available in hundreds of colors, including dark colors, and can be purchased with an integral EPS backing to increase overall R-values.

According to David Johnston, a technical director at the Vinyl Siding Institute, insulated siding can add between R-2.5 and R-3 to a wall's R-value. Although it's somewhat more expensive than other grades of vinyl siding, it tends to appear flatter on the wall.

The thickness of vinyl siding ranges from 1⁄25 in. to 1⁄20 in. (builder grade). Thicker and more expensive grades of vinyl siding are stronger and more rigid than entry-level products.

Many manufacturers—including Westlake Royal Building Products and CertainTeed—offer vinyl siding in a range of profiles, thicknesses, and performance levels to suit different budgets and design goals. CertainTeed's Monogram line and WRBP's premium offerings feature deeper profiles, wider exposures, and enhanced impact resistance.

Two words: Vinyl lasts

Low cost is an important advantage of vinyl, but it's not the only one. Vinyl siding requires virtually no maintenance, lasts for decades, and won't trap moisture against the sheathing as other types of siding can. With no wood-fiber content, it won't absorb water and won't rot.

The right vinyl will stand up in a storm. According to the Vinyl Siding Institute, some products meet 150-mph building-code requirements in Miami and Texas, and several can withstand 190-mph winds.

Expensive is better than cheap

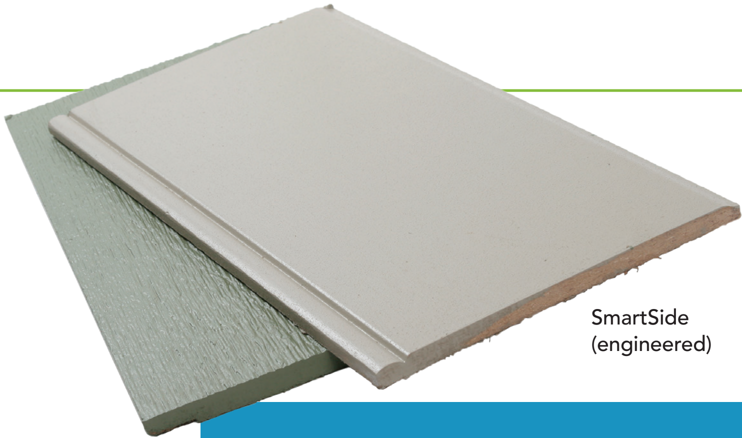
There's no formal grading system for vinyl siding as there is for wood, but three important variables are the thickness of the material, the type of nail hem, and the type of capstock, which is co-extruded with the substrate as a color layer. Economy vinyl is light and easy to install. Among vinyl sidings, polymer products are often the most expensive to install.

Market Square vinyl (Westlake Royal Building Products)

Cedar Impressions polymer (CertainTeed)

Look again. *Vinyl siding comes in as many forms as real wood, including trim pieces.*

Photos this page left and bottom, facing page bottom left and top right: courtesy of Westlake Royal Building Products. Other photos: Rodney Diaz.



SmartSide
(engineered)

TruExterior
(composite)

Still undecided? Engineered options have improved—and multiplied

Engineered-wood siding, including hardboard and oriented-strand-board products, got off to a rocky start in the 1990s.

Made with wood fibers and resin, engineered siding was marketed by a number of companies as a lower-cost, better-performing alternative to solid wood. Early versions of the siding often failed, though, none so spectacularly as Louisiana-Pacific's Inner-Seal. The OSB siding ultimately cost the company $460 million in payouts. Class-action suits over faulty hardboard siding haunted other manufacturers, including Georgia-Pacific, Weyerhaeuser, and Abitibi-Price.

After the Inner-Seal debacle, LP regrouped and went on to develop an OSB-like board called SmartSide that uses a different kind of resin and incorporates zinc borate to protect it against decay. LP says it has sold 6 billion sq. ft. of SmartSide siding and trim since 1998 without a single claim for rot or decay.

There are also engineered-wood options that contain no wood fibers. Celect Cellular Composite Siding by Westlake Royal Building Products is made of recyclable cellular PVC and designed to replicate the look of real wood without the upkeep. Another alternative is the WRBP's TruExterior siding and trim, which is made of a combination of fly ash and polymers and can be cut, milled, painted, or stained like wood, yet won't crack, rot, or swell. Norandex manufactures another composite option, Everlast, made from a mix of stone dust and polymers.

Celect
(composite)

TruWood
(engineered)

SIDING COSTS COMPARED

"Bare costs" include siding, installation labor, and finish, but not profit or overhead, scaffolding, housewrap, or trim. Prices may vary significantly by region.

Dollars per square (100 sq. ft.)	Vinyl	Fiber cement	Polymer	Wood (cedar)
Materials	$100	$150	$300+	$500 to $1100
Labor	$110	$150	$130	$85
Exterior finish	N/A	$55	N/A	$0
Total bare costs	**$210**	**$355**	**$430+**	**$635 to $1365**

Designed for Wildfire Country

New homes, remodels, and accessory structures near wildlands are increasingly subject to WUI codes. Even when they're not, implementing these fire-resistant details may be a best practice.

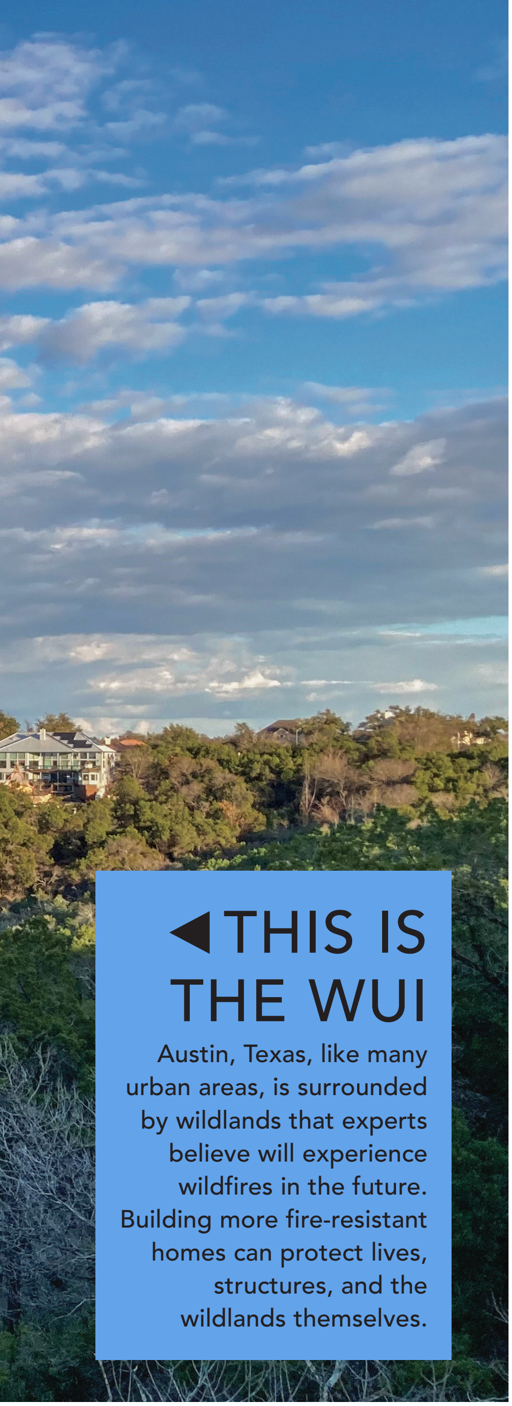
BY PAUL DeGROOT

Summers in Austin, Texas, where I'm an architect, are long, hot, and dry. The consensus is that it's only a matter of time before a wildfire turns one of our peaceful neighborhoods into an evacuation zone. Prolonged droughts coupled with development inching closer to greenbelts, nature preserves, and other wildland areas create perfect conditions for such an event. So that structures near these undeveloped areas might better survive a fire, Austin adopted the International Wildland-Urban Interface Code.

The International Code Council issued the first IWUIC in 2003. According to its writers, the code is "founded on data collected from tests and fire incidents, technical reports, and mitigation strategies from around the world." Applying to all structures, residential and otherwise, that are located in WUI (pronounced "woo-ey") zones, its purpose is to "mitigate the risk to life and structures from intrusion of fire from wildland fire exposures and fire exposures from adjacent structures and to mitigate structure fires from spreading to wildland fuels." It's updated every three years and governs new builds, additions, relocations, and repairs to structures. The code defines a WUI as a "geographic area where structures and other human development meet or intermingle with wildland or vegetative fuels."

Like fellow architects and builders in a growing range of the country, I recently found myself faced for the first time with needing to know how to make projects more fire-resistant in order to meet this code. This article is my attempt to share what I have learned. I work primarily on wood-framed homes, so that's what I'll focus on here. And when I refer to "the code," that means the 2024 IWUIC, since it is the most recent version. Your jurisdiction could be using a prior edition or have made amendments. As with anything code-related, local building departments typically have the final say about what is acceptable. And finally, you don't have to be under IWUIC juris-

Photos this page and facing page: Paul DeGroot



◀ THIS IS THE WUI

Austin, Texas, like many urban areas, is surrounded by wildlands that experts believe will experience wildfires in the future. Building more fire-resistant homes can protect lives, structures, and the wildlands themselves.

▲ THIS IS HOW TO BUILD IN THE WUI

Homes like this one (designed and built by Dana Copp) have exterior details that are less likely to allow embers to enter the building, are less likely to ignite as flames spread, and will burn slowly if they do catch fire, offering time for occupants to escape. But clearly, design possibilities still abound, as seen in the variety of exterior materials used here: The noncombustible metal wall panels are a standard corrugated profile with exposed fasteners. The porcelain wall tiles are installed over a two-coat stucco base. The masonry is Texas Lueders limestone with sawn tops and bottoms and a split face showing. And the roof is standing-seam double-lock Galvalume.

diction to adopt these practices. There are a lot of areas where these details may just be a commonsense approach to more-resilient construction.

Severity levels and ignition resistance

The first thing to know is that not all projects subject to the code are required to meet the same level of fire resistance. The code uses a matrix to determine levels of ignition-resistant construction for a given building site. Fire-hazard severity levels—extreme, high, and moderate—are set by the type of fuel in the wildland area, the slope of the terrain, and the number of days per year that critical fire weather occurs. The type of water supply available for firefighting and the quality of defensible space around a building also contribute to the degree of ignition-resistant construction necessary. The code deems water supply and defensible space as either "conforming" or "nonconforming," according to criteria too detailed for this article. Still, it's worth taking a moment to understand "defensible space."

According to the code, defensible space can occur naturally or be part of a landscape design. It is defined as an area where "material capable of allowing a fire to spread unchecked has been treated, cleared, or modified to slow the rate and intensity of an advancing wildfire and to create an area for fire suppression operations to occur." As designers and builders, we may find that incorporating a defensible space into our projects becomes part of our design and construction work. However, my focus here is on structures.

The code leaves it to each local authority to determine its wildland boundaries and to publish a map of them. Austin established its own three levels of fire-hazard severity based on terrain and wildland fuels: Proximity Zone A is 0 ft. to 50 ft. to the WUI, Proximity Zone B is 50 ft. to 150 ft., and Proximity Zone C is 150 ft. to 1.5 miles. So the property you are designing and building can be quite distant from a wildland and still require code compliance. I was surprised to learn that one of my recent projects was in Zone C. The shady suburban street gave me no sense of a nearby wildland, highlighting that seemingly safe locations are well within reach of the embers carried in the wind during a wildfire.

Ignition-resistant roofs, walls, and decks help keep the reach of a wildfire in check. The code is big on ignition-resistant (IR) materials. Chapter 5 delineates the requirements by class: Class 1 IR prescribes the best protection; Class 3 IR prescribes the least. For example, a home in an extreme fire-hazard severity zone with a conforming water supply must follow the Class 1 IR rules. One in a high hazard severity zone follows Class 2 IR, provided that the water supply is conforming. A home in a moderate severity zone with a conforming water supply follows Class 2 IR or Class 3 IR provisions, depending on the type of defensible space that will be maintained. These are some of the possible conditions listed in Table 503.1 of the code, the starting point for determining fire-resistance rules for a project. Let's look at how these requirements affect different aspects of a home.

Roofs and roof assemblies

An IR roof is a critical line of defense against fire. Embers can easily ignite combustible roofs like wood shakes and low-cost shingles. Roofing tested for ignition resistance is categorized by Classes A, B, and C. Class A roofs perform well under severe fire-test exposure. Class B roofs perform suitably in moderate fire-exposure testing. Class C roofs offer the least fire protection. The code distinguishes between a roof covering—the top weather barrier—and a roof assembly. A roof assembly includes the covering, the roof deck, and anything in between, such as an underlayment, ignition barrier, or insulation layer. Class A assemblies are required for Class 1 IR structures due to the elevated fire-hazard severity. In Class 2 IR zones, roofs may be either Class A assemblies or have an approved noncombustible roof covering. Roofs in Class 3 IR zones may be Class B assemblies or have an approved noncombustible roof covering.

There are many Class A–rated roof coverings, including asphalt shingles, composite shakes/shingles, and TPO and modified bitumen membranes. (Newpoint Concrete Roof Tile by Westlake Royal Building Products is a Class A–rated covering, for example.) The code allows fire-retardant-treated wood shakes and shingles, but some jurisdictions (and insurance policies) may not. Metal roofing, though noncombustible, is not Class A–rated by itself and must be combined with IR materials underneath to constitute a Class A assembly.

Noncombustible clay, concrete, and slate roofs are superior in fire protection, but they still require diligent installation. All gaps where embers can lodge must be protected, particularly at eaves, ridges, and valleys. Some tile, metal, and composite roof coverings have profiles that leave gaps between the roofing and the deck where embers can enter. For these roofs, the roof deck must be protected if it's combustible, and that includes common OSB and plywood sheathing. One layer of 72-lb. mineral-surfaced, nonperforated cap sheet is a code-prescribed solution. Other roof-deck protection products with Class A ratings may be acceptable in your jurisdiction. These include Type X gypsum sheathing along with deck cover boards used over rigid roof insulation. Fire-retardant-treated OSB and plywood sheathings may also be acceptable cover boards. The same goes for noncombustible mineral-wool insulation boards.

A NEW HOME OF STUCCO, STEEL, AND STONE

This new home, designed by Janet Hobbs and built by Roost Custom Homes, is in Austin's Proximity Zone A, which means it is as close as you can get to the WUI. The builder cleared a defensible space between the house and the wildlands, and the designer located a retaining wall and the pool as a fire break and to further buffer the distance between the house and a potential wildfire. The primary exterior materials—stucco, steel, and fiber cement—are noncombustible. The house has tempered-glass doors and windows, a concrete porch floor, tile stair treads, and stucco porch ceilings. The metal roof is noncombustible, but the code requires that metal roofing still be backed up by an ignition-resistant underlayment. The steel planters with rocks instead of mulch provide another fire break at the base of the walls.

Extra protection is mandated at roof valleys, where stuck leaves and pine needles can make for perfect tinder. In all IR classes, valleys must have 26-ga. galvanized sheet metal installed over a 72-lb. mineral-surfaced cap sheet. Shingles can be woven to conceal valley flashings if desired.

Eaves, vents, and gutters

Except in Class 3 IR zones, the code requires protecting the underside of eaves, where radiant and convective heat concentrate during a fire. This makes sense, but I wish the wording in the code were clearer. The rule for Class 1 IR eaves says that they must be protected on the underside by IR materials, materials treated for 1-hr. fire resistance, 2x material, or ¾-in. exterior fire-retardant-treated wood (FRTW).

Eaves must also have fascias, backed by similar fire protection.

It seems pretty straightforward: Protect the underside of the eave. But why stipulate that a fascia must be protected on the backside? Does this imply that exposed rafter tails are allowed as long as the backside of the fascia is protected? No way! Open rafter tails are prohibited, even though that's not stated explicitly. What about the fascia of a closed/boxed eave? Doesn't the required IR soffit already protect it? And why aren't IR fiber-cement fascia boards mentioned? It seems like they wouldn't need backside protection. Clarification in a future edition of the code is sorely needed here.

The code is clearer and more lenient for Class 2 IR eaves: "Combustible eaves, fascias, and soffits shall be enclosed with solid materials with a minimum thickness of ¾ inch (19 mm). Exposed rafter tails shall not be permitted unless constructed of heavy timber materials." Here, exposed rafter tails are permitted only in heavy timber sizes (4x6 minimum, per the Uniform Building Code). But why no requirement for the exposed underside of the roof deck between the rafter tails? I would also like to see this clarified.

Attic vents can't be located in eave soffits, between rafters at eaves, or in other overhanging areas because these places are vulnerable to ember and flame intrusion. Gable-end vents and dormer vents must be located at least 10 ft. from lot lines. Vents are limited to 144 sq. in., but the number of vents isn't restricted. They must be covered with noncombustible, corrosion-resistant mesh with openings not to exceed ⅛ in. or, as the code says, "be designed and approved to prevent flame or ember penetration into the structure." These vent rules apply to both Classes 1 IR and 2 IR; there are no restrictions in Class 3 IR zones. For all classes, gutters and downspouts must be noncombustible and must prevent leaves and debris from filling them.

Walls and wall assemblies

Noncombustible cladding is always prudent in the WUI. Walls faced with brick, stone, cement stucco, ceramic tile, metal, and fiber cement offer superior protection. IR wall cladding is another option. Traditional wood siding doesn't measure up to the Class A standard, but certain dense tropical hardwoods do. FRTW siding is also an IR option. It's impregnated with chemicals to drastically reduce the flame spread, rate of fuel contribution, and smoke development. Log wall construction and heavy timber exterior walls are ignition resistant because of their mass.

Ignition-resistant TruExterior cladding by Westlake Royal Building Products is an excellent substitute for wood siding. Made from fly ash and polymers, it comes in a range of sizes and profiles with thicknesses matching real wood boards. Duration Moulding & Millwork in Hamilton, N.J., uses TruExterior stock to mill bevel siding in profiles replicating traditional wood clapboards.

In some cases, a 1-hr. fire-rated wall assembly is required. These assemblies often rely on ⅝-in.-thick Type X exterior gypsum board as sheathing, or as a protection board over other sheathing. FRTW sheathing can also be part of a 1-hr. wall assembly. In extreme fire-hazard cases the code mandates that an exterior wall must be 1-hr. fire-rated and have cladding that is noncombustible.

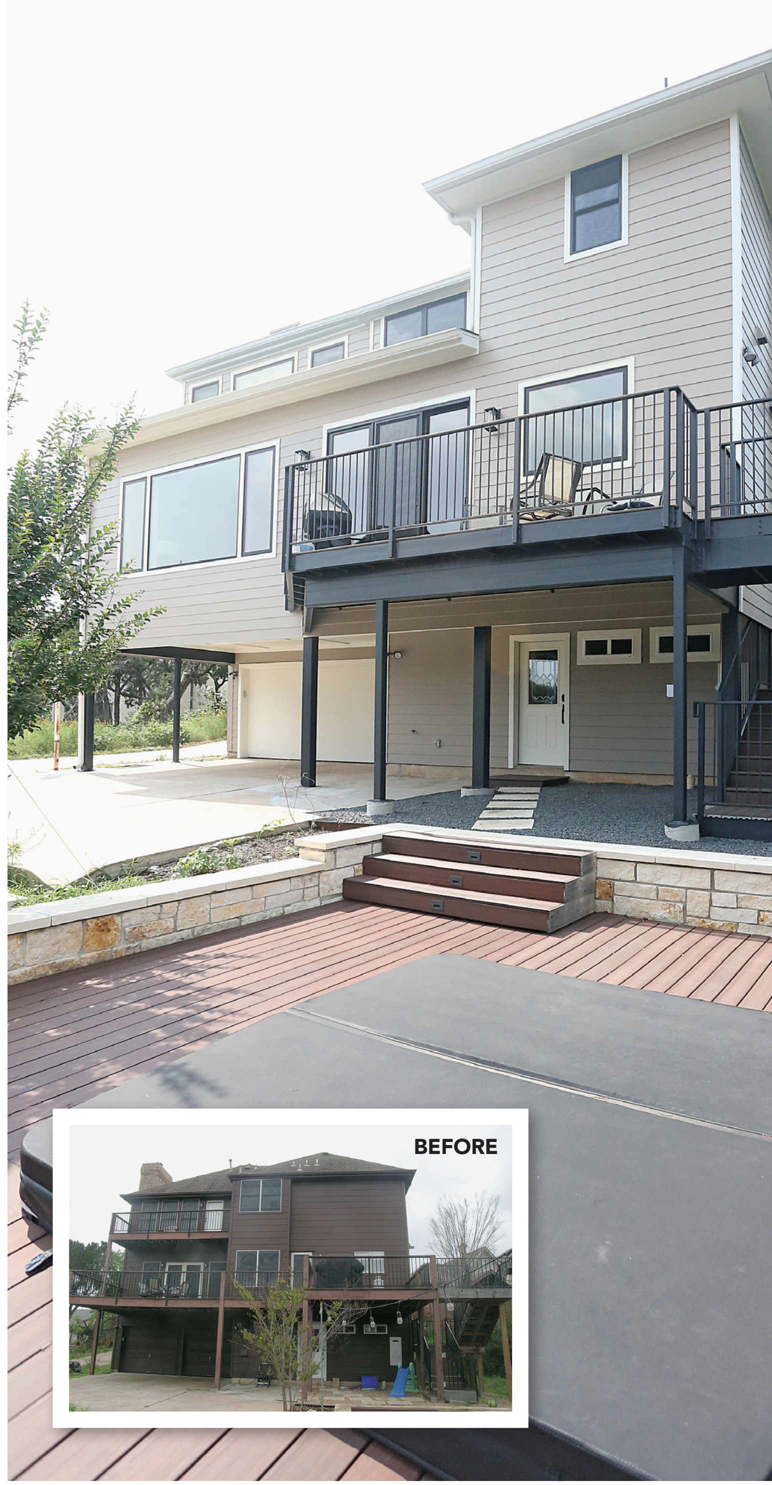
For a Class 1 IR wall, the bottom 6 in. must be a noncombustible material or be protected with 6-in.-high metal flashing. This applies where a wall meets the ground, or where it meets a deck or a roof—places where debris can ignite the base of the wall. One area the code doesn't specifically address is the unprotected bottom edge of combustible sheathing. In extreme fire-hazard zones it is wise to use IR sheathing if the bottom edge will be exposed.

Although the code doesn't specifically address rainscreens or open-joint cladding, use care and common sense here. Gaps between boards must be less than ⅛ in. to keep embers out. Close the drainage channels behind rainscreen siding at the top and bottom with metal mesh, vent the drainage plane to the exterior before it reaches the soffit, and use galvanized hat channels, FRTW, or fiber-cement battens.

Some sidings require 2x4 pressure-treated furring strips for adequate nail-holding power. But does this 1½-in. drainage gap act as a thermal chimney, threatening the wall materials? Possibly. According to the Building America Solution Center, rainscreen walls with drainage gaps of 1 in. or more should be limited to assemblies of noncombustible cladding with either noncombustible sheathing or mineral-wool insulation.

Windows and doors

There are no limitations for windows and doors in Class 3 IR construction. In Classes 1 IR and 2 IR, the code allows four types of exterior glazing: tempered glass, multilayered glazed panels, glass block, and glass with a fire rating of at least 20 minutes. It does not exclude any window-frame material. Therefore, at a base level, any window with insulating glass is code compliant. However, many jurisdictions specify that at least one of the glass layers be tempered. Compared to standard glass, tempered glass lasts much longer before shattering in the elevated temperatures of a fire.



True fire-rated window assemblies are available, but I suspect that the code does not mandate them because of their high cost. Fire-rated insulated glass units with low-e coatings are available to meet energy codes; the fire-resistant glass is the outer pane.

As with windows, there are no door materials that are banned. Allowable exterior doors include noncombustible doors, such as hollow-core insulated steel doors and fiberglass doors with a minimum 20-minute fire rating. Wood doors must be solid-core and a minimum of 1¾ in. thick. Glazing in exterior doors must satisfy the same rules as those for windows. Patio doors of all operational types and materials are permitted, with no size limit on the glass. Doors for vehicular access—garage doors—are exempt in the IWUIC, but your jurisdiction may have stipulations concerning sealing the perimeter gaps to

“Before” photo: Paul DeGroot

A MORE RESILIENT ADDITION

While this house was built before Austin had adopted the IWUIC, the addition, designed by the author and built by Urban Home Builders, had to meet the new code. The house is squarely located in the city's Proximity Zone A. Though the city did not require upgrades to the original home, its existing exterior materials are noncombustible brick and fiber-cement siding. The addition's exterior is fiber-cement siding over fire-retardant-treated wood (FRTW) sheathing. The eaves also are fiber cement. Though the existing house has soffit vents, they were not allowed on the addition. The underside of the floor projection is protected with two layers of gypsum board. The deck is built with steel beams and columns, FRTW joists, Class A fire-rated decking, and custom steel railings. The deck stair has FRTW stringers with custom steel tread supports. The new windows are the required tempered glass. The addition has Class A roof shingles and metal roofing with an ignition-resistant underlayment. The existing deck is over 10 ft. away, so its lack of FRTW framing is not too worrisome. It does have Class A deck boards, plus a fire break of gravel and a concrete driveway between it and the house.

keep embers away from the myriad combustibles inside your garage.

Porch ceilings and underfloor areas

Because the term "porch" isn't used in the code, it's a bit challenging to find the rules for one. For example, a porch with just a roof over it has to follow the rules for a roof eave/soffit. But a porch with living space above it must comply with the exception written for an "underfloor enclosure." In the former case, there are no requirements for protecting the porch support posts and beams; just the porch fascia and the underside of the roof need protection as stipulated for eaves. In the latter case, the underside of the floor and the supporting columns, beams, and walls (if there are any) must be built of heavy timber, fire-retardant treated wood, or fire-resistant construction rated for 1-hr. exposure from the exterior. There's no mention of using noncombustible columns and beams, but surely this is just an oversight.

You won't find the term "carport" in the code either. An attached carport is treated in the same way as a covered porch; whether there's a floor above determines which part of the code applies. You also won't find the term "crawlspace." Here again the "underfloor enclosure" requirements prevail. A crawlspace below a pier-and-beam home must have fire-resistant exterior walls enclosing it down to grade. Alternatively, this enclosure is not necessary if the underfloor area—along with any supporting columns, beams, and walls—is heavy timber, fire-retardant treated wood, or 1-hr. fire-resistant construction. Overhanging projections such as cantilevered floor framing, balconies, and bay windows must be protected on the underside per the "underfloor enclosure" provisions as well. This is true for all three IR classes.

Deck details

An attached wood deck is an expressway for fire to reach a home, giving red-hot embers a big landing area with crevices galore. Accordingly, deck surfaces must be noncombustible or ignition resistant. Noncombustible deck surfaces include flagstone, brick pavers, porcelain tile, concrete, and aluminum planks. IR decking includes a variety of Class A–rated planks: dense tropical hardwoods, bamboo, and PVC decking. Deck boards that are painted, stained, or otherwise coated are not allowed. Stairs and railings must also be ignition resistant. Class 3 IR decks have no IR specifications.

Ignition of debris and other combustibles below a deck is perilous. To combat this, deck framing in Class 1 IR and 2 IR areas must be noncombustible, ignition resistant, made from heavy timber, or FRTW rated for exterior use. Steel deck framing is another option for deck framing that won't burn. Heavy-timber deck framing, per Uniform Building Code definition, means 8x8 posts or larger and 6x10 beams or larger. If you are keen on using FRTW framing, be sure to check availability. Here in Austin, 2x joist sizes are well stocked, but larger timbers sometimes aren't. A hybrid deck frame using 2x FRTW joists with steel posts and beams could be worth considering. Be aware that fire-retardant treatments are not as rot resistant as pressure-treated lumber, so consider flashing the tops of all FRTW joists and beams.

Undersides of decks that extend over a descending slope are extra vulnerable. Where the slope exceeds 10%, the code requires these underdeck spaces to be enclosed, with walls meeting the same requirements for the exterior walls of a house. The same is true for a gazebo, screened-in porch, or other appendage built over a steep descending slope. The code requires that these spaces be enclosed to within 6 in. of grade so that water can get out from below the deck. This large gap at the base of a protection wall is questionable to some in the WUI community. The Austin Fire Department will soon be amending this provision, calling for full enclosure and the use of approved vents for drying below the deck. Access points to allow storage below the deck will be forbidden.

Accessory structures and sprinklers

In Classes 1 IR and 2 IR, a detached accessory building that is within 50 ft. of a building containing habitable space must have IR exterior walls. The walls may be heavy timber, log wall construction, or made from materials with a minimum 1-hr. fire rating. They may also be built with noncombustible materials or FRTW on the exterior side. Requirements for elements like the roof, eaves, and windows for such a building match those for the primary dwelling. Exempt from the code are accessory structures not exceeding 120 sq. ft. and located 50 ft. or more from buildings containing habitable spaces. Also exempt are agricultural buildings of any size that are separated from homes by 50 ft. or more.

The 2024 IWUIC requires that buildings in Class 1 IR areas have automatic sprinkler systems protecting their interiors. The intent is to extinguish an internal fire before it engulfs a structure and spreads to the adjacent wildland, thus endangering more lives and property. It's common for jurisdictions to amend the code; check with your authority for sprinkler system rules. A new amendment in Austin allows a property in the WUI with a nonconforming water supply (e.g., a large home and a fire hydrant with inadequate flow) to install an approved sprinkler system in lieu of providing a conforming water supply.

As you can see, there's a lot to know about designing and building a more fire-safe home in the WUI. And the IWUIC, like most building codes, can be confusing and open to interpretation. When you're unsure, it's always a good idea to talk to your local building officials about what they will and will not accept. I hope you also will see, through the projects shared here, that this is all very doable and that even with more restrictions, the resources and materials we need to design and build attractive and safe houses for our clients are readily available. □

AWAY FROM THE HOUSE, IN THE WUI

These homeowners were looking for a better outdoor living space and a shady oasis from Austin's summer sun. The new covered patio, designed by the author and built by TRS Build, is not attached to the house and is in Austin's least severe Proximity Zone C, but it was still subject to the city's newly adopted codes. Plus, fire can easily jump the short distance from this new structure to the house. To make it fire-resistant and meet the code, the structure has a Class A metal roof assembly with noncombustible fiber-cement trim for the fascias. The roof framing is standard 2x lumber, but the ceiling and the underside of the eaves are clad with cumaru hardwood, which is Class A–rated. The columns and beams are steel, and the hardscape is concrete, tile, and stone.

Paul DeGroot is an architect in Austin, Texas, and a longtime *FHB* contributor (degrootarchitect.com). Photos by Brian

"Before" photo: Paul DeGroot


BEFORE

Siding to Last a Lifetime

Rainscreen details that improve the durability of any lap-siding installation

BY JOHN CONSTANTINI

My partner, Joe Filanowski, and I have been working together for almost 20 years. He handles the business side of our custom-home-building business and I run the job site. Most of our work is along the western Connecticut coastline, where homes are routinely pounded by coastal storms packing savage winds.

Through our remodeling work, we came to the conclusion long ago that even the best siding jobs leak when subject to gale-force wind and rain. We've seen firsthand the rot and structural damage that occurs when rain is forced behind siding and can't get out. The stakes are even higher with modern insulation and air-sealing requirements, because there's often very little drying potential when the inevitable leak occurs. For all these reasons, we now insist that clients install lap siding over an airspace on major remodels and new builds.

We nail the siding to ¾-in.-thick furring strips, and assembly often described as a rainscreen. Vents at the top and bottom of the wall allow any water that manages to get behind the siding a chance to get back out, and the air gap eliminates pressure differentials—which can cause water to be sucked inward—while also promoting air circulation for fast drying. The home shown here has prefinished fiber-cement siding from James Hardie, but the installation methods are virtually the same for every type of lap siding. That includes cellular composite and polyash products like Celect and TruExterior by Westlake Royal Building Products, which are also designed for rainscreen applications and benefit from the same furring, venting, and fastening strategies.

IT'S ALL ABOUT THE AIRFLOW

This relatively inexpensive prefinished fiber cement gives a traditional lap-siding look, but the ¾-in. pine furring with vents at the top and bottom of the walls and windows is what ensures the siding will stay looking good for decades.

Where to start?

Before we can install the siding, we have to install the trim. On this project, and on most others, we used PVC trim fastened with a combination of stainless-steel screws and 15-ga.

Drawings: Chris Mills

TRIM AND LAYOUT

Meticulously installed trim doesn't just look better, it also makes it easier to install the siding. Aim for level, plumb, and square and the payoff is less time spent laying out and fitting siding.

Ease the back. *Chamfer the hidden edge of the inside-corner stock with a block plane before installation to ensure the 1-in.-square stock will sit tight to the underlying furring strips.*

Start straight. *Inside corners—rips of PVC trim—must be shimmed and plumbed before final fastening with 15-ga. stainless-steel finish nails. Making the corners straight ensures uniform 1⁄8-in. gaps at the ends of siding planks.*

stainless-steel finish nails. We use the finish nails on small and relatively short pieces of trim, and the screws on larger, longer elements like frieze boards and water tables. The screws are a must for those pieces in order to minimize the problems associated with the expansion and contraction of PVC. We prefer Cortex screws and their premade plugs, and we leave the plugs out until the siding is installed so we can remove the trim if it's necessary.

Even though this house is all on one level, the siding follows several grade changes and the windows and doors are different sizes and at different elevations. In traditional New England carpentry, the mark of a good siding job was full courses at both the tops and bottoms of doors and windows. Carpenters would adjust the siding's exposure to ensure things lined up. This is easy with consistently-sized windows and simple architectural forms like capes, center-hall colonials, and saltboxes, but it's impossible when you have a house like this one.

We decided that having the courses line up at corners was more important than having full courses above and below windows, so we

Mark both ends. *Place the story pole, marked with a 4-in. siding exposure, on top of a 1⁄4-in. shim that creates the manufacturer-required gap above the water table. Once in place, transfer the siding courses from the story pole to the furring strips at both ends of each run. Snap chalklines between the marks so the siding can be easily aligned for its entire length.*

THE FIRST COURSE

The first piece of siding sets the stage for everything that is fastened above it, so be sure the water table is level, the starter strip is in place, and the first course is fit and fastened according to manufacturer instructions.

Begin with a starter strip. *A 1¼-in.-wide starter strip—ripped from ¼-in.-thick PVC sheet stock—angles the first course of siding so it matches the subsequent courses. Set the starter strip atop ¼-in.-thick shims and fasten it to the furring strips with 1¼-in. stainless-steel ring-shank siding nails.*

Hang the first plank. *Set the first course of siding atop the same ¼-in.-thick shims to create a drainage space between it and the water table below, eliminating the chance of the siding wicking water. Once it's in place, nail the plank into the furring—following the stamped nailing line and ensuring the nails are driven snug with minimal, if any, countersinking—before removing the shims.*

Flash butt joints. *Cut siding planks so that any butt joints land in the center of a furring strip where they can be backed up with flashing (bearclip.com) before being nailed about ½ in. from the end of the plank. Offset seams at least 2 ft. and arrange them so they don't create a repeating pattern.*

kept the 4-in. exposure consistent on all the elevations.

The west side of the house that's shown in these photographs is near the driveway—and it's the first side you see when arriving. It also has several corners close together, so it made sense to start the siding there. This is also one of the elevations with a step in the foundation. We adjusted the location of the water table by varying the amount it overhangs the foundation so there would be full courses at as many of the stepped elevation changes as possible. To ensure the courses of siding lined up from one side of the house to the next, we made story poles that referenced off the top of the water table.

An airtight, durable assembly

On this project, the clients are aiming for net-zero performance, so to minimize thermal bridging, the exterior is skinned with 1½ in. of foil-faced polyiso insulation. A layer of ½-in. Zip System sheathing with taped seams is behind the polyiso. The sheathing is nailed to the framing with 2½-in. nails and the foam is secured to the sheathing

WATERTIGHT DETAILS UNDER WINDOWS

Water intrusion under windows is commonplace in areas subject to high winds, but even in less risky regions it only takes one nasty storm to lead to damage. A second layer of flashing is cheap insurance.

Extra protection. *To prevent wind-driven rain from getting under windows, lap the bottom of the windowsill and the nearest full course of siding below with a 6-in. layer of self-adhered flashing.*

Seal first. *Apply a liberal bead of solvent-based, all-weather sealant to the apron's top edge, which will be in contact with the underside of the window's sill nosing, before nailing the apron to the wall.*

Windows wear an apron. *Cut the 5/4 PVC window aprons with a bevel at the top that matches the slope of the sill and a notch on the back that matches the angle of the lap siding. The size of the notch varies with the layout of the courses, so each is custom-cut.*

with 2½-in. screws set in Thermal-Grip washers. I like these screws for fastening rigid insulation because their slightly conical washer flattens as the screw is driven. When you use metal roof tins or cheaper washers, the edges tend to curl up, so any furring strips that land on a screw are more difficult to get tight to the sheathing.

We also splurged on the ¾-in. by 3-in. pine furring because it better resists cupping and twisting than less-expensive and more commonly used spruce strapping. The result is flatter siding that's easier to install. The furring strips are fastened to the studs with 4½-in. structural screws. To locate the studs through the polyiso insulation, we station one carpenter inside the house to shout distances from windows, doors, or corners to another carpenter outside the house who marks the stud locations on the foam with a felt-tip marker.

To accommodate the walls' extra thickness on this house, the window casing has ¾-in.-thick stock applied to the outside perimeter with 2-in. screws. At the tops of windows and doors is a PVC drip cap that's covered with a secondary aluminum drip cap with hemmed ends. We make the aluminum cap on site with a metal brake.

Details to promote drying

To enable drainage and drying, we install the water table on Cor-A-Vent SV-3 vent strips, which match the thickness of the furring strips. This corrugated plastic vent is sturdy enough to resist crushing when we screw trim over it and it does a good job keeping out pests. We also install Cor-A-Vent at the top of the wall, behind a frieze, which is packed out 1 in. at eaves and rakes (see drawing p. 35). We do this so the siding can be slipped behind the frieze for better water shedding and to conceal the gap left for air circulation. We paint the bottom of the packout material with black spray paint so the gap is as unobtrusive as possible.

Although some builders don't bother ventilating above and below windows, we install the Cor-A-Vent at the tops of windows, too. The siding manufacturer requires a gap between the window's or door's drip cap and the siding to promote drainage and drying. We exploit

FIT AND FASTEN

Although it's tempting to install siding tight to the trim, manufacturers require a gap, which is caulked after the installation. These cut ends, and any others, must always be primed before the boards are nailed into place.

Shim for an even gap. *When measuring and fitting each plank, use an ⅛-in.-thick shim at either end to ensure a consistent gap where the ends of siding planks butt into trim boards.*

Work around windows and doors. *The tops and bottoms of windows and the tops of doors often require a U-shaped cut. We prefer to make these cuts using a circular saw equipped with a fiber-cement blade.*

Clean up corners. *Instead of overcutting the corners, stop the vertical cuts of a U-shaped cutout at the layout marks on the panel's front side. Then break off the waste piece and square up the corners with a utility knife.*

Prime cuts. *Cut ends, even in fiber-cement siding, will wick moisture and lead to degradation and peeling paint. We prefer to apply primer with a foam-tipped squeeze bottle, much like a liquid shoe polish.*

WATERTIGHT DETAILS ABOVE WINDOWS

The flat casing surrounding each window and door is topped with a PVC drip cap and an aluminum drip cap. Both pieces are meant to direct water away from the opening.

Mind the gap. *Install the planks over openings with the same ¼-in. gap used below the first course. These gaps are not caulked, allowing water to get out from behind the siding and air to circulate for fast drying.*

that gap to introduce airflow as well. Underneath windows and doors, we use a sill pan that drains on top of the insulation layer. An additional layer of 6-in.-wide 3M All Weather Flashing Tape attached to the sill nosing and lapped over the top edge of the siding prevents wind-driven rain from finding a way in. On top of the flashing we install a PVC apron with a notched back cut so that it follows the siding contours.

Is all of this really necessary?

Builders in other areas of the country may ask, is all this extra work really worth it? In our climate, with our clients, it absolutely is. They expect the best exterior details and are willing to pay for them. When we started our business, we committed to doing the best possible job for our customers, and we won't work for clients who are unwilling to let us do that.

In recent years, we've had the opportunity to work for repeat clients. When we've opened up walls that we've worked on previously, they're dry and in good shape, which only reinforces our belief that we're doing things the right way. □

John Constantini is co-owner of J&J Custom Builders in Milford, Conn. Photos by Patrick McCombe.

FINISHING UP

By padding out the frieze board 1 in., we're able to fit the siding behind the frieze for better water shedding. The gap also creates the rainscreen's top vent, so the furred cavities can dry when wind-driven rain is forced behind.

Frieze overlaps siding. *The final course of siding at eaves and gable ends is pretty forgiving to install thanks to the packed-out frieze, which allows pieces to be slipped into place.*

Favorite fasteners

Thermal-Grip washer

Because of its slightly conical shape, this 2-in.-diameter plastic washer sits tight to the rigid-foam insulation rather than cupping and interfering with the installation of the furring strips. A pair of prongs on the back of each washer prevents spinning while the screw is tightened.

Cortex screw

Available in 2-in. and 2¾-in. sizes, Cortex trim screws are self-drilling. A special driver bit ensures the counterbored head is set to the correct depth for the matching PVC plug that conceals the hole.

HeadLok screw

These flat-head structural screws are code-approved for installing wood furring strips to structural framing through foam insulations. Spacing requirements are specified in the Technical Evaluation Report, which is available at fastenmaster.com.

The Advantages of Cellular PVC Siding

This material is durable, waterproof, and ideal for places where the weather is hard on a home's exterior

BY FERNANDO PAGÉS RUIZ

Carpenters have used cellular PVC trims for decades, but as a solid and practical siding, cellular PVC cladding is a recent development. I first saw cellular PVC siding in its early stages when building-product manufacturer Westlake Royal Building Products asked me to organize a private meeting with architectural thought leaders Steve Mouzon and Andrés Duany. These two architects are well known for their critique of vinyl siding, and the manufacturer wanted their honest opinion on a new category of PVC cladding. While the architects scrutinized and complimented the clean lines, crisp edges, and rigidity, I was fascinated by the rabbeted, interlocking ends and the notion that any plastic siding could withstand 210-mph winds.

What is cellular PVC?

In the building world, cellular PVC is a solid material, and it has been used for nearly three decades as a 100% synthetic alternative to traditional wood trim. "PVC" stands for *polyvinyl chloride*, the same material used for DWV pipes as well as vinyl siding (and many other building products). Cellular PVC is a type of polyvinyl chloride that is softer and more flexible than standard PVC. This softness means that cellular PVC can be molded to resemble real wood without feeling synthetic.

While not all vinyl is PVC, all PVC is vinyl, and the majority of vinyl products you encounter in the building world are made from PVC. PVC materials include addi-

Photo: Glenn Bashaw. Drawings: John Schreiner.

WORKING IN REVERSE

NAIL EACH COURSE Once a piece of siding is set in place, secure it with 1¾-in. stainless-steel roofing nails driven into the center of the nail slot every 16 in. and left a little loose.

The biggest adjustment to working with cellular PVC siding is the order of installation. Unlike other siding materials, PVC siding is installed before the trim. The first step is to install furring strips or spacers around openings and inside and outside corners using 1x2 PVC or treated wood. Next, install the siding, allowing a ½-in. to 1-in. gap between the boards and furring strips—a full inch if the run is 12 ft. or longer, and ½ in. if shorter. PVC claddings need room to move as a result of changes in temperature, and this gap enables that to happen.

SLIDE IN THE JOINT Each piece connects to the piece to its left via a rabbeted half-lap joint. Tap the siding into place so that the bottom connects to the piece below.

LOCK IN THE TOP Cut the top course to fit, and secure each piece with nails placed along the cut edge. The nail heads will hold the siding to the wall, and the shaft of the nails will keep it locked to the siding below it.

tives that make them stronger, more durable, and more resistant to UV exposure and weather than other plastics. This is why PVC performs well as siding.

Cellular PVC siding as we know it has been around for about fifteen years. It's primarily used along the eastern seaboard because of properties that make it ideal for coastal climates, though its popularity is growing in the Midwest and South because of its durability.

A solution to thermal movement

Any cellular PVC siding needs to solve for the issue of thermal movement at the butt joints. During the seasonal fluctuation of summer and winter, PVC may expand and contract as much as 2 in. within a 12-ft. span. Manufacturers take different approaches to locking butt joints together and accommodating thermal movement. The Celect Cellular Composite Siding installed on this project uses a rabbeted joint tooled into the ends of each board. Gripping like interlocking fingers, this machined joint causes the run of siding to move as one piece from end to end. And because the rabbeted union is precise, the seams virtually disappear. Expansion occurs at both ends of panel runs, with trim pieces covering any movement at corners and around windows and doors. This method of interlocking makes the siding very resilient once installed. Each piece of siding is fully secured on all four sides, giving it unbeatable strength, especially against strong winds and storm conditions.

The many other benefits

As prices rise for other types of synthetic siding, cellular PVC's up-front cost has fallen more in line with that of its competitors. While cellular PVC is still priced higher than fiber cement, its installation cost can be significantly lower, making it an attractive alternative. And like traditional vinyl siding, it's prefinished, low maintenance, and available in many colors. (See a side-by-side comparison at the bottom of this page, with material prices from my local dealer.)

Many homeowners want the look of wood siding, but not the price tag and maintenance. Vinyl siding accomplishes both objectives for a low-cost installation, but cellular PVC looks, feels, and acts more like wood. It's available in several profiles for a more customized exterior, including traditional clapboards with a smooth or wood-grain finish as well as shakes and vertical board and batten. It looks convincingly like painted wood siding, installs with standard woodworking tools and techniques, and lasts a long time without maintenance. Most cellular PVC siding is warranted for at least 25 years.

With a cellular PVC siding installation, the boards stack on top of one another, interlocking horizontally. The nail hem provides oblong slots to center fasteners. This built-in water management allows the material to move and breathe and creates a rainscreen cavity behind the siding large enough to drain via gravity. Because the joints of the siding aren't airtight, the wall assembly behind the siding can dry to the exterior. PVC absorbs no moisture, so it can scribe along a roof edge or remain in contact with the ground without causing damage to the substrate or finish.

PVC is among the most easily recycled plastics because of its simple composition—it's made of just one plastic as opposed to a combination of many. As an embedded plastic installed on a house (not a single-use plastic that is discarded quickly, such as a water bottle), it does not readily pollute the environment. And though recycling used PVC building materials is still a challenge in many parts of the country, the manufacturing process for vinyl products yields virtually no waste.

The low global warming potential of vinyl products makes cellular PVC an attractive cladding alternative to brick (which may have a longer useful life but has a heavier up-front carbon footprint). If up-front carbon reduction and long-lasting siding are a priority, wood and vinyl claddings (including cellular PVC) are good options. And cellular PVC lasts longer and is more durable than traditional vinyl siding.

If a woodlike aesthetic is the goal, cellular PVC siding is an approachable and increasingly affordable alternative. I am convinced that solid, cellular PVC claddings—which are resilient, durable, and almost impervious to wind and hail—will become increasingly popular as one of the best material choices available when balancing performance and price. □

Fernando Pagés Ruiz is a builder and an ICC-certified residential building inspector in Houston. Photos by the author, except where noted.

PREASSEMBLED PVC TRIM



Preassembling cellular PVC casings and trim and installing them as a unit is easier and ensures tight joints. Apply PVC cement to pocket-holed joints, and assemble with 1½-in. exterior pocket-hole screws. For narrow pieces, use PVC cement and CA glue (with an activator). The CA glue keeps the joint closed, while the PVC cement creates a permanent bond. Attach the casing assembly to the spacers using 1¾-in. color-matched stainless-steel screws.

SYNTHETIC SIDING, SIDE BY SIDE

Siding type	Cellular PVC	Vinyl	Fiber cement	Engineered wood
Material	Proprietary composite of materials, including polymeric resin	Polyvinyl chloride	Sand, cement, water, cellulose fibers	Wood strands and a resin binder
Warranty	Limited lifetime for original owner	50 years	30 years	25 to 50 years
Water resistance	Waterproof	Waterproof	Resists moisture	Treated to resist moisture
Paint performance	25+ year color warranty	N/A	Paint every 10 to 15 years	Paint every 10 years
Ground contact	Yes	No	No	No
Material cost	$3.87 to $4.40 per sq. ft.	$0.94 per sq. ft.	$2.42 per sq. ft.	$2.57 per sq. ft.
Labor cost	$4.50 per sq. ft.	$2.90 per sq. ft.	$5.60 per sq. ft.	$5.10 per sq. ft.

Better Board

and Batten

Modern materials breathe new life into a siding that can be both rustic and refined

BY ANDREW GRACE

The western edge of Pennsylvania's Allegheny Mountains is a rural landscape, with small communities surrounded by farmland dotting the washboard hills. On a lot of the country roads, old barns are as much a part of the scenery as the trees. These barns aren't particularly unusual, but they have a look that people like and that clients want me to replicate. Often, I do this with board-and-batten siding.

Sometimes called *barn siding*, board and batten is made up of wide vertical boards and narrower strips (battens) that cover the gaps. The material is often rough-cut, leaving the sawmill as "finished" siding without an additional trip to a mill shop for further beautification.

While this lack of polish can be stark, board and batten wasn't always relegated to barns and sheds. Its American heyday came in the 1800s, when it was a common feature of grand Carpenter Gothic homes during the Gothic Revival period. Its vertical lines draw the eye upward, making a structure appear taller and slimmer, while the bold shadows cast by the battens give walls a striking texture.

Board and batten fell out of favor as siding for homes largely because it wasn't as water- and airtight a system as horizontal lap siding. These days, though, siding materials are usually more of a decoration than a barrier to the elements. The task of weatherproofing a home falls on housewrap, flashing, and other materials inboard of the

PREP THE WALL

For the most part, wall prep for board-and-batten siding is the same as that for horizontal siding. The only difference—at least when working with wood—is the rainscreen assembly, which is installed horizontally rather than vertically. When working with poly-ash trim, you can skip the rainscreen altogether.

Prep as usual. *Before the first siding board goes up, wrap the walls in housewrap, trim out, flash and tape all the windows, and install the belly band.*

Keep out the rain. *To prevent water from sneaking behind the stone veneer skirting the lower portion of the garage wall, we install a copper flashing cap that is let in around the bottoms of the windows.*

Flashing is necessary. *After installing the window trim, install field-bent cap flashing. Tape the top edge of the flashing to the housewrap with flashing tape to keep water from infiltrating behind the flashing and window trim.*

Photo facing page: Patrick McCombe

PLAN YOUR LAYOUT

Avoiding overly narrow battens alongside window and door trim requires planning and possibly some math. Adjust your spacing so that gaps between boards land a couple of inches or more to the side of head casings or on top of them. It's easy to arrange it so the boards at the ends of a wall are the same size: Start in the middle and work out. Center the first board or a gap in the middle—whichever leaves you with the widest boards at the ends of the wall. Fasten the first board perfectly plumb, or the error will repeat in both directions.

Work from the middle out. *To start, measure the wall and find its center. Then draw a plumb line from top to bottom through the centerpoint as a reference for the first board.*

Use spacers for consistency. *Once you've determined your layout, use spacers to maintain a consistent gap between boards and keep your layout on track. Here we used ½-in.-thick scraps of plywood.*

Keep it tight. *Cut the boards to fit snugly around window and door trim. Do the same with battens if you have to, but try to avoid leaving narrow strips of batten next to trim elements.*

siding. This change, along with the introduction of materials that address some of wood's shortcomings, probably has something to do with the resurgence of vertical siding we're now seeing on American homes.

Wrap and flash as usual

Whether we're using wood or engineered materials like the TruExterior Siding & Trim poly-ashwe used on this project, we prepare a wall for board-and-batten siding the same way we would for any siding. We cover the building in housewrap, and then flash and trim out the door and window openings.

When installing wood board and batten, we create a rainscreen gap using horizontal 2½-in.-wide strips of ½-in. T1-11 siding nailed or screwed through the studs. The T1-11's vertical grooves promote drainage and airflow. To keep out unwanted intruders, we staple 8-in. strips of metal insect screen horizontally across the top and bottom of the wall, attach T1-11 strips over the edge of the screen, and then roll the screen over the strips and nail it off to complete the insect barrier.

We left the rainscreen out on this project, because poly-ash trim is nearly impervious to water and doesn't need an air gap to promote drying (and because it's more flexible than wood, I'm not sure it would lie as flat if you used such an assembly). The manufacturer does, however, recommend using a drainable housewrap behind TruExterior, as well as sheathing that is a minimum 7⁄16 in. thick for holding power since, as with any vertical siding, nails won't hit studs as often.

If a belly band is called for, we install that next. Here, our trim boards weren't long enough to run the full length of the band. Rather than simply scarfing the pieces together, we used biscuits and a moisture-cure polyurethane adhesive (Gorilla Glue) for a stronger joint. The glue reacts with water and fills any gaps. We go back later and scrape off the squeeze-out using a sharpened putty knife. We also use the glue on all joints in our window and door casings.

Determine your layout

We start our layout by measuring the length of the wall, and finding and marking the centerline from top to bottom with the aid of a long level and/or plumb bob. We like to work from the center out because it helps to achieve equal-width corners at both ends of the wall without any math. If we started at one end of the wall, we could wind up with an odd-width rip at the far end.

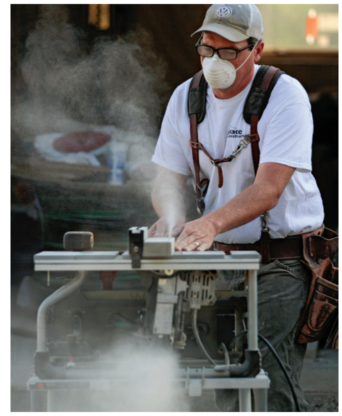
Some math is needed to ensure that the boards at the corners won't be too narrow, but you may have other considerations, such as windows or gable vents, to contend with.

Photo left: Patrick McCombe

ADAPT TO CHANGE

New materials are often designed to overcome real or perceived problems with existing products, and that's certainly the case with poly-ash trim and siding material. But changing to a new material can also change the way you operate, and that's true of this product in some respects.

Same old tools. *Poly-ash trim can be cut with standard carpentry tools using carbide-tipped blades. Dedicate blades to this material, though, because after cutting poly ash, a blade isn't much good for cutting wood.*



Work safely. *When working with poly-ash trim, take the same precautions that you would when working with wood. Cutting produces a fair amount of dust, so protect your lungs with a high-quality dust mask or respirator.*

Don't be a hero. *Carrying poly-ash trim alone isn't advisable because the material is much more flexible than wood and can snap more easily. Generally, we prefer to have two people carry the material to prevent damage.*

Centering the first board on the centerline of the wall is one way to start, but you can also center a gap on the centerline; this choice can add or subtract inches from the width remaining at the corners. On this wall, we wanted the boards at the corners to be at least close to full width, which meant centering a gap on the wall's centerline (the first board was set ¼ in. to the right of the line).

When figuring out your layout, be sure to account for the gaps between boards as well as the boards' width. Battens will cover the gaps, and, depending on the battens' width, you have some room to adjust your spacing.

Typically, we leave at least a ½-in. gap between boards. On this project, the boards were 11¼ in. wide, the battens were 2½ in. wide, and we were shooting for a 9¼-in. reveal between battens. The math conveniently left us with a ½-in. gap between boards. If necessary, you can adjust the size of the gap to avoid narrow boards at the corners, and to avoid having to rip down battens where they run along door and window trim.

Install with the next step in mind

After cutting a board to length, our cut man marks it with a chalkline 1 in. from an edge on the finish face. The lines, made with non-permanent chalk, will be used later as a guide to position the battens.

It's critical that the first board be fastened plumb. The next board in each direction will register directly off of that one, the next ones off of those, and so on. If a board is out of plumb at the beginning, this will repeat to the ends of the walls, where you'd be left with tapered rips. While it's possible to hide an out-of-plumb mistake behind the battens, the lines snapped on the boards to locate the battens would then lose their usefulness. After the first board is up, we use spacer blocks to set a consistent gap between successive boards.

The boards (and sometimes battens) are cut to fit tight around door and window trim. If necessary, we adjust our gaps so we aren't left with narrow strips of batten alongside the trim. It's also possible to cheat this by ripping a bit off of a few boards so the trim is farther away from any gap. A small variation in the exposure of the boards between the battens is hard to notice, but we try to avoid rips when we want consistent reveals.

When working with wood, we leave a 2-in. gap between the bottom ends of the siding and any horizontal surfaces or intersecting roof planes. But poly-ash trim is rated for ground contact, so we can—and do—run it right down to intersecting surfaces.

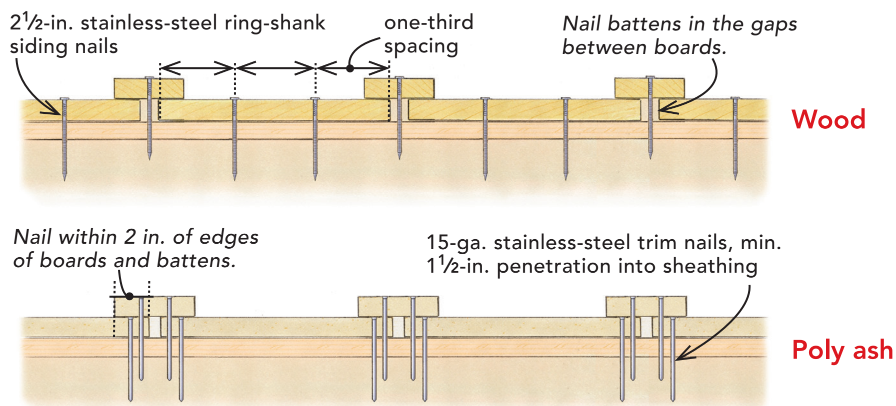
All outside corners end with battens butted together. It looks better if both legs of a corner appear to be the same width, so in this

NAILING:
NEW MATERIALS, NEW PATTERNS

The key when nailing wood board-and-batten siding is to allow for expansion and contraction so the material doesn't split. You want the boards and battens to be able to slide past each other. That usually means keeping the nails away from the edges, or nailing just one edge. Many new materials behave differently than wood, so the old rules don't always apply. Check with manufacturers for guidance on how to fasten their products.

NAILING RECOMMENDATIONS

There are various acceptable nailing patterns for attaching wood board-and-batten siding. For narrower boards, one row of nails down the middle, 24 in. on center, works well. For wider boards, you may want to use two rows of nails spaced one-third the width of the board. The nails should penetrate 1½ in. into framing or sheathing. Battens then get nailed 24 in. on center through the gaps between boards. When working with poly-ash trim, which barely moves, it's recommended to nail within 2 in. of the edges and ends, 24 in. on center, using 15-ga. stainless-steel trim nails long enough for 1½ in. of penetration into the sheathing.



case we ripped ¾ in.—the thickness of the material—off of one batten at each corner to get 2½ in. of batten on both legs of the corner.

When nailing, take movement into account—or don't

Wood swells and shrinks as moisture cycles in and out, and you can accommodate this—and keep boards and battens from splitting—with smart nailing. We typically nail down the center of the boards using 2½-in. stainless-steel ring-shank siding nails, then attach our battens with nails through the gaps between the boards (nails spaced one-third the width of the boards work too). The key is to nail so the boards are allowed to grow and shrink under the battens, so they don't split.

Because poly-ash trim doesn't cycle moisture, our nailing pattern was different. WRBP recommends nailing within 2 in. of the edges, with nails spaced no more than 24 in. on center. This allows us to hide the board nails under the battens. Nailing along the edges of the battens, meanwhile, produces tight seams where they meet the boards. We go back later and fill the nail holes with caulk.

Our TruExterior supply rep recommended fastening the boards and battens with 15-ga. stainless-steel trim nails long enough for 1½ in. of penetration into the sheathing. Nails for board and batten are typically larger than that because they have to resist the movement of wood. Poly-ash material is inherently more stable than wood, so, as the supply rep said, "We don't really need the help of a fastener to keep it from moving."

After nailing, we run beads of acrylic caulk down both sides of each batten and along joints between the trim and siding to give the walls extra protection from the elements.

The timeworn house and garage we remodeled on this project weren't much to look at when we started, but with their new siding, both structures now blend into the rural neighborhood quite nicely. Even though the material we used isn't traditional, the look we achieved sure is. □

Andrew Grace is a remodeler in Ligonier, Pa. Photos by Matthew Millham, except where noted.

Drawings: Dan Thornton

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