

A Hard Look at Hardboard Siding

by David Dobbs

Hardboard is taking its share of knocks lately. Recent figures show that its share of the siding market, almost 30% as recently as 1983, had slipped to 20% by 1987 (the last year for which figures are available).

Vinyl siding in particular has bitten into hardboard's market niche over the last decade, winning over homeowners with its promise of low maintenance. Plywood and cedar are gaining, too, while new processed wood products such as Louisiana-Pacific's OSB-based Inner Seal are adding to the competitive pressure.

Why the drooping sales? We asked a number of builders, distributors, researchers, building consultants, and industry representatives from around the country. Some said that problems with moisture absorption, poor paint adhesion, and poor support from manufacturers are turning off some builders and homeowners. Others blame the contractors who install hardboard and the homeowners who fail to maintain it properly. The reality appears to lie somewhere in between.

What is Hardboard?

Hardboard is defined as compressed fiberboard with a density of at least 31 pounds per cubic foot. To make hardboard, wood fibers are formed under pressure and heat into panels or boards using either a "wet" or "dry" process. In the wet process, the fibers are bound together by lignin, a natural resin in the wood; in the dry process, the lignin gets help from a phenolic resin that is added during the manufacture. In either case, manufacturers might include different additives to increase the product's stability and reduce its rate of moisture absorption.

After pressing, the hardboard is dried in kilns, and then run through humidifiers to bring the moisture content up to a standard level, usually between 2% and 9%. Finally, most hardboard siding these days is either primed or prefinished before it leaves the factory. This provides protection from moisture and speeds or eliminates finishing in the field.

Your Choice

Hardboard comes in forms imitating almost any other siding material you can think of. But most hardboard falls into two basic categories: lap and panel siding.

Lap and multilap. Lap and multilap siding, designed to look like cedar, redwood, or fir clapboards, accounts for 60% of hardboard sales. It comes in sizes from 4-inch to 16-inch boards, and it is available in multilap versions that take care of several "rows" of siding at once to speed installation. Most lap siding is face nailed. Lap siding is especially prominent in the East, Midwest, and parts of the South—wherever clapboards are popular.

Panel siding. Hardboard siding also comes in 2x8-foot, 4x8-foot, and 4x9-foot panels. The panels imitate everything from board-and-batten construction and vertical rabbeted laps to stone and stucco. The large panels install quickly.

Panels are popular where the materials they imitate are common (stucco sells well in the Southwest, for instance) or where cutting costs is important, as in low-end mobile homes.

Different grades and thicknesses. Hardboard comes in five different grades and two basic thicknesses. The better quality sidings are of "standard" or "tempered" grade. Tempered siding is impregnated with additives and/or heat treated to make it stiffer, harder, and more resistant to water and abrasion.

Siding comes in $\frac{7}{16}$ -inch and $\frac{1}{2}$ -inch thicknesses. Several of the builders and distributors I talked to said the $\frac{1}{2}$ -inch product performed significantly better than the thinner versions.

Unprimed, primed, or prefinished. Unprimed hardboard siding is a rarity these days, because most installers want to reduce finishing time. Primed siding, which accounts for most of the market, comes ready to paint or stain. Most manufacturer warranties require finishing within 30 to 90 days of installation. Two coats of an acrylic latex paint or acrylic stain are recommended for hardboard.

Prefinished sidings are taking a steadily increasing share of the market—10% and growing, according to the American Hardboard Association (AHA). Though more expensive, prefinished siding offers the advantage of quicker job completion. Both manufacturers and distributors say the extra cost is usually less than that of paying someone to paint primed siding.

Most finish warranties are for five years. But a few newer lap products that have blind nailing (nails hidden under the lap above) offer warranties up to 15 years.

A Few Bones to Pick

Hardboard promises a lot: the look, solidity, and insulating qualities of natural wood; a wide variety of types and patterns; resistance to impact; and a reasonable price. But does it deliver on these promises?

I found opinions on this divided pretty evenly among the builders, distributors, researchers, and construction consultants I spoke to. Some say hardboard falls woefully short of its promises and suffers poor manufacturer support. Others say that if applied properly, its advantages outweigh its drawbacks.

All agree, however, on what factors are critical to hardboard performance. Moisture absorption topped the list, followed by quality of installation, joint performance, and manufacturer support.



Some of the new hardboard products, such as MacMillan Bloedel's lap siding shown above, offer greater durability with blind nailing and long-warranty factory finishes.

Tales of buckling, swelling, and peeling paint plague the product. But good performance is possible with proper installation and maintenance.

Naturally Thirsty

One thing everyone agreed on: moisture is bad news to hardboard—even more than to regular wood.

Dobbin McNatt, who has researched hardboard at the U.S. Forest Products Laboratory in Madison, Wis., for almost 20 years, says that by its nature, hardboard is vulnerable to moisture.



Figure 1. This hardboard has absorbed excessive moisture and expanded, causing buckling and bowing. Note how tight and swollen the butted joints are.

"Hardboard, as it comes out [of the factory], is pretty dry," says McNatt. "If it's not equilibrated before it's put up, it will pick up moisture and expand. Since it's homogenized wood, it expands more in length than a piece of solid wood siding will. And it will buckle if it's nailed down when it expands."

This expansion from moisture absorption lies behind most hardboard siding failures. The industry standard allows an expansion of 2.4 inches for every 50 feet of siding. That's enough, says Boston-area building consultant Paul Cove, to cause severe buckling of

the board—enough to pull nail heads through the board as it bows away from the wall. This expansion is even enough to move studs out of line and cause cracking in interior surfaces.

Buckling and bending. Any break or weakness in hardboard's finish—an overdriven nail, an unpainted butt edge, an uncaulked seam—can lead to moisture problems (see Figure 1). Once moisture gets a toehold, a cycle sets in. Breaks in the finish caused by pulled nails, for instance, invite more moisture infiltration, causing more expansion and more pulled nails, and so on. Moisture can also speed paint degrada-

tion, and as the paint comes off, more moisture comes in.

Bad enough to quit. Problems like that are driving some hardboard dealers and installers out of the business. Minneapolis siding distributor Marty Bennis, for instance, has sold and installed hardboard siding for 20 years. In recent years, however, he has begun to phase the product out of his sales.

"A lot of hardboard is good product, but it's inconsistent," says Bennis. "You get what you pay for. We've just had too many problems over the years." Bennis says moisture "wicking" into the hardboard caused most of his problems, which included buckling boards and peeling paint (see Figure 2).

Tim Melgren, operations manager at Inner Mountain Lumber in Missoula, Mont., tells of similar problems.

"It's pretty dry here," says Melgren, "but we've still had expansion problems, swelling and shrinking. Where you have long runs on a wall, you get swaying and buckling. It'll pull nails and swell up over the heads. We've also had some shrinkage problems, where the gap opens and the caulk pops off."

Melgren blames some of these failures on builders who butt the boards too tightly or fail to caulk and paint adequately. But, he says, "We're seeing some problems even when people follow the [installation] guidelines strictly...and the problems are bad enough to discourage us from using it." As a result, says Melgren, he now sells hardboard "reluctantly." When possible, he steers his customers to an OSB product made by Louisiana-Pacific instead (see "Hardboard's New Rivals").

It's not just the humidity, it's the heat. Hardboard fares worst in areas that have big swings in humidity and temperature and does best in areas that are dry year-round. Louis Wagner, technical director of the American Hardboard Association (AHA), says "you'll very rarely see a rot or buckling problem in Arizona, but in Louisiana or Mississippi or across the South where you've got high summer temperatures and high humidity, you tend to see more problems with linear expansion. And in the North, where you get condensation from inside, you tend to get more problems with rot. There's a band in the central part of the country where you don't see problems very often."

This regional variation was backed up by the builders I talked to. A builder in New Mexico, for instance, said his only problem occurred when the crew butted the board's edges up snug against one another. Several builders and distributors in the upper Midwest, however, said they sometimes had failures even on jobs where installation was perfect.

And two St. Louis builders—who live in the "central band" Wagner speaks of—both said they never had any trouble. Harold Burkemper, president of First St. Charles County Construction Co., in St. Louis, has been using hardboard siding from three different companies over the last ten years, and he has had "no problem whatsoever." Emil DeLuca, another St. Louis builder, said the same. Both follow the manufacturers' application instructions to the T.

Proper installation crucial. Along with weather, quality of installation is a crucial factor in hardboard's performance. All agree that to stray from the manufacturer's installation guidelines is to ask for trouble.

Installation guidelines vary only slightly from one manufacturer to another (see "Hardboard Do's &

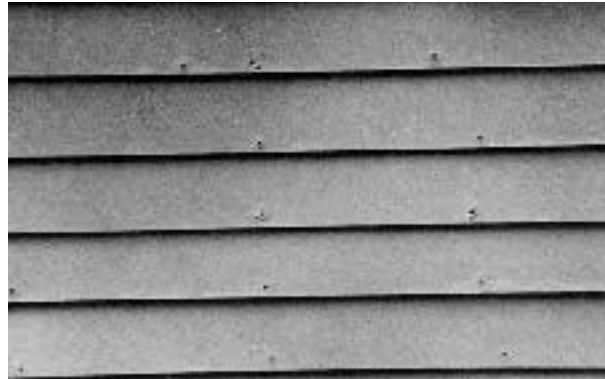


Figure 2. Overdriving nails into hardboard siding invites trouble. The broken surface gives an inroad to moisture, leading to cracking and further moisture absorption. Overdriven nails should be caulked.

Hardboard's New Rivals

Over the last few years, a few new manufactured wood products have appeared to compete with top-of-the-line hardboard and natural wood sidings. Manufacturers of these products claim they shrink less, have longer finishes, and look better than hardboard, while preventing the variations in quality found in natural wood.

Making the biggest splash is Louisiana-Pacific's Inner-Seal, which made its debut in 1986 (Louisiana Pacific, 111 SW 5th Ave., Portland, OR 97204; 503/221-0800). Inner-Seal is made from oriented-strand board (OSB) covered with an overlay of kraft paper; the whole affair is sealed together with a liquid resin. The kraft paper is textured to look like cedar, and must be finished with stain or paint. Blind-nailing keeps the appearance clean and reduces the chance of moisture infiltration.

Inner-Seal costs a bit more than the best hardboard but looks like cedar, says Louisiana-Pacific sales rep Ken Fara. The product comes primed, but Louisiana-Pacific doesn't offer a prefinished version. However, says Fara, Louisiana-Pacific will refer buyers or distributors to finishers who will pre-finish the batch for an extra fee.

That's the route Montana distributor Tim Melgren takes with many of his Inner-Seal sales. A finisher in his region paints or stains siding batches with Olympic products for about \$250 per thousand board feet. That works out to about \$750 for a typical house, which, Melgren points out, is generally less than the cost to paint on site. Olympic will guarantee this finish (if

done by an authorized Olympic finisher) for 25 years—one of the longest finish warranties in the processed-wood siding field. Louisiana-Pacific warrants the substrate for 25 years.

Melgren initially had doubts about the durability of the overlay, so he left a piece of Inner-Seal in a bucket of water for three weeks. Even after that time, he said, "you couldn't tell where the overlay started and the OSB began." In the five years he's been selling it he has not had a callback.

Neither has Missoula, Mont., builder Steve Loken, who has been using Inner-Seal on many of his residential and light commercial projects for five years. "It's tough-cookie stuff," he says. "It looks clean because it blind-nails, and it nails a lot nicer than hardboard because it's softer." Loken's only concern is how the product would fare in high winds, since it is blind-nailed, leaving the bottom edge of the siding dependent only on the product's stiffness to stay snug to the house. However, he has had no problems yet from the high alpine winds that sometimes blast Missoula.

Another new product taking aim at the hardboard market is PlyLap, from PlyLap Industries (1462-D Tanforan Ave., Woodland, CA 95695; 916/661-0812).

PlyLap is face-nailed plywood lap siding with a real wood outer layer. It comes covered with several different face woods, including Douglas fir, western red cedar, Spanish cedar, and redwood. You can also get a medium-density-overlay version with a smooth

finish, and fir and cedar "shakelaps" made to imitate shakes. PlyLap is available unfinished, preprimed, prestained, or prefinished. Widths range from 5 to 12 inches, and thicknesses from 15/32 to 5/8. Altogether, says PlyLap marketing vice-president Kathryn Upton, "there are 61 different ways" you can get the product.

In all versions, a self-alignment notch along the bottom edge of each lap aligns it with the one below. Upton says this speeds installation by avoiding the need to pop chalk lines, and makes the product sturdier by tying each course to the one below. To install, you butt the 8-foot lengths flush against each other, caulking the seam, and nail two rows of nails, one near the bottom and one near the top of each course, into the studs.

The hidden plies behind the face layer are cut slightly short so that those courses can expand without buckling the board. Upton says that those hidden expansion joints, along with the relatively short 8-foot lengths, prevent expansion problems, while the tight joints maintain a smooth appearance.

PlyLap does lack blind nailing, which seems to be a popular feature in processed wood sidings. On the other hand, the notches, along with the face-nails high and low on each course, would seem to make it a good choice for windy sites.

PlyLap comes with a lifetime guarantee against delamination. Prepainted versions come with a five-year finish warranty; the stains are not warranted at all.—D.D.

Hardboard Do's and Don'ts

Always follow the manufacturer's recommendations for the specific hardboard product you use. Not to do so risks product failure and voiding the warranty. Most manufacturers' guidelines are similar to the ones described here, which are compiled from American Hardboard Association (AHA) literature, manufacturers' instructions, and conversations with builders, suppliers, and researchers.

If the product doesn't come with instructions, call the manufacturer (see "Hardboard Siding Manufacturers") and have them send you a copy.

Pre-application

Hardboard performs best if you take a few precautions and do a little planning before you install it.

Get it used to the place. It's best to get hardboard siding a week early and store it at the job site to let it adjust to the site's humidity. That should minimize expansion or shrinking after application. Store it flat on stickers in an unheated, covered building or under tarps. Keep it away from moisture.

Some manufacturers recommend "splintering" the bundles (breaking them up and restacking them with stickers placed between every few layers of siding) to help this stabilizing process. In fact, splintering is the only way to ensure the siding will reach the proper humidity level, according to Dobbin McNatt of the U.S. Forest Product Research Service. Some manufacturers send their siding out in smaller bundles for this reason—something to check on when you're choosing a product.

Let the place dry first. Don't install hardboard siding when a building's concrete foundation is still drying. The moisture released by the foundation may condense on the back side of the hardboard. If you have no choice, says AHA technical director Louis Wagner, "Make sure that you find other ways to dispose of that water vapor—leave a window open—and make sure you're getting some outdoor air exchange." Leaving the interior unheated as long as

possible will also help.

Installation

The instructions below are fairly representative, but you should follow your manufacturer's guidelines to protect your warranty.

Use a warm-side vapor barrier. The hardboard industry requires warm-side vapor barriers—if you don't use one and have problems, you'll probably strike out trying to get a warranty settlement. Use a vapor retarder rated at one perm or less (this includes polyethylene film, kraft paper, or foil-backed gypsum board). Some manufacturers will accept foil-backed fiberglass batts.

These requirements generally apply to retrofit jobs, too. If you can't provide a suitable interior vapor barrier on a residing job, some manufacturers will accept exterior foam sheathing. Some will also accept an exterior vapor barrier with strapping between it and the hardboard; however, in cold climates, an exterior vapor barrier could trap moisture within the wall cavity. Either solution may require you to extend the window and door trim as well.

Cut it correctly. Use a fine tooth saw. Always cut into the face of the board; that is, place boards face up when using a hand saw, face down when using a circular saw.

Stay clear of the ground and roofs. Don't install hardboard siding closer than 6 or 8 inches to the ground (many codes require an 8-inch clearance) or closer than 2 inches to roofs. If you're in an area where it snows a lot, you might want to leave a 4- or 6-inch gap above roofs.

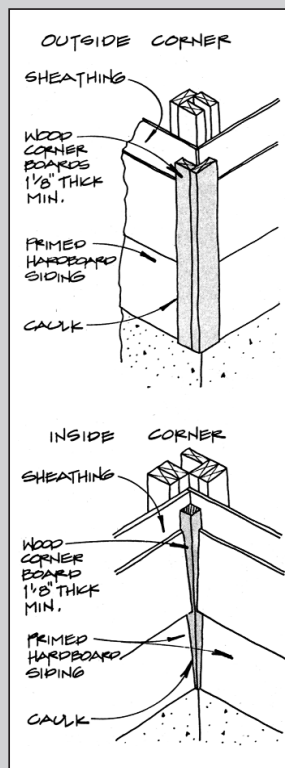
Gap all butt ends. To allow for expansion, follow the manufacturer's recommendations for spacing between boards. Usually this is $\frac{1}{16}$ inch or $\frac{1}{8}$ inch; a few recommend $\frac{3}{16}$; some recommend different gaps for board-to-board and board-to-trim spaces. If you use H-strips, you may need to leave an even bigger gap.

Seal the gaps. You can either caulk the gaps or install "H-strips" manufac-

tured for sealing them. Use an acrylic or urethane-based caulk—silicone won't take paint. You'll need to leave a larger gap between boards—up to $\frac{1}{2}$ inch—when using H-strips.

Builders are divided on whether caulk or H-strips perform better. Some feel the caulk makes for a smoother look; others feel that H-strips look okay and are worth the protection they give from caulk bulging or falling out when boards expand and contract.

Use proper corner boards and trim. Corner boards and trim must be thick enough to completely cover the ends and edges of the siding. Leave a gap of about $\frac{1}{8}$ inch between board and trim



Corner board detail. Corner boards must be thick enough to cover ends or edges of siding, with a caulked gap of about $\frac{1}{8}$ -inch between boards and siding.

and caulk this (see illustration). Where boards run over the top of a door or window trim, use a proper flashing and caulk.

Use the right nails, and don't overdrive them. Use galvanized box nails of the recommended size; usually it's a 6d, 8d, or 10d nail. Nails should penetrate at least $1\frac{1}{2}$ inches into the studs.

Drive the nails just flush with the surface. An underdriven nail will loosen; an overdriven nail breaks the surface of the siding, opening an avenue for moisture infiltration. If you overdrive one, caulk the hole.

Finishing

To protect the wood and the warranty, you must finish with the thoroughness of a tax auditor.

Use the right primer and paint. Hardboard manufacturers leave the back side of their siding unprimed and unfinished, and they recommend that you do the same. According to AHA technical director Louis Wagner, this is done to give moisture some means of escape.

For unprimed siding, use oil/alkyd primers. Over the primer or on primed siding, apply two coats of a high-quality acrylic latex paint or acrylic stain that is recommended for use on hardboard. Products not recommended may not adhere as well or last as long. Don't skimp on the paint; if necessary remind your client that cheap paint will likely mean a new paint job a lot sooner.

It helps to use a paler color, preferably with a lot of white in it. "The whiter the color is, usually, the longer it'll last," says Wagner. "There are some colors that don't last well at all—yellow, for example. Titanium dioxide makes a stable color, and will last longer than anything else." Titanium dioxide content is highest in white or off-white paints.

Don't take any "holidays." Painters call a missed spot a "holiday." Don't take any with hardboard siding. Hit every spot, paying special attention to the butt edges along the bottom of each board. This will mean getting down low to hit the bottoms of the lower boards, which will need protection the most.

Emphasize maintenance. Clients need to keep an eye on the siding and look for popped caulk, missing H-joints, or nail holes that open. These should be caulked and refinished immediately.

Don'ts"). Most companies void the warranty if certain guidelines aren't followed. Generally, key guidelines include:

- Installing a continuous warm-side vapor barrier.
- Leaving gaps of about $\frac{1}{8}$ -inch between butt ends of boards and between boards and trim. The gaps must be caulked or covered with a special "H-joint" (see Figure 3).
- Using only galvanized box nails driven flush with the board's surface.
- Finishing the siding within a certain period, usually 30 to 90 days after installation.

Leaving out any of those steps opens the door to moisture and expansion problems, and later to warranty disputes. So knowing and following the guidelines is crucial.

Unfortunately, some manufacturers do a poor job of getting these guidelines to builders, say some builders and distributors. Mike Davis, an Albuquerque framing and siding contractor, said his distributor didn't have any instructions and that he had to call long-distance to get a copy. Builders unaware that special instructions exist

might easily put the siding up incorrectly—only to run into problems with warranty claims later.

Paint: Another Sticky Subject

Hardboard's need for frequent painting is another source of complaint from builders and homeowners. Jim Adams, who used to use hardboard for the 400 homes his Good Value Homes builds in the Minneapolis area every year, quit using it primarily because it required painting so often.

"We just had too many claims [from

clients]," he says. "The freeze/thaw cycle was rough on the paint, and it would crack. You have to repaint every two or three years. Then we got a batch with some bad primer and the paint wouldn't stick, and that was the frosting on the cake for us."

According to construction consultant Paul Cove, Adams' problem with frequent painting isn't unusual. "Hardboard has to be painted more often than wood," he says, because cracked or peeling paint opens the way to moisture infiltration. Such

high maintenance needs, however, are a real drawback today. As Minneapolis builder Adams put it, "People would much rather go skiing than paint their houses."

A few of the newer hardboard products address this issue, offering longer finish warranties. MacMillan-Bloedel, for instance, recently came out with a blind-nailed product that carries a 15-year finish warranty, and Masonite offers its blind-nailed "Colorlock" with a 15-year warranty.

St. Louis builder DeLuca uses the MacMillan-Bloedel product and refuses to use anything else. "We've never had a problem with the finish, and we've never had a warranty claim," says DeLuca.

Given the success of MacMillan-Bloedel's product and the competition hardboard is getting, the hardboard industry will likely move toward more low-maintenance products in the next few years. Peter Armstrong of MacMillan-Bloedel says, "People continually ask for a prefinished system with as little maintenance as possible. So we're trying to promote our four prefinished product lines, all [with] lap siding, hid-



Figure 3. Undersized corner boards have aggravated the expansion problem on this installation by allowing moisture access to the ends of siding panels. Corner boards should fully cover the ends of the siding.

den nailing, longer warranties, and less maintenance."

Such products might ease many of the industry's problems. According to Armstrong, blind-nailing makes the product both more durable and more attractive. In face-nailed sidings, nail holes usually offer moisture its first entry; hiding the nail holes under the lap above removes this entryway. The absence of visible nails also gives the siding a much cleaner look.

A Question of Support

One final area of contention is warranty support. That's where some hardboard installers and distributors have found their biggest frustration.

Minneapolis siding distributor Bennis says, "All the hardboard manufacturers are quite difficult to deal with, whereas that's not the case with vinyl, aluminum, or steel manufacturers, who will bend over backwards."

When there's a problem with hardboard, says Bennis, the manufacturers "push the blame back onto the distributor or the installer." Bennis said he has never had a hardboard manufacturer offer to do more than replace defective materials, even though materials make up only a fraction of the cost of removing and replacing bad siding.

Tim Melgren, the Montana distributor, found the same thing. "Usually [the manufacturers] just want to replace materials and the contractor eats the labor for replacing it. The builders aren't real crazy about that, because they feel the problem should be taken care of. And you have to follow the installation instructions to the letter. You use the wrong nail or what they don't consider a good vapor barrier, and you can forget it."

The level of support seems to vary within the industry and even among service reps for individual manufacturers. One manufacturer, for instance, was dropped by distributor Bennis because the company was "not willing to adjust any of the problems [it] had." But another service rep for the same

manufacturer won the good will of builder Harold Burkemper by covering all the cost, including labor, of replacing some siding that had finish problems. Said Burkemper, "They covered everything, lock, stock, and barrel."

So What's a Builder to Do?

To some builders, hardboard's tendency to swell with moisture is sufficient reason to avoid it. Other builders, however, say it's a good product if used properly and with limited expectations.

There's no magic formula you can use to determine whether it's worth using. It seems clear that with proper application, reasonable expectations (especially about maintenance), and a little luck, the better brands and grades of hardboard will perform well. It also seems clear that it's a very unforgiving product—any error in application may not only lead to big problems, but will likely void the warranty as well. And even if the warranty does kick in, you'll probably have to eat the labor.

Given all that, each contractor must juggle the pros and cons and decide for him or herself. Asking yourself a few questions, however, can help you account for the most important variables.

- Is the client willing to pay for a good grade—near the top of the line?
- Do you have enough control over the siding's application and finishing to be confident it will be installed correctly?
- Is your client willing to live with the product's maintenance requirements?
- Are you willing to take your chances, given all the other factors, on having to bear the labor cost of replacing the siding if it fails?

Finally, you should talk to distributors and other builders in your area who have used hardboard siding. See if they've had problems and, if so, how the manufacturers responded. ■

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