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Hardboard Headaches: Another Look

by Ted Cushman

A class-action lawsuit against manufacturers of hardboard is still in its early stages (*Eight-Penny News*, 3/96). Plaintiffs claim that the material has inherent limitations as siding, while manufacturers respond that most problems stem from faulty installation or maintenance.

On closer scrutiny, both sides may turn out to have legitimate points. While hardboard is particularly vulnerable to moisture, builders or homeowners can make matters better — or worse.

Understanding hardboard. Hardboard is made of wood pulp: fibers, bundles of fibers, and fiber fragments produced

by blasting wood chips apart with a steam-pressure vessel, or grinding the chips between giant steel plates. In a hardboard plant, the fibers are formed into boards under high heat and pressure.

In “wet-process” hardboard manufacture, a slurry of wet pulp is pressed and heated to squeeze out water and steam, forming a dense board. Under these conditions, naturally occurring wood lignins create a strong bond between fibers, accounting for most of the adhesive bond in the finished product.

In “dry-process” hardboard manufacturing, air rather than water moves the fibers into place in the press, and

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Builders shouldn't expect good performance — or warranty coverage — if they mishandle materials on site. At left, siding buckles on a home; inset, siding stored in the open on the ground on a Georgia job site.

JOHN BOSONETTO



GreenStone Industries guarantees low energy bills for energy-rated homes insulated with its “R-Pro” cellulose.

Cellulose Insulation Maker Guarantees Low Energy Costs

Fans of cellulose insulation have long argued that the material is a superior choice for energy-efficient homes. They cite its relatively high R-value, resistance to air movement, and low installation cost as qualities that contribute to affordable energy savings.

GreenStone Industries, a major cellulose manufacturer, is now taking these claims a step further: Under its new “Buyer’s Choice” program, GreenStone offers

homeowners nationwide a guaranteed energy bill for two years in new homes built to energy-efficient specifications and insulated with the company’s “R-Pro” cellulose. If a customer spends more on heating and cooling than the guaranteed amount, GreenStone promises to make up the difference.

Insulation by itself, of course, won’t ensure energy performance. To qualify for the guarantee, the home must comply with a detailed

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STATE BY STATE

Maryland. Advocates for the disabled are suing five large Baltimore-area builders, alleging violations of the Federal Fair Housing Act in multi-family projects, according to the March 29 *Baltimore Sun*. Baltimore Neighborhoods, Inc., a fair-housing group, says the builders failed to make first-floor units wheelchair accessible as required by 1991 amendments to the federal law.

Florida. The state has decided to limit home building on the Florida Keys to 255 houses a year, reports the March 29 *Miami Herald*. In recent years, more than 500 homes annually have been built on the chain of tiny islands. The state will also require Monroe County, which has jurisdiction over the islands, to build a new sewage treatment plant and remove failed cesspools. Under the plan, one cesspool must be replaced for each new house permit issued.

Arizona. The state senate has killed a plan to provide tax incentives for infill home construction in Phoenix, according to the March 14 *Arizona Business Gazette*. The bill would have given infill home buyers a rebate on the state's 5% sales tax, which is applied to the 65% of a home's price that is considered to be materials cost.

Lessons in Ductmanship

Leaky ductwork in central air conditioning systems is a big energy waster (see "Sizing Air Conditioners," page 29). But sealing those ducts doesn't always get the attention it deserves. In fact, recent California utility studies found a 25% to 30% leakage rate to be common in home air conditioning ducts, according to a report in the May 1996 *Contractor* magazine.

To remedy that, the California Building Industry Association (CBIA) has started a training program for builders and hvac contractors, supported with a \$200,000 grant from the Department of Energy (DOE). The pilot program, taught by the consulting engineering firm ConSol, of Stockton, Calif., will target 20 of the state's biggest builders and their hvac subs, bringing installers into the classroom for instruction and following up with hands-on field training. Utilities are eager to help with the program and have agreed to supply classroom space.



The dirty job of duct sealing is often neglected, but it can be a cost-effective way to boost energy efficiency. A DOE-funded pilot program in California aims to teach hvac contractors the necessary skills.

C. BATES

Air conditioning creates high peak power requirements during the summer, forcing power companies to invest in supplemental generating equipment that they don't need during the rest of the year. It's often more cost-effective for power suppliers to invest in peak load reduction than to build those occasional-use plants.

Participants in the program will learn how to size duct systems room by room, using

ASHRAE standards or the Air Conditioning Contractors of America (ACCA) Manual J. They will also learn to seal all duct joints, plenums, and duct boards with mastic or a UL-181 listed tape, and to join flexible ducts with metal sleeves or collar and coupling systems.

For more information, contact the California Building Industry Association at 916/443-7933, or call ConSol Inc. at 209/474-8446. □

Now That's a Wet Site

So you want to build on the waterfront? How about on the water? Here's a new technology that could be a contender.

The Fortress system uses reinforced concrete and expanded polystyrene to construct floating decks of 2,400 square feet or larger. Originally developed as platforms for floating single homes, the floats can now be connected together as floating foundations for commercial-size projects. For information, contact Galva Foam Marine Industries, Route 67, Box 19, Camdenton, MO 65020; 573/346-3323. □



Finished home on a floating platform, complete with helicopter landing pad, is towed to its watery site. Power and phone hookups and a pump-operated sewer line will be connected to the shore.

Humvee Gets a Civilian Job

Truck too small? How about a Hummer? The military all-terrain vehicle officially known as the HMMWV (short for "high mobility, multipurpose wheeled vehicle") is now for sale on the private market, according to

and cruise through 3-foot snowdrifts — even with 4,000 lb. strapped to its back."

A backhoe, auger, crane, or other equipment can be mounted on the Hummer's rear. Operating costs are a



AM General's HMMWV, originally developed for the U.S. military, has now found civilian applications.

February's *Construction Marketing Today*.

Priced at \$40,000, the Hummer is like a Jeep on steroids. The manufacturer, AM General, says, "With 37-inch tires, 16 inches of ground clearance, and 10,000 foot-pounds of torque, it can scale 18-inch walls, ford 2 feet of water,

soldierly 29¢ per mile, says the company.

If you stay on the highway, a Hummer doesn't make sense, says company spokesman Lee Woodward, "but if you've got ten miles of dirt road and two miles of no road, you need it."

For a dealer on a paved road near you, call 800/732-5493. □

Cellulose Guarantee

set of construction specifications. The specs cover everything from framing and air sealing to heating and ductwork design.

A consultant from Energy Pro, of Virginia Beach, Va., verifies the energy detailing and sets the energy-use level on which the guarantee is based.

Homes that participate in the program should qualify for a Five-Star energy rating

and an EPA Energy Star, the company says, and so may also qualify for an energy-efficient mortgage. Some immediate savings may also result from the ability to downsize heating and cooling equipment, the cellulose maker adds.

For more information on the Buyer's Choice program, contact Tom Ward (800/488-5565 — Eastern U.S.) or Harold Shepard (619/942-2378 — Western U.S.). □

FROM WHAT WE GATHER

Straw-panel producer Stramit USA is going out of business, reports May/June's *Environmental Building News*.

The company has been trying for two years to introduce a compressed-straw panel for interior partitions (*Eight-Penny News*, 11/95), but technical and cash-flow problems are reportedly forcing a shutdown. The remaining stock of panels on hand will be sold off.

OSHA is not responsible for the proliferation of MSDS documents for harmless substances like water, an agency spokesman told Chicago *Tribune* columnist Mike Royko. Royko's column made fun of OSHA for requiring an MSDS for water, but the MSDS, located on a university Internet database, was evidently created by a private consulting group and is not OSHA-required anywhere. A check of the Internet file revealed MSDS documents for other common substances like silicon dioxide and sodium chloride (that's sand and salt to you and me). By the way, if you ingest the sand or salt, the MSDS advises drinking — you guessed it — water.

Caterpillar tractors may soon be able to report their own maintenance problems, according to press reports. Most Caterpillar equipment is already equipped with sensors that detect malfunctions, and repair shops have computers that diagnose problems and tell technicians how to fix them. The missing link, a worldwide system to monitor the sensors remotely, could be in place in a few years. When perfected, the computer system will tell repairmen where to find the broken machine, and which tools and parts they'll be needing at the site.

You won't have polybutylene to kick around anymore. Shell Chemical, the last remaining manufacturer of the material for the U.S. market, has discontinued production, citing the cost of lawsuits over leaky joints in PB-piped systems. Vanguard Industries of McPherson, Kan., a major supplier of PB pipe and "Manabloc" manifold-based plumbing systems, says its stocks of PB pipe will run out in late summer. Cross-linked polyethylene (PEX) tubing will still be available for use with the manifold systems. For information, call Vanguard at 800/775-5039.

Is your painter certified (as a painter, that is)? The Painting and Decorating Contractors of America (PDCA) has begun awarding qualified painters its "Certified Residential Contractor" designation. To qualify, painting contractors must submit financial documentation and copies of business and safety plans, as well as pass a detailed two-hour exam. PDCA says the program is intended to distinguish reputable painters from the fly-by-night competition. For information, contact PDCA, 3913 Old Lee Hwy., Suite 33-B, Fairfax, VA 22030; 703/359-0826.

Hardboard Headaches

synthetic chemicals — usually heat-curing phenolic adhesives — provide most of the adhesive bond in the board.

Dry-process and wet-process manufacturers each claim advantages for their techniques, but the products have much in common. Both processes create a dense, easily machined board with consistent dimensions that holds paint well. For purposes of industry performance standards, hardboard is hardboard — both types are covered by the same American Hardboard Association (AHA) and American National Standards Institute (ANSI) standards.

Attractive to water.

Because hardboard is made with wood pulp, some critics have likened it to paper, another wood pulp product. But U.S. Forest Products scientist Charlie Carll says that such a comparison is extreme and inaccurate. While the bonds holding paper together can be dissolved by water, neither the lignin bonds in wet-process hardboard nor the phenolic bonds in dry-process hardboard are water-soluble.

Like natural wood, however, all hardboard is vulnerable to water intrusion, through capillary action when the material is in direct contact with water, and through the electromagnetic attraction of lignin and cellulose molecules, which pulls water vapor into the material anytime humidity is high.

In general, hardboard swells more than wood. Since hardboard is denser than wood, with smaller voids in the structure, water intruding into hardboard quickly runs out of space and begins to swell the material.



Edge swelling and dimpling around nails are common hardboard complaints (above left). Sometimes, severe deterioration follows: A Baltimore-area home inspector was able to poke his finger through rotting hardboard siding (above). Installation details can contribute to problems: The hardboard shown at left was placed in direct contact with a roof surface, contrary to manufacturer instructions.

Hardboard also swells more than wood in the long dimension. In the manufacturing process, the fiber mat is laid down randomly, with many fibers running across the width of the board (in contrast to wood, where almost all

cost, you must pay attention to details. If you use it where it receives a lot of runoff or splashback, or if you put it in contact with the ground or a roof, you're asking for trouble.

Hardboard must be kept dry in storage and during

Atlanta construction inspector John Bosonetto. The problem is that these directions are widely ignored. On job sites, Bosonetto frequently sees the instructions "laying in the mud with people stepping on them."

Bosonetto says he often sees hardboard stored in the open on the ground (see photo, page 9). "If it rains, it's a disaster," he says.

Homeowner maintenance. Bosonetto's conclusion after years of inspecting new and existing homes is that although hardboard experiences widespread problems, it can perform well when cared for properly. "If every three years, you clean all the mildew off and paint it and make sure it is covered completely, it will last." The problem is that most people wait until the damage has started before they act, says Bosonetto. "If it has started to decay, painting does nothing but seal in the moisture. It's too late." □

"If it has started to decay, it's too late to paint."

the fibers run parallel to the grain). So thickness swelling of fibers makes the boards longer. If the boards are pinned at the ends — say, nailed to studs — the length swelling can cause the boards to buckle.

In addition to buckling, swelling can create an unsightly appearance around nails and at joints. And unlike wood, which may swell but then shrink again, some of hardboard's swelling is often permanent.

Careful installation.

Despite hardboard's weaknesses, some builders have used it successfully. To reap the advantage of hardboard's low

installation, and should be painted immediately when installed (better yet, use a prefinished product). Paint should be reapplied every three years.

Humidity alone will cause hardboard to swell. If you're in an unusually rainy or humid climate, you might want to look for another material.

Follow the directions.

Hardboard is often installed by unskilled labor. Problems frequently begin when the material isn't handled right.

Every bundle of hardboard siding ships with several sets of instructions that give details about storage and handling, correct nailing, and gapping of joints, observes