

LUMBER AND WOOD:

Building Strength *and* Beauty

By Judith Shinsato

It's "green," it's renewable, it's affordable. Whether it's being used for structural purposes or purely aesthetics, top (roofs and trusses) to bottom (floors and walls), wood is one of the most versatile building materials available, as those in the industry will attest.

But wood also has its challenges, like termites for instance. So, is there still a demand for this building material today? And if so, where and how is it being used? Our annual update on the state of the wood and lumber industry looks at what's growing in the forest, with a special focus on the increasing popularity of engineered wood.

Based on Demand

In April 2006, the Western Wood Products Association (WWPA) predicted that, "The string of four consecutive years of record lumber demand should end in 2006 as the red-hot construction market begins to cool. ... All of the decline in lumber demand will come in residential construction."

Did this prediction pan out?

Well, for the most part, there's a consensus that the demand for lumber and wood in 2006 in Hawaii was as strong as demand in 2005, at least in the first half of the year. But while many report that they are beginning to see a slowdown, some say demand is still high but are anticipating a decrease in 2007.

"It was definitely as strong," says Carl Liliequist, CEO of Honsadr. "In fact, the first part of the year, it was stronger. It was quite remarkable; we had the biggest month in the company's history in June of 2006. But it has slowed, particularly in the fourth quarter, due to the general slowdown in residential construction."

"The overall demand for forest products remained relatively constant in 2006. Primarily this was due to the fact that lumber prices remained stable, as they have over the past 20 years," adds Mike Fujimoto, president and CEO of HPM Building Supply on the Big Island. HPM recently opened a new six-acre distribution center in Hilo. "(It) has already proven to improve inventory levels at our four yards in Hilo, Keauu, Kona and Waimea."

Hap Person, president of HWT Company, LLC and the Hawaii Lumber Products Association says, "2006 was another record setting year for U.S. and world demand of lumber and wood fiber used

to make many different consumer products. Yet, with demand remaining high, the cost of lumber and plywood is now at four to five year lows. ... Commodity product pricing is dependent on reliable future supply, and wood is the only renewable building supply resource that really does grow on trees."

Explaining further, Person says, "The lower cost ... is due to many things. One is the increased amount of managed forest lands planted to meet the consumer demands. ... The second reason is the use of new technologies that use wood fiber from trees in ways that reduce the waste and increase the yield and strengths of wood building materials called engineered wood products (EWP)." (Editor's note: More about engineered wood products can be found later in this report.)

Person continues, "Meeting the increasing demand for wood products does not mean the depletion of the world's supply. Just the opposite is true of wood. ... Think of it as an increase in consumer demand for another crop like corn. The increased demand would drive more landowners to plant more acres in corn to fill that demand. Once it is

harvested it is quickly replanted to fill future demands, providing environmental and air quality benefits while it renews itself. The demand for wood keeps it growing."

The prognosis for 2007:

Consumption and demand are expected to slow further, according to the forecast by WWPA, again due to the decrease in housing construction.

"The housing market has slowed down," reiterates Liliequist. "We think this year is going to be a challenge. While we don't think it will be a disaster like it is in some places on the mainland, we think it definitely will be slower in 2007 overall. The one thing that could help us and mitigate that is the military housing, which will be a boon this year. Though these developments use steel framing, there's still wood floor systems, trusses, roof sheeting and all those types of things."

Also affecting demand for wood and lumber is the growing popularity of wood replacement products. "We see composite, low-maintenance products continuing to grow at a pretty good pace," Liliequist explains, "like Hardiplank, like fiberglass doors instead of wood doors, like Trex decking in replacement for wood decking."

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From left to right: A completed Graham Builders custom, wood-framed home. Most of the homes built by Graham Builders use wood framing. Besides wood framing, Graham Builders also uses wood trusses, plywood siding and sheathing and the T&J Joist "silent floor" system. Graham Builders uses MDF wood for much of its cabinetry.

While it doesn't hurt our business because we carry a variety of both products, it is a trend you have to be aware of. But there will always be a place for wood because of its aesthetics, and it's a very versatile building product. All these products that are trying to be substitutes for wood, they are really trying to copy the appearance of wood and maybe improve upon the characteristics."

Added Attraction

While traditional hardwood and softwood species are as important today as they were 100 years ago, engineered wood products (EWP) also are gaining in popularity.

"On the wood products side," Honsador's Liliequist adds, "engineered wood is our fastest growing category, and it continues to grow at double digit rates. Most of what we sell in terms of engineered wood

is a floor or roof system." Asked about the reason behind the growth in demand, he answers, "It's the quality of the engineered system that you get. And in many cases, the prices are very competitive."

HPM's Fujimoto agrees, "Demand is defiantly growing for these items. Contractors appreciate the ease of use, product uniformity and strength of EWP."

Dan Hayashi, buyer of lumber and building materials at City Mill

A SAMPLE OF TYPES OF ENGINEERED WOOD

The following list was taken from the Wood Promotion Network Be Constructive web site, www.beconstructive.com.

- **Plywood** — structural plywood, used for construction and industrial applications, is made with waterproof glue to maintain strength in exterior applications. Decorative plywood is used for wall paneling, cabinet construction or furniture.
- **Oriented Strand Board (OSB)** — a wood panel used as a sheathing material for floors, walls and roofs.
- **Glulam** — also known as glue-laminated timber, refers to large, structural members made by gluing together pieces of dimension lumber. It can be formed into many curved shapes, and the sizes are limited only by transportation restrictions.
- **I-Joists** — a structural engineered wood product often used for joists and rafters in residential and commercial construction.
- **Laminated Veneer Lumber (LVL)** — has several layers of wood veneers and adhesive.
- **Parallel Strand Lumber (PSL)** — a high-strength structural composite marketed under the trade name Parallam®. It is comparable in strength to LVL. Both products are often grouped under the heading structural composite lumber (SCL).
- **Machine Stress Rated Lumber** — lumber that has been mechanically stressed to its rated load before it is used in a project. The benefit is the lumber is less likely to fail mechanically once installed.
- **Finger-Jointed Lumber** — dimensional lumber made from short lengths of wood that have been machined with finger joints at the ends so they mate perfectly when glued together. Finger-jointing adds surface area to the joint which greatly increases its strength.
- **Particleboard** — a panel product made from sawdust and other residue left over from the manufacture of lumber and other wood products
- **Medium Density Fiberboard (MDF)** — a wood-based panel made from fine cellulose fibers combined with a synthetic resin or other suitable bonding system, which are then joined together under heat and pressure. Because of the fineness of the fibers, it forms and machines smoothly and precisely, making it an ideal substrate for thin laminates.



Co., Ltd., also agrees that demand for EWP is growing, but admits that these products are not as popular with his client base. One product that Hayashi brought in, however, is selling well. "Last summer, I brought in a treated and primed pine, a finger-jointed lumber. Since it's engineered wood, the 'bad' parts have been cut out, so you can make full use of the wood. It comes from New Zealand, through a local supplier, and it's doing very well. It's used more for trims, aesthetics."

At Hardware Hawaii, which carries a full line of EWP, Larry Lanning, the company's marketing director, says, "Glulam beams and I-joists have been popular for some years, but the Parallam beams and TimberStrand (a brand of laminated strand lumber) are joining them in popularity. These products will become increasingly popular because they enable us to provide large pieces of lumber that do not have to come from large — and therefore old — trees. Through today's engineering and manufacturing abilities, these products can be made from small pieces of lumber or even just strands of wood bonded together. The resulting products have uniform strength, stiffness and dimensional stability, all valuable attributes especially for framing."

Person adds, "While EWP may cost slightly more up front than other lumber materials, its superior

performance provides contractors with exceptional long-term value and usually reduced labor costs." Some advantages of EWP, as outlined by Person, include:

- "Strength and consistency: Such materials are produced using wood strands that are laminated together under high pressure with adhesives, taking advantage of the wood's natural strength while minimizing natural inconsistencies such as knots and splits. The result is high-strength form boards that resist twisting, bowing and shrinking.
- "Longer lengths, greater depths, allowing framing crews to design and build framing with minimal splicing and labor.
- "Multiple uses: EWP's uniform strength means it potentially can be used for more structural framing needs, while retaining its straightness and finish. For contractors, this means less material waste and labor cost.
- "Ease of handling and holding of fasteners: EWP can be worked using common tools, including standard saws and hammers. Past challenges such as difficulty in driving nails have been addressed through refinements in material composition and manufacturing. In addition, the materials are excellent at holding fasteners, helping increase long term strength and quality.
- "Environmentally responsible choice: EWP can be produced from logs that are not large or straight enough to be of structural value in conventional products. It also uses fibers from plentiful, fast-growing trees such as aspen and uses a high percentage of each log."

An example of the growing use of EWP can be found in the design-built homes of residential contractor Graham Builders. According to CEO Danny Graham, the company uses glulam beams, treated with Tribucide, for structural purposes; plywood siding, depending on the design of

Top to Bottom:

Wood also is a popular choice for stairs.

Glulam beams are a popular engineered wood product for Hardware Hawaii.

Also available at Hardware Hawaii are OSB panels.

TimberStrand, a brand of laminated strand lumber, is made of fast-growing aspen and yellow poplar and can be used for a broad range of applications, including window headers, wall studs and door headers.

Parallams, another EWP, also are growing in popularity.

Forestry Fact*

To grow a pound of wood, a tree consumes about 1.47 pounds of carbon dioxide and releases approximately 1.07 pounds of oxygen. Young, well-managed forests tend to be the most efficient at absorbing carbon dioxide and producing oxygen. Old, over-crowded, slow-growing forests begin to use more oxygen than they produce.

(*Editor's note: The "Forestry Facts" illustrations are from the South Carolina Forestry Commission Management Group.)

the home; MDF for cabinetry; plywood sheathing on the roofs and, on the floors, the TJI® Joist "silent floor" system from iLevel by Weyerhaeuser (formerly known as Trus Joist). "Yes, wood is still the building material we use," says Graham. "That's because people are asking for wood; it's the least expensive method at this point, ever since prices of other building materials increased. Wood also is an easier material to work with. It's more flexible, and you can do more with it. And it's readily available." Graham Builders is currently involved in several new home construction and remodels in Manoa, Hawaii Kai, Nuuanu, Kaneohe, Kahaluu and Makaha.

Truss Talk

Is wood still the preferred material when it comes to the manufacture of trusses? The answer is a resounding, "Yes!"

Steve Myers, general manager of AMT Truss, says it's because the use of dimensional lumber is easier to cut and use and it's rigid during manufacturing and delivery of trusses. "It's a better product and is

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CORROSION AND CONNECTORS

Since the preservative-treated wood industry, effective Dec. 31, 2003, voluntarily transitioned away from CCA-C (chromated copper arsenate) in residential applications to alternative treatments, there has been some concern about the potentially corrosive effects of those alternatives on metal connectors, anchors and fasteners.

Simpson Strong-Tie has conducted a series of tests, in compliance with standards set forth by the American Wood-Preservers' Association, to assess the corrosive impact of various pressure-treated woods on its hot-dip galvanized products, over 1,800 steel coupons and 3,000 fasteners.

Analysis of the results led to the following observations, as written in a the Simpson Strong-Tie technical bulletin T-PTWOOD06:

• "ACQ-D (carbonate), CA-B and SBX (DOT)

with NaSiO₂ treated wood is on average approximately two times more corrosive than CCA-C treated wood. ... Thus, it could be reasoned that there needs to be at least two times the (zinc) coating protection. ... It is Simpson's recommendation that a minimum ZMAX™ (a G185 coating), which provides approximately three times the corrosion protection of G60 (considered an industry standard), should be applied to meet the potential demand from these treated woods.

- "Testing on sodium borate treated wood generally indicates corrosion rates less than seen with CCA-C treated wood." However, in guidelines for selecting proper connectors, the bulletin also states that borate treated woods are not appropriate for outdoor use.

more cost effective."

David Vikers, president of Island Truss on Kauai, agrees. "Wood is just easier to work with, not only while a truss manufacturer is

building a truss, but also when the different trades are working with it. Wood is just a wonderful product to use. You can do so many things with it, you can bevel cut the

wood, etc. It's very versatile and strong in handling. All our equipment is set up to use wood."

"For trusses, wood offers the best options, from cost, flexibility of design, lead times, quality and ability to adjust at the jobsite if the building requires field modifications," adds Fujimoto of HPM, which has a truss manufacturing division.

And treated Douglas Fir is the wood of choice. The aforementioned truss manufacturers do not use engineered wood, and Vikers explains that though it's possible to use, it's not necessary in Hawaii. "We don't use it because we don't have any heavy loads, like snow loading, that they have in many mainland states. That's why you would need engineered wood, for really heavy loads. We don't need it here."



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Forestry Fact

Growth in all U.S. forests removes approximately 9 percent of total carbon dioxide emissions in the United States.

UNDERWATER TREASURES

BuildingGreen, Inc., publisher of *Environmental Building News*, announced its fifth annual top 10 green building products during the U.S. Green Building Council's November 2006 Greenbuild Conference and Expo in Denver, Colo. One of the 10 was underwater timber salvaged by Triton Logging, Inc.

The British Columbia-based company harvests underwater, old-growth standing forests that were submerged as early as the 1930s by man-made lakes behind hydroelectric dams. Using an adapted remote operating vehicle called Sawfish™, Triton is able to salvage Douglas Fir, Western Red Cedar, Western White Pine, Lodgepole Pine, Hemlock and other species year round.



When hydroelectric dams were built decades ago, at a time when timber was thought to be a limitless resource, large areas of forest were often flooded, which shielded the wood from the ravages of fire, pests and atmospheric oxygen. Triton Logging has developed a remote-controlled vehicle to harvest the wood with minimal environmental impact.

Borrowing a technique used by ship salvagers to lift sunken vessels, Christopher Godsall, CEO of Triton Logging, developed the Sawfish to clasp the tree with 51-inch metallic mandibles, screw in a 500-pound air bag and inflate it. (Editor's note: Such large air bags are needed because waterlogged timber weighs 40 percent more than dry timber.) The submarine like machine, which can be operated remotely as deep as 300 feet, then cuts the tree with a 55-inch chainsaw and releases it to float up to the surface. One machine can cut up to 100 trees a day.

And though there's a misconception that the water would have caused the trees to rot, it is actually the presence of oxygen that leads to rotting wood, says Godsall, and there is very little oxygen at such depths. In essence, underwater standing trees are protected and allowed to mature, resulting in a finely-grained, scratch-resistant and denser wood than generally found today.

Godsall says there are about 45,000 dams in the world over 330 feet tall, hundreds of which have underwater forests beneath them. He estimates that 100 billion board feet of timber is underwater globally and is in negotiations to use or sell Sawfish technology in other countries, including several in South America and Asia.

In the truss arena, what's developing is availability of state-of-the-art equipment and programs being used to manufacture the trusses.

"In our cutting department, we have two computerized saws that cut lumber into truss parts very fast and efficiently," says Myers. "The designers send their truss designs straight into the batch program which decides which of the two computerized saws will cut the parts. Our automated assembly

Below, top to bottom:

An AMT Truss worker assembling a truss

AMT Truss uses state-of-the-art Hundegger saws (shown here) in the manufacture of its trusses.

The trusses for Gentry Homes' Cypress Point subdivision were manufactured by AMT Truss.

Steve Myers was recently promoted to general manager of AMT Truss.



line is 150 feet long with a two-gantry press where we assemble the trusses, and then it is ejected into a finish roller press to be packaged for delivery. Set up time is very fast using our laser system that projects the image of the truss and the size and location of connector plates right on the assembly table. We have two trucks with 84-foot cranes and one truck with a roll-off trailer to either hoist trusses onto plate-line or roll off the truss

Below, top to bottom:

Kauai's Island Truss manufactured trusses with special radius overhangs for Starwood's Westin Ocean Resort.

Island Truss is in the process of developing 4x6, 4x8 type, heavy timber trusses (shown here), possibly using them to manufacture custom, prefabricated gazebos.



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Top to bottom:

Stacked lumber at Sawdust's new manufacturing plant

A Sawdust crewmember at work

Grant Merritt, president of Sawdust, at the company's new location.



package at the jobsite."

Myers adds that through the WTCA (Wood Truss Council of America), AMT Truss is the first in the state to implement "third party inspection" and a documented control program, in compliance with the Uniform Building Code. AMT Truss is currently involved with Gentry Homes' Cypress Point subdivision, Ford Island and Ke Alii Villas on Maui.

"What I'm getting into is I want to start doing old timber trusses," Vikers says. "All our trusses right now use either 2x4s or 2x6s. I want to get into 4x6, 4x8 type, heavy, old trusses with the plates and bolts going through. We have new software and equipment available now that can do that. We have two computerized Hundegger SC-1 saws, one that can actually cut and drill bigger timber pieces. Then we design the connectors and everything using the same program. The trusses look sturdier. We're testing our boundaries right now." With these timber-type, open beam structures, Vikers also plans to design custom, prefabricated gazebos and similar items. "We plan to put a few together and, if it takes off, ship them unassembled to other islands."

Island Truss is the only truss manufacturer on Kauai for almost 13 years, according to Vikers, and is currently involved in Starwood's Westin Ocean Resort and Kaiulani at Princeville, both about halfway through.

For Starwood, the units were initially designed with trusses along with an overbuild on the roof to help shed water. "We were able to incorporate it all in one to save (the general contractor Unlimited Construction) from having to build two different things. It saved a lot



of time. The way I see it, the more I can prefabricate, the more I can save the consumer." Also for this project, because the company has the saws to do it, the trusses were designed and manufactured with special radius overhangs.

At HPM, Fujimoto says, "We...doubled the capacity of our truss plant and improved the truss quality with the acquisition of additional automated saws, assembly tables and a truss tracking system."

Millwork, Decks and Floors

An area in which wood truly shines is aesthetics. "When it comes to appearance, typically, people want to see the look of wood, and you don't see substitutes for that," says Honsador's Lillequist.

Grant Merritt of Sawdust, which specializes in the manufacture of

Forestry Fact

An acre of trees can remove about 13 tons of dust and gas from the surrounding environment every year.

millwork, says the type of wood he uses most is Poplar and African Mahogany, because "that's what people want." He explains, "Poplar is paint grade; it mills very nicely and is very affordable. African Mahogany is red, also mills pretty well, is also relatively inexpensive for a dark-colored wood and is in plentiful supply." Sawdust recently relocated to 151 B Puuhale Rd. to a lot that is bigger and better, says Merritt, "better space, better access, better neighbors, better location, more electrically. There are some distinct advantages here."

Hardware Hawaii recently opened a new showroom in Kailua





TigerDeck decking is a popular product at Hardware Hawaii's recently-opened Kailua showroom.

with kitchen and bath display vignettes to showcase available products, many of which are lumber products. One of the more popular products in the showroom is TigerDeck decking, says Larry Lanning. "The product is more than just the wood decking. It is milled with a groove on both sides that allows the decking to be easily installed with a powder-coated stainless-steel fastener, leaving an unblemished surface. Tigerwood facias, rails, balusters and posts make it easy to create an outstandingly beautiful deck. ... Although it does not have to be finished, a quick and easy application of Penofin tropical oil really shows off the 'tiger stripes' of the wood."

Also generating interest in the showroom is the company's Vallenza Collection of exotic wood flooring. Lanning explains, "This is a real wood flooring in solid planks for nail-down applications

and a thick-veneered engineered plank for glue-down applications. The wood species include Sakura, Kempas, Lapacho (Ipe), Pradoo, Jatoba and Cabreuva. Since our showroom opening, we have definitely noticed that customers are expecting more well-designed, high-quality products both in wood (cabinets, windows, doors and flooring) as well as appliances, lighting and bathroom fixtures."

"HPM moved and upgraded our door shop, which has improved the efficiency and output of prehung doors," Fujimoto adds.

And by the end of February, AMT Truss will begin manufacturing 4x2 floor trusses, says Myers. "It's a great system because the open web design allows plumbers, electricians and HVAC systems to run their equipment inside the floor system. This is becoming a new choice for builders."

Termites and Other Issues

"When you talk about wood, there is usually one thing that tends to be a topic of concern by consumers and builders on wood as the best choice for building. That is the termites," says HWT's Person. "What most people do not realize is most damage accrues in wood that is not properly treated to building code standards, used in an improper application or has no treatment protection at all. This is common in non-structural

materials like doors, trim, windows and furniture. Most structural wood used in Hawaii for construction is treated with a Borate-based treatment like Hi-bor. Borates have proven to be extremely effective in protecting wood from termites while being less toxic to people than table salt. Its proven ability to penetrate deeply and completely in 2-inch dimensions can eliminate the threat of termite attack."

Commenting on a study undertaken by Simpson Strong-Tie (see sidebar on corrosion on page S2), Person says, "Recently, some attention has been given to the results of a study on certain new wood treatments and how they may increase the corrosion rate of metal connectors and fasteners. Although this is a real concern, it is related only to certain treatment formulas which are not being used in Hawaii and are not borate based. Borate-based treatments like Hi-bor and zinc borate used in the manufacturing of EWP, have NO negative or corrosion effect on metal. All the builder or consumer needs to remember is if the treatment is a borate based treatment, it is safe and noncorrosive."

Besides termites, "Freight is probably the biggest challenge, and that's for everything," says City Mill's Hayashi. "With the two major carriers raising their rates and fuel charges, it's going to have to be passed on (to the consumer). They've just raised the cost of living in Hawaii. It's one of the reasons for the rising cost of building materials."

Related to this, adds Fujimoto, "(A) never ending challenge is the logistics involved with getting products to Hawaii in an efficient manner. At HPM we constantly look at process improvements to ensure our supply chain is operating optimally and work hard with our suppliers to keep the product flowing to our builders."

Forestry Fact

Lumber manufacturers use about 98 percent of each tree that is harvested. Processing bark for fuel and mulch, wood chemicals and all fiber ensures almost complete utilization.

"Wood has been used in construction for thousands of years," concludes HPM's Fujimoto. "It provides superior insulation, is easy to work with, costs less and is amazingly strong. As for aesthetics, wood is unmatched. The vast breadth of wood products available ensures you will find the exact look you want. The ability to alter wood through milling, staining or painting means that you can easily customize the final product. And a greater percentage of our Hawaii construction workforce are skilled in wood working than in working with other materials."

Homebuyers and builders today always try to keep informed of the newest improvements and benefits of building products available, Person says. "(They) want to be sure of getting a product which will perform best for (the) need, last over time and give the most value for the money. Always consider both the long-term maintenance and energy costs of the materials you use. You will find a home built with lumber provides many benefits, including the best values for thermal and sound reduction into the home, along with exceptional natural beauty and proven durability."

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