

# Engineered Wood

SPRING 2008

# JOURNAL



## **BEETLE BATTLE**

**Impact of the Mountain Pine Beetle Infestation in British Columbia and Alberta**

## **WORKFORCE WOES**

**Older Boomers Could Be Partial Answer to Impending Labor Shortage**

## **CONFORMITY ASSESSMENT**

**The Need for International Standards in Today's Global Marketplace**

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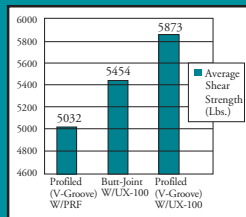


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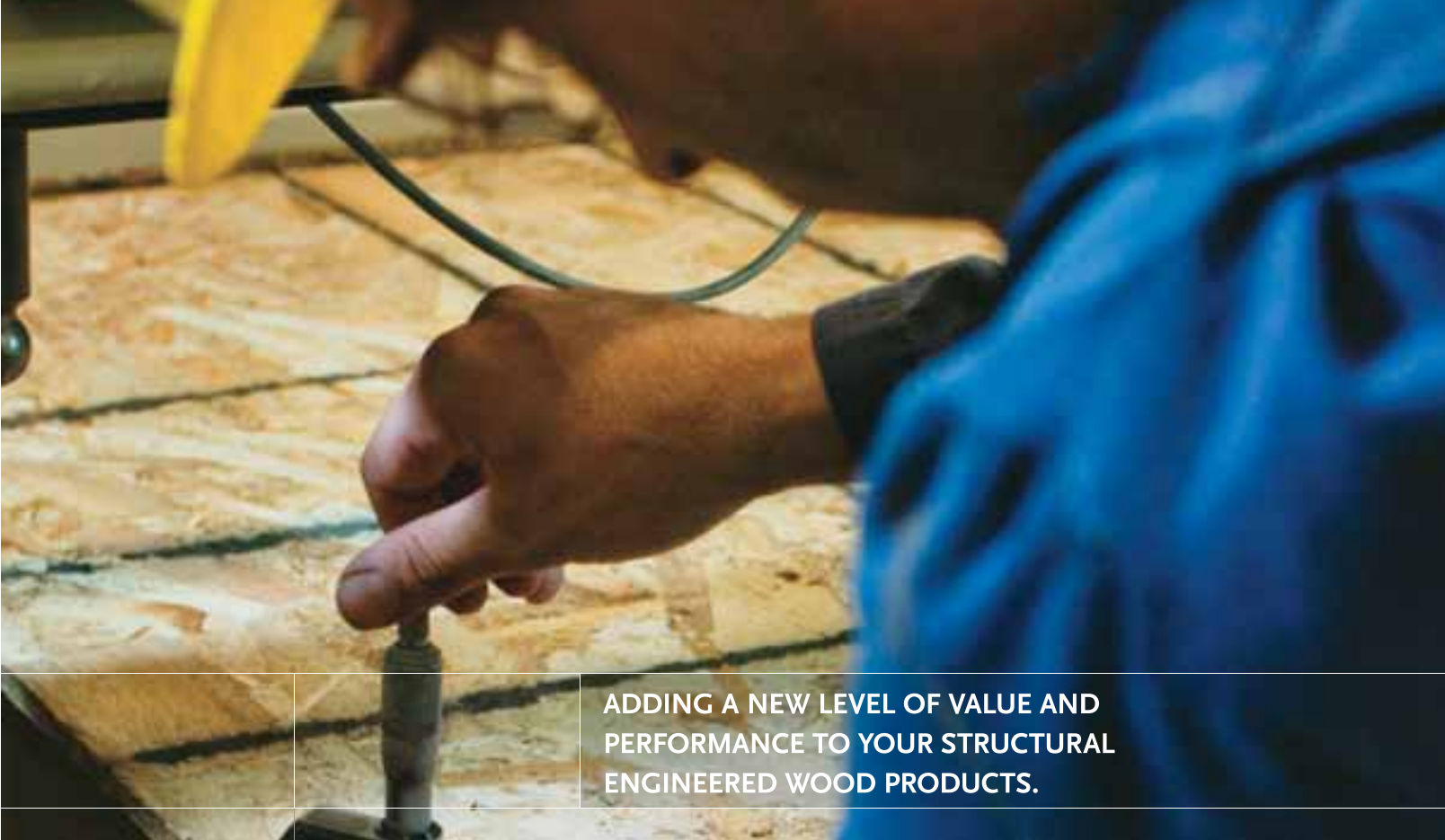
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# Engineered Wood

## JOURNAL

THE OFFICIAL PUBLICATION OF APA – THE ENGINEERED WOOD ASSOCIATION

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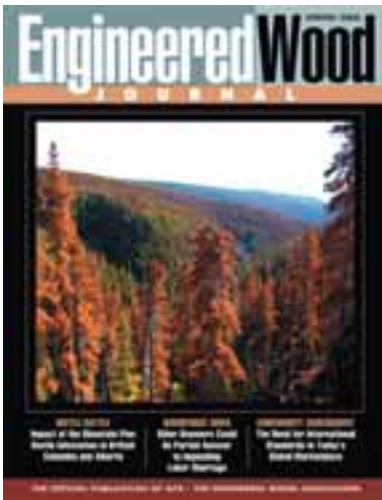
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The mountain pine beetle continues to ravage British Columbia and Alberta. See story on page 16. Photo by Mark Creery

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## On Turning 75

We're not planning to make a big deal of it, but it shouldn't go entirely unnoticed either. APA celebrates its 75th anniversary this year.

We're taking a fairly low-key approach to the milestone in part because it was just a couple of years ago that we all celebrated—with no small amount of fanfare—the 100th anniversary of the plywood industry. And also in part because market conditions don't really lend themselves to a lot of celebration right now.

For the record, though, the Association was founded in 1933 as the Douglas Fir Plywood Association (DFPA). There had been earlier attempts to organize, but those efforts never quite took off. A fellow named Axel Oxholm, who had served for 18 years with the U.S. Commerce Department, became DFPA's first managing director.

History records that the first few years of the Association were rather turbulent. That's not too surprising given that the Great Depression was in full swing. But the group survived, grew, and prospered. And yes, weathered many more turbulent times.

DFPA became the American Plywood Association, commonly known as APA, in 1964 following the introduction of southern pine plywood. Then in the late 1970s, along came oriented strand board, which APA's management and Board of Trustees wisely chose to include in the Association's membership.

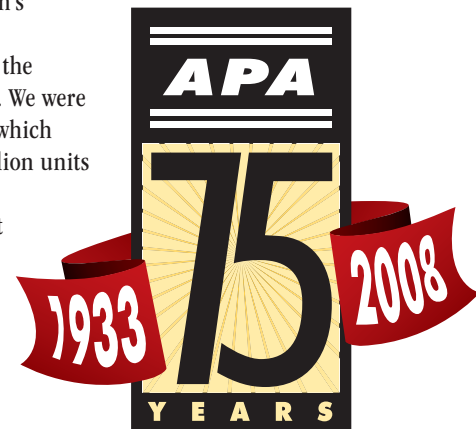
In 1983, when APA marked its 50th anniversary, the membership and staff had good reason to celebrate. We were coming off a deep and protracted recession during which annual U.S. housing starts barely exceeded one million units for two years running.

A few years later, with technological and product innovations, it was a logical and natural next step for APA to offer membership services to manufacturers of other engineered wood products—glulam timber, wood I-joists and structural composite lumber. In recognition of its broadening product mix and geographic range (which came to include Canada), the Association changed its name again in 1994 to APA—The Engineered Wood Association.

Geographically, the story goes from the Pacific Northwest to the Southeast to the Upper Midwest and Canada. Biographically, it goes from Oxholm and Difford to Turnbull, Lewis and Hardman. It goes from crates and boxes to barracks, residential wall sheathing and commercial roof decks. From 500 million square feet of panel production to some 40 billion feet of industry production today. From a handful of plywood members, all in the Northwest, to approximately 160 diverse engineered wood product facilities in 22 states and seven provinces. And yes, from boom to recession, and boom again.

It's quite a story. And although we won't be throwing any big parties, we do plan to mark the occasion in various ways and at various times during the year. It will be a theme of our annual meeting in Las Vegas in September, for example. We're developing articles for the general news and trade media. And we plan to publish a special anniversary issue of this magazine next fall.

In the meantime, no gifts, please. We'll pop the cork when the next boom comes. ●



Jack Merry



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## 2007 Panel Production Declines Nine Percent

U.S. and Canadian structural wood panel production dropped 3.9 billion square feet, or nine percent, in 2007 compared with 2006, according to yearend data released by APA.

The housing recession was the clear cause of the decline. U.S. housing starts last year, including manufactured homes, totaled just 1.4 million, compared with 1.9 million in 2006 and 2.2 million in 2005. Panel production peaked at 43.1 billion feet in 2005.

Production of other structural engineered wood products also declined for the year. Glulam output fell 21 percent, I-joists 18 percent and laminated veneer lumber 15 percent.

Seven structural wood panel mills and four engineered wood product facilities closed during the year, while one new OSB plant and a plywood mill rebuilt after a fire opened, according to APA records.

## Work Progressing on Structural Insulated Panel Consensus Standard

An APA Standards Committee on Structural Insulated Panels (SIPs) has met twice at APA headquarters in Tacoma and is making progress on development of a new national standard for the product under the American National Standards Institute (ANSI) consensus process.

The committee is comprised of 33 persons representing manufacturers, design professionals, code agencies, third-party inspection agencies and testing laboratories from the U.S., Canada and the United Kingdom. It has formed three subcommittees covering fire, structural, and durability/quality. Efforts so far have concentrated on structural insulated panel wall applications.

APA, which is secretariat of the Committee, initiated the effort in cooperation with the Structural Insulated Panel Association under APA's accreditation as an ANSI standards developer.

APA and SIPA, meanwhile, have published a 20-page structural insulated panel product guide that covers the

product's applications, advantages, design and construction considerations, assembly and related topics.

## Sustainable Forestry Initiative® Program Marks Record Growth

The Sustainable Forestry Initiative® (SFI®) program recorded substantial growth in 2007, including a 750 percent increase in locations with SFI chain-of-custody certification that can track products from certified forests, the organization announced earlier this year.

The SFI program started 2007 with 21 certificates at 48 locations and ended it with 102 SFI chain-of-custody certifications at 408 certified locations, SFI Inc. President and CEO Kathy Abusow said. "This represents a 386 percent increase in certificates and a 750 percent increase in certified locations," she noted.

SFI-certified lands also rose during the year nearly 6.5 percent, from 135 million acres to 143.7 million.

The SFI sustainable forestry certification program is one of the largest in the world, with a standard based on principles and measures that promote sustainability.

## Mill Safety Seminar Presentations Available

Presentations from a seminar on mill safety for the composite wood panel industry are available for downloading at [www.pbmdf.com](http://www.pbmdf.com), the web site of the Composite Panel Association (CPA).

The seminar, held last year in Atlanta, was sponsored by CPA, APA, Canadian Hardwood Plywood and Veneer Association, Hardwood Plywood and Veneer Association, and Structural Board Association.

Presentations were given by safety experts from Anthony Forest Products Company, Flakeboard Company Limited, Norbord Incorporated, Potlatch Corporation, Roseburg Forest Products, LP Corporation, Plum Creek, CPA and APA.



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## NAHB Introduces Certified Green Professional Designation

The National Association of Home Builders (NAHB) introduced a Certified Green Professional™ designation during the International Builders' Show in Orlando, Florida in February.

The designation is based on the "Green Building for Building Professionals" course, a two-day training and education course. The course was piloted two years ago and has been completed by more than 700 builders. Candidates must also complete a NAHB University of Housing management course, agree to continuing education requirements and adhere to a code of ethics.

"We know green is the future of building," said NAHB President Brian Catalde. "With the Certified Green Professional designation, we're helping our qualified members demonstrate to their clients that the future is here."

## New Study Questions Accuracy of Tropical Deforestation Claims

A leading expert on tropical deforestation has completed research that challenges the evidence for claims that the world's tropical forests are declining.

"The errors and inconsistencies I have discovered in the area data raise too many questions to provide convincing support for the accepted picture of tropical forest decline over the last 40 years," said Dr. Alan Grainger, senior lecturer in geography at the

University of Leeds. "Scientists all over the world who have used these data to make predictions of species extinctions and the role of forests in global climate change will find it helpful to revisit their findings in the light of my study," he said.

Grainger said the lack of apparent decline in tropical moist forest area suggests that deforestation is being offset by natural reforestation at a higher rate than previously thought. He urged the creation of a World Forest Observatory to monitor changes in tropical and other forests.

The results of the research were published in January in the *Proceedings of the US National Academy of Sciences*.

The most recent USDA Forest Service data, meanwhile, confirms that U.S. forestland is roughly as abundant today as it was 100 years ago and that forestland in the northern U.S. has increased by almost 30 percent.

The new data reinforces findings in *The State of America's Forests*, a 2007 report by the Society of American Foresters that found that replanting and reforestation efforts, as well as natural forest regrowth on

abandoned agricultural lands, have generally offset loss of forestland during the 20th century.

## Panel Imports Continue to Fall While Exports Rise

North American plywood imports are forecast to fall to 825 million square feet this year, down from almost two billion feet as recently as 2005, according to APA forecast data.

Imports of oriented strand board, meanwhile, are expected to near zero. OSB import in 2005 were approximately 780 million square feet.

The reasons for the declines include the lower value of the U.S. dollar, the weakened domestic housing market, higher transportation costs and, in the case of Brazil, the imposition of an eight percent import tariff.

Panel exports, meanwhile, are expected to exceed one billion square feet for the second year in a row, compared with just 605 million feet in 2006 and 527 million in 2005. ●

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## Annual Meeting Set for Sept. 21-24 In Las Vegas



APA's 75th anniversary will be a main theme of the Association's annual meeting at the Ritz-Carlton Lake Las Vegas Hotel in Henderson, Nev., Sept. 21-24.

Located 17 miles from the Las Vegas Strip, the 349-room, Tuscan-inspired resort offers a wide variety of recreational activities, including golf, water sports, hiking, mountain biking, fly fishing and others. Hoover Dam and Lake Mead National Recreation Area also are nearby.

More information about the resort and meeting will be sent soon to all APA and Engineered Wood Technology Association members and posted on the APA web site.



## APA Board Seats New Officers, Trustee Vacancy Filled



*Jim Enright*

Jim Enright, president of Standard Structures Inc., Windsor, Calif., and Mike Rehwinkel, president-wood products at Georgia-Pacific, Atlanta, Ga., have assumed the positions of chairman and vice chairman, respectively, of the APA Board of Trustees.

Enright was elected vice chairman during



*Mike Rehwinkel*

the Association's annual meeting last November, but assumed the position of chairman with the resignation of Rick Huff, who departed from Tolko Industries Ltd. Rehwinkel was then elected to fill the vice chairman vacancy.

Enright is a past chairman of the APA Engineered Wood Systems (EWS) I-Joist/Laminated Veneer Lumber Management Committee and also served as chairman of the APA Marketing Advisory Committee. He has served on the board of trustees since November 2003. Rehwinkel has served on the APA Board since 2006. As vice chairman of the Board, he also takes on the chairmanship of the APA Finance Committee.



*Brad Thorlakson*

Brad Thorlakson, vice president and general manager, marketing and sales at Tolko Industries Ltd., Vernon, BC, also was elected recently to the

Board to fill the vacancy created by the resignation of Huff.

## Ventek, Hexion, Panel World Take EWTA Supplier of the Year Awards

Ventek, Inc., Hexion Specialty Chemicals, Inc., and *Panel World* magazine were named the winners of the Engineered Wood Technology Association's annual Suppliers of the Year Awards during the APA annual meeting in California last winter. Ventek won in the equipment category, Hexion in the materials and supplies category, and *Panel World* in the consultant category.

The supplier awards program recognizes the value and importance of the business relationships between APA member companies and their EWTA member suppliers.

## Elias Promoted to Vice President, Barnes to Director of International Marketing



*Ed Elias*

Ed Elias, APA secretary and director of the Financial & Administrative Services Division, was promoted earlier this year to vice president and corporate secretary.

Elias, who holds a master's degree in wood science from Colorado State University, joined APA as an associate scientist in 1977. He became manager of research and development in 1987, was



*Charles Barnes*

appointed director of the International Marketing Division in 1993, and then secretary and director of the financial division in 2006.

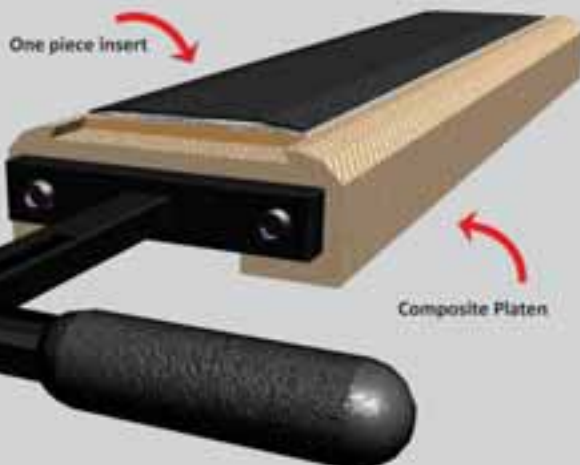
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Also promoted to director of International Marketing was Charles Barnes. Barnes holds bachelor's degrees in journalism and Japanese language and culture from the University of Kansas. He joined APA in 1990 as the Association's representative in Japan and since 2003 served as international market development manager.

### APA, SPC Launch Joint Raised Wood Floor Promotion Program

APA and the Southern Pine Council, armed with approximately \$1 million each from the binational council administering U.S.-Canada Softwood Lumber Agreement settlement funds, have embarked on an aggressive raised wood floor education and promotion program in the Gulf Coast region.

Raised wood floors are the focus of the joint effort because compared with other options—concrete slab atop dirt fill, slab on backfilled perimeter wall, or ring levee—they are often the most practical and cost-effective way to protect buildings and meet local building ordinances in flood-prone areas.

The program consists of several components, including consumer promotion, builder and designer education and training, and collaboration with code officials and building inspectors. APA is primarily in charge of professional training while SPC, a joint promotional body of the Southern Forest Products Association and Southeastern Lumber Manufacturers Association, is handling consumer and builder promotion.

More information can be found at [www.raisedfloorliving.com](http://www.raisedfloorliving.com).

### APA Siding Products Pass Test Requirements Under California Fire Regulations

APA successfully completed fire tests on APA member siding products recently under new California Department of Forestry and Fire Protection regulations for fire-resistive construction assemblies in the state's urban-wildland interface areas.

The tests, conducted at the Western Fire Center, Inc. in Kelso, Wash., covered three common varieties of APA 303® Siding.

The Association is applying for product listing by the California State Fire Marshall product listing program and seeking recognition as an inspection agency in order to stamp member products meeting the regulations.

Approximately a dozen persons were killed and more than 1,500 homes destroyed by urban-wildland interface area fires in Southern California last year. ●

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Mark Greery Photo

# BEETLE BATTLE

## Impact of the Mountain Pine Beetle Infestation in British Columbia and Alberta

by Steve Dunkelberger

**T**imes are not good in the forests of British Columbia and Alberta where a war is being waged against a relentless insect infestation.

Mountain pine beetles have killed or damaged millions of dollars worth of timber in recent years, and more losses are expected in the years to come. Infestations are so complete in some areas that battling the beetle has become the top priority of foresters.

"This is a significant impact. This is an infestation the likes of which we have never seen," said Canadian Forest Products Chief Forester Walter Matosevic from his office in British Columbia. "This is a real tough time. It is the worst I have seen it. There is no doubt about it."

Some 70 percent of the current harvest in British Columbia is linked to the pine beetle infestation. The 25-year veteran of the forest

industry has seen infestations before, but this wave of beetle troubles is coming at a time when foresters and mills are already facing other troubles with cuts in orders and higher costs.

The very real possibility of finding tainted trees in lands slated for harvest and the fall in the pine lumber market are forcing Canadian foresters to scrap their logging strategies time and again as they shift from long-range harvest plans to reactionary cutting in order to control infestations and salvage whatever value they can get from the trees. The exact cost in monetary damage from the infestations remains unknown since those damages involve lost potential revenue.

"There are those biological factors and then there are the economical factors. You have to think about all of that," Matosevic said. "We think a lot about the investment in wood we have out there."



While harvesters work their logging maps, forest researchers are looking for technical ways to handle the beetle-tainted wood. Some procedures have become industry-wide best practices while others are company secrets in the increasingly competitive pine lumber market. Part of the industry effort involves a marketing and education drive with consumers and wholesale buyers to convince them that the beetle-affected wood does not change the resource's performance or strength. Some buyers have been more receptive than others.

"In some cases, they don't want it so we have to sell it in another market at a lower price," Matosevic said.

Provincial experts predict the pine beetle infestation will be a defining component of timber harvesting plans for the next decade, so better times aren't likely to come soon.

Complicating matters are unrelated but very untimely additional challenges, such as the high Canadian dollar and slow U.S. housing starts. The Canadian dollar stands at about twice what it was just six years ago, making Canadian wood products more expensive for customers in the Canadian industry's vital U.S. market. "The dollar scares me the most because that is completely out of our control," Matosevic said. "The pine beetle infestation is hard, but at least we could do something about it."

Mountain pine beetles aren't strangers to forests in British Columbia and Alberta, or even to forests in the western United States, for that matter. They have always infested some volume of trees with periodic spikes and lows. The current troubles, however, are setting records and reaching forests previously thought to be too remote and too cold for the beetles to survive.

*Alberta still tallies its beetle damage one tree at a time while British Columbia counts its losses by hectares. Alberta has counted some 250,000 infested trees, enough timber for about 1,500 homes. British Columbia, by comparison, has lost enough wood for about 60,000 homes.*

The roots of the current infestation date back to the mid 1990s, when foresters in British Columbia began seeing an increased number of pine trees with signs of infestation. The beetles dine on older and stressed trees. They bore under the pine bark to eat and lay their eggs. A fungus that rides on their backs leaves deep blue stains on the wood, upsets the tree's internal transport systems, and blocks the release of resin, the tree's natural defense mechanism.

A tricky part about finding the affected wood is that by the time the needles turn red or rings of wood dust can be found around the trunks, the beetles have likely infested hundreds if not thousands of trees. Trees are often dead by the time they turn gray, which denotes the last phase of an infestation. The current infestation is running longer and affecting more trees for a variety of reasons, many of them of our own making, some research suggests.

"Bottom line: it is absolutely a result of climate change," University of British Columbia Forest Resources Management Professor George Hoberg said. "Warmer weather has been compounded by a history of

effective fire suppression that has created an unusual larger amount of mature pine that the bugs love."

Efforts to control forest fires, for example, have left Canadian forests stocked with older trees that otherwise would not be found there. British Columbia has three times the number of mature trees in its forests than it did a century ago. The last few years have seen drier and warmer weather, which means that more trees are stressed from drought conditions.

Some scientists have cited global warming as the reason for the recent run of mild winters and dry summers. Cold snaps needed in early fall or late spring to naturally kill off pine beetles have not occurred. The beetles, therefore, not only have more of their favorite food supply, but there are more of them dining at that tree buffet.

By far the most infested forests in Canada can be found in British Columbia, where provincial reports put the current tally at about 13 million hectares of affected trees and 582 million cubic meters of pine trees killed in recent years. The timber assessments on the issue have shifted from calling it an "infestation" to an "epidemic" because the volumes of timber being harvested with pine beetle and fungal damage is the norm and not the exception.

Pine makes up about half of the timber harvests in the province. Some of the pine stands are upward of 80 percent affected by pine beetles and the fungal infections that accompany them. That volume of damage means the industry will feel the effects on harvesting levels for decades to come, according to a government report released last September. Pine harvests are now so aggressive that the current stock of old-growth trees could be gone in 7-10 years. That means a glut of pine lumber now and a potentially tight market in the future.

"This is the most significant forest event in British Columbia," said Council of Forest Industries Vice President Douglas A. Routledge. "The battle has been lost in B.C. We lost the battle to control the infestation years ago. We are very much now into salvage mode."

Newly attacked trees can be harvested and milled for premium uses. Those trees standing but either dead or dying often have cracks that limit their uses to either lower grade wood products, pulp or pellets. "Just because a tree is cracked doesn't mean it has no value," Routledge said. "You have a series of economic shelf lives for a pine tree." The longer the dead tree stands the more limited the uses since the wood degrades over time.

Beetle-killed trees lose their value as lumber or veneer first, because of changes in the appearance of the wood. More value is lost because of changes in the working properties of the salvaged wood. Changes in wood moisture content and wood permeability will affect the efficiency and cost of manufacturing processes, such as veneer cutting, strand cutting, drying and gluing.

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Mountain pine beetle timber salvage operation.

There is potential use as pellets for energy generation, but there is little to no profit in that since pellets are often just made from the scraps of wood mills discarded in the creation of higher margin value-added products. Harvesting pine for pellets just doesn't pencil when stumpage, harvesting and transportation costs are rolled into the accounting, even with the rise of demand for pellets as the world searches for alternative energy sources to fossil fuels.

Provincial officials have allowed for more harvesting of pine timber so that the industry can capture the highest use of the trees, but the increase comes at a time when the market for wood products in residential construction is down significantly. The rush to harvest pine trees ahead of the deteriorating affects of the infestation not only means the higher logging volumes come at a time of market glut, but other species of trees that otherwise would be on their way to the mill, such as Douglas fir, are left standing.

While foresters in British Columbia trace the current infestation back a decade, their counterparts in Alberta can almost point to a single day when managing the beetle as an annoyance was transformed into a guerilla war. It was in late July in 2005 when a strong jet stream from the west carried a swarm of pine beetles well into the interior forests of the province.

Urban legend holds that the swarm was so thick it was picked up on radar, said Alberta's Sustainable Resource Development Communications Director Duncan MacDonnell. "There was no doubt that there was a big fly over at that time," he said. Millions of the beetles traveled the jet stream hundreds of kilometers and showered the forests of Alberta like a Biblical downpour.

Beetles had been under relative control on Alberta's western edge but the winds destroyed the battle front by scattering beetles into forests that had never been touched by infestations previously.

Learning the lessons from British Columbia, officials in Alberta are being aggressive with their tactics to control the infestation by doing controlled burns starting in the spring and with constant monitoring of vulnerable forests. Word from the forest is that infestation levels so far are lower than first feared.

However, millions of the pests could now be at work there, just not long enough to have been detected yet. Alberta has all the makings of a massive infestation since more than half of the province's forests are more than 50 years old, the weather has been warm, and there is an abundance of beetles thanks to the fly over.

"We sort of have all three," MacDonnell said. "It's all about temperature and timing now. We see it as the largest forest health issue

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Mark Creery Photo

we are facing, but that has to be put into perspective. BC's problem is huge by comparison. That means we have to be aggressive with our plans to save our forests."

Alberta still tallies its beetle damage one tree at a time while British Columbia counts its losses by hectares. Alberta has counted some 250,000 infested trees, enough timber for about 1,500 homes. British Columbia, by comparison, has lost enough wood for about 60,000 homes.

"We not only need to be aggressive on the ground, we need mother nature to help out," said Alberta Forest Products Association Public Affairs Director Parker Hogan. "We need a cold snap."

The Canadian government is set to spend \$1 billion over the next 10 years battling the beetles while provincial and industry dollars directed at the problem will likely be in the millions. FPInnovations—Forintek Division, Canada's wood products research institute, continues to test beetle-affected wood and to investigate alternative uses for the pine. Researchers have already concluded that the blue staining from the fungal infection or the beveled holes under the bark don't affect the strength of the wood. Adhesion of wood finishes isn't affected either, although the blue staining can be pronounced. That fact has led to some mills marketing the blue stained lumber as "denim wood" for aesthetic uses such as decks and flooring or high-profile timbers.

"It's interesting," says Peter Lister, lumber manufacturing technology manager at FPInnovations-Forintek Division. "But it is pretty much a niche thing." The company's main efforts are going toward testing and retesting the pine to illustrate to buyers – mostly in Japan, South Korea and China – that its performance doesn't change just because it has the tell-tale blue stains.

"It's really not that much of an issue," Lister said.

The blue-stained wood actually performs better than wood not touched by the beetle infestation in tests with wood treatments that require deep penetration. That means its better for outdoor decking, for example.

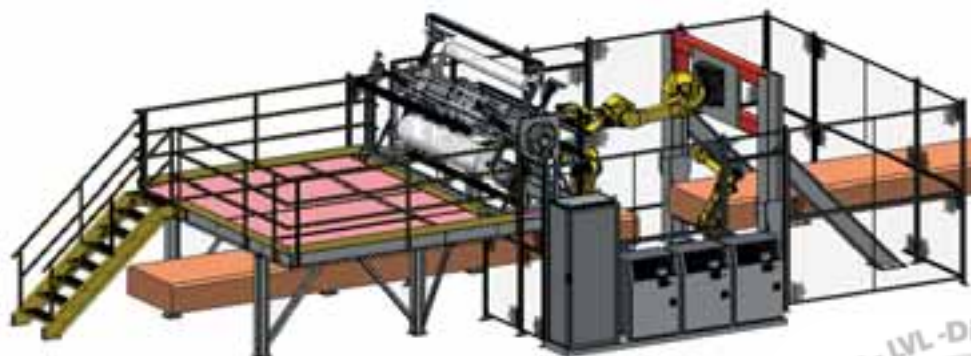
But that news is of little value in face of the supply and demand imbalance that now confronts Canadian producers. ●

*Steve Dunkelberger is a Tacoma, Washington freelance writer.*



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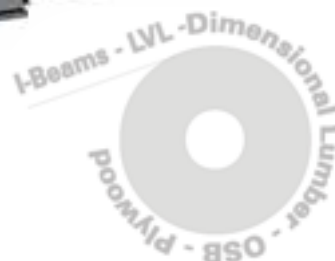
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# Lack of Meaningful Criteria Diminishes the Value of Many Green Building Programs

by Jim Bowyer



# DEFINING GREEN

**Editor's Note:** The following is excerpted from an article that first appeared in the September 2007 issue of the Forest Products Journal and is reprinted here with the permission of the Forest Products Society and the author.

**G**reen building programs have grown out of a general concern for the impact of building construction and operation on the local, regional, and global environment. Thus, such programs address a broad array of topic areas including energy efficiency; water management; building materials production, transport, use, and maintenance; indoor environmental quality; and recycling, reuse, and waste minimization. While the impacts of green building programs are currently modest, the rate of growth in program participation and development is large, suggesting substantial impact on the construction sector in the relatively near future.

In general, the influence of green building programs is positive, as the programs are causing builders, architects, home buyers, and others to think systematically about how to improve the environmental performance of buildings. A negative aspect is that directors of the best known programs have fallen victim to adoption of prescriptive standards for environmentally preferable materials that are based on intuitive judgment and/or single attributes. There is also a focus in all current programs on a single material—wood—that requires that wood, and wood alone, demonstrate responsible practice in product manufacture. The result is that a number of materials currently listed as environmentally preferable by green building organizations have demonstrably greater environmental impacts than non-favored alternatives.

For instance, judging whether products are environmentally good or bad based on a single product attribute simply isn't supported by

science. The focus on a single product characteristic keeps things simple and easy to comprehend—simple for the consumer and simple for organizations making judgments about various products: a product contains recycled content (good) or it doesn't (bad); it is "natural" (good) or it isn't (bad); it was produced from rapidly renewable resources (good) or it wasn't (bad).

Unfortunately, focusing narrowly on product attributes is often useful in identifying environmentally preferable products only in the most straightforward of situations. For example, if faced with purchasing one of two brands of aluminum garage doors, one of which is made of 100 percent recycled aluminum and the other of 100 percent virgin aluminum, the consumer is presented a clear choice. While a recycled label wouldn't say so, the product made entirely of virgin content requires 20 times more energy to produce than the recycled alternative. Also, production of the recycled aluminum results in far less in the way of impacts to air, water, and land, and is clearly environmentally superior.

Suppose, however, that a consumer is faced with the choice of selecting steel framing that has 35 percent recycled content or wood framing members that contain no recycled content. In this case, a choice to use steel framing based on recycled content would result in more than twice the energy consumption and more than four times the fossil fuel consumption to produce the framing members, and increased emissions to air and water in roughly the same magnitude

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## Summary comparison of green building programs

Green Bldg Program	FSC Only	SFI, ATFS, CSA, FSC	3rd party verification of certification	Certif. req. for mat'ls other than wood	vinyl use discouraged	Use of bamboo flooring rewarded	Prescriptive system RE env. preferable mat'ls	Bldg mat'ls assessment based on LCA/LCI
LEED	X		X			X	X	•
Green Globes		X	X					X
Seattle (King County)	X		X			X	X	
Austin Green Building	X	--	X			X	X	
Built Green Colorado		X	X			X	X	
Wisconsin Greenbuilt	X		X		X	X	X	

• *The use of LCA is mentioned, but not required, in the standard.*

as the differences in fuel consumption. Insulating the framed-in wall to a given R-value would result in even greater differences in energy consumption. Is a product containing recycled content always an environmentally better choice? Clearly not!

With regard to certification, required for wood to receive credit as an environmentally preferable material in most green building programs, it is important to recognize that there is no requirement that any material other than wood be certified.

This singular focus on wood is worth consideration. FSC certification, as specified in a number of green building programs, requires assessment of a number of factors in the certification process within the following categories:

- Compliance with laws

- Tenure and use rights and responsibilities
- Indigenous peoples' rights
- Community relations & workers' rights
- Benefits from the forest
- Environmental impact
- Management plan
- Monitoring and assessment
- Maintenance of high conservation value forests
- Plantations

Attention to land tenure issues, observance of indigenous peoples' and workers' rights, and focusing on community relations in addition to a wide range of environmental impacts linked to raw materials extraction and processing is certainly an enlightened approach to



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materials selection. But if these factors constitute essential elements in selection of an environmentally preferable building material, it is reasonable to ask why green building programs do not require compliance with similar standards for any material other than wood. As an example, growing and harvesting of bamboo is known to have all of the problems often attributed to wood and also often bears the environmental burdens associated with monoculture plantations and intensive agriculture. It is curious, then, that bamboo is accepted without question by the U.S. Green Building Council's LEED and other green building programs as an "environmentally preferable" material. There appears to be no logical or scientific reason for this.

As things now stand, non-wood materials are in effect being given a free pass, the implication being that typical practices employed in their production are inherently environmentally better than those associated with production of wood products. However, most of the same concerns that led to development of certification programs for forests and forest management also apply to extraction and processing of other basic raw materials.

With respect to non-biobased materials and products such as metals, there is extensive evidence pointing to mining development as a major disruptive force to communities, indigenous peoples' rights, workers' rights, and long-held land tenure. It is also often highly disruptive of forested and non-forested ecosystems alike. In view of these realities, the World Wildlife Fund (WWF) in January 2003 took the first steps to create a Mining Stewardship Council, noting pervasive environmental, social, and economic problems linked to mining activity worldwide.

Given these problems, it would appear that development of a certification program for metals and minerals should be a high priority. In any event, there is no apparent justification for singling out only one construction material for a host of special requirements.

Perhaps the worst characteristic of most green building programs today is defined by what is **not** considered in identification of environmentally preferable materials. At the moment, only one program requires consideration of embodied energy of products and product assemblies, even though embodied energy is often equivalent to many years of energy consumption associated with

a structure, and even though high embodied energy products result in far higher emissions to air and water. Only one program systematically and comprehensively considers environmental impacts linked to all inputs and outputs associated with building materials production and use. This one program is Green Globes—in many ways a prototype for what green building programs of the future need to become. This program requires that selection of building assemblies be based on life cycle assessment considering embodied energy and green house gas emissions.

Designation of environmentally preferable materials in a 21st century green building program should never be based on unsubstantiated prescriptive standards, especially in view of the fact that tools are now available that allow comprehensive assessment using standard methodologies. In addition, criteria used in assessing landscape impacts of raw materials production in such a program should not focus on only one material to the exclusion of others. Unfortunately, these characteristics describe the vast majority of leading green building programs in the United States and Canada.

What must be done in order to correct deficiencies in the way that environmental preferability of construction products is determined today within leading green building programs? There is no one answer, no miracle solution, but three things are obvious:

1. A "green" building program that cannot accurately distinguish low environmental

impact products from high impact products, but that nonetheless encourages the use of some products over others, is green in name only.

2. Environmental labeling programs, if they are to facilitate meaningful comparisons, must quickly evolve to include all products used for similar applications.
3. All assessments of environmental performance of products must include evaluation based on examination of a broad range of environmental indicators representing the full life cycle of products using internationally accepted protocols for evaluation. Another way of saying this is that environmental life-cycle assessment must play a major role in product evaluation and labeling.

Fundamental change in the way that green building programs assess environmental attributes of construction materials is needed. Ironically, current practices are encouraging unsound environmental decisions at a time when precisely the opposite is needed. ●

*Jim Bowyer is professor emeritus at the University of Minnesota Department of Bioproducts and Biosystems Engineering and director of the Sustainable Material Program at Dovetail Partners, Inc. (<http://dovetailinc.org>), a Minneapolis-based nonprofit organization that fosters sustainable forestry.*

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# WORKFORCE WOES

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## Older Boomers Could Be Partial Answer To Impending Labor Shortage



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**W**hen the AARP announced its seventh annual “Best Employers for Workers over 50” awards on September 25, the corporations at the top of the list didn’t get there by offering the traditional fringe benefit trio of health, life and disability insurance.

Instead, the AARP recognized companies such as SC Johnson, the Principal Financial Group, Michelin North America and Mercy Health System for providing “forward-looking” benefits packages to workers over 50 that include alternative work schedules, lifelong learning and career training opportunities, and a program that allows today’s graying workforce to care for their own aging families. AARP’s announcement included a statement from AARP CEO William D. Novelli which helped highlight the obvious: Focusing on an aging employee’s personal needs makes “good business sense” and pays dividends to companies that value the knowledge and experience of older workers.

“As the gap between the demand for, and the supply of, seasoned knowledgeable workers widens, employers in all industries will need to pay close attention to recruiting and retaining older, experienced employees,” noted a recent national survey on the aging workforce by MetLife Mature Market Institute, the company’s information and policy resource center. “This is particularly true in sectors such as healthcare, government, education, manufacturing, energy and aerospace, which are expected to be especially hard hit by the loss of veteran workers when millions of baby boomers begin to leave the workforce for good.”

### Boomers’ Influence

“Companies are making a big mistake assuming that older employees will not have the will, motivation or physical stamina to continue working,” says Wharton management professor Sigal Barsade. And given that today’s older workers tend to be in better health than their predecessors, what does the term “older employee” even mean these days, she asks. Companies that fail to tap into the older workforce “are not only behaving unfairly,” Barsade says, “but are likely missing out on excellent employees who have important institutional knowledge and are still ready, eager and willing to do excellent work.”

Based on statistics from the U.S. Census Bureau that were reported in September by the Congressional Research Service (CSR), the demographic profile of the U.S. workforce will “undergo a substantial shift” as the baby boomers born between 1946 and 1964 approach retirement and fewer younger people join the labor force. The number of people between the ages of 55 and 64 will grow by about 11 million between 2005 and 2025, while the number of people who are 25 to 54 years old will grow by only five million.

According to the MetLife survey, Americans between the ages of 55 to 70 stay in the workforce for two primary reasons: “financial necessity and the desire to remain active and/or try something new.” Those who are now in their 60s and early 70s represent “perhaps the last generation fortunate enough to have broad access to corporate

pensions and Social Security,” the survey adds. “Boomer employees age 55 to 59 face greater financial uncertainty.”

Wharton professor Olivia S. Mitchell points out that the sheer size of the baby boom cohort—estimated at around 78.2 million—attracts attention. “The baby boom generation has been so large that everything it does influences popular culture and media reports, which is one reason there is now a lot of emphasis on this,” says Mitchell, executive director of Wharton’s Pension Research Council and director of the school’s Boettner Center for Pensions and Retirement Research. “But I do think ... that boomers will change the definition of retirement.”

Indeed, in her new book, *Redefining Retirement: How will Boomers Fare?* Mitchell and two co-authors argue that “people are not going to follow the old pattern of work, work, work and then quit. Instead, they are going to take what we call bridge jobs—leave their long-time career employer and move into part-time transition arrangements.” Some will start companies and become entrepreneurs and some will go into volunteer jobs, Mitchell says. “This is different from previous generations, and there is some evidence that expectations have changed. What we don’t really know is, will the demand for these boomers be

are some examples from the AARP’s 2007 list of top employers for workers over 50:

- SC Johnson, the consumer packaged goods company based in Racine, Wisc., provides an on-site medical center and wellness, fitness and recreation programs; an on-site education program that provides lifelong learning and college credits; paid sabbaticals to experienced employees; comprehensive financial benefits, and retirement planning tools.
- Mercy Health System of Janesville, Wisc., provides a variety of alternative work arrangements, including what the company calls “float” options (the ability to work at different facilities or departments) and “seasonal work” that allows employees to go on leave for lengthy periods while maintaining their eligibility for benefits.
- Michelin North America provides flexible work schedules, temporary assignments for workers and access to job rotations, plus a part-time work policy for retirees.
- The Principal Financial Group, based in Des Moines, Iowa, offers what AARP calls an “ambitious working caregiver leave program” that allows employees the option to work a part-time schedule for up

*AARP has long emphasized the benefits of eldercare programs for older workers, and has even called baby boomers with aging parents the “Eldercare Generation.” As AARP points out, providing such benefits is simply good business; companies realize a \$3 to \$14 return on every \$1 they spend on eldercare benefits. It’s no coincidence that 42 of the 50 companies on this year’s AARP “Best Employers” list offer eldercare benefits.*

there? Even if the supply side of the labor market keeps going down, will employers turn to older workers? I think it’s too soon to say.”

Mitchell does acknowledge that in some industries, “this has already happened. There has already been outreach to older workers—such as in call centers, hotel reservation companies and seasonal companies. But these are not permanent jobs, which points to the definition we use to redefine retirement. In this new definition, people ... won’t just reach a [certain] age and stop working.”

Wharton management professor Peter Cappelli, director of Wharton’s Center for Human Resources, adds another word of caution when it comes to the employment landscape for older workers. “Companies are still pushing them out through early retirement programs,” he notes, adding that some employers actively work to retain older workers “for a few jobs with true legacy skills. It’s worth remembering that employees always left companies. There is nothing new about this. The way companies kept the knowledge was through development programs that prepared younger workers to do those jobs. The big issue is that companies have more or less abandoned those programs.”

## The ‘Eldercare Generation’

In an effort to attract and keep older employees, some employers have responded with a menu of benefits that, by law, are offered to all employees but clearly appeal to the older worker. Here

to 12 weeks a year while maintaining job security and full benefits.

AARP has long emphasized the benefits of eldercare programs for older workers, and has even called baby boomers with aging parents the “Eldercare Generation.” As AARP points out, providing such benefits is simply good business; companies realize a \$3 to \$14 return on every \$1 they spend on eldercare benefits. It’s no coincidence that 42 of the 50 companies on this year’s AARP “Best Employers” list offer eldercare benefits.

Deborah Russell, director of Economic Security and Work at AARP, believes that the number of boomers who work past retirement will continue to rise. According to estimates, nearly 20 percent of the workforce will be over age 55 by 2010. The trend is driven by “money issues and the cost of health insurance—the top two reasons that dominate why people will remain working,” Russell says. “Longevity will drive it as well. If you’re living until your mid-80s, you have a long time to work.”

But she agrees with Mitchell that the trend towards older workers in the workforce “doesn’t cut across every industry. You talk about advertising and high tech, and the demographic skews to the younger worker. But if you look at demographics in general, there are fewer younger workers, period. There are industries that are going to feel the pain—health care, for instance, as well as teaching. And the replacement rate of engineers is very low.”

Russell does not anticipate that companies will ever return to the traditional defined benefit plan, even if they are eager to recruit younger employees or keep older workers. "I don't see that happening. That model no longer works. Clearly, flexibility is going to be important, and defined benefit plans are not portable." Instead, AARP research shows that what companies must offer "in order to keep workers and attract new ones are flexibility and the ability to retrain," says Russell. "Workers will want to keep their skills up to date. An employer should not assume when looking at 62-year-olds that they don't want to learn something new. That's not the case any more."

In addition to its list of top businesses for older workers, the AARP also released a new study that called on all employers in the United States, Japan, Germany, France, Britain, Italy and Canada (the "G7 Countries") to end age discrimination in the workplace. In the report, called "International Profit from Experience," AARP found that "age discrimination is the single largest barrier for those 50 plus who want to continue working past their anticipated retirement age. At least 60 percent of employees 50 plus in each G7 country view age discrimination as the primary barrier to job security, as opposed to only 38 percent of employees who view their employers as welcoming of older workers." The study found that older workers in the G7 countries want to continue to work on average an additional five years. "Allowing employees to continue working past their traditional retirement age will not only allow [them] to remain in their careers and stay active but will have a positive impact on an employer's bottom line."

In Japan, for instance, a labor shortage has already resulted in efforts to end age discrimination for workers and to move the official

retirement age from 60 to 65 in order to allow people to work longer before benefits kick in. In 2004, Japan passed a law that required companies to raise their retirement age from 60 to 65 by 2013 in an effort to cope with its aging population.

Anita L. Allen, professor of law and philosophy at the University of Pennsylvania, notes that federal age discrimination laws make it unlawful to discriminate against employees due to age. An "employer can no longer fire you just because you are 65," she says, citing exceptions in certain sectors like police and fire fighters, some parts of government and high-level executive positions. "Workers have much more choice in when they want to retire, in theory. But there may be suitable pressures to leave the work place."

For example, if the company emphasizes physical fitness and a certain kind of lifestyle, Allen says, older workers may feel out of place if they "can't hit the golf course or work out in the company gym. And if they stop getting promotions or raises, they get the message that the company is not as welcoming." But, she adds, "my impression is that employers are relatively careful to avoid discrimination and litigation. I think people are trying to be mindful."

According to Russell, AARP identifies the older worker as anyone over the age of 50. AARP research shows that employees begin to feel age discrimination in the workplace at around 49 years of age. "Perhaps when it comes to the interview process, you are looked upon less favorably as an older worker, and you start to sense that," says Russell. Will more older workers be likely to file age discrimination suits against employers? "I think where we see those patterns, it's based on the economy," said Russell. "As the economy slows, companies let go of people, and we see

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discrimination claims go up. We do see a correlation there.”

But Russell thinks that corporate America has gotten the message, given its experience in the early 1990s “when every other day there was another company downsizing. One of the ways they accomplished this was to look at the salaries of middle managers, who tended to be older workers. If there were lessons to be learned, it was that you don’t get rid of people who have essential knowledge that is key to your ability to conduct business. Many [employees forced out] were hired back as consultants or rehired full-time. If it happens again, we’ll see a more strategic way to downsize.”

### A Win-Win for Both Sides

Though labor force participation historically begins to fall for men and women after age 55, Census Bureau data shows that the percentage of men and women age 62 and older who work has risen over the past 10 years. According to CSR, 49 percent of men aged 62 to 64 were employed in March 2007, compared with 43 percent in 1995 and 42 percent in 1990; among older men aged 65 to 69, 33 percent were employed in March 2007, compared with 27 percent in 1995 and 26 percent in 1990. A similar increase is noted among female workers. Among women 62 to 64 years old, 42 percent were working in March 2007, compared with 32 percent in 1995 and 28 percent in 1990; in women 65 to 69 years old, 26 percent were working in March 2007, compared with 17 percent in 1995 and 1990.

These older workers are not just punching the clock on part-time jobs. Older Americans who work are increasingly pursuing full-time employment. In March 2007, 81 percent of employed men aged 62 to 64 were working full-time, compared with 77 percent in both 1995 and 1990; among men aged 65 to 69, 71 percent who were working in March 2007 were employed full-time, compared with 57 percent in 1995 and 56 percent in 1990. Among working women aged 62 to 64, 69 percent worked full-time in March 2007, compared with 60 percent in both 1995 and 1990; among working women aged 65 to 69, 54 percent were employed full-time in March 2007, compared with 43 percent in 1995 and 44 percent in 1990.

These workers won’t be penalized for working more than another decade. The

Senior Citizens Freedom to Work Act in 2000 repealed the Social Security earnings limit, allowing workers 65 through 69 to earn income without losing Social Security benefits; if they choose, workers can now postpone receiving Social Security benefits until age 67.

The trend should benefit both employers and employees. As Lynn Selhat, an editor at Wharton’s Center for Human Resources, points out, the growing push by some companies to meet the needs of an increasingly older workforce “is not at all

just about a lack of younger workers. It’s about what the older workers bring to the companies.” Some companies are working hard “not only to retain, but also recruit, older workers,” says Selhat, who is collaborating with Cappelli on a book about the strategic benefits of older employees. “Companies are bringing on those who are 50 plus. When they talk about older workers, they talk about dedication, understanding customers, loyalty. Experience is important. And older workers tend to have experience.” ●

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## Standards and Conformity Assessment for Softwood Plywood and Laminated Veneer Lumber



# LEVELING THE PLAYING FIELD

*by Tom Williamson*

In the past decade, glued engineered wood composites have truly become a global family with plywood, oriented strand board (OSB), laminated veneer lumber (LVL) and glulam being imported and exported throughout the major economic centers of the world. As such, there is growing awareness of the need to understand and adhere to regional and domestic standards for these products.

In addition, there is a need to develop international standards for these products that can be applied to current producing regions and to countries just entering the import and export activities for these products. For glued engineered wood composites, this work is being undertaken by two ISO technical committees—ISO TC89 for Wood Panels and TC165 for Timber Structures.

TC89 has three subcommittees for fiberboard, particleboard and plywood while TC165 represents structural products including lumber, glulam, LVL, I-joists, SIPs,

plywood and others. (APA is active in both of these, serving as the chair of the US Technical Advisory Group (TAG) for TC89 and as the chair of Working Group 2 (WG2) of TC165, which is charged with developing standards on glulam, I-joists and LVL.)

In addition to domestic and international standards development, it also is imperative that conformity assessment programs be established to assure that products being imported and exported meet the requirements of both domestic and international standards. This is important to assure a level playing field that will protect both importing and exporting countries from substandard products that could impact the future acceptance and use of these products.

This article focuses on standards and conformity assessment needs for softwood plywood and LVL.

### **Softwood Plywood**

Although production of softwood plywood has declined in North America in recent

years, that decline has been more than offset by increased production elsewhere around the world. Asia is the largest producing region with over 26 billion square feet of production. Worldwide overcapacity creates a demand gap that must be addressed by increasing market opportunities for plywood.

Since softwood plywood is a product that is routinely exported and imported by all plywood producing countries, it is important that those countries have codes and standards in place that protect end-use performance requirements and have conformity assessment programs in place that allow imported products to compete on an equal basis with domestic products. Thus, it is important to understand the similarities and differences between national codes and standards that apply to softwood plywood. While all of these have similar requirements, there are unique differences that exporting countries must be aware of to meet regional conformity assessment requirements.

In the U.S., all wood structural panels used in building construction must meet the provisions of the 2006 International Building Code (IBC) for commercial buildings or the 2006 International Residential Code (IRC) for residential construction. Both of these codes require that wood structural panels be certified by an accredited third party certification body as meeting *PS 1-07, Structural Plywood*, or *PS 2-04, Performance Standard for Wood-Based Structural-Use Panels*.

*PS 1* is a prescriptive standard that establishes end-use performance based on veneer species, veneer grades and quality, veneer thickness and the positioning of the veneers throughout the thickness of the panel (panel lay-up construction). *PS 1* also has a provision to qualify the end-use of the plywood based on performance testing. *PS 2* qualifies the panels for the intended end-use applications based on meeting a series of performance criteria, including structural performance, physical properties and adhesive bond performance. Structural performance tests include concentrated loads, uniform loads, wall racking and fastener holding.

Since structural wood panels used in building applications may be subjected to intermittent wetting during transportation, job site storage and erection, both *PS 1* and *PS 2* require the adhesives to meet either an Exposure 1 or Exterior bond classification. Exposure 1 is suitable for panels not permanently exposed to the weather but which may be wetted intermittently. Exterior is a bond classification for panels suitable for repeated wetting and drying or long-term exposure to the weather.

The National Building Code of Canada requires that wood structural panels used in building construction be certified as complying with one of several Canadian Standards Association (CSA) panel standards by an accredited third party certification body recognized in accordance with ISO Guide 65. These standards include *CSA O121, Douglas Fir Plywood*; *CSA O151, Canadian Softwood Plywood*; *CSA O153, Poplar Plywood* and *CSA O325, Construction Sheathing*. While these standards have some unique provisions, CSA Standards *O121, O151*, and *O153* all contain manufacturing and use requirements based on veneer species, veneer grades and quality, veneer thickness and panel lay-up construction,

similar to the prescriptive provisions of *PS 1* for the U.S. The Canadian Standard *O325* is a performance based standard for both plywood and OSB and is very similar in content to *PS 2*.

The CSA standards also have strict requirements related to adhesive bond performance. For example, standards *O121* and *O151* only permit the use of adhesives that meet the requirements for Exterior exposure to extreme conditions of moisture and temperature. Standard *O325* also provides for an Exposure 1 bond classification for OSB similar to *PS 2* but it must also meet the requirements for Exterior Type adhesives as specified in the National Building Code of Canada.

The Japan Building Standard Law requires that all construction plywood be certified by a registered third party certification body approved by MAFF to meet the requirements of *JAS Notification No. 233, Japanese Agricultural Standard for Plywood*. As with the U.S. and Canadian standards for plywood, this standard provides requirements based on veneer species, veneer grades and quality, veneer thickness and panel lay-up construction. For adhesive bonding requirements, plywood is classified as Special Type (similar to Exposure 1 for *PS 1*), Type I for plywood used in places where humid conditions exist repeatedly and Type II for plywood used in places where humid conditions occur occasionally.

In addition, *JAS Standard 233* also has requirements for formaldehyde emissions ranging from the highest amount of permissible emissions, F\*, to the lowest amount of permissible emissions, F\*\*\*\*. The F\*\*\*\* rating can only be met by the use of adhesives, such as phenol formaldehyde, which off gas extremely low emissions. (As a Registered Offshore Certification Body approved by MAFF, APA provides trademarking services to its members for the export of softwood plywood to Japan.)

Eurocode V requires that all plywood used in structural applications must be certified with a CE mark as meeting *EN 13986, Wood Based Panels for Use in Construction*. This standard covers all panel types intended for structural uses and references other EN standards such as *EN 310, Wood Based Panels, Determination of Modulus of Elasticity and Bending Strength*; *EN 314-1, Plywood Bonding*

*Quality Part 1*; *EN 314-2, Plywood Bonding Quality, Part 2*; *EN 315, Plywood, Tolerances for Dimensions and EN 635, Softwood Plywood Classification by Surface Appearance*. Thus, it is a very rigorous process to certify structural plywood for use in Europe.

With respect to adhesive bonding classifications for structural plywood, the European standards have three classes—plywood for internal use in dry conditions (Service Class 1 - *EN 636-1*), plywood for internal use in humid conditions (Service Class 2 - *EN 636-2*) and plywood for external use (Service Class 3 - *EN 636-3*). *EN 13986* also establishes formaldehyde emission levels corresponding to Classes E1 and E2, with E1 being the most restrictive with a formaldehyde release limit of less than or equal to 0.124 mg/m<sup>3</sup>.

While there are many similarities between the national standards for plywood as cited above, there are also numerous differences. To harmonize these standards, a number of ISO standards are being drafted and balloted. It is anticipated that countries without existing national standards will be able to adopt these harmonized ISO standards and thus help lead to unification of plywood standards on a worldwide basis.

## Laminated Veneer Lumber (LVL)

North American companies have been producing laminated veneer lumber (LVL) for over 30 years but it is only in the past decade that significant growth has been observed. The primary reason for this growth has been the acceptance of the product by designers and homebuilders as a major component in residential building construction.

While North America has long been the dominant producer of LVL, many other countries are now also manufacturing the product. As with plywood, this makes it vitally important that international standards under ISO be developed to ensure equality in performance around the world.

In the U.S., the primary standard for LVL is *ASTM D5456 Standard Specifications for Evaluation of Structural Composite Lumber Products*. In addition, the ICC-Evaluation Service has promulgated *Acceptance Criteria AC 47, Structural Wood-Based Products*. Since all LVL products produced in the US are proprietary, each manufacture must obtain an ICC-ES

code report demonstrating that the product meets the requirements of AC 47 and ASTM D5456. This would also apply to any off shore producers wanting to export LVL into the U.S.

As part of the ICC-ES code report, each manufacturer must demonstrate that it has a quality assurance program in place and that its products are produced under the auspices of an ICC certified third party inspection agency such as APA. This then entitles the manufacturer to apply a trademark indicating conformance to the applicable building code provisions.

In Europe, the basic standard related to the manufacture of LVL is prEN 14279, *Laminated Veneer Lumber (LVL) - Definitions, Classification and Specifications*. In Japan, JAS 237, *Structural Laminated Veneer Lumber* provides the basis for the manufacture and acceptance of LVL products.

While these standards all have similarities, there are many unique differences that make it difficult for international acceptance of these products. Based on the growth of the LVL industry worldwide and the increasing interest in importing and exporting this product, it was deemed important to harmonize the various national standards for LVL under the ISO process.

Since LVL is manufactured as a panel product, it was determined that ISO standards related to manufacturing and end-use requirements should be developed under ISO/TC89, *Wood Based Panels*. In addition, it was determined that standards related to test methods and the determination of mechanical properties for LVL should be developed under ISO/TC 165, *Timber Structures*. The basis for all such standards was deemed to be any existing European

standards in accordance with a worldwide agreement related to the development of ISO standards.

Thus, prEN 14279, *Laminated Veneer Lumber (LVL) - Definitions, Classification and Specifications* was used by Working Group 6 (WG 6) of TC 89 as the basis for a draft ISO standard identified as ISO/CD 18776, *Laminated Veneer Lumber (LVL) - Specifications*.

As with plywood, one of the key issues to be addressed is adhesive quality. This standard states that the adhesive, in combination with the veneers used, shall provide a bond of the strength, durability and integrity necessary to meet the requirements for the bond type as specified. Bonding quality shall be established in accordance with ISO 12466 Part 1 and ISO 12466 Part 2 for plywood. In addition, a draft test method specifically for LVL is being developed based on a harmonization of tests contained in the national standards.

The lay-up or arrangement of veneers within the LVL construction, including the type and frequency of end joints, will be specified based on various national standards. Structural properties and capacities appropriate for the intended application shall be determined by the testing and evaluation methods specified in ISO TC 165/WG2 document WD 22390 currently being drafted. Physical properties are moisture content and density. These will be determined in accordance with the applicable ISO standard.

Due to the international concern over formaldehyde emissions, consideration is being given to including formaldehyde requirements for interior applications of LVL. However, for non-interior exposed applications, and as built in floor joists, rafters or formwork applications, formaldehyde restrictions will not be required.

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This standard also includes a section on branding or product identification. Each piece of LVL manufactured in accordance with this standard shall have a trademark affixed by the manufacturer at the point of manufacture. This provides the conformity assessment requirement that is critical to assuring a level playing field for this potentially high risk end-use structural product.

The challenge facing the ISO TC 165 Working Group 2 (WG 2) that is developing a standard for determination of structural properties is to harmonize a number of national standards. These include *ASTM D 5456, Standard Specifications for Evaluation of Structural Composite Lumber Products*, *AS/NZS 4357, Structural LVL, Determination of Structural Properties – Test Methods*, *JAS 237, Structural Laminated Veneer Lumber*, and *prEN 14374, Timber Structures, Structural Laminated Veneer, Requirements*.

While all of these standards provide test methods and analysis procedures for determining the structural properties of LVL, they all have unique features that make harmonization difficult. As with other ISO standards, it was determined that *prEN 14374* would form the basis for an ISO standard for structural LVL. Based on this, WG 2 of ISO/TC 165 developed a draft ISO LVL standard identified as *WD 22390, Timber Structures, Laminated Veneer Lumber (LVL), Part 1: Structural Properties*.

In accordance with *prEN 14374*, the mechanical properties to be determined are, for strength requirements, edgewise bending strength, flatwise bending strength, tension strength parallel to the grain, compression strength parallel to the grain, shear strength related to edgewise bending, shear strength related to flatwise bending, and compression strength perpendicular to the grain. For stiffness, they

are modulus of elasticity in edgewise bending, modulus of elasticity in flatwise bending, modulus of elasticity in tension parallel to the grain, and modulus of elasticity in compression parallel to the grain.

One of the challenges facing the Working Group is that not all of these properties are required to be developed under the existing national standards.

For example, *ASTM D5456*

only requires the determination of edgewise and flatwise bending strength and stiffness, tension strength parallel to the grain, compression strength parallel to the grain, compression strength perpendicular to the grain and longitudinal shear strength. *ASTM D 5456* is unique in that the other national standards do not require the determination of a compression perpendicular to grain stress. *AS/NZS 4357* is unique in that it is the only national standard that requires the determination of the modulus of elasticity in tension perpendicular to the grain and the tension strength perpendicular to the grain.

The Working Group must resolve these differences, as well as differences in the basic test methods to determine some of the common properties.



Author Tom Williamson signs a memorandum of understanding between APA and the Republic of China's Architecture & Building Research Institute for the exchange of information related to material and test standards, building codes and wood-frame construction techniques.

*continued on page 37*

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# POWER STUDIES

## Elements and Benefits of Periodic Plant Power System Reviews

*by Stephen K. Blackwelder*

**T**he plant electrical power system is probably the most taken for granted component of today's industrial infrastructure. When we turn on the light switch, we expect the lights to come on every time. Electrical power is normally out of sight and out of mind until an outage or upset event occurs and at that point it gets major attention.

When correctly engineered and operated, a power system should be something we can take for granted. It's going to be there steadily providing energy to our processes – without failure. Upset conditions can occur and a correctly designed system will handle the condition both from a safety and an operational standpoint.

The basic industrial plant power system consists of the following typical major components:

- Primary service from utility
- Plant primary distribution
- Transformation to low & medium voltage
- Low & medium voltage distribution
- Low & medium voltage controls
- Motor, lighting & other power loads

There are other components that will vary with each industrial process. Some may include power generation at the plant site to supplement or even replace the utility service. Each of these components has its own protective devices choreographed to work together as one unit. It is the purpose of these protective devices to protect personnel and property from harm caused by failure of any of the power system components or load devices connected to the system.

The protective device's function is to safely minimize and isolate a fault or overload condition to a confined area of control without impacting the operation of the remainder of the plant. Improper sizing or lack of coordination of protective devices can result in unsafe outages or major thermal events.

What about your system? Is your plant vulnerable to electrical system failure? Could your plant be a candidate for a significant event? Some of the factors that need to be considered include:

### System age

Plants that have been around a few years rarely resemble the original facility that was constructed. Processes change with time. Old equipment is replaced with new, faster equipment most often requiring more power to operate and adding more demand on the electrical distribution system. If these load changes have not been properly engineered and integrated into the existing system, there is the potential for protective device coordination and load flow problems.

### Equipment changes

Many times, equipment is installed in a facility without a proper regard to its fault current rating and the equipment's relationship to the rest of the system. The equipment may be undersized and could pose a threat to personal safety as well as equipment failure.

### Growth plans

If your facility is contemplating substantial growth or major upgrades that will affect the electrical loading and proper engineering

has not been done to integrate the load into the existing system, problems could develop.

### Utility system changes

Most utility systems are continuously upgrading and adding load. With this come new transformers, regulators, conductors and other devices that will have an effect on the available short circuit current to your facility.

These changes can have an effect on your plant's protective device settings.

If you are contemplating major growth or if some of the items noted above leave you in doubt about your facility, you are a candidate for a comprehensive power study. A power study will provide you the information you and your operations personnel need to make informed decisions in regard to power system safety, usage and maintenance.

A power study is a detailed analysis of your complete power system. It begins with gathering fault current and impedance data from the utility company and the updating or development of a power single line diagram of the facility. This single line diagram is the power engineer's roadmap of the plant system.

Data is then gathered from various equipment and devices connected to the system including fuses, circuit breakers, transformers, switchgear, motor control centers and conductors. All this information is entered into a specialized computer program that allows the engineer to view different operating scenarios and to generate reports based upon the specific need. Normally, the engineer will focus on three specific target areas under various operating conditions.

### Short circuit study

A short circuit study is conducted in accordance with industry standards to determine fault current levels at different points in the

electrical distribution system. These levels are then compared with equipment ratings to determine the adequacy of the equipment to handle faults. The study should be performed if changes have been made to the primary utility supply system or if significant changes have been made within the plant utility system.

### Protective device study

A protective device study is conducted to establish settings for protective devices. Equipment protection under the American National Standards Institute (ANSI) and the National Electric Code (NEC) rules is the objective. Selection of settings is not a rigorous science, but involves judgment calls for the best compromise between coordination among protective devices during fault conditions and equipment protection.

The objective of a protection scheme in a power system is to minimize hazards to personnel and equipment while causing the least disruption of power service. The protective device studies are required to select or verify the clearing characteristics of devices such as fuses, circuit breakers, and relays used in the protection scheme. The studies are also needed to determine the protective device settings that will provide selective fault isolation.

In a properly coordinated system, a fault results in interruption of only the minimum amount of equipment necessary to isolate the faulted portion of the system. The power supply to loads in the remainder of the system is maintained. The goal is to achieve an optimum balance between equipment protection and selective fault isolation that is consistent with the operating requirements of the overall power system.

Time current curves are generated by the computer software. The graphics include time current curves with one-line diagrams, and the reports include protective devices and their settings.

## Arc-Flash Hazards and Analysis

**ONE ITEM TARGETED** by OSHA and other safety concerns is arc-flash. An arc-flash is potentially a very hazardous event in which the heat energy alone can cause ignition of clothing and severe burns, as well as other injuries.

Potential hazards from electricity include electrical shock and arc-flash. Electrical shock occurs upon contact or approach within the breakdown distance of an exposed, energized electrical conductor or circuit part. Arc-flash occurs during breakdown when the arc current exceeds the glow-to-arc transition current. The arc current creates a loud noise, intense heat, a bright flash of light and a fast moving pressure wave that propels products of the arcing fault. Some of the products produced by the sudden and violent release of energy include ionized gases, metal vapors, molten metal droplets and shrapnel.

An arc-flash event can be set up by improper selection or application of protective devices. These devices may not be capable of clearing a fault within the time required to prevent a significant thermal event.

National Fire Protection Association (NFPA) 70 National Electric Code Section 110.16 (2002 and later) requires that electrical equipment be marked in the field to indicate where the potential of an arc-flash hazard exists. In order to identify the equipment and determine the extent of the electrical hazard from the arcing fault current, an arc-flash analysis must be performed.

NFPA 70E-2000 Section 220.2(B)(1) states that a flash hazard analysis must be performed before an employee can approach any exposed electrical conductor or circuit part that has not been placed in an electricity safe work condition. The flash hazard analysis shall determine the flash protection boundary and the personal protective equipment that people within the arc-flash boundary must use.

NFPA 70E-2000 covers a voltage range of 208-600 volts and a current range of 16kA-50kA. The IEEE 1584-2002 standard covers a voltage range of 208kv-15kv and 15kv+ and a current range of .7kA-106kA.

Although NFPA 70E is a voluntary consensus standard, OSHA considers it a recognized industry practice.

An arc-flash program calculates the incident energy and arc-flash boundary for each location in a power system. The software automatically determines the trip times from the protective device settings and arcing fault current values from the short circuit study. The incident energy and arc flash boundaries are calculated based on bolted bus fault values. Performing an accurate arc-flash study is not a stand-alone process. A short circuit study is a prerequisite for an arc-flash analysis.

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## Load flow study

A load flow study is conducted to determine the voltage, current, real power, reactive power and power factor in a power system. A number of operating scenarios can be analyzed, including contingency conditions, such as the loss of a generator, a power source, a transformer, or a load.

Load flow studies can alert the engineer to conditions that may cause equipment overloads or poor voltage levels, and determine the optimum size and location of capacitors for power factor improvement.

A power study should be performed whenever major changes in the power system and loading are anticipated. These anticipated loads may be simulated by the computer program to see what effect they may have on load flow and short circuit.

If things have not changed in the plant over a period of time, it is a good idea to have a power study update done every five years to capture changes that may have occurred due to changes in the utility supply.

In its controlled environment, electrical power is a safe and efficient means of bringing easily convertible power to industry. Just as mechanical and structural systems need inspection and maintenance, the electrical power system cannot operate without periodic inspection and adjustment. Correct maintenance includes power system analysis, equipment inspection and adjustment of protective device settings for proper coordination. It all begins with the power study. ●

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*continued from page 33*

In summary, the future of the international trade of softwood plywood and LVL depends on the harmonization of a number of different national standards. These standards are related to manufacturing requirements and to the determination of structural properties. While these standards have many similarities, they also have many unique requirements as established by the standards development bodies of each country or geographic area.

Thus, to harmonize these standards under an ISO standard requires each country involved to consider adopting provisions that may or may not be compatible with their own national standards. This is difficult in many instances. In addition, some of these standards have been in use for many years and have resulted in excellent performance and market gains for both softwood plywood and LVL. Fortunately, ISO Technical Committees TC 89 and TC 165, have a proven track record of overcoming such obstacles and in developing international wood based standards, and it is anticipated that they will be successful in completing these various standards within the next two years.

Associated with development of international standards is the need to assure that a strong conformity assessment program is in place in each country or geographic region. This will help smooth the import/export of plywood and LVL globally. ●

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### For Info Fair exhibiting information:

Contact Melinda Lilley, 206-818-7432, or Terry Kerwood, 253-620-7237

## Upcoming Events

### MARCH

31-4/2 WSU 42nd International Wood Composites Symposium, Seattle, Wash., (509) 335-2262, [www.woodsposium.wsu.edu/](http://www.woodsposium.wsu.edu/).

### APRIL

3-6 American Institute of Architects Gulf Coast Green 2008 Symposium and Expo, Houston, Tex., [www.gulfcoastgreen.org](http://www.gulfcoastgreen.org).  
16-18 Council of Forest Industries annual convention, Kelowna, BC, (250) 614-4353, [www.cofi.org](http://www.cofi.org).  
27-29 American Institute of Timber Construction annual meeting, Naples, Fla., (303) 792-9559, [www.aitc-glulam.org](http://www.aitc-glulam.org).  
28-30 Structural Board Association OSB world symposium & exhibition, San Antonio, Tex., (905) 475-1100, [www.osbguide.com](http://www.osbguide.com).

### MAY

11-13 NAHB National Green Building Conference – ‘Greening the American Dream,’ New Orleans, La, (800) 368-5242, ext. 8338, [www.nahb.org](http://www.nahb.org).  
12-13 10th International Conference on Progress in Biofibre Plastic Composites, Toronto, On., 519-249-0545, [www.biocomposites-toronto.com](http://www.biocomposites-toronto.com).  
13-15 Forest Products Society Smallwood 2008 and Bioenergy & Wood Products Joint Conference, Madison, Wisc., (608) 231-1631, ext. 20, [www.forestprod.org](http://www.forestprod.org).  
14-15 Southern Forest Products Association midyear meeting, New Orleans, La, (504) 443-4464, ext. 225, [www.sfpa.org](http://www.sfpa.org).  
15-17 American Institute of Architects national convention and design exposition, Boston, Mass., [www.aia.org](http://www.aia.org).  
17-20 Structural Insulated Panel Association annual meeting, New Orleans, La., (800) 368-5242 ext. 8489, [www.sips.org](http://www.sips.org).  
31-6/3 Composite Panel Association spring meeting, Cancun, Mex., (301) 670-0604, [www.pbmdf.com](http://www.pbmdf.com).

### JUNE

3-6 Construction Specifications Institute Construct 2008, Las Vegas, Nev., [www.constructshow.com](http://www.constructshow.com).  
5-7 Forest and Resources Expo, Prince George, British Columbia, (250) 563-8833, [www.forestexpo.bc.ca](http://www.forestexpo.bc.ca).  
22-24 Forest Products Society 62nd international convention, St. Louis, Mo., (608) 231-1361, ext. 208, [www.forestprod.org](http://www.forestprod.org).

### SEPTEMBER

21-24 APA annual meeting and Info Fair supplier exhibition, Henderson, Nev., (253) 620-7429, [www.apawood.org](http://www.apawood.org).

### OCTOBER

2-4 National Lumber & Building Material Dealers Association Pro Sales Industry Summit, Tucson, Ariz., (202) 547-2230, [www.dealer.org](http://www.dealer.org).

### NOVEMBER

12-13 North American Building Material Distribution Association annual convention, National Harbor, Me., (888) 747-7862, [www.nbmda.org](http://www.nbmda.org).  
15-17 North American Wholesale Lumber Association Traders Market, Dallas, Tex., (847) 870-7470, [www.lumber.org](http://www.lumber.org).  
19-21 U.S. Green Building Council Green Building Conference, Boston, Mass., [www.greenbuildexpo.com](http://www.greenbuildexpo.com).



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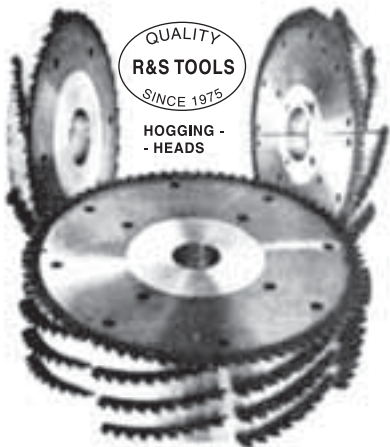
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## Final Frame



**APA's Christmas Committee, here with Santa Claus, organized a Christmas dinner and party for children being treated for Type 1 diabetes at Mary Bridge Children's Hospital in Tacoma in December. Approximately 160 children and their parents attended the charity event. Committee members are (front row, left to right) Kim Sivertsen and Sida Rivera, and (back row, left to right) Maria Johnsen, Roger Roatch and Kevin Hayes. Santa is actually Jim O'Donnell, who worked at APA as a forester in the 1970s.**

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