Forestweb

Modified wood producers must stress environmental, end-user benefits to increase market share, conference told

Oct 26, 2007 — Forestweb
By Wendy Lisney

Cardiff, U.K., October 26, 2007 (Forestweb) — Stringent legislation on wood preservatives, and pressure on environmentally sensitive species such as Western red cedar, is leading to an explosion of new technologies that extend the life of wood without the use of preservatives, or improve its durability so that plantation-grown softwood can be used as a hardwood replacement.

These technologies were explored at the 3rd European Conference on Wood Modification, held last week in Cardiff, UK. The conference covered developments in thermally modified wood and other property enhancing processes including acetylated and furfurylated wood. These processes increase the durability and stability of different species of timber without the need for deep penetration of toxic chemicals.

More than 70 scientists and engineers presented papers on their work to extend the life of timber naturally and in the most carbon-efficient way possible. North American organisations represented at the event included the Natural Resources Research Institute of Duluth, Minn.; McFarland Cascade of Tacoma, Wash.; Marvin Windows and Doors of Warroad Minn.; Osmose Inc.; the University of Quebec; the University of Idaho; FPInnovations – Forintek, Que., and the Tennessee Forest Products Center of Knoxville, Tenn. Other countries represented included Iran, Brazil, Japan, New Zealand, Japan, Chile, Australia and Europe.

The process of thermal modification involves changing wood's chemical properties by heating it at 160-245° C within an oxygen-controlled atmosphere. Carl Tremblay of FPInnovations – Forintek in Québec, Que., said this resulted in a chemical modification of the wood structure including degrading the hemicelluloses and lignin components.

Thermally modified wood is enjoying a period of high growth in Europe, delegates heard, where it is competitively priced as a cladding (siding) product. Many companies are investing in spray lines to offer a pre-finished product in either wood stain with an UV absorber, or solid colour coating.

Jerry Wilson, who represented Finnish thermally modified wood producer Stellac®Wood Mikkeli Oy at the conference, said this year had seen a rapid expansion of demand for thermally modified wood products in Europe, and the UK was now beginning to catch on, helped by rocketing cedar prices and problems with obtaining the species. He noted that the UK's Building Research Establishment in Watford, Hertfordshire, had intimated the life of D-Class Thermowood (treated at 212°C within a range of plus or minus 3°C for 2-3 hours) could be 30 years, which would place it in a higher category than copper and biocide pretreated timber.

But despite the recent expansion of European modified wood markets, Dr. Andrew Saunders of Osmose, in Marlow, Buckinghamshire, UK, said only comparatively trivial quantities of wood were being modified on an industrial scale.

"During the last two decades, the media's use of pseudoscience has created a social climate in which traditional wood preservation…is seen as a potentially dangerous source of pollution," he said. Saunders suggested that to improve the commercial desirability of modified wood, the industry should avoid turning wood into a "universal wonder material" which would make it prohibitively expensive. Instead, the focus should be on a modest property enhancement at a cost that can be recovered.

Jukka Ala-Viikari, of the Finnish ThermoWood® Association in Helsinki, Finland, outlined some of the association's work to commercialise ThermoWood® on behalf of its member companies, who either produce thermally modified wood under the generic ThermoWood® brand or supply processing technology, including specialised high-temperature kilns, to manufacturers.

The association's activities have included patenting the processing technology, by VTT Technical Research Center of Finland. The patent is valid in a number of European countries as well as Japan and the U.S. The association has established a registered trademark and an audited quality control system for the product, as well as a certification system for raw materials that includes forest management criteria and chain of custody verification.

Product classification has also been developed giving end-use recommendations depending on the durability and species. For pine and spruce, Thermo-S, treated to 190° C within a range of plus or minus 3°C for 2-3 hours, is suitable for end-uses including garden furniture, cladding, shutters and sauna products, said Ala-Vikari.

Thermo-D is treated at 212°C within a range of plus or minus 3°C for 2-3 hours, giving greater durability. This classification is suitable for cladding, fascia boards, exterior joinery, decking, garden furniture, sound barriers and other exterior structures. Separate Thermo-S and Thermo-D treatment classes have been developed for thermally modified birch and aspen, said Ala-Vikari, noting that the color of hardwood Thermo-D products is darker because of

the higher treatment temperature.

Radiata pine featured in many of the new processes, because it readily lends itself to both heat modification and other property enhancing processes such as acetylation. As a plantation crop, supplies are well managed and forestry practices are modern, producing some high quality dimensions, delegates were told. The most successful growing areas are currently in Chile, New Zealand and Australia.

Titan Wood, of Arnhem in the Netherlands, has been working on the commercialisation of acetylated wood since 2003. The process of acetylation involves treatment with acetic anhydride, which reacts with and blocks the chemical components of wood that normally absorb water and moisture. Titan is using this process to enhance the properties of Radiata pine.

Titan is marketing its product as AccoyaTM, and has worked to create value for the name by emphasising its reliability, high durability, high dimensional stability and UV resistance. Titan has also developed a method of correctly analysing the correlation between acetyl percentage and quality performance to provide performance assurances to customers.

Other property-enhancing technologies include furfurylation, which involves the formation of furan polymers from the condensation of furfuryl alcohol. Per Brynildsen and Espen Myhre of Kebony ASA in Porsgrunn, Norway, described two brands in commercial production since 2003: VisorWood®, which is furfurylated Scots pine, and Kebony®, which is homogeneously treated sapwood of various pines or temperate hardwoods such as beech or ash.

Kebony®, said the presenters, is marketed as an alternative to tropical hardwoods, and demand for both products has overtaken current production capacity. A new plant, with the capacity to manufacture 20,000m3 annually of furfurylated wood, is due for completion by the summer of 2008.

The modification of wood can be achieved through chemical, thermal, impregnation or polymerisation and enzymatic treatments. The University of Idaho's Department of Forest Products presented a paper on a project to enhance the dimensional stability and hardness of small diameter ponderosa pine. This low-value species was by impregnation with a low molecular weight urea-formaldehyde resin system followed by curing. The results indicate that the process increased the material's density and hardness and reduced swelling, offering a low-cost option for wood enhancement for flooring and furniture applications.

Dr. Carl Tremblay of FPInnovations – Forintek, of Québec, Que., gave a presentation on the thermal modification of Jack Pine. He noted that industrial production of thermally modified wood had been performed on a small scale in Canada, but interest was now growing. Currently the eastern laboratory of FPInnovations-Forintek is conducting a study to determine wood properties of thermally modified eastern Canadian jack pine compared with natural kiln-dried wood.

Tremblay said kiln dried jack pine lumber (50mm x 150mm x 3.05mm, premium graded) was modified at three temperature levels: including the Thermo-S (190°C) and Thermo-D (212°C) standards established by the Finnish ThermoWood® Association, and 230°C. The results showed the treated wood to have enhanced resistance to fungal decay and a significant increase in dimensional stability, although its resistance to impact bending and abrasion was reduced.

The conference concluded with a presentation by Dennis Jones of Wood Knowledge Wales, based at the University of Wales Bangor in Gwynedd, UK. Jones said commercial ventures had identified a number of selling points for modified wood. These included its increased dimensional stability and durability, which had led to several claims of that the product behaves in a similar fashion to tropical hardwood species. Given the sustainable source of many European species, the environmental marketing angle was a key area of focus.

But Jones cautioned that there is a fine balance between a product with excellent properties and one that can viably compete in today's aggressive market. Finland's ThermoWood® Association, he said, demonstrated the importance of a collective approach to marketing and product development. Jones said marketing modified wood under brand names – which include AccoyaTM, Osmose Royale and Osmose Indurite, Stellac®Wood, Belmadur®, Plato and ThermoWood® - was a major breakthrough in presenting a more recognisable product, and the perception of a new timber species.

- share the URL link with unlicensed users
- share the access password with unlicensed users
- forward, fax or email the content to unlicensed users