Engineering new revenues with Scrimtec

An engineered wood product called Scrimtec—developed in Australia and now being produced in the U.S. South—could help B.C. forest companies further utilize beetle killed wood, and other sawmills utilize small diameter logs.

By Tony Kryzanowski

Some Canadian forestry companies are working on improving their balance sheets at the same time as they find themselves surrounded by vast tracts of lower quality wood.

Help could come in a new wood product. Advocates of a new engineered wood product called Scrimtec believe their technology has the potential to make high strength and high value products through better use of both smaller diameter wood and beetle-killed wood.

Originally developed in Australia by the Commonwealth Scientific Industrial Research Organization (CSIRO) in the early 1970s, the scrimming process crushes small logs into scrim, which is a matrix of wood strands. The scrim is dried, coated with an adhesive, then heated and formed into billets in a steam heated press. The billets are then cut to specification according to customer needs.

The initial market focus for the product is on high strength and stiffness components such as window, door and garage door headers, beams, and columns, which means it will compete directly with laminated veneer lumber (LVL), laminated strand lumber (LSL) and parallel strand lumber (PSL).

Sita Millar, a Canadian forest industry researcher, now a consultant with Catamount Consulting Inc., has been working to help introduce Scrimtec technology to Canada, focusing on using it to make better use of beetle-killed wood in B.C. and smaller diameter wood in places like Manitoba.

“\text{A lot of money has been spent on the beetle-kill problem and we have so many beetle-killed logs in B.C. and elsewhere in places like Colorado,}” says Millar. “\text{The thing that came to my mind was whether we could scrim those logs and convert the fibre into high strength and value products out of those beetle-killed logs.}”

Millar was impressed with how much fibre recovery the scrimming process achieves.

“\text{Recovery from a log in B.C. and elsewhere, you’re lucky to get 60 per cent,}” she says. “\text{With scrimming, we get 98 per cent recovery.}”

That’s one of the reasons why the process has so much potential not only for beetle-killed logs, but also smaller diameter logs, where economical use of the logs as a raw material requires high recovery.

Early versions of Scrimtec, originally called TimTek in Australia, faced a few technical challenges. Australian researchers had difficulty producing a consistent product using a radio frequency press in the manufacturing process. However, forest
industry veteran Walter Jarck saw the potential of the product and has been working with the Australian government to introduce Scrimtec to North America. He co-founded TimTek Australia PTY, Ltd in 1996.

For over a decade, TimTek has worked extensively with Mississippi State University (MSU) to create a revised version of the Scrimtec product.

“The technology has evolved now where we use a steam chamber press (to manufacture the product) and we get a very, very consistent product,” says Dr. Dan Seale, researcher at the Forest and Wildlife Research Centre at MSU. He adds that the focus also changed from using the technology to manufacture products that compete with lumber to a high strength, high stiffness product.

Changing the target market resulted in new process techniques so that high quality stiffness and strength beams are produced in the steam chamber press.

“The properties of the beams are also adjustable or ‘engineerable’ and vary a little with species of raw material,” says Seale. “But generally the properties range from 1.8 MOE with 2600 Fb to 2.4 MOE with 3100 Fb.”

He adds that developing the new process techniques took over two years of research and development, describing the adhesive now being used as a ‘first cousin’ to adhesives commonly used in both oriented strandboard and plywood manufacturing.

In 2003, MSU constructed a pilot plant to develop and refine the manufacturing processes for the new market focus of Scrimtec. To date, it has manufactured more than 600 billets, using these specimens to test the product’s stiffness and strength compared to its competitors in-house as well as sending them for third-party testing. MSU claims that the Scrimtec product is as strong as or stronger than other structural engineered wood products.

“From a stiffness perspective, it is superior,” says Seale. “I can engineer the strength to go just about anywhere I want within reason.” In terms of dimensions, it can be manufactured from a thickness of from 1 ¾” to 7 ½”, in billets from 48’ to 60’ in length. Width depends on the size of the press, but typically it is about 18” wide.

MSU also says that it is less expensive to manufacture Scrimtec than other engineered wood products, and studies evaluating the potential of using beetle-killed wood from northern British Columbia have borne that out. A Scrimtec manufacturing trial was held at the MSU pilot plant in 2011 using 200 beetle-killed logs, with logs divided into five years, 10 years and 15 years since they had been killed by the mountain pine beetle.

“What we came up with is that the strength and stiffness from the Scrimtec product produced from beetle-killed wood was very good,” says Millar. “We didn’t find any major differences between the times that the logs were killed.”

The scrimming process also produced positive results regarding the visible appearance of blue stain common in lumber produced from beetle-killed logs.

“When we scrimmed the logs, we could hardly see the blue stain in the boards we made,” says Millar.

According to studies conducted by BC Hydro as part of this project, manufacturing the product uses 30 per cent less
electrical energy and 28 per cent less thermal energy than manufacturing LVL.

“We did the electrical measurements on the Scrimtec process and then we compared them to manufacturing energy use data from making LVL. From that, we determined what the energy savings were for manufacturing Scrimtec versus LVL,” says Markus Zeller, Manager Industrial Sector at BC Hydro Power Smart Technology & Innovation. The study was conducted as part of the utility’s Power Smart Energy Conservation Program to advance world-leading energy efficient technologies and practices in British Columbia.

He adds that much of the thermal energy savings were from not having to condition the logs at elevated temperatures to enable log veneering and later drying off that moisture again in the veneer dryer prior to processing LVL. The electrical energy savings with Scrimtec were achieved mainly in the reduction of related pump and fan power during log conditioning and fibre drying and overall smaller motor-driven processing equipment.

Given the trend toward building taller, multi-residential and non-residential buildings from wood, and because Scimtec can be used for columns, Millar says it may find a potential market in this type of construction.

The Scrimtec technology is not limited to specific tree species and works using both softwood and hardwood fibre commonly used in the North American forest industry.

Proponents of the technology have evaluated scenarios involving the retrofitting of existing engineered wood product plants as well as constructing entirely new plants from scratch. While the cost varies depending on how much existing facility infrastructure and equipment can be reused, current estimates show that building a greenfield Scrimtec plant would be about 10 to 15 per cent cheaper than building a brand new LVL plant.

Seale says that not having to manufacture veneer or purchase veneer logs also contributes to the cost effectiveness of manufacturing Scrimtec panels.

TimTek has signed a sub-licensing agreement with a Mississippi-based lumber company, Shuqualak Lumber, and it has constructed a near-commercial Scrimtec production facility in Mississippi. Seale is spending considerable time at the facility, which is helping to prove the production technology on an industrial-size scrim line.

“The machinery to do it is engineered,” says Seale. “If somebody is willing to invest, it is ready for someone to turn the key. . . . if one of these plants were running right now, given what the costs are and what the current selling prices are, it would generate cash flow and be profitable.”

What has impressed him with Scrimtec manufacturing is that unlike producing other engineered wood products, there are no knives or sawblades to sharpen when converting the logs into process fibre.

“You basically turn the electricity on and it runs,” says Seale. “And the more it runs, the cheaper it is to run due to the low maintenance requirements of the log line. It’s very durable technology.”

Millar says that it would take anywhere from eight months to a year to construct a Scrimtec plant. In terms of the willingness of companies to make an investment given the current economic climate, she adds that it almost makes more sense to consider an investment in this technology now.
“We are forced to marry the feedstock with the technology to make the best economic sense,” she says. “The only way we can compete is to look at added value and technology. Industry is looking for answers because of the economy.”