A look at solid hardwood markets and how the future is bright for small-diameter, low-grade timber in the United States.

Hardwood timber markets — a focus on small diameter

Bruce Hansen, Phil Araman, Cindi West and Al Schuler | USDA Forest Service

Table 1 shows roundwood consumption of four major product groups — sawlogs, veneer logs, pulpwood, and composite products — for 1986 and 1996. Combined, these products in 1996 accounted for the production of 13.69 billion ft^3 of hardwood and softwood roundwood. Sawlogs alone accounted for more than half the total. Pulpwood accounted for more than a third, while veneer logs accounted for more than nine per cent. The remaining 2.5 per cent was used in rapidly growing engineered wood products.

Of particular interest is the increasing hardwood content. The hardwood component of sawlogs increased by more than 18 per cent, that of veneer logs increased more than 90 per cent, and the combined pulpwood and engineered wood product sectors increased by more than 28 per cent. Clearly, hardwood has become increasingly important during the past decade in meeting the markets demand for solid wood and wood fibre-based products.

Table 1. Hardwood composition of US roundwood production, selected products (1986 and 1996).

Product	Total hardwood and softwood		Hardwood content	
	1986	1996	1986	1996
	Million cubic feet		Per cent hardwood	
Sawlogs	7,063	7,044	23.6	27.9
Veneer logs	1,535	1,249	6.6	12.6
Pulpwood	N/A	5,037	N/A	43.5
Engineered wood products	N/A	361	N/A	68.4
Combined pulp and engineered	4,788	5,398	35.2	45.2
Total	**13,386**	**13,691**	**25.8**	**33.3**

Hardwood fibre markets

Hardwood fibre markets consist of three sectors — pulp mills, chip mills, and engineered product mills. Pulp mills represent huge investments ranging today from ½ billion to a billion dollars. They also consume huge amounts of wood fibre. During the past few years, however, total pulpwood capacity in North America fell by some 2.7 million tonnes (Frost 1999). This was roughly 7 per cent of global capacity. The decline was due to mill closures, which led to more and more wood fibre being supplied from outside the region.

Engineered wood products are important not only because of their potential to use increasing amounts of low-grade and small-

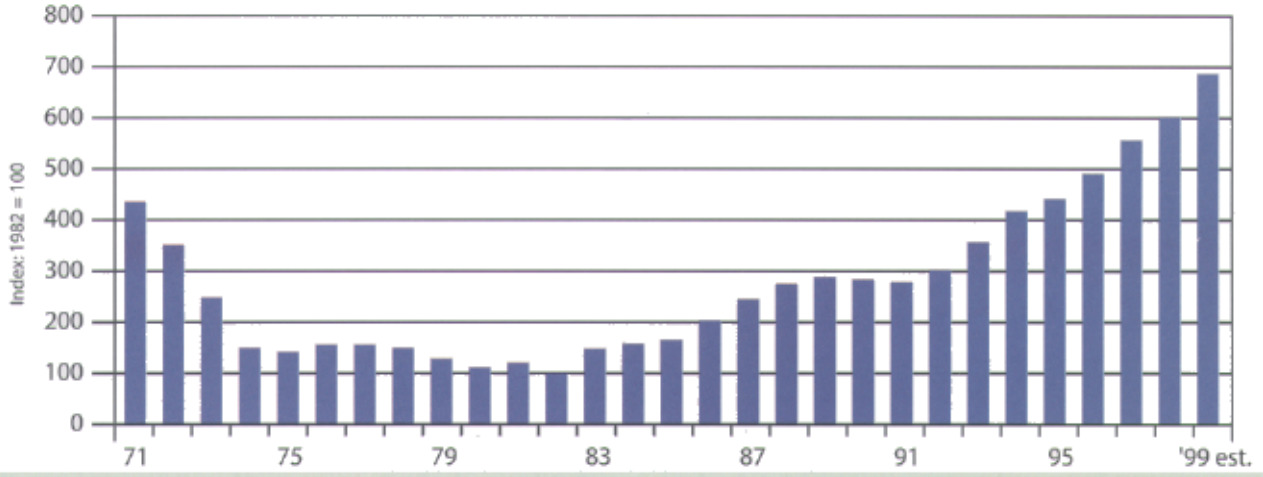

Figure 1. Estimated hardwood flooring production (1971 to 1999).

diameter hardwoods, but also because they are introducing hardwoods in large volumes to a non-traditional market sector — housing. For instance, nearly 70 per cent of the OSB produced is used in new residential housing, while another 14 per cent is used in repair and remodelling projects in existing homes (RISI 1999).

Solid hardwood markets

Hansen and West (1998) estimated hardwood lumber consumption by major use at 13.2 billion board feet in 1997. This reflected an overall increase of 24 per cent from 1991. Hardwood flooring — the Dow Jones of the wood products industry — was the leader with a 120 per cent increase in consumption of hardwood lumber (NOFMA 1999) (Figure 1).

During this same period, dimension and component manufacturers increased consumption by more than 90 per cent. Hardwood dimension and component manufacturers hold a unique position within the industry. Not only do they consume lumber, but their product output — hardwood dimension — is used in several other products among which are furniture, millwork, cabinets, and exports. In surveys of the furniture industry's wood use, both lumber and dimension use are treated similarly and are reported in units of thousand board feet. However, this minimises total wood use since each board foot of dimension represents the equivalent of approximately 2 board feet of hardwood lumber. Using lumber equivalents to account for dimension use, the furniture industry's use of hardwood lumber increases from 2.6 billion board feet to 3 billion board feet in 1997 (Hansen and West 1998). Likewise, because US exports of hardwood lumber include increasing amounts of dimension or material that is either trimmed to specific widths or lengths, Commerce Department estimates of US exports of hardwood lumber fail to account for 'true' wood use in lumber equivalents.

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Although furniture manufacturers generally use the better grades of lumber, most furniture is made of relatively short pieces of wood glued and fastened together. It is apparent from collated data that the physical constraints imposed by low-grade, small-diameter hardwood would not pose a significant problem to their use so long as processing costs can be kept competitive.

The next big hurdle is technology for handling, drying, and colour matching short pieces and looking at the material in non-conventional ways that make processing economically acceptable and competitive. While scanning, colour technologies and computer simulation are in place in a number of operations to help with much of this, areas still needing attention are efficiency in throughput and manufacturing flexibility. The big questions that remain are whether small-diameter, low-grade materials can be economically competitive and meet with consumer acceptance.

Consumer preferences

Ultimately, it is the consumer who may have the most to say about use of small-diameter, low-grade materials by choosing what is acceptable and what is not. In a study of consumer preferences at the New York State fair, 10 'brown' hard maple panels of varying colour, finish, and stain (mineral streak) were exhibited. Those volunteering to participate were asked to rank the panels on the basis of preference from one (best) to 10 (worst). All displayed panels received at least one first place vote suggesting a large degree of variability among consumers as to preference. Further, respondents generally indicated a preference for dark brown without mineral in a cherry finish for living room, dining room, and bedroom applications. By contrast, they indicated a preference for no mineral, and light finishes in kitchen applications. For flooring, they expressed a preference for mixed colour with mineral.

It is apparent that consumers, taken collectively, have a wide range of tastes and preferences. Thus, if the wide range in tastes and preferences can be matched efficiently to the variety in wood, greater opportunity will be available for use of low-grade, small-diameter materials and lesser used species.

Composite products or solid wood?

Both composite products and solid wood seem to provide alternatives for use of low-grade, small-diameter hardwood use. How a particular resource might be directed — composite products, solid products, or both — will depend on who is able to offer the best price (return to log). Although solid wood, value-added products might seem to offer the highest sales revenue, conversion costs and yield losses will likely be greater also. Composites have the advantage of using all the log in a highly efficient manner. Thus, lower product prices may be more than offset by lower processing costs and higher yields.

Conclusion

Although utilisation of small-diameter timber from thinning operations may seem like a daunting task, there is reason for optimism. That reason is the successful use of rubberwood in southeast Asia and its introduction into markets throughout the US. After 30 to 35 years rubberwood trees become unproductive (Smith et al 1990). They are subsequently cut and new trees planted in their place. Until 10 to 20 years ago, the cut trees were usually burned on site, used for fuelwood, or used to make charcoal. The typical tree at harvest is small in diameter, quite crooked, and highly susceptible to blue stain fungi and beetle attack. Because they are so crooked, the maximum length of the usable log is about 6 feet. The logs also have a high juvenile and reaction wood content. Yields range from 20 to 30 per cent.

There is probably no worse resource for the production of wood products than rubberwood, yet despite all the negatives, rubberwood use in products today is ubiquitous. A short list of products include strip and parquet flooring found in most home centres, kitchen tables and chairs, and cutting boards. The use of rubberwood has proven the technological and economic potential of using small-diameter, low-grade material. In the US, future technological advances may well provide the needed efficiencies to make low-grade, small-diameter hardwood utilisation an economic reality. ●

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