VALWOOD

NEW WOOD

FURNITURE FROM FORESTS

IN 50 years the State's supplies of jarrah and other hardwoods from old growth forests will virtually cease. This is because of timber harvests over the last 150 years and the fact that large areas of virgin forest are now in parks and reserves. However, timber in our regrowth hardwood forests and logs considered too small for economic use by sawmillers or furniture makers are plentiful.

The Department of Conservation and Land Management (CALM) has capitalised on this situation with its VALWOOD research project. The achievement: a technique that uses small trees, recovers unusually large amounts of timber, and creates a value-added product (hence its name) which is easy to use and highly profitable. The product: a unique timber panel built from thin planks jointed and glued to size - and, incredibly, delivered to the manufacturer within a month of the date of tree felling. This research is expected to revolutionize the forest products industry.

VALWOOD laminates are cut to one thickness: 10 mm. The processor can build it up to any thickness in multiples of 10 mm, and can do so quickly - it takes about the same time to make a panel 200 mm thick as 20 mm thick. The wood has no splits and, because it is so thin, it is evenly and thoroughly dry so does not shrink in use. Another advantage is that much of the wood that used to be stripped off a log and discarded can now be used. The outside sapwood, for example, has a pale, unlovely hue; but because only the face surfaces are important in furniture, sapwood can be used inside a VALWOOD panel.

The VALWOOD system is also suitable for high value uses of light-coloured plantation-grown hardwoods, such as the Tasmanian bluegum, which are now mainly converted to pulpwood.

This new product is therefore an elegant solution to the problem of how to use timber that presently has little commercial value. It also provides a new resource to replace the forests now managed as parks or reserves.

PLENTY OF NOTHING

In South-West forests where trees were harvested around the turn of the century, there is now a healthy regrowth of timber. But there is always a surplus of trees in a regrowth eucalypt forest, causing overcrowding and reducing the development of bigger trees. The surplus trees can be thinned out, but they are too small for use in sawmills. In the past, small jarrah logs could only be sold for firewood or charcoal, while small marri and karri logs are made into chips for paper pulp manufacture. Alternatively, culled timber can be left to rot in the forest.

To overcome these problems, CALM undertook a research project, funded by a $4.6 million grant from the State and Commonwealth Governments and industry.

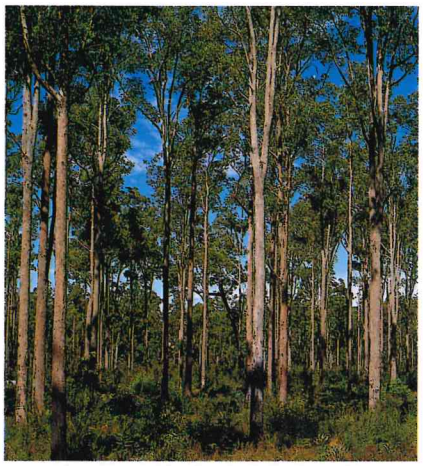
WHO SAID IT COULDN'T BE DONE?

In 1983 CALM suggested that the State's sawmillers supply furniture makers with little pieces of wood joined together to make big ones.

It must have seemed a cheeky idea. Both the sawmillers and the manufacturers doubted that it could be done easily or economically. The millers said they already had too many plank thicknesses to supply without increasing the variety, while the manufacturers shuddered at the idea of making, say, a dining room suite from what they must have thought was a kind of upmarket plywood.

The results of the project have erased everyone's doubts. Some half-dozen furniture manufacturers have now constructed items from VALWOOD furniture 'blanks' and have found the finished product stable and attractive, the equal of any they have made. Management consultants are now preparing a business plan which suggests the new product could provide many financial advantages.

As VALWOOD panels are made from planks of only one 10 mm thickness,



Slender regrowth jarrah forest before thinning.Thinned wood from the overcrowded forest is currently used for firewood or charcoal.◀

Small boards of varying quality are glued together to form the VALWOOD panels. The highest quality timber is used for the outer panels.▼

Photos - John Green

NEW TECHNOLOGY

Moisture content is one of the vital factors in preparing timber for manufacture. If it is uneven or too great, the wood is difficult to glue and will be unstable. Drying out even tiny amounts of moisture accurately, therefore, is important.

Conventional methods of measuring wood moisture distribution in research kilns involves cutting thin slices from the middle sections of a sample board. Fine though these slivers are, the process still results in the destruction of the sample.

CALM therefore commissioned the development of a gamma-ray densitometer by Dr John Davis of the Chisholm Institute of Technology in Melbourne. This instrument measures moisture profiles and density variations in sample boards up to 150 mm thick without causing damage; a significant breakthrough in timber drying research techniques.

At the CSIRO in Melbourne, CALM are funding a research and development project led by Dr Bob Leicester using microwave technology to detect 'rogue' moisture contents in finished boards. The prototype, shortly to be installed at CALM's research centre at Harvey, will measure moisture contents and densities of boards moving past a scanner at speeds up to 80 m per minute.

jointed at face and edge to make up pieces of any required size, sawmills will have only one thickness to cut, instead of many. The lamination process also gives it strength. Tests conducted at Curtin University of Technology prove VALWOOD has great structural qualities.

VALWOOD also addresses another problem faced by sawmillers: splitting of timber pieces as they dry.

MOISTURE: A MILLION-DOLLAR PROBLEM

Most sawmills are equipped to handle big logs. This is a legacy from the nineteenth century, when there was plenty of timber, and wasting the outer parts of each log did not seem to matter. But thick timber does not dry well, retaining moisture in pockets and layers, and sawn timber has to be stored (air-dried) long enough for the moisture to recede, a method still used today.

Unfortunately, it takes up to two years to air dry timber, so an extended period without earnings is forced on the mill. Even then, the seasoned timber may be so cracked that a proportion of the wood cannot be recovered. Even recoverable wood may be too moist inside, or unevenly moist.

Small sections of furniture grade timber are glued, then go into a press where they are heated to cure the adhesive. Photo - John Green◄

Information on VALWOOD is available from the Wood Utilisation Research Centre at Harvey on (097) 291 913 or from the Department of CALM at Como on (09) 367 0333.

Moisture is a major problem when attempting to produce stable and warp-free timber. If the wood is dried too fast, there will be almost no moisture on the surface but a considerable amount at the core. This creates immense stresses as the outside dries and shrinks; the board may split inside or on the surfaces.

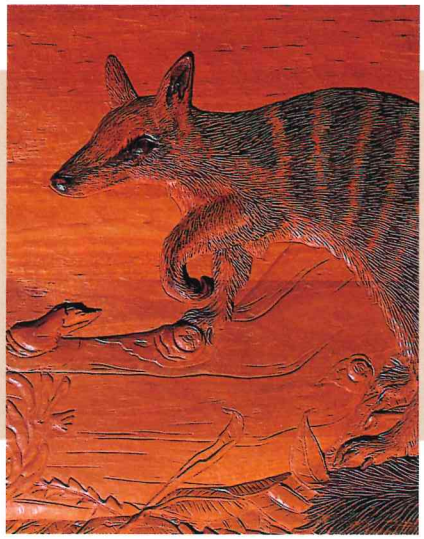
VALWOOD, by contrast, dries quickly and evenly. But it is an unfamiliar process in a hard-pressed and cautious industry. Experimenting with different drying methods, especially using unconventionally small logs, is a high-risk undertaking. Even though furniture makers are convinced that VALWOOD is stable, easy to work with, and produces attractive items, CALM needs to show sawmillers that the new panel will be economically viable. This means demonstrating that VALWOOD is quick drying, easy to cut and assemble, and provides a fast turnover in high value sales.

PLENTY OF HOT AIR

At CALM's Wood Utilisation Research Centre (WURC) in Harvey, staff have been experimenting with different methods of stockpiling and drying timber. Some years ago they developed a tunnel kiln in which warm air was pumped from one end to the other. Although this works well in all weathers, the system is a little rigid: because of circulation inadequacies, the batches of wood have to be periodically moved step by step towards the warmer end of the kiln.

A newly-developed solar blanket dryer is more promising. It has a double shell of soft, inflatable plastic. The controlled air inside can be separately heated and humidified according to the needs of timber at different stages of drying. Large fans blow air around and through the stacks of timber, drying them more evenly. The drying process is controlled by a patented blanket and by adjusting the fans, the curtain filters, or the fogger water-sprays which initially reduce splitting. The wood can be inspected at any time merely by unfastening the Velcro-sealed door and stepping inside. And the heat comes free from the sun!

The solar blanket dryer, an innovative low-cost, low-volume timber dryer, will allow small sawmillers to increase their efficiency and dramatically cut costs. ▲



Two VALWOOD panels. One is a carving of the State's faunal emblem, the numbat; the other carries a random computer design.
Photos - John Green and Cliff Winfield◀

The solar blanket dryer is a highly efficient way of drying wood cheaply, quickly and evenly, and even the smallest sawmill can afford it. Used to dry VALWOOD timber, the solar blanket dryer and the new timber product will cut sawmillers' costs dramatically. For example, air drying a 2.1 m length of 100 x 100 mm jarrah, destined to be a cross-arm on a SEC transmission pole, normally takes two years and there is a risk of it splitting; with VALWOOD and the solar kiln, the SEC can take delivery in a fortnight - with no splits at all. The benefits are huge.

Once VALWOOD and its associated technology become established, sales and world-wide interest are expected. There is a strong demand for dark red furniture timber like jarrah and karri. World supplies of mahogany are dwindling, and in any case there is increased resistance to buying timber that comes, as mahogany does, from tropical rainforests.

There is a bright future for jarrah VALWOOD: it is a fine cabinet wood with a range of colours from salmon pink to dark red brown, it is stable and economical to harvest and prepare. It not only makes excellent use of thinning logs that are normally wasted, but creates a fine product that benefits both saw millers and furniture makers, while protecting W.A.'s supplies of mature jarrah.

RAY BAILEY