Department of Conservation
and Land Management

Wood Utilisation Research Centre

PRACTICAL ASPECTS OF PRODUCING VALWOOD® BLANKS

P. Newby

March 1991
W.U.R.C. Technical Report No. 26

Weir Road Harvey WA 6220 (097) 29 1913
50 Hayman Road Como WA 6152 (097) 367 0333

PRACTICAL ASPECTS OF PRODUCING VALWOOD® BLANKS

P. Newby

March 1991
W.U.R.C. Technical Report No. 26

PRACTICAL ASPECTS OF PRODUCING VALWOOD® BLANKS

P. Newby

SUMMARY

The VALWOOD® process developed at the Wood Utilisation Research Centre (W.U.R.C.) at Harvey involves the manufacturing of edge- and face-jointed blanks (panels) for furniture or structural uses. The potential for furniture blanks from regrowth jarrah (*Eucalyptus marginata* Donn ex Sm.), to supplement supplies of solid timber of this species for furniture manufacturers, is being assessed by the W.U.R.C.. To assess the quality of this product, 160 blanks of different thicknesses were constructed in a production run.

The boards used were colour matched, by separating into light, medium or dark shades. Blanks were assembled using urea formaldehyde adhesive, and pressed in an 'Orma' glue press. The adhesive requirements and production times were recorded, and the quality of the product assessed. The blanks were stored in controlled environment rooms at equilibrium moisture contents of 6 per cent or 20 per cent for four weeks. Glueline movement and timber stability were then monitored, and found to be completely acceptable. This indicated that blanks are an excellent alternative source of furniture timber, and can be custom-built commercially in specified lengths, widths and thicknesses.

INTRODUCTION

The major hardwood species used in the furniture manufacturing industry in Western Australia is jarrah (*Eucalyptus marginata* Donn ex Sm.). The growing demand for solid timber of high quality, and the reduced forest areas available for timber production, place many constraints on this supply. In the future, most jarrah will be supplied from small diameter regrowth stands with trees having a diameter breast height over bark (d.b.h.o.b.) of 150 mm to 400 mm. The timber from regrowth eucalypts is therefore of smaller size (both width and thickness) than that available from mature trees, and although these pieces are suitable for the furniture industry, larger dimensioned components are also required (Challis 1989).

Large sections of solid timber are affected by problems such as increased drying times, increased degrade and reduced recovery. Research by the Department of Conservation and Land Management at the Wood Utilisation Research Centre

(W.U.R.C.) at Harvey has resulted in the VALWOOD® process, in which small dimension boards are edge- and face-jointed to produce furniture blanks. The concept of edge-jointed furniture blanks was previously discussed by Araman (1982), Araman *et al.* (1982), and Reynolds and Araman (1986).

In manufacturing furniture blanks, factors to be considered include the quality and stability of the finished product, and industry acceptance. This report discusses a production trial of jarrah furniture blanks manufactured by the VALWOOD® process.

METHODS

The research was conducted at the W.U.R.C. at Harvey. The dry dressed regrowth jarrah used to construct the panels came from Kent Block, about 15km east of Harvey. This area was cut over for general purpose sawlogs in the 1940s and 1950s, and thinned for small sawlog and residue log harvesting trials in 1987 (Clark and Brennan 1988). The small sawlogs were stored under water spray at the W.U.R.C. until milled in 1989. The boards were air-dried initially, and dried to 8 per cent final moisture content in a commercial high temperature kiln. The boards were then stored under cover in the VALWOOD® production area until required.

The dry boards were dressed on a 'Guilliet' straightening four sider planer, and sorted into one of three different colour groups (light, medium or dark) at the planer outfeed. Edges of the boards were dressed immediately prior to gluing, allowing a maximum period of one hour between dressing and gluing. Boards with thickness of 10 mm, 20 mm or 30 mm, and widths of 60 mm, 80 mm or 100 mm were edge- and face-jointed with urea formaldehyde adhesive. This was the most efficient adhesive tested for furniture blank production by Newby and Siemon (1989).

Ten panels 900 mm long, and either 40 mm or 60 mm thickness were constructed from Merchantable, and/or Processing, Feature, Clear and Random Grade boards, which were edge- and face-glued to produce blanks. The widths were 200 mm or 300 mm. An 'Orma' glue press with oil heated platens,with a temperature setting of 90°C and downward pressure of 1500 p.s.i. (10.3 MPa) and lateral pressure of 250 p.s.i. (1.7 MPa) was used to press the blanks.

Visual assessment of the quality and acceptability of the blanks was by a furniture industry group and W.U.R.C. staff, during and on completion of manufacture. Half of the blanks were then stored in a conditioning room at 6 per cent e.m.c., and the other half in a conditioning room at 20 per cent e.m.c., for four weeks.

RESULTS AND DISCUSSION

Blanks of different widths and thicknesses produced from regrowth jarrah required an average labour content of 16 minutes for 40 mm thick panels and 21 minutes for 60 mm thick panels. The additional time for the 60 mm thick blanks was due mainly to the extended time required for the curing of adhesive while the blanks were in the glue press, because it takes longer for heat to penetrate to the centre gluelines. Compared to solid wood available from timber merchants, the VALWOOD® panels are custom built and supplied in finished sanded dimensions rather than skip-dressed.

The total fabrication time includes:

- colour matching of boards
- dressing boards prior to gluing
- applying adhesive and laying-up
- pressing
- docking to size
- sanding the finished blank.

Edge- and face-jointed blanks used for exposed components of high value high quality products in furniture and joinery manufacturing require colour matching of the component boards to produce an even colour change throughout large panel surfaces. Colour matching was achieved by sorting boards into three main colour shades (light, medium, and dark), with light and medium being the dominant shades. Matching boards in panels to these shades was a reasonably cost-efficient procedure when carried out off the planer prior to panel lay up and adhesive application. Colour matching has been included in the total panel fabrication time, as stated previously, and when included in the overall production procedure can be carried out as a normal stacking function on the planer outfeed.

Seventy-five grams per square metre of urea formaldehyde adhesive are required for a 40 mm thick blank, and 125 g for a 60 mm thick blank. Adhesives vary considerably in cost and coverage, and the final cost per panel would depend mainly on the adhesive and whether the intended use was internal or external.

The panels were assessed after production and found to be stable with satisfactory gluelines. There was minimal cup, bow and spring, because alternating growth ring orientation in laying-up the boards distributes any stresses through the blank. This stage of the research will be discussed in a separate report.

Observations made during fabrication of the edge- and face-jointed panels indicated that the concept of built-up solid panels from small dimension timber has many and varied uses in the building, joinery and furniture industry. Furniture grade timber is becoming increasingly difficult to obtain in large cross-sections, because of a

shortage of large trees, the problems in drying wide thick sections without causing degrade, and the increasing costs of drying and prolonged storage.

Edge- and face-jointed blanks can supplement this market. The component panel concept uses small dimension timber which is easy to dry, and low grade material can be used in the internal laminates while high grade material is used on the exposed outer laminates. The resulting custom built panels give higher recoveries for the sawmiller and processor. Nevertheless, the fabrication of edge-and face-jointed panels is very labour-intensive, with the bulk of the labour required in machining the various timber components and the subsequent finishing of the panel to furniture manufacturers' specifications. This process can be greatly improved with modern and technically advanced machinery which is available and used world wide.

Industry and public acceptance in Western Australia will be the major test for laminated blanks. With growing demand for high quality hardwood furniture, the production of limited furniture blanks is suggested as the best option to reduce the demand for solid timber from the State's hardwood resources, while providing for high value manufacturing in the future.

REFERENCES

ARAMAN, P.A. (1982). Rough-part sizes needed for lumber for manufacturing furniture and kitchen cabinets. U.S. Department of Agriculture Forest Service. Research Paper N.E. -503.

ARAMAN, P.A., GATCHELL, C.J., REYNOLDS, H.S. (1982). Meeting the solid wood needs of the furniture and cabinet industries: Standard-size hardwood blanks. U.S. Department of Agriculture Forest Service. Research Paper N.W. -494.

CHALLIS D.J. (1989). Survey of solid wood sizes used by the furniture industry in Western Australia. Department of Conservation and Land Management. W.U.R.C. Report No. 9.

CLARK, J.D. and BRENNAN, G.K. (1988). Small jarrah sawlog and residue log harvesting trials near Harvey, W.A. Department of Conservation and Land Management. W.U.R.C. Report No. 4.

NEWBY, P. and SIEMON, G.R. (1989). Adhesives for manufacture of furniture blanks. Department of Conservation and Land Management. W.U.R.C. Report No. 12.

REYNOLDS, H.W. and ARAMAN, P.A. (1986). Program Blanks on the IBM-PC. U.S. Department of Agriculture Forest Service. General Technical Report N-E-107.