CHAPTER 13 - UTILISATION

The success of growing plantation blackwood will be shown by its successful utilisation and market acceptance.

Sawing of New Zealand plantation-grown blackwood is hampered by a lack of suitable material that has been tended and well managed. Despite this there is some experience with utilising plantation blackwood.

Sawing

Logs can be either flat or quarter sawn, but flat sawing is preferred because it does not require large logs or specialised sawing equipment, and flat sawn boards are more figured. New Zealand blackwood is producing some excellent furniture and joinery (Fig 64).

Profile size

A popular size to saw is 155 x 55 mm as it can be split to 25 mm, or multi-sawn for 50 mm squares for laminating in benches etc. Demand for 25 mm thick lumber is about half that of 55 mm material. Dimensions over 155 x 55 can be milled for confirmed orders, but this is seldom required. In Tasmania, popularity of sizes depends on market conditions, but 150 mm wide by 25, 38 and 50 mm are generally the most popular sizes.

Length

The aim is to have 2.4 m of clean board. Lengths of 1.5 m and less are difficult to market and are of lower price, although they can still be worth holding on pallets unfilleted.

Knots

Knots up to 10 mm are useable in some furniture. They also can give character. Larger knots are undesirable, but sometimes accepted. However, there is a tendency for wood deformation around large knots.

Slabs

These have limited market but are of high value, especially if curved and wide, and can be worth more per m3 than the top lumber price.

Figure 64: High quality niche market use of New Zealand grown blackwood.

Sawing Evaluations

(i) In 1981, 77 sawlogs from 21 trees were extracted from the untended Whakarewarewa stand at age 75 years. Log length ranged from 2.7-5.5 m and SED averaged 396 mm (range 230-660 mm). Log quality was generally poor with 10% logs having included bark pockets. 42% exhibited measurable sweep with an average of 66 mm and 15% of the logs suffered from noticeable spiral grain. Mean branch size was 113 mm with a maximum of 310 mm. Figure 10 shows the logs before sawing. The logs were sawn with a Stenner band headrig and a circular breast bench. A conversion of 46% was achieved. Of the sawn output 73% was in the better grades (clean, dressing and factory i.e. clear cutting).

The timber was very easy to saw, with a smooth to medium saw finish obtained regardless of a range of saw speeds tested. Evaluations made during this study led to a conclusion that a saw pitch of 45-70 mm is recommended.

(ii) An evaluation in 2001 to scope potential outputs from a 40-year-old New Zealand blackwood stand was recently undertaken. As this stand had substantial small logs from being over-stocked, a pilot sawing study of twelve logs was undertaken to evaluate sawing small logs. The logs were sawn on a portable saw of Mahoe design using two right angle circular saws with a kerf of 6mm; this system has no ability to turn logs during sawing. Sawn conversion of three runs with different log sizes was poor with an average of 34% (range 29-40%).

The sawn output from logs of the smallest size sawn (mean SED of 231 mm and LED of 270 mm) was generally of very poor quality because of sap or knots. In one of the runs log tension and sweep caused problems, so much so that the run was abandoned. A small sample of larger diameter logs sawn (400-500 mm SED) showed that logs of this size produce a higher percentage of acceptable timber. Mean heartwood level of the twelve logs was 67%, with a range from 52% to 98%.

(iii) In Westland five 32 year-old trees, a 19 and a 20 year-old tree were helicopter extracted from two forests for evaluation in 1999. The 32 year old trees had a high heartwood content (70-90%) while the younger trees' content was much lower, with 20-30% heartwood. The importance of age, site or genetics on this factor is unknown.

The seven trees with an average SED of 280 mm yielded 12 logs and one veneer log. Tension in logs from two trees caused some sawing problems and a multi-saw edger had some difficulties with the hardness of the wood. One log had significant decay from a dead branch. The sawn volume gave a recovery of 50%. Grade recovery was excellent with 64% dressing, 31% select appearance and 5% standard (Beech grading rules). The main defect reducing dressing grade was large knots and the poorest grade of standard was caused by decayed knots. Veneer was cut from one log length, after the log had been cooked in hot water at 75°C for two days. This appeared insufficient to adequately soften the wood and some difficulty was experienced with knots. However the veneer dried well, was nice and flat and produced attractive veneer.

The timber machined well and was considered very suitable for furniture and joinery applications.

It should be noted that the logs for these sawing studies came from stands which have had minimal or no silvicultural treatment. These studies from a mixed range of ages, quality and sizes have demonstrated that plantation grown material has no major problems. Log size and some stress in logs suggest that well tended logs will be well received in the market place.

The chance to saw some good quality logs from New Zealand plantations is probably a few years away, but these results are encouraging considering well managed stands should produce higher grade recovery percentages.

In New Zealand, experience has shown that processors want logs of reasonable diameter, over 600 mm SED. These logs usually have high yield and low internal stress. As outlined above logs below 300 mm SED have very low recovery of decent boards, frequently display high stress and are milled to minimise crook. They also produce bowed boards. It is reported that even logs of 400 SED can be troublesome.

Fallen trees

These are often worth rescuing from firewood use as they can yield good lumber, even when sapwood is decaying. However, some will have spots of decay, which are obvious when machined. This may have occurred in a standing tree when large branches have broken off.

Drying

Air dry under cover, avoid sun and rain on sides. Use fillets of 20 mm or less for slow drying. When 30% moisture or less, dehumidify to 12-14% for furniture trade. Blackwood can be dried slowly (dehumidifier) from green - low temperature 25-30 °C and maintain 60% moisture content or more until down to 20-25% moisture content. Australian markets generally require timber to be seasoned to between 10-12%.

Grading

This is a key aspect of marketing and quality. End users want timber graded to their specifications and are usually prepared to pay for the right material. The down side of this is that lumber outside the specifications may not have a ready market, resulting in the building up of stocks of low demand material. A practice in the early days of New Zealand timber sales was to sell only cut-of-log, which created problems of wastage and stock build up for the end-user. Current thinking is to be more selective in log buying and grade for specific end uses. While this is better for end-users it creates a problem with lack of markets for all grades. Until this can be achieved, better utilisation and greater value from blackwood stands in New Zealand will be harder to achieve.

Working Properties

Blunting: Moderate, according to density.

Boring: Reasonable; occasional problem with roughness or tear–out.

Nailing: Must be pre-drilled before nailing.

Planing: Straight grained lengths will give an excellent finish with a 30° cutting angle and low to moderate feed speed, although there is a tendency to chip out, especially if cutters are not sharp; tungsten cutters are recommended. Material containing cross-grain incurs severe picking-out and fuzzy grain. For this type of material, the cutting angle should be reduced and lengths individually hand-machined.

Sanding: Sanding occasionally produces a stringy surface. Care must be taken to avoid overheating. Sand paper (i.e. 80 grit) is recommended for initial crosssanding and finishing with a 100/120 grit paper (note dust can cause an allergy, see comment below).

Sawing: Hardness can cause burning so tungstencarbide- tipped saws are an advantage.

Screwing: No problems.

Shaping and routing: Can burn when using high speed machinery.

Chiselling: Good.

Spindle moulding: Good, although burning can occur.

Turning: an excellent turnery timber; turns well at high speed, but with some chipping; cutters must be sharp.

Gluing

Care should be taken to ensure that wood is at the moisture content appropriate for the end-use and that the surfaces to be glued are freshly machined and dust free. It is not advisable to glue boards over 150 mm wide.

A wide variety of glues can be used, but note that casein glues will discolour the wood at the glue line.

Steam bending

Blackwood has an excellent reputation in Australia for steam bending. New Zealand grown material appears to have no problems.

Veneer and plywood

After conditioning at 70°C flitches can be sliced into 0.5 mm thick veneer without difficulty. However, density variation can cause problems. Blackwood slices well along the quarter grain, but the veneer can crinkle-up in the drier if unrestrained. Blackwood is regarded as easy to peel. Care should be taken to minimise iron/tannin staining (which can result from contact between wet veneer and steel). Matching colour with veneer material is considered a constraint in marketing veneer. Blackwood also slices well on the flat grain.

Allergy reactions

Blackwood has been implicated in allergy reactions in Australia, usually associated with processes involving dust. Cases of dermatitis and asthma reactions are reported in the literature. Any processor using blackwood should ensure that adequate dust collection and protection of staff is carried out to avoid blackwood dust allergies.

Key Points

- New Zealand plantation blackwood has been utilised for many years and has proved very acceptable in the marketplace.
- Flat sawing is preferred to quarter sawing.
- Sawing studies on untended stands have produced an average conversion close to 50%, and show the importance of large diameter logs.
- Heartwood percentage is variable.
- Some tension in logs occurs, but is variable.
- Blackwood dries and machines well, and has excellent working properties.
- Processors should ensure a dust-free work environment.
- Processors prefer larger logs (SED 400 mm +).
- New Zealand plantation material is being converted to furniture and is selling in the market place.

Suggested reading:

Haslett 1986.

Wood-Baker and Markos 1997.