

# Case Study: Davis Furniture

## Project Overview

In January 2004 EcoRecycle Victoria commissioned the Australian Sustainable Industry Research Centre Ltd (ASIRC) to undertake materials efficiency supply chain studies in the Furniture Manufacturing Industry of Victoria. This case study describes the project undertaken in partnership with Davis Furniture, one of the leading furniture manufacturing companies in Australia. The objectives of the project were to quantify the waste within the timber supply chain from the logs entering the mill to the furniture delivered to the retailer.

The emphasis was on the timber supply within Victoria but other waste going to landfill was included.

## The Lead Organisation

Davis Furniture has been producing high quality furniture since 1972 and today Davis Furniture is one of the top 20 Furniture Manufacturers within Australia. A leader in the Furniture Industry Davis Furniture has been recognised by 16 Excellence Awards over the last 12 years. Davis Furniture is a participant in the Furnishing Industry Association of Australia (FIAA) and uses their resources to improve quality and efficiency of its processes and products. Furniture is sold Australia wide and exported to New Zealand. The company has 44 employees and generates a wholesale value of \$5.5 million per year.

Customers of Davis Furniture in Australia are the major retail stores as well as a number of independently owned stores. The name and reputation as a supplier of high quality furniture is well recognised and continues to grow through an ongoing commitment to detail, quality, product improvements, and service delivery. Davis Furniture is focused on their responsibility toward preservation of our Heritage Forest areas and only sources raw materials from re-growth areas.

## Understanding the Issues

EcoRecycle Victoria, in partnership with Davis Furniture and ASIRC, initiated a supply chain study to quantify the solid waste generated in the supply chain from the mill to the furniture company. The study was complicated by the diverse nature of the timber used, Blackwood, Vic Ash and veneered panels and the many sources of the timber supplied. The study focused on Blackwood as this represents about half of Davis' volume and has strong sales growth. Davis Furniture has a strong relationship with the supplier, Corsair Timber. The Vic Ash supply is similar to the Messmate supply chain covered in a related project. Veneered panels are supplied from South Australia in kit form thereby minimising waste at Davis Furniture.

The key issues relevant to the study:

- The waste within Davis manufacturing had not been quantified and there was no routine measurement of waste incurred. Waste management costs (<\$10,000) were small and did not justify internal effort.
- Davis Furniture have already minimised waste by partnering with suppliers to source veneer panels in kit form and Blackwood docked to length. Timber shorts were used as firewood but the volume of timber shavings and dust was insufficient to make it economic to recycle into poultry litter.
- Improved timber efficiency was the main driver to justify effort within Davis Furniture.

### **Desired Project Outcomes**

In planning the study the following outcomes were anticipated:

- Quantification of the timber waste would allow further small improvement in waste management costs and recycling.
- Supply chain process studies would identify areas of process duplication and opportunities for improvement in partnership with the supplier.
- Environmental gains will be achieved by increasing the proportion of timber milled that is converted into furniture thereby reducing the demand for timber and the associated waste in the supply chain.

### **The Project Methodology**

Given these expectations, the following project methodology was developed based on Six Sigma:

1. Define: Eco Recycle Victoria was the paying customer and their requirements were paramount. The Furnishing Industry Association of Victoria endorsed the project and introduced two leading furniture companies who specialised in hardwood furniture. Their needs were identified and the project scoped to ensure there was a business return to these lead companies.
2. Measure: The furniture manufacturing process was documented by walking the flow as a process audit report and functional flow diagram with all inputs and outputs identified. The anecdotal data was verified by production records and purchasing invoices. This facilitated an understanding of the key processes that converted the timber into furniture and importantly the quality requirements of timber used. The key supplier processes were documented.
3. Analyse: Data was consolidated and analysed to identify the major timber use by species, the major product parts ie tops, frames, drawers etc and the average timber sizes. The waste was similarly analysed to identify the relative volumes of each type of waste and the losses in each major process. This information was

displayed as a *Material Balance* for the furniture company and a *Waste Map* for the supply chain. The yield of each major process was calculated to estimate the proportion of timber that was converted to furniture. Additional anecdotal data was also supplied as a *Supply Chain Summary Map* to show the information flow, the material flow, the value and the waste.

4. **Improve:** The process flow charts were examined to identify process duplication across the total supply chain so that a supply chain team could work together to eliminate the duplication and the waste inherent in the step. Large waste volumes also became opportunities for recycling. The team documented the timber specification and compared to the process capability. If these were matched then a trial was arranged and the trial material use to make furniture. The timber savings were calculated and if attractive, scale up into production planned
5. **Control:** This step locks in the change by documenting the specification, supplier agreements and verifying safety impact. Operator training or briefing occurs and the change is implemented smoothly. The team continues to meet regularly to review production performance and to address further opportunities.

### **Project Timing**

The project was undertaken over 18 Months:

Partner selection and commitment: 2 Month

Information gathering and measurement: 8 Months

Map supply chain and identify opportunities: 1 Month

Establish supply chain improvement: 1 Months

Select capable timber moulding contractor and pilot changes: 6 Month

Analyse and report results: 1 Month

### **The Project**

The waste within Davis was quantified as

<b>Waste Material</b>	<b>Quantity per Year</b>	<b>Disposal Practice</b>
<b>Timber Shavings</b>	23 tonne	Landfill
<b>Timber shorts</b>	15 tonnes	Firewood
<b>Timber dust</b>	15 tonnes	Landfill
<b>Luan Ply</b>	2 tonnes	Landfill
<b>Other</b>	4 tonnes	Landfill

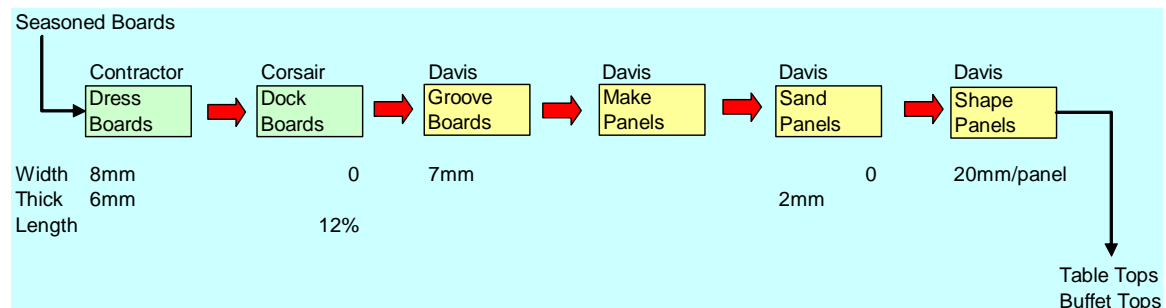
These quantities are too small to economically recycle at Davis Furniture.

The supply chain flow maps identified two process duplication steps:

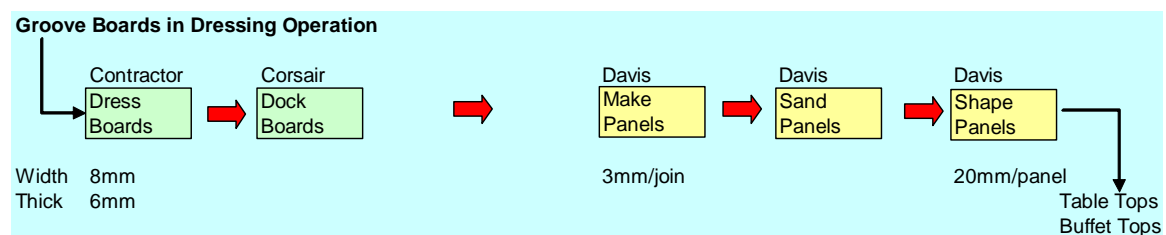
1. Docking
2. Moulding / Edge grooving

Davis Furniture were currently receiving Blackwood docked to length from Corsair Timber and did not have a supplier of Vic Ash that was interested in providing docked to length timber. Davis Furniture was keen to eliminate a 7 mm width loss in edge grooving at Davis Furniture by having Corsair Timber supply edge grooved timber. The grooved timber is used for producing panels for table tops and buffets. It represents two thirds of the timber used and the 7 mm savings translates to a 4% increase in the total timber utilisation. Using Timber Promotion prices of \$2,000 per cubic metre it represents a savings of \$13,000 in timber purchases in addition to productivity gains.

**The current process is:**



**The proposed process is**



Corsair Timber has Blackwood dressed by a contractor. This contractor was at capacity and their moulding machine was not capable of meeting Davis Furniture specifications. An alternative moulder, Merriwa Industries, was accredited for traditional square dressing and for the edge grooving project. The timber waste at Merriwa Industries is recycled as input to particle board manufacturing.

Davis Furniture supplied drawings of their cutters and samples of the edge profile required plus the acceptance criteria for assessing acceptance of the profile. Acceptance required physically interlocking two grooved timber boards and checking for a tight longitudinal fit and no perceptible thickness offset across the joint.

Packs of Blackwood were moulded at Merriwa Industries, returned to Corsair Timber for docking and then shipped to Davis Furniture where they were converted into furniture. The initial trial demonstrated a 5 mm saving by eliminating the grooving process from Davis Furniture. The discrepancy between 5 mm saving achieved in the improvement project versus a theoretical 7 mm saving through elimination of grooving at Davis Furniture is due to a contingency placed on the grooving operation at Davis Furniture.

## **Project Outcomes**

The project strengthened the links between Corsair Timber and Davis Furniture. It demonstrated that high quality edge moulding could be contracted to suppliers and transported from regional Victoria to the Melbourne. It also introduced a new partner, Merriwa Industries, into the supply chain who recycle their timber waste into particle board manufacturing so that upstream process waste is not disposed to landfill.

Davis Furniture can realise a three tonne saving in timber valued at \$10,000 in addition to productivity gains. The demand on Blackwood logs can be reduced by 10 tonnes through more efficient utilisation.

The project demonstrated that by using a data based improvement process and utilising the experience within the industry, timber utilisation can be improved by eliminating waste to provide more sustainable manufacturing.

## **Future Challenges**

Davis Furniture must apply the same practices to Vic Ash supply or to contracting parts supply such as drawers to extend the benefits across the total product range. The opportunity in Vic Ash timber is at least 14 tonnes if docked to length and upstream moulding are implemented. This has a flow on effect of reducing the Vic Ash logging requirement by 56 tonne.

The challenge remains to engage an industry that is comprised of many small companies in this improvement process so that timber being disposed to landfill is dramatically reduced.

## **Contact Details**

EcoRecycle Victoria: Mrs Andrea Klindworth, Mr Simon Clay

ASIRC: Dr Kirsten Schliephake

Davis Furniture Pty Ltd: Mr Tim Little, Mr David Baumann

Corsair Timber: Mr Dennis Brown

## **Acknowledgements**

EcoRecycle Victoria, ASIRC, The operators and management of Davis Furniture and Corsair Timber.