

**MARKET STUDIES  
of  
NEW ZEALAND AND AUSTRALIA**

**WP-OI-95.07**

**Working Paper**

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CANADA-BRITISH COLUMBIA PARTNERSHIP AGREEMENT ON FOREST RESOURCE DEVELOPMENT: FRDA II

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**Canada** 

**BC** 

**MARKET STUDIES  
of  
NEW ZEALAND AND AUSTRALIA**

**WP-OI-95.07**

by

**The Western Canadian Wood Machinery  
&  
Services Export Association**

**This study was prepared as part of the Opportunity Identification Program (Program 5), Canada-British Columbia Partnership Agreement on Forest Resource Development: FRDA II.**

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## **Preamble**

This report is part of a larger project undertaken by the members of the Western Canadian Wood Machinery and Services Export Association in cooperation with FRDA. The objectives of the project were:

.. to assess the potential for exports of wood machinery and engineering products into select jurisdictions with either emerging or an established forest products industry;  
and

.. to develop a sound market development plan for those jurisdictions where the export opportunities warranted.

The report was initially released within the Association and has led to considerable market development effort and some very positive export success.

## **Acknowledgment**

WCWMSEA would like to acknowledge the support and contribution of those who assisted in the completion of this report. The preparation, organization and mission logistics as well as the documentation, writing and printing could not have been possible without the generous support of:

Dr. Bill Wilson, Canadian Forest Service; and

the management and staff of the B.C. Trade Development Corporation.

## **Disclaimer**

The views expressed in this report do not necessarily represent those of the Canadian Forest Service or the B.C. Ministry of Forests.

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## **EXECUTIVE SUMMARY**

### **New Zealand Forestry Sector**

New Zealand is a politically and financially stable country whose economy is predicated on exporting. New Zealand is recognized as an emerging world class forest industry producer.

### **New Zealand Forests**

The impressive growth of the Radiata Pine plantation resource is the driving factor in New Zealand's evolution into a major forestry producer. With the advantage of the fastest growing Radiata Pine in the world, the country expects to double its annual harvest early in the next century to 28 million cubic meters. The success of New Zealand's plantations is a direct result of the country's leading edge management of the resource.

Approximately 85% of the plantations are now privately owned, and this has fueled investment in the forestry sector. About 50% of the privately owned plantations are held by three major forestry companies.

### **Market Opportunities**

The growth of the New Zealand forest sector will catalyze opportunities for Canadian engineering, sawmill equipment and harvesting equipment companies.

In the consulting services sector, engineering forms a part of a design/supply package that is offered by one company. New Zealand is self sufficient in its engineering capabilities, but there will be opportunities for Canadian consultants to support Canadian sawmill equipment vendors with supply contracts. In the longer term it is possible Canadian companies may use collaborative efforts to introduce new Canadian design/supply companies to the market.

The growth in harvest levels is projected to create sawmill equipment opportunities approximating CAN \$36 million annually for the next 15 year period. These harvest levels will also result in a CAN \$38.5 million per year opportunity for harvesting equipment, most notably in the demand for yarding equipment, through to the turn of the century.

### **Competition**

European companies are the predominant competitors in the New Zealand sawmill sector. This is the result of three factors; the perception of the New Zealand sawmill sector that European equipment is ideally suited to its needs; a perception that Canadian equipment is not well suited to the New Zealand sawmill sector; and a strong local marketing effort by the European companies.

In the harvesting equipment sector, the competitor are the same as those in Canada. Canadian yarding equipment is considered leading edge technology.

### **Approach to the Market**

The fundamental factors identified by the market study are:

1. Perception that Canadian equipment is not as well suited as European equipment to saw Radiata Pine. Canadian harvesting equipment is known and well respected, but the market is demanding a greater presence.



2. There are significant sales opportunities in the sawmill and harvesting sectors. Engineering opportunities will result from Canadian contracts to supply sawmill equipment.
3. To succeed in New Zealand, Western Canadian companies will have to:
  - a) develop a local presence or business alliance;
  - b) create an accurate market image for Canadian equipment;
  - c) commit the marketing support and financial resources needed to achieve the above.

### **Australian Forestry Sector**

Australia is a politically and financially stable country. The thrust of its forestry sector is self sufficiency, leading to import replacement and ultimately value added exports.

Australia's pine forest plantation harvests are expected to increase by 35% to 12 million cubic meters by the year 2000, and a further 25% growth to 15 million cubic meters by 2010. With the objective of replacing the 20% of domestic lumber demand and 10% of domestic veneer demand currently satisfied by imports, the State forest owners and the privately owned sawmills are working together to achieve industry self-sufficiency. Value added exports are the longer term goal of the sector.

### **Market Opportunities**

The projected growth in pine harvests will create sales opportunities for consulting services, and sawmill and harvesting equipment.

Sawmill companies rely on internal resources to undertake their process design, and then rely on design/supply companies to support this effort. As such, there are no stand alone wood products engineering companies in Australia. Providing engineering to Canadian companies with equipment supply contracts will be the key mechanism for engineering consultants to enter this market.

Opportunities for equipment sales in the sawmill sector are projected to approximate CAN \$35 million for the period 1994-2000. This projection does not include the trend to small log processing by the sector, or the possible increase in harvest levels resulting from a change in management practices and/or increased privatization of the forest resource. Opportunities for harvesting equipment sales are projected at \$CAN 13.5 million annually to the year 2000.

### **Competition**

Competition in the sawmill equipment sector is predominantly from European and American companies. European companies have the greatest market share as a result of their market efforts, and the perception of the Australian sawmill sector that its processing needs are similar to those of the European forest sector.

Competitors in the harvesting sector are the same as those in Canada and North America, with no distinct market leader.

## **Approach to the Market**

The critical factors identified by the market study include:

1. The sawmill sector is not aware of Canada's small log processing capability and technology. A defined market presence and effort is required.
2. There are significant sales opportunities in the sawmill and harvesting markets, and the potential that the market may grow dramatically if the allowable cut of timber increases or if some privatization of the plantation resource occurs.
3. To penetrate the Australian market, Western Canadian companies need to:
  - a) develop a local presence and/or business alliance;
  - b) undertake a focused marketing effort to change the Australian misconceptions of Canadian equipment capabilities;
  - c) commit the marketing and financial resources needed to create a market identity.

## **2.0 NEW ZEALAND OVERVIEW**

### **2.1 Political System**

New Zealand became a self governing dominion in 1907. While Queen Elizabeth II remains the titular head of state and is represented by a Governor General, New Zealand's constitution operates as a democracy.

New Zealand's two principal political parties are the National Party, which is considered to be to the right or conservative side of centre, and the Labour Party, which is considered to be to the left or socialistic side of centre. Although the parties have shared equally balanced popular support since the post war period, the National Party has enjoyed more electoral success. The National Party has held power from 1949 with the exception of three periods: 1957-60, 1972-73, and 1984-90.

Local or provincial authorities administer local community services other than police, fire, education and social welfare services, which are under the control of the central government.

### **2.2 Geography**

New Zealand is situated in the South Pacific Ocean approximately 1,600 kilometers east of Australia, and 12,000 Kilometers from Vancouver. The country is comprised of two main islands, the North Island and South Island, separated by the narrow Cook Strait.

The country has an area of 26.9 million hectares or 103,800 square miles. By comparison it is similar in size to the United Kingdom or Japan. The North and South Islands extend over 1,700 kilometers in length, but do not exceed 450 kilometers in width. While the coastal areas are characterized by lowland areas, New Zealand also has mountainous topography, predominantly on the South Island.

### **2.3 Population**

New Zealand's population as of its last census in March 1991 was 3.43 million people. This number is projected to increase to 3.7 million by the turn of the century. Populations of the cities are as follows.

## North Island

Auckland	886,000
Wellington	326,000
Hamilton	149,000
Napier/Hastings	110,000

## South Island

Christchurch	307,000
Dunedin	110,000

### **3.0 NEW ZEALAND BUSINESS ENVIRONMENT**

#### **3.1 Economic Trends**






New Zealand's economy is based on a private enterprise system. The country's economic development has traditionally been based on agricultural products. Meat, dairy products and wool products accounted for 96% percent of New Zealand's total exports in 1966. Today, these products account for only 40% of total exports, with the remainder including manufactured products, forestry products, fish, horticultural products and engineering products.

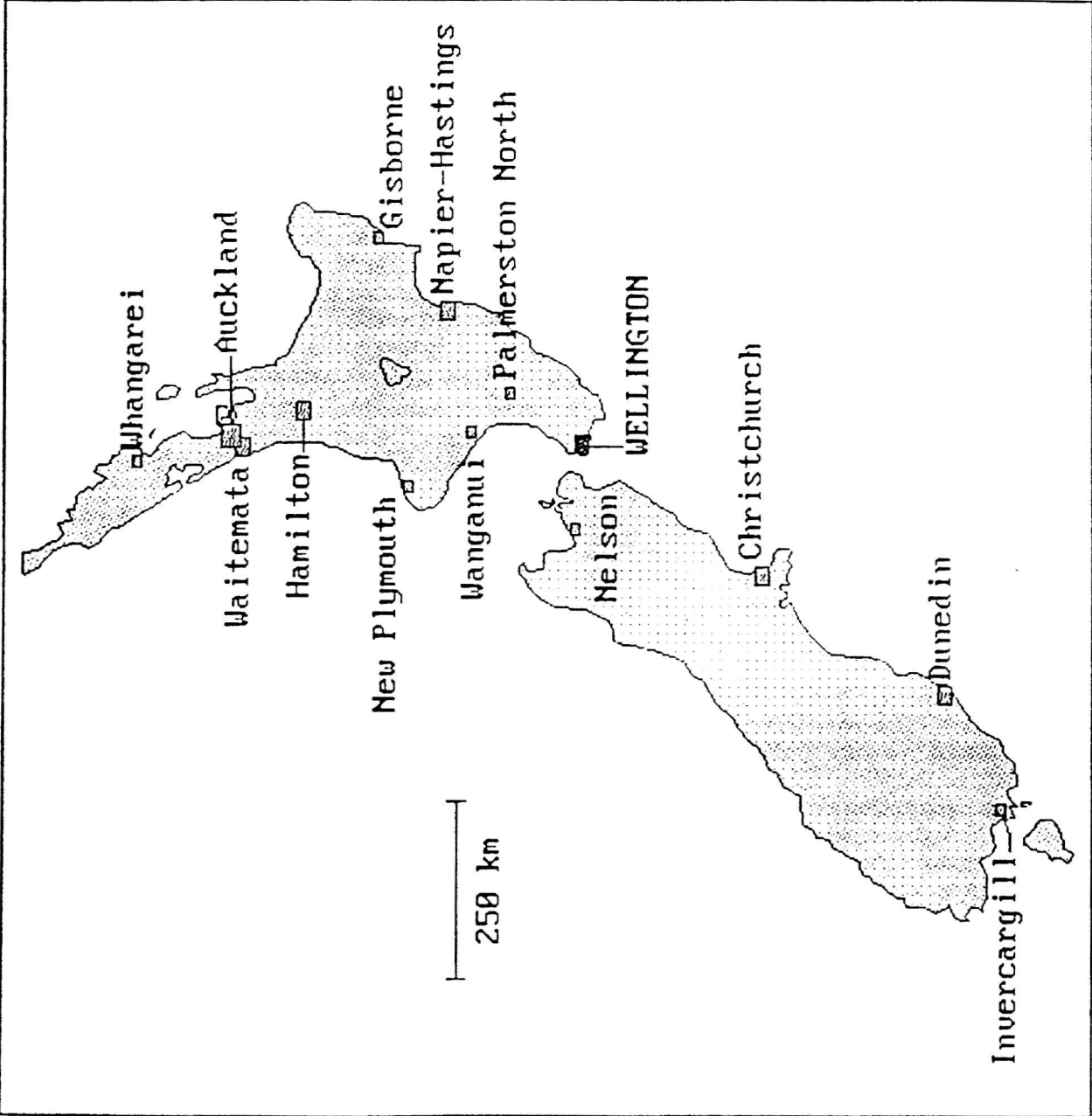
Although the growth and diversification of New Zealand's economy are dependent on the further development of exports, the country suffers from the problem of distance. It is not only a long way from Canada, it is a significant distance from most of its markets, particularly Europe. Australia, New Zealand's major trading partner, is over 1,500 kilometers away.

New Zealand's economy has experienced a slow economic growth over the last several years, the result of the October 1987 crash of its financial markets. Tough monetary policies and reforms have been employed by the government to reduce inflation and foster an export led economic recovery. Unemployment has risen during this period from 7 percent to approximately 11 percent.

The theme communicated to the Association's market investigation team was the need for tough economic policies to turn around the country's economy, and lead it away from the prospect of bankruptcy. The economic recovery evidenced in New Zealand is a positive one, as the country appears to be on a solidly founded road to financial stability. Most New Zealanders expressed the notion that recent tough times were the necessary "pain to gain" required to make the country an internationally competitive nation.

Although the immediate impact of New Zealand's "economic reform" has been an increase in unemployment and an increase in overseas debt as a percentage of GDP, a competitively priced currency has resulted in an increase in exports in 1991 and New Zealand's first surplus in its balance of payments in several years. The reserve bank predicts that the economy will grow 3% per year in 1993 and 1994. Inflation is expected to increase by 2% this year.

<b>NEW ZEALAND</b>	
Population	3.3 Million
Area (sq km)	268,676
<b>City Population</b>	
	Over 1,000,000
	Over 500,000
	Over 100,000
	Under 100,000
	Capital



### **3.2 Currency and Foreign Exchange**

New Zealand has a modern financial and banking system by Canadian standards. It is composed of a Reserve Bank that operates similarly to the central banks of other Western countries. It regulates the monetary and banking systems, administers exchange control, and it regulates monetary policy to control inflation (Reserve Bank Act December 1989) at forecasted levels of 1.5 to 3.5 percent in 1992/93 and 0 to 2 percent in 1993/94.

The banking market is a composition of institutions that provide a wide range of traditional banking services.

The New Zealand dollar, which is divided into 100 cents, is currently trading in the range of \$US 1 = \$NZ 1.75

It should be noted that the weak performance of the New Zealand dollar against international currencies has made it extremely difficult for companies in the forest industry to afford the price of equipment manufactured in North America and Europe.

### **3.3 Import Duties**

There are no quantitative restrictions on imports to New Zealand. Effective July 1992, there are no licensing requirements for imported goods. The Minister of Commerce has the power to impose dumping duties on imported goods if it deems a prejudicial effect on any New Zealand Industry.

Imports into New Zealand are subject to varying rates of duty, which can be amended to protect local industries. Tariff rates are expressed in ad valorem terms, as a percentage of the New Zealand currency value of the imported good. The value is generally the transaction price on an FOB basis.

New Zealand uses a Generalized System of Preferences (GSP) to set duty rates for developed and less developed countries. GSP operates on a unilateral and non-reciprocal basis for developed countries. Under this concept, Canada enjoys a preferential maximum rate of 10%, and a reduction of this rate to 2 or 3 % is currently in the planning stages.

The above rate includes all manufactured goods including forest equipment. It should be noted that raw materials, components or goods that are not manufactured locally may be imported duty free on approval of concessions.

Goods and services tax (GST) is payable on all goods imported into New Zealand and it is calculated on:

- Customs value, normally invoice value, and;
- customs duties, including dumping or countervailing duties if any.

Note: Canada's preferential rate can change at any time. At the current moment it is the position of the Minister of Commerce that Canada's preferential rate is not being reciprocated by Canada on New Zealand imports.

### **3.4 Taxation**

The primary income tax rate for resident companies is 33% of taxable income. Non resident companies are taxed at 38% of taxable income. Within these simple categorizations there are a host of structural considerations to be considered regarding resident and non resident companies, and branch versus subsidiary operations, all of which should be considered when establishing an operation in New Zealand.

### **3.5 Business Practices**

In general terms, business practices in New Zealand are similar to those in Canada. New Zealand's financial and legal systems are conducive to foreign investment and trade. Day-to-day business practices mirror those in Canada.

Due to New Zealand's reliance on imports and its geographic isolation, New Zealand business people commonly possess a good knowledge of world trends that effect their industry sector. The forest sector is a good example of this market factor. Since there is little domestic manufacturing of forest equipment, industry personnel do travel abroad to educate themselves on equipment and technology.

### **3.6 Foreign Investment**

Foreign investment is encouraged and accepted by the government of New Zealand. Foreign investment, especially considering the country's reliance on imports, is viewed as an essential component for the country's industrial development.

The highlights of the foreign investment policy are summarized below.

- New Zealand currency is freely convertible.
- One hundred percent foreign ownership is permitted.
- Profits can be freely repatriated.
- New Zealand has a free trade agreement with Australia.

There are investment regulations and restrictions but foreign investment consents typically involve investments greater than NZ \$10 million.

### 3.7 Labour

The population of New Zealand is approximately 3.5 million people, of which the total labour force is about 1.6 million people. It should be noted that 83% of the population resides in the major urban centers.

While New Zealand maintains what is considered a moderately high standard of living, since the economic recession in 1988 unemployment has increased in the middle and lower socio-economic income bracket. Current unemployment approximates 11% and the average weekly wage is estimated to be \$650 per week.

With unemployment currently running over 10%, there is a large pool of available labour. However, there is a shortage of skilled labour and New Zealand is searching for alternatives to create the skills needed to induce industrial growth in the country. This fact was illustrated in the harvesting industry, where contractors were trying to import yarder crews as there was a defined shortage of that skill. Notably, this is also the fastest growing segment of the logging business.

Of considerable importance to the form of the labour market is the impact of the Employments Contracts Act which was enacted in 1991.

Prior to this act, the industrial relations environment in New Zealand was defined as regulated, wherein union membership was compulsory with some minor exceptions, and settlements were based on a national award system administered by the Department of Labor.

The Employment Contracts Act introduced in 1991 was a radical change in direction from a century of labour law. The critical issue was the fact the Act provided for no statutory role for unions. It put in place decentralized methods of negotiation that emphasized the individual over the collective.

Essentially, for the first time in a century, the labour market was given the right to negotiate labour matters outside the context of union agreements. Labor was permitted to become a free market, as opposed to a regulated, closed market place.

This act has had a stunning impact on labour. It enabled employers and employees to enter into contracts individually at market rates. It also permitted the establishment of collectives of employees who could negotiate their own working agreement outside a national context. The result is a labour market predicated on deregulation and competitiveness.

Examples of the dramatic impact of this legislation are the port authorities in New Zealand. Manpower reductions at these facilities were as high as 70%, leading to debilitating strikes. Yet, within the provisions of the Act the port authorities restructured their labour, achieving huge productivity gains with smaller work forces, and achieving a return to profitability.

Given the radical nature of this legislation, there are both advocates and critics of this concept. Generally it has been accepted as one of the get tough measures needed to make New Zealand an internationally competitive country. In the short term it has resulted in an increase in unemployment as businesses restructured their work forces and their competitive positions.



### **3.8 Access to other Countries**

As mentioned above, New Zealand has a free trade agreement with Australia, which is a significant advantage to the Canadian supplier, who plans to supply both markets.

Also of import consideration is the fact Australia is perceived as a gateway to the southeast Asian market. Hence, an effort to supply the New Zealand/Australia markets may be the foundation to a further expansion into Asia.

#### 4.0 FOREST INDUSTRY OVERVIEW

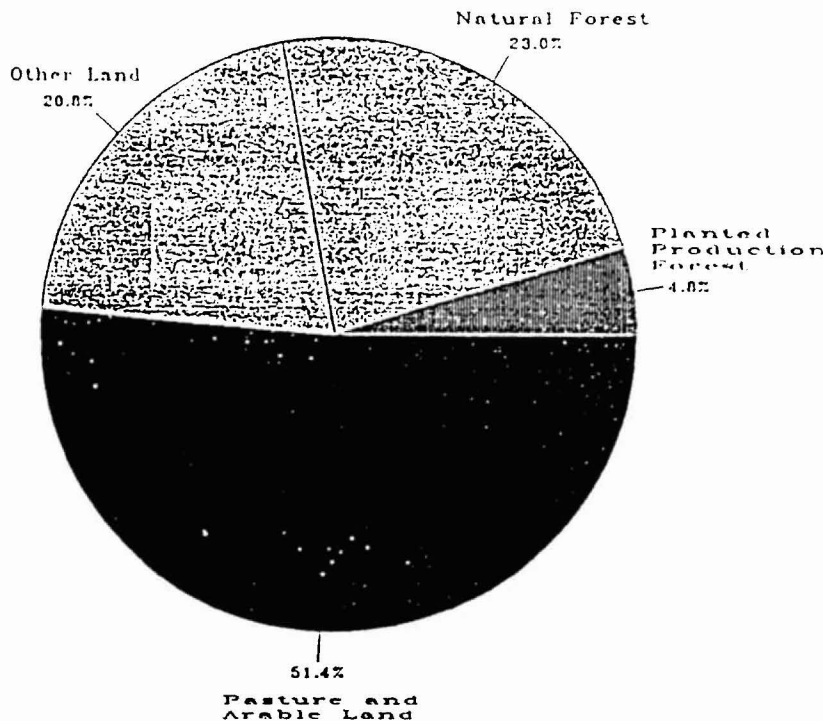
The forest sector, as a direct result of major investments in intensive forest management starting in the early 1900's, has become a major economic contributor to the New Zealand economy. The sector currently employs 28,000 people and accounts for more than 10% of total export earnings.

The impact of the sector will increase as the harvest from plantation forests is expected to almost double by early in the next century. It has been estimated that an investment of approximately NZ \$3.5 billion will be required over the next 15 years to process this wood into sawn lumber, panel and pulp and paper products.

#### 4.1 Forest Resource

### AREAS OF FORESTED AND NON-FORESTED LAND

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From the arrival of the first Polynesian settlers some 1000 years ago, native vegetation that covered the majority of the two main islands has been systematically removed. European settlers accelerated the rate of removal to support an expanding sheep farming industry.

Concern about an adequate supply of commercial timber for domestic consumption led to the start of plantation forest management in the late 1800's. The New Zealand forest industry is now based primarily on the efficient management and processing of fibre from these forests.

#### 4.1.1 Native Species

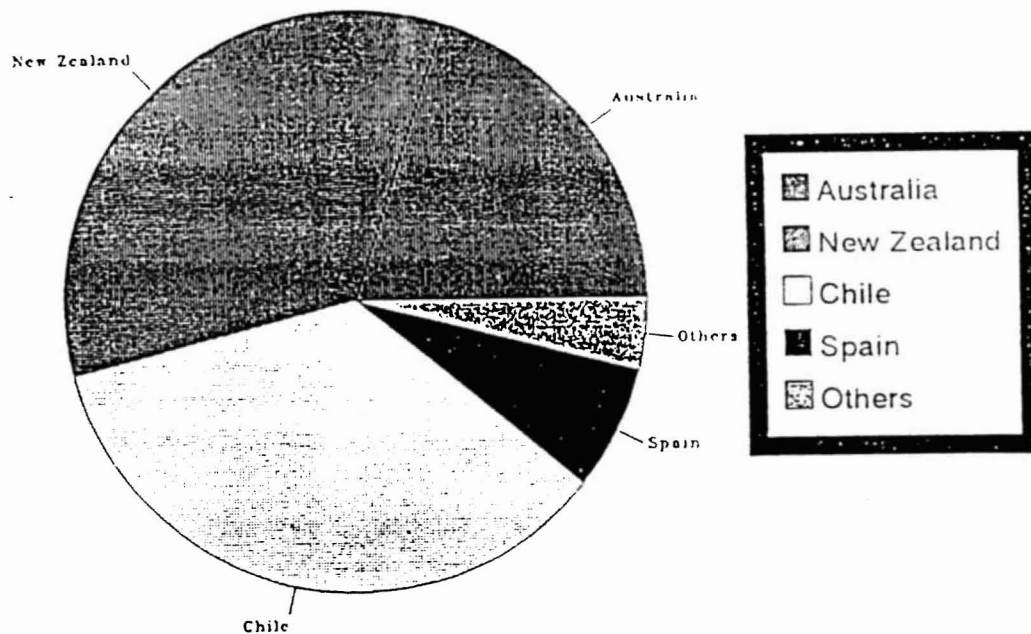
The native forests of New Zealand cover approximately 23% (6.2 million hectares) but account for less than 2% of the total forest production. Most of the area has been permanently set aside in national parks, reserves and other protected areas.

New legislation in the 1993 Forest Amendment Act sets out specific rules on processing and exporting to ensure the sustainable management of native species.

#### 4.1.2 Plantations

### THE GLOBAL RADIATA FOREST ESTATE

Estimated Total Area 3.60 Million Hectares



Radiata Pine has been grown commercially in a number of countries for some time. The specific nature of the timber now being harvested has been determined by the intensity and nature of forest management practiced in each area. The total volume of Radiata Pine expected to reach world markets will increase significantly towards the turn of the century as plantations reach determined rotation ages (25 to 45 years).

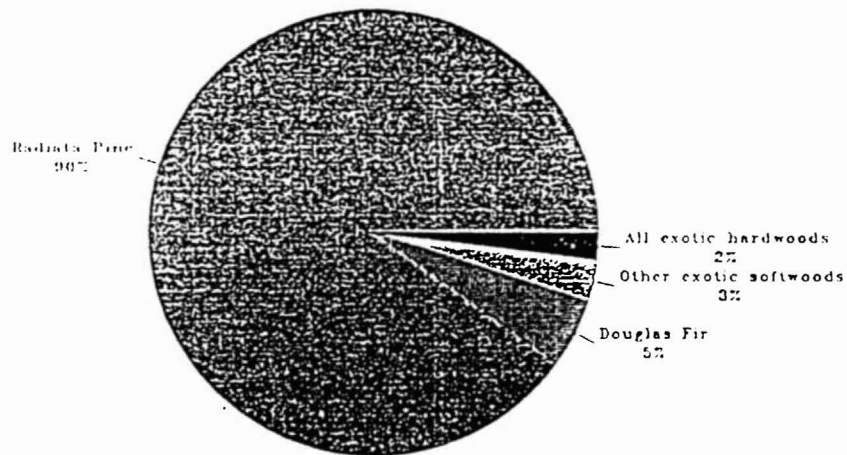


lantation forests are distributed throughout the north and south islands with a large concentration in the Central North Island Area. The majority of the forested area is contained in relatively few large blocks. There are, however, an increasing number of small holdings being developed by groups of independent investors.

The geographic distribution of the original plantation forests was determined to meet various government initiatives from erosion control to economic development. Forests are now being established based on commercial and environmental considerations.

## SPECIES DISTRIBUTION

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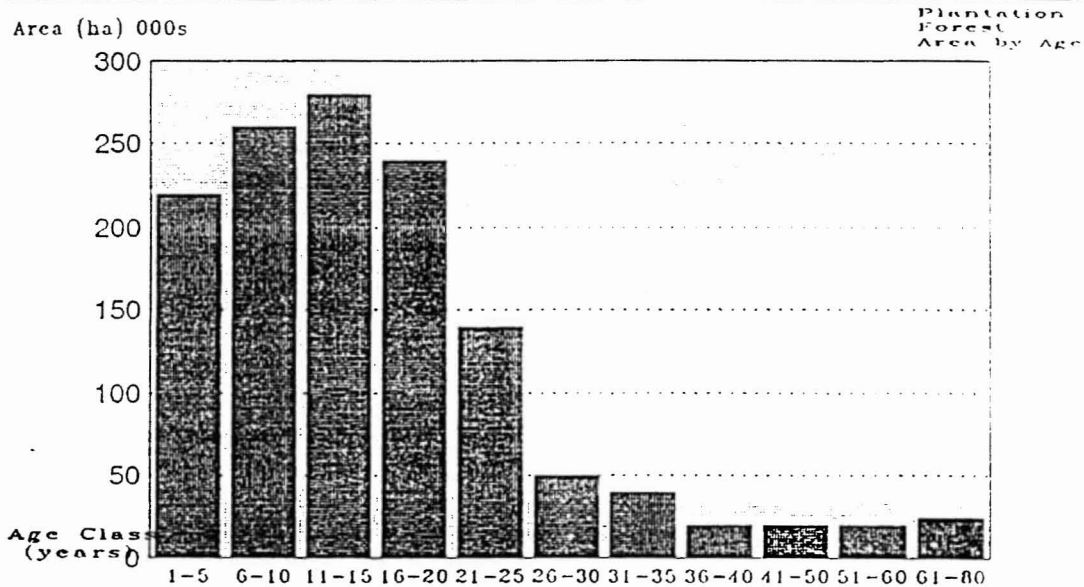


Source: National Exotic Forest Description (1992)

Over 90% of the total plantation production forests are Radiata Pine. Small amounts of Douglas Fir (5%), Larch and Lodgepole have been planted in the past. In addition, several hardwood species such as Macrocarpa, Blackwood and several eucalyptus species are grown in some areas. Commercial considerations that drive the sector, have resulted in Radiata Pine being the species of choice.

# SIZE AND AGE CLASS DISTRIBUTION

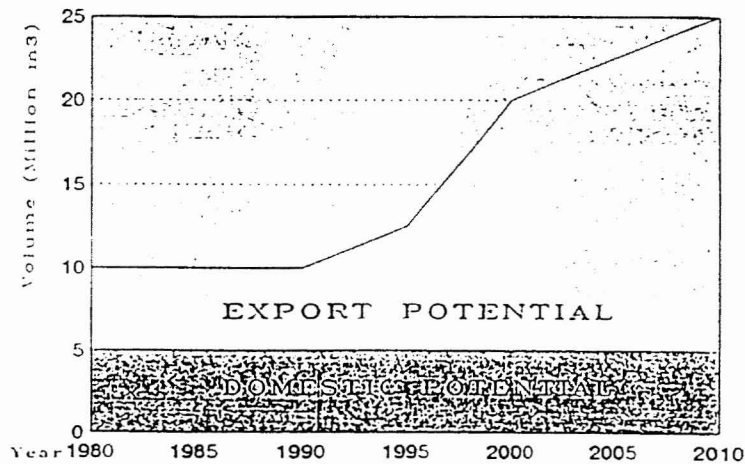
The Total planted forest resource now exceeds 1.3 million hectares.  
The resource is broken down into Age Classes.



Source: National Exotic Forest Description as at April 1, 1991

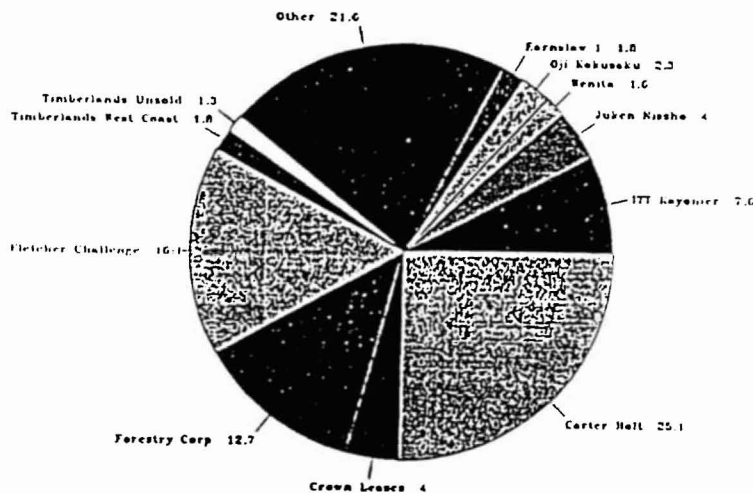
The total area in plantation forests in New Zealand now exceeds 1.3 million hectares. Early in the next century, harvest levels of mainly Radiata Pine are expected to double the current harvest level of 14 million cubic meters. If a further 50,000 hectares per year are established on marginal farmland, harvest levels could approach 40 million cubic meters by the year 2020.

# WOOD AVAILABILITY FORECAST



The domestic market for wood products will remain fairly static and limited in scope because of the small population base. The manufacture of a greater range of products and the development of new export markets will be a major challenge and potentially a significant opportunity for the industry.

OWNERSHIP OF NEW ZEALAND'S PLANTATION FOREST AS AT MAY 1992



Source: Ministry of Forestry 1993

The New Zealand government started a privatization process in 1987 when the forests that were controlled by the New Zealand Forest Service were transferred to a state-owned enterprise (New Zealand Forestry Corporation). From 1990 to 1992, all but approximately 14% of the forestland was sold to private interests.

A number of major global forest companies purchased significant areas of established plantations. The remaining commercial plantation currently under the management of the Forestry Corporation is expected to be sold.

## 4.2 Wood Products Manufacturing Sector

The industry has evolved rapidly since the national financial crises of the late 80's. The privatization of the plantation resource has had a tremendously positive impact on the sector, as the sector now has a greater control over its destiny, and major capital investments are easier to define and justify. This privatization has facilitated a major shift in the sector, from one marketing 75% of its product domestically, to one marketing 75% of its product offshore. This shift has created dramatic changes in operating philosophy and equipment, and the sector is still adapting to this evolution.

Perhaps the greatest challenge facing the industry is improving ability to pay ever increasing international prices for raw material. That is to say, given current production efficiencies, timber owners can earn greater profits by exporting logs, rather than processing them in their own processing facilities.

The supply of timber is projected to grow by as much as 100% by the turn of the century. This would suggest that production capacity will also have to double over this time frame. However, until the processing sector can improve processing efficiencies to lower cost, develop higher valued products, and develop new markets, the sector will continue to compete with the increasing international price for export logs.

### Softwood Harvest Levels (Million m<sup>3</sup>)

	<u>1993</u>	<u>2000</u>	<u>2010</u>	<u>2020</u>
New Zealand	14	22	29	40
Australia	9	12	15	20
Chile	12	23	30	45

### Investment

An analysis of the development of the New Zealand industry since the mid 1950's shows:

- The evolution of a diversified solid wood products industry producing a range of sawn lumber products;
- Steady growth in the domestic sawmilling industry;
- Little growth in the pulp and paper and fiberboard industry over the last 5 years;
- Rapid increase in log exports since 1989 (over 26% of the annual harvest).

The larger mills in the solid wood products industry have invested over \$100 million in new plants and equipment over the last 5 years. New kiln drying facilities have been the most common form of investment, followed by mill modernization and expansion, and the addition of further processing facilities.

In its effort to become more production efficient and internationally competitive, and process the increasing volumes of plantation resource, the processing sector will require new capital investment. Over 90% of the mills surveyed during the study preceding this report indicated they were planning new investments. However, the mills found it difficult



to be categorical on their expansion plans, as they continue to struggle to be efficient and compete with the export price for raw materials.

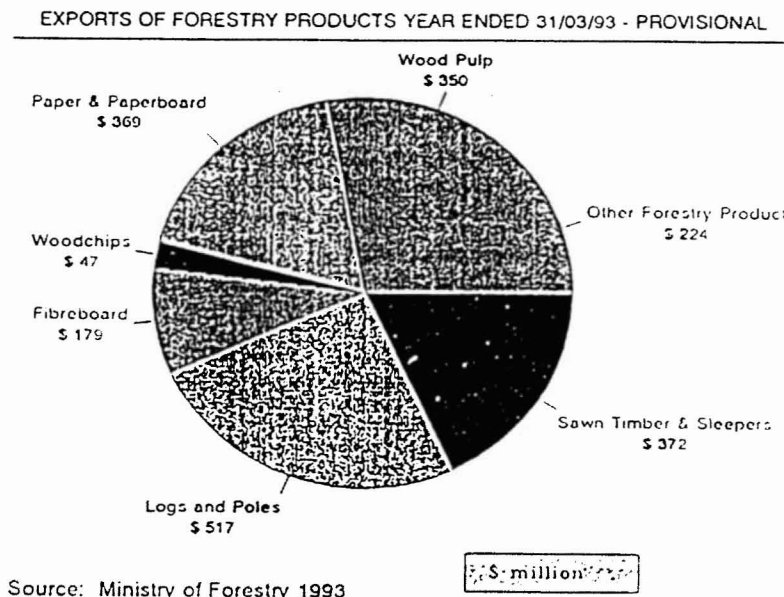
## Markets

The largest and most profitable export market continues to be Australia because of its close proximity; the fact the country shares the same resource and knowledge about the use of that resource; and the fact the two countries have a free trade agreement. The industry sector must go beyond this familiar market and find new markets that will accept Radiata Pine as more than just a source of structural lumber.

In the United States, Radiata Pine is being accepted as a substitute for Ponderosa Pine as the availability of this species diminishes.

In most new markets New Zealand is competing not only with traditional softwood exporters from North America and Scandinavia but with rapidly expanding supplies of other plantation grown softwood in Chile, Brazil, South Africa, Australia, and the US South.

The forest sector has had considerable success breaking into new markets some of which have been the exclusive realm of northern hemisphere softwood producers. The sector has also diversified into products not traditionally manufactured in New Zealand.



## Constraints to Market Growth

To succeed in its goal to expand into an international competitive forest sector, New Zealand will have to contend with the following factors.

1. An increasing international price for export logs.
2. High shipping costs to export markets.

3. The growing pains involved with evolving from dimensional lumber production to value added processing.

The government allows unrestricted export of logs harvested from plantation forests. Since 1987, log exports have increased 615% to over 4 million cubic meters per annum.

This increase can be attributed to the attractive returns from log exports and the need for increased cash flow to finance the purchase of forest land and the installation of new solid wood processing equipment.

Access to international log prices has been a stimulus for growing investment in the forest sector, including investments in land, new plantations, and processing equipment. Most forest companies do seem committed to further domestic processing of the plantation harvest.

#### 4.2.1 Sawmilling

The structure of the sawmill industry is reminiscent of the British Columbia industry in the 1960's. The 10 largest mills produce approximately 50% of the lumber. These larger mills, in most cases, process timber harvested from plantation forests owned by the same company.

By British Columbia standards, even the larger New Zealand mills are relatively small with the largest producing in the order of 200,000 cubic meters of sawn timber annually. Some of these larger mills, over the last several years, have installed new processing technology. Computer optimization is just now being installed by some of the more progressive operators.

### SIZE CLASS STRUCTURE OF NEW ZEALAND SAWMILLS (YEAR ENDED 31 MARCH 1992)

MILL SIZE CLASS (IN TERMS OF M <sup>3</sup> OF SAWN TIMBER PRODUCED IN THE YEAR)		NUMBER OF MILLS	% OF TOTAL NUMBER OF MILLS	ANNUAL VOLUME OF PLANTATION FOREST GROWN SAWN TIMBER PRODUCED IN THE YEAR ENDED 31 MARCH 1992 (M <sup>3</sup> )	% OF TOTAL VOLUME PRODUCED
FROM	TO				
0	4 500	178	71	162 812	7
4 501	10 000	21	8	134 678	6
10 001	20 000	28	11	398 060	18
20 001	50 000	10	4	271 565	12
50 001	100 000	6	2	432 146	19
100 000	200 000	6	2	838 756	37
		249	100	2 238 017	100

Note: The table also includes mills which saw indigenous logs only.

In contrast to much of our industry, a number of the sawmills further processed sawn lumber into finger jointed products at the same site.

Independent sawmills are usually small, private companies (in some cases family owned) who do not own forests or hold long term supply contracts with forest owners. They produce approximately 37% of New Zealand's total annual sawn timber production.

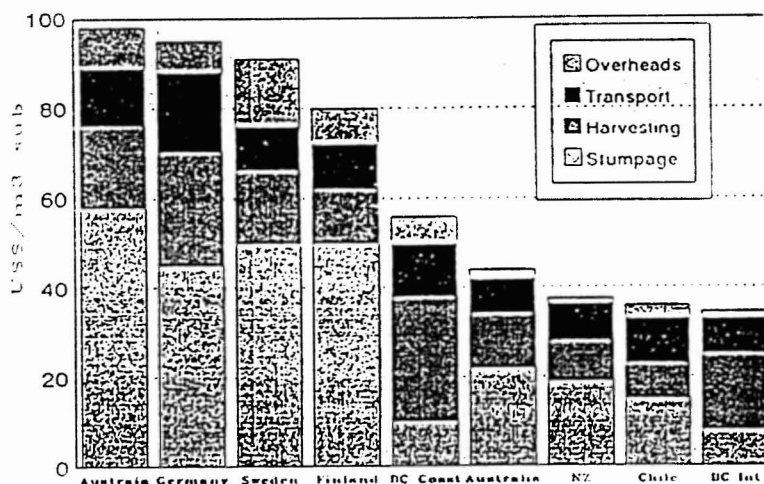
Dramatic increases in international demand for wood products, including logs, and the recent changes in forestland ownership in New Zealand have adversely affected the supply and cost of wood to independent sawmills. For example, Radiata Pine log prices on the export market increased by up to 120% during the last year.

**Coping with these changes to remain competitive in international markets will require significant investment in new process technology. This is a significant opportunity for WCWMSEA members.**

The remanufacturing sector of the industry, like that in British Columbia, consists of a wide range of facilities owned by both independent companies and large integrated concerns such as the Forestry Corporation of New Zealand. Many of these are stand alone facilities but some are an integral part of primary sawmills.

The secondary manufacturing operations not linked to sawmills buy clear and shop grade lumber to further manufacture into such products as cut-to-size blanks, mouldings, doors, and furniture components.

REGIONAL WOOD COST STRUCTURES: SOFTWOOD SAWLOGS (1992 1/IV)



SOURCE: Groome Polyr (1992)

It should be noted that the forest operations and the processing side of most of the major forest companies operate as individual profit centers. Therefore, mill facilities buy logs from their own forest operations at market prices. However, accessible terrain, exceptional growth rates and increasingly competitive labour rates combine to provide sawlog costs among the lowest in the world.

## **4.2.2 Panel Products**

The New Zealand forest industry currently manufactures a range of panel products. International investors, attracted by the privatization of forestlands, an increasing harvest level and an attractive investment climate continue to expand the production of veneer, plywood, laminated veneer lumber and various reconstituted panel products such as laminated veneer lumber.

Currently, a relatively small quantity of veneer and plywood (less than 100,000 cubic meters), is produced for the domestic and Australian market. In addition, a small amount of veneer is shipped to Asia and Japan.

A Japanese company (Juken Nissho) is the only company currently producing laminated veneer lumber in New Zealand. The company is employing Japanese technology to manufacture a product primarily for the furniture market in Japan. Another facility is now being constructed on the North Island.

Radiata Pine is particularly suited for the production of medium density fibreboard. Additional capacity will be required to meet the growing demand in Asian markets.

**Note:** Readers interested in a more detailed overview of engineered board industry in New Zealand and Australia can refer to a detailed report included in Appendix 8.3.

## **4.2.3 Pulp and Paper**

Seven pulp and paper mills have been constructed on the North Island since the first pulp mill was established to use Radiata Pine in 1937. A paper mill processing purchased fibre is located on the south island.

Increasing harvest levels should lead to further investment in this sector, particularly expansion of existing facilities and construction of greenfield operations to produce mechanically based products.

## **4.3 Industry Organizations**

### **Radiata Pine Remanufacturing Association (RPRA)**

Box 256  
111 High Street  
Motueka, New Zealand

Phone: 03 528 6006  
Fax: 03 528 6220

- Represents manufacturers of millwork, dimension stock and solid clearwood components and products,
- Association objectives of special interest:
  1. To provide the means by which to upgrade the industry's manufacturing capabilities and profitability through product

diversification and exposure to new and improved production techniques;

2. To encourage the free exchange of ideas, information and skills between members and others.

**New Zealand Timber Industry Federation (Inc.)**

Box 308  
Wellington, New Zealand

Phone: 04 735 200  
Fax: 04 736 536

- Represents 250 sawmillers and processors.

**New Zealand Owned Sawmillers Group**

**New Zealand Forest Owners Association**

**New Zealand Forest Research Institute**

Private Bag 3020  
Rotorua, New Zealand

Phone: 64-7-347-5899  
Fax: 64-7-347-9398

R.J. (George) Hooper  
Business Development Manager

## 5.0 NEW ZEALAND CONSULTING ENGINEERING SERVICES MARKET OVERVIEW

The New Zealand forest industry has suffered through recessionary times in the 80's and recently has undergone major restructuring to retain its international competitiveness. The forest industry has been privatized, resulting in consolidation of most of the forest ownership to three major owners, Carter Holt Harvey, Tasman Forest (Fletcher Challenge), and the Forestry Corporation who owns the last portion of the Government forests.

In addition to these major new owners, smaller holdings and operations have been purchased by Asian owners such as Juken Nissho (Japan) in LVL and plywood and Ernslaw One Limited (Malaysian investors) on the South Island who are into sawmilling and remanufacturing. IIT Rayonier now holds 10% of the forest but only exports logs as it does not own processing facilities.

There are many small sawmill operations that have survived the recession and restructuring, through focused market niche and diversification approaches, but who face an increased uncertainty of timber supply. The more financially stable ones are getting into their own plantations and ultimately will be in the harvesting business. The small operators tend to do small incremental improvements using their maintenance staff, small local consultants, and design/supply vendors to do any engineering required.

The recent recession and market demand has resulted in most consulting engineering services being provided as part of design/equipment supply product offered by machinery vendors. There are no consulting firms who specialize in wood products engineering alone.

Most of the major forest companies have developed in-house resources (engineering or production or maintenance personnel) to do their feasibility studies and process engineering. These companies then rely on consultants for discipline engineering and/or use design/supply services of local supply companies who are agents for machinery vendors and fabricators. **Engineering services now commonly form a part of the equipment supply package.**

This is the result of two factors:

- \* The industry demand to have equipment vendors include the relevant engineering to achieve the sale.
- \* The industry interest to exchange design concepts with an engineer who is familiar with a particular product(s) and its application(s).

The the three major suppliers of wood products engineering services are Southern Cross Engineering Company Limited, Christchurch; I.S.T. Engineering Limited, Auckland; and Wilson Engineering Systems, Auckland, all of whom are agents for a range of North American, Japanese and European equipment manufacturers and fabricate material handling equipment.

Recently, Tasman dissolved its engineering group and hired an external consultant, Beca-Simons, to do its engineering. This event has generated considerable interest in the industry and may signify a future trend for the other major companies. This may also represent an opportunity for Canadian consultants, but it may require affiliation with a NZ firm to work successfully.

## **5.1 MARKET OPPORTUNITY FOR CANADIAN CONSULTING COMPANIES**

### **Sawmill Sector**

The opportunity for Canadian consulting companies is to support B.C. equipment vendors who have secured design/supply contracts. With the New Zealand forest regime evolving to value rather than volume, expertise in B.C. coastal log conversion may be applicable.

Alternatively, a Canadian consultant could collaborate with Canadian equipment suppliers to penetrate this market in affiliation with a local engineering company.

### **Secondary Manufacturing Operations**

At present the major thrust to remanufacturing is being provided by U.S. companies who are providing the manufacturing and marketing expertise along with equipment supply and some financing. The predominant American company is Fiberwood out of California who are forming joint ventures in both NZ and Australia. Japanese operations in this area (Juken Nissho) also provide their own expertise, equipment, management, and financing.

### **Silviculture and Forestry**

The New Zealanders lead the world in Radiata Pine forestry and thus there is little or no opportunity in this area. An opportunity for Canadian companies might be to learn what the New Zealanders are doing in forest management and apply applicable practices in Canada.

### **Harvesting Operations**

The trend in harvesting in NZ is to use yarders for logging as many of the plantations sites are on sloping ground and there is a major trend to reduce ground degradation. There are Canadian loggers now in NZ operating as contractors. There may be some opportunities in this area, but with the capability of the NZ foresters, combined with their knowledge of practices world wide, specific research beyond the scope of this survey would be required to quantify any opportunities.

### **Summary**

Opportunities lie with providing engineering support to Canadian equipment suppliers and affiliation with a resident engineering company. Like most sales opportunities, market presence is key, as the cost of personnel transportation to these markets is high and Canadian labour rates are in the order of 25% higher than NZ rates.

Strategically, a Canadian company considering the penetration of this market would need an aggressive, persistent effort, as the market is currently self sufficient in engineering capability. Affiliations with Canadian or other equipment suppliers attempting a similar market entry, and offering new products to the industry, may be the strategic key to success.

## **5.2 STRENGTHS, WEAKNESSES, OPPORTUNITIES & THREATS (SWOT) ANALYSIS FOR CANADIAN ENGINEERING CONSULTANTS IN NEW ZEALAND**

### **Strengths**

Canadians are recognized as having world class sawmilling expertise.

Canada has an international reputation and has sold design and equipment in NZ in the past.

Full range of engineering design capabilities offered.

### **Weaknesses**

Lack of market presence and market linkages.

Charge out rates are 25% higher than local rates.

Perceived lack of knowledge in Radiata Pine product markets and related sawing requirements.

### **Opportunities**

Fletcher Challenge (Tasman) is one of the majors in New Zealand and is also in Canada. Using this connection could provide an opportunity to enter the New Zealand market.

Fletcher Challenge (Tasman) has sub-contracted its in-house pulp and paper engineering to a local consultant. This may establish a trend amongst the other majors which may enhance the opportunity for Canadian consultants who can become affiliated with a local consultant.

### **Threats**

Existing equipment suppliers provide engineering design services.

Perception that European design is more applicable to plantation forest sawmilling design.



## 6.0 NEW ZEALAND SAWMILLING SECTOR OVERVIEW

### Sawmilling Operations

There are approximately 243 sawmills operating in New Zealand.

- \* Three companies, namely Carter Holt Harvey, Fletcher Challenge, Forestry Corporation of NZ control 54% of the forests.
- \* These companies produce 69% of the sawn timber. About 25% of the total sawmill output is produced by small to medium sized mills.
- \* There are approximately eight large mills (by NZ standards) that produce up to 500-600 m<sup>3</sup>/shift. An annual production of 200,000 m<sup>3</sup>/year is the high end of the range.
- \* Most of the medium to small mills produce 20-30,000 m<sup>3</sup>/year on a single shift basis.

**To compare to B.C., who produce 34 million cubic meters per year in 205 mills, NZ produces about 2.4 million cubic meters in 243 mills.**

A typical mill has a bandsaw headrig, an edger and a resaw and employ about 100 people. Most of the small to medium mills are constrained by limited wood supply, especially after the recent privatization of the forests.

Privatization has led to foreign investment by Japanese and Malaysian investors who now own 18% of the forests. Typical is Juken Nissho who own 4% of the forests and who have installed LVL capacity in Masterton and Gisborne, and have purchased and expanded the Triboard mill at Kaitaia.

Included in this group of foreign investors is ITT Rayonier who is exporting logs and who has no conversion facilities. Note: As stated earlier there are no controls of log exports in NZ.

### Equipment Focus

The privatization of the forest resource has catalyzed a dramatic change in thinking within the major forest companies. With a secure supply of raw material these companies can better project capital investment requirements. Similar to Chile, New Zealand forest production will double early in the next century at approximately 29 million cubic meters. With the goal of evolving into internationally competitive value-added processors, these companies will have to expand and upgrade to accommodate their goals.

However, a conclusion of the market study was the fact that these major producers were still in the formative stages of these plans. Each major mill visited was asked how it planned to meet future projections of resource increases. Invariably, senior managers of these companies based their answer on two factors.

- \* The uncertainty about the increasing price for export logs.

- \* The companies value added export initiatives were in their embryonic stages.

The trend in sawmill design and equipment usage will be a direct result of the export markets the majors decide to pursue. At his point, New Zealand exports 34% of its output to Australia as dimensional lumber. As Australia works towards self-sufficiency, New Zealand will be forced to look for replacement markets. Clearly the forest practices of the majors forest companies target value. Therefore, it is expected that the development of larger mills will parallel that of Chile, towards cutting for remanufactured products.

An indication of this trend is the fact that two large remanufacturing plants are being developed. One is a joint venture between NZ Forestry Corporation and Fiberform Woodproducts, a US manufacturer and marketer of wood products, to be situated on the North Island. The other will be situated on the South Island by Ernslaw I, and financed by Malaysian investors.

Although specific expansion plans are not clear at this time, upgrading of existing mills is being planned. As an example, Carter Holt Harvey (CHH) plans to spend US \$50 million upgrading their existing mills installing automatic trimmers, edger optimization and lumber sorters.

A typical small mill operator spends NZ \$1-3 million per year upgrading his mills and expects a 3 year payback. This work is usually done by the mill maintenance staff supported by either a local engineering firm and/or by the equipment vendor who can supply engineering services along with their equipment. These mills have relatively little scanning and optimization technology, but the escalating cost of raw material will force these operators into newer technologies if they hope to remain competitive. Notably, owners did express a concern about being able to afford the capital cost of installing scanning and optimization equipment.

The New Zealanders have done a lot of R&D work in kiln drying and feel they are more advanced than North American technology for their application in drying Radiata Pine. Windsor Kilns of New Zealand and Australia have been able to licence and/or use the technology and has been able to gain the largest share of the market. Windsor claim to be wanting to sell in the North American market and may try to enter in 1994.

The owner/managers of the small to medium sized mills have travelled the world in the last two years focussing primarily on European, Scandinavia and U.S. equipment. **The managers of these operations candidly expressed that the capability of Canadian equipment and technology is largely unknown in New Zealand.** The U.S. is viewed as a product market and thus U.S. equipment manufacturers and mills have an attraction for NZ sawmillers.

The NZ Minister of Forests has produced a study which shows the potential investment in new processing plants in the period 1991-2005 to be between NZ \$3 Billion-NZ\$3.6 Billion. The following table summarizes the areas of investment. Sawmilling is the largest sector, with a potential of NZ \$1.8 Billion.

**POTENTIAL PROCESSING OPTIONS FOR NEW ZEALAND RESOURCE (1991 - 2005)**

NO. OF NEW PROCESSING SITES	1990 - 1995	1995 - 2000	2000 - 2005	TOTAL SITES	TOTAL INVESTMENT (NZ\$ MILLION)
<b>SOLID WOOD INDUSTRIES (1)</b>					
SAWMILLS (OUTPUT: 50,000 - 200,000 M <sup>3</sup> /MILL)	11	9	11	31	1815
PLYWOOD MILLS (OUTPUT: 60,000 M <sup>3</sup> /MILL)	2	2	0	4	300
<b>RECONSTITUTES WOOD INDUSTRIES (1)</b>					
<b>OPTION (a)</b>					
MDF MILLS (OUTPUT: 100,000 M <sup>3</sup> /MILL)	2	6	2	10	725
<b>or OPTION (b)</b>					
MDF MILLS (OUTPUT: 100,000 M <sup>3</sup> /MILL)	0	0	2	2	145
BCTMP or NEWSPRINT MILLS (OUTPUT: 210,000 M <sup>3</sup> /MILL)	0	2	0	2	1250
<b>REMANUFACTURING INDUSTRIES (2)</b>					
SOLID WOOD REPROCESSING (OUTPUT: 9,000 - 17,000 M <sup>3</sup> /MILL)	41	26	33	100	120
<b>TOTAL INVESTMENT POTENTIAL: NZ\$ 3 BILLION - NZ\$ 3.6 BILLION</b>					

(1) Source: New Zealand Forest Industries Strategy Study, 1992

(2) Ministry of Forestry: Analysis of the Reprocessing of Wood in New Zealand, 1992

## Wood Base Panels

New Zealand is a relatively small plywood and veneer producer, and mainly supplies domestic and Australian markets. Total annual production is about 65,000 m<sup>3</sup>.

Juken Nissho is the only LVL producer with two plants making LVL products for the Japanese market exclusively. They also bought the bankrupt Triboard at Kaitia, which produces a MDF/OSB board primarily sold in Japan.

New Zealand is the worlds leader in the production of high quality MDF, a product that is replacing thin plywood and particleboard. Radiata Pine lends itself well to producing a light colored board preferred by the overlay industry.

Note: Readers interested in a detailed review of the opportunities in the New Zealand plywood industry should refer to Appendix 8.3.

### 6.1 Sawmill Equipment: State-Of-The-Art-Review

To summarize the key factors influencing the sawmill sector:

- \* NZ is formulating its growth on the development of new export markets for value added products.
- \* The forest regime will produce an increasing volume of pruned sawlogs, similar to the scenario evidenced in Chile.
- \* As the supply of high quality raw material suitable for solid wood conversion diminishes on a world wide basis, the cost of sawlogs will continue to increase. As an example, Juken Nissho is paying NZ \$520/m<sup>3</sup> for pruned Radiata Pine for its LVL mill in Masterton. This is equivalent to US \$290/m<sup>3</sup>.

These trends mean that primary sawing will increasingly be done for secondary manufacturing, utilizing the latest in scanning and optimization to maximize profit.

### 6.2 Sawmill Sector Opportunities for Canadian Companies

These opportunities will be driven by:

- \* A doubling of the harvest to 29 million m<sup>3</sup> within the next 10-12 years.
- \* The efforts of the wood processing sector to use this resource to manufacture value added products for export markets.

The above table indicates the capital investment needed in the industry is NZ\$ 1.8 billion over a 15 year period. This equates to NZ \$121 million per year. If forty percent of the capital cost is equipment, the total sales potential is NZ \$48 million per year or CAN \$36 million.

As most of the sawmill development will be among the major forest owners the opportunity to sell Canadian equipment can be more easily focused on these buyers. The two key elements to capture this opportunity are:

- \* A presence in the market place, and;
- \* A concerted effort to convince the buyers that Canadian equipment is as good as or better than European supplied equipment.

### **6.3 Strategic Implications/Competitive Factors**

- Clearly to capture the opportunity, market presence is mandatory, either directly or through local agents. Equipment buyers relish the opportunity to "pick the brain" of equipment suppliers to compliment their in-house engineering efforts. The CCH mill at Thames indicated that this factor was the key to in their selection of an edger optimizer.
- A significant effort will be required to overcome the industry perception that European equipment is better suited to Radiata pine than North American supplied equipment.
- New Zealand sawmillers are increasingly looking to European technology. One reason is the New Zealand view that the management and conversion of the New Zealand forests is similar to European practices. A second reason is that European equipment companies are more active in the New Zealand marketplace.
- An affiliation with a local agent is a market advantage. As an example, the New Zealand Forestry Corporation mill at Waipa had made a decision to purchase a Schurman edger the day before we arrived. The other company considered had been Newnes. The deciding factor was the fact that Schurman had a local agents who would provide post sale service. USNR and CSMI have sales representatives in the market as well.
- The ability to sub manufacture or assemble in New Zealand will improve price competitiveness. The value of the New Zealand dollar against foreign currencies, combined with shipping costs, is a deciding factor in purchase decisions. Local manufacturing could be a significant competitive advantage.
- Canadian companies should recognize a significant investment will be required to penetrate this market. Travel costs and personnel time commitments will be significant.

### **6.4 Existing Competition**

The competition for Western Canadian companies comes from Europe and the United States.

Europe has a defined competitive advantage in the marketplace for two reasons.

- \* The perception that European equipment is ideally suited to New Zealand forests.
- \* A strong local sales effort by the European equipment suppliers to market or capitalize on the above.

For Canadian companies to succeed in New Zealand, they must create a market structure to overcome these competitive factors.

### **6.5 Marketing Framework**

The key factors reviewed by mill managers when making an equipment purchase decision included:

- \* The ability to "pick the brain" of local equipment representatives to catalyze process design concepts.
- \* Price. The New Zealand dollar does not go far against foreign currencies. This has implications for local manufacturing and an affiliation with a design/supply company.
- \* Post sale service was a consideration. Most mill operators acknowledged the limited scope of the forest sector made service commitments risky ventures for equipment suppliers. However, the ability to provide pre and post sale service is an increasingly important factor in equipment selection.

### **6.6 Agents/Dealers**

As noted in the discussions above, an affiliation with a local agent is critical. The importance of an design/supply relationship in New Zealand is essential for market success.

This framework is a significant deviation from North American and Chilean market practices, but it is imperative in New Zealand. There are several reputable design/supply companies in New Zealand (there is a listing in Appendix 8.6).

The design/supply structure may present an opportunity for Canadian companies to collaborate and create a new market presence.

### **6.7 Customer Service and Training**

Local service was a deciding factor in making an equipment purchase decision for some companies. Yet other mill managers indicated that given the relatively small size of the forest sector in New Zealand, they recognized a service network would be a financially risky venture for equipment suppliers.

Generally, service is gaining importance in the New Zealand market.

Training of operating personnel on new equipment was not mentioned as a purchase decision factor. However, provision of this service is expected to become a market factor as competition increases in the sector.

### **6.8 Project Financing**

As most of the equipment will be bought by the major companies, providing financing is not a major requirement of this market.

## **6.9 Strengths, Weaknesses, Opportunities & Threats (SWOT) Analysis for Canadian Sawmill Equipment Suppliers**

### **Strengths**

- Canadian equipment is appropriate if not leading edge, for the New Zealand market.
- WCWMSEA presents a full range of capabilities in primary sawmilling operations.

### **Weaknesses**

- Perception that Canadian equipment is not as well suited to NZ timber as European equipment.
- Lack of market representation.
- Lack of local affiliations with a design/supply entity.

### **Opportunities**

- Major growth in the Radiata Pine resource will generate numerous market opportunities.
- **Annual capital investment is projected to be in the range of \$Cdn. 36 million in each of the next 15 years.**
- Trend to value added processing of Radiata Pine will create other equipment supply opportunities i.e. optimization equipment.
- Three major companies in the market, thus marketing/sales efforts can be targeted.
- Economy is stable, and may be a gateway to Australian market.

### **Threats**

- European and American competition with established market positions.
- Perception that European equipment better suited to New Zealand forests.
- Window of opportunity is now, as European companies are improving their foundation in the market.

## **7.0 HARVESTING SECTOR OVERVIEW**

### **7.1 Harvesting Methods**

The significant trend in harvesting operations is the increasing use of yarders (termed "haulers" in NZ). In 1980 15% of the logging in New Zealand was performed with yarders. Currently 30% of the logging is carried on with yarders, and John Gaskin of LIRO (Logging Industry Research Organization) projects that by the year 2000 the number will be over 50%. He does not foresee any growth in skidder or ground based operations. This trend is a result of a maturing plantation in more adverse terrain, and efforts to control and prevent land erosion that plagues New Zealand.

The most noticeable feature of the logging and harvesting operations in New Zealand was the use of landings. Ground based or hauler operation, regardless of the method of harvesting the landings were a consistent feature. The landing is the log sort. It was not uncommon for the landing to sort as many as 20 different products for the mill and the export log market. The result of the sort at the landing was a congested work area and enormous handling requirements.

For the most part the logging and forestry operations are extremely labour intensive, but the trend to mechanized logging operations is developing. The traditional ground based system generally includes fallers; cable skidders (Caterpillar, VME, and John Deere where the most common); Bell three wheeled grapple loaders; and Caterpillar wheel loaders (936E or 950E size with log forks). The "hauler system" includes fallers; yarders with shot gun or gravity return; and hydraulic log loaders (Prentice, Caterpillar, or Komatsu, all in the 40,000 to 60,000 lb class).

Like his Chilean counterpart, the New Zealand forest owner is extremely conscientious about maximizing resource value. The typical breakdown of a mature 40 meter Radiata Pine is: 6.5 meters clear, 20.5 meters saw log, 8 meters pulp, and 5 meters to waste.

The high value of the log and the weight per cubic meter have forced harvesting contractors to manually fall, delimb and cut to length to prevent log breakage. The weight of Radiata Pine, which is approximately one metric ton per cubic meter, is a real problem when dealing with trees over 25 years of age. This weight factor presents a problem for mechanized falling, as the crown of the tree and its large branch configuration acts as a sail, which if not felled and placed properly results in breakage.

The industry is addressing the breakage problem by closely monitoring manual falling operations. However, as production demands increase, testing of machinery to handle this wood effectively is underway. An example of a current machine under consideration is a Caterpillar 235 front shovel equipped with a 28 inch intermittent Rotosaw felling head. The problem with this configuration is the size of the base machine and the standing tree and soil damage it causes.

While manual falling operations are the norm, increases in production, rising labour costs, and employee safety costs have hastened the trend to mechanization. Employee safety is expected to be the lead factor in the move to a more mechanized logging industry. The industry has been experimenting with a variety of feller bunchers, harvesters, and delimiters, but few have been utilized. The obstacles limiting the success of traditional harvesting, delimiting and processing systems are the weight, branch size and breakage of 25+ year old Radiata Pine.



### **7.1.1 Thinning**

Of the harvesting sites visited the most mechanized were the thinning operations. The Waratha processing head, designed to address the characteristics of Radiata Pine, was the unit of choice. At one site the head was mounted on a Caterpillar EL200 equipped with a Waratha Engineering logging front and guarding package. The unit was used in a commercial thinning operation supported by a forwarder developed from a MOXY articulated truck frame. The system was effective in selective thinning as both units minimized damage to the remaining stems.

There are several forestry management regimes followed by companies in New Zealand, but the most common focuses on minimizing branch size and maintaining uniformity in the tree diameter. Given the commercial value of the wood harvested in the 25th to 30th years, the pruning and thinning programs are tied specifically to maximize clear wood production.

### **7.2 Use of Contractors**

The majority of the harvesting operations are carried out on a contract basis. Contractors are responsible for harvesting operations as well as loading and transportation. The privatization of the plantations and the enactment of the Employment Contracts Act has facilitated relationships and negotiations between employer and employee. As a result, the number of contractors has grown.

In most cases the contractors bid on a site-by-site basis but maintain long term relationships with the forest owners. The contracting mechanism used by forest companies facilitates major equipment purchases by the contractor. When new equipment or processes are considered, it is common for the forest owner and the contractor to jointly determine its acceptance. Both parties rely on LIRO as a resource during equipment review.

### **7.3 Existing Equipment**

All the major equipment lines are represented through the traditional dealer networks with no real make or model having a clear market advantage.

**Yarders** - Clearly the most dynamic machinery market is for yarders. New Zealand manufactured machines, Dispatch and Bellis, are working in limited numbers while the real players are the Ross and the S.Madill systems.

**Hydraulic Log Loaders** - A number of hydraulic log loaders were in operation at the landings. Caterpillar conversions outfitted with a Prentise grapple and utilizing the excavator boom and stick were common, as were Komatsu conversions with a forestry boom, stick, heel, grapple, cab riser and guarding equipped. A number of Prentise loaders were also in operation.

**Skidders** - Most of the skidders in operation were outfitted with winches and very few grapple units were in use.

**Wheel Loaders** - The wheel loaders in use on the landings were Caterpillar 936E and 950E. The larger units were used on the docks and in the mills. Most units were equipped with pin on log forks.

**Dozers** - The crawler dozers were a consistently old mix of makes and models. There were few machines seen in the woods newer than 10 years old. Some of the newer equipment was used in the export chip piles but still the equipment was not current.

**Bell Loaders** - The loaders are found on the sorts for most of the group base systems and were outfitted with rotary grapples.

**Waratha Feller Bunchers** - The converted excavators were seen working in commercial thinning operations equipped with a Waratha processing head.

**Waratha Processing Heads** - This head, which is generally mounted on a purpose built feller buncher or excavator conversion, has been designed specifically to address the characteristics of Radiata Pine. It has had one problem, inaccurate length measurements. This is due largely to the bark of Radiata Pine.

**Pacific Trucks** - The most visible off highway truck is the Pacific. These trucks currently dominate the market. While no new Pacific trucks have been placed in service recently, the existing fleet is well maintained with units 20 years old in full time operation. One trucking contractor repowered his Pacific with two engines, increasing his load carrying capacity from 100 tons to 270 tons.

**Prentise Loaders and Attachments** - The tracked Prentise loader and the rubber tired machine were in operation on the landings. While no market share numbers are available they certainly were the most visible. The Prentise grapples and attachments were also very popular.

#### **7.4 Competition**

The New Zealand industry is supported by an effective service and support network. There are very capable equipment service firms with fabrication capabilities. Bellis, Dispatch, and Waratha are all typical New Zealand products developed to service the industry. Attachments, equipment conversions, and overhaul are all available and very common in the country. The industry has developed a very competent service and support sector which is far more advanced than Chile and very much in line with that of North America.

The competition in NZ are similar to that in the Pacific North West. The two key players in the Yarder market are Madill and Ross. The establishment of a Ross dealer and service location 18 months ago led to the sale of 12 yarders during this time period. Madill's track undercarriage has been seen by some as a disadvantage because it is perceived to limit yarder mobility.

Another critical aspect when addressing competition in this region is the availability of used equipment in the Pacific North West, which is being sourced directly from New Zealand.

#### **7.5 Channels of Distribution**

Equipment with an established dealer network appeared to have the greatest market share. An example of this appears to be the Ross Corporation.

When the company first entered the New Zealand market an agent was assigned. The agent identified sales opportunities but with limited success. Once the Ross Corporation established a dealership office with parts and service support, sales expanded quickly. In the first 18 months of dealership operation Ross sold 12 yarders in New Zealand. The moral of the story for the equipment manufacturers is to establish a quality dealer who can sell, support and service the equipment.

This concept is no different in North America. The equipment manufacturers who establish the most comprehensive dealer network generally enjoy market share.

All the major forestry equipment manufacturers are represented through a traditional dealer network. In some cases the service support is not as exhaustive as we see in North America or what was requested in Chile. In New Zealand and Australia there is a larger service component and most of the contractors have in-house service capabilities. The New Zealand contractor tries to avoid the high cost of dealership service by handling service and repairs in house.

#### **7.6 Customer Service Expectations**

The relatively small machine populations have created problems where replacement and service parts are required. The more traditional North American equipment uses standardized parts that are available through most supply houses, regardless of the industry application. Where problems have developed is in the non-traditional areas such as computerized and electronic components and non standard bearings and shafts. The cost of downtime and high replacement part costs have limited sales of this equipment.

The service support of the equipment in the forest does not appear to be a real concern for the industry as there is a well trained service network in New Zealand. In most cases the contractor maintains his own mechanics and service group. In one case a contractor maintained his own parts warehouse and distributed yarder parts to his fellow contractors.

#### **7.7 Customer Training Requirements**

The logging industry in New Zealand, because of its relative size when compared to British Columbia, is somewhat limited when it comes to trained forestry crews. The biggest single problem facing the contractor and the forestry companies is finding and holding trained forestry crews. One of the contractors made a statement that in British Columbia one in seven people who apply for a forestry job would be qualified, whereas in New Zealand one in one hundred would be the case.

ITT Rayonier experiences problems finding trained and experienced logging crews. They have tried to attract North American crews to New Zealand but, because of the New Zealand dollar disparity in relation to the United States and Canadian dollar, they have been largely unsuccessful.

With this in mind, when equipment is being sold one should be aware that an effective demonstration and eventual operator training will most likely be required.

## 7.8 Financing Requirements

In most equipment sales a financing component is desirable but not essential. In New Zealand, because the major forest owners will provide secure contracts. The banks recognize the contractors ability to negotiate the best lease, purchase or rental agreement.

## 7.9 Sales Potential

Yarder sales are the largest market potential. Concerns regarding soil disruption and erosion in adverse terrain are the principle reasons for the move to more soil sensitive logging operations. LIRO expects the majority of equipment purchases in the future to be yarding equipment and supplies. New Zealand looks to the Pacific North West for quality, used yarding equipment. This is of course a threat to new equipment sales. Most of the used equipment coming to New Zealand is not fully equipped, as generally the yarders come in without rigging.

The move to more stringent labour safety will lead to a more mechanized logging environment. Feller bunchers are now being sourced. The concerns with the feller bunchers are soil disruption and the size of the machines required. The smaller units used for thinning are compact and maneuverable. The larger units, required to handle the weight of Radiata Pine, meet with reservations, as soil disruption and tree damage is a concern to the forest owners. Two contractors have traveled to the Pacific North West to look at Caterpillar 235 excavators converted to feller bunchers. If initial tests prove successful additional units will be required.

The off highway truck market is currently dominated by an aging fleet of Pacific Trucks. Most have been rebuilt several times and replacement opportunities will occur as increasing harvest levels necessitate more transportation.

In projecting the forecast for forestry equipment we have considered the increase in harvest expected, current equipment harvest capacities, and past purchasing trends. The estimate is developed for new equipment purchases only.

**It is estimated that over the next ten years the New Zealand harvest will increase by 15 million cubic meters. To service this harvest it is expected that CDN \$38,500,000 per year of new equipment purchases will be realized. The estimate is based largely on the projected increase in yarder operations, equipment to support the yarders, the expansion of the off highway fleet, as well as related road building equipment.**

\*\*\*\*\*

Please note: It was brought to the attention of the Association during the market study in New Zealand, that the LIRO organization plays an active role with industry during equipment selection. LIRO maintains a full library of forestry equipment specifications that is used as a resource by the industry, and staff members are often consulted for objective expertise on equipment selection and application issues. Companies considering entry to this market should provide its equipment specification to. LIRO has equipment specifications and is informed.

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## **7.10 Strengths, Weaknesses, Opportunities & Threats (SWOT) Analysis for Canadian Harvesting Machinery Suppliers**

### **Strengths**

Durable equipment.

Standardized components.

Labour saving equipment.

Proven technologies.

Equipment designed to B.C. WCB standards considered most comprehensive in international forestry industry.

### **Weakness**

Limited distribution agents/dealers.

Freight costs relative to cost of goods for supply and attachments.

### **Opportunities**

New Zealand move to improve levels of worker safety - less people on the ground.

New Zealand increase in harvest will require more productive and durable equipment.

New Zealand concern over erosion on ground base operations good for yarder and low ground pressure machines from Madill and KMC.

Australia / New Zealand - small harvest blocks over a large area creates requirement for additional units.

Australia / New Zealand - Roll over protection developed in North America designed for older equipment (dozers, skidders, and wheel loaders) will be required as industries move to improve operator safety.

Australia / New Zealand - opportunity for yarding consumables limited source of supply in both countries I'Anco and Robar.

New Zealand - Off highway trucks - Challenger and Western Star.

Australia - New Zealand - JV opportunities for more advanced attachments for IMAC and Weldco-Beales.

**Threats**

Dealer coverage.

Competitive dealers well established.

Good local manufacturing base.

Highly skilled service network in-house for most contractors.

Large, used equipment inventory to draw from in the Pacific North West.

International currency rate New Zealand and Australia.

## **2.0 AUSTRALIAN OVERVIEW**

### **2.1 Political System**

Australia has a democratic form of government that is essentially a two party political system. The Labor party, which has been in government since 1983, is traditionally left of centre. The Liberal party stands on a pro-business platform. The National Party, whose base of support comes from rural Australia, aligns itself with the Liberals to form the Coalition. Members from each of these parties currently hold opposition seats. The next federal election is due before May 1996.

Like Canada, the Australian governmental framework also has regional State (as opposed to Provincial) governments. The Commonwealth governs areas such as defense, foreign affairs, income and taxation, and customs and excise, while the State governments are responsible for education, justice, railways, roads and housing.

The legal system is based in common law with a system of courts at the Commonwealth and state levels.

### **2.2 Geography**

The continent, including Tasmania, covers a land mass of approximately 7,700,00 square kilometers, or 2,966,000 square miles, which is about 75% the size of Canada. The country spans 3,700 kilometers from north to south, and 4,000 from east to west.

The country is predominantly flat with low lying land, the center of which is an expansive arid desert. Low mountain ranges with a maximum elevation of 2,000 meters run the length of the country just inland from the east coast.

Approximately 40% of the country lies within the tropics, and the seasons are the reverse of those in the Northern Hemisphere.

### **2.3 Population**

The population of the country was estimated at 16.7 million at January 1990. The population is expected to grow to 19 million by the turn of the century. The population of Australia is relatively young, with over 65% being between the ages of 15 and 65. There are approximately 8 million people in the work force.

Australia is extremely urbanized with 65% of the population living in major cities.

<b>City</b>	<b>State or Territory</b>	<b>Population (000)</b>
Sydney	New South Wales	3,600
Melbourne	Victoria	3,000
Brisbane	Queensland	1,240
Adelaide	South Australia	1,024
Perth	Western Australia	1,119
Canberra	Australian Capital Terr.	297
Hobart	Tasmania	180
Darwin	North Territory	73

### **3.0 AUSTRALIAN BUSINESS ENVIRONMENT**

#### **3.1 Economic Trends**

The country has a private enterprise based economy. While the Commonwealth and the States do run public utilities, the governments are not in the business of producing goods or services. There has been an effort by the governments to privatize where possible. However, the forest resource remains under government control.

The foundations of Australia's economy are agriculture, mineral production and processing, energy reserves production, and manufacturing. Australia's economy experienced a recession in the 1990-92 time frame, which coincided with recessionary periods in other western nations. Unemployment rose from about 6% in 1990 to 10.7% in September 1993. Gross Domestic product, which had shown a consistent and impressive growth up to 1990, has remained static for the past two years.

<b>GDP</b>	<b>\$AUS 000</b>
1989-90	371,107
1990-91	360,506
1991-92	361,273

The prime rate or business indicator rate as it is commonly known in Australia, dropped from 18.75% in 1990 to 10.75% in 1992, and is currently around 8.95 - 9.00%.

#### **3.2 Currency and Foreign Exchange**

The banking system is regulated by The Reserve Bank of Australia, which is operated by the Commonwealth government who manages the banking system in Australia.

The banking market is as modern as North Americas with a wide level of services available at both the domestic and international levels. Australia's foreign exchange market is ranked in the top ten in the world.

Currently, the Australian dollar is trading in the range of US \$1 = Aus \$1.50.



### **3.3 Import Duties**

Historically, Australia has had high customs tariffs and import restrictions by international standards. However, duty rates are dropping, although specific highly protected industries will continue to have high rates. Commercial tariff Concession Orders (CTCO) remove duty where it can be shown that no class of goods providing a similar function are produced in Australia.

The current rate for Canadian forest equipment and machinery is 12%. Valuations for duty are based on GATT articles. Essentially, the valuation is based on FOB price. In some cases, sales tax will apply to the imported product, but it does not form a part of the valuation.

### **3.4 Taxation**

The general income tax rate for companies in Australia is 39%. This rate also applies to foreign subsidiaries and foreign companies in Australia, through a branch operation. In addition to this basic rate, there are several other principal taxes that a foreign company should consider.

- Fringe benefits tax charged by the Commonwealth.
- A State Payroll tax of 5 to 6 percent of wages and allowances.

The tax system in Australia, which includes a combination of Commonwealth and State charges, is complex and the foreign investor must be extremely prudent in its review.

### **3.5 Business Practices**

Generally, business practices in Australia are identical to those experienced in North America. Like its New Zealand counterpart, the Australian forest sector is reliant on the importation of equipment. Thus, with the objective of assessing technology and equipment, forest industry personnel will travel abroad frequently.

### **3.6 Foreign Investment**

Australia has an open policy welcoming foreign investment and one hundred percent foreign ownership is possible. However, investment is subject to Foreign Investment Review Board policy. The federal government tries to facilitate foreign investment by streamlining the approval process.

There are no specific rules limiting the transfer of Australian profits, dividends, license fees, capital or other similar funds. Currency is freely convertible, and there are few exchange controls.

### 3.7 Labour

With a population of approximately 16.7 million people, there are about 8 million people in Australia's work force. As mentioned earlier, it is important to recognize that over 65% of the population is between the ages of 15 and 65, and that 65% of the populous live in urban centres. The average wage is about A \$600 per week. By comparison, saw mill employee wages are in the following ranges.

Base Rate	A \$9.50 hr
Skilled Operators	10.75 hr
Tradespeople	11.75 hr.

Not included in these rates is a 30% burden to the employer

Unemployment has grown from about 6% in 1990 to over 10%. Despite this fact, over 1 million Australians are working over 50 hours per week, which is a reversal of a long term trend to shorter work hours. If all hours over 40 were allocated to new jobs, 15,000 new full time jobs would be created.

Australia is one of the most unionized nations in the world and most wages are governed by trade union agreements. It should be noted that the wage increases for all unions are awarded on a national basis by the Commonwealth government. That is to say, if the government stipulates a 2% increase in wages, all unions receive this increase with or without justification.

### 3.8 Access to Other Countries

For the Association member who is targeting Australia and New Zealand as one market, it should be noted that these countries have a free trade agreement.

Given its geographic location, Australia is considered a jumping off point for penetration into the Asian market. In fact, many Asian operations are managed by ex-pat Australians, and are controlled by operations based in Australia.

The city of Darwin, located in the Northern Territory, is located closer to Asia than it is to Sydney or Melbourne. Hence, a free trade zone has been established in the city, providing a manufacturer with relief from certain local taxes. It should be noted that this trade zone does not provide relief from federal duties or sales tax.

#### 4.0 FOREST INDUSTRY OVERVIEW

Both government and business recognize that there are huge untapped opportunities in the forest sector in Australia. However, because the forest resource is owned and managed by the government, both parties recognize that an increased interaction is needed to chart the destiny of the sector. At the heart of the matter is the objective of creating forest sector competitiveness, in both domestic and international markets.

In countries like Chile and New Zealand, where most of the plantation forest resource is privately owned, the ability to make investment decisions, based on resource security, is the critical factor in the competitiveness of the industry sector. For the industry sector in Australia to achieve a similar competitive framework, government/industry interaction will have to achieve the following:

1. The expansion of the hardwood and softwood plantation resource;
2. Improved labour productivity and flexibility;
3. A framework to create a competitive structure capable of capitalizing on the countries proximity to Asian markets;
4. The ability to capitalize on domestic market opportunities and replace imported forest products;
5. Better government/industry interaction on the growth of the sector based on a definable and consistent allocation of the forest resource.

The forestry sector also needs to overcome these market factors:

1. Limited resource security and declining access to native hardwoods,
2. Limited domestic demand for the range of products the forest sector is capable of producing;
3. High chemical, wood and energy costs;
4. High transportation costs;
5. Small (by world scale) processing facilities.

#### 4.1 Forest Resource

- \* Less than 5% of Australia, or approximately 42 million hectares, is covered in forest.
- \* Of the total forest area, 97% are native species.
- \* About 75% of the forest area remains under public ownership, and most of the plantations have been established on crown land.

#### AREAS OF WOOD SUPPLY (1991) (MILLION HECTARES)

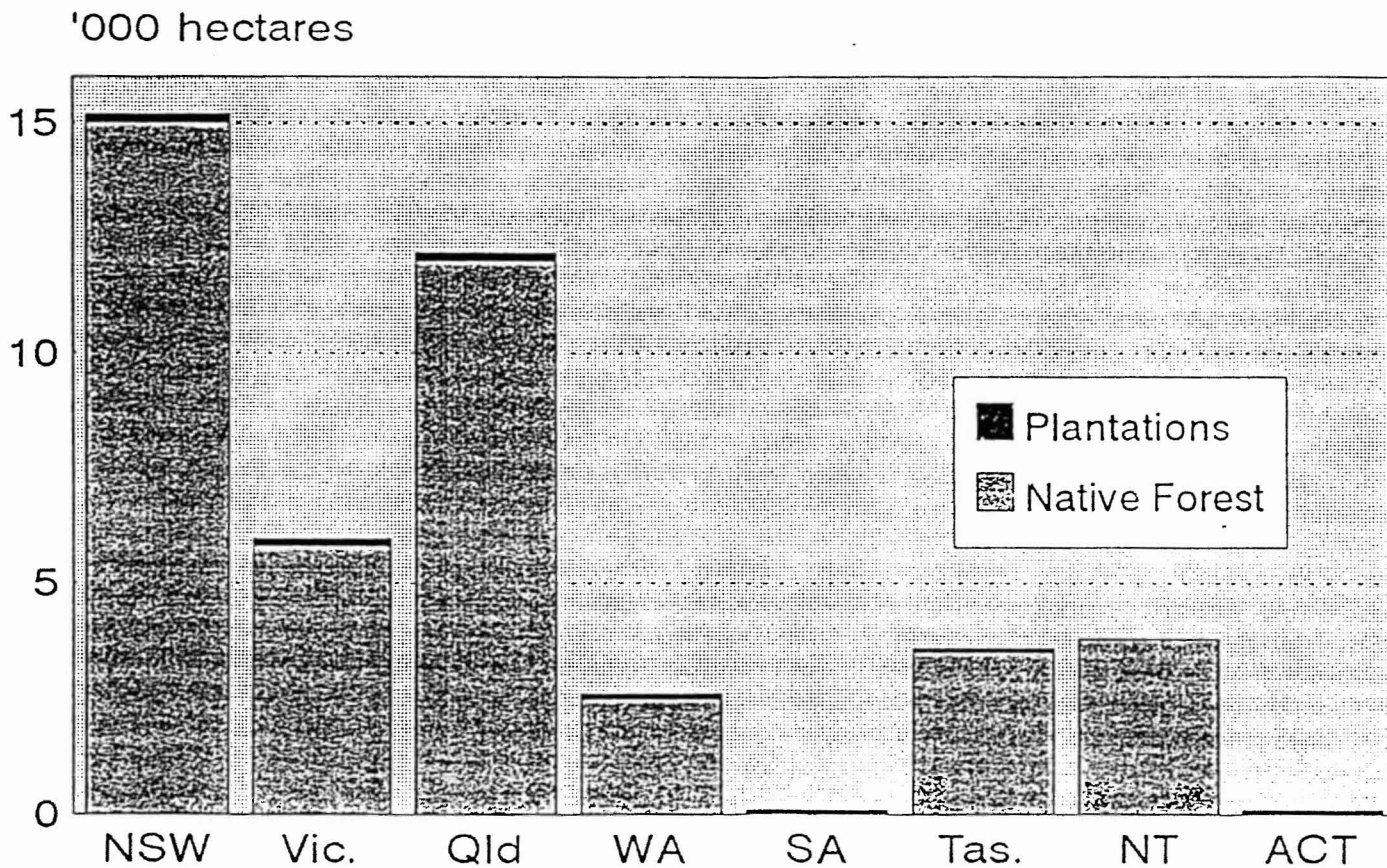
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Native Forests	40.8
Crown	29.7
Private	11.1
Plantations	1.1

	Crown	.8
	Private	.3
<b>Total</b>		<b>41.9</b>

Over 90% of the total wood resource is in the states of New South Wales, Victoria and Queensland and Tasmania.

### TOTAL WOOD RESOURCE AREA, BY STATE AND TERRITORY, 1991



SOURCE: ABARE (1992b)

#### 4.1.1 Native Forests

Only a very limited portion of the native forests are available for harvest. Large areas of the 41 million hectares of native forests have been set aside in National Parks and reserves. Much of the remainder is either poor quality or in very remote regions of the country.

The majority of harvest operations in native forests takes place in the eucalyptus forests in New South Wales, Victoria, Queensland and Tasmania. Approximately 30% of native forests are privately owned and account for about 30% of the wood removed.

#### 4.1.2 Plantations

Australia has over 1 million hectares of plantation forests.

- \* 70% are publicly owned.
- \* Plantations account for less than 3% of the forested area.
- \* Yet, they account for over 45% of the coniferous saw log harvest.

About one half of the coniferous plantations are located in New South Wales and Victoria. Unlike plantation ownership in the other states, a greater proportion of the plantations in Tasmania are privately owned and the area of softwood plantation is equivalent to the area in hardwood species.

The larger producers of forest products in Australia, have increasingly, over the last decade, established plantations on owned or leased forest land. This has been prompted by the producers desire for a secure supply of high quality timber at competitive prices. These large land owners include:

APPM	125 000 ha in Tasmania
SEAS Sapfor	35 000 ha
CSR	20 000 ha

Forest management philosophy often varies significantly between state owned and private lands. In the Mt. Gambier area, for example, government owned forests are harvested at 45 years while private forests are clear felled at age 30. In general, public forests used for wood production are being managed on a sustained yield basis with wood harvesting being controlled by strict environmental codes.

Radiata Pine has been established in over two thirds of the coniferous plantations and remains the species of choice, particularly on private plantations. While Radiata Pine is the principal species planted in southern Australia, other species planted include:

Pinus Elliotti - Slash Pine  
Pinus caribaea - Caribbean Pine  
Araucaria Cunningham II - Hoop Pine

Broadleaf plantations consist almost exclusively of eucalyptus.

The area of plantation forests in Australia is projected to expand significantly. Since the turn of this decade, about 26,000 hectares of new softwood plantations have been

established annually. While there has been little new hardwood establishment, this may change as Japanese and Korean interests have signed pulp fibre agreements.

#### 4.2 Harvest Levels

Due to the fact that plantation resource is owned and managed by several different state governments, it is extremely difficult to compile accurate harvest level data. However, the following numbers are believed to be representative of the Australian forest sector. Comparable numbers for New Zealand and Chile are also stated.

#### Projected Softwood Harvest Levels (Million m<sup>3</sup>)

	<u>1993</u>	<u>2000</u>	<u>2010</u>	<u>2020</u>
Australia	9	12	15	40
New Zealand	14	22	29	20
Chile	12	23	30	45

Please note that these are softwood harvests only. As noted above, plantation softwood harvests are expected to increase 35% by the year 2000, and an additional 25% percent by 2010.

The above projections for Australia do not include the possibility the South Australia may reduce the harvest age of its Mount Gambier plantations from its current regime of 45 years which would immediately increase softwood supply by an additional \$4 million m<sup>3</sup>.

#### 4.3 Wood Products Manufacturing Sector

The scope of the forest sector in Australia is illustrated in the following table which makes states the production levels of major timber products.

#### PRODUCTION OF MAJOR TIMBER PRODUCTS<sup>a</sup>

	1981-82	1986-87	1991-92 <sup>p</sup>	CHANGE 81-82 to 91-92
	'000 m <sup>3</sup>	'000 m <sup>3</sup>	'000 m <sup>3</sup>	%
SAWNWOOD				
- HARDWOOD	1976	1708	1387	-30
- SOFTWOOD	1181	1240	1560	32
PLYWOOD	89	97	107	20
PARTICLEBOARD	647	660	655	1
HARDBOARD	102	101	84	-18
RAILWAY SLEEPERS	207	195	100	-52
EXPORT WOODCHIPS	3821	5020	5258	38

a No data are available for medium density fibreboard.

p Preliminary

Source: ABARE (1992c).

For purposes of comparison, Australia's 1991-92 production is about 20% the size of British Columbia's production.

As illustrated, sawmilling and pulp and paper account for over 30% of the total output of the forest sector. The contribution of pulp and paper has increased over the last 20 years, while the contribution of sawmilling has declined, with the reduction in hardwood harvesting. **This relationship is expected to change significantly as the supply of plantation softwood increases over the next decade.**

Unlike New Zealand, the companies producing forest products in Australia are predominantly Australian owned, although there are exceptions to this in the pulp and paper industry.

Australia's total sawnwood production for 1991-92 is 3 million m<sup>3</sup>, of which one-half is softwood mills. Of the total 240 softwood mills the 10 largest produce 50% of total volumes.

By comparison, British Columbia's reported sawn timber output, by COFI for 1992, was 14,152 million board feet, which is equivalent to 34 million m<sup>3</sup> per year. This is the reported output of 205 mills.

#### 4.3.1 Sawmilling

There are several distinct trends in the sawmill sector.

- \* There is a trend toward the concentration of manufacturing facilities into larger operations, as companies strive to create competitive synergies.
- \* Total employment in the sector has dropped, indicative of the efforts of the sector to increase employee output, which is a key to the viability of the sector, domestically and internationally.
- \* The above factors are a direct result of modernization efforts throughout the industry and a decrease in the number of small, inefficient operations.

Improving competitiveness of the wood products sector will require an improvement in process technology, increasing the scale of operations, developing new products and markets and improving management and work force skills. **This is a significant opportunity for the members of WCWMSEA.**

#### Hardwood

By contrast, the hardwood sawmill sector has not experienced a significant rationalization processing resource. This sector remains very fragmented and only a few modern facilities have been constructed. Boral and Bunnings are two larger companies involved in this sector of the industry. Just over 80% of the hardwood sawmills produce less than 3000 cubic meters per year and account for about 25% of total hardwood production.

The number of hardwood sawmills will continue to decrease because of the generally poor quality of the resource remaining in many areas, and the move to preserve what remains of the native forest.

## Softwood

Australia currently has about 240 softwood sawmills. The largest 10 mills produce between 50 - 125 000 cubic meters annual output. Although these mills are small by B.C. standards, they account for 50% of Australia's total industry output. Most of the remaining sawmills are small with annual production levels of 4000 to 5000 cubic meters.

The softwood sector is where the greatest opportunity exists in the Australian forest industry. This is a result of two key factors.

- \* The expansion of the plantation pine resource.
- \* The efforts to modernize and streamline operations into viably competitive domestic and international positions.

Domestic demand is projected to increase and there remains a significant opportunity to replace imports, which still capture a significant share of the Australian market, in the range of 20% sawn lumber and 10% veneer.

Most of the WCWMSEA market opportunity exists within the larger sawmills, which are targeting production efficiencies to strengthen their competitive position, especially in export markets. These major producers include:

CSR Softwoods

Boral

Brown and Dureau (owned by AMCOR)

SEAS SAPFOR (owned and operated by the South Australian state government)

Australian Forest Industries (owned by Bowater Industries).

### 4.3.2 Value Added

The majority of wood products manufactured in Australia are sold in the domestic market. Because of the fragmented nature of the wholesalers and final users of wood products, few companies have integrated forward into the manufacture of finished secondary wood products.

One exception is the Bunning company. Their operations extend from the manufacture of raw lumber in company owned sawmills to the manufacture of final products such as garden furniture, flooring and doors to be sold in a string of company owned retail outlets. SEAS Sapfor also has extensive retail operations.

Most companies, however, including hardwood manufacturers, are increasingly moving towards some degree of further processing in the pursuit of niche market opportunities. The extent of the value-added varies considerably depending on the nature of the resource, the type of primary manufacturing operation, the specific market opportunities and the overall company philosophy.



In some cases, government has intervened to stimulate the production of value-added products, often to create economic activity and employment in regional centers. Most companies have improved their processing technology and dry kilns have become common in most operations.

#### **4.3.3 Plywood and Veneer**

Nine plywood mills in Australia produce mainly softwood plywood for the domestic market. Four of these mills with a capacity of over 10,000 cubic meters per annum produce over 65% of the softwood plywood in Australia. Although competitive in domestic markets, they are at a disadvantage in markets outside Australia.

#### **4.3.4 Particleboard**

The seven particleboard plants in Australia all produce a relatively high quality product because they use woodchip residue from sawmills. There appeared to be sufficient excess fibre in some regions to expand this sector of the industry.

#### **4.3.5 Medium Density Fibreboard (MDF)**

The four MDF mills all have a capacity of between 100,000 and 140,000 cubic meters per annum.

Note: Included in Appendix 8.3 to this report is a comprehensive overview of the engineered board of plywood industry in Australia and New Zealand for readers interested in a more comprehensive discussion of these products.

## **5.0 AUSTRALIAN CONSULTING ENGINEERING SERVICES MARKET OVERVIEW**

The wood products consulting engineering business in Australia is significantly different than it is in North America.

Firstly, it should be noted that there are no consulting firms who specialize in wood products engineering as a stand alone product. The norm in Australia is significantly different.

The major wood companies traditionally have the in-house resources, albeit maintenance or production personnel, to do their own feasibility studies and process design. The companies then rely on consultants for discipline engineering and/or use the design/supply services of local equipment supply companies, who are agents for machinery vendors and fabricators, and who provide engineering services as part of an overall product mix.

Small mill operations in Australia are on the decline, the result of the consolidation of mill facilities to take advantage of scale efficiencies; and hardwood mills as the result of a diminishing supply of hardwood resource. These mills tend to undertake small incremental improvements that are coordinated by maintenance staff in concert with small local consultants and design/supply vendors.

To date, the Australian forest sector has concentrated on the production of dimensional products to satisfy local demand. Any additional production volumes achieved by the sector will logically target dimensional lumber import replacement. However, the industry sector recognizes that it must work toward an internationally competitive position that would enable it to realize a greater market return for grade products or engineered products.

To that end, the Australian market does not have the local expertise to undertake new product and new market studies. This market niche may have potential for Canadian companies with this expertise.

### **5.1 Market Opportunity for Canadian Consulting Companies**

#### **Sawmill Sector**

Given the operating framework of the forest sector as discussed above, the opportunity for Canadian companies would be in the area of support to Canadian equipment vendors with design/supply contracts. As the Australian forest regime gradually adopts a value rather than volume approach to its resource, expertise in B.C. coastal sawmill log conversion may become applicable. This value approach may also spawn opportunities for Canadian consultants with an expertise in product/market studies.

#### **Secondary Manufacturing Operations**

At present the major thrust in remanufacturing is being provided by U.S. companies who supply the manufacturing and marketing expertise along with equipment and some financing. The predominant American company is Fiberwood, of California, who is

forming joint ventures in both NZ and Australia. Japanese operations in this area (Juken Nissho) also provide their own expertise, equipment, management, and financing.

### **Silviculture and Forestry**

The Australia//New Zealand markets are extremely capable in Radiata Pine forestry, with New Zealand arguably the world leader in this capability. Accordingly, there appears to be little opportunity for Canadian companies in this discipline. An opportunity for Canadian companies might be to learn what the New Zealanders are doing in forest management and apply applicable practices in Canada.

### **Harvesting Operations**

The future of the Australian forest sector is predicated on the growth, expansion and maximization of the plantation resource. Over 75% percent of this resource is currently owned and managed by the government, which is not equipped financially to provide the extensive management required to maximize the potential of the resource.

Opportunities in harvesting operations will be fuelled by two market potentials:

- \* A stronger pulp chip demand or a move by the forest sector to capitalize on the wood now being left in the forest during thinning and harvesting, and;
- \* Privatization of the plantation resource.

These factors would necessitate a rethinking of existing thinning and harvesting practices, which are not structured to maximize the value of the resource. Significant competition in this discipline will come from New Zealand companies who are recognized leaders in plantation practice.

In summary, Australia is self-sufficient in engineering capability, which combined with equipment vendors who provide design/supply services, indicates little opportunity for Canadian consultants. Any opportunities lie with providing engineering support to Canadian equipment suppliers and affiliation with a resident engineering company. Market presence is essential to overcome personnel transportation costs to these markets and higher Canadian labour rates in the order of 25%.

## **5.2 Strengths, Weaknesses, Opportunities & Threats (SWOT) Analysis for Canadian Engineering Consultants in Australia**

### **Strengths**

Canadians are recognized as having world class sawmilling expertise.

Canada has an international reputation and has sold design and equipment in Australia in the past.

Full range of engineering design capabilities offered.

### **Weaknesses**

Lack of market presence and market linkages.

Charge out rates are 25% higher than local rates.

Personnel transportation costs to Australia are high.

Perceived lack of knowledge in Radiata Pine product markets and related sawing requirements.

Perception that Canada is not strong in small log processing technology.

### **Opportunities**

Fletcher Challenge is one of the majors in NZ and is also in Canada. Using this connection could provide an opportunity to enter the Australia/NZ market.

Fletcher Challenge has sub-contracted its in-house pulp and paper engineering in New Zealand to a local consultant. This may establish a trend among the other majors which may enhance the opportunity for Canadian consultants who can become affiliated with a local consultant.

### **Threats**

Existing equipment suppliers provide engineering design services.

Perception that European design is more applicable to plantation forest sawmilling design.

## 6.0 AUSTRALIAN SAWMILLING SECTOR OVERVIEW

Australia's softwood plantation forests are located along the eastern part of the country, stretching from the Maryborough region north of Brisbane to Mount Gambier in the south, and include the forests of Tasmania.

The species in the warmer northern section are Slash Pine (*Pinus Ellioti*) and Caribbean Pine (*Pinus Caribea*). In the south, Radiata Pine is the predominate specie. Hoop Pine (*Araucaria Cunnighamii*) plantations in South East and North Queensland produce quality wood for the furniture and high end structural markets.

Australia's plantation management practices are not as sophisticated as those evidenced in Chile and New Zealand, largely due to the fact the resource remains publicly owned, and the state governments do not have the resources to manage the forests. Forests have been inadequately thinned, especially in Queensland. The recession in the pulp and paper industry and the corresponding low demand for the wood from thinnings has contributed to this problem.

This lack of thinning has slowed the growth of the forest stock. For example, both New Zealand and Chile thin their plantation forests 2-3 times before final harvest. Thinning is performed on a selective basis to foster growth of the remaining stock.

By comparison, Australia's plantations may only be thinned once during their 30 year rotation, and this practice is not done on a selective basis, but on a "corridor" basis, where a straight cut is made. Hence, the growth of the remaining stand is not cultivated, resulting in small, underdeveloped timber. This factor is forcing the mills to cut smaller diameter wood than they were designed for, and causing usable fibre to be left in the forest.

In the southern part of Australia, the Radiata Pine plantations have been predominantly developed by the government, who use the same thinning practices noted above. The processing industry, having survived a recessionary period, did so by consolidating operations to capitalize on scale economies and competitive synergies.

As a result, a few major softwood companies control most of the plantation conversion. **Forwood**, the state owned forest company whose primary holdings are in Mount Gambier area, is rumoured to be planning the sale of its sawmill operations, but the company will retain the ownership of its forest holdings.

Generally, the Australian economy has weathered its recession and is on a rebound. Optimism in the wood sector is high as prices for wood products continue to rise. Australia is not self-sufficient in wood but is striving to be so by the year 2005. Once it has satisfied the domestic market for structural lumber, the sector realizes that its long term growth will be predicated on the successful penetration of export markets. Thus, as it focuses on its ability to manufacture wood products competitively for world markets, the industry is evaluating opportunities in southeast Asia and Europe.

### 6.1 Sawmill Capacity

Australia rates the capacities of their mills on the input volume rather than lumber output. Recoveries range between 45 and 55% depending on log input diameter. The input capacities of the major softwood producers are shown in the following table.

**AUSTRALIAN SAWMILL CAPACITIES**  
(Cubic meters/year)  
Input

<b>CSR Softwoods</b>		<b>APM</b>	
Caboolture	200,000	Morewell	200,000
Tumut	450,000	Canberra	<u>70,000</u>
Mt. Gambier	<u>300,000</u>		270,000
	950,000		
<b>S.E.A.S. Sapfor</b>		<b>Hyne &amp; Sons</b>	
Tarpena	300,000	Tuan	200,000
Tasi	<u>350,000</u>	Melawondi	<u>70,000</u>
	650,000		270,000
<b>Forwood</b>		<b>Bowater</b>	
Lakeside	150,000	Mrytleford	170,000
Nangwarry	140,000	Plywood Plant	<u>40,000</u>
Mt. Burr	<u>80,000</u>		210,000
	370,000		
<b>Boral Timber</b>			
Oberon	150,000		
Tumburumba	<u>150,000</u>		
	300,000		

In addition to the larger mills, there are many small family owned mills in the 70-80,000 m<sup>3</sup>/year capacity.

There are also many hardwood sawmills in Australia. With the environmental pressures on the indigenous forests, hardwood sawmilling is in rapid decline, thus this sector was not reviewed by the Association market investigation team.

Labour rates are about 50% lower than those in B.C. mills. In Australian Dollars the base rate is \$9.50/hr, skilled operators \$10.75, and tradesman \$11.75/hr plus a burden of 30%.

## 6.2 Sawmill Equipment: State-Of-The-Art Review

Australia's sawmilling industry produces primarily for its domestic market which is primarily stress graded structural dimension lumber. The domestic market is not self sufficient as approximately 20% of the dimensional lumber supply and 10% of the veneer supply comes from offshore.

As the sawmill sector evolves toward self sufficiency and import replacement, Australian mills are beginning to focus on export markets with the long term objective of capitalizing on grade value grade value products. As an example, CSR Softwoods at Tumut is dedicating 15% of its capacity to the Japanese market, even though its domestic market is strong and domestic profits greater.

The sawmills of the major producers mainly utilize twin and quad band mills with and without canters for primary breakdown of medium to small logs. Headrigs and carriage

mills are used for the larger high quality logs. Some of the mills use slant bandmills and carriages for primary breakdown and slant resaws. Edgers, trimmers and drop sorters are similar to those used in North America.

**Scanning and optimization is not widely used at this point but in their efforts to improve their competitive positions most mills will be incorporating this technology in their modernization plans.**

Small log canters will be increasingly used to better utilize the smaller diameter wood that is available to the Queensland mills, as there is little other wood to provide any expansion of capacity.

The Hyne and Son mill at Tuan (north of Brisbane near Maryborough) is an example of one of the best designed and operated mills in Australia. Hyne is noted for its very focused approach to matching raw materials to markets, and for doing extensive testing prior to constructing mills. Its new sawmill has Linck primary breakdown equipment and Ari edgers without optimization. This choice was made following a review of sawing systems around the world, and a conclusion that this equipment best matched Hynes's processing requirements. A detailed description of the mill is included in Appendix 8.11.

Hyne is the leader in drying technology in Australia and possibly in the world. The company is drying pine under weight restraint in 4 1/2 to 5 hours at temperatures up to 180 degrees Centigrade followed by 4 to 5 hours conditioning and 24 hours cooling. Computers (PCs) and specialized sensors are used to control the process. Thermal oil systems are used for heat. The biggest problem is the kiln materials and bearings do not stand up well at these temperatures. The quality of the dried lumber appeared to be in excellent condition.

As the mills expand, planing mills are experiencing a bottleneck in planing speed, and in material handling. Most mills are using Wenig 22B planer/moulders. As finger jointed pine continues to replace Asian hardwoods for joinery and mouldings, sorting and material handling revisions will be necessary.

### **6.3 Sawmill Sector Opportunities for Canadian Companies**

Several factors will influence the Australian forest sector opportunities for Canadian companies. The immediate opportunities are:

- \* The 35% projected growth in supply of plantation timber, or approximately 3 million m<sup>3</sup>, by the year 2000, and;
- \* The trend in the industry toward small log equipment retrofits.

Other factors that could impact market opportunities include:

- \* The planned privatization of 700,000 m<sup>3</sup> of softwood and 1 million m<sup>3</sup> of hardwood in the State of Victoria;
- \* The possibility that the State of South Australia may change its clear cut rotation age from 45 years to 35 years, which would immediately increase harvestable inventory by 4 million m<sup>3</sup>, and;

- \* The possible privatization of more plantations. Management practices would improve the supply of timber, initially as small logs from thinnings, and subsequently as better managed larger timber at harvest.

With an eye on the projected increase in timber supply, several major mill producers interviewed during the market investigation had already completed green mill expansions, or had committed to equipment purchases for mill upgrades. These mills indicated that their next round of expansion, based on timber supply projections and existing capacities, is in the 1996-97 time-frame.

In addition to the above, the following expansions/new mill developments are planned for 1994.

- \* CSR softwoods at Tumut is planning an A \$10 million to expansion of its facility to process an additional 150,000 m<sup>3</sup> annual input.
- \* S.E.A.S. Sapfor is planning the construction of a softwood mill at Portland at a projected cost of A \$8 million.
- \* Bunnings is planning the A \$8.5 million construction of a hardwood mill in Western Australia.

These projects total A \$26.5 million. If 40% of this total is equipment purchases then A \$10.5 million will be tendered in 1994/95.

Not included in the above figure is the market potential for the sale of small log equipment retrofits. Although mill operations acknowledged this need, most were unable to estimate equipment investments required in their facility or by the industry sector.

Equipment purchase projections for the 1996-97 time period are based on the increase in timber supply forecast to the year 2000. If half of the projected increase of softwood, or 1.5 million m<sup>3</sup> is projected to come on stream after 1996, then the sawmill sector will need to expand to meet this capacity.

For purposes of illustration, using an average mill input of 300,000 m<sup>3</sup> annually, an equivalent of 5 new mills of capacity would have to be created. At an estimated cost of A \$15 million per mill, 40% of which is for equipment, A \$30 million will be spent on equipment in the 1996-97 time frame.

To summarize, the expected equipment purchases in the sawmill sector are:

1994-95	A \$10 million
1996-97	<u>A \$30 million</u>
Total	A \$40 million

The above figures do not include:

- \* Small log retrofits.
- \* The 1.7 million m<sup>3</sup> increase in timber supply in the State of Victoria.
- \* The 4 million m<sup>3</sup> increase in supply in the State of South Australia.



The last two factors could potentially create equipment requirements in the range of A \$30-50 million by the turn of the century (based on the construction of an additional 5-7 mills).

#### **6.4 Strategic Implications/Competitive Factors**

As member companies develop strategies to penetrate or expand in the Australian market, the following factors should be addressed.

- \* Equipment sales are normally a component part of a design/supply package offered by one company. Canadian companies must affiliate with a local company with a design/supply capability.
- \* Post sale service, while important to mill operators, was not viewed as a critical issue in the purchase decision. Given the geographic dispersion of the mill locations in Australia, production and maintenance staff are usually equipped to maintain equipment. Parts supply was the critical issue, as mill personnel expect replacement parts on a timely basis.
- \* The exchange value of the Australian dollar against world currencies, combined with shipping costs to Australia, are significant barriers to viable purchase options for mill operators. In an effort to achieve price competitiveness, Canadian companies should consider the sub-manufacture/assembly of equipment in Australia.
- \* The Australian sawmill sector is not aware of Western Canada's small log processing capability. It was mentioned several times by mill operators that they had looked at European equipment because Canada does not have this expertise. Invariably they were surprised to learn this technology existed in WCWMSEA.
- \* Sales support of your design/supply partner is critical. Scandinavian and European companies provide this services, and it is the determining factor in their current level of success in the market.
- \* Be realistic about the monetary investment needed to penetrate this market. Travel costs to Australia are high and the travel time commitment is significant. The design/supply mechanism is the standard means of business in the sector, and you will need to support this operation to be successful in the market.

#### **6.5 Existing Competition**

Competition for equipment sales in the Australian sawmill sector comes predominantly from European, Scandanavian and American companies, with the Europeans appearing to have an edge in the market. The comparative advantage the European companies have achieved is a function of three factors.

- \* The sales efforts of the European companies;
- \* The perception of the Australian sawmill sector that European equipment is better suited to its processing requirements, and;
- \* The perception of the Australian sawmill sector that Canadian/North American mill equipment is not suited to its processing needs.

The strategic implication for Canadian companies is: a determined local marketing effort is required to create a market image and convince the Australian sawmill sector that Canadian equipment and technology is ideally suited to its needs.

## **6.6 Marketing Framework**

To be successful, a Canadian company should entertain the following requirements.

- \* An alliance with a local design/supply company, as this is the structure that sawmills prefer to purchase from.
- \* Sub-manufacture or assembly in Australia. With the exchange rate of the Australian dollar against North American currencies, and given shipping costs, a company can achieve significant price advantages by manufacturing locally.
- \* A strong (Canadian) sales support of the local operations. European companies are the leaders in the market because of their sales efforts, not because their equipment is superior to Canadian equipment.

## **6.7 Agents/Dealers**

As reiterated above, the key to success in the Australian market is a relationship with a local design/supply company. This form of relationship is standard in the sawmill sector.

## **6.8 Customer Service and Training**

Replacement part supply was the key concern for mill managers. Given the limited scope of the Australian sawmill sector and the geographic dispersion of the mill facilities, mill managers recognize that it is not realistic to expect dedicated service efforts by equipment suppliers. Most mills communicated that they expect to service and maintain equipment, thus parts supply was the key issue.

With increasing competition in the Australian market, service may be a factor that will provide a comparative edge to equipment suppliers.

With an established track record in the operation of modern mill equipment, mill managers were not vocal about training considerations. Once again, this is not a service the marketplace has offered to the customer.

## **6.9 Project Financing**

Most of the major mill operations are owned by large forest companies. Vendor financing is not a consideration to these companies on equipment purchases.

## **6.10 Strengths, Weaknesses, Opportunities & Threats (SWOT) Analysis For Canadian Sawmill Equipment Suppliers**

### **Strengths**

Canadian equipment/technology is appropriate, if not leading edge, for the Australian market.

WCWMSEA presents a full range of capabilities in primary sawmilling operations.

Canadians manufacture robust high technology equipment appropriate to the processing requirements of plantation pines.

### Weaknesses

Perception that small log processing equipment and technology is found in Europe, not Canada.

Lack of representation and/or continued presence in market.

Lack of local affiliations or sub-manufacturing capability in Australia.

### Opportunities

Growth in plantation resource will create equipment opportunities. Significant investment and upgrades will be required over the next five years.

Goal of domestic lumber market self sufficiency by the year 2000.

Increase in labour and raw material costs are leading to more sawmill mechanization and optimization.

Long term goal of sawmill sector to penetrate export markets.

### Threats

Strong international competitors established.

**Perception that Canada does not have leading edge small log technology.**

## 7.0 HARVESTING SECTOR OVERVIEW

### 7.1 Harvesting Methods

Of the three countries visited in the Association's market studies (Chile, NZ, Australia), the mechanized harvesting methods evidenced in Australia are the closest to those practiced in North America. While the species of pine were more varied in Australia with Hoop, Slash, and Radiata, the equipment utilized was common regardless of species harvested.

The cost of worker insurance forced the logging industry to mechanize a number of years ago in Australia. The cost of worker insurance is \$.49 for every labour dollar spent. This cost leads to a very quick justification of labour saving mechanized equipment.

The market investigation covered four different Australian states, Queensland, New South Wales, Victoria, and South Australia. The first visit was to the Queensland logging areas. The Hoop and Slash pines dominated the government owned plantations in the state. The more adverse terrain required yarders. One of the sites visited employed Thunderbird rubber tired (TY40) equipment supported with Prentise hydraulic loaders. The rigging used was standard wire rope with non standard chain and hook for choking. As in New Zealand, good rigging equipment is expensive and hard to source. At one ground based site we visited, Caterpillar feller bunchers equipped with Forano shears were used to cut for an in-woods chipping operation. This dated chipper was supported by two new John Deere 648 grapple skidders and fed by a Caterpillar log loader.

The ground based systems in Australia consisted of tracked or rubber tired feller bunchers, processors or delimiters, and grapple skidders. The distinct difference in harvesting practices, as compared to New Zealand, Chile and even North America, was the quantity and value of the fibre left in the forest. The Australian plantations, for the most part, are government owned and managed. The contractors are paid only for what goes to the mill. As a result little detail is paid to the difficult to delimb large Radiata branches on the top section of the tree, and these top sections are simply left in the forest. In the area of New South Wales, high transportation costs and soft pulp market prices, contribute to this practice.

The concerns of the Chilean and New Zealand forest owners, regarding fibre damage during mechanical processing or delimiting of Radiata Pine, were demonstrated in New South Wales, Victoria and South Australia. In Chile and New Zealand the forest industry has been reluctant to use mechanical processing equipment in harvesting operations because of fibre damage during delimiting of Radiata Pine. Its large branches and their configuration cause them to be ripped out during delimiting, as opposed to being sheared. This ripping of the branches leaves deep gouges in the log. In Australia, to avoid fibre damage the top half of the tree is generally discarded. In New Zealand, efforts were made to reduce breakage and process down to 6 inches diameter. In Australia, the diameter generally does not get down to 10 inches because of breakage and fibre damage during delimiting.

The logging crews we met were well versed in harvesting techniques. However, at one site we saw more trees being broken than processed. The contractor was using a Bell three wheeled machine equipped with a directional felling head. The contractor was harvesting a stand of 30+ year old Radiata Pine in a gully. To get at the stand on the gully slope the Bell was anchored to a skidder. The trees were felled downhill and most broke on the uphill portion on the opposite side of the gully. A John Deere 748 grapple skidder was attempting to unscramble the mess. This operation was an exceptional site visit!

Visits to the operations of another contractor were far more impressive. The contractor, Jim Crozier, utilized some of the most current North American mechanized technology. Crozier is one of the first contractors to use the Timbco feller buncher and the Timberline delimeter. The company has some old Koehring delimeters in its operations but cannot replace them, as the Ontario based manufacturer does not build this equipment any longer.

One Crozier site was particularly illustrative of harvesting mechanization. It featured a Timbco felling up hill on a grade over 20%. The Timbco was supported by two Koehring delimeters and a VME 668 equipped with a Weldco grapple. This site also highlighted a notable difference in mechanical processing. In Canada, in most cases the trees are mechanically felled and skidded to roadside for delimiting. In Australia, and as illustrated at this site, the delimeter follows the path of the feller buncher and delimits and cuts to length in the field, while the grapple skidder skids the delimited and processed logs to road side for loading.

### **7.1.1 Thinning**

The thinning operations in Australia were consistent from state to state. The contractor would thin every fifth row of a stand, and selectively thin between rows from the original corridor. A variety of equipment makes were employed with rubber tired Scandinavian harvesters with processing heads the most common. The processors were supported by either grapple skidders or forwarders. In South Australia and Victoria the "original" Kockums forwarders were still in operation.

## **7.2 Use of Contractors**

Like Chile and New Zealand almost all the logging in Australia is carried on by contractors, who are responsible for felling, delimiting and loading. The only exception to this norm is the logging and chipping operations carried on by CSR Softwoods in Queensland.

## **7.3 Existing Equipment**

**Yarders** - The Ross Thunderbird is well known in Australia but S.Madill's appears to have market share in Tasmania.

**Hydraulic Loaders** - The Prentise loader was by far the most dominant loader at the sites visited. The loaders and their grapple attachments are well supported by a strong dealer that has driven sales. This is the case in New Zealand as well

**Harvesters/Forwarders** - There are a number of different makes and models in service in Australia, ranging from the original Kockums units to the latest Valmet machines, all of which are active in thinning operations.

**Feller Bunchers** - Bell and Koehring were the initial players in this market, but the success of the Timbco on sloped terrain and its ability to handle the heavier plantation pine trees has given it the edge in the market.

**Wheel Loaders** - Wheel loaders were most common in the mill yard. In the yards visited logs were debarked and graded by diameter. Loaders loaded from diameter bins using locally designed log forks.

Skidders - A variety of sizes and makes were in operation at the sites visited. Common to the skidders was the use of grapples. Only one winch skidder was seen in operation and it was being used to anchor a bell directional feller in a sloped cut.

Delimbers - Dennis, Harricana, Koehring and Timberline delimiters were all seen operating in the plantations. The Timberline appeared the most efficient.

Processors - The Waratha head is more popular in Australia than in New Zealand. In most cases it is mounted on a converted excavator and used in thinning operations.

#### **7.4 Existing Competition**

There is no purpose built harvesting equipment manufactured in Australia. However, there are a good number of attachment manufacturers who provide products ranging from grapples to sawheads to processing heads. Originally most of the imported logging equipment was European or Scandinavian, but high parts prices and none standard components made this equipment maintenance cost prohibitive. Today the trend for robust equipment of North American origin is common. The Australians are looking for durable equipment that is simple in design and easy to service.

Other than the attachment manufacturers there is no Australian manufactured competition. Like New Zealand, the competitors identified in Australia are the same ones present in the forest industry in North America.

#### **7.5 Channels of Distribution**

The major equipment lines are represented through the traditional dealer networks. The difficulty faced by dealers is the vast geographic distances between the various forest operations. It is virtually impossible to serve the whole market with one operation. In some instances, the location of the dealer affords him a competitive advantage for a given regional forestry area. The potential market size of the Australian forest industry does not justify or support a multi-location forest equipment dealership.

Therefore, replacement part supply is an important facet of the dealer network. Although contractors and forest companies are willing to stock consumables and repair parts within reasonable levels, replacement parts availability and delivery becomes a deciding factor in the equipment selection decision.

#### **7.6 Customer Service Expectations**

The Australians, like their New Zealand counterparts, are relatively self-sufficient when it comes to the servicing and repair of their forestry equipment, largely due to the vast distances between plantations. Their major sensitivity is inadequate parts support and the cost to source parts both in terms of time and dollar value. As mentioned above, the Australians are realistic in their service and replacement parts expectations, but they do not want to rely on support from North America for the day to day operation of their equipment. To be effective in this market, like in most, parts support in a timely fashion is critical.

It is also important to realize that the typical Australian contractor is extremely vocal about dealer parts pricing and service pricing. Although this criticism is commonly directed at the

local dealer, it influences the likelihood of repeat purchases from the original equipment manufacturer.

### **7.7 Customer Training Requirements**

The Australian industry is well versed in mechanized logging techniques and with the exception of one site visited, the operations ran smoothly. The quality of the wood left in the forest reflects more on industry practices and the forest owner than the level of logging expertise.

The Australians are self-sufficient with respect to operations and service resulting in limited demands for training.

### **7.8 Financing Requirements**

The typical Australian contract logger finances his equipment through a loan broker. He sets up the best commercial mechanism for his operation.

An example of a financing package would be a 5 year lease to purchase with a buy out in the final year. In the final year the contractor would finance the buy out over 2 to 3 years and plan to operate the equipment for at least five more years.

### **7.9 Sales Potential**

The immediate sales potential appears somewhat limited on first review, but as you look to the age of the existing equipment in most operations, an opportunity for equipment replacement exists. Also, as the plantations in Queensland, New South Wales, and Victoria mature, most of which are in adverse areas, ground sensitive and steep slope equipment will be required. For example, the increase in fibre granted to the CSR Tumut Mill is on adverse terrain and will require yarders for cost effective harvesting.

Yarding equipment as well as rigging equipment is required in Queensland, Victoria and New South Wales. The small harvest blocks require mobile equipment that is quick and inexpensive to move on the landing, and from site to site.

Potential equipment sales are related to the expected growth in harvests of plantation softwood. With the need for the industry to be cost effective, and given the high labour safety costs, innovative and effective products and equipment are the trend in the market.

In developing the sales potential for Australia we considered:

- \* new mobile equipment requirements of the mills;
- \* new equipment requirements for more adverse logging;
- \* transportation equipment;
- \* safety equipment;
- \* attachments as well as limited equipment replacement.

Over the next five years based on equipment replacement and new equipment and supplies to service the growth in the forest industry it is estimated conservatively that \$67,250,000 or approximately \$13,450,000 per year will be invested by the industry in its equipment.

## **7.10 STRENGTHS, WEAKNESSES, OPPORTUNITIES & THREATS (SWOT) ANALYSIS FOR CANADIAN HARVESTING MACHINERY SUPPLIES**

### **Strengths**

Durable equipment

Standardized components

Labour saving equipment

Proven technologies

Equipment designed to BC WCB standards considered most comprehensive in international forestry industry

### **Weakness**

Limited distribution agents/dealers

Few players

Freight costs relative to cost of goods for supply and attachments

### **Opportunities**

Levels of worker safety - less people on the ground

Australia's increase in softwood harvest will require more productive and durable equipment

Concern over erosion on ground base operations good for yarder and low ground pressure machines from Madill and KMC

Australia / New Zealand - small harvest blocks over a large area creates requirement for additional units

Australia / New Zealand - Roll over protection developed in North America designed for older equipment (dozers, skidders, and wheel loaders) will be required as industries move to improve operator safety

Australia / New Zealand - opportunity for yarding consumables limited source of supply in both countries P'Anco and Robar

Australia / New Zealand - JV opportunities for more advanced attachments for IMAC and Weldco-Beales.



## **Threats**

Poor dealer coverage

Competitive dealers well established

Good local manufacturing base to draw from

Highly skilled service network in-house for most contractors

Large used equipment inventory to draw from in Pacific North West

International currency rate New Zealand and Australia

**APPENDIX**

**8.1**

**MARKET STUDY ITINERARY**

**SUNDAY, OCTOBER 10, 1993**

0805	Arrive Auckland Airport	PWB/TEB
0930	Arrive Auckland Airport Travelodge Hotel	
0930 - 1300	Relax & Lunch at Hotel	
1300	Briefing on NZ & NZ Forest Industry	TEB
1400 - 1730	Visit to Woodhill & Riverhead Forests	Bruce Larsen
1830	Travelodge Hotel FIEA & Mike Horan	

**MONDAY, OCTOBER 11, 1993**

0830 - 0915	Ports of Auckland	John Quinn
0915 - 0950	Government Book Store	
1000 - 1030	ITT Rayonier	Charlie Margiotti
1100 - 1130	Anderson & O'Leary Mill Whenuapai	Bruce Anderson
1230 - 1400	Travel to Thames	
1400 - 1515	Thames Timber Co. Mill	Ron Duff Neville Read
1600 - 1700	CHH Timber Kopu Mill	Paul McCready Geoff Alexander
1700 - 1830	Travel Tauranga	
1900	Dinner with Bill Johnson, Manager Earnslaw One	

**TUESDAY, OCTOBER 12, 1993**

0800 - 0915	Visit Port of Tauranga	Grant MacVeagh
0915 - 1030	Travel to Rotorua	
1030 - 1130	Logging Industry Research Organization, Rotorua	John Gaskin Director
1200 - 1730	Forestry Corporation of New Zealand, Rotorua	
1200 - 1230	Lunch & Industry Status	Russell Dale G.M. Planning
1230 - 1500	Clear-fell Operations Kaingaroa	Euan McKenzie Clear-fell Manager

1500 - 1600	Waipa Mill Briefing	Peter Davidson Mill Manager
1600 - 1700	Waipa Mill Site Sawmill, Kilns	
1830	Meeting FIEA, Canadian Consulate Hotel	

**WEDNESDAY, OCTOBER 13, 1993**

0800 - 1600	Tasman Forestry Meetings & Visits to Mills & Forests	Dave Evans
0800 - 1015	Kawerau Forest Operations	Dave Sayer District Manager
1030 - 1215	Tasman Lumber Mill	Grant Butterworth Mill Manager
1215 - 1245	Lunch	
1245 - 1400	Travel to Rotorua	
1400 - 1600	Briefing on Tasman Forestry	Brian Johnston Planning Manager
1600 - 1700	Travel to Taupo	
1700 - 1800	Taupo CHH Sawmill	Stuart Collins Mill Manager
1800 - 2000	Travel to Napier	

**THURSDAY, OCTOBER 14, 1993**

0800 - 0900	Meet Sandy Hampton, CHH Forests Manager	
0900 - 1600	Visit Clear-felling of Very Large Radiata in Mohaka Forest, Production Thinning in Tangoio Forest & the Panpac Mill Whirinaki	
1600 - 1800	Travel to Masterton, Solway Park Travelodge	
1900	Meeting with Local Forest Operators	

**FRIDAY, OCTOBER 15, 1993**

0800 - 0830 Visit Tom Ward, Conservation Forest Ranger, Wellington Regional Council, Masterton. Briefing on Requirements of Resource Management Act 1992

0845 - 1030 Juken Nissho Harvesting Ngaumu Forest

1030 - 1200 Visit Farm Forest Harvesting Operations

1200 - 1400 Travel to Wellington

1400 - 1500 Meet with Don Wiji-Wardana, Manager International Policy, Ministry of Forestry

1500 - 1530 Meet with Alan Davies, General Manager Business Policy, Ministry of Commerce

1600 - 1700 Meeting with Tradenz (Laurie Halkett & John Stephens)

1700 Meeting with Journalists

**SATURDAY, OCTOBER 16, 1993**

0900 - 1200 Meet Paul Harris, Forestry Manager, Wellington Regional Council. Visit to Local Harvesting & Processing Operations

1300 - 1500 Visit to Port of Wellington

1500 Debriefing on Trip  
Catch Flight to Auckland, Ansett 736, Dep. 5:30 p.m., Arr. 6:30 p.m.

**SUNDAY, OCTOBER 17, 1993**

Meet John Dunstan at Brisbane Airport. Collect hire cars. To Gympie via coast & early dinner at Malony with Dick Baucher. Briefing on itinerary at Gympie Motel.

**MONDAY, OCTOBER 18, 1993**

Drive to CSR - Softwoods, Caboolture, to inspect their Slash Pine sawmilling operation. Meet with Greg L'Estrange, CSR - Softwoods' Queensland State Manager & his senior operations people.

Late a.m. & p.m. look at harvesting operations in Slash & Hoop pine plantations including an in-forest chipping operation.

Possible visit to Hyne & Son Hoop Pine sawmill at Melawondi.

Evening dinner to Gympie with local Managers of ACI, CSR - Softwoods & Hyne & Son. Also some logging contractor principals.

**TUESDAY, OCTOBER 19, 1993**

In a.m. drive to inspect harvesting operations in Tuan Slash Pine plantations, mechanized pulpwood & long length sawlog.

Proceed to Hyne's Slash Pine sawmill at Tuan for lunch. Inspection and meet with Richard Hyne and Les Inglis, CEO Hyne's softwood division.

Drive to Brisbane (3 hrs.) and fly to Sydney, New South Wales (NSW) on Ansett AN 157 leaving 1915 hrs., arriving 2035 hrs. Collect hire cars and to city hotel.

### WEDNESDAY, OCTOBER 20, 1993

Meet Paul Cotton, CSR - Softwoods, NSW manager in his Homebush Bay office at 8:30.

Drive to Oberon (3 hrs.) to see Boral's Radiata Pine sawmill at Oberon, looking at harvesting operations en route.

Meet All Ralph, Boral's Softwood Division Manager, onsite or at his Bathurst office.

Drive to Tumut (4 hrs.).

Dinner with CSR local management and some logging contractor principals. Joined till Friday p.m. by Gerard Moore.

### THURSDAY, OCTOBER 21, 1993

10:30	ETD CSR Softwoods mill at Tumut and travel to Green Hills State Forest
12:00	ETD Bago Forest and LUNCH
12:15	Lunch at Batlow, or in forest, en route to Bago forest, or at the operation site
12:30	Clear-fall operation: Settlement Road
13:30	ETD Green Hills Forest South and travel to Carrs Road
13:45	Thinning operation: Carrs Road
14:45	ETD for Australian Newsprint Mills, Albury
16:30	ETA Australian Newsprint Mills, Albury

Visit CSR's Radiata sawmill at Tumut, meeting site management.

Drive to Albury, looking a sawlog and thinning (pulpwood) harvesting operations in Radiata plantations en route.

Late afternoon meet Peter Rutherford, ANM Wood Supply manager, at Albury Mill. Host dinner in Albury with ANM and AFI managers and some logging contractor principals.

**FRIDAY, OCTOBER 22, 1993**

08:00 ETD Albury Carlton for Tallangatta Forest and Shelley Forest Camp, then to Waiwa Road

09:15 Clear-fall operation, Walwa Road

09:45 ETD Walwa Road for Pheasant Creek Road

10:00 Clear-fall operation, Pheasant Creek Road

11:00 ETD Pheasant Creek Road for Australian Forest Industries, Myrtleford

11:00 - 13:00 Travel to Myrtleford

13:00 Lunch at AFI Myrtleford

A.M. inspect harvesting operations in the Victorian plantations.

To Myrtleford, Victoria for lunch with Ken Robertson, AFI operations manager and his team, followed by inspection of AFT's complex including Plymill.

Drive to Melbourne (3 hrs.)

Weekend in Melbourne

**SUNDAY, OCTOBER 24, 1993**

Joined by Helen Rowell of Sydney Canadian Consulate

Fly to Mt. Gambier, South Australia

1845 Leave Melbourne

1940 Arrive Mt. Gambier (S.A. time)

**MONDAY, OCTOBER 25, 1993**

Inspect Tarpeena sawmill of SEAS - Sapfor.

Meet Adrian De Bruin and John MacNamara, owner and CEO of SEAS - Sapfor, in their Tarpeena head office.

Visit harvesting operations of SEAS - Sapfor.

Dinner in evening with manager of Forwood, SEAS - Sapfor and CSR; Roger White, CEO of Forwood will attend.

**TUESDAY, OCTOBER 26, 1993**

Visit Nangwarry sawmill and plymill of Forwood. Meet with Brent Lonn and Russ Neilsen.

Inspect further harvesting operations especially large log operations.

1630 Leave Mt. Gambier

1810 Arrive Melbourne



**APPENDIX**

**8.2**

**MARKET STUDY NOTES**

## OBSERVATIONS & NOTES FROM WCWM&SEA VISIT TO NEW ZEALAND & AUSTRALIA

### About Radiata

New Zealand's climate, even rainfall and fertile soil make it ideal for growing plantation Radiata Pine, one of the world's most widely planted plantation species. One of the main reasons why Radiata grows so fast is its ability to take advantage of very brief growing conditions. By comparison, most conifers grow only for a limited period of the year. If the proper conditions exist, Radiata will grow year round.

It is also an excellent tree for rotary peeling, slicing and sawing. Pruning plays an important role in the development of the tree. Done correctly, pruning of the lower branches (up to 20 ft.) when the trees are young will yield a high percentage of knot-free clear wood used in high-value lumber and veneers. The upper sections of the tree are used as construction lumber while small and lower grade logs are used for pulp and paper, and fiberboard.

Considering the species was introduced only 140 years ago, it is a credit to New Zealand's forestry industry that the country is now the world's leading supplier of high quality Radiata. Typically, Radiata plantations yield logs of high quality in just 30 years. All told, 1.3 million hectares (2.72 million acres) of Radiata plantations in New Zealand supply premium quality wood to mostly international markets. Interestingly, New Zealand is one of the very few countries able to increase and sustain its total wood production. Apart from disciplined management of the resource and a "commitment forever to forestry", plantations are able to achieve average annual growth of 20 to 24 cubic meters (706 to 848 cubic feet) per hectare (285 to 343 ft.<sup>3</sup> per acre).

As the supply of large trees from natural forests diminishes, the availability of lumber which is free from defects, especially knots, diminishes along with it. Radiata, with its high percentage of clear wood, will become a much sought after commodity in the years to come.

### The Suitability of Radiata in Making Plywood

In order to achieve good quality veneer from Radiata, careful conditioning is required. Tests indicate that the blocks should be conditioned for about 48 hours at temperatures ranging from 35-50 deg. C.

In tests conducted by Raute, Finland the same lathe settings used for Finnish spruce were used when peeling Radiata with appropriate results. Lathe setup for spruce proved to be even better on Radiata. Because of the high compression of the Radiata, the veneer was strong and smooth without any observable roughness around the knots. Soft knots peeled especially well.

Testing also found that the leading edge of the veneer ribbon contained unusable roundup veneer. The knots in Radiata grow deep into the wood and a powered backup roll is recommended to enable consistent peeling down to a sufficiently small core.

The proportion of heartwood to sapwood in Radiata was found to be small. Drying time for Radiata was found to be about 5 percent longer than for spruce. When dried at higher temperatures of approximately 200 deg. C, and with high humidity of approximately 500 g/kg, the veneer was good in quality and free from buckling or problems with resin. The enable proper drying, heartwood and sapwood should be separated after peeling. The high resin content of the wood required that it be dried at high temperature. If the drying temperature is too low the resin will accumulate on the roll.

### **How Much Plantation Wood Is There?**

Presently, Australia supports 1 million hectares of plantation forest. Commercial softwood planting began in Australia some time around the 1870's. After many trial species were planted, Radiata pine came to dominate, particularly in the southeastern states of Victoria and South Australia. Of the 1 million hectares under plantation, softwood stands account for 915,000 hectares. Early plantations also included hardwood species but the rapid growth rates achieved by softwood species and the relative abundance of hardwood timber resulted in a much slower rate of establishment. Hardwood plantation exceeds 85,000 hectares. New Zealand's plantation resource stands at 1.3 million hectares of Radiata.

### **Notes From Visits To Mills**

#### **1. New Zealand**

##### **1.1. Meeting at Travelodge, Auckland with Peter Broadbent and Trevor Butler of the Frame Group Sunday - October 10**

- . Overall, New Zealand's economy is improving due to the sweeping political and economic changes that have taken place in the last 10 years or so. The Labour government has been instrumental in restructuring the country; eliminating much of the social welfare system and replacing it with a more free enterprise system.
- . Interest rates have fallen significantly and are now at around 10%.
- . Unemployment remains at a fairly high 11%.
- . "Control of business is now back in the hands of business" which has revitalized the private sector and led to greater entrepreneurship.
- . Demand for skilled and professional people; particularly in the areas of engineering and marketing, is on the rise. In the forestry sector New Zealand is turning away from its traditional commodities-based business into more value added. Log exports, however, continue at a strong pace and will almost certainly continue to do so. Log exports provide employment and foreign exchange. There is a fairly strong reliance on these exports which has had some negative consequences. Supply of logs to the smaller sawmillers has become tighter and when a large volume of wood was dumped onto the world market in recent months, prices paid by Japan and other trading partners fell which hurt the forestry sector in New Zealand. Inventories rose and harvesting was curtailed to some degree.
- . Forest ownership and management, prior to corporatization, was carried out by New Zealand Forest Service. Heavy planting of Radiata was carried out during the thirties and forties using cheap labour. Planting fell off during the fifties and sixties, rebounded strongly during the eighties. Currently there are 1.3 million hectares of Radiata under plantation. Some Douglas Fir and other species are also grown for commercial use. Indigenous species are, for the most part, no longer logged.

In 1987 the Forest Service was corporatized. Forests then were put under the control of New Zealand Timberlands. Forests were offered for public tender, however, asset value was not determined at time of handover. Forests were made available to private companies operating within the scope of the wood products industry.

With corporatization came concerns by the Maori people that they would lose control of the land which they saw as their's by right of birth. Native land claims are resolved in New Zealand courts of law.

There has been little interference in logging operations from environmentalists because the forest industry has all but abandoned the felling of indigenous species. Radiata plantations are seen as being environmentally friendly. There is the feeling also that, given the economic climate in New Zealand, and the importance of Radiata as a revenue earner, environmental complaints would generally fall on deaf ears.

The Crown was responsible for granting forestry licenses. Forest companies are granted leases and logging rights over land through one rotation with an option to renew. The land is owned by the Crown with the forest company paying an annual lease fee. The forest company has control over the resource. It is their resource to use as they see fit. Some companies, like Carter Holt Harvey, are committed to maintaining a strong manufacturing base in New Zealand with the view that the raw material should be processed in New Zealand. Other companies, like ITT Rayonier, use the forests as a raw material supply only and do not carry out any processing in New Zealand. A large Japanese company, Juken Nissho, processes wood in New Zealand and exports the finished product to Japan.

There have been concerns expressed that foreign companies would raid New Zealand's forests and make no attempt to replant. Although companies are not required to replant, there is sufficient economic incentive to make them want to do so. The forest is seen as a long-term investment. It will cost the forest company more to lease the land if it does not replant. Replanting also gives the forest company a second rotation.

Currently, 14 million m<sup>3</sup> of timber is being processed. However, processing capacity is 23 million m<sup>3</sup> which is expected to rise to 30 million by the year 2000. It is anticipated that more of what is presently exported in the form of whole logs will become available for processing. This represents an opportunity for machinery manufacturers to sell equipment in New Zealand, from harvesting through sawmill and other.

The Resource Management Act of 1991 brought together many planning activities, including harvesting which had previously had little control exercised over it. Harvesting in New Zealand is now more tightly controlled, the main reason being to protect the environment by reducing the incidence of damage to the land. The Resource Management Act operates in a similar fashion to the Environmental Protection Agency in the U.S.

There are also tighter controls over occupational safety. The Health and Safety Act functions in a similar way to OSHA and the WCB by looking at health in the workplace. There is now more of an onus on the employer to produce a safety plan and identify risks in the workplace. Safety conditions in the forests, however, still remain suspect and more needs to be done to improve in this area.

The Employment Contracts Act gave employers more flexibility in arranging contracts with workers. Under the act, employees arrange contracts directly with the employer rather than through a collective bargaining agreement as with unions. This recent initiative has improved productivity in the forest industry and improved competitiveness while reducing non-productive time. It remains to be seen how long the New Zealand worker will accept this situation once prosperity levels rise.

New Zealand's forest industry has placed great emphasis on silviculture with the aim of producing a high percentage of clearwood in their Radiata. A lot of clearwood is used in the production of veneer based products. Juken Nissho and Carter Holt Harvey are two companies which rely heavily on clearwood for their veneer based products. One result of this initiative has been shortages of resource suitable for pulp.

Skidder harvesting is favoured in the South island because it is generally flatter than the North island. Cable harvesting is widespread in the north where the planted ground is steeper. Cable harvesting is also favoured because it minimizes ground disturbance.

There is also a greater emphasis being placed on merchandising in the forest. A lot of the timber is felled and bucked to size at the logging site rather than being shipped

New Zealand's forest products industry has become more market focused; from commodity based to market oriented.

## **1.2. Visit to Anderson & O'Leary - Monday, October 11.**

Small sawmill producing about 20 m<sup>3</sup> of sawn lumber annually. Sawmill is also a retail outlet which is part of a home hardware chain.

Part of the Pinepac group.

Bruce Anderson, managing Director, stated that the export of whole logs from New Zealand has become a contentious issue with small sawmill owners because it places them in the position of having to pay high prices for raw materials on the local market in order to compete with overseas buyers. In particular, the strength of the Yen has forced prices for whole logs up.

This situation may force small sawmills out of business.

### **1.2.1. ITT Rayonier New Zealand - Mr. Charles Margiotta Managing Director**

Peter Berg is operations manager who is supported by 6 or 7 field managers.

In 1987 to expand export trade, based on customer demand began to explore Radiata Pine for Japan and Korean markets.

Started buying woodlots in New Zealand and export first shipment in 1989

In May 1992 purchased approximately 40% of New Zealand Forestry Corporations plantations.

In ten years expect to double export potential of 800,000 cubic meters to close to 2,000,000. This is driven by age class of plantations.

Currently looking and reviewing wood processing options( JV/purchase/etc).

Rayonier is largest seedling producer in new Zealand.

The company runs 70% traditional cable logging sites. Logging capacity must double. The east coast operation will require 20 or 3 units but it is hard to find quality people with the right equipment.

The company is reviewing plans to bring equipment in from the Pacific North West. Imported talent is hard to find of the low New Zealand Dollar.

### **1.2.2. Carter Holt Harvey Timber Kopu Mill - Paul McCready and Geoff Alexander**

The mill currently operates at 58% recovery. Mill has a 16 year CAE headrig and carriage, a vertical resaw and a Nicholson debarker.

The mill is operated on a two shift bases for the past year and for the first time as a result of a secured timber supply.

The mill is awaiting board approval to purchase a edger optimizer and a gang saw which will improve recovery by 5% and have a 1 to 2 year payback.

- . The equipment will come from Sweden. This will be the third CCH mill to order this equipment. The ability to grade scan is the most important element of package.
- . Sawmill costs are \$40 per cubic meter plus \$80 per cubic meters processing costs.
- . Carter Holt Harvey is looking a building one new mill on the North Island.
- . CHH plans to process all their own timber in the future.
- . Hard to find process consulting expertise. Most equipment vendors supply and distribute they do not get involved in projects. CHH needs good technical support from suppliers would can work with staff to develop and solve problems.
- . Planning to put in bin sorter and moving to ISO9000 as two CHH mills have done.

### 1.3. Visit to Waipa Processing Complex, Forestry Corp of NZ - Tuesday, October 12.

- . Mill has a CAE slant bed carriage headrig and Kockums Chip n' Saw.
- . Purchased optimized board edger from Schurman (USNR) instead of from Newnes because Newnes has suffered from poor local representation which has tarnished their reputation.
- . Newnes is seen as being the best company of its kind in Canada now that Kockums has moved to the U.S.
- . Nicholson has a local representative. Some of their equipment is built in Auckland.
- . Canadian equipment for the most part is well represented in NZ. Quite a lot of Canadian equipment in NZ mills. Has a good reputation.
- . Quite a large amount of used equipment is sold in NZ by Brian Mannington, former Morbark representative.
- . There are no longer many small ma and pa operations which were a good target for used equipment. The sawmill industry is now much more modern and sophisticated in product knowledge and application.
- . Currently building a moulding plant which is a joint venture between Fibereform and Forestry Corporation of NZ.
- . Whole log sawmill also being built. The contract was secured by Stohlberg.

#### 1.3.1. LIRO - John Gaskin

- . LIRO has a detail library of logging equipment both current and past. The organization is similar to FERIC but appears to work much closer with industry. The organizations members frequently use their library to research information on both equipment and technics. The group is often consulted as an impartial body when new equipment purchase are considered.
- . In 1980 15% of logging was cable yarder now it is 30% by the year 2000 50% of New Zealand logging will be preformed by cable yarding systems. Yarders will grow by 45% by 2000.
- . Shortage of rigging equipment for yarders and it is hard to come by in New Zealand.

### 1.4. Visit to Tasman - Wednesday, October 13.

- . Has a 60,000 ha resource in the Bay of Plenty.
- . Cutting rights in the central District amount to 800,000 t.
- . Small log diameters given as 20-50 cm.
- . Sawlog diameters given as 50-90 cm.
- . have had experience with stroke delimiters.
- . have used Denis product but it didn't function satisfactorily.
- . Suppliers need to concentrate on providing equipment that will minimize breakage of the trees while giving best recovery.
- . using yarders (20%) and skidders (80%).

Methods of harvesting - using skidders to haul logs 150 m to landings where the trees are delimited with chainsaws. Keen on mechanization for better recovery and improved site safety.

Approve of the use of central processing yards. Good opportunity for whole log scanning. expensive to set up a CPY.

84% of Tasman's sawlogs are processed into lumber.

Tasman is part of Fletcher Challenge. Concentration on solid wood products rather than reconstituted products. Focus also on Radiata Pine.

Sawn log volume 504,000 m<sup>3</sup>; total logs processed 984,000 m<sup>3</sup>.

By 2010 they expect to be harvesting 17 million m<sup>3</sup>.

## 2. Australia

### 2.1. Meeting at CSR Softwoods, Caboolture, Qld. - Monday, October 18.

Met with Greg L'Estrange, Regional general manager

Two resource groups; hoop pine and slash pine. Hoop mills expected to account for 25% of resource in next 10 years.

Caribea pine has become an important species and will continue to grow in importance in the next 10-15 years.

Another species that has been developed is called the F1 hybrid - slash and caribea.

Radiata has a good reputation for being a straight; stable species.

Improvements in drying has improved the utilization of slash - high temperature kilns, better, tighter drying chambers, more scientific drying methods. Drying particularly important to the quality of the final product and for the mill's operating efficiency.

There are a few small pockets of Radiata grown in Queensland, but the predominant species are slash and hoop.

The growth in the Caboolture sawmill will be static and relevant to the volume of resource in the area. No extraordinary growth expected.

Mill capacity at the plant is 270,000 m<sup>3</sup> of log in on 2 shifts.

105,000 m<sup>3</sup> of dressed, dried lumber out.

Mill has bin sorters, edgers and optimizers. Docking and stacking is done manually.

It was stated that labour costs and safety issues are a factor at the mill but that new equipment purchases may not be cost effective and thus not economically justifiable.

Costs of labour. Award rates are paid: unskilled labourers are paid \$375.00 per week; skilled operators are paid \$415.00 per week and tradesmen are paid \$470.00 per week.

CSR Softwoods have three major sawmills:

. Tumut 320,000 m<sup>3</sup> of log in rising to 450,000 m<sup>3</sup> in 1994

. Mt. Gambier 300,000 m<sup>3</sup> of log in

. Caboolture 270,000 m<sup>3</sup> of log in

The raw material for the Caboolture mill comes from 18,000 ha of private forest land. The balance comes from the state government.

The removal of the resource is the responsibility of the sawmill. The government manages the forests but does not get involved in harvesting. The state government also has the responsibility for regenerating the forests. Works with the sawmills in planning reforestation.

State research has been involved in developing tree species.

CSR hopes that state forests will be privatized like in NZ, but feel that it is unlikely.

There is a move towards corporatization but not privatization.

Each state has control over its own forest resource.

CSR also has a panels division - plywood, particleboard and MDF.

800 m<sup>3</sup> of product is exported to Japan each month.

- . generates 250-300,000 t per month of chip residue; 80% of which goes to export.
- . The Caboolture facility has 220 people employed on the production site.
- . Average diameter of resource coming into mill is 200 mm; log length is 5 m.
- . Takes 32 years for hoop pine to be ready for harvesting.
- . There are several thinnings carried out during the growth cycle.
- . Recovery per ha is 12-15 m<sup>3</sup>.
- . Raw material has very little heart wood, mostly very sappy. Tight with small knots.
- . Self pruning.

## 2.2. Meeting with CSR Softwood, Homebush Bay, NSW - Wednesday, October 20.

- . Met with Paul Cotton, regional General manager NSW and Terry warren, Sales manager NSW.
- . Cotton gave overview of the Tumut mill in NSW. Relatively modern mill technologically speaking.
- . It is 4 years old and operating on 2 shifts.
- . The timber allocation rises from 320,000 m<sup>3</sup> to 450,000 m<sup>3</sup> in January, 1994 at which time the mill will go on three shifts.
- . Currently planning to spend money on major upgrading - drying, planing and finger-jointing. Cost expected to be \$9 million AUS.
- . No large scale plan for spending money on primary and secondary breakdown equipment in the sawmill.
- . Mill is currently producing 20 lumber sorts. F5 and F8 structural grades are sold in 300 mm increments.
- . Mill has 2 Weinig 22B planers and machine stress graders made by Plessey. High speed moulders needed.
- . product mix is 80% structural and 20% appearance.
- . Environmental pressures caused CSR to go to mouldings because much of the moulding material coming from Asia was being produced from tropical species.
- . Raw material comes from mostly government controlled forests. Resource will amount to 600,000 m<sup>3</sup> by the year 2000.
- . CSR has signed 20 year wood agreements with the NSW government.
- . CSR has its own engineering division in Mt. Gambier, SA.
- . Cotton said that the Scandinavians have done a good sales and marketing job in Australia. Australians are impressed with Scandinavian equipment because they feel it better suits their raw material. Quality of the equipment was, however, questioned.
- . There is a move towards long length log merchandising.
- . CSR has two small plywood mills, one in Wagga Wagga NSW and the other in Adelaide, SA. Both are antiquated.
- . CSR has an interest in LVL.
- . Told that CSR lacks technically qualified people who have a vision about the future of the wood products business. detrimental to the future growth of the industry.
- . hardwoods still make up 30% of the wood processed in Australia. Environmental pressures are closing in however and putting pressure on hardwood processing plants.

### Plans to Upgrade the Tumut Mill

A successful tender by CSR Softwoods which will significantly increase the company's purchase of NSW State Forests softwood sawlogs over the next two years has paved the way for expansion of the company's Tumut sawmill into the biggest in Australia.



CSR will spend \$8.5 million AUS to expand the mill's capacity by almost 50%. An additional \$1.5 million will be spent on the utilization of cut-offs and on value adding facilities at CSR's nearby Gilmore plant.

The Tumut mill produces two main products - structural and appearance timbers and treated timber. Ten percent of its output at present is exported. Tumut is also the location of CSR Woos Panel's particleboard factory which uses most of the sawmill's residue in its processing.

Mill Manager, Frank Barker, stated that the mill's upgrading program is accelerating so that the mill will be able to move to round-the-clock operation by early 1994 at which time the mill will become world-scale. Mill employment is expected to increase from 250 to 280 with another 30 jobs being created in harvesting-transport, engineering and service activities. The upgrade will lift CSR's sawlog allocation from 640,000 to 900,000 m<sup>3</sup> over the next two years.

CSR's latest contract, along with other contracts, will increase processing in the region from 425,000 to 600,000 m<sup>3</sup> per year. The latest tender was part of the N.S.W. State Forests' marketing strategy to sell an increasing yield from its softwood plantations.

CSR's ability to process species previously considered difficult to process and market and improved growing techniques has ensured that the extra allocation would not endanger the sustainability of the plantations. For example, in addition to Radiata being utilized, large volumes of Western Yellow pine and Corsican pine planed in the 20's and 30's are also part of the allocation. Total sawlog availability will in fact increase from 1996 onwards because of the large numbers of trees planted in the 60's and 70's will have reached harvestable age.

Paul Cotton, regional general manager of CSR Softwoods, stated that the moving forward of expansion plants at the Tumut mill by two years was partly prompted by increased international demand and its effects on domestic demand. The move will enable CSR to meet local needs and position the company well for further expansion into the export market.

Mr Peter Crowe, general manager of State Forests' Softwoods region believes the agreement with CSR dramatically demonstrates the foresight of earlier planning by both CSR and State Forests.

#### **2.2.1. Boral Softwoods - Allan Ralph**

- . There is a perception in Australia that for small log processing and equipment expertise one must go to Europe.
- . The North American equipment is designed to handle products for only 2 to 4 markets and only prime prices. Because of volumes processed the company has to be capital efficient.
- . In 1992/93 Boral Oberon average log was .493 cubic meters, total log in was 186,300 cubic meters, recovery after drying was 41.6%, and processing costs were \$58.32.

### **2.3. Visit to AFI, Myrtleford, VIC - Friday, October 22.**

- . Met with Pat Cox, Plymill manager.
- . AFI is a division of Bowater, a large U.K. company.
- . AFI originally got into the plywood business when they submitted a successful tender about 10 years ago. A provision of the tender was that a plywood mill be built on the location. Another large Australian plywood manufacturer, Hancock Bros., declined to put in a bid because they believed that there wasn't enough resource in the area to make it a worthwhile proposition for capital expenditure in the future.
- . The mill has a short-coupled peeling line supplied by Raute, Finland. The veneer ribbon comes straight off the lathe into an old-style clipper without catchup conveyors.
- . 42,000 m<sup>3</sup> of wood under bark goes into the plywood mill which produces 22,000 m<sup>3</sup> of plywood. Mill operates a 7 hour shift, 5 days per week.
- . 75 people work in the plywood mill; 330 in total at the complex.
- . 4 full-time engineering staff.
- . Consultants are brought in when the mill undertakes a large-scale project for project management purposes.
- . It is likely that mill management would like to increase output from the line to around 40,000 m<sup>3</sup> per year, single-shift basis. To make a capital investment worthwhile, the mill would have to operate on a two-shift basis. It is unlikely that resource restrictions will allow them to do that.

### **2.4. Visit to SEAS SAPFOR, Mt. Gambier, SA - Monday, October 25**

- . Logging for the mill is carried out by outside contractors. The company's strategy is to invest in land and forests, not harvesting equipment.
- . The company has access to a total of 42,000 ha of which 60% is located in the state of Victoria and the remaining 40% is located in South Australia. Resource is 100% Radiata.
- . That area of Australia is the largest Radiata growing region in Australia. All told there is approximately 1 million ha of Radiata being grown which includes a small amount of slash pine.

### **2.5. Visit to Forwood IPL, Nangwarry, South Australia - Tuesday, October 26**

IPL is wholly owned by the South Australian Timber Corporation (SATC), a unit of the South Australia state government, which also owns pine timberlands, sawmills and a small glulam facility. IPL is primarily concerned with veneer-based products; structural plywood, Laminated veneer Lumber and derivatives. IPL and SATC have merged into Forwood Products which will be one of the largest timber companies in Australia.

The production and use of LVL in Australia is growing, according Bruce Hutchings, chief timber engineer advisor to IPL. IPL's plant at Nangwarry has an original capacity of 5,000 m<sup>3</sup> per year when it was purchased as used equipment in 1986. It subsequently expanded to 10,000 m<sup>3</sup> in 1993 and will reach 20,000 m<sup>3</sup> in 1994. The plant is operating at capacity.

The development of LVL in Australia is driven by three factors:

- . The extreme price escalation of sawn timber from the US and New Zealand.
- . The comparatively high price of glulam beams in Australia due to the small scale of operations.
- . The emerging importance of tropical rain forest ecological issues which is causing a shortage of Queensland hardwood timber.

LVL has been increasingly substituted for these three product categories since the late 1980's.

The technology used in the production of LVL in Australia is relatively labour intensive and simple by North American standards. It is, however, effective. Layup is manual and the whole operation is generally slower than would be considered economically viable in North America. However, the business is there which is prompting IPL to install a new line at the end of 1993. The line was built to IPL's own design by a NSW company called Krueger.

### **Trends In The Australian Plywood Industry**

Leng Sar and Jeremy Whitham of the Land and Forestry Economics Section of the Australian Government state in the Agriculture and Resources Quarterly; vol. 5, no. 3, 1993 that consumption of wood-based panels in Australia is forecast to fall by 2 percent in 1993-94; to a level of 1.22 million m<sup>3</sup>. This reflects downward revisions in forecasting of residential and non-residential construction. The Indicative Planning Council for the Housing Industry estimates that residential commencements will fall by 7 percent in 1993-94, and the Construction forecasting Committee forecasts a fall in non-residential construction of 3 percent in that year.

Domestic markets for plywood, however, are expected to continue to expand in 1993-94. Over the past few years Australian plywood producers have been diversifying and expanding plywood applications in the domestic market. This has resulted both in growth in domestic consumption of plywood (of 11 percent in 1992-93) as well as an increase in the share of the market supplied by domestic producers (from 61 percent of the market in 1991-92 to 63 percent in 1992-93). growth in market share of domestic producers has also been assisted by higher world log prices which have reduced the price competitiveness of South East plywood.

Unlike North America, there is very little plywood used in the construction of a typical family dwelling. Generally speaking, plywood sheathing is only used on the corners as bracing. This is due to the fact that the large percentage of new homes built in Australia are so-called brick veneer. In a similar manner, roofing is applied directly to the roof framing; either tin or tiles.

Australian producers are expected to continue expanding into non-residential building markets, such as warehouses and materials handling applications, and achieving product substitution in dwelling applications in 1993-94. Consequently, despite weaker construction activity, consumption of plywood is forecast to increase by 4 percent to 196,000 m<sup>3</sup> in that year.

### **General Trends In The Australian Wood Products Marketing Outlook**

At the 14th All Australia Timber Congress, Mike Quinn, general manager CSR Building Materials Export, NSW gave the following run down of timber changes and trends affecting the wood products markets.

Dramatic changes in the world timber industry have resulted in permanent structural changes in the demand/supply relationship that benefit Australia and New Zealand. In line with these changes, both Australia and New Zealand have been undergoing internal changes aimed at improving their international competitiveness. The realization that neither country can count on domestic markets for growth have led to strong growth in the export potential of forest products.

Environmental restrictions in North America and the withdrawal of western timberlands have also created opportunities for Australian and New Zealand timber products. A bi-product of the change and coinciding shortage in SE Asia has been a reduction in the availability of quality timber providing greater impetus for the demand for manufactured solutions; like finger-jointed, edge laminated mouldings and OSB-type material.

Concurrent with the changes in the US were the SE Asia reductions in log supply. Pressures based on concerns centered around logging at unsustainable rates, illegal logging and the desire to add value to forest products in their own countries have sharply reduced log exports. This, coupled with restructuring of concessions in Indonesia, has seen sharp increases in the price of logs, plywood and wood components and moulding from that region.

Furniture manufacture is becoming concentrated in the developing nations of Asia. Plywood, the favoured material for furniture, has become difficult to obtain, quality has deteriorated and prices have escalated. This has seen users seek new materials to maintain their competitiveness.

This has helped Australia and New Zealand because of the Radiata pine resource that exists in both those countries. Radiata has gained acceptance as structural timber due to its presentation as a machine stress graded kiln dried product in Japan. However, care needs to be taken in meeting specification and in the provision of standard sizes acceptable to Asian markets as they differ to Australia and New Zealand.

Particleboard and MDF are in strong demand for use in furniture manufacture which is relocating from eastern Europe to developing Asian countries where labour is cheap. US producers are limited now and an opportunity to gain their market volume in MDF exists at present. There is a limited demand for pulp logs for paper, particleboard and MDF in countries with scarce timbers. This opportunity will reduce as plantation forests in Asia come on stream. Value added products of all types have a good future and this encompasses solid wood and reconstituted wood panel products. Major opportunities exist in products like mouldings, edge laminated products, finger-jointed products, furniture and door components and cut-to-size and machined components.

Opportunities exist all over the Pacific Rim with particular emphasis on Japan, Taiwan, Korea and China. The difficulties to be encountered in establishing an export market as far as Australia is concerned are:

- . determining what is the appropriate product really required in terms of grade size and intended end user.
- . Negotiating a competitive shipping rate from Australia.
- . Different cultures pose barriers in understanding requirements, building relationship and negotiations in general.
- . Australia's poor export record due to the lack of commitment to export in good times and maintaining supply to overseas customers. A further problem is Australia's history of bad industrial relations and failing to meet contracted supply.
- . There is a high level of commitment and a lot of work with seemingly little return at the beginning.

Keys to establishing a sound export foundation are:

- . Long-term commitment.
- . Understanding and defining the market, researching and carefully selecting the distribution representation.
- . Learn about the culture which is essential to the development of sound, long-term relationships.
- . Have a plan, concentrate on what is achievable and most attractive and focus activities.
- . Be prepared to commit the resources required.

### **The Australian and New Zealand Plywood Industry**

The Australian plywood industry is low tech by world standards. The most significant major investment in plywood manufacturing is already ten years ago at the AFI plant in Myrtleford. Although Forwood has an interest in producing veneer, its main focus appears to be on the development of the LVL markets with plywood and veneer remaining secondary. CSR Softwoods is a company that could become involved with the plywood business in a bigger way in the future. However, their focus appears to be on sawn goods and it is doubtful that their two small plywood mills in N.S.W. and South Australia will see any changes in the near future.

Australia must import a lot of its raw material and is not an exporter of plywood to any significant degree. The locations of its plywood operations causes a further problem with supply. It is doubtful whether any large scale plywood operation would be set up to take advantage of resource given the success of the sawmill industry and the concentration in that area. In all probability, additional demand for plywood in Australia will be met by imports from New Zealand, particularly in light of the huge increase in production made possible by the recent commissioning of the Carter Holt Harvey plywood mill in Tokoroa, New Zealand and the additional 50,000 m<sup>3</sup> of plywood it will bring onto the market in that region.

Carter Holt Harvey is the largest producer of Radiata Pine plywood in the Australia/New Zealand region. CHH is a New Zealand company that is focused on the plywood industry. They recently brought on line a new, modern facility at their Kinleith site near Tokoroa on the North Island to meet the growing demand for its products in world markets. The redevelopment of the plant will double the company's plywood and veneer capacity from 50,000 to 100,000 m<sup>3</sup> per year. The upgrade was in response to the considerable demand for plywood and veneer products in the Pacific Rim markets which is expected to increase significantly in the future. This is a result of the diminishing supply of softwood and hardwood

products from traditional sources in SE Asia and North America. The wood supply for the new plant will come from CHH's Kinleith forests. The expansion project will create an additional 100 jobs in Tokoroa resulting in over 200 jobs in the new plywood plant. As a result of the Tokoroa plant upgrade, CHH will close its existing mill at Mt. Eden in central Auckland. Machinery supplied to the new mill came predominantly from COE and Durand-Raute, with COE supplying the lathe deck and drying lines while Durand-Raute supplied the green end.

This additional 50,000 m<sup>3</sup> of quality Radiata Pine softwood plywood will have a significant effect on the future investments in plant and equipment in both Australia and New Zealand. It will place New Zealand at the forefront of softwood plywood supply in the region and will add a significant volume of new product to the market. As to capital investment, it is likely that any future investment will be confined to the purchase of used equipment from the US west coast. A large amount of equipment that has come onto the market in recent years as a result of the closing of dozens of plywood operation in Oregon and Washington is still available for refurbishing and shipping to Australia and New Zealand. Much of this equipment can be bought for a fraction of its replacement cost and it would be able to do the job. This is a trend that has been occurring for some time.

The situation could change if one of the large Australian forest products companies; such as CSR, AFI or Hancock decides to build a world-class plywood plant. To put it into perspective, the current output of the Australian plywood industry would not even equal the output from one modern North American softwood plywood mill.

**APPENDIX**

**8.3**

**OPPORTUNITIES IN AUSTRALIAN &  
NEW ZEALAND PLYWOOD INDUSTRY**

## **OPPORTUNITIES FOR WESTERN CANADIAN MACHINERY MANUFACTURERS IN THE AUSTRALIAN AND NEW ZEALAND PLYWOOD INDUSTRY**

**For the purposes of this report, the Australian and New Zealand plywood industry will be considered as a single market area, given the relatively close proximity of the two countries to one another and the relatively small size of the overall market. The content of this report deals only with that part of the industry that produces rotary cut veneer and plywood with emphasis on softwood plywood.**

### **1. Present Situation**

The Australian and New Zealand plywood industry has a combined annual output of around 220,000 m<sup>3</sup> of finished product, or 245,000,000 sq. ft. (3/8" basis). To put this volume into perspective, a single, medium-sized softwood plywood mill in North America, of relatively modern technological standards, is capable of producing in the order of 165,000,000 sq. ft. (3/8" basis). Indeed, there are several softwood plywood mills in North America which routinely produce in excess of 250,000,000 sq. ft. (3/8" basis) on an annual basis.

By comparison with the output of plywood from Australia and New Zealand, the North American output of softwood plywood in 1993 is expected to reach over 20,000,000 m<sup>3</sup> or roughly 22.5 billion sq. ft. (3/8" basis). This does not include the volume of hardwood plywood and veneer that is produced in North America. From these figures it is apparent then that the Australian and New Zealand plywood industry is small, by North American standards at least.

There are five plywood mills in New Zealand, all of which produce softwood plywood from Radiata. The industry is dominated by a New Zealand company, Carter Holt Harvey (CHH), which is based in Auckland. The company's business includes forestry and forestry products; pulp and paper; paperboard packaging; building products and foodstuffs. Fletcher Challenge, New Zealand's largest company, at one time had significant interest in softwood plywood when it controlled several plywood mills in Western Canada. They have since sold off these interests and are no longer involved in the manufacture of softwood plywood in Canada and have no similar interests in New Zealand.

CHH is focused on the plywood industry and is by far the largest producer of softwood plywood in the region. The company recently brought on line a new, modern facility at their Kinleith site near Tokoroa on the North Island to meet the growing demand for its products in world markets. The redevelopment of the plant will double the company's plywood and veneer capacity from 50,000 to 100,000 m<sup>3</sup> or 112,000,000 sq. ft. (3/8" basis) per year. The upgrade was in response to the considerable demand for plywood and veneer products in the Pacific Rim markets which is expected to increase significantly in the future. This is a result of the diminishing supply of softwood and hardwood products from traditional sources in SE Asia and North America. The wood supply for the new plant will come from CHH's Kinleith forests. The expansion project will create an additional 100 jobs in Tokoroa resulting in over 200 jobs in the new plywood plant. As a result of the Tokoroa plant upgrade, CHH will close its existing mill at Mt. Eden in central Auckland. Machinery supplied to the new mill came predominantly from COE and Durand-Raute, with COE supplying the lathe deck and drying lines while Durand-Raute supplied the green end.



New Zealand, up until earlier this year, exported approximately 20,000 m<sup>3</sup> of softwood plywood, mainly to Australia. The additional capacity made available through CHH's plant expansion will produce a significant increase in the volume available for export, a percentage of which will probably find its way onto the Australian market to satisfy its domestic demand.

There are nine softwood plywood mills in Australia and two hardwood mills with a combined annual capacity of 150,000 m<sup>3</sup>, or 168,000,000 sq. ft. (3/8" basis). However, actual production is only about two-thirds of rated capacity. Key players in the Australian plywood industry are Hancock Bros. of Ipswich, Queensland and Australian Forest Industries (AFI) of Myrtleford, Victoria. Combined plywood production from all producers in Australia is around 105,000 m<sup>3</sup> or 118,000,000 sq. ft. (3/8" basis). This represents approximately 53 per cent of the total Australia/New Zealand market.

AFI currently produces around 25,000 m<sup>3</sup> of plywood on a single-shift basis at their mill in Myrtleford, Victoria. Figures for Hancock Bros. are not available. Another significant producer of note is Forwood which is wholly owned by the South Australian Timber Corporation (SATC), a unit of the South Australia state government, which also owns pine timberlands, sawmills and a small glulam facility. A division of Forwood, International Panel and Lumber (IPL) is primarily concerned with veneer-based products; structural plywood, Laminated Veneer Lumber and derivatives. IPL and SATC have merged into Forwood Products, one of the largest timber companies in Australia. Although Forwood has an interest in producing veneer, its main focus appears to be on the development of the LVL markets with plywood and veneer remaining secondary.

IPL is also the leading supplier of structural Laminated Veneer Lumber (LVL) in the region. LVL is made from sheets of veneer glued together in the direction of the grain. It is pressed using heat and pressure into billets of varying lengths up to a practical length of 80 ft. and widths of usually 4 ft. Thickness is usually 1.75". Lumber of commodity or customer-designated dimensions is cut from the billet and used in structural applications; such as window and door headers; roof trusses; floor joists or for long spans. The production and use of LVL in Australia is growing, according to Bruce Hutchings, chief timber engineer advisor to IPL. IPL's plant at Nangwarry had an original capacity of 5,000 m<sup>3</sup> per year when it was set up with used equipment in 1986. It subsequently expanded to 10,000 m<sup>3</sup> in 1993 and will reach 20,000 m<sup>3</sup> in 1994, or 8,480,000 bd. ft. Current LVL production in North America, by comparison, stands at about 350,000,000 bd. ft. The Nangwarry plant is operating at capacity.

The development of LVL markets in Australia is driven by three main factors:

- . The extreme price increases of sawn timber from the US and New Zealand.
- . The comparatively high price of glulam beams in Australia due to the small scale of operations.
- . The emerging importance of tropical rain forest ecological issues which is causing a shortage of Queensland hardwood timber.

LVL has been increasingly substituted for these three product categories since the late 1980's.

The technology used in the production of LVL in Australia is relatively labour intensive, and simple by North American standards. It is, however, effective. Layup is manual and the whole operation is generally slower than would be considered economically viable in North America. However, the business is there, which is prompting IPL to install a new line at the end of 1993.

New Zealand, too, has significant interest in LVL. A plant operating in Napier and owned by the Juken Nissho company of Japan is producing non-structural LVL for use in making furniture, door and window components. A second line is being installed by Raute, Finland to increase plant capacity. There is a very strong demand for this product in Japan. The production of the plant is all exported to Japan. Juken Nissho is currently building a structural LVL plant in Gisborne. It is assumed that the output will go to Japanese markets.

Australia imports approximately 65,000 m<sup>3</sup> of plywood and exports only a very small amount of specialty plywood and veneer. The locations of its plywood operations causes a further problem with supply. It is doubtful whether any large scale plywood operation would be set up to take advantage of resource, given the success of the sawmill industry and the concentration in that area. In all probability, additional demand for plywood in Australia will be met by imports from New Zealand, particularly in light of the huge increase in production made possible by the recent commissioning of the Carter Holt Harvey plywood mill in Tokoroa, New Zealand and the additional 50,000 m<sup>3</sup> of plywood it will bring onto the market in that region.

This additional 50,000 m<sup>3</sup> of quality Radiata Pine softwood plywood will have a significant effect on the future investments in plant and equipment in both Australia and New Zealand. It will place New Zealand at the forefront of softwood plywood supply in the region and will add a significant volume of new product to the market.

### **Trends In The Australian Plywood Industry**

A report in the Australian Government's Agriculture and Resources Quarterly; vol. 5, no. 3, 1993 states that consumption of wood-based panels in Australia is forecast to fall by 2 percent in 1993-94; to a level of 1.22 million m<sup>3</sup>. This reflects downward revisions in forecasting of residential and non-residential construction. The Indicative Planning Council for the Housing Industry estimates that residential commencements will fall by 7 percent in 1993-94, and the Construction forecasting Committee forecasts a fall in non-residential construction of 3 percent in that year.

Domestic markets for plywood, however, are expected to continue to expand in 1993-94. Over the past few years Australian plywood producers have been diversifying and expanding plywood applications in the domestic market. This has resulted both in growth in domestic consumption of plywood (of 11 percent in 1992-93) as well as an increase in the share of the market supplied by domestic producers (from 61 percent of the market in 1991-92 to 63 percent in 1992-93). growth in market share of domestic producers has also been assisted by higher world log prices which have reduced the price competitiveness of South East plywood.

Australian producers are expected to continue expanding into non-residential building markets, such as warehouses and materials handling applications, and achieving product substitution in dwelling applications in 1993-94. Consequently, despite weaker construction activity, consumption of plywood is forecast to increase by 4 percent to 196,000 m<sup>3</sup> in that year.

## Potential For The Sale Of New Equipment

It is unlikely that any significant investment will be made in new equipment in the immediate future by the Australian/New Zealand plywood industry. The situation could, however, change if one of the large Australian forest products companies decided to build a world-class plywood plant. It has been stated by people who are close to the Australian plywood industry that there is room only for perhaps three world-class plywood mills in Australia/New Zealand.

There are several factors supporting this view:

New Zealand is an exporter of Radiata logs, whereas Australia is not. New Zealand has raw material available for processing into plywood, whereas Australia must import logs to satisfy domestic demand for raw material.

Available resource is a problem for plywood producers. Apart from CHH, the emphasis of the major forest products companies is on the sawmill sector. It is unlikely that they would free up suitable peeler logs to be turned into veneer. Logs of suitable size for processing into veneer (given the equipment in place) are too valuable as sawlogs. There appears to be a good supply of small logs (5-9" dbh) that are presently being chipped which could be processed into veneer using modern, small log peeling technology. However, the economics of placing such a system do not seem to justify the capital expenditure as there appears to be insufficient market to meet the production capabilities.

The size of the market is so small in Australia and New Zealand that another world-class mill of the size of CHH would tend to saturate the market. Export markets would need to be found and, apart from CHH, no plywood producer in either country has any real history in this area.

A large amount of machinery has come onto the market in recent years as a result of the closing of dozens of plywood operations in Oregon and Washington. Much of this equipment is available for refurbishing and shipping to Australia and New Zealand. Much of this equipment can be bought for a fraction of its replacement cost and it would be able to do the job. This is a trend that has been occurring for some time.

Plywood, although utilized in both countries, is not a popular building material in terms of the volume used in construction. Unlike North America, there is very little plywood used in the construction of a typical family dwelling. Generally speaking, plywood sheathing is only used on the corners as bracing. This is due to the fact that the large percentage of new homes built in Australia are so-called brick veneer. In a similar manner, roofing is applied directly to the roof framing; either tin or tiles.

Due to the small size of the market, the amount of effort and expense required in setting up a dedicated sales effort in the region to serve the plywood industry does not seem to be justified. Western Canadian suppliers who believe they have equipment to offer the New Zealand/Australian plywood industry would be best off finding a dedicated local representative who has a good history of dealing with the forest products industries of both countries. The representative should be charged with the responsibility of maintaining current market intelligence so that, should an opportunity to sell equipment arise, the supplier can act quickly.

If any major plywood equipment sales are made in Australia or New Zealand in the future, in all likelihood the machinery would be supplied from North America. Southern Yellow Pine (SYP), which has become the most important softwood plywood resource in North America, closely resembles the characteristics of Radiata. For this reason, North America has the technology to meet the needs of Australia and New Zealand.

### **General Trends In The Australian Wood Products Marketing Outlook**

At the 14th All Australia Timber Congress, Mike Quinn, general manager CSR Building Materials Export, NSW gave the following rundown of timber changes and trends affecting the wood products markets.

Dramatic changes in the world timber industry have resulted in permanent structural changes in the demand/supply relationship that benefit Australia and New Zealand. In line with these changes, both Australia and New Zealand have been undergoing internal changes aimed at improving their international competitiveness. The realization that neither country can count on domestic markets for growth has led to strong growth in the export potential of forest products.

Environmental restrictions in North America and the withdrawal of western timberlands have also created opportunities for Australian and New Zealand timber products. A bi-product of the change and coinciding shortage in SE Asia has been a reduction in the availability of quality timber providing greater impetus for the demand for manufactured solutions; like finger-jointed, edge laminated mouldings and OSB-type material.

Concurrent with the changes in the US were the SE Asia reductions in log supply. Pressures based on concerns centered around logging at unsustainable rates, illegal logging and the desire to add value to forest products in their own countries have sharply reduced log exports. This, coupled with restructuring of concessions in Indonesia, has seen sharp increases in the price of logs, plywood and wood components and moulding from that region.

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Opportunities exist all over the Pacific Rim with particular emphasis on Japan, Taiwan, Korea and China. The difficulties to be encountered in establishing an export market as far as Australia is concerned are:

- . Determining what is the appropriate product really required in terms of grade size and intended end user.
- . Negotiating a competitive shipping rate from Australia.
- . Different cultures pose barriers in understanding requirements, building relationship and negotiations in general.
- . Australia's poor export record due to the lack of commitment to export in good times and maintaining supply to overseas customers. A further problem is Australia's history of bad industrial relations and failing to meet contracted supply.
- . There is a high level of commitment and a lot of work with seemingly little return at the beginning

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- . Learn about the culture which is essential to the development of sound, long-term relationships.
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- . Be prepared to commit the resources required.

**APPENDIX**

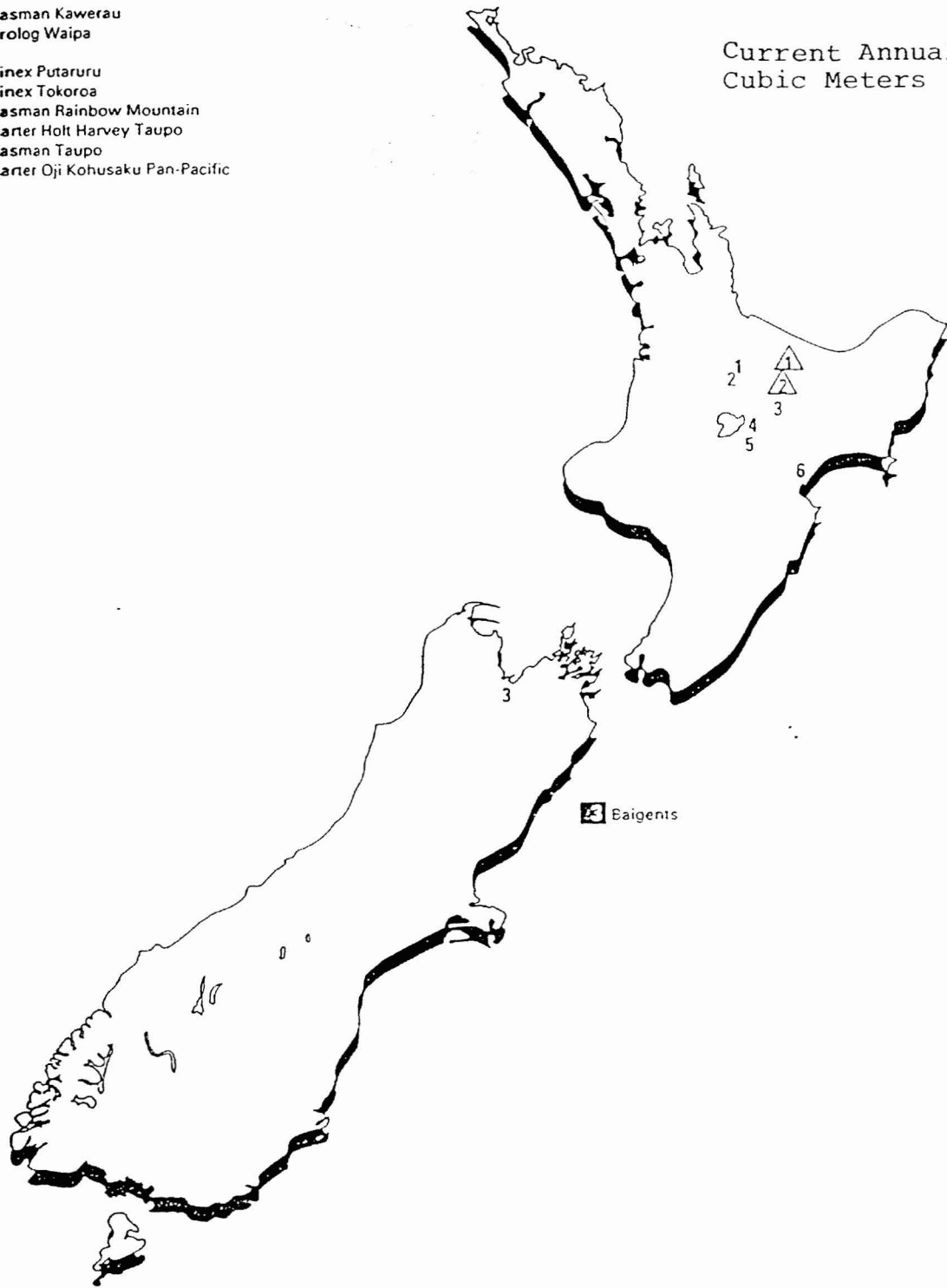
**8.4**

**NEW ZEALAND SAWMILLS  
(CURRENT ANNUAL OUTPUT)**

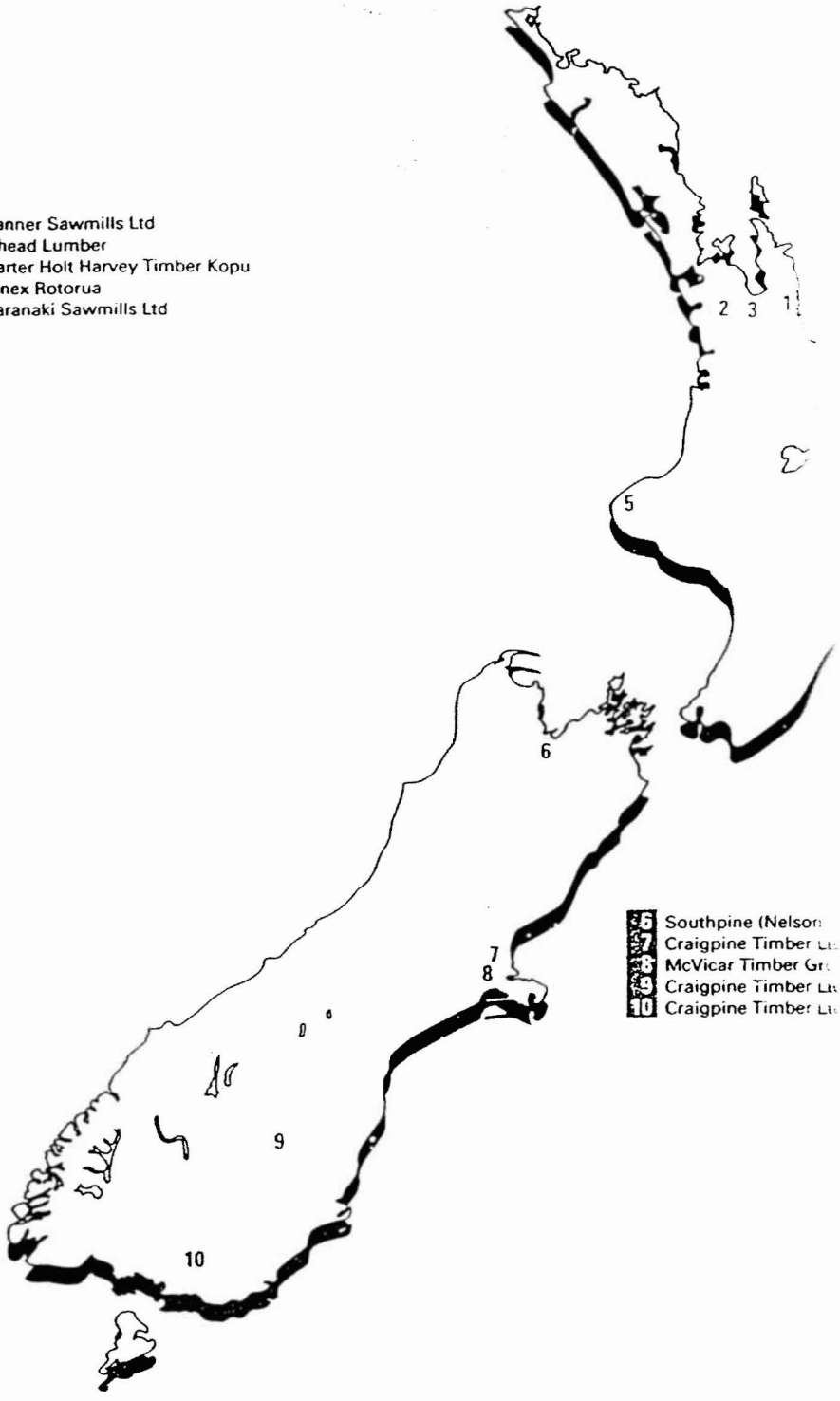
Current annual production  
 in cubic metres

- 1 Tasman Kawerau
- 2 Prolog Waipa
- 3 Pinex Putaruru
- 4 Pinex Tokoroa
- 5 Tasman Rainbow Mountain
- 6 Carter Holt Harvey Taupo
- 7 Tasman Taupo
- 8 Carter Oji Kohusaku Pan-Pacific

Current Annual Production  
 Cubic Meters



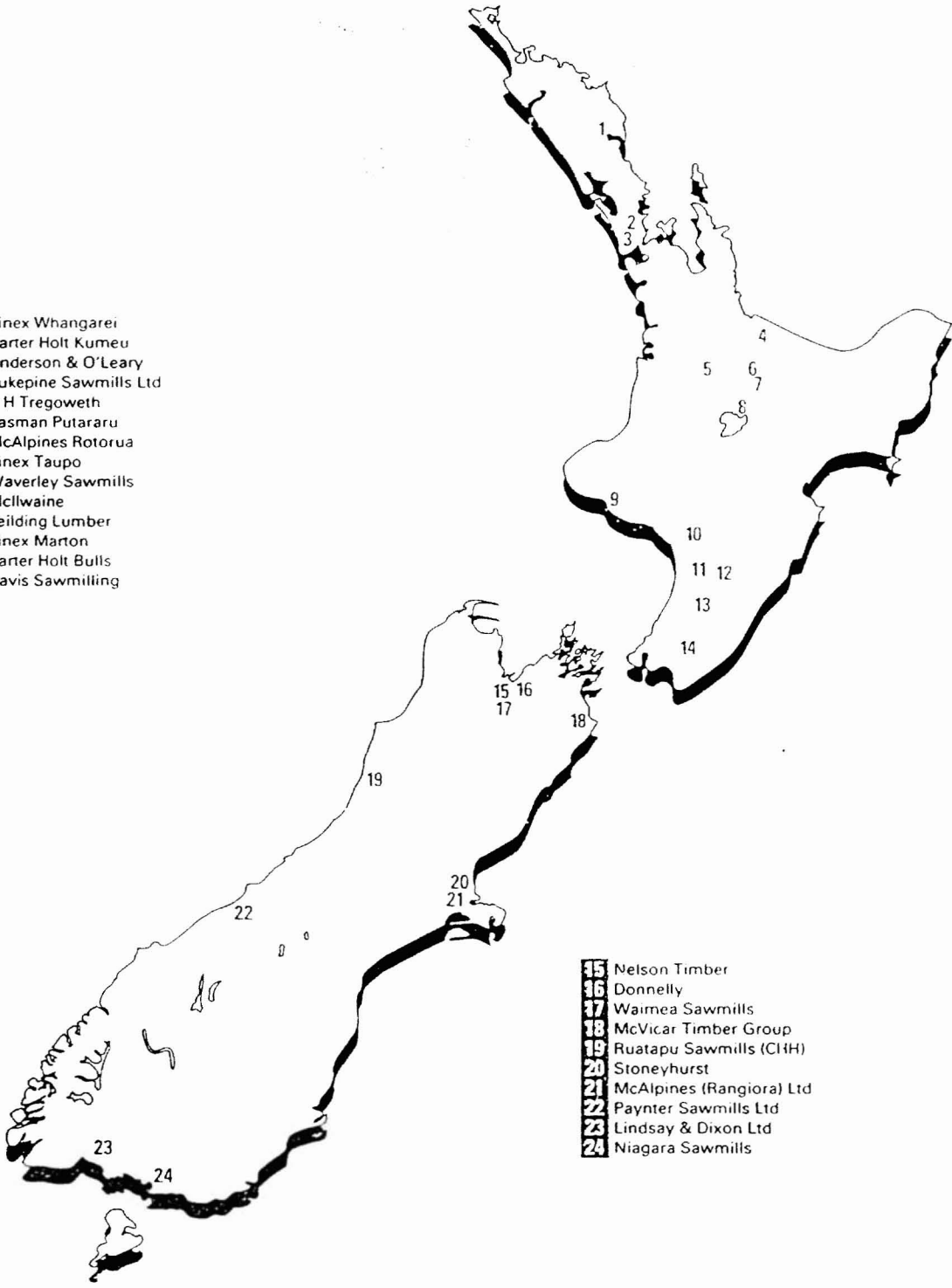
- 1** Tanner Sawmills Ltd
- 2** Ahead Lumber
- 3** Carter Holt Harvey Timber Kopu
- 4** Pinex Rotorua
- 5** Taranaki Sawmills Ltd



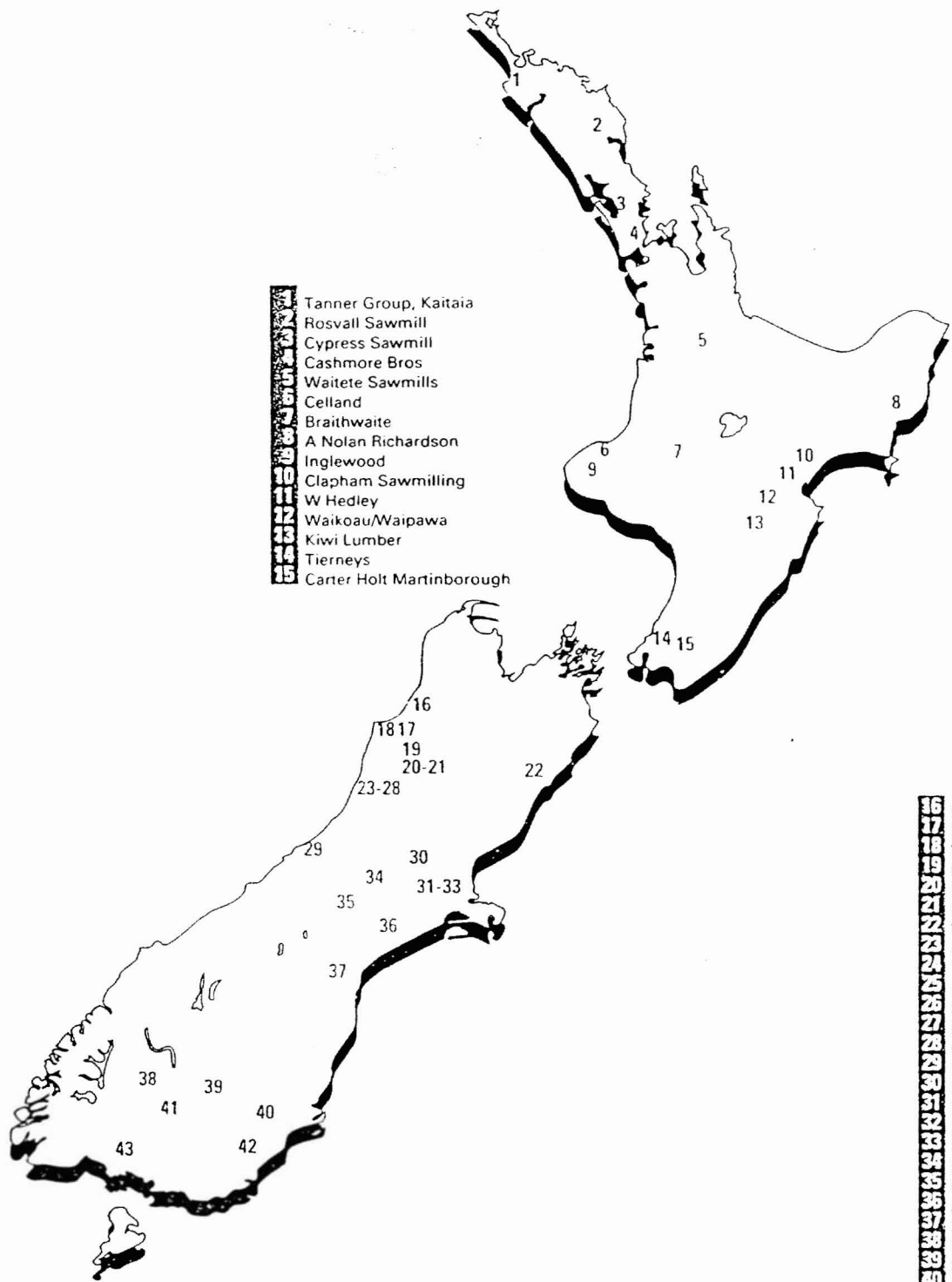
- 6** Southpine (Nelson)
- 7** Craigpine Timber Ltd
- 8** McVicar Timber Gro
- 9** Craigpine Timber Ltd
- 10** Craigpine Timber Ltd



- 1 Pinex Whangarei
- 2 Carter Holt Kumeu
- 3 Anderson & O'Leary
- 4 Pukepine Sawmills Ltd
- 5 R H Tregoweth
- 6 Tasman Putaruru
- 7 McAlpines Rotorua
- 8 Pinex Taupo
- 9 Waverley Sawmills
- 10 McIlwaine
- 11 Feilding Lumber
- 12 Pinex Marton
- 13 Carter Holt Bulls
- 14 Davis Sawmilling

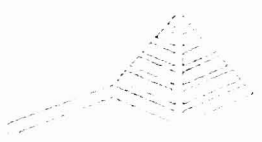


- 15 Nelson Timber
- 16 Donnelly
- 17 Waimea Sawmills
- 18 McVicar Timber Group
- 19 Ruatapu Sawmills (CIH)
- 20 Stoneyhurst
- 21 McAlpines (Rangiora) Ltd
- 22 Paynter Sawmills Ltd
- 23 Lindsay & Dixon Ltd
- 24 Niagara Sawmills



- 1 Tanner Group, Kaitaia
- 2 Rosvall Sawmill
- 3 Cypress Sawmill
- 4 Cashmore Bros
- 5 Waitete Sawmills
- 6 Celland
- 7 Braithwaite
- 8 A Nolan Richardson
- 9 Inglewood
- 10 Clapham Sawmilling
- 11 W Hedley
- 12 Waikoau/Waipawa
- 13 Kiwi Lumber
- 14 Tierneys
- 15 Carter Holt Martinborough

- 16 Karamea Sawmills
- 17 Buller
- 18 Westport Sawmilling
- 19 Inangahua Sawmilling
- 20 McInroe Bros
- 21 Ikamatua Sawmills
- 22 V L Smith
- 23 Ngahere Processing
- 24 Totara
- 25 Keighleys Sawmilling
- 26 Donaldsons Ltd
- 27 G Gibson
- 28 Greenstone
- 29 Hari Hari (CHH)
- 30 Mitchell Bros
- 31 P G Morrison
- 32 New Forest Sawmilling
- 33 Kopara Sawmilling
- 34 Selwyn Sawmills
- 35 Cochrane
- 36 Asburton Timber
- 37 Unwin Sawmilling
- 38 Rural
- 39 Stuart
- 40 Hollow Timber
- 41 Ngahere Sawmilling
- 42 Bruce Sawmilling
- 43 Findlater Bros



**APPENDIX**

**8.5**

**NEW ZEALAND FORESTRY CONTACTS**

## NEW ZEALAND CONTACTS

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North Island Manager

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Juken Nissho Ltd.  
Ngaumu Forest, Stronvar Road  
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Masterton, New Zealand

Stu Orme  
Forest Operations

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Juken Nissho Ltd.  
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John Valentine, Ph.D.  
Chief Executive

Warwick Foran  
Senior Technical Support Officer

Chris Brown  
Senior Economist

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Ministry of Forestry  
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## NEW ZEALAND CONTACTS

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John Stulen  
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Colin Zeff - Assistant to General Manager - Sawmills

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Geoff Alexander - Site Manager  
Paul McCready - Mill Manager

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Bruce Mills - Sawmill Manager  
Drew Campi - Remanufacturing Manager

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Napier

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Phone: 011-64-70-356-390  
Fax: 011-63-70-356-239

- Company owns and manages 325,000 hectares of plantation forest consisting of principally Radiata Pine. (25% of New Zealand's total plantation forest)

- The companies timber group operates 10 sawmills and 6 timber remanufacturing plants and has 50% interest in the Baigent Forest Industries sawmill in Nelson.
- New Zealand's largest sawn timber producer with a production capacity of 770,000 cubic meters per annum, including Baigent's 145,000 cubic meter mill. This represents 33% of total New Zealand sawn timber output.

## ITT RAYONIER NEW ZEALAND LTD.

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### HEADQUARTERS

SYMONDS CENTRE  
LEVEL 5, 49 SYMONDS STREET  
P.O. BOX 9283  
NEWMARKET, AUCKLAND, NEW ZEALAND  
TEL: 0-9-302-2988  
FAX: 0-9-377-0249

Charles Margiotta - Managing Director

### DISTRICT OFFICES

#### WHANGAREI

P.O. BOX 165  
TEL: 0-9-438-9174  
FAX: 0-9-438-7818

Mr. Mike Fulcher - District Manager  
Mr. Harold Corbett - Northland Resource Manager

#### WANGANUI

P.O. BOX 370  
TEL: 0-6-347-1774  
FAX: 0-6-345-4016

Mr. Greg Molloy - South North Island Resource Manager

#### TIMARU

P.O. BOX 377  
TEL: 03-688-5345  
FAX: 03-688-5346

Mr. Evan MacClure - Resource Manager

#### MT. MAUNGANUI

P.O. BOX 4442  
TEL: 0-7-575-2927  
FAX: 0-7-575-7304

Mr. Richard Dearsly - District Manager

#### WELLINGTON

P.O. BOX 295  
PARAPARAUMU  
TEL: 0-4-298-3807  
FAX: 0-4-298-2699

Mr. Donald King - District Manager



**GISBORNE**  
P.O. BOX 935  
TEL: 0-6-867-9179  
FAX: 0-6-867-9468

Mr. Harry Saunders - District Manager  
Mr. Philip Langston - East Coast Resource Manager

**NELSON**  
P.O. BOX 3241  
RICHMOND  
TEL: 0-3-544-0704  
FAX: 0-3-544-1704

Mr. Jake de Boer - District Manager

**INVERCARGILL**  
P.O. BOX 1742  
TEL: 03-214-1793  
FAX: 03-214-1822

Mr. Des Wilson - District Manager  
Mr. Trevor Best - Southland Resource Manager

#### **NURSERIES**

**BULLS NURSERY**  
31 BRIDGE STREET  
BULLS  
TEL: 0-6-322-1973  
FAX: 0-6-322-0014

**PUHA NURSERY**  
RD TE KARAKA  
TEL: 0-6-862-3819

**EDENDALE NURSERY**  
P.O. BOX 8  
EDENDALE  
TEL: 0-3-206-6665  
FAX: 0-3-206-6112

## TASMAN FORESTRY LIMITED

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Tasman Forestry Limited  
Head Office  
Ngahere House  
Vaughan Road  
Rotorua, New Zealand

Postal Address:

Private Bag 3031  
Rotorua 3200  
New Zealand

Phone: 011-64-7-347-4899  
Fax: 011-64-7-347-8755

Brain Johnson - Planning Manager

Land Ownership	264,000 Hectares
Productive Plantations (19% N.Z plantation resource)	201,000 Hectares
Land Bank	27,000 Hectares
Reserves	36,000 Hectares

Michael Duggan  
District Manager - Central North Island  
Tasman Forestry Limited  
Taupo  
P.O. Box 944  
Taupo 2730 New Zealand

Phone: 011-64-7-377-4399  
Fax: 011-64-7-378-3314

Lindsay Robinson  
Assistant Manager, Harvesting - Murupara  
Private Bag 211  
Murupara 3272 New Zealand

Phone: 011-64-7-366-5809  
Fax: 011-64-7-366-5202

Head Rig Mills:

Taupo	130,000 Cu Meters Output
Putaruru	60,000 Cu Meters Output

**Small Log Mills: (Chipper Canters; Gangsaws)**

Rainbow Mtn.(1)  
Kawerau(2)

75,000 Cu Meters Output  
207,000 Cu Meters Output

- (1) Valon Kone Debarker  
Mecman Log Scanner and Controller  
One Chipper Canter, Quad Circular Breakdown Unit  
One Chipper Canter, Circular Gang Saw  
Ari Board Edger  
Bruks Chipper  
CAE Bandsaw
- (2) 1990 ARI System

## FOREST CORPORATION

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Forestry Corporation  
32 Pukaki Street  
P.O. Box 1748  
Rotorua, New Zealand

Mr. Russer W. Dale  
General Manager Planning

Phone: 011-64-7-347-9012  
Fax: 011-64-7-348-7289

Forestry Corporation  
Waipai Processing Complex  
P.O. Box 1748  
Rotorua, New Zealand

John G. McPherson  
General Manager Processing

Phillip J. Heron  
Mill & Processing Manager

Peter Davidson  
Site Manager - Waipa

Jack Black  
Project Manager

- . Forest corporation owns 13% of New Zealands plantation resource (170,000 Hectares).
- . Corporation planted 6,000 Hectares in 1993 and will plant 10,000 in 1994. Corporation is limited by availability of seedings.
- . Corporation harvested 3,000,000 cubic meters in last fiscal year; 400,000 processed at Waipa mill; 1.7 million cubic meters by agreement to Fletcher Challenge and 900,000 cubic meters in log exports.

### Waipai Processing Complex

400,000 Cubic meters input  
220,000 Cubic meters output

### Equipment:

- Nicholson 35A5 debarker - Fabricated in Auckland
- CAE Headrig and carriage - Fabricated in Christchurch
- Kockums Cancar - Fabricated by Wilson in Auckland
- Schurman Edger Optimizer

- . Company installing a tree length log sort to process logs. The system will debark, scan, and buck for grade or chip.

**APPENDIX**

**8.6**

**NEW ZEALAND AGENTS & MANUFACTURERS**

**NEW ZEALAND  
AGENTS/MANUFACTURERS**

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**Wood Processing Equipment**

C.B.S. Engineering Ltd.  
48 Wharf Rd, Te Atatu North  
P.O. Box 45032  
Te Atatu, Auckland, New Zealand

Phone: 011-64-9-834-7139  
Fax: 011-64-9-837-5512

Products: Materials Handling, Packaging, Wrapping

Canadian Steel Specialties Limited  
20A Hull Road  
P.O. Box 633  
Tauranga, New Zealand

Phone: 011-64-7-575-6062  
Fax: 011-64-7-575-2779

Products: Bandsaws, Chippers, Circular Saws, Files, Headrigs, Knives, Resaws, Sawdoctoring and Equipment.

I.S.T. Engineering Limited  
17 Beasley Avenue  
P.O. Box 12463, Penrose  
Auckland, New Zealand

Phone: 011-64-9-579-8149  
Fax: 011-64-9-579-3471

Products: Bandmills, Chipper Canters, Chippers, Circular Saws, Conveyors, Debarkers, Edgers, Kilns, Log Carriages, Logfeeders, Scanners, Setworks, Sorters.

Morbark (NZ) Ltd.  
27-29 Maisey Place  
P.O. Box 1312  
Rotorua, New Zealand

Phone: 011-64-7-348-0356  
Fax: 011-64-7-346-3433

Products: Chippers, Conveyors, Debarkers

Nickolson Akarana Engineering Ltd.  
13 Newark Place  
East Tamaki, Auckland  
P.O. Box 58043

Greenmount, Auckland  
New Zealand

Phone: 011-64-9-274-9160  
Fax: 011-64-9-274-5260

Producers: Bandmills, Bandsaws, Bearings Chain Sprockets, Chipper Canters, Circular Saws, Debarkers, Edgers, Gangsaws, Optimizers, Regaws, Setworks.

Southern Cross Engineering Co. Ltd.  
128 Maces Road  
Bromley, Christchurch  
P.O. Box 24114, East Linwood  
Christchurch, New Zealand

Phone: 011-64-3-384-2019  
Fax: 011-64-3-384-1563

Products: Bandmills Chains, Chipper Canter, Conveyors, Edgers, Gangsaws, Headrigs, Kilns, Log Carriages, Optimizers, Portable Sawmills, Sorters.

Wilson Engineering Systems Ltd.  
750 Great South Road  
P.O. Box 12878 Penrose  
Auckland, New Zealand

Phone: 011-64-9-525-0817  
Fax: 011-64-9-525-0818

Products: Bandmills, Chain Sprockets, Chipper Canters, Chipper, Circular Saws, Debarkers, Edgers, Headrigs, Optimizers, Scanners, Sorters.

Windsor Engineering Group  
18 Cashen Street Grenada North  
P.O. Box 13348 Johnsonville  
Wellington, New Zealand

Phone: 011-64-4-232-8080  
Fax: 011-64-4-232-5929

Products: Boilers, Ducting Fans, Heat Exchangers, Heat Recovery and Transfer, Dust Exhaust, Kilns, High Temp Kilns.

### **Forestry Equipment**

Brightwater Engineers Ltd.  
7 Spencer Place  
P.O. Box 43, Birdgewater  
Nelson, New Zealand

Phone: 011-64-3-542-3500  
Fax: 011-64-3-542-3114



Products: Cable Logging Equipment, Chains, Bellis Yarders, Skyline Systems, Wenchers, Wire Rope.

Cable-Price Equipment  
192-208 Middleton Road  
P.O. Box 13339 Johnsonville  
Wellington, New Zealand

Phone: 011-64-4-478-3020  
Fax: 011-64-4-477-0017

Products: John Deere, Hitachi, Fiatallis

Dispatch Engineering Ltd.  
36 Lord Street  
P.O. Box 26, Greymouth  
New Zealand

Phone: 011-64-3-768-7089  
Fax: 011-64-3-768-5525

Products: Yarders, Skyline Systems, Wire Ropes.

Gough, Gough & Hamer Ltd.  
P.O. Box 16-168 Hornby  
Christchurch, New Zealand

Phone: 011-64-3-349-5689  
Fax: 011-64-3-349-4235

Products: Caterpillar

Motor Holdings (Komatsu) Ltd.  
200 Roscommon Road, Wiri, Auckland  
P.O. Box 762774, Manuku City  
Auckland, New Zealand

Phone: 011-64-9-277-8300  
Fax: 011-64-9-277-5846

Products: Komatsu

Ross Corporation  
P.O. Box 62044  
Mt. Wellington, Auckland  
New Zealand

Phone: 011-64-9-537-4913  
Fax: 011-64-9-534-5424

Products: Thunderbird

Taupo Rigging Service Ltd.  
12 Miro Street

P.O. Box 853  
Taupo, New Zealand

Phone: 011-64-7-378-4754  
Fax: 011-64-7-378-4754

Products: Talkie-Tooter, Cadie Logging Equipment chains, Wire Rope.

Titan Plant Services Ltd.  
Miro Street  
P.O. Box 152  
Taupo, New Zealand

Phone: 011-64-7-378-8673  
Fax: 011-64-7-378-8603

Products: Hydro-Ax, VME, Prentice, Valmet, S. Madill's

Trackweld Group Ltd.  
54-58 Fairy Springs Road  
P.O. Box 1678  
Rotorua, New Zealand

Phone: 011-64-7-348-3047  
Fax: 011-64-7-346-2564

Products: Barko, Timberjack

Waratha General Engineering Ltd.  
Waratha Place  
P.O. Box 375  
Tokoroa, New Zealand

Phone: 011-64-7-886-8828  
Fax: 011-64-7-886-0054

Products: Cranes, Delimbers, Feller Bunchers, Felling Heads, Grapple Harvesters.

**APPENDIX**

**8.7**

**AUSTRALIAN PLANTATION FOREST BY TENURE**

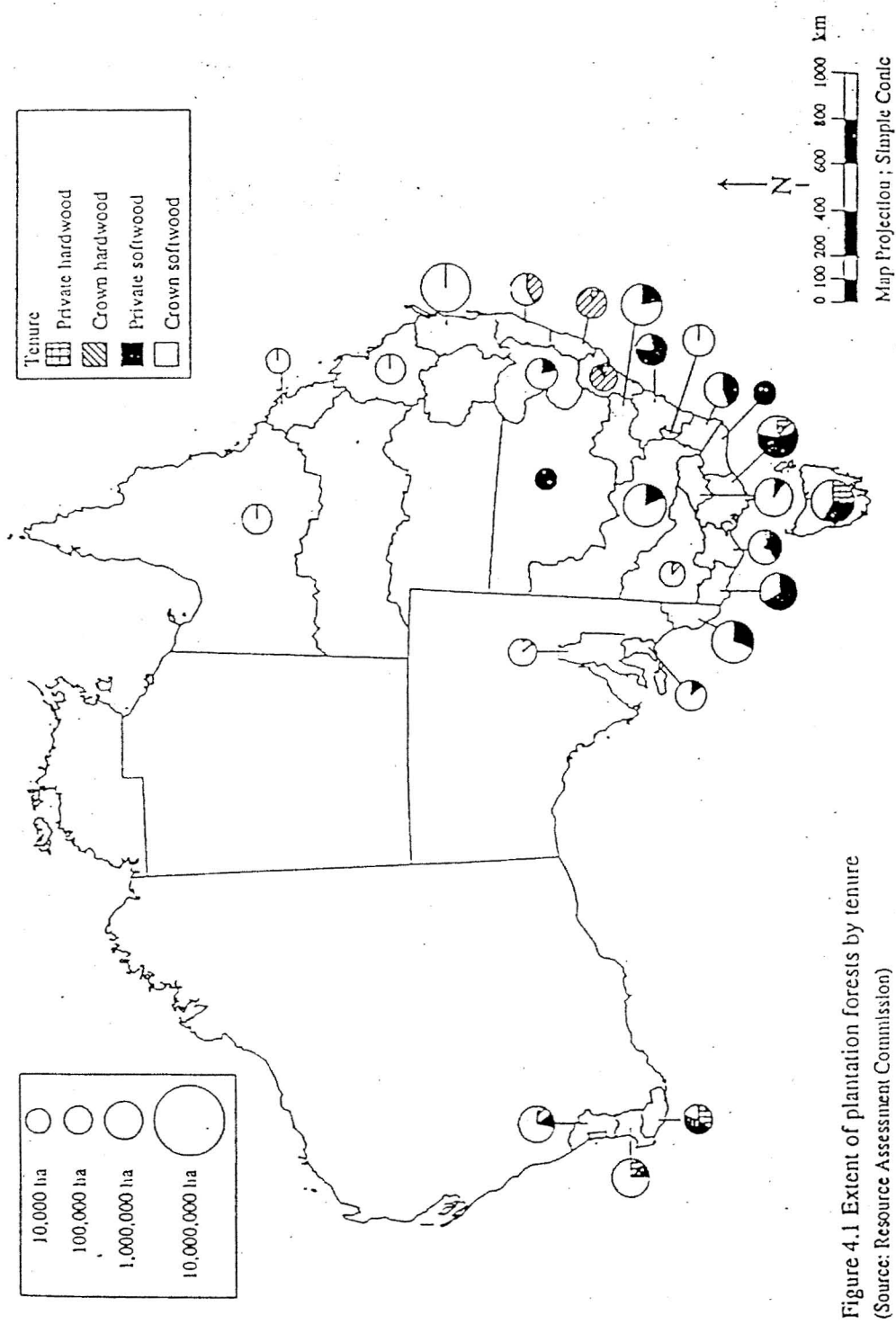


Figure 4.1 Extent of plantation forests by tenure  
 (Source: Resource Assessment Commission)

**APPENDIX**

**8.8**

**AUSTRALIAN PLANTATION AREA**

## PLANTATION AREA by STATE by WOOD TYPE by OWNERSHIP

STATE	SOFTWOOD		HARDWOOD	
	PUBLIC	PRIVATE	PUBLIC	PRIVATE
A.C.T.	16 459			
SOUTH AUSTRALIA	68 857	26 320	963	
WESTERN AUSTRALIA	70 000	17 750	5 000	9 840
QUEENSLAND	166 995			
NEW SOUTH WALES	179 700	68 480	24 930	2 790
TASMANIA	38 000	30 000	4 000	19 000
VICTORIA	106 034	98 891	9 619	8 253
<b>TOTAL</b>	<b>646 045</b>	<b>241 441</b>	<b>44 512</b>	<b>39 883</b>

### Notes:

- Source: Resource Assessment Commission, March 1992.
- Softwood plantings are predominantly P. Radiata in all states except on crown lands Qld. and W.A. The split up of the totals for these states are as follows:

<u>Qld.</u>	Pinus spp (hoop)	11 750
	Pinus caribaea	45 330
	Pinus elliottii (slash)	64 690
	Other	45 225

<u>W.A.</u>	Pinus spp	42 000
	Pinus pinaster	28 000

**APPENDIX**

**8.9**

**AUSTRALIAN SOFTWOOD MILLS**

## AUSTRALIAN SOFTWOOD SAWMILLS

Following is a list of softwood sawmills with an annual capacity in excess of 100 cubic metres of logs.

### NEW SOUTH WALES

#### Owner:

Albury Sawmilling  
Boral  
CSR Softwood  
CSR Softwood  
Brown & Dureau  
Boral  
Boral

#### Region:

Tumut  
Tumut  
Tumut  
Bombala  
Canberra  
Oberon  
Bathurst

### VICTORIA

CSR Softwoods  
Victory  
Victory  
AKD  
Brown & Dureau  
AFI (Bowater)  
D & R Henderson

Dartmoor  
Colac  
Ballarat  
Colac  
Morwell  
Myrtleford  
Benalla

### TASMANIA

K. French  
Seas Sapfor

Scottsdale  
North Tasmania

### QUEENSLAND

CSR Softwood  
Hyne & Son  
Hyne & Son  
ACI

Caboolture  
Maryborough  
Mary Valley  
Mary Valley

### SOUTH AUSTRALIA

Seas Sapfor  
CSR Softwood  
Forwood

Tarpeena  
Mt. Gambier  
Mt. Gambier (3 Mills)

### WESTERN AUSTRALIA

Westpine  
Whittakers



**APPENDIX**

**8.10**

**AUSTRALIAN FORESTRY CONTACT**

## AUSTRALIAN FOREST INDUSTRIES

### 1. CSR SOFTWOODS

CSR SOFTWOODS  
SOFTWOODS HOLDINGS LIMITED  
ACN 007 541-460  
9-13 BENNELONG ROAD  
HOMEBUSH BAY, NEW SOUTH WALES, 2140

TEL: 011-61-2-714-3911  
FAX: 011-61-2-714-3900

- Mr. Henry Pens, CEO
- Mr. Paul Cotton  
Regional General Manager NSW

SOFTWOODS QUEENSLAND PTY LTD.  
ACN 010721212  
13 HENZELL ROAD  
CABOOLTURE, QUEENSLAND, 4510  
P.O. BOX 700

270,000 in meters input

TEL: 011-61-74-95-9111  
FAX: 011-61-74-95-5999

- Mr. Greg L'estrage  
Regional General Manager, Queensland
- Mr. Kevin Schultz  
Mill Manager

CSR SOFTWOODS  
ADELONG ROAD  
P.O. BOX 324  
TUMUT, NEW SOUTH WALES, 2720

320,000 Cu Meter Input

TEL: 011-69-41-1917  
FAX: 011-69-41-1909

- Mr. Frank Barker  
Mill Manager
- Robin Ried  
Wood Supply Manager
- Roy Humphries  
Engineering Manager

CSR Softwoods

300,000 Cu Meters input

Mt. Gambier

(18,000 Ha Radiata Pine)

**2. HYNE & SON PTY LIMITED**  
160 KENT STREET  
MARYBOROUGH 4650  
QUEENSLAND, AUSTRALIA

TEL: 011-61-71-21-8800  
FAX: 011-61-71-23-2182

- Mr. Richard Hyne  
General Manager Development
- Mr. Les Ingles  
Softwood Division Manager
- Mr. Chris Robertson  
Assistant Manager, Tuan Mill (150,000 Cu Meters Input)

**3. BORAL SOFTWOODS**  
BATHURST

**BORAL SOFTWOODS**  
OBERON

- Mr. Allan Ralph  
Softwood Division Manager (220,000 Cu Meter Input)

**4. S.E.A.S. SAPFOR LIMITED**  
TARPEENA SAWMILL  
PENOLA ROAD  
TARPEENA, SOUTH AUSTRALIA, 5277

TEL: 011-61-87-39-6511  
FAX: 011-61-87-23-1469

- Mr. John McNamara  
General Manager Timber Manufacturing & Wholesale
- Mr. Michael Plummer  
Manager Woodchip/Timber
- Mr. Geoff Banks  
Resource General Manager
- Mr. Adrian De Bruin  
Managing Director

**Log Productions**

57% Sawlog  
30% Chips

9% Pulp  
4% Preservation Roundwood

- Tarpeena Mill 350,000 Cu Meters Input

- Portland Mill  
Starting (1994-95) 180,000 Cu Meters Input
- Scottsdale Mill
- Kalangadoo Preservation Plant

Log Harvest Volume

- 92 - 700,000 Cu Meters
- 93 - 760,000 Cu Meters
- 94 - 770,000 Cu Meters
- 95 - 1,200,000 Cu Meters
- 96 - 1,300,000 Cu Meters
- 97 - 1,400,000 Cu Meters

40,000 Hectares managed

**5. WOODS & FOREST (FORWOOD)  
NANGWARRY MILL**

- Mr. Brent Lonn
- Mr. Russ Nellson

**HEAD OFFICE:**

**WOODS AND FOREST  
135 WAYMOUTH STREET  
ADELAIDE, 2000**

- Mr. Roger White, CEO

TEL: 216-7211

- Mt. Gambier Sawmill 170,000 Cu Meters Input
- Mt. Burr Sawmill 70,000 Cu Meters Input
- Nangwarry Sawmill 130,000 Cu Meters Input
- Brenton

**6. AUSTRALIAN FOREST INDUSTRY  
MYRTLEFORD, VICTORIA**

- Norm Cleland  
CEO
  - Mr. Ken Robertson  
Operations Manager
  - Mr. Pat Cox  
Plywood Mill Manager
  - Pulp Mill
  - Plywood Mill
  - Sawmill
- 200,000 Cu Meters Input

**APPENDIX**

**8.11**

**HYNE'S SLASH PINE MILL**

**QUEENSLAND**

## A LINCK SAWMILL LINE FOR HYNE'S SLASH PINE MILL IN SOUTH EAST QUEENSLAND

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### INTRODUCTION

I have been asked to address you on the background to the decisions leading to our choice of sawmill equipment for our new modern sawmill at Tuan in Queensland. In order to set the stage for what follows, I would first like to outline some of the pertinent statistics relating to the project to establish its relative size and expected efficiencies.

- Log cut: 150,000 cubic metres p.a. roundwood in two shifts.
- Increasing to 225,000 cubic metres over about five years.
- Product to be kiln dried, dressed, stress graded framing and a range of board products.
- Chips: high quality, suitable for particle board feedstock.
- Staff levels (including all operational staff and supervisors, but excluding office staff): 50 per shift.

To focus on the background more clearly, it is necessary to describe the environment in which the plant was required to operate, i.e.

- (a) Resource characteristics
- (b) Market to be supplied

I deal with these in order.

#### (a) The Resource

The forest resource which we operate is growing in a plantation established in the early 1950's and planted with:

Slash Pine ( <i>Pinus Elliottii</i> )	80%
Caribbean Pine ( <i>Pinus Caribaea</i> ) and Hybrids of the two	20%

Planting of Slash Pine is being discontinued and the whole resource will change over to Caribbean and Hybrids as the Slash is harvested.

Total area in the Tuan/Toolara/Wongi State Forest is 60,000 hectares increasing to 80,000 hectares and expected production when on full cycle in 2005 is thinnings 350,000 cubic metres, sawlogs 600,000 cubic metres clear fall.

Slash Pine timber has often been regarded as the "poor cousin" of the pinus species when compared to the industry standard, *Radiata*, but as we developed expertise in its production especially in seasoning, we have found it to outperform *Radiata* in many respects. The product is characterized by:

- (i) Stems smaller than much Radiata, a.s.v. approximately .45 cubic metres tall slender trees which tend to self prune.
- (ii) This yields timber with relatively small, tight knots.
- (iii) High strength wood.
- (iv) Abundant resin.
- (v) Prominent grain structure with pronounced contrast between early and late wood.

**(b) The Market**

Hyne & Son had commenced cutting and drying Slash Pine in a small way in the early 1970's and our experience had indicated that it was best suited to the structural framing market; this has been borne out by the U.S.A. experience where the species originate. This decision introduced two essential requirements into the planning process.

- (a) Finished material must be straight, flat, dressed DAR with eased edges. These dimensional requirements dictated the need for accurate sawing, precise stripping and effective high temperature drying under restraint.
- (b) The local market orders by size, length and grade. The consequence is that in order to supply customers' orders rather than stock, we must gain control over these variables early in the process and to the greatest extent possible.

**OVERALL PROJECT PLANNING**

In looking at the total project, we addressed a number of planning options and, in doing so, built a detailed financial model which could be accommodated to each option and its variations in order to arrive at the best solution for us. As a result of these investigations, we decided to build the project in two stages, i.e.

**Stage 1**

We planned to produce the green sawn timber in two existing softwood mills by a programme of modernizing, upgrading, double-shifting and doing whatever else was necessary to lift them to the production level required. This resulted in production at reasonable cost with high labour and low capital.

To coincide with these developments, we constructed on the new site, the new plant from the green mill stacker on, i.e.

- Stacker
- Kilns
- Dry mill
- Despatch
- Site infrastructure



We were fortunate in being able to choose a site in the Forest Reserve which ensured an environmental buffer zone for all time, and established us in close proximity to our log supply.

This strategy enabled us to get the product flowing, the quality in proper control, to establish market share and cash flow. Stage I was successfully commissioned in March 1986 and has operated ahead of expectations since the product subsequently winning the Queensland Timber Board Quality Awards for three years in succession.

### Stage 2

Planning then started in earnest on Stage 2 to comprise a log processing line, sawmill and sorter.

I might mention here that the planning process was thorough, detailed and developed from the mill floor up, not from the top down. The process was formalized by the writing of a rigorous operational study which defined all operational parameters and explained all planned procedures. The document was put together as a result of extensive consultation with relevant staff down to mill floor level, was widely circulated, criticized and agreed to before being adopted. It then became the source document for all performance specifications. I fully recommend this approach to anyone undertaking a similar planning task.

While our planning approach was to start at the output end, i.e. the result we wanted to achieve and to work back step by step through the process, we will describe the decisions as if they were taken in the more normal order, i.e. from the resource forward.

## DETAIL PLANNING - STAGE 2

As is usual in Southeast Queensland Slash Pine operations, we harvest the stems in full length up to 20 metres maximum, bring them into the mill yard, debark and process into mill logs. There is always debate as to whether long length or short length logging is best, and to evaluate this, it must be looked at as the first step in the whole conversion process, and so the answer in each case will be given by what best fits the overall process being considered.

### Log Yard

In our case, long stem logging means cheaper extraction costs, simpler bush operation, simpler haulage and complete control over the stem cutup. Our stem specification is:

Maximum length	20	metres
Minimum length	4.8	metres
Top diameter	15	cm
Maximum butt diameter	40	cm
Minimum butt diameter	19	cm
Average stem volume	.45	cubic metres

Log sections above 35 cm diameter comprising less than one quarter of a percent by volume are diverted from the new mill and processed elsewhere.

Planning for the log line was undertaken in detail by our staff, and a supply and install contract let to an Australian company. The operation of the line is as follows:

Full length stems to 20 metres are cut up on a log processing line which feeds stems one at a time through a VK debarker to a single axis scanner, then to an appraisal deck where the operator reviews the computer cutup solution, thence to a cross cut saw. The cut up logs produced flow down a conventional log sorting line where they are sorted into categories as required. This line is operated by one man and serviced by two forklifts, one to load the stems, the other to clear the logs and feed the sawmill. The logs thus produced provide the feedstock for the sawmill.

### **Log Specification**

Nominal top diameter	15	cm
Smallest log top diameter	12	cm
Maximum butt diameter	35	cm
Shortest log	2.4	metres
Longest log	6.0	metres
Average log volume	.150	cubic metres
No. of logs/shift	2200	

### **Sawmill Line Background**

In looking for sawmill equipment and, given the log specification above, we obviously focused on small log systems.

Over the years, we had kept up to date with developments in the USA, Canada and Europe and, of course, were familiar with Linck and in fact had first visited their works in early 1960. We had studied small log lines, both band and circular saw, operating in Europe, USA, Canada and New Zealand, and had gained practical experience with both sawing systems cutting Slash Pine in our own mills.

We developed a concern earlier on as to the suitability of band saws operating in resinous Slash Pine logs. As the trees age, and probably as a result of growth stresses of one kind or another, they tend to develop pitch pockets, i.e. cavities filled with liquid resin which, in some cases, can extend 3 - 4 metres along a stem and in such frequency as to render the sawn timber useless.

When a saw blade encounters a pitch pocket, pitch is extruded under pressure down both sides of the saw eliminating its side clearance, causing it instantly to heat and start to deviate in the cut. Bandsaws are much less stable in this regard than circular saws and, in fact, it is not uncommon to see a bandsaw blade run out and emerge completely from one side of the flitch being sawn.

In early investigations of the problem, we had sent a load of logs to South Australia for processing on their Linck line and had found the problems due to sawing resinous logs with circular saws on their equipment were minimal.

## **Proposals**

With this background, we wrote a broad performance based specification and called for proposals from all Australian and selected overseas suppliers. Coincidentally with the earlier evaluation of responses, we were able to assess the performance of a new Quad Bandsaw system operating on Slash Pine, and this experience tended to reinforce our view that a Circular Saw Line would be more reliable in operation on our resinous timber and, given the small average diameter, would sacrifice little in kerf particularly if dimensional accuracy could be assured.

All the proposals we had received were for Log Reducer Lines, i.e. logs fed down a single main line being progressively chipped and sawn to reduce them to the final required sawn dimensions. Taper sawing was not offered and, based on our observation and experience, we believed it to be not appropriate for our log size particularly in view of the need to retain pith in as few boards as possible.

The sawing patterns determined were based on chipping two faces on the logs to produce double side boards when the parallel sided cant was subsequently sawn from the centre of the log. The width dimension of the centre cant becomes the width dimension of the centre yield sawn boards.

## **Factors in Evaluations - Sawing Patterns**

Most lines we observed in Europe tended to saw a single pair of side boards from the log and to saw a centre cant which was close to being square, i.e. they would saw a centre cant as wide as the log would yield. The sawn timber produced would be dried in this wide width and subsequently resawn or split into narrower widths as required. This method is also commonly used in older growth Radiata in Australia and leads to economies in the mill, the kilns and the planers.

In our case, the market calls for a predominance of 70 and 90 mm wide timber, and with fast growing 35 year old trees we found that if we were to rip these widths from wider boards we would have an unacceptable number of bent boards. To produce straight timber we had to saw the centre cant to the required sawn timber dimension. This often required four side boards to be cut from the log, i.e. two per side which, when edged, would produce straight timber.

The need to produce four side boards at the log breakdown became essential to our plant specification and subsequently became a deciding factor in favouring the Linck Line.

## **Recovery**

As in all sawmill lines, maximizing recovery became a prime objective in our planning. The ratio of sawn timber to chip value in our case is about 7:1, and as we have a market for boards in size down to 75 x 15, there was a strong financial incentive to choose equipment which would saw high recovery.

In quoting figures for recovery, it is necessary to define how it is to be measured as all countries tend to approach it differently. In our case, we measure log volume input to the mill as true volume, including all volume in the log contained in the taper. It is measured by an electronic scanner measuring log diameters every 50 mm and summing the small increments thus measured to arrive at the total log volume.

As a hangover from the old days of imperial measurement, we calculate the sawn timber volume on nominal green sizes, i.e. for example:

<u>Nominal Size</u>	<u>Actual Sawn Size</u>
75 x 25	80 x 25
100 x 25	98 x 25
75 x 38	80 x 40
100 x 38	98 x 40
125 x 38 etc.	3 x 40 etc.

On this basis, and given our average log size of .15 m<sup>3</sup>, our studies and estimates lead us to a budget figure for recovery of 48%. To compare different operations, either the same basis must be used to measure recovery, or the figures must be reduced to a fibre/fibre ratio. On this basis, and given the range of sizes we normally cut, weighted in terms of their respective proportions, the correction factor to express recovery as "wet" fibre/fibre ratio would be:  $48 \times 1.071 = 51.4\%$ .

The factors which influence recovery, especially on small logs, start with the log crosscut operation, i.e.

- (a) accuracy of length cut with minimum overcut - we decided to cut up against stops to a tolerance of +/- 10 mm with an overcut allowance of 50 mm.
- (b) straightness of sweep in cut up logs. This is a prime consideration and its control is often overlooked as it is accepted on the basis "that this is what our logs are like". The effect of sweep and crook on recovery is dramatic and the decision to cut up stems on a process line under mill staff control followed partly from this consideration. We have installed some effective aids for log cut up decision to minimize sweep, and these will be improved by retrofitting two axis scanning and sweep determination to provide another criteria for cut up decision.
- (c) matching log diameter to sawing pattern. In log reducer lines, it is necessary to impose a sawing pattern on logs based on their small end diameter. This means that various cross-sections of timber are cut from logs of specific diameter and, in order to relate sawn yield in terms of both cross section and length, it is necessary to match log diameters with lengths as they are being cut from the stem. The computer software installed in the cut up line enables this to be achieved. Obviously, when the logs so produced are subsequently fed into the mill, they must again be scanned so that the correct sawing pattern can be applied to each individual log.

### Log Alignment into the Log Sawing Line

Swedish studies have shown the importance of centering the small end of the log accurately, and in this regard we were initially concerned at the Linck practice of feeding log large end first into the line. This concern was largely dispelled when we were able to observe a number of lines in operation, as will be explained below.

### Sweep Sawing

Sweep sawing has been practiced on frame saw lines for many years and the advantages are well established. We surveyed the incidence of sweep in our logs and found it to be significantly greater than typical European logs. We looked at a number of circular saw lines offering sweep sawing capabilities and found that they generally recommended sawing to a maximum 30 - 40 mm curve and they were observed doing this quite effectively in practice. In looking at proposals from Linck, we were concerned that sweep sawing was not recommended by them and we felt this was a minus, given our small diameter sweepy logs. However, in spite of their advocacy for straight line sawing, we were surprised to see on careful observation of their lines in practice, that in fact they do sweep saw on smaller logs up to about 220 - 250 mm top diameter. It is most noticeable that a bent cant entering butt first into the cant reducer has the trailing end well off to one side of the centre line of the machine. By the time the cant has fed through the machine and the top end is entering, it is almost back on the centre line. The emerging cant tends to have the pith in the small end reasonably well centred in the cant and the sweep in the cant is quite noticeable. The effect is achieved by the feedworks forcing the smaller logs straight, so the effect is limited by diameter.

### Kerf, Accuracy, Target, Sizes

In looking at effects on recovery, the three items kerf, accuracy and target sizes are all inter-related and must not be considered separately but together. Often it is difficult to grasp the significance of kerf in sawing small diameter logs where there are few saw lines across the diameter, but our observations backed by computer studies show that minimizing losses in sawdust and overcut will always improve recovery. The saving is not in producing an extra board from the log, but in producing a board one increment wider or longer, and with a small log of an average volume of .15 cubic metre, the effect is of the order;

Extra .3 m in length on two side boards 100 x 25 + 1% in recovery

Extra 25 mm in width on two side boards 25 mm thick x 4 m long + 3.3%

Kerf on circular log saws investigated varied between 4.4 mm to 5.2 mm depending on make and log diameter being processed, while with the thicker saws the guaranteed accuracy was to standard deviation = 0.2 mm. Overcut due to size variation is typically .5 mm and this, combined with the fine surface finish produced by good carbide tipped circular saws, means dressing allowance can be kept down to 3 mm.

When compared to band saws cutting say 3.2 mm kerf with 2 mm sawing allowance and rougher cut, the overall losses are comparable.

In the case of circular gang resaws cutting typically 3.8 mm with a standard deviation on thickness of 0.2 mm, the recovery is better than with band resaws.

These assessments have been borne out by the recovery figures now being achieved through the line.

## **Performance Criteria**

In view of all these considerations, we formulated a performance specification which included:

- a circular saw log reducer line
- line to scan incoming logs and to adjust the sawing pattern to maximize recovery
- moderate piece count, 6 to 7 logs per minute with adequate surge capacity to take up lost time and extra latent capacity to increase as log availability increased
- ability to produce 4 log side boards
- line to saw high recovery
- guaranteed high accuracy with minimum kerf
- good surface finish
- straight, well sawn product
- kerf sawing, if available
- tight control over chip specification
- low maintenance and saw costs
- to avoid environmental problems brought on by excessive noise and dust
- reliability and high availability
- cost competitive

## **Final Assessment**

An exhaustive evaluation of all these matters came down in the end to a choice between a Scandinavian line and a Linck line, and the final decision was made only after a thorough comparison both in the field and on paper.

While we were convinced that either offer would have provided us with a practical and economical mill, we eventually decided in favour of Linck, largely as a result of our confidence in their saw technology operating in our resinous timber.

Sawing on the Scandinavian line was based on relatively large diameter, thin gauge saws, running on single arbors with lubricated guide systems, while the Linck sawing was all done on double arbor, unguided saws of slightly heavier gauge. Judged on our past performance in running thin, large diameter saws, we were not confident of our ability to stand them up and saw accurately, and so we decided to trade off some kerf saving for what we perceived to be greater accuracy and reliability.

## **CONSTRUCTION OF THE MILL**

We set up a Project Team, the construction section of which was comprised of three professional engineers, and we organized the project around a number of contracts which were let on a supply, install and commission basis in the following broad areas:

- (a) Site works and civil
- (b) Log processing line
- (c) Sawmill line
- (d) Sawn timber sorter and trimmer

Work started on the site in November 1988 and the project was completed on time and to budget costs, starting on schedule on 15 January 1990. In this regard, I would mention the use of computer based project scheduling; it is an invaluable tool for the management of large projects and was used throughout to keep the project on track.

### MILL PERFORMANCE

Within three months of start up, the mill was achieving its designed level of performance, and within five months all target levels had been revised upwards. The contribution made by the Linck organization to the success of the project was significant. Their expertise, co-operation and willingness to work and to get things done correctly and on time, and to achieve guaranteed levels of performance in both throughout and accuracy, provided a yardstick by which the performance of all other contracts on the site was measured.

R.L. Hyne  
General Manager - Development  
HYNE & SON PTY. LIMITED  
Maryborough, Queensland  
Australia

**APPENDIX**

**8.12**

**AUSTRALIAN SAWMILL MACHINERY AGENTS**



## AUSTRALIAN SAWMILL MACHINERY AGENTS

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Grey Engineering Pty Ltd.  
Buladelah Road  
Booral NSW 2425  
Tel: 049 94 9203  
Fax: 049 94 9103

**Contact: Mick French**

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Systematic Sawmill Supplies  
Pty Ltd  
P.O. Box 1080  
Coffs Harbour NSW 2450  
Tel: 066 51 3999  
Fax: 066 51 1112

**Contact: Colin Pickworth**

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Macquarrie Corporation Pty Ltd.  
1620 Hume Highway  
Campbellfield VIC 3061  
Tel: 03 358 5555  
Fax: 03 358 5556

**Contact: Alan MacQuarrie**

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Forestry Machinery Co.  
80 Batten Street  
Albury NSW 2640  
Tel: 060 25 2666  
Fax: 060 40 2224

**Contact: Arthur Coleman**

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Randalls Equipment Company Pte Ltd.  
228 Kororoit Creek Road  
Williamstown VIC 3016  
Tel: 03 391 5955  
Fax: 03 399 1258

**Contact: Peter Randalls**

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Nicholson Manufacturing Pty Ltd.  
P.O. Box 339, Englands Road  
Coffs Harbours NSW 2450  
Tel: 066 522 066  
Fax: 066 523 650

**Contact: Bernard Streblow**

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A.E. Gibson & Sons Pty Ltd.  
Comboyne Street  
Kendall NSW 2439

Tel: 065 59 4001  
Fax: 065 59 4571

**Contact: John Scott**

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Umenco Pty Ltd.  
P.O. Box 27  
Bonville NSW 2441  
Tel: 066 53 4499  
Fax: 066 53 4499

**Contact: Ian Meares**

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Skipper Australia Pty Ltd.  
199 Miller Road  
Villawood NSW 2163  
Tel: 02 728 7588  
Fax: 02 724 6030

**Contact: Geoff Davies**

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Customs Saws (Aust) Pty Ltd.  
1 Barrett Street  
Kensington VIC 3031  
Tel: 03 372 1688  
Fax: 03 372 1859

**Contact: Michael Salamito**

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H.T. Champman Pty Ltd.  
9 Rothesay Avenue  
Ryde NSW 2112  
Tel: 02 807 6216  
Fax: 02 807 2005

**Contact: Paul Dunnett**

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Integrated Engineering  
Pacific Highway  
Coffs Harbour NSW 2450  
Tel: 066 523 233  
Fax: 066 522 851

**Contact: John Blain**

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Thatcher Engineering Systems Pty Ltd.  
4 Govan Street  
Seaford VIC 3198  
Tel: 03 785 3222  
Fax: 03 785 3340

**Contact: Russ Thatcher**

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Wilson Ari (Aust) Pty Ltd.  
1 Elma Road  
Cheltenham VIC 3192  
Tel: 03 553 188  
Fax: 03 555 6834

**Contact: John Edstrom**

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**APPENDIX**

**8.13**

**GUIDE TO TIMBER SPECIES**

**TIMBER & THE ENVIRONMENT  
A GUIDE TO TIMBER SPECIES**

**FOREST INDUSTRIES**

FURNITURE TREE SPECIES INTERNAL COMMON NAME JOINERY	TREE SPECIES BOTANICAL NAME	FRAMING										
		FOREST TYPE	IN GROUND	ABOVE GROUND- EXPOSED	ABOVE GROUND PROTECTED	EXTERNAL DECKING	EXTERNAL CLADDING	EXTERNAL JOINERY	INTERNAL FLOORS	PANELLING		
PINE, CARIBBEAN OS	PINUS CARIBAEA	PL	OP	OP	OS	OPS	OPS	OPS	OS	OS	OS	OS
PINE, HOOP OS	ARAUCARIA CUNNINGHAMII	WS/PL	OP	OP	OS	OPS	OPS	OPS	OS	OS	OS	OS
PINE, RADIATA OS	PINUS RADIATA	PL	OP	OP	OS	OPS	OPS	OPS	OS	OS	OS	OS
PINE, SLASH OS	PINUS ELLIOTTI	PL	OP	OP	OS	OPS	OPS	OPS	OS	OS	OS	OS

DS = DRY SCLEROPHYLL  
 NF = NORTH AMERICAN CONIFER FOREST  
 O = COMMONLY USED  
 OP = COMMONLY USED BUT PRESERVATIVE TREATED  
 OPS = COMMONLY USED BUT SHOULD BE SEASONED AND PRESERVATIVE TREATED  
 OS = COMMONLY USED BUT SHOULD BE SEASONED (DRIED)  
 PL = PLANTATION  
 RF = RAIN FOREST  
 WL = WOODLAND  
 WS = WET SCLEROPHYLL

**APPENDIX**

**8.14**

**AVERAGE WOOD DENSITIES**

## AVERAGE WOOD DENSITY

	AIR DRIED (kg/m <sup>3</sup> )
WESTERN RED CEDAR	380
YELLOW CYPRESS	480
DOUGLAS FIR	540
WESTERN HEMLOCK	480
WESTERN LARCH	640
LODGE POLE PINE	460
PONDEROSA PINE	510
SPRUCE ENGELMANN	450
SPRUCE SITKA	430
RADIATA PINE	660

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