

**U.S. Value-Added Wood Products  
Bench-marking Study**

Final Report to Participating Companies

**January 1996**

**Sponsored By**

**Forest Renewal B.C.**

**A B.C. Crown Corporation**

**Prepared By**

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## 1.0 Introduction

The Ministry of Employment and Investment (MEI) has retained R.E. Taylor & Associates Ltd. to conduct a "benchmarking" study of value-added wood manufacturing facilities in the U.S. Pacific Northwest. This project is an extension of earlier work and is designed to provide basic information on the cost structure and general characteristics of value-added plants located outside of B.C.

The original request for proposals (RFP) identified three objectives (Note: number 2 was added by R.E. Taylor & Associates):

- 1) Obtain specific operational, market and competitive information from value-added wood manufacturing plants in the Pacific Northwest based on established or desired criteria;
- 2) Develop composite benchmarking information on a much wider scope of value-added plants in the Pacific Northwest by conducting a separate "stand-alone" survey. Target up to 100 plants to obtain comparative financial, operational and marketing performance data directly from respondents; and
- 3) Lead a small delegation of B.C. government and industry representatives to visit approximately ten pre-selected value-added plants (that meet targeted sector profiles) in the Pacific Northwest;

This combination of benchmarking information, directed at U.S. value-added plants processing lumber graded under Canadian Lumber Standards (CLS) coupled with selected field trips, has addressed many questions about value-added opportunities, both in general terms and in some detail. These include opportunities, pitfalls and strategies.

Earlier commissioned studies have addressed some of these questions on value-added opportunities on a general basis only, and without the reality checks required in evaluating remanufacturing options. This study provides a unique and detailed profile on various remanufacturing sectors in the U.S. border states that should assist others in quantifying more comprehensively the success factors and obstacles typical of the dynamics in the value-added wood manufacturing industry.

## 2.0 Methodology

The work plan was structured into five complementary phases. In the benchmarking survey (phases 1 through 3 below), the project team consisted of:

- Russell E. Taylor, RPF, MBA, President, R.E. Taylor & Associates Ltd.;
- Jim Fraser, President, J.H. Fraser & Associates Inc.; and
- Peter Butzelaar, Senior Consultant, R.E. Taylor & Associates Ltd.

For phases 4 and 5, the primary project consultants and participants were:

- Russell E. Taylor, RPF, MBA, President, R.E. Taylor & Associates Ltd.;
- Arthur Tsai, Consultant, R.E. Taylor & Associates Ltd.; and
- Government/industry representatives (field trip phase).

These five phases are outlined below.

### **Phase 1: Pre-Screening of Value-Added Plants**

### **Phase 2: Survey of Value-Added Plants in the Pacific Northwest**

Two summary reports were planned, based on a successful minimum number of responses, to be prepared at different levels of detail and confidentiality:

#### **Report #1: General Summary of Plant Operations, Product Line, Markets and Competitive Advantages:**

This first report lists all participating mills (on an anonymous basis) based on the company information that was supplied on production, process, technology employed, market, product line, raw material requirements, etc. Sector profiles were developed to summarize the average performance of responding plants.

#### **Report #2: Detailed Summary of Selected Financial Information of Plants**

The second, optional survey was based on each mill submitting confidential financial and operational data. This report would not be designed to list individual mills, but instead would summarize basic financial data such as net income, relative levels of sales, direct expenses, indirect expenses, overhead, labour rates, etc., on a sector or category basis. To maintain confidentiality and improve response rates, financial data

by mill would not be supplied to any of the respondents nor to the client. The objective of this report was to summarize value-added sectors on an "average" basis.

### **Phase 3: Compilation of Benchmarking Survey Results**

The survey results were audited and compiled by the project team and summarized.

### **Phase 4: Field Trip to U.S. Plants**

Following the completion of the benchmarking analysis, field visits were planned and conducted to obtain a firsthand perspective on the status of the remanufacturing industry in selected regions of Washington, Idaho and Montana.

### **Phase 5: Final Report**

#### **2.1 Special Qualifying Note**

All data collected and summarized in this report are based either on information provided by plants from the benchmarking study or are based on our field investigations. We will not provide any participant or our client with any plant's name or plant information within the collected database or from market information collected during the visits. All mill identities have been kept strictly confidential by R.E. Taylor & Associates Ltd. The manager for this project, the Ministry of Employment & Investment, has been provided with the same report information as sent to those participating mills in the benchmarking survey. To repeat, our objective is to keep the names of all plants strictly confidential.

### 3.0 Summary of Value-Added Benchmarking Survey

A summary of responses to the initial (more general) benchmarking survey across the various value-added sectors is presented in various tables in the appendix. A summary table is also provided for perspective on the following page.

Initial surveys were faxed to over 100 value-added plants in the four U.S. border states that met pre-qualification criteria. There were 31 complete responses to the first survey, grouped as follows:

- 13 remanufacturers (processors of lumber into fencing, panels, and specialty products);
- 6 pallet manufacturers (producers of industrial pallets, boxes and crates);
- 9 truss manufacturers (engineered construction products); and
- 3 miscellaneous respondents (two pressure treaters and one log home manufacturer).

Response rates varied:

- A very high response rate was obtained from engineered truss manufacturers (60%);
- An average response came from pallet manufacturers (40%);
- A below average response came from remanufacturers (25%); and
- A low response rate of less than 15% came from other producers of engineered wood products, log home manufacturers and treated wood products.

Approximately seven responses were disqualified for a variety of reasons (incompleteness, inaccuracies, poor fit within the sector profiles, etc.).

Our survey of 31 responding plants identified a total of 530 million board feet of lumber consumption at value-added plants, of which:

- 246 million board feet was CLS-sized lumber or other lumber produced in Canada (mainly B.C.; some from Alberta) and destined for further remanufacturing in Idaho, Montana, Oregon, and Washington -- this was 46% of the plants' total lumber usage.
- The total SPF volume accounted for in our survey was 207 million board feet (39% of all species processed).

Table 1: The 1994 Sector Profile of 31 U. S. Value-Added Plants

	Average				Median
	Total	Reman	Pallet	Truss	Reman
Years in business	15	11	21	16	10
Production workers	33	37	37	27	21
Management/administration workers	6	5	6	9	3
Number of shifts/day	1.4	1.3	1.3	1.2	1.0
Relative degree of technology	Average	Average	Average	Average	Average
- ranking on a scale of 1 (low) to 5 (high)	2.9	2.6	2.8	3.3	3.0
Types of reman equipment per plant	1.7	2.6	1.8	0.1	N/A
Annual lumber purchases (MMbf)	17.1	31.1	7.2	3.8	15.0
Lumber purchase cost (US\$/Mbf)	\$288	\$200	\$217	\$424	\$200
Annual Canadian lumber purchases (MMbf)	7.9	16.9	1.3	1.1	6.6
- % of all sources	46%	54%	18%	29%	44%
Annual lumber sales (MMbf)	16.1	29.3	6.6	3.6	14.0
Annual lumber sales (\$Million)	\$7.4	\$14.8	\$2.5	\$3.6	\$5.4
Lumber sales price (US\$/Mbf)	\$464	\$504	\$385	\$1,008	\$385
Main product category produced (Grade)	Construction	Construction	Industrial	Construction	N/A
- % of products produced	61%	59%	73%	78%	N/A
Main market	US West	US West	US West	US West	N/A
- % of all markets	69%	59%	93%	100%	N/A
1994 margin (estimated)	10%	10%	10%	N/A	10%
1995 margin (estimated)	0-5%	0-2%	0-5%	N/A	N/A
Derived "value-added" score (US\$/m <sup>3</sup> )	\$35	\$20	\$28	\$65	\$16

With the exception of a few respondents, all sectors were selling primarily to the western U.S. (e.g., local) market.

The total cost of lumber purchased from our survey was U.S. \$143 million on 530 million board feet, an average lumber cost of U.S. \$288/Mbf.

The cumulative sales of value-added producers was U.S. \$216 million on 498 million board feet, or a sales average of U.S. \$464/Mbf.

The major lumber grade sold (representing over 302 million board feet) was a "construction-grade" product (61% of the total respondents' sales volume of 498 million board feet).

The average "value-added score" derived from our survey, expressed in U.S.\$ per equivalent volume of logs (in cubic metres), was U.S. \$35/m<sup>3</sup>. Remanufacturers surveyed averaged only one-half of this at about U.S. \$20/m<sup>3</sup>.

The 31 survey responses quantified a total volume of Canadian-sourced lumber of 245 million board feet (8 million board feet per plant representing 46% of total consumption).

### **3.1 Summary by Value-Added Sector**

From the survey responses, a profile of value-added plants by three main industry sectors (lumber remanufacturer, pallet producer and engineered truss producer) was established. Based on the data in the appendix and table 1, the following depicts the average profile of value-added plant in the U.S. border states:

#### **Years in business:**

The average number of years in business was relatively similar for all three remanufacturing sectors surveyed: an average of 15 years, ranging between 11 (reman) and 21 years (pallets).

#### **Number of production workers:**

The average number of production workers per plant was, again, similar: an average of 33 workers, ranging between 27 (truss) and 37 (reman).

#### **Management/administrative workers:**

Again, similarities occurred in the average number of management and administration workers per plant: an average of six, ranging between five (reman) and nine (truss).

**Average number of production shifts:**

The average of about 1.4 was nearly the same in each sector.

**Relative degree of technology:**

The level of technology employed at each plant was self-assessed by each respondent relative to their specific industry sector. Based on a scale of one (low) to five (high), the respondents averaged 2.9 (0.1 below "average"), ranging from 2.6 (reman) to 3.3 (truss). This self-ranking indicates that most value-added plants surveyed only had an average level of equipment technology employed in their respective sectors. The respondents ranged from a low of one (three plants) to a high of five (one plant).

**Average types of remanufacturing equipment:**

Based on a count of the different types of remanufacturing equipment located at each plant surveyed, a perspective evolves between the sectors. Some plants may have more than one piece of equipment within a specific equipment type, but only one "count" is given to each type for the purposes of this summary. The remanufacturing equipment located at each plant averaged 1.7 different types, ranging between 0.1 types (truss) to 2.6 types (reman).

**Average annual lumber purchases:**

Compared to an overall average lumber production of 17.1 million board feet from the survey, pallet plants averaged 7.2 million board feet; truss plants averaged only 3.8 million board feet. The remanufacturing sector had the largest annual volume purchased: an average of 31.1 million board feet per plant. The profile of the average respondent differs somewhat when compared to the individual remanufacturing sectors. In our survey of remanufacturing plants, there were a number responses from larger companies that skewed the "average" values. When a median value is used for comparison, a different answer emerges in some cases. In both the lumber volume purchased and sold, the median value is approximately one-half of the average value (15 million board feet) for the reman sector. The larger, more-established reman plants must be factored into the results when using "average" survey results.

**Average lumber purchase cost:**

The average cost of lumber purchased (in U.S. dollars) was \$288/Mbf, ranging from \$217/Mbf for pallets, \$339/Mbf for reman, and \$424/Mbf for truss plants.

**Average Canadian lumber purchased:**

The average volume of Canadian lumber purchased by the plants surveyed averaged almost eight million board feet, ranging from 1.1 million (truss) and 1.3 million (pallet) to 17 million bf (reman). When the median value for reman plants is used and excluding some of the larger plants, a much lower value of only 6.6 million bf results.

**Average percentage Canadian lumber purchased:**

Canadian lumber processed averaged 46% of all consumption at value-added plants surveyed, ranging from 18% (pallet) and 29% (truss) to a strong 54% at reman plants. This signifies that industrial lumber from Canada, and especially B.C., represents a significant input to the average value-added plant in the U.S. border states.

**Average annual lumber production:**

As with lumber purchases, the profile of the average respondent differs somewhat when compared to the individual remanufacturing sectors. The average annual production in the survey was 16 million board feet, ranging from only four million fbm (truss) and seven million bf (pallet) to 29 million bf (reman). In comparison, the median volume for reman was only 14 million bf.

**Average lumber sales revenue:**

Lumber revenue produced from the value-added plants surveyed averaged US \$7.4 million per plant, ranging from \$2.5 million (pallet) and \$3.6 million (truss) to \$14.8 million at reman plants. When the median value for reman plants is used, a much lower value of only \$5.4 million emerges.

**Average lumber sales price:**

The derived average lumber sales price from the survey was US \$464/Mbf, ranging from \$385/Mbf (pallet) and \$504/Mbf at reman plants to \$1,008/Mbf at truss plants. When the median value for reman plants is used, a lower value of US \$385/Mbf results.

**Main lumber product category/grade:**

The pallet sector's main product was an industrial lumber grade that represented 73% of all shipments. The average produced by all plants, however, was a construction-grade product, representing 61% of all shipments. Construction-grade products dominated the reman sector (62% of shipments) and especially the truss plants (78%).

**Main markets served:**

All plants surveyed sold the bulk of their product to the U.S. western states (west of the Rocky Mountains). The U.S. West market averaged 69% for all plants surveyed. By sector, reman plants sold 61% into the U.S. West; pallet shipments were 93%; trusses were 100%.

**Derived trim loss/waste:**

Comparing lumber input to finished product output, the average trim loss or waste factor was 11% for all plants.

**"Value-added" score:**

The B.C. Ministry of Forests (MOF) calculates "value-added" in a way that relates raw lumber to finished or semi-finished wood products. The value-added is calculated based on the equivalent volume of logs used as lumber at the proposed reman plant. The score can be derived as follows:

$$\text{Value-added } (\$/\text{m}^3) = [\text{lumber sales revenue } (\$) \text{ less lumber cost } (\$) \text{ less consumables } (\$)] \text{ divided by } [\text{equivalent volume of logs to produce the lumber input}(\text{m}^3)]$$

Note: 1 m<sup>3</sup> of logs = approx. 0.20 Mbf (Scribner scale) to 0.22 Mbf (metric scale)

In our survey, a "basic value-added" calculation was derived to approximate the evaluation procedure used in B.C. What is surprising is the very low value-added scores achieved by the established plants from our sample. The average score was only US \$35/m<sup>3</sup>, ranging from just \$20/m<sup>3</sup> at reman plants to \$28/m<sup>3</sup> at pallet plants and \$65/m<sup>3</sup> at truss plants. In fact, the two highest derived value-added scores in our survey were two truss plants (US \$100 and \$109/m<sup>3</sup>). The highest score derived from a reman plant was only US \$47/m<sup>3</sup>; for pallets plants, the highest score was \$70/m<sup>3</sup>. However, we believe there is at least one remanufacturing plant that should be scored closer to the US \$200/m<sup>3</sup> range, even though the survey results did not yield that result.

**Estimated 1994 net margin:**

Our survey was based on each company's latest financial year's operating results; in essentially all cases, this was the year 1994, which on average featured the best financial results (e.g., profits) in many years for sawmills and all types of value-added plants. In 1995, the situation changed considerably with the market collapse of lumber and value-added products in early summer.

Although information regarding net margins was not requested in our initial survey, we have been able to obtain enough general comments during our benchmarking survey and later in our field trips to determine a relative level of operating results. Our best indications are that an average net margin of about 10% (before tax) was likely achieved during 1994; we have used this estimate in our summary table for perspective only. For 1995, our estimate is for an average net margin of 0%-2%, ranging from losses of 5% to positive margins up to 10% for specific plants.

### 3.2 Detailed Financial Benchmarking Survey

Of the 40 companies that responded to our first benchmarking survey, 30 selected firms received an invitation to participate in a second survey of mainly financial operating results. The work plan had budgeted for a 65% response rate to this second survey from those companies that had already been involved. Unfortunately, only ten responses were received (33%), of which three were unsuitable for comparative purposes. The remaining seven responses were spread over four value-added sectors, preventing any meaningful comparisons by sector.

Since six of the respondents to our second survey were remanufacturers or pallet producers, we have provided a summary of the "average" of these responses in the appendix. The average of the six remanufacturing plants surveyed in this detailed survey provided the following highlights:

- **Number of production workers:**

Average was 28 workers, with a seasonal average high of 34 and a low of 22; no plants were unionized.

- **Management/administrative workers:**

Average number was four.

- **Average hourly wages and benefits:**

Including overtime, the average hourly wage paid was US \$10.45; benefits averaged US \$2.89 per hour; combined hourly wages and benefits paid in 1994 were US \$13.34 per hour.

- **Average salary wages and benefits:**

The average wage paid to salaried employees was US \$19.09 per hour; benefits averaged US \$3.08 per hour; the combined salary wages and benefits paid in 1994 were US \$22.17.

- **Annual lumber sales by volume and (\$) - 1994:**

The average annual sales was US \$3.6 million; the average plant sold 18 million board feet; the average sales price was US \$197/Mbf; since some of the respondents performed custom processing, a lower sales average results.

- **Lumber grades sold:**

Economy (25%), other/specialty (23%), standard & better (18%), select tight knot (16%) and utility (15%) were the main lumber grades sold.

- **Lumber used by species and grade:**

Douglas fir (43%), hem-fir (18%) and cedar (16%) were the major species consumed; standard & better (36%), economy (30%), and utility (22%) were the main lumber grades purchased; purchasing direct from the mills (58%) was more predominant than buying from wholesalers (42%).

- **Annual lumber volume and cost purchased:**

The average plant used 21 million board feet; the average cost was US \$12.1 million; the average lumber purchase price was US \$98/Mbf based on total operating costs.

- **Average cost of sales - 1994 (on lumber sold):**

Lumber	US\$110/Mbf	(56%)
Hourly Labour	US\$41/Mbf	(21%)
Other Costs	<u>US\$13/Mbf</u>	<u>(7%)</u>
<b>Total Direct Costs</b>	<b>US\$164/Mbf</b>	<b>(83%)</b>
Admin Costs	US\$8/Mbf	(4%)
Office	US\$6/Mbf	(3%)
Other	<u>US\$13/Mbf</u>	<u>(7%)</u>
<b>Total Indirect</b>	<b>US\$27/Mbf</b>	<b>(14%)</b>
<b>Total Costs</b>	<b>US\$191/Mbf</b>	<b>(97%)</b>

- **Average net margin - 1994 (before taxes):**

The average margin on sales before taxes was US \$6/Mbf, or 3% of sales, ranging from a low of -4% to a high of 11%.

- **Average balance sheet:**

The average balance sheet showed assets of US \$1.1 million against liabilities of US \$1.0 million.

- **Proposed capital plans:**

The average company planned U.S. \$73,000 in capital expenditures for the current year.

• **Derived trim loss/waste:**

Comparing lumber input to finished product output, the average trim loss or waste factor was 11.5%.

The small sample size of six plants provides some additional perspective on some topics and the results conform to much of the first survey. However, this information cannot be used statistically for drawing any specific profile of any remanufacturing sector.