SECTION 1:
SECONDARY MANUFACTURED SOLID WOOD PRODUCTS
IN B.C.
SECONDARY MANUFACTURED
SOLID WOOD PRODUCTS
IN B.C.

Prepared for
Ministry of Forests

By
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Vancouver, B.C.

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## INDEX

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Executive Summary</td>
<td>i</td>
</tr>
<tr>
<td>1. Introduction</td>
<td>1</td>
</tr>
<tr>
<td>2. Definition</td>
<td>3</td>
</tr>
<tr>
<td>3. Profile of Current Activity</td>
<td>4</td>
</tr>
<tr>
<td>- Secondary Manufacturing at Primary Sawmills</td>
<td></td>
</tr>
<tr>
<td>- Secondary Manufacturing Industries</td>
<td></td>
</tr>
<tr>
<td>- Remanufacturers</td>
<td></td>
</tr>
<tr>
<td>4. Challenges &amp; Constraints</td>
<td>9</td>
</tr>
<tr>
<td>- Coast Operations</td>
<td></td>
</tr>
<tr>
<td>- Interior Operations</td>
<td></td>
</tr>
<tr>
<td>- Secondary Manufacturing Industries</td>
<td></td>
</tr>
<tr>
<td>- External Constraints</td>
<td></td>
</tr>
<tr>
<td>5. Opportunities</td>
<td>18</td>
</tr>
<tr>
<td>- Hemlock</td>
<td></td>
</tr>
<tr>
<td>- S-P-F</td>
<td></td>
</tr>
<tr>
<td>- The Potential for Value and Volume Increase</td>
<td></td>
</tr>
<tr>
<td>- Summary of Opportunities</td>
<td></td>
</tr>
<tr>
<td>6. Suggested New Approaches</td>
<td>34</td>
</tr>
<tr>
<td>- Research &amp; Development</td>
<td></td>
</tr>
<tr>
<td>- Wood Supply</td>
<td></td>
</tr>
<tr>
<td>- Marketing</td>
<td></td>
</tr>
<tr>
<td>- Incentives &amp; Initiatives</td>
<td></td>
</tr>
</tbody>
</table>
EXECUTIVE SUMMARY

It is generally recognized that some of the best opportunities for growth for the B.C. forest industry lie in the development of more valuable products from the resource that exists. Consequently, an analysis of secondary manufacturing of solid wood products in B.C. was undertaken. The work was carried out by Woodbridge, Reed and Associates in July/August 1984. The objectives were to identify the current activity relative to secondary manufacturing, to review the constraints and to outline the potential for development.

Secondary manufacture was defined as being any processing activity that is outside the normal framework of a primary sawmill. The industry sectors investigated were:

- secondary manufacturing industries producing specific products such as doors, windows, furniture, kitchen cabinets, prefabricated houses.
- remanufacturers processing lumber from one form into another.
- primary sawmills where there is some separate processing activity that results in the production of a specialty product (e.g. fingerjointing, sidings, panelling).

The secondary manufacturing industries employ close to 7,000 people and have been expanding in recent years. However, these industries are primarily oriented towards domestic consumption with only 5 per cent of production being exported. Furthermore, apart from the industries related to construction, relatively little solid wood from B.C.'s resources is used. Many of the companies are small and lack the equipment and infrastructure to expand significantly into export markets. The variety of specifications and fashions demanded in each export market is a further constraint. It is concluded therefore that, apart from some specific industries such as kitchen cabinets, the opportunity for substantial export volumes of the products produced by the secondary manufacturing industries is not great.

There are about 65 companies engaged in remanufacturing—75 per cent being on the Coast. These companies process over 500 million board feet of lumber from B.C. sawmills at a sales value of around $200 million. The products vary widely from edge-glued boards to spindles to ladder and door stock. The principal constraints facing the remanufacturers are:
- raw material supply (no long term security and the wrong sizes).
- lack of financial strength
- too small to develop major export programmes.

The strengths of this sector lie in substantially greater production flexibility, together with a more entrepreneurial approach and a lower overhead/labour cost structure.

With the exception of the cedar mills where there is already a substantial amount of secondary manufacture, B.C. sawmills concentrate on the production of primary products. The majority of the mills, particularly in the Interior, have developed production techniques that emphasize a cost minimization approach. They depend on high volume throughput of standardized items. This approach is essential for the mills to operate economically but limits the flexibility to extract products that may command higher value through secondary manufacture. On the coast, sawmills also cut for value on the outside of the log when this has the potential to yield better quality lumber. The balance, over 80 per cent, is cut into sizes that are compatible with the sizes demanded for construction grades.

It is estimated that, for hemlock, a further 15 to 20 per cent of higher value product could be extracted. The Council of Forest Industries is currently developing new grading rules which take advantage of this potential relative to the lumber qualities required by industrial consumers worldwide.

In the Interior the quality of the resource would allow substantial volumes to be extracted for sale to industrial consumers worldwide at prices in excess of construction lumber. In order to capitalize on this opportunity the species must be segregated. Lodgepole pine, in particular, offers excellent potential for the production and sale of higher value products.

Markets exist, or can be developed, for the higher value products that can be manufactured but fundamental changes in production and marketing approaches are needed. Closer relationships between producer and consumer have to be developed and a value, not volume, oriented approach to manufacture has to be adopted.

The very real production cost constraints at the primary sawmill suggest that the development of greater volumes of higher value products may depend on the lower cost remanufacturing sector. Greater coordination and cooperation between the primary sawmills and remanufacturers would overcome many of the constraints faced by both sectors and take advantage of the strengths each can offer.

It is estimated that the value of higher grade lumber that could be sold in specialty sizes and grades and components could be increased to $1 billion annually, from the current $500 million. Substantial added value could be obtained and over 5,000 jobs would be created directly.
New initiatives and incentives at both the private and public sector levels are needed to capitalize on this opportunity. Research and development effort related to new remanufacturing technologies, a re-evaluation of Category 2 Small Business Enterprise programmes, changes in the marketing approach, promotional emphasis on remanufactured products, the promotion of foreign joint venture participation, detailed analysis of current uses of B.C. lumber—these are all areas that need to be explored in greater depth.
1. INTRODUCTION

The Ministry of Forests required, as an integral part of the 1984 Resource Analysis, an analysis of secondary manufacturing in solid wood products. The study was undertaken by Woodbridge, Reed and Associates during July and August of 1984.

The objectives of the study were as follows:

1. To ascertain the current level of activity in secondary manufacturing.
2. To identify the major constraints to growth.
3. To outline some of the opportunities that may exist to obtain greater value from the B.C. resource by secondary manufacturing.

The activity of secondary manufacturing is defined in detail in the following section but there were essentially three separate industry sectors that were investigated. These were:

- secondary manufacturing industry
- remanufacturers
- primary sawmills

The approach taken in the study was to undertake an extensive programme of personal interviews, mail questionnaires and telephone contacts. This was supplemented by an analysis of data available from sources such as Statistics Canada. With the cooperation of the industry associations (COFI, CLMA, ILMA) approximately 200 sawmills were contacted by mail, telephone and personal interview. The majority of the remanufacturers on the Coast and in the Interior were visited. In addition a representative sample of the very fragmented secondary manufacturing sector was contacted. These contacts supplemented the information already available to Woodbridge, Reed and Associates from previous analyses of this sector. It should be noted, however, that the investigation of this sector was given a lower priority and was in less depth than the other two sectors.

The terms of reference and time constraints did not permit any new market research in the potential export markets. However, field trips were undertaken in the U.S. to ascertain the raw material requirements of the U.S. millwork industry and to investigate how these could be met from B.C.'s resource. This visit was also intended to review whether any significant differences existed in working relationships between the primary and remanufacturing sectors in the U.S.A. as compared with B.C.
The first part of this report explains the guidelines used to identify what is regarded as secondary manufacturing of solid wood products. This is followed by an analysis of the current activity in each of the three sectors. The challenges and the existing constraints to expansion are discussed in some detail for each of these sectors. The report identifies some of the opportunities that exist for the secondary manufacture of the B.C. resource to obtain higher values and the final section suggests some new approaches that need discussion and evaluation.
2. DEFINITION

The further processing of lumber produced by the primary sawmill industry is undertaken in a number of different industry sectors. In all cases value is added to the primary product since additional work is done on the lumber. In some cases the activity is readily identified as secondary manufacture since a specific product is produced - such as doors, windows, kitchen cabinets and prefabricated housing components. In others the aspect of secondary manufacture can also be easily identified in that the company takes lumber into its facility, processes it in some way and produces a product designed for some specific and identifiable end-use. There are a large number of remanufacturers in B.C. who operate in this fashion and whose activities vary from simply drying green coastal lumber to producing finished door jamb sets.

Problems of definition arise, however, at the primary sawmill level. Some mills further process their primary lumber products. Where this activity is separate from the main primary production flow - such as finger jointing - again it can readily be identified as secondary manufacturing. Where the product can be specifically identified as a "specialty" item such as sidings or panelling it is believed that this also should be regarded as secondary manufacturing. However, where the primary mill is breaking the lumber down into smaller sizes by the use of primary manufacturing equipment it is judged that this should not be regarded as secondary manufacturing within the context of this analysis.

There are therefore three distinct sectors which are discussed below. These are:

- Secondary manufacturing industries (producing products such as doors, cabinets, etc.)
- Remanufacturers (reprocessing lumber from one form into another)
- Primary sawmills (where identifiable reprocessing occurs).

It should be noted that there is some inevitable dynamism within these sectors and within the definitions used to identify secondary manufacturing. Thus a remanufacturer purchasing rough green 1x4 or 1x6 S-P-F boards and selling KD 54S boards is included under "secondary manufacturing". However, if the primary sawmill did the drying and planing of the boards as a part of its regular processing activity this would not be included as "secondary manufacturing". Similarly small cabinet and millwork shops producing custom mouldings for specific job-sites are regarded as "secondary manufacturers" whereas companies producing mouldings on a production line basis are included under "remanufacturers".
3. PROFILE OF CURRENT ACTIVITY

Secondary Manufacturing in Primary Sawmills

Approximately 200 sawmills were contacted to ascertain the extent to which they were currently engaged in secondary manufacturing. The results of this survey were as follows:

Coast

Of the 64 mills contacted, about 20 per cent advised that they undertook some secondary manufacturing. The great majority of these were cedar mills producing sidings and panelling. It was found that, within cedar mills, the proportion of the product being remanufactured into higher value products was often more than 50 per cent of production. In contrast, very few of the mills based on hemlock and Douglas fir were producing secondary manufactured products. Most of them extract the clear and shop grade material from the outside of the log and process the balance into 'merch' grades for various markets - essentially in sizes that relate to construction uses. Some have programmes to extract higher grade pieces that develop from these construction grades and a few reprocess factory flitches to obtain specific grades that are suitable for particular end-uses such as ladder and door stock. It is estimated that the volume of clear/shop grades of hemfir produced by the primary sawmills is approximately 15 per cent of the total hemfir produced. The great majority of this is essentially in the same general form as the piece sawn initially from the outside of the log. It should be noted however that there are some mills that obtain a significantly higher percentage - up to 30 per cent - of clear/shop. There is also the good possibility that adoption of the new COFI grades will allow significant increases in the recovery of higher value lumber.

COFI is currently undertaking a major review of the grading rules under which lumber is produced in B.C. This review does not affect the "NLGA Standard Grading Rules for Canadian Lumber" but is concentrating on the rules used for a substantial proportion of offshore export - "Export R List Grading and Dressing Rules". These rules have been essentially unchanged since their development in 1951. At that time the fundamental grading philosophy was one related to production not to markets. Furthermore, the nature of the raw material, production equipment and techniques, and the requirements of the users have all changed since 1951.

The intention of the new approach is to develop rules that relate more closely to the needs of the end users while maximizing the recovery from the raw material. A computer programme has been developed to analyse the relationships between grade and recovery while still producing a grade that satisfies its intended end-use.
The new rules will apply to all species, including those in the Interior, and is being supported by a promotional programme to emphasize the advantages of B.C. species, such as hemlock, in a large number of applications, where the product can command price levels higher than those for construction grades.

**B.C. Interior**

A total of 127 mills were contacted in the B.C. Interior. Of these 15 mills (12 per cent) advised that they carried out some secondary manufacturing and a further 6 indicated that they were currently planning to commence doing so. Apart from the mills based on cedar and producing sidings/panelling, the principal activity related to finger jointing (5 mills). With the exception of one mill these finger jointing operations are designed to improve the value of shorts and reject lumber. There is also a very limited volume of joinery grade material and specific furniture quality being extracted from the logs.

In total the amount of secondary manufacturing being undertaken at Interior mills is small and amounts to less than 2 per cent of the total volume of lumber produced in the region. There is also a very small volume of clear/shop grade lumber produced but in most cases this is manufactured directly from the log and is not the result of a secondary manufacturing process.

**General**

It should be emphasized that the relatively minor level of secondary manufacturing found at primary sawmills is at least partly due to the definitions used. A number of mills are also producing fractional and metric sizes or are involved in custom cut programmes. This type of activity is regarded as primary manufacture for the purposes of this analysis.

**Secondary Manufacturing Industries**

Detailed study and analysis of the secondary manufacturing industry sector is complicated by the fragmentation of the sector. There are a large number of companies involved and many of them are very small. The average number of employees is between 15 and 20 but close to 75 per cent of the establishments have less than 10 employees.
There are a number of industry classifications identified within this sector. These are:

<table>
<thead>
<tr>
<th>Industry Classification</th>
<th>No. of Employees</th>
<th>No. of Establishments</th>
<th>Value of Shipments $ million</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sash door &amp; millwork¹</td>
<td>1600</td>
<td>116</td>
<td>134</td>
</tr>
<tr>
<td>Prefabricated housing</td>
<td>495</td>
<td>18</td>
<td>36</td>
</tr>
<tr>
<td>Kitchen cabinets</td>
<td>1025</td>
<td>95</td>
<td>65</td>
</tr>
<tr>
<td>Wooden boxes</td>
<td>190(e)</td>
<td>11(e)</td>
<td>16(e)</td>
</tr>
<tr>
<td>Coffins</td>
<td>20</td>
<td>3</td>
<td>neg.</td>
</tr>
<tr>
<td>Miscellaneous wood industries²</td>
<td>980</td>
<td>51</td>
<td>98</td>
</tr>
<tr>
<td>Office furniture</td>
<td>195</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>Household furniture</td>
<td>700</td>
<td>70</td>
<td>39</td>
</tr>
<tr>
<td>Miscellaneous furniture</td>
<td>975</td>
<td>42</td>
<td>59</td>
</tr>
</tbody>
</table>

**Total** 6180 418 455

Source: Statistics Canada 1982

1 This classification includes some companies that are separately discussed in this report as "remanufacturers."

2 This includes particleboard mills which probably account for a third of the employment.

The 1982 figures quoted above reflect the depressed conditions of that year and are 20 per cent below the activity of 1981.

There has been an increase of about 35 per cent in the number of people employed in this industry sector during the past 10 years. It is significant to note, however, that over 20 years ago the number of people employed in "Sash, Door and Millwork" was double the current level. This would appear to confirm the statements, by people contacted in the industry, that there had been a long term decline in secondary manufacturing activity in B.C. Recent trends, however, are more encouraging.

The total value added by these companies is in the region of $240 million of which salaries and wages account for $160 million. In contrast, however, with the primary sawmill and the remanufacturing sectors, the secondary manufacturing industries export a very small proportion. The value of exports of products produced by this sector has averaged only $25 million per year for the past three years. This represents about 5 per cent of total shipments.
Consequently, it can be estimated that the secondary manufacturing industries producing specific consumer products, such as doors, kitchen cabinets and furniture, ship over 95 per cent of their goods within Canada — primarily B.C. There are, however, some individual exceptions to this general statement. For example, there are some large production line kitchen cabinet manufacturers that have had substantial success in the export market.

A very large proportion of the raw material utilized by the secondary manufacturing industries is other than softwood lumber. Particleboard, plywood and various hardwoods are the principal products used. Consequently, with the exception of door and window manufacturers and the industries related to the construction sector such as prefabricated housing and trusses, the significance of domestic softwood lumber is relatively small at present. An exception to this is the growing impact of pine furniture based on sound tight knotted pine that can be obtained from the Interior. However, even in this area many of the manufacturers are importing ponderosa pine from the U.S. because suitable grades and sizes are not available in B.C.

In summary, therefore, though the secondary manufacturing industries represent a sizeable industrial sector in terms of employment and shipment value it is of limited significance, at present, relative to the use of, or the addition of value to, the B.C. forest resource. Furthermore, it is primarily oriented towards the manufacture of products for domestic consumption.

Remanufacturers

In B.C. the remanufacturing sector is made up of three main categories:

**Phase I**  
- Primarily planing, resawing, moulding, drying, etc.

**Phase II**  
- Involves intensive defect trimming and includes finger jointing, edge and face gluing capability.

**Custom Work**  
- essentially Phase I service work for wholesalers and sawmills. No inventory is owned by the custom remanufacturer.

There are about 65 firms engaged in remanufacturing, 75 per cent of whom are located on the Coast and 25 per cent in the Interior. These firms employ 1,800 people directly and pay $50,000,000 in wages, salaries and benefits annually. The variety of services and products include:

- veneered wood substitutes for solid wood
- edgeglued boards for furniture components, shelving and DIY projects
- kiln dried cut stock components and industrial clears for further processing
- fencing, rails, boards and posts
- bed frame components
- sidings, panelling and flooring
- roof and floor decking
- small dimensions in 1x2, 2x2, 1x3, 2x3 for mobile homes, furring strips, DIY projects, greenhouses, lumber-lath, shingle bands, kiln sticks, cant strip, bridging and dunnage
- turning squares, spindles and stair parts
- ladders and ladder blanks
- door and window cut stock
- pressure treated wood
- edgeglued, face glued, finger jointed blanks
- pallet components

Virtually all raw material used by the remanufacturing industry is derived from local B.C. sawmills of which in excess of 70 percent is coastal and the balance Interior species. Well over 500 million FBM of primary B.C. sawmill material is consumed annually by the secondary producers who change the nature of the inbound raw material into the many different forms described above thereby adding an additional value of $70,000,000 to the base raw material.

Sales of the remanufactured items are in excess of $160,000,000 per year and an additional $20,000,000 of custom services are performed for wholesaler and sawmills.

Shipments from remanufacturers by region are as follows:

| Region   | Percentage |
-|----------|------------|
-| Canada   | 35 per cent|
-| U.S.A.   | 48 per cent|
-| Offshore | 17 per cent|

Most of the companies are small, relative to the size of the primary sawmills, and employ less than 50 people. Of the firms engaged in custom service work it is significant to note that there has been a dramatic increase in the amount now being undertaken directly for the primary sawmills. In the 1970's the majority of their clients had been wholesalers but it appears that well over 50 per cent of their activities are now on behalf of the sawmills.

Though there have been very few new remanufacturers established in the past five years there has been a significant increase in the capacity of modern dry kilns at the remanufacturing level. There has also been a substantial change in activity. Some years ago the remanufacturing industry derived much of its profitability from the mistakes of the sawmills - even to the extent of buying mixed parcels of lumber and simply regrading more carefully. The sawmills are now being more precise and the remanufacturers must use greater ingenuity in their technology and marketing. There is a much greater variety of products manufactured, and markets accessed, than in earlier years.
The primary sawmill industries' dependence upon the U.S. housing market creates violent swings in demand and prices. The philosophy of increased throughput to lower per MFDM processing costs is becoming more difficult to achieve particularly with the limitation in the available resource. Consequently since growth cannot be achieved by increased volume it must be obtained by increased value.

Sawmills are primary breakdown units which are relatively inflexible in being able to meet diverse customer specifications. The traditional throughput philosophy is not consistent with the methods necessary to extract optimum value from the log. At the same time the high labour costs at B.C. sawmills make it essential that high throughput volumes are maintained.

Finding cost cutting measures with limited or no possibility to offset rising costs, including labour, is a concern to B.C. remanufacturers who find it difficult to automate due to production diversity and the need to move with the ever changing raw material availability and customer requirements.

Past labour and management attitudes and throughput practices however are not considered desirable in the context of remanufacturing where a cooperative atmosphere, flexibility in work scheduling and quality consciousness are paramount to success.

As commodity producers, B.C. sawmills have traditionally taken a commodity oriented approach to world marketing. This has proved successful during times of high demand and the industry has been able to weather the relatively short cyclical depressions. It now appears, however, that there has been a structural change in the markets. In the future, further diversification of sizes and grades will be required to meet changing needs for B.C.'s products. Furthermore, increased emphasis must be directed to extracting more value from the log as the economic alternative to offset rising costs.

Although there is a general recognition of the need for sawmills to search out alternatives to the commodity approach, there are many constraints that make changes difficult. Labour and management philosophies, costs of processing and limited manufacturing flexibility without extensive new capital investment all restrict change.

The B.C. forest industry image in, and approach to, export markets has been one of an industry primarily dedicated to the U.S.A. housing market and not one of an industry committed to long term customer service oriented requirements. As a result the industry has had limited exposure to the magnitude of end-uses and options available from both the Coast and Interior species.
Coast Operations

There is already a high degree of secondary manufacturing being carried out within B.C. on products manufactured from the cedar resource. In 1983, for example, the value of cedar pattern stock exported through B.C. ports was $85,000,000. However, it is in the major species group, hemfir, that the greatest challenge lies. In 1983 2.4 billion board feet of hemlock were produced. The great majority of this was sold as construction lumber at prices that show little or no profit. It is estimated that 400 million FBM of new "shop" material could be extracted from the logs that were processed. This quality of "shop" will require further processing outside the sawmill in order to develop saleable sizes and quality. It is in this stage of reprocessing and marketing that entirely new methods must be developed.

There are still substantial volumes of old growth virgin timber, which has taken hundred of years to grow, available for harvesting. This timber has the potential for extraction of significant volumes of quality suitable for millwork in addition to the clear/shop grades currently being developed. It should be emphasized that this timber is not a "renewable resource" in the context of the growing and harvesting cycles now being considered. Consequently, it is essential that while it exists the maximum value should be extracted.

In order to capitalize on this higher value opportunity significant changes are needed to production, remanufacturing and marketing practices. There are, however, a number of constraints that exist.

- Coastal sawmills have high manufacturing costs and cannot afford to slow down their operations to extract and remanufacture the products required by the consumers. Furthermore automatic sorting systems lack the flexibility to add new products.

- Production of basic sizes by primary producers for further processing outside the sawmill into a variety of components offers significant marketing opportunities worldwide but there will be a need for some new capital investment by either the primary or remanufacturing sectors.

- Many of the specific market niches that can be satisfied by the higher value item are relatively small. There have been cases in the past where the development of a specialty product by one mill has been emulated by several. Oversupply of the item has resulted in uneconomic prices and poor results for the companies that may have invested capital to pursue the programme.
The marketing of such products requires that a close relationship and mutual understanding be developed between producer and consumer. Traditionally B.C. producers manufacture in accordance with grade rules and tend to market through an extended distribution chain - wholesaler, importer, distributor, etc. This can make it difficult to fully develop the product really needed by the end-user (and which is worth more to him). Geographic distances are also a problem.

There is an acute lack of awareness of B.C. as a value-added service supply source. At the same time there are several commodity product opportunities which have diminished including the loss of green hemlock market share to S-P-F, eastern spruce and southern yellow pine. In addition significant in-roads have been made by non wood material (aluminum, plastic, fibreglass) into traditional wood markets.

On the Coast the major species, hemlock, can provide a high quality substitute for millwork and joinery items where some hardwoods and other softwoods are presently being utilized but are becoming increasingly more costly. On the other hand, hemlock is known for its kiln drying difficulties where uniform drying and elimination of wet pockets is an important millwork consideration. Bark seams and pockets, particularly in the abies species, are considered undesirable for appearance applications.

Commercial B.C. timber trade marketing functions are performed traditionally by major B.C. shippers and a few independent wholesalers. For the most part, the major shippers' marketing methods are structured for the distribution of commodities where relatively concise grading rules and traditional selling practices are well established.

Conversely, expertise and knowledge of specialty export sales, distribution methods, markets, end-uses and potential product applications is quite limited relative to the volume and variety of products which could be extracted from the "new shop" quality.

Exporters and wholesalers provide valuable services for remanufacturers in the form of export documentation, faster cash flow and general market comprehension. The need however, for remanufacturers and customers to have a direct understanding of specialty items, many of which do not relate to industry grading rules, is made more difficult when wholesalers, exporters or importers are not familiar with the specialized needs of their respective clients.
There is a general marketing shortfall in the area of remanufactured products in the sense that neither the primary/secondary production coordination nor the marketing/distribution methods are clearly established to logically extract more value from the resource.

- The remanufacturing industry sector, which tends to have a lower cost structure both for labour and overhead, has been reluctant, or unable, to expand to undertake the production of the products that could be developed. There are a number of constraints faced by the remanufacturers.

- They are often underfinanced and lack the "clout" to obtain sufficient capital to survive cyclical downturns or strikes.

- They are frequently too small to be able to afford the time and effort needed to access offshore markets.

- Remanufacturers' concentration tends to be production rather than marketing oriented insuring that machinery and people are operating efficiently. Limited time and insufficient promotion funds are available for intensive market investigation. Individual pioneering by remanufacturers is not only expensive but individual companies exploring new markets tend to be attracted only to those opportunities which fit their own production capabilities and manufacturing philosophy. Financing and the risk of export accounts receivable tends to lead remanufacturers to wholesalers rather than attempt to become proficient marketers as well as producers.

- They have little or no security of raw material supply. In the past there has been an atmosphere of peaceful co-existence between B.C. sawmills and local remanufacturers. The "local trade" has purchased what the mill develops in excess of, or below the grade of, what is traditionally exported. On occasions when export markets have been particularly strong, local accounts found themselves on a supply allocation list where limited or no supply was made available. Prices were dictated by world demand.

Today, with depressed markets and prices, the remanufacturing industry is being recognized by sawmills as not only a valuable customer, but also a service feature necessary to assist sawmills in their endeavour to extract more value from the log. It is to be hoped that this attitude will continue when markets improve.
Finally, the remanufacturer is restricted by the sizes and specifications made available to him by the sawmill. These often develop from sawmill programmes that are designed to meet the demands of the North American housing market or offshore markets. They are not necessarily ideal for the product that is to be produced.

The labour/management climate in B.C. and the risk of a strike or labour shutdown is a fear expressed by many remanufacturing firms who simply do not have the financial strength to continue operation under these devastating economic circumstances. This concern is perhaps the most significant reason most existing B.C. remanufacturing plants are reluctant to expand operations and perhaps the reason new potential candidates feel the risk/reward relationship makes the effort impractical. Foreign customers are also reluctant to place heavy dependence for a specifically developed product on a B.C. sawmill. Consequently they continue a production approach that is based on remanufacturing commodity material that is readily available from a number of sources.

The B.C. industry tends to be regarded as being primarily committed to the production of construction lumber.

**Interior Operations**

Though many of the Interior mills are very competitive and can operate profitably at low prices there are others which are having increasing difficulty in meeting the competitive demands of the current dimension lumber market. The challenge for these mills therefore lies in manufacturing at least some share of their production for markets other than the 2" dimension lumber construction market. Most of the mills harvesting cedar are already producing substantial volumes of sidings and panelling. The problem lies with the major species group - S-P-F.

The concept of a mixed species grouping has proved ideal relative to the production of commodity construction lumber but is a major constraint for almost any programme that involves the production of lumber for specific, higher paying, end-uses - with the exception of MSR lumber. For virtually every higher value potential market the segregation of the different species is essential. For treated wood stock it is vital since spruce does not retain preservative under current impregnation methods. Similarly for millwork or joinery, it is pine that is needed. On the other hand, sidings made entirely from spruce are preferable. A redwood joinery grade can command a substantial premium in Europe over carcassing lumber, but must be 100 percent pine. There is also growing interest in a whitewood joinery grade for which much of the old growth spruce logs could prove ideal.
The difficulty in segregating the species in log form due to space limitations, cost and so on and the uncertainty inherent in trying to grade by species the sawn lumber 'in line' are both major constraints. A further constraint is the marketing approach of Interior sawmills. As part of the need to minimize costs the marketing effort by Interior sawmills is small. Heavy reliance is place on wholesalers. This tends to discourage the development of close relationships between producer and consumer.

Growth at the level of the remanufacturer is also constrained since the primary breakdown of the logs almost entirely relates to the sizes of the U.S. construction market.

Most mills are only able to offer mixed species and sizes, grades, and drying tolerances which are unsuitable for the intended secondary manufactured items. In order to develop their business, some larger remanufacturing firms have found it necessary to saw logs to obtain proper material but at the same time face restrictions in their efforts to participate in log purchases.

**Secondary Manufacturing Industries**

It has been shown that, at present, this sector is heavily oriented to the local market and consumes relatively little B.C. softwood, apart from the industries related to construction. A major constraint is the variety of specifications and fashions demanded in export markets for finished consumer goods. Consequently the marketing effort needed in the different markets tends to be greater than can be supported by the individual small companies that tend to exist in the secondary manufacturing sector.

There are also constraints relative to the type of lumber that is available from local producers. For example, quality alder lumber is needed but, though the B.C. Coast has a substantial alder resource, so far few of the companies that have attempted to produce alder locally have survived. These have tended to be small and under-financed. A major new company, backed by the experience and capital of a U.S. company already in the alder sawmilling business, should commence operations in 1984. This company could have a major impact and result in some growth in secondary manufacturing based on B.C.'s forest resource. The advent and emphasis on remanufacturing for industrial and millwork applications could have the benefit of drawing further attention to high value opportunities for alder, birch and aspen which are not presently being harvested in quantity.

There is also a significant potential for pine furniture for sale in North America. Again the major constraint lies in the availability of suitably dried and graded lumber in the necessary dimensions. Some manufacturers have become very ingenious in their techniques of extracting the required components from regular commodity lumber but this is not necessarily the most economic approach.
A major constraint to growth for the great majority of the companies is their size. Any significant growth would depend on expansion into export markets. In order to be competitive in these markets the current, more traditional, artisan approach of custom designed products would have to be radically altered. Larger, capital intensive, automated plants would be required. At present it is only in the kitchen cabinet and door sectors that such plants exist.

External Constraints

Tariffs

There is a concern that products of a higher value incur a higher tariff in export markets. This is not necessarily a valid concern and depends on the nature of the work that is done to increase the value. Furthermore many of the tariffs are relatively low. For example, finger jointed lumber over 6' in length or edge glued lumber under 15" in width is free into the U.S. but even if it is under 6' or over 15" the tariff is only 1.9 per cent.

The tariff categories in the U.S. and how lumber in various forms fit into them are complicated. Relatively small differences in manufacture can have a significant impact on the amount of duty levied. For example, panelling in shrink wrapped bundles with a V-joint tongue and grooved profile is duty free if the end of each piece are cut square. However, if the pieces are end matched then the tariff applied is 6.2 per cent. Another, and more complicated, example relates to furniture.

| (a) | furniture grade lumber | free |
| (b) | furniture stock, even if profiled and cut-to-size (but not worked on the ends) | free |
| (c) | specific furniture components where part of the manufacture involves working the piece across the grain in some specific way | 8.9% |
| (d) | furniture, assembled or knockdown (except for chairs which are 6.5%) | 3.4% |

The critical element in this example is the difference between item (b) and item (c); the ruling is based on case by case interpretation by the customs authority and the manufacturer has to be very careful in the presentation, description and nature of the product shipped. It is also interesting to note that furniture itself bears a lower dutiable level than components.
The tariffs into the EEC for lumber also vary according to the nature of work that has been done on the product. However once the product has undergone any manufacture other than just sawing lengthwise, the differences in the various tariffs are relatively small. The levels that apply in 1984 are as follows:

- rough sawn lumber (whatever grade) free
- lumber that has been planed or profiled in any way 4.4%
- wood beadings and mouldings 4.7%
- builders' carpentry and joinery (includes doors and windows) 6.4%
- furniture or furniture parts (includes kitchen cabinets) 6.7%

Though any tariff has a direct effect on the competitive ability of a B.C. manufacturer it is clear that the levels of these tariffs do not constitute a major constraint. Fluctuation in exchange rates can have a far greater effect.

In Japan the principal tariff barrier relates to the species. Thus hemlock or Douglas fir lumber whether it is rough or planed and profiled is free whereas pine and spruce incur a tariff of 10 per cent. Tariff levels (1983) are as follows:

- Rough sawn lumber
  - spruce, pine, larch (up to 160 mm thick) 8%
  - hemlock, cedar, Douglas fir, sitka spruce free

- Planed and Profiled Lumber
  - spruce, pine, larch (up to 160 mm thick) 10%
  - hemlock, cedar, Douglas fir, sitka spruce free

- Mouldings and beadings 10.1%

- Builders carpentry and joinery (doors, windows, sashes) 3.8%
  (other) 5.3%

- Furniture and furniture parts 10%

Considerable efforts have been undertaken at a government level to reduce the specific barrier related to spruce and pine but it is believed that it is likely to be some time before this will be reduced significantly.
As in the case of the U.S. the nature of the product is critical. For example if hemlock is profiled and cut-to-size in a form suitable for sills and lintels and is defined as being specifically for that purpose it could incur 5.3 per cent tariff. As profiled lumber it would be free.

In all countries there is some element of tariff that can be incurred for lumber in varying stages of manufacture. A common belief is that the more highly manufactured the product the higher the tariff. This is not always valid and any manufacturer of a secondary product needs to study the regulations of the country in question carefully in order to decide on the level of remanufacture and the description of the product to be exported.

**Non-Tariff Barriers**

In addition to specific cost constraints such as tariffs there are also a number of less easily defined constraints imposed by importing countries. The principal of these are specifications but often they also relate to presentation, phytosanitary requirements and financial regulations. For most of the major markets, however, these constraints need not be a major factor.
5. OPPORTUNITIES

There are very significant growth prospects in the whole area of secondary manufacturing. The most significant of these, in the immediate future, lie within the primary sawmill and remanufacturing industry sectors. In hemlock alone it is estimated that approximately 400 million board feet per year could be moved out of green construction grades into higher value dried industrial grades. This would represent an increase in value of around $100,000,000 or about 2500 jobs after allowing for a return to capital invested.

The constraints or challenges involved have already been discussed but it is believed that the cooperative approach now being adopted by primary sawmills towards remanufacturers could allow a much closer relationship to be developed. One possible approach may be for sawmills to provide the initial breakdown and remove the cant immediately from the sawmill for processing and remanufacture into specific sizes by the remanufacturing industry.

Sawmills are well equipped to produce sizes intended specifically for further processing without interfering with basic throughput philosophies. Thus production costs can be minimized.

Remanufacturers have the expertise and can provide the attention to detail necessary to further process material for a wide variety of customer requirements. Furthermore they have a lower cost structure and the necessary flexibility to undertake these activities more economically than the primary sawmills.

Coordination of these complementary activities, combined with promotion and marketing efforts directed toward specialty rather than commodity markets, could bring about a high rate of success in efforts to obtain more value from the resource. Furthermore the stronger financial profile of the sawmills could allow the remanufacturers to work from a more secure economic base. This contrasts with the current underfinanced and underequipped approach.

It is interesting to compare the relationship between the U.S.A. primary/remanufacturing sectors, producing ponderosa pine, with present B.C. Coast sawmill/remanufacturing activities.

In the U.S.A. ponderosa pine sawmills market their production almost exclusively within the U.S. As much as 80 per cent of the log is cut into sizes specifically designed for further processing by remanufacturing plants. Many of these millwork plants employ over 200 employees with several employing in excess of 1,000 employees. The remanufacturing activities
include producing components by defect ripping, cross-cutting, finger-jointing, edge and face gluing and veneer overlayed parts. A variety of finished products are also manufactured falling into the general categories of doors, windows, frames, stair parts, mouldings and furniture. It is estimated that close to one billion fbm of material is processed annually by the 53 U.S. millwork companies who make up the majority membership of the National Woodwork Manufacturers Association.

By comparison B.C. remanufacturers produce approximately 65 million fbm primarily in hemlock and Douglas fir in either kiln dried special size industrial lumber, cut stock or finished product for one or more of the product categories described.

The U.S. pine sawmills produce sizes principally for further processing by remanufacturing plants and the balance is in boards or construction lumber for the U.S. market. Virtually all of the log is consumed in one form or another within the U.S.A. Equipment and methods employed by the U.S. remanufacturing sector are generally more technologically advanced than B.C. with substantial commitments having been made to capital investment for the production of very standardized finished or semi-finished product groups.

This approach contrasts with B.C. remanufacturing firms who must compete for raw material at the whim of world markets and use sizes which are not necessarily appropriate for further processing to match customer demands. On past occasions when export markets were particularly strong the "local" trade found themselves on supply allocations lists which had a dramatic impact on their ability to survive let alone plan for the future. Although, a glut of raw material exists today, local B.C. remanufacturing firms are still conscious of their fragile long term supply assurance and price stability.

In the U.S. pine remanufacturing field large capital investments are made in the knowledge that the raw material will be competitively available. Thus the company can search out new methods and markets to improve value through further processing. Fortunately, our B.C. primary industry, particularly on the Coast, is beginning to regard the secondary sector with more interest which may instill sufficient confidence for this sector to justify further investments and to create the initiative to develop its potential.

Certainly B.C. has the capability to participate as a more significant supplier not only to the U.S.A. millwork industry but several other countries who require high quality millwork materials which are available from the B.C. resource.
Hemlock

The sawmill industry is actively evaluating the opportunities in hemlock and is already commencing to develop programmes that will capitalise on the market opportunities presented by the quality of lumber that can be extracted from old growth hemlock. In many cases there is no need for any major capital investment; the principal requirements are change in production techniques and marketing approaches. Long term commitments in supply and greater price stability are necessary. Also vital is a change in the approach to quality control. Quality control procedures that have been adequate and economic for the production of commodity grades do not suffice for the types of industrial products being considered.

Contrary to the statements that are made both domestically and, more often, in export markets, it is strongly believed that the B.C. industry can undertake these necessary changes and, furthermore, is close to achieving major improvements in the returns for at least some part of the hemlock resource.

Some product opportunities relative to hemlock include:

- a variety of millwork grades and sizes for the U.S. as an alternative to the declining volumes of old growth ponderosa pine
- flooring
- component stock for windows in Europe
- ladder components in U.S. and offshore
- component stock for doors worldwide
- lumber for garage doors worldwide
- components for roller blinds and shutters in Europe
- furniture components where hardwoods can be replaced
- core stock for veneer overlay either in B.C. or by customers including finger-joint or solid components for Japanese shop and other moulding and finish work.

Note: see "specific product opportunities" for additional items.

Although these types of product opportunities are not a new "revelation" to the industry there is considerably more potential than is presently being achieved. Although sawmills are unable to manufacture specialty items without incurring high processing costs and residue items they are able to produce basic sizes for further processing. Because of their high profile position they also have access to markets and customer specialty requests. Many of these items could be attractive to remanufacturers in a cooperative approach with sawmills to satisfy specific customer needs utilizing basic primary material with each finding alternative outlets for developing items.

All these products, and many more, can be extracted from the part of the log that is currently being sawn into construction lumber. In a number of cases the necessary grades and lengths can be remanufactured from lumber that would otherwise be graded as #3 or Utility.
Hemlock has the quality and milling potential to replace many of the U.S.A. millwork items now using white fir. Hemlock is also capable of entering many areas which are price sensitive where it is not considered necessary to use the higher priced ponderosa pine. Sawing and grading differences are not considered major obstacles in the ability to cater to this major market potential.

At this time it is believed that the best opportunities lie in the production of component stock for the end consumers. It is apparent, however, that in most developed countries manufacturers of finished products are increasingly interested in obtaining their raw material in a form that is immediately useable. This allows them to dispense with the need to remanufacture lumber and to concentrate on the production and marketing of their product. At the same time, however, they cannot afford to commit themselves to a programme that depends on a consistent supply of precisely the right product until they are confident that such supply exists.

Components from both the Interior and Coast are a desirable complement to customers whose expertise and technology is in producing "finished" goods. Components are equally as important to export customers whose facilities are old and in need of expensive updating which could be reduced by incorporating semi-finished components into production. Many present large remanufacturing firms in export markets are beginning to seriously consider becoming assembly plants with components coming from raw material supply areas. Reduced waste and shipping costs, better inventory control, improved cash flow and efficiencies in production methods are all customer considerations leading to major supply opportunities from the B.C. remanufacturing sector. Quality benefits resulting from drying soon after production to reduce checks, splits and discoloration are also saleable benefits. As this activity expands the risk to customers will be reduced by virtue of having several supply sources available. This in turn will lead to increased component enquiries as the B.C. industry establishes supply credibility.

The B.C. industry, regrettably, does not have the image of a reliable, quality conscious, supplier. Consequently, all of the potential benefits mentioned above are presently insufficient to overcome customer concern about B.C.'s processing reliability and ability to provide consistent quality - on time - which is of paramount importance when importing components or semi-finished goods. It is believed that credibility is being developed as B.C. firms gradually increase sales of component stock. The next stage of development will be to supply the profiled cut to size components for direct assembly.
S-P-F

The principal opportunities for secondary remanufacture of the main species in the interior of B.C. depend upon the ability to segregate the species. There are already a few sawmills that are separating lodgepole pine and it is these mills that have been able to develop programs to supply some of potential industrial end users of that species.

There was a total of 15.5 million m³ of lodgepole pine harvested in 1983. At a lumber recovery factor of 200 bf/m³ this represents over 3 billion board feet. Clearly the great majority of this must continue to be sawn for, and sold as, construction lumber. At present, however, the proportion that is recovered and sold for industrial uses that command a higher value is less than 1 per cent. Yet a significant proportion of this lodgepole pine resource could be sawn into products that would be suitable for such uses. The volume of clear and shop is relatively limited though it is interesting to note that one interior remanufacturer purchasing rough green S-P-F boards (mostly lodgepole pine) is able to develop 10 to 15 per cent clear/shop. It is, however, in the portion of the lodgepole pine log that can develop sound tight knot material that the greatest potential lies.

Although lodgepole pine is stressed in applications for furniture and joinery work, there is also a very significant market for shop and better western white spruce which could be extracted from much of the larger old growth spruce. This is a whiter wood than hemlock and because of the closeness in character to European whitewood it quite probably would be a more desirable component than hemlock for window manufacturers in both Germany and Switzerland. This material is worth 2 to 3 times the value mills would normally expect from dimension lumber.

It is not known precisely how much of a sound tight knot quality could be extracted in the grades and sizes required but it is believed that an estimate of 10 to 15 percent would be a very conservative level. Many Scandinavian producers are able to extract up to 50 percent of high grades from their Scottish pine resource, which is essentially similar to the B.C. lodgepole pine. A remanufacturer in the southern interior has indicated that he is able to obtain up to 80 percent of a sound tight knot grade from lodgepole pine harvested in the south Okanagan and even in the northern interior around 50 percent can be obtained.

It is believed, therefore, that is must be realistic to assume a potential, from the resource point of view, of at least 500 million board feet of product that would meet the quality requirements of industrial users. This would represent an increase in value of over $100,000,000 or about 2500 jobs.
It should also be noted that the products need not necessarily only come from the prime stands of timber. Some manufacturers of panelling and furniture have found that they are able to obtain suitable raw material from very small mills operating under Small Business Enterprise programmes and even on a clean-up basis within the TFLs of major companies. These small companies supply suitable lodgepole pine cants from 3x3 up to 6x6 to the remanufacturers who then resaw and dry the lumber for use in panelling, furniture and so on. The sawing and drying techniques used, however, are substantially different to those utilised by the major dimension mills. It is questionable, therefore, whether the large mills could realistically be expected to produce these higher value industrial products without seriously affecting their production economics and these mills can only survive by keeping costs to the bare minimum. The solution may be, therefore, with a closer relationship between the major mills and the remanufacturers—as is suggested is already developing on the Coast.

An important side effect to channelling even a relatively small proportion of the resource into markets other than those for dimension lumber is that the volume of dimension lumber is reduced. The problems faced currently by the forest industry relate directly to oversupply. The demand for dimension lumber in 1983 and 1984 was as strong as can reasonably be expected for many years in the future. Prices, however, have been so poor that the industry has been enjoying what has been called "profitless prosperity" as the mills "produce themselves into oblivion". A reduction in volume can only have a beneficial effect.

It appears clear that the potential, from the resource point of view, exists. It is in the market however that greater uncertainties exist. Many of the potential consumption areas are effectively untested or are of questionable depth.

Joinery Grades for Europe

It is known that redwood (pine) joinery grades from Scandinavia enjoy premium prices in Europe and the redwood resource is declining as a share of total resource availability. During the past decade, particularly at times of cyclical downturns, there have been many trial shipments of lodgepole pine from B.C. to determine whether this would offer a suitable substitute. Despite comments that it is 'whiter', doesn't machine as well and has too many bark ringed knots, it has been generally agreed that a properly graded and manufactured product would have a place in the market. However, apart from a few exceptions, these trials have not been followed up by strong and consistent sales efforts. The U.S. markets have improved or the mills have found that the additional costs incurred would not justify the programme.
There is therefore a cynicism at the level of the European user about the long term intentions of the B.C. suppliers. This can be overcome and very significant volumes could be sold. The total market volume for lumber of better than construction quality in Europe is in the region of 1 billion board feet. Consequently substantial volumes could be exported from B.C. without appreciably disturbing the supply/demand price relationships—particularly bearing in mind that Scandinavian redwood supply is becoming tighter.

A specialty opportunity exists for 7' components for the door and doorframe industry in both lodgepole pine and western white spruce provided they are segregated. This may well be a viable alternative to the traditional and volatile stud market and offers export customers a service in a specified length not easily obtained from either Scandinavian or Russian suppliers.

Panelling

This market has had a high profile in the past five years and many companies became involved. The market did not prove to have the depth to absorb all the new production and there was considerable oversupply. Even now, with many of the companies having ceased the production of panelling, the need for just one B.C. producer to reduce inventory recently caused a 20 percent drop in prices.

It is believed, however, that this market does have long term potential for pine since consumer tastes appear to be moving away from the less expensive, imitation wood, 4x8 panels. Consequently market growth is likely and a more controlled, less headlong, approach could offer excellent potential for obtaining the sale of a pine product worth very substantially more than construction lumber. An essential is a strong marketing and distribution effort.

Furniture and Furniture Stock

About 20 percent of the sales of one large furniture chain in Canada is in products utilising sound tight knotted pine. At present half of this is manufactured in Canada from lodgepole pine specially remanufactured in B.C. This is just one chain marketing a particular type of product. In the U.S. there has been a dramatic growth in high quality unfinished furniture. It is claimed that in 1984 the sales value of unfinished furniture in the U.S. will reach close to $1.5 billion. Almost half of this is pine furniture of which well under half demands clear lumber. The balance is manufactured with sound tight knotted pine—most of it coming from eastern pines and ponderosa pine.
In addition to this specific furniture sector there is also a considerable volume of finished pine furniture produced in California--again much of it using sound tight knot material. There are even greater amounts of pine furniture produced in the southeast U.S. However, it would be more difficult for B.C. products to compete in that region.

Though, theoretically, secondary manufacturers in B.C. could develop pine furniture products, suitable for the U.S. and possibly overseas markets, it is felt that the more immediate potential lies in the development of grades and sizes that would meet the requirements of furniture manufacturers. Subsequent development would include the sale of suitable blanks and components.

It should be emphasized that this is not a market that will be easy to access. The customer base and the channels of distribution are very different to those currently utilised by the B.C. lumber industry.

Home Centre Items

There has been a significant development in recent years in the demand for edge glued products. These are found in home centres throughout North America, and increasingly in Europe, for use as shelving or a variety of home handyman projects. They are also sold in package form for easy assembly into furniture units. There are already some manufacturers producing these items in B.C. but it is believed that this product line may have a very substantial potential. The development of more highly automated plants to produce edge glued lumber would allow this product to compete more effectively at the retail level.

The above comments describe some of the areas that could be developed as markets for remanufactured products or grades that could be developed from the pine resource--if this is segregated. It should also be noted that there are other possibilities for obtaining a higher value than regular commodity lumber.

Treated Lumber

A dramatic increase in consumer interest for wood in exterior applications has evolved in the past years. Cedar which has been the traditional species used outdoors is diminishing in supply and is too costly for many of the new items. Consequently there has been much greater recognition of the benefits of treated wood in other species for foundation construction and various outdoor applications. A substantial part of the growth is in totally new uses for lumber.

Growth of this segment has been very rapid particularly in the past few years. It is estimated that 250 million fbm of treated material was used last year in Western Canada alone.
In the U.S.A. 3.3 billion fbm of material was treated in 1983, 80 per cent of which was southern yellow pine which does not require incising to achieve acceptable penetration and retention of the preservative. According to SFPA (Southern Forest Products Assn.) estimates, around 30 per cent of membership production was sold for treating.

Hemlock and lodgepole pine are considered more treatable than the firs and spruces and are used fairly extensively within Canada for fence posts, preserved wood foundations, decking, landscape materials and a number of other exterior applications where a preservative will extend the life of the product.

A variety of proprietary names are used to describe treated wood including "all weather wood", "outdoor wood", "wolmanized", "stormwood", "cedartone" and "sunwood". Some of the trademark names offer limited product guarantees for 20-40 years.

Because the industry has grown so rapidly, time has not permitted the introduction of formal association or industry standards of treating in Canada except for preserved wood foundation applications where CSA standards apply and regular testing is done at the treating facility.

In some instances treating plants do not have adequate processing equipment to treat material to a degree where it performs to an acceptable standard for exterior use. Many species, including hemlock and lodgepole pine, require incising in order to reach the depth and preservative retention for effective treatment. It is also desirable that material first be kiln dried or air dried under 25 per cent mc. In practice however much of the material is neither dried nor incised. Some Interior mills attempt to promote treated lumber based on a guaranteed minimum 90 per cent pine; in some cases even 60 per cent pine is quoted. Often drying, incising or species segregation is eliminated to save costs in a competitive market. Incising is considered an undesirable appearance factor particularly for applications such as decking and other products where aesthetics rather than extended wood life is considered more important.

The growth of treated lumber is expected to continue at a strong rate and it is not unreasonable to expect that double the present volume will be used within the next 6 to 8 years.

Southern yellow pine is an ideal species for treatment and it will undoubtedly fill a portion of the growth demand particularly in eastern regions. It is also possible to ship kiln dried southern yellow pine to the midwest for treating in order to increase market share in the west.

There is an equally attractive opportunity for both lodgepole pine and hemlock from B.C. to expand activity in this growth area, particularly in the western states. It will be necessary for Interior mills to segregate the lodgepole pine species to cater to this potential.
It may be advisable for Coast hemlock mills to develop a product line perhaps for the decking market in 2x4 and 2x6 S4S vertical grain "appearance grade" KD to 25 per cent or less. This would provide the market with a high line item with the benefit of less nail splitting or raised grain. At the same time it provides a volume alternative to lessen reliance on the regular dimension market.

There are 48 licenced treating plants in Canada many of whom are associated with The Canadian Institute of Treated Wood located in Ottawa. This association provides technical information, health and safety standards, advertising and other services to its members. The institute is in the process of developing quality assurance and optimum minimum treating requirements for the industry. Promotion of these standards is expected to increase consumer awareness and reduce some of the existing confusion. This could be a decided benefit in assisting professional efforts by Canadian suppliers to gain market share and to promote features and benefits of both lodgepole pine and hemlock as durable exterior products.

Treated lumber must, however, be approached in a responsible and professional manner to avoid doing great harm to the long term development of this potentially valuable market.

**Mechanical Stress Grading**

Though this cannot be regarded as secondary manufacturing, unless lower visual grades are being trimmed or resawn to obtain a proportion of higher value MSR grades, it is nevertheless an additional process in the course of manufacturing which results in a higher value for the lumber. It is believed that, in the long term, there will be a substantial increase in the use of mechanical grading. New building regulations resulting from new design concepts and, possibly, the results of the in grade testing programme may enhance the economic advantages of this approach to grading.

**Boards and Small Dimensions**

Though boards can normally be regarded as part of the primary production process in fact there is a relatively small proportion of boards produced by the interior mills. The prices that can be obtained are higher than for 2" dimension lumber but production costs are also higher. It is not believed, however, that the size of the market for general purpose commodity boards would permit any very substantial increase in the production of S4S boards at the primary processing level. On the other hand, at the remanufacturing level where more specific products fitting particular consumer needs can be developed, possibly including defect trimming and finger jointing, a greater potential exists. There are already some companies, both sawmills and independent remanufacturers, who have developed sales to the bed frame and mobile home sectors.
Pallets and Pallet Stock

Though this industry sector is essentially based on very low value lumber nevertheless there is a significant amount of value that is added. Furthermore, it is one of the few sectors within the secondary manufacturing industries that appears to be expanding at present. It is understood that there is a significant trend amongst U.S. pallet manufacturers to purchase cut to size pallet stock rather than lumber. The cost of transporting waste is no doubt a consideration that is leading to this change. The pallet manufacturing industry in the U.S. is very large and claims to be "the second largest growth industry in the U.S." Though much of the lumber consumed is low value domestic hardwoods there is probably over 2 billion board feet of softwood lumber consumed. Even though much of this market may be inaccessible to a remanufacturer located in B.C. nevertheless even 10 to 20 percent represents a substantial market opportunity to increase the value of economy grades of lumber. Spruce has some particular advantages since companies shipping their products any distance wish to reduce the pallet weight as much as possible.

Some "specific product opportunities" not being produced to a major extent in B.C. include:

<table>
<thead>
<tr>
<th>Species</th>
<th>Quality</th>
<th>Size</th>
<th>Est. Annual Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Western white spruce</td>
<td>#3 shop &amp; btr. K.D. 12%</td>
<td>7/8 x 3 1/2</td>
<td>7-10 million fbm</td>
</tr>
<tr>
<td>Western white spruce</td>
<td>Shop/clear K.D. 12%</td>
<td>2 3/4 x 3 1/2 FOHC</td>
<td>7-10 million fbm</td>
</tr>
<tr>
<td>Douglas fir</td>
<td>#1 shop &amp; btr. Green or K.D.</td>
<td>2 1/4 x 2 1/4</td>
<td>10 million fbm</td>
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<td>Select common Green or K.D.</td>
<td>2 1/4 x 2 1/4 FOHC</td>
<td>15 million fbm</td>
</tr>
<tr>
<td>Lodgepole pine</td>
<td>Select common K.D. 12%</td>
<td>3 1/4 x 3 1/4 FOHC</td>
<td>5 million fbm</td>
</tr>
<tr>
<td>Lodgepole pine</td>
<td>Select common K.D. 12%</td>
<td>4 1/4 x 3 1/4 FOHC</td>
<td>7 million fbm</td>
</tr>
<tr>
<td>Hemlock</td>
<td>#3 Shop &amp; btr. K.D. 52S</td>
<td>1 5/16 x R/W</td>
<td>25 million fbm+</td>
</tr>
<tr>
<td>Western white spruce &amp; lodgepole pine (segregated)</td>
<td>Select common K.D. 19%</td>
<td>Various dimen. 7' length only - for doors, door-frames and mouldings</td>
<td>4 million fbm</td>
</tr>
<tr>
<td>Material</td>
<td>Grade</td>
<td>Dimensions</td>
<td>Quantity</td>
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<td>---------------------</td>
<td>-----------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>Hemlock or Douglas fir</td>
<td>#4 Clear &amp; btr.</td>
<td>1 3/4 x R/W</td>
<td>3 million fbm</td>
</tr>
<tr>
<td></td>
<td>flat grain</td>
<td>7' only</td>
<td></td>
</tr>
<tr>
<td></td>
<td>K.D. or green</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Western white spruce or lodgepole pine (seg.)</td>
<td>Select common</td>
<td>1 x 3 &amp; 4 -</td>
<td>6 million fbm</td>
</tr>
<tr>
<td></td>
<td>K.D. 19%</td>
<td>3'-8' Alt. R/L</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5/8 x 2-3'-8'</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Alt. R/L</td>
<td></td>
</tr>
<tr>
<td>Hemlock</td>
<td>Select common</td>
<td>2x4 VG S4S R/L</td>
<td>15 million fbm+</td>
</tr>
<tr>
<td></td>
<td>appearance</td>
<td>2x6 VG S4S R/L</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Grade dimen.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>K.D. 15%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**The Potential for Value and Volume Increase**

There are substantial differences between the value of high grade lumber and the regular construction grades. This applies both to the highest value export clear grades and the lesser quality shop grades. An analysis of price differentials between construction lumber and higher value grades is shown in the following graph.
The top line represents the additional value in $/1000 for export clear compared with export merch grades. It is evident that there is a very substantial difference and apart from cyclical fluctuations, this difference has been growing. The bottom line shows the differences in the U.S. between #3 shop grade and construction. This, of course, is a much lower quality than clear but nevertheless the additional value is significant and is growing.

There is no detailed statistical information available on the volumes of material presently being extracted that is of higher value than traditional construction-oriented grades produced by the forest sector. Based on information from COFI and discussions with a number of individual companies, it would appear that the production and value of these grades presently being extracted would be approximately as follows:

<table>
<thead>
<tr>
<th>Species</th>
<th>Volume MMBF</th>
<th>Average $/MBF</th>
<th>Total Value $ million</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hemfir</td>
<td>350</td>
<td>550</td>
<td>192.5</td>
</tr>
<tr>
<td>Douglas fir</td>
<td>65</td>
<td>600</td>
<td>39.0</td>
</tr>
<tr>
<td>Cedar</td>
<td>350</td>
<td>580</td>
<td>203.0</td>
</tr>
<tr>
<td>S-P-F</td>
<td>50</td>
<td>310</td>
<td>15.5</td>
</tr>
<tr>
<td>Other (Sikta, Y. cedar P. pine)</td>
<td>30</td>
<td>500</td>
<td>15.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>465.0</strong></td>
</tr>
</tbody>
</table>

Note: Cedar and SPF includes a number of higher value specialties in tight knot material whereas fir and hemlock figures primarily reflect clear/shop quality.

It is quite conceivable that the higher value opportunities detailed earlier, based on a significant change in the current relationship between the primary and re-manufacturing sectors, could develop a dramatic increase in the volume of lumber including specialty sizes, grades and components which are presently produced in and are sold at prices in the Common or Merch grade categories.

Estimates of recoverable clear wood fibre or in the case of the Interior furniture quality, European sizes and pressure treated pine which is now included in shipments of "Common" lumber, indicate that the following volume per species could find higher value levels than presently being experienced.
Additional Value which Could Be Extracted from Construction Grades

<table>
<thead>
<tr>
<th>Species</th>
<th>Quality to be extracted for</th>
<th>Quantity million BF</th>
<th>Average Selling Price as construction</th>
<th>Potential(^1) Sales Price</th>
<th>Value of Potential Sales $ million</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hem</td>
<td>new shop &amp; short clear cuttings for treating</td>
<td>400</td>
<td>$240/m</td>
<td>$400/m</td>
<td>160</td>
</tr>
<tr>
<td>Fir</td>
<td>short clear</td>
<td>200</td>
<td>$240</td>
<td>$290</td>
<td>58</td>
</tr>
<tr>
<td>Cedar</td>
<td>short clear and select tight knot</td>
<td>80</td>
<td>$240</td>
<td>$450</td>
<td>36</td>
</tr>
<tr>
<td>SPF</td>
<td>Pine for European sizes for treating</td>
<td>300</td>
<td>$180</td>
<td>$390</td>
<td>117</td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td>10</td>
<td>$200</td>
<td>$300</td>
<td>3</td>
</tr>
</tbody>
</table>

Total 507

\(^1\) based on input volume.

As shown, the most significant value added opportunity exists on the Coast, specifically in hemlock, and the lodgepole pine potential in the Interior.

Most joinery applications require lengths under 10 ft. with the majority of end-use lengths in the 2 to 7 ft. range. On the Coast sawmills do not traditionally extract these lengths in production nor do they selectively cut back longer length merch material containing these short clear cuttings. In the Interior utilizing a different production approach for both the furniture and joinery quality, increased value is also possible for these same short length customer requirements.
Summary of Opportunities

The emphasis of the analysis of opportunities has been on hemlock and specific species with the S-P-F group. It is these species that represent the greatest volume of the harvest. On the coast, cedar is the next most important species. Secondary manufacturing of cedar has already developed well and some major companies have already adopted the approach whereby they carry the remanufacture of their product as far as possible; either with their own facilities or on a custom service basis by remanufacturers.

Douglas fir, though the origin of the coastal lumber industry, now only represents 10 to 15 percent of the coastal harvest. Many of the opportunities identified for hemlock also exist for Douglas fir and, indeed, there is already a significant volume of the higher value specialty products being sawn and remanufactured from this species. The nature of the Douglas fir in the interior is such that the resource contains much less of the quality that would be suitable for industrial consumers. Consequently, though some opportunities may well exist the potential is significantly less. Now that the official strength values for Douglas fir in visual grades are no better than those for S-P-F the potential economic benefits of mechanical grading Douglas fir could become more attractive since many of the pieces can grade to high strength values.

The volumes of sitka spruce and yellow cedar are small. These species are, however, highly valued in offshore markets. The prices that can be obtained for logs or lumber in primary form have been such that most mills have so far not found it economic to remanufacture these species into even higher value products. There has also been considerable resistance from buyers in Japan whose operations depend on the very sophisticated further breakdown of the raw material obtained from B.C. of sitka spruce and yellow cedar the total potential volume is much more limited than in the main species.

It is believed that very significant volume opportunities exist to obtain a greater value from the B.C. resource by additional manufacturing either at sawmills, or by remanufacturers, or some combination of both. It is estimated that the total value of high quality material that could be extracted would be close to $1 billion—approximately double the current level—and over 5000 jobs could be developed directly. In addition, of course, there would be a substantial amount of indirect employment induced by this new activity.

The forest industry sector, including both sawmills and remanufacturers, is already aware of many of the opportunities and very conscious of the need to develop the necessary programmes.
Public sector initiatives and incentives are essential in order to encourage the orderly development of these programmes. Investment is needed in modern dry kilns and the development of some additional remanufacturing facilities. The total capital needs, however, are not large in comparison with the investment already in place in the sawmills.

The opportunity for any major expansion of the secondary manufacturing industries producing specific products is believed to be substantially less than that which exists for the forest sector. It is possible, however, that the greater availability of raw material suitable for industrial consumers could encourage the development of more industries within B.C. These would have to be based on the potential for export since the domestic market is small. This represents a substantial change from the current activity of the great majority of the companies included in this sector.
A number of opportunities have been discussed in the previous section of the report. The terms of reference for this study did not include any fundamental, new, market research, consequently many of the areas discussed are already common knowledge and others are known to at least a few. Some are already being developed but it is believed that much more can be done at all levels--industry, government and labour--to dramatically improve the dollars earned from the resource.

The following suggested approaches are put forward with the intention of promoting further discussion and evaluation by all parties.

**Research and Development**

The amount of research and development work on solid wood products undertaken by the forest companies in the private sector is limited to very few companies. Forintek, funded by the forest industry, both levels of government and by contract fees, has an annual budget of about $11 million. This is only 0.1 per cent of the revenue for the wood industries. Even with the addition of company research and development, in-house or contracted, it would appear that the level of expenditure is very low in comparison to other industries. For example, in the petroleum industry product R & D is between one and two per cent of revenue. Furthermore, apart from fundamental research on totally new products, the bulk of the effort relates to the activities of the primary industries. The remanufacturers tend to be unsuited, both financially and philosophically, to a research and development activity. Yet there are a great variety of new technologies and new equipment being developed worldwide which could prove of great significance to the remanufacturing industry.

Some of the areas that need evaluation for B.C. would include new drying technologies, new treating methods, thin kerf sawing for small dimensions, defect chopping, new gluing and finger jointing approaches and so on.

The cost, in terms of commitment and capital, of evaluating the benefits of new technologies and equipment can be high - too high for an individual remanufacturer. Furthermore, the remanufacturer does not have the technical expertise to undertake controlled research. A purely research oriented evaluation, for example, by Forintek, would, however, still leave unanswered questions relative to commercial and economic application.

It is believed that the public sector could provide some valuable assistance in this area by sponsoring the evaluation of new technology and equipment in a cooperative manner. A tentative outline of the approach to be taken could be:
- The initial capital cost of the new equipment is funded by the public sector.

- The remanufacturer installs the equipment in his facility and provides the operating work force.

- Forintek provides technical assistance to the remanufacturer relative to the utilization of the equipment.

- Forintek develops a research programme which allows an evaluation of the technical results of the product processed.

- The remanufacturer develops a sales programme for the products.

- At the end of a given period of time, which could vary according to the nature of the equipment, an evaluation is undertaken
  - by Forintek to determine the technical suitability for B.C. species
  - by the remanufacturer to determine the economic benefit.

- A report would be prepared for distribution to interested parties.

- At the end of the project the remanufacturer would have the option to purchase the equipment at some agreed percentage of the original capital cost. If the programme was successful he would presumably wish to continue. If the equipment ultimately proved unsuccessful, either technically or economically, then at least the results will be known and no other remanufacturer would incur the cost of pursuing the technology.

- The initiative for developing the programme could come either from Forintek or the remanufacturer and would clearly depend on a conviction by all parties that the technology has some real potential for success.

The benefits of such an approach would be that new technologies would be evaluated both technically and commercially and the cost of the evaluation, which could be of ultimate benefit to the whole industry, would not be borne by just one company.
Wood Supply

A significant proportion of the raw material utilized by the secondary manufacturers, particularly in the Interior, comes from timber harvested under the Small Business Enterprise programme. In some cases the manufacturer obtains the raw material from small processing companies qualifying under Category 2; in others the secondary manufacturer qualifies as Category 2 and undertakes the total activity from log to product.

Within the Interior the volumes of the AAC apportioned to Category 2 in 1983 was small, at 2.3 per cent of the AAC in Timber Supply Areas. The Category 1 volumes were substantially greater at 7.5 per cent, however it appears that much of this volume goes to the larger dimension mills where the primary objective tends to be to produce for the U.S. construction market.

Discussions with companies involved in secondary manufacture in the Interior indicate that the Small Business Enterprise Program is a vital ingredient of their ability to operate. The sizes of much of the material they need do not fit into the sizes of lumber currently cut at most sawmills. In their opinion an expansion in the apportioned volume for Category 2 would allow greater activity in the development of smaller companies with the flexibility and cost structure to obtain greater value from the resource. At present the competition for this Category 2 volume is said to be so intense that the stumpage prices are far in excess of the upset stumpage levels.

It should be emphasized that a detailed investigation of this aspect was not undertaken nor was any analysis of the implications of increasing Category 2 apportionsments. It would appear, however, that this is an area where there may be room for some public sector initiative that could encourage greater value from the resource. If it is true that the small secondary manufacturers are sufficiently innovative to be able to operate profitably paying high stumpage levels then it would seem that such encouragement would be very appropriate. A detailed evaluation is required.

Marketing

Coast mill cutting practices have evolved based on traditional markets for volume shipments in sizes which are compatible for both high and lower grades developing, i.e.

**Thickness of Cut Off Headrig**

<table>
<thead>
<tr>
<th>If mill cuts for</th>
<th>1 3/4&quot;/2&quot;</th>
<th>21/4&quot;</th>
<th>3&quot; and 4&quot;</th>
<th>5&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>clear or factory</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>grade of:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Must have standard</td>
<td>2&quot;, 1 7/8&quot;</td>
<td>21/4&quot; or 3&quot; and 4&quot;</td>
<td>not a &quot;common&quot; size</td>
<td></td>
</tr>
<tr>
<td>size merch or</td>
<td>1 3/4&quot; or</td>
<td>take count or take loss and reproc-</td>
<td>therefore select only highest</td>
<td></td>
</tr>
<tr>
<td>common orders</td>
<td>S4S ALS/</td>
<td>ess loss to lower size</td>
<td>quality cant</td>
<td></td>
</tr>
<tr>
<td>for:</td>
<td>CLS</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Since only approximately 15% of the log will yield clear material, it is easy to understand the reluctance of a sawmill to accept an order for say, 3 3/8 x 7 and 9 R LIST Factory Flitch, without a back up order of shop or lower grade in the same size, and possibly other developing sizes, to be sure this residue is not left behind. This type of constraint typically represents the reason primary producers are unable to take advantage of some of the higher value potential. They have limited flexibility to allow for a greater variety of specifications.

The traditional export industry standards, sizes and governing grading rules, although somewhat outdated in terms of present log quality, economic value considerations and customer specification requirements, are well established and known throughout the export distribution path.

There is a tendency by the established export distribution network to take a customer "non standard" enquiry and translate this back into known industry standards which are understood, otherwise a general lack of interest is shown. This is due to the perceived inability of the manufacturer to cater to the customers' non-standard needs.

Although COFI are developing new rules which are intended to address the more practical present needs of both manufacturer and end user, it does not resolve the sawmills basic falldown or residue difficulty as "non standard" or "specialty" customer grades and size specifications increase in demand.

Transmission of a non standard enquiry may be handled thus:-

"I need 50m 1½ x 3 1/16VG 3' to 12' clear kiln dried or 3 3/8 x 7"x9" green factory flitch"

(a) "Regret", "Unable" ("We don't make these sizes")
or (b) "Can't accept without your agreement accept developing falldown items"

The response may come from any segment of distribution as past experience on "specialty" enquiries results in similar residue constraints.
It is becoming more difficult for coast mills to find profitable large volume markets worldwide that will accept both the high and the low grades that result from the present manufacturing approach. It is therefore becoming more important for the coast industry to adopt a more service oriented and less traditional approach to markets.

Utilizing the cooperative services of both primary and remanufacturing expertise may have the effect of diversifying production to meet changing customer requirements. Cooperation at the supply source would enable marketing and distribution functions to represent their customer/manufacturer client interest in greater depth.

"We need to extract more value from logs and assist customers by providing specifications closer to their finished size and grade requirements"

**Information Flow**

Some coast mills are experimenting with outside custom services to produce specialty items, but find the accumulation of developing residue items a problem to sell. On the other hand, the strength of the remanufacturers is their proficiency in developing new ways of manufacturing residual items from their prime production in order to efficiently utilize the inbound raw material. In many cases, this involves taking wood apart and reconstructing by face and/or edge glueing and/or finger jointing to obtain defect free material of the highest quality. As the old growth timber resource continues to diminish, these manufacturing processes and technologies will of necessity become more commonplace.

Economies of scale in remanufacturing favour the smaller firms. Flexibility, quality and a cooperative working atmosphere are important ingredients in this sector, which tends to be more labour intensive than primary. Combining the efficiency of sawmill log processing with the attention to detail of the remanufacturing sector is an area of cooperation worthy of further exploration.
Developing a cooperative relationship, where remanufacturers are able to rely on assured supply, builds confidence in investment in the secondary processing sector. This security would encourage the potential of obtaining additional market share through innovation and development of new products.

On the coast, it may be practical for sawmills to produce the "new shop" quality in the form of cants for further processing by remanufacturers. In the interior the same approach to selected lodgepole pine cants may provide the opportunity for further processing into metric sizes, grades and drying tolerances acceptable to the joinery and furniture industries. In both cases it provides an opportunity to develop long term market plans with a stable raw material supply.

**Incentives and Initiatives**

There are already a number of programmes at both the federal and provincial levels which are designed to encourage industrial and export development. It has not proved possible to obtain reliable data but it is widely believed that the forest sector does not take maximum advantage of these programmes. Furthermore many do not appear entirely appropriate for the type of activity and investment needed to capitalise on the opportunities for secondary manufacturing. The small entrepreneurial remanufacturer is either unaware of them or is reluctant to get involved with the bureaucracy. The COMDP programme, until very recently, has been largely devoted to the promotion of B.C. commodity grades and products.

Some government actions worth considering would be:

- companies that appear to have the potential to develop product lines of higher value should be encouraged to explore the possible benefits of existing programmes. Emphasis should be on the development of closer relationships between producer and user, i.e. contributing to the costs of incoming buyers and of market trips.

- the COMDP programme should be continued with greater emphasis being given to the products that can develop from remanufacturing.

- the public sector could prepare investment promotion packages for industrial development opportunities in remanufacturing. The objective would be to encourage joint venture participation from export markets, particularly where the foreign investor has expertise in the production, marketing or use of the product line to be developed in B.C.

- the forest industry currently lacks sound and reliable knowledge of how the lumber is being used (even in Canada). Whenever a piece of lumber leaves B.C. the industry should be aware of precisely how it is handled and into what products it is remanufactured. Such analysis is expensive and would more appropriately be funded by Government for the information and benefit of all.
There are a great variety of actions by all sectors that could help encourage greater development of secondary manufacturing and thus a greater value from the resource. The specific points addressed above are only some of the possible actions that could be taken. What is certain is that some major thrusts should be developed in the near future. The future health of the industry depends on taking advantage of the opportunities that exist.